A mixed-methods investigation of the extent to which routinely collected information can help evaluate the implementation of screening and brief alcohol interventions in primary health care.

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Abstract

Background: UK health policy has sought to encourage alcohol screening and brief intervention (ASBI) delivery in primary care, including via pay-for-performance (P4P) schemes. To measure the impact of such policies, a range of data exist, including General Practitioner (GP) Read codes, which record all clinical activity. However, previous studies have highlighted the difficulties of using Read code data for evaluation purposes, with concerns around the distorting effect of P4P on healthcare recording. Against this background, this research investigated whether Read code data can be used to provide a meaningful measure of ASBI implementation in primary care.

Methods: Sequential mixed methods design, comprising: (1) systematic literature review to identify what factors influence the recording of routine clinical data by UK primary care physicians; (2) analysis of ASBI Read code data from 16 GP practices in North East England; (3) 14 GP interviews to explore the barriers and facilitators affecting their ASBI recording.

Results: (1) Multiple factors shape primary care physicians' recording of routine data, including structural influencers (such as the design and resourcing of the coding system), and psychosocial factors (including patient characteristics and physicians' perspectives on their role as care-givers). (2) 287 Read codes exist to record alcohol-related activity however only a small minority are used regularly, generally relating to the identification of alcohol use disorders. Whilst many unused Read codes are associated with relatively rare alcohol conditions, a significant number relate to duplicate or outmoded terminology. Overall, practices associated with higher recorded rates of key ASBI service indicators were signed up to P4P schemes. (3) GP interviews suggested that across all practices, nurse-administered ASBI components were most likely to be provided and coded consistently, with GP-delivery and recording activity far more ad hoc.

Conclusion: Whilst routine data may be a valid indicator of more successfully embedded ASBI activity in UK primary healthcare following the introduction of P4P schemes, measuring the impact on delivery at GP level remains challenging due to the deficiency of the available Read code data across a number of quality dimensions.

Publications and presentations arising from this thesis

O'Donnell A, Anderson P, Newbury-Birch D, Schulte B, Schmidt C, Reimer J & Kaner E. "The impact of brief alcohol interventions in primary healthcare: A systematic review of reviews". Alcohol and Alcoholism. 2014. 49 (1): 66-78 (published) (see Appendix P)

O'Donnell A. & Kaner E. "Chapter 35: Screening of High Risk Drinkers", In Alcohol: Science, Policy and Public Health, Boyle, Boffetta, Zatonski, Lowenfels, Brawley, Burns and Rehm (Eds). 2013. Oxford University Press, Oxford (published)

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O'Donnell A, Haighton K, Chappel D, Shevills C & Kaner E. "Can routine data help evaluate the implementation of a brief alcohol intervention in primary health care?" 36th Annual Scientific Meeting of the Research Society on Alcoholism. 22nd to 26th June 2013. Orlando, USA (poster presentation, abstract published in Alcoholism: Clinical and Experimental Research 2013; 35(S6): 149A)

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1.1 Risky drinking: a global concern

1.1.1 Social, economic and health impacts of alcohol consumption

Alcohol is a significant risk to public health (1), and globally represents the fifth leading cause of morbidity and premature death after high blood pressure, tobacco smoking, household air pollution from solid fuels and a diet low in fruits (2). An intoxicant, affecting a wide range of structures and processes, alcohol consumption is causally related to over 230 International Classification of Disease Version 10 (ICD-10), disease codes (3, 4). This includes both those diseases in which alcohol consumption is a necessary cause (such as alcohol-use disorders, alcoholic liver disease, and alcohol-induced pancreatitis), plus those in which alcohol plays a contributory role (such as diabetes, cardiovascular disease, and accidental and intentional injury) (5-7), particularly in terms of its carcinogenic effects (8).

According to Rehm et al (3), health and well-being is affected by two different dimensions of alcohol consumption. First, the average volume of alcohol consumption, which has been linked to more than 60 disease conditions, including mental and behavioural disorders, gastrointestinal conditions, cancers, cardiovascular diseases, immunological disorders, lung diseases, skeletal and muscular diseases, reproductive disorders and pre-natal harm (9, 10). Second, patterns of drinking, in particular episodes of heavy drinking, linked mainly to two categories of disease outcome, acute effects of alcohol such as accidental and intentional injuries, and cardiovascular outcomes (11). However the socio-economic context in which alcohol is consumed, and the demographic characteristics of individual drinkers themselves, also influence outcomes. For example, the proportional impact of alcohol is larger in younger age groups, mainly due to the increased risk of alcohol-related injuries, and globally, alcohol-attributable mortality rates for men are about 5.2 times those for women (4). Further, epidemiological data confirm that the disease burden is greatest in socio-economically deprived and / or marginalised people, with rates of alcohol-attributable mortality higher in developing than in developed countries, relative to the volume of alcohol consumed per head (4). Recent evidence also suggests that the presence of other people during consumption may enhance some of the subjective and

behavioural effects of alcohol, in particular, drinking in the presence of another intoxicated individual (12).

Whilst the vast majority of the health effects of alcohol consumption are negative, with a clear and quantifiable dose–response adverse relationship (4), some evidence suggests there may be positive effects of light regular drinking on both ischaemic cardiovascular diseases and diabetes mellitus (3, 13), resulting in the so-called 'J-shaped' curve (14). It is important to emphasise, however, that available epidemiological data demonstrate these beneficial effects apply only to men over 40 years, and post-menopausal women (15, 16). Moreover, given that the category of non-drinkers includes both lifetime abstainers and ex-drinkers, there is also some evidence to suggest that the observed protective effect may be due to the fact that some drinkers quit drinking as a result of health reasons and are therefore more vulnerable for mortality over the longer term, thus contributing to the higher risk observed in abstainers compared to moderate drinkers(17, 18), (the so-called 'sick-quitter' hypothesis) (19). In addition, the degree of heterogeneity in effect size leads others to dispute the causality of a cardio-protective quality of light regular drinking, given the unknown confounding effect of other heart disease risk factors, such as education, income, physical activity or smoking (13, 14, 20). Finally, irrespective of these concerns, it remains the case that any such potential protective properties are far outweighed by the detrimental effects of alcohol on disease and injury overall (21).

Further, although the aforementioned alcohol-related health impacts are indeed substantial, there are additional wider social and economic consequences, which extend beyond the individual drinker to their families, local communities and indeed society as a whole. Alcohol consumption, especially heavy episodic drinking, is associated with fewer years in formal education (22), and ultimately educational underachievement (23, 24). In the workplace, it increases the risk of unemployment, absenteeism and presenteeism, and can lead to disciplinary problems and low productivity (25, 26). Heavy alcohol consumption is also associated with family disruption (27), child abuse and neglect (28), with homicide, crime, and drink driving fatalities (29-31), and is a contributory factor for risky sexual behaviour, sexually transmitted diseases and HIV infection (32, 33).

The key question would seem, therefore, is there a 'risk-free' level at which alcohol can be consumed? Here, however the research literature diverges, with varied evidence available about what constitutes lower-risk alcohol consumption (27, 34), including those who suggest that in fact there is no safe limit as far as alcohol consumption and cancer risk is concerned (35). Alcohol consumption at a dependent level (with dependence defined as repetitive problems, affecting three or more areas of life, including a strong desire or compulsion to use alcohol, inability to control use, withdrawal from and tolerance to alcohol (5)) is widely accepted as being associated with major physiological consequences and life impairment (36). Further, Rehm et al have demonstrated that heavy (though not necessarily dependent) use – defined as drinking in excess of 60 grammes of alcohol per day for men, and 40 grammes for women – is responsible for the majority of alcohol-related mortality and morbidity (37). In addition, as implied earlier, the pattern in which alcohol is consumed, is also an influencing factor (38) (for example, drinking 10 drinks on 3 days a week is more harmful than 5 drinks 6 days a week (39)).

Finally, it is also the case that what constitutes lower-risk alcohol consumption will vary for different population groups. Currently in the UK, government guidance is that adult men should not regularly drink more than 3-4 units of alcohol a day, and adult women should not regularly drink more than 2-3 units a day (where one unit = 8 g (10 ml) of pure alcohol). Further, after an episode of heavy drinking (defined as consuming more than double the daily unit guidelines for alcohol in one session), it is also advisable to refrain from drinking for 48 hours to allow tissues to recover (40). However a recent report of the House of Commons Science and Technology Committee has highlighted the need for clearer, evidence-based guidelines for specific population groups such as younger and older people, and pregnant women (16). For example, research published by the Royal College of Psychiatrists in 2011, suggested that a 'safe limit' for older people would be substantially lower than younger adults at 11 units per week for men aged 65 and over, or seven units per week for women (41).

However, whilst there is a recognised continuum of both alcohol consumption and harm (42, 43), the damaging effects of alcohol consumption are evident at much lower levels than heavy or dependent level use, with any alcohol consumption over 10g per day associated with higher overall mortality (27). In fact, a recent modelling exercise

conducted with UK consumption data by Nicholls et al, suggested that a reduction to no more than 5g a day would provide the optimum level of reduced chronic diseased mortality in England (34). Importantly, epidemiological data have shown that the majority of alcohol-related problems that occur in a population are not due to the most problematic drinkers, generally individuals with alcohol dependence, but to a much larger group of hazardous and harmful drinkers: this is known as the preventative paradox (44-47). Hazardous drinking is consumption at a level, or in such a pattern, that increases an individual's risk of physical or psychological consequences (48), whilst harmful drinking is defined by the presence of these consequences (49). The paradox comes from the fact that whilst dependent drinkers experience the most alcohol-related harm compared to other types of drinkers on an individual basis, society as a whole incurs more damage from a larger group whose members each experience less severe problems themselves, at least for the majority of their drinking careers (50). Against such evidence, the simple 'take home' message is probably that abstinence represents the most effective approach to minimising risk. If adults choose to drink however, less is better, and limiting consumption to no more than 20g of alcohol per day will keep the lifetime risk of dying from an alcohol-related condition to less than one in a hundred (51).

1.1.2 Recent changes in global alcohol consumption trends

Whilst drinking alcohol has been a long-standing practice in human societies (26), with archaeological evidence showing the existence of fermented beverages as long as 12,000 years ago (52), the past thirty years has witnessed some significant changes in global consumption patterns. In particular, although the amount of alcohol consumed overall has remained relatively stable over the past few decades, there has been an increase in higher-risk drinking behaviours. These include an increased prevalence of both drinking at hazardous levels, and heavy episodic drinking, described by Room as the consumption of five or more drinks (or more precisely, 60g of alcohol (53)) on a single occasion (54)), especially amongst young people (4). A number of factors have been suggested as contributing to these increases in consumption amongst younger drinkers, including the relative affordability, availability and accessibility of alcohol (55), alongside changing social norms relating to the perceived *acceptability* of certain drinking behaviours (56). These trends have profound consequences for public health,

both in terms of the short-term increased risk of morbidity and mortality from alcohol-related accidents and injuries, but also in respect of the longer term implications for the development of problematic drinking practices in later life (52). This trend in alcohol consumption patterns is also significant for health service provision as empirical evidence shows that the preventive paradox is most pronounced in populations where heavy episodic drinking (commonly known as binge drinking) is a common component of hazardous or harmful drinking (57, 58).

At the same time, it is important to emphasise the fact that there is considerable variation in the burden of alcohol-related disease experienced by different countries. High abstainer rates in Islamic countries, and in the Near East, mean that there are relatively low levels of alcohol-attributable harm (27). Conversely, excessive drinking presents a significant risk to public health in more developed countries [8, 9], and Europe, in particular, has the highest impact of alcohol, accounting for 6.5% of deaths, and 11.6% of DALYs (Disability Adjusted Life Years) in 2004 (27). Within Europe overall per capita consumption of alcohol is relatively stable, however, again, this conceals significant variation between countries (26, 27), even between those with relatively similar genetic backgrounds and cultures (34). Although average alcohol consumption has indeed fallen in a number of European countries since the 1970s (Italy, France, Spain for example) (59), it has risen in others (such as Finland, Iceland and Ireland) (26).

1.1.3 The scale and impact of risky drinking in the United Kingdom

In the UK, whilst the average alcohol consumption (as measured by annual sales) is slightly lower than the overall European average (10.2 litres in comparison to 10.7 litres per person) (60), recent decades have witnessed a rise in more problematic patterns of alcohol consumption overall (21), alongside increased levels of drinking amongst new sections of the population (women, middle- and older- age groups, and younger adolescents (aged 11-13) (61)). In 1986, for example, the UK had a similar drinking culture to other Northern European countries such as Sweden, and broadly similar liver disease death rates. The most recent World Health Organisation (WHO) liver death rate for Sweden, however, was 5.3, whereas in the UK it had more than doubled from 4.9 to 11.4 (59). In England, despite a long-term downward trend in the

proportion of adults who reported drinking in the previous week, almost a quarter of men and around one in five women continue to drink above recommended levels (62).

Further, there is significant variation at a regional level in terms of the level and pattern of alcohol consumption. In the North East of England, for example, 2009 synthetic alcohol estimate data suggest that 30.1% of drinkers aged 16 and over reported heavy episodic alcohol consumption ('binge' drinking), compared with just 14.3% in London (63). Further, the North East also shows a higher prevalence of hazardous or dependent alcohol consumption, and higher rates of alcohol related death and poor health, compared with the rest of England (64-66). The problem of heavy episodic drinking has worsened in recent years in the North East, especially for female drinkers (64).

The harmful effects of excessive alcohol consumption on the physical, psychological and social health of individuals, families and communities, and the rising costs to the NHS, the economy, the criminal justice system and social care have been well-documented (67-70). For individuals, as discussed earlier, the health risks associated with harmful alcohol use are manifold. Balakrishnan et al estimate that alcohol consumption was responsible for 31,000 deaths in the UK in 2005 (representing 5% of all deaths), and for 10% of all disability adjusted life years in 2002 (male: 15%; female: 4%) alone (71). As Table 1 demonstrates, the number of hospital admissions attributable to alcohol was over 1.22 million in 2011/12, a 139% increase since 2002/03 (72).

Table 1: Alcohol-related NHS hospital admissions in England based on primary and secondary diagnoses: 2002-03 to 2011-12[1]

	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012
Acute	63,500	69,400	75,400	83,900	85,300	88,100	90,500	94,200	96,100	94,300
Chronic	363,800	403,700	456,200	524,000	579,900	630,800	698,400	785,400	880,200	919,200
Mental & behav. disorders	83,400	97,000	113,000	128,100	136,900	144,700	156,500	177,400	192,000	206,800
Total	**510,700**	**570,100**	**644,700**	**736,000**	**802,000**	**863,500**	**945,400**	**1,056,900**	**1,168,300**	**1,220,300**

[1] Lifestyle Statistics. Statistics on Alcohol: England, 2013. London: Health and Social Care Information Centre, 2013.

However, the consequences of the UK's problematic relationship with alcohol also carry a tangible financial price tag. In England, estimates for the annual cost of alcohol-related harm range from £20 billion to £55 billion (73, 74). Again, there are regional variations, but conservative estimates put the annual cost of alcohol consumption to the North East in the region of £950 million to £1 billion alone (75). This of course includes costs to the health service: the latest government figures suggest that the overall annual cost of alcohol-related harm to the NHS is approximately £2.9 billion at 2008/9 prices (76, 77). However more recent research using 2006–07 data, has estimated that £3.3 billion of total NHS costs (over £43 billion) were due to alcohol-related ill health (78).

There are also wider costs incurred by society as a result of excessive alcohol consumption, such as the impact of heavy drinking on crime, and in particular the strong link between heavy drinking and violent crime including domestic violence (73). Indeed, the 2008/9 British Crime Survey (79) reported victims believed the offender(s) to be under the influence of alcohol in nearly half (47%) of all violent incidents. The Prime Ministers Strategy Unit (PMSU) estimated the overall annual cost of crime and antisocial behaviour linked to alcohol to be about £7.5 billion (73) (figure since revised upwards to £8 billion taking into account rises in the Retail Price Index (RPI)) (77). In addition, there are costs to businesses due to alcohol-related employer absence: a report by the Cabinet Office estimated that sickness absence because of alcohol among both alcohol-dependent and non-alcohol dependent employees was around 17 million working days per year (80). Based on Chartered Institute of Personnel and Development survey data (81), the National Institute for Health and Clinical Excellence (NICE) calculate that employee absenteeism costs related to alcohol-use disorders are £1.7 billion (77). There are also less immediately tangible costs associated with presenteeism with employees underperforming but in work as a result of heavy drinking (82).

1.2 Preventing and treating hazardous and harmful alcohol consumption

1.2.1 Tackling alcohol-related harm in the UK

Growing recognition of both the harmful effects of alcohol consumption, and the rising associated costs (83), have ensured that responding to alcohol-related harm has become a major public health priority in recent years, both internationally and within

the UK (84). Indeed whilst not a new concern for Governments (see the work of the Temperance League movement in Victorian England for example (85)), the period from the late 1990s onwards has seen an increased focus on addressing the health, social and financial impacts of drinking. The Labour Government of 1997-2010 introduced an *"unprecedented"* proliferation of laws, regulations, guidance documents and policy statements on alcohol (86). In part, these policy directives focussed on tackling the health-related consequences of alcohol consumption, for example in the 1998 publication, *Saving Lives: Our Healthier Nation* (87), and subsequently in *The NHS Plan* (88) and *Choosing Health* (89). However, there was also a strong preoccupation with addressing alcohol-related crime and disorder on the part of the new Labour government, arguably the main driving force behind the reformed licensing laws in 2003 (90).

The publication of the Labour administration's *Alcohol Harm Reduction Strategy for England* in 2004 (73) can be seen as a milestone in the development of national alcohol policy, marking the first concerted (if not entirely successful) attempt to bring together government interventions to prevent, minimise and manage alcohol-related harm (91). In addition to a focus on improving treatment for harmful and dependent drinkers, this reflected a stronger emphasis on the importance of prevention and public health measures on the part of the Government, evidenced by commitments: to improve education and communication around 'alcohol misuse'; to tackle alcohol-related crime; and to work more effectively with the alcohol industry itself. Importantly, under the thematic area of improving health and treatment services, the findings of the Alcohol Needs Assessment Research Project were published (92), alongside various guidance documents on the provision of effective alcohol treatment services (67, 93, 94). Importantly, the Alcohol Needs Assessment Research Project found extremely low levels of identification, treatment and referral of patients with alcohol use disorders by GPs in primary care, despite higher levels of awareness of alcohol-related problems in comparison to previous studies (92). Further, the project highlighted considerable regional variation in the levels of alcohol related need, and in turn, availability of specialist agencies to provide appropriate care (92). In particular, the study determined that despite the fact that the North East of England demonstrated some of the highest rates of people with alcohol-use disorders, it was

particularly poorly served in terms of alcohol treatment agencies, resulting in the highest regional Prevalence Service Utilisation Ratio (PSUR) in England, with only one in 102 (1%) of alcohol dependent people accessing treatment in a year (92).

Three years later, the Labour Government published their revised Strategy: *Safe. Sensible. Social*, which sought to *"build on the foundations laid and lessons learned since 2004"* (91). In doing so, the Strategy focused on three key areas. First, it aimed to ensure more effective use of the laws and licensing powers which had been previously introduced to tackle alcohol-fuelled crime and disorder, protect young people and bear down on irresponsibly managed premises. Secondly, it sought to *"sharpen the focus"* on the minority of drinkers who cause or experience the most harm to themselves, their communities and their families (specifically, young people under 18 who drink alcohol, 18 to 24-year-old binge drinkers, and harmful drinkers (95)). Third, the Strategy emphasised the need for a joined-up approach, whereby the various groups / agencies involved (police, local authorities, prison and probation staff, the NHS, voluntary organisations, the alcohol industry, the wider business community, the media and local communities) would work together to shape an environment that actively promotes sensible drinking. This new requirement for local actors to produce area specific strategies was an important development in the alcohol policy framework, particularly as it was underpinned by a Public Sector Agreement (PSA 25), meaning there was now *"a delivery plan and focussed targets around reducing harms caused by drugs and alcohol"* (86).

However, despite Labour's increasing focus on alcohol, the approaches outlined above were strongly criticised. A 2010 report from the House of Commons Health Committee went so far as describing the continued alcohol-related problems as reflective of a *"failure of will and competence"* (68). For example, commentators argued that the complex nature of the policy framework governing alcohol at both the national and local level had resulted in conflicting and diverse agendas. A study by the Alcohol Education and Research Council focussed on the example of the inherent contradictions present in Labour policies around the night-time economy, where a local level desire to market urban centres as cultural and leisure zones, the need to promote liberal licensing legislation and the concern to tackle potential public order issues, all conspired to work against each other (86). Further, a *"stark discrepancy"* (96)

was highlighted between the findings of research on effective methods of alcohol control, and the policy measures actually introduced under Labour. In particular, it was argued that the need to foster good relations with the alcohol industry resulted in an undue focus on the responsibility of the individual consumer, through policing and enforcement activity (86).

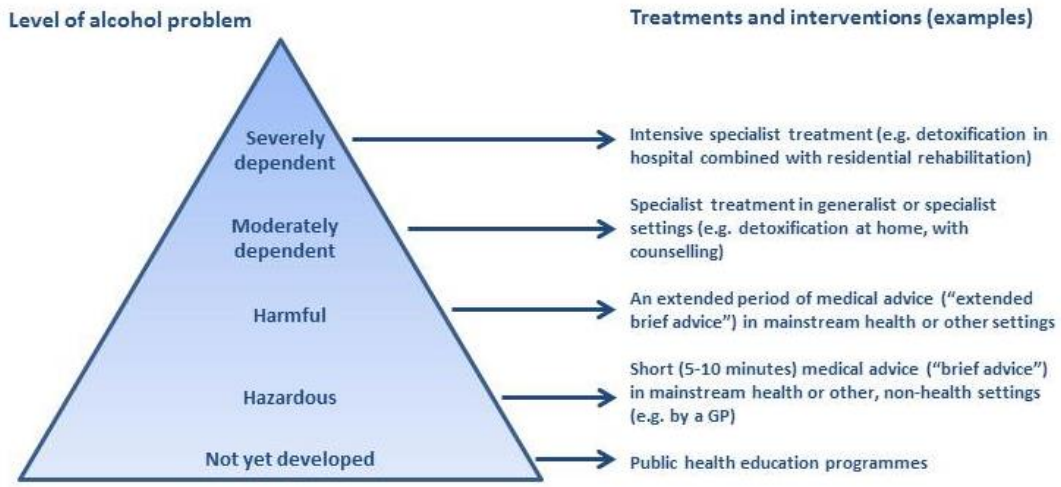
More recently, following their election in 2010, the Coalition Government announced their intention to review alcohol taxation and pricing (97), along with changes to licensing legislation as part of the 2011 Policing Reform and Social Responsibility Act (98). When published in 2012, the UK Government Alcohol Strategy (99), appeared to deliver on early promises to strengthen supply-side controls, comprising greater powers for licensing authorities and the introduction of minimum unit pricing, a potential landmark in British policy (100). In addition, the Strategy proposed consultation on the limited introduction of a 'public health objective' for local authorities, a review of alcohol consumption guidelines and greater enforcement of the Responsibility Deal adopted in 2011 by the alcohol industry (101). At the same time, although there was initially relatively positive feedback (102), concern was expressed that the strategy represented an essentially individualistic approach to tackling alcohol-related harm, in particular in relation to its failure to acknowledge the wider impact of excessive drinking on children and families; its focus on crime rather than health (100); and despite assurances around the Responsibility Deal, the perceived continued influence of the alcohol industry on UK policy formulation (103). The failure to progress the implementation of minimum unit pricing since 2012, has done little to allay such fears, raising concern that there remains a lack of political will to introduce population level interventions to tackle excessive drinking, in spite of significant evidence in favour of such measures (68, 96, 104)

1.2.2 The 'triangle' of treatment options

A range of interventions exist for the prevention and treatment of heavy drinking at present, from health promoting interventions aimed at tackling hazardous and harmful drinking, to more intensive and specialist treatment for severely dependent drinking (105). Figure 1 below illustrates the main alcohol treatments and interventions currently available to policy makers and health practitioners. As the scale indicates, dependent level alcohol consumption represents a much smaller proportion of the

drinking population in comparison to hazardous and harmful drinkers. Thus, according to the aforementioned preventative paradox (46), it has been argued that the greatest impact in addressing alcohol-related harm at a population level is likely to be achieved by focussing on this larger group of hazardous and harmful drinkers. However, it needs to be acknowledged that individual drinkers may move between categories of alcohol problem over time, and the boundaries between categories are not clear-cut. Further, it is also important to acknowledge more recent evidence from Rehm et al which demonstrates the significant contribution of heavy drinking to alcohol-related mortality (77% of all deaths). As such, and given the dose-response relationship of alcohol consumption and related harms, Rehm suggests that greater health gains can be achieved with a 10% reduction from a dependent drinker than from a 10% reduction from a hazardous or harmful drinker (37)

Figure 1: The range of alcohol treatments and interventions



(Adapted from the 2008 NAO report Reducing Alcohol Harm (105))

In recognition of the high prevalence of hazardous and harmful level drinking, recent policy approaches have included a strong emphasis on public health measures aimed at raising awareness of the negative impacts of alcohol at population level. Examples include school based interventions aimed at reducing drug and alcohol use in children; community-based programmes (such as increased enforcement of licensing); mass media campaigns highlighting the harmful effects of excessive alcohol consumption (106); and family and individual level interventions (107). However, whilst acknowledging a general lack of robust evaluation data on many of these intervention approaches, what little evidence is available suggests that public and school-based

education and information programmes do not consistently lead to sustained changes in drinking behaviour (108-111), and in fact, are likely to be ineffective if pursued in isolation from other preventative measures (112). In contrast, there appears to be stronger scientific support for both the better regulation of alcohol marketing, particularly in relation to its effects on adolescent drinking (113), and for measures to reduce the relative affordability of alcohol through taxation and minimum pricing (114, 115).

Within the multi-stranded approach described above the health sector itself has a clear role to play in delivering specialist, intensive treatment for severe and moderately dependent drinkers [30]. However, generalist health settings also offer a prime opportunity for effective preventative work, with primary care seen as an ideal context for the early detection and secondary prevention of alcohol-related problems, due to its high contact-exposure to the population [54], and the frequency with which excessive drinkers present to primary healthcare practitioners [55]. In particular, screening and brief intervention (SBI) for alcohol has emerged as a cost-effective preventative approach (116), which is relevant and practicable for delivery in primary care settings (93), where patients tend to present with less acute symptoms, return regularly for follow-up appointments (117) and often build long-term relationships with their GP (118).

1.2.3 Screening patients for risky drinking

Screening and brief alcohol intervention comprises two key elements. First, an essential pre-requisite of any intervention, is the process of screening a patient to help identify those individuals drinking in a potentially hazardous or harmful way. Screening is defined as tests done among apparently well people to identify those at an increased risk of a disease or disorder (119). Those identified are sometimes then offered a subsequent diagnostic test or procedure, or, in some instances, a treatment or preventive medication. Thus, screening is not the same as diagnostic testing, which establishes the actual presence of a disorder. Rather, screening is often used to indicate if early stage risk or harm is present, and act as a precursor to preventive intervention to avoid the development of more serious future problems (120).

There is a wide range of alcohol screening tests and approaches available to practitioners, which vary in their degree of accuracy, intrusiveness, and acceptability to

practitioners and patients (121). These tests include a number of biomedical markers of alcohol use such as mean corpuscular volume, gamma-glutamyl transferase (GGT), carbohydrate deficient transferrin (CDT), and the ratio of aspartate aminotransferase (AST) to alanine aminotransferase (ALT). However such biomedical markers generally only identify those patients with long-term use in whom secondary symptoms have already occurred, and thus perform significantly better in clinical populations as opposed to community settings where high sensitivity is required (122). In addition, certain laboratory tests can pick up pathologies unrelated to alcohol (such as liver disease due to obesity) and they can be affected by several medications (123). Further, urine, blood, and breath tests are all relatively unreliable indicators of different levels of alcohol use, particularly early stage problems, since alcohol is metabolized quickly and is unlikely to be detected in body fluids (124). As a result, biomedical markers have a relatively limited role to play in the detection of hazardous and harmful drinking in primary healthcare settings. However, there is some support for their use as a supplementary screening measure (125), or for monitoring following intervention (126).

As an alternative to the biomedical markers described above, educated guessing based on clinical experience may identify some users, but this approach is heavily dependent on the practitioner's attitudes and experience. Structured interviewing, although arguably a more consistent approach, is both time-intensive to deliver, and requires a level of training and monitoring that is impractical in most clinical settings. Therefore the most effective method for detecting high-risk drinkers has been found to be via a validated, standardised questionnaire-based screening tool, generally designed to be administered face-to-face, patient-to-provider. Importantly, their standardization permits uniformity in administration and scoring across interviewers with diverse experience, training, and treatment philosophies. In addition, questionnaire-based screening is less costly than laboratory analysis; and is far less intrusive and more acceptable to patients. Crucially, in medical practice, standardized questionnaires have been found to have a greater sensitivity and specificity than biomedical markers (121).

A number of questionnaire screening tools exist, and for practitioners selecting an appropriate screening instrument, it is vital to choose a test that will both accurately detect alcohol problems and be practical to deliver (127). Screening test

implementation can be affected by: the age (128-134), ethnicity (129, 135) and gender (136, 137), of the target population; the means of administration ("pen and paper" versus interview or computer-based forms of inquiry); and the level of training required for test delivery. In addition, some self-report screening questionnaires are more effective at detecting recent or lower level risk drinking whilst others are more appropriate for screening longer-term chronic alcohol abuse or dependence (131, 138). A further debate concerns the relative merits of two different approaches to screening: universal screening, aimed at all patients attending a setting; and targeted screening, aimed at groups of patients with a higher likely risk of drinking-related risk or harm. Some research has shown that targeted screening is preferred by both practitioners and patients for reasons of efficiency and salience respectively (139). However, universal screening, if practicable, has the obvious advantage that high-risk drinkers are less likely to be missed (140). The relative (cost-) effectiveness and acceptability of universal versus targeted screening are the focus of on-going research (141, 142).

Overall, however, a consistently good performance is reported for the ten question Alcohol Use Disorders Identification Test (AUDIT) (121, 143). AUDIT was the first screening tool designed specifically to detect hazardous and harmful drinking in both primary and secondary care. Importantly this contrasts with, for example, the CAGE screening tool, as it identifies not just all those harmful drinkers likely to be picked up by the CAGE, but also hazardous drinkers who have not yet reached that level of harm, and may therefore be more receptive to brief interventions (144). Developed by the World Health Organisation (WHO), AUDIT has ten questions that consider drinking frequency and intensity (binge drinking), together with experience of alcohol-related problems and dependence (see Table 2). At a score of eight or more out of a possible 40, its ability to detect genuine excessive drinkers (sensitivity), and to exclude false cases (specificity), is 92 % and 94 %, respectively (145). Thus AUDIT is a highly accurate tool which has been validated in a large number of countries with consistently strong psychometric performance (129). It is now regarded as the 'gold standard' screening tool to detect hazardous and harmful drinking in primary care patients.

Table 2: Alcohol Users Disorders Identification Test (AUDIT)[2]

Questions	Scoring System					Your Score*
	0	1	2	3	4	
1. How often do you have a drink that contains alcohol?	Never	Monthly or less	2-4 times per month	2-3 times per week	4+ times per week	
2. How many standard alcoholic drinks do you have on a typical day when you are drinking?	1-2	3-4	5-6	7-9	10+	
3. How often do you have 6 or more standard drinks on one occasion?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
4. How often in the last year have you found you were not able to stop drinking once you had started?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
5. How often in the last year have you failed to do what was expected of you because of drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
6. How often in the last year have you needed an alcoholic drink in the morning to get you going?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
7. How often in the last year have you had a feeling of guilt or regret after drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
8. How often in the last year have you not been able to remember what happened when drinking the night before?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
9. Have you or someone else been injured as a result of your drinking?	No		Yes, but not in the last year		Yes, during the last year	
10. Has a relative/friend /doctor/health worker been concerned about your drinking or advised you to cut down?	No		Yes, but not in the last year		Yes, during the last year	

***0-7 = sensible drinking; 8-15 = hazardous drinking; 16-19 = harmful drinking; 20+ = possible dependence**

Nevertheless, at ten items, AUDIT may be considered to be too lengthy for use in regular screening activity. Further, in primary care, approximately four out of every five patients tend to screen negative for hazardous and harmful drinking. Thus practitioners need a more time-effective detection method and so several shorter versions of AUDIT have been developed, including:

- **AUDIT-C** – the first three (consumption) items of the full AUDIT. A score of five plus indicates hazardous or harmful drinking (146).

[2] 143. Saunders JB, Aasland OG, Babor TF, de la Fuente JR, Grant M. Development of the Alcohol Use Disorders Identification Test (AUDIT): WHO Collaborative Project on Early Detection of Persons with Harmful Alcohol Consumption II. Addiction. 1993;88:791-804.

- **AUDIT-PC** – the first two (consumption) questions of AUDIT, plus items four, five and ten which focus on alcohol-related problems and possible dependence. A score of five plus indicates hazardous or harmful drinking (147).
- **Fast Alcohol Screening Test (FAST)** – a two-stage screening procedure based on four of the original AUDIT items. Item three is asked first and classifies over half of respondents as either non-hazardous or hazardous drinkers. Only those not classified at the first stage go on to the second stage, consisting of AUDIT items five, eight, and ten. A response other than 'never' to any of these three items classifies the respondent as a hazardous drinker (148).
- **Single Alcohol Screening Questionnaire (SASQ)** – "When was the last time you had more than 'x' drinks in one day?" (where x = five for men and four for women (USA values), eight for men and six for women (UK values)). Possible responses are: never; over 12 months; three–12 months; within three months: the last response suggests hazardous or harmful drinking (149).

These short instruments are quicker to administer than AUDIT, but are generally less accurate than the longer tool, and do not all clearly differentiate between hazardous, harmful and dependent drinking. Nevertheless, a recent review reported that these shorter tools have relatively good psychometric properties, with AUDIT-C in particular nearly as accurate as the full version (150). Thus, a pragmatic approach for practitioners may be to use AUDIT-C as a pre-screening tool to quickly filter out negative cases; administering the remaining seven AUDIT questions to the smaller pool of cases to provide an accurate and differential assessment of alcohol-related risk or harm (121).

1.2.4 Brief alcohol interventions

The second key component of screening and brief alcohol intervention concerns the delivery of a brief preventative intervention. Originating in the field of smoking cessation (151), these interventions aim to detect alcohol problems at an early stage, when they are most amenable to adjustment, to promote positive behaviour change (152), and thus avoid the development of more serious future problems in an

individual (120). Grounded in social cognitive theory (153), brief alcohol intervention is concerned with supporting positive behaviour change in individuals to help reduce risk or harm linked to drinking. Brief intervention draws on a fundamentally social concept of learning and behaviour (154) and operates from the perspective that all activity results from a dynamic and reciprocal interaction between an individual, his or her actions and the physical and social environment. Thus, drinking behaviour is influenced not only by an individual's attitudes towards alcohol, their knowledge about its risks, and perceptions of its reinforcing effects; but also by the attitudes of family members and friends towards drinking, and the patterns of use within social groups (50).

Brief intervention comprises two broad modalities. First, simple structured advice in the form of personalised feedback on how to address problematic drinking behaviour and/or avoid its adverse consequences, which are typically short in duration (5-10 minutes). Second, extended brief intervention, using counselling techniques such as motivational interviewing, which are generally around 20 to 30 minutes in length (155). Further, brief interventions have been delivered either in a single appointment or a series of related sessions which can last between five and 60 minutes overall. Whilst brief interventions for non-treatment seeking populations (that is, those whose risk is opportunistically identified, and who are not consciously seeking help for alcohol-related problems) tend not to exceed five sessions in total, those aimed at more problematic drinkers can involve more sessions and include a wider variety of counselling techniques (including cognitive behavioural therapy, motivational enhancement therapy and motivational interviewing) (50).

However, whilst the content and delivery style of brief intervention may vary, at their core, all modalities are designed to promote awareness of the negative effects of drinking and to motivate change (68). Thus, important components of brief alcohol interventions include drawing out individuals' beliefs and attitudes about drinking, their self-efficacy or sense of personal confidence about changing their drinking, and a view about how their drinking sits in relation to other people's drinking behaviour (normative comparison) (50). These core elements of brief alcohol intervention are based upon 'FRAMES' principles (156):

Feedback: provide feedback on the individual's risk from their drinking

Responsibility: be clear that the individual is responsible for change

Advice: provide advice on risk reduction or gives explicit direction to change

Menu: provide a variety of options or strategies for behaviour change

Empathy: deliver advice or counselling using empathy and avoid judgment

Self-efficacy: encourage optimism about the scope for behaviour change

From the first study of the effects of opportunistic brief intervention carried out in Malmo, Sweden in the early 1980s (157), over three decades of research has been undertaken both locally and internationally to develop these simple technologies to assist with the identification of individuals at risk from their alcohol consumption, and the delivery of short, cost-effective interventions in community and health care settings. Across a series of systematic reviews, covering a total of 56 unique primary healthcare-based randomised controlled trials, it has been consistently reported that brief alcohol interventions are effective at reducing hazardous and harmful drinking in primary healthcare (158-176). Weekly alcohol consumption is the most commonly reported outcome, and meta-analysis by Kaner et al. showed that compared with control conditions, brief intervention reduced the quantity of alcohol drunk by an average 38 g per week (95% CI (confidence interval): 23-54g) (159). This is slightly less than the overall effect size found more recently by Jonas et al (160), which suggested that brief intervention compared to controls in primary healthcare reduced alcohol consumption by 49g per week for adults aged 18-64 (95% CI: 33-66g) (although this latter review suggests effects may be lesser in older adults aged 65 and over (23g: 95% CI 8-38g) and for young adults / college students aged 18-30 (23g: 95% CI 10-36g)). Other positive outcomes reported in previous studies include a reduction in alcohol-related problems (177), and reduced health-care utilization (178) and mortality outcomes (165). Importantly, delivery by a range of practitioners in primary healthcare settings has beneficial effects (179), although findings of one review suggests that the effect-sizes are greater if delivered by doctors (180).

1.3 Screening and brief alcohol intervention: from knowledge to practice

1.3.1 Barriers to implementing brief alcohol interventions in routine primary healthcare

Whilst there have been successive attempts to encourage the routinized delivery of brief alcohol interventions in day-to-day practice, most efforts have demonstrated limited success (181-185), and approaches to care remain inconsistent. In the UK, recent attitudinal survey data suggest that whilst GPs see both preventative medicine and alcohol as increasingly high priority public health areas, and generally view primary health care as an appropriate setting to raise and discuss alcohol, particularly as part of a broader healthy lifestyle focus (186), most are not routinely asking patients about their drinking (187), resulting in sporadic provision of alcohol care (105). Further, even where primary care practitioners are raising the topic of alcohol consumption within consultations, recent data suggests a strong reliance on the use of simple quantity questions as a means of screening patients as opposed to using a validated questionnaire such as AUDIT (188). This is problematic for a range of reasons, not least as evidence suggests patients both struggle to translate standard drink measures into their actual consumption reports; and that they may actually underestimate their overall consumption regardless (189).

Some of the barriers to the provision of brief alcohol interventions identified to date concern the socio-cultural, interactional and attitudinal factors that influence their delivery by individual primary healthcare practitioners (190, 191). For example, there is evidence to suggest that many GPs remain unconvinced that patients will take such advice to change their drinking behaviour, particularly those patients drinking at heavy or dependent levels (192-194). Practitioners are also concerned that they might offend patients by discussing alcohol or at least view alcohol as a 'delicate' subject to raise in the standard consultation situation (191, 194), which potentially risks jeopardising the patient-doctor relationship (195, 196). This 'role insecurity' (197) also relates to the impact that practitioners' own drinking practices may have on intervention delivery, alongside confusion about what advice they should actually be delivering on lower risk drinking (186).

In addition, there are also a series of structural and organisational factors that influence alcohol intervention delivery. Lack of training or suitable intervention

materials (194, 198), inadequate financial incentives (199, 200), unsupportive specialist alcohol service provision (117, 193), and everyday time pressures (193, 201), have all been identified by GPs and other health practitioners as barriers to their successful engagement in and delivery of brief interventions for alcohol (184, 187, 190, 199, 202-206). In the UK, for example, a recent House of Commons (HoC) report drew particular attention to t*he "dire state"* of alcohol treatment service as a *" significant disincentive for primary care services to detect alcohol related issues at an early stage"* (68). Moreover, these barriers are often interrelated. Thus GPs' discussions around alcohol are shaped by both the practical challenge of incorporating discussions about alcohol within the pressured, time-limited consultation process, and their own (and the patient's) complex social, cultural and moral beliefs about what constitutes 'normal' versus 'problematic' drinking (190, 207, 208).

The complex set of barriers discussed above highlight a fundamental challenge for evidence-based medicine: how to bridge the knowledge-to-practice gap (209). Indeed, many of the obstacles to routine delivery of alcohol interventions are reflective of some of the common themes emerging from the growing field of implementation science. Linton (210) has described implementation as:

> *"…all activities that occur between making an adoption commitment and the time that an innovation either becomes part of the organizational routine, ceases to be new, or is abandoned (…) [and the] behaviour of organizational members over time evolves from avoidance or non-use, through unenthusiastic or compliant use, to skilled or consistent use."*

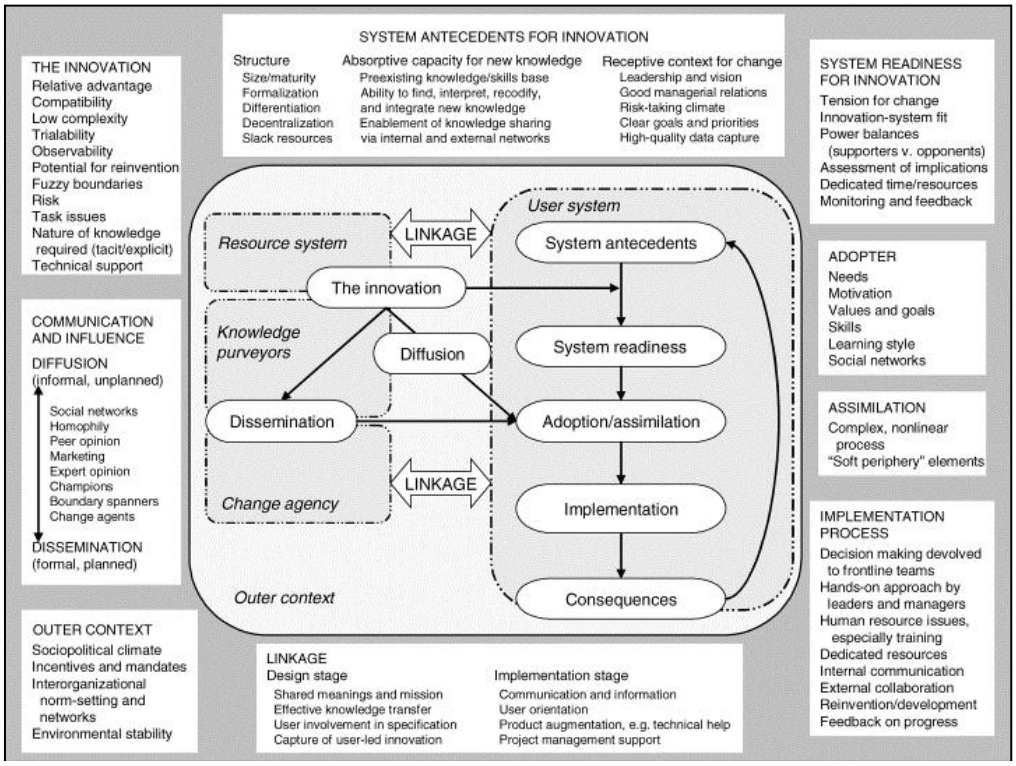
Despite Linton's implication above, however, implementation need not necessarily be concerned with *innovation*. Implementation may comprise more conservative goals, such as the standardization and regulation of (best) practices, as is often the case in medicine and health care (211). Moreover, it is important to emphasise the fact that implementation never refers to a single, easily-defined entity that is to be implemented. Whenever some new way of thinking, acting, or organising is introduced into a social system of any kind, it evolves as a multi-faceted, and essentially organic package of both material and cognitive practices (212) .

Various theories have been developed in recent years to support our better understanding of this complex process of implementation. These have included

theories focussed on understanding the behaviour of the individual health professional, such as psychological theories of intention, and in particular, the Theory of Planned Behaviour (213). However, it has been argued that such an essentially individualistic approach to implementation fails to take into account the issue that *"there are always social factors that promote or constrain particular expressions of agency"* (211). Alternative approaches, such as Everett Roger's classic Diffusion of Innovations theory (214), Normalization Process Theory, and May's emerging General Theory of Implementation, therefore represent attempts to integrate the structural properties of social systems into our understanding of the implementation process (212).

Greenhalgh et al's (215) review of the diffusion of service innovations represents a particularly comprehensive approach to amalgamating the multiple elements involved in implementation. The emerging theory draws heavily on Roger's seminal work in this field (214), but also takes in a multi-disciplinary evidence-base (encompassing sociology, psychology, anthropology, political science, ecology organisation and management theory), in order to develop a unifying conceptual model to aide consideration of the determinants of diffusion, dissemination and implementation of innovations in health service delivery and organisation. Figure 2 overleaf, is their graphical representation of the theoretical model developed.

Figure 2: Conceptual Model for Considering the Determinants of Diffusion, Dissemination, and Implementation of Innovations in Health Service Delivery and Organization (215)



According to the above model, therefore, the rate and scale of implementation is influenced by a multifarious collection of interrelated factors. These include key attributes of the innovation itself, indeed Rogers himself found that innovation characteristics explain 49-87% of the variance in rate of adoption (214). Such attributes include: whether an innovation is perceived to deliver a clear unambiguous and observable (relative) advantage to users over existing practice (214, 216, 217); the degree of flexibility and experimentation it tolerates (214, 217); the extent to which the innovation is simple (as opposed to complex) (218); and whether it is compatible with adopters' values, norms, and perceived needs (218-220). At the same time, the model acknowledges that *"people are not passive recipients of innovations"* (215): individuals may be psychologically pre-disposed toward trying out and using new practices or systems (214); and may also attach disparate and even conflicting *"meanings"* to initiatives (221). Further, their involvement in the *process* of implementation itself can be influential, such as whether they have been involved in the initial decision to introduce an innovation (214), or have had their concerns about the impact of the innovation addressed at key stages of the adoption process (222).

Moreover, the process of successful *diffusion* and *dissemination* of an initiative is also subject to multiple influencers. These may include: the structure, quality and type of social networks to which potential adopters belong (214, 223, 224); the extent to which relations between new and current users of the innovation are homophilic (i.e. share common characteristics) (223); and the influence of expert opinion leaders on take-up (225), such as through the use of innovation champions (226). Further, the system itself, or as Greenhalgh describes it the *"structural determinants of innovativeness"*, also has bearing on adoption rates. Systems which are large, mature, functionally differentiated and well-resourced, with decentralised decision-making, a flexible organisational structure, and top management support (227), are generally more amenable to successful innovation implementation. Whilst these structural determinants may interact in a complex and unpredictable way (215), system characteristics, in particular, the extent to which it demonstrates 'readiness' for change (214, 228) can impact heavily on the extent to which an innovation becomes 'routinised' once adopted. Finally, there are also external influencers that can impact on the success of innovation, including the role played by inter-organisational (sometimes informal) networks (223), *"intentional spread strategies"* such as quality improvement initiatives (217), and the impact of political directives on practice, such as the provision of a dedicated funding stream (229, 230).

1.3.2 Incentivising screening and brief alcohol intervention implementation in primary healthcare

As part of the UK governments' continued focus on addressing alcohol-related risk and harm, the key role played by screening and brief alcohol intervention has been recognised at both a national and regional level. Receiving its first mention in Labour's Safe, Sensible, Social, (73), the more recent 2012 Alcohol Strategy again emphasises the current Governments commitment (on paper at least) to maximise potential opportunities for their delivery in suitable settings (99). However, whilst most comprehensive theories of implementation emphasise the complex and interrelated factors that may potentially influence practitioners' adoption of new services or practices, empirical evidence would suggest approaches in UK healthcare have been much more simplistic. Focussing now on attempts by governments to encourage the routine delivery of screening and brief alcohol intervention in primary health care, for example, there have arguably been two main mechanisms employed to date.

First, and importantly, screening and brief intervention in primary care has been endorsed in a series of health and social care policy statements and guidelines in the UK. Current NICE guidance on the prevention of alcohol use disorders recommends the prioritisation of resources for screening and brief alcohol interventions by health service commissioners, alongside their routine delivery (in adults and older adolescents) by trained professionals in primary healthcare and other appropriate settings (231): a message reiterated in the more recent 2012 Government Alcohol Strategy (232). Further, from April 2013, the Department of Health has included alcohol screening and related brief advice within the NHS Health Check for adults aged between 40 and 75 [86].

There have also been regional level policy attempts to accelerate the rate of implementation of alcohol screening and brief intervention in primary healthcare. In the North East of England, for example, building on the recommendations of the North East Alcohol Misuse Statement of Priorities (65), the 2007 health strategy Better Health, Fairer Health, outlined the region's policy approach to tackling the rising costs of alcohol-related harm. In particular, this strategy responded to evidence from the 2004 Alcohol Needs Assessment Research Project, suggesting a large regional gap between the need for alcohol treatment and actual access to treatment (92) (although subsequent data suggests significant improvements in service provision since 2004, and even that the initially identified low treatment rates may have been more related to inadequate data than inadequate services per se (233)). Thus, key elements included a commitment to expand services *"to deliver ready availability of brief interventions"*, and a commitment to having the *"highest per capita availability of brief interventions in the country"* by 2010 (234). Further, it resulted in the establishment of a regional office for alcohol, BALANCE (the North East Office for Alcohol). Funded by the twelve Local Authorities across the North East of England, BALANCE is the first regional Office of its kind to tackle alcohol-related issues in a cross-cutting way (235). Its remit includes a commitment to: raise the profile of alcohol-related issues; coordinate good practice across the region and push for appropriate changes in laws, regulations and pricing policy based on existing evidence and new research.

Second, there have also been initiatives targeting what might be described as practitioners' extrinsic motivations (236), through the introduction of a dedicated (yet

time-limited) funding stream in the form of enhanced services (financial incentives) to encourage the delivery of screening and brief intervention for alcohol. Following the Alcohol Harm Reduction Strategy for England (2004), alcohol-focused Local Enhanced Services (LES) were set up across the country with local general practices. Financed by the relevant Primary Care Trust (PCT), the alcohol LES was a package targeted at meeting the needs of the local population, most often involving screening existing patient lists and delivering Brief Advice. Not all PCTs introduced such services, and payment packages were agreed locally, with sign-up by individual practices themselves done on a voluntary basis. As such, provision at either national or even regional level was far from uniform. For example, in the three former PCT areas that encompassed NHS South of Tyne (i.e. Gateshead, South Tyneside and Sunderland), addressing alcohol misuse was a stated Local Enhanced Service (LES) area and GP practices were paid for both screening patients, and delivering interventions and / or specialist referrals as required (237). However, no comparable local level service was introduced in the former NHS North of Tyne area (i.e. Newcastle, North Tyneside and Northumberland located in the north of the same North East region).

Building on the approach behind the local-level alcohol Enhanced Service, in April 2008, NHS Employers and the General Practitioners Committee (GPC) of the British Medical Association (BMA) agreed five new clinical Directed Enhanced Services (DES); including a DES specification for alcohol (238). Again, such services were introduced on a voluntary, time-limited, albeit now available on a national level basis. Under the alcohol DES, practices would be financially rewarded by their PCT for screening all newly registered patients aged 16 and over; with the recommendation that practices should then deliver brief advice to patients identified as drinking at increasing and higher risk levels. Again, a PCT Alcohol Service Framework was established to support this delivery [50, 88]. Initially planned to last for a two year period, the national alcohol enhanced service has been repeatedly renewed, and was recently extended yet again to continue until March 31st 2014 (239).

Since April 2013, arrangements for both national and local enhanced services have altered as a result of the major restructuring of primary healthcare in England (240). Responsibility for the national level Directed Enhanced Service for alcohol contracts previously managed locally by PCTs has transferred to NHS England, to be

commissioned by the relevant NHS England Area Team (for the former NHS North of Tyne and South of Tyne and Wear organisational areas, this relates to the Cumbria, Northumberland and Tyne and Wear Area Team (241)) (242). Local Enhanced Services for alcohol come under the new public health responsibilities of English Local Authorities (242). However NHS England retains overall contractual responsibility for primary care, and Clinical Commissioning Groups have been charged with managing transitional arrangements during an interim period lasting to 2014 (243).

There have also been (albeit to date unsuccessful) attempts at incorporating screening and brief alcohol intervention into the Quality and Outcomes Framework (QOF) which may yet bear fruit (QOF: a voluntary incentive scheme for GPs in the UK which financially rewards practices for their performance against a pre-determined set of key service indicators). This step was recommended in the 2010 House of Commons Health Committee report on alcohol (68) and the 2012 Alcohol Strategy also included a commitment to revisit the potential to support GPs through the incorporation of alcohol into the QOF (232). However, some areas (including Hammersmith and Fulham Council in London) did introduce a local version of the Quality and Outcomes Framework named QOF+, whereby practices were incentivised to screen patients with cardiovascular conditions, mental health conditions and patients on the cardiovascular disease risk register for alcohol use disorders (244). QOF+ was introduced in July 2008, and recent research by Hamilton et al suggested that the initiative was delivered successfully, leading to a statistically significant increase in the proportion of patients with cardiovascular and mental health conditions being screened for problem alcohol use (from 4.8% prior to the introduction of QOF+ to 65.7% afterwards) (245). However the programme ended in March 2011, when funding was withdrawn.

1.4 Using routine data to assess the implementation of screening and brief alcohol interventions in primary health care

In determining the impact of the various policy endorsements and incentivisation schemes at encouraging implementation (delivery) of screening and brief alcohol intervention in primary care, a range of routine data exist, much of which remains relatively untapped in research (246). Key features of routine data include: their regular and continuing collection; the use of standard terminology and definitions; and some degree of obligation to collect them universally (i.e. through systems which

cover all relevant patients) (247). Importantly, routine data should be collected *irrespective* of the procedure or outcome. As such, it is data whose primary reason for collection is administrative i.e. to manage the day-to-day running of health services, not specifically for the purposes of research (248).

Routine data includes not only administrative data sets, but also disease and health technology registers, adverse event reporting systems, and regular health-related surveys (247-249), and may be collected at the national or regional level. Examples include Hospital Episode Statistics (250), a data warehouse containing details of all admissions to NHS hospitals in England, alongside specific commissioning-focussed datasets, such as the 'Better Care Better Value' indicator sets (251), and those captured under the Secondary Uses Service Programme to support purposes other than clinical care such as healthcare planning, commissioning services, public health and national policy development (252).

1.4.1 Capturing routine data in primary healthcare

As the entry point to the health care system for most users, and accountable for addressing a large majority of personal health care needs (253), primary health care offers a prime opportunity to collect a wide-range of routine data. In particular, as a highly computerised sector of the NHS (254), and given it's near universal population coverage (255), general practice performs a central role in routine data collection. According to the DH, there are four key purposes for the capture of routine data within general practice (256). First, routine data is gathered to directly support clinical practice, facilitating the optimal care of both individual patients and that of the practice population as a whole. Second, routine data can also perform various non-clinical functions, and in particular, help practices to meet their administrative, legal, and contractual obligations. For example the Quality and Outcomes Framework requires that certain data items are captured and recorded to demonstrate an individual practice's achievements in clinical areas (257). Third, routine data can support additional purposes such as clinical governance, professional development, commissioning and healthcare planning. Fourth and finally, there may be 'emerging needs' driving the collection of routine data, such as the need to share health records across providers, or to facilitate further control on the part of patients over their own health records (256).

Whilst a modern general practice continually receives large volumes of information from a wide range of sources and in a variety of different formats, such as x-rays, hospital letters, and summary data on Lloyd George record (256), a significant proportion of this data is collected by clinicians as part of the everyday patient consultation (258). Indeed, a range of literature underlines the central role GPs now play in the collection of routine primary care data in the UK (259). Importantly, GPs provide the majority of primary health care provision in the UK; they are generally the first point of contact for patients, and also act as gatekeepers to facilitate access to secondary care services (260). Further, the capture of routine data as part of the consultation encounter is effectively mandated, with current Department of Health guidelines 'encouraging' clinicians to *"add at least one clinical code per encounter"* (256).

However, although traditionally the main function of information systems in general practice has been to provide information for GPs and other members of the clinical team for day-to-day clinical care, changes to GPs' contractual arrangements in 2004, including the introduction of financial incentives tied to the achievement of clinical and other performance targets (255, 260), mean that general practices are increasingly required to record detailed information on clinical management in order to qualify for payment (254). As a result, although there is some evidence to suggest that in practice much routine coding is carried out by nursing staff in primary care, such recording activity is generally directed and delegated by GPs, meaning nurses have little discretion over when or whether to record (261).

The major general practice clinical computer systems currently used in the UK include EMIS (Egton Medical Information System), SystmOne and Vision (262). As Lusignan writes, GP systems record data in two ways. First, via date-stamped 'coded' (or structured) data, where the data entrant selects the most appropriate clinical term to represent the main purpose of the consultation event (whether this refers to a presenting complaint, a diagnosis, procedure or administrative term), with additional clinical terms added as necessary. Second, most systems also allow the entry of 'free text' or narrative as part of the record of the patient encounter (263). For example, such narrative free text may be used to qualify any clinical term, and thus place the coded information within the overarching context of the patient's 'story' (256). The

key advantage of structured data, however, is the potential it offers for simplicity and consistency, and thus enhanced accessibility of the resultant information. Importantly, coded data facilitates the “simple” representation of often complex information, that allows it to be processed within the general practice system (263). Further, in selecting the most appropriate code, clinicians generally use a list of options, potentially via the use of a keyword search, or through the use of a standardised data template. Thus, coded data also perform a vital function in helping to rationalise the multiple ways in which clinical concepts can be represented in healthcare.

Since the 1980s, the UK primary care sector has mainly used Read codes for the purposes of recording structured data. Named after their inventor, Dr James Read (264), Read codes are a hierarchically-arranged controlled standard clinical vocabulary (265) which support detailed clinical encoding of multiple patient phenomena, including demographic details, clinical signs, symptoms and observations; laboratory tests and results; diagnoses; and administrative items. There are currently two Read code versions of differing complexity: READ version 2, commonly known as 5-Byte READ due to its five character code structure, released in 1991; and READ version 3 (Clinical Terms Version 3 or 'CTV3'), devised during the 1990s in an attempt to address some technical limitations of the earlier designs. Today, whilst the NHS in England has committed to a strategic move to a further coding system, SNOMED CT (Systematised Nomenclature for Medicine—Clinical Terms) (266), 5-Byte Read and Clinical Terms V3 remain the most commonly used Read code systems in UK general practice (266).

Together, Clinical Terms V3, 5-Byte Read codes and SNOMED CT comprise the standard national code set for UK primary care, with each set of codes updated on a biannual basis by the UK Terminology Centre. It should be noted that at present, however, there is no provision to ‘retire’ defunct Read codes; rather, the lexicon continually expands as new codes are added to the system. There are attempts to rationalise the available codes however: in the case of Clinical Terms V3 for example, each concept is assigned an appropriate ‘status’, either current, optional, redundant or extinct (267). Current status is given to all mainstream, clinically useful concepts, suitable for recording clinical data. Optional status is given to concepts which are mainly derived from incorporation of earlier versions and are not considered clinically intuitive (but which may still be used). Redundant status is assigned in circumstances where more than one

code is found to exist for the same concept. However as no codes are actually deleted, the resulting Read code lexicon is sizeable to say the least. By way of illustration, the October Clinical Terms V3 2010 release contained 298,102 discrete concept codes of which 55,829 were marked as inactive, and 58,130 were pharmaceutical products or devices. Further, additional Read codes may also be devised for use within individual or groups of general practices. These codes are not part of the standard national code set (Read, CVT3, SNOMED) but are generated at a more local level by a particular supplier, health community or practice. In particular, it has been observed that *"local codes are usually generated to fill a perceived gap in the national set or meet some peculiarly intrinsically local requirement"* (256).

1.4.2 Routine sources of alcohol data

Whilst there is an existing system to collect data on the delivery of alcohol treatment services in the form of the National Drug Treatment Monitoring System, this only gathers data on specialist alcohol treatments (Tier 3 and 4 services) so cannot be used to determine activity within primary care settings (classed as Tier 2 services). Other potential sources of performance data for the measurement of screening and brief alcohol intervention in primary care include hospital admission episode data for alcohol-attributable conditions. Hospital Episode Data has been collected in the UK since 1989-90 and aims to collect a detailed record for each 'episode' of admitted patient care delivered in England, either by NHS hospitals or delivered in the independent sector but commissioned by the NHS (268). Such data include alcohol-attributable mortality and hospital admissions (i.e. admissions relating to those conditions which are significantly (>20%) attributable to alcohol (269)). These data are considered to be sensitive to prevention interventions (i.e. eventually alcohol-attributable admissions would fall if screening and brief alcohol interventions were successful), therefore it has been argued that improved prevention and treatment interventions would have a direct impact on the rate of alcohol admissions to hospital (270, 271).

Indeed, under the previous Labour Government, alcohol-related admissions data was used to evidence progress towards their Public Service Agreement performance indicator (PSA 25) *'to reduce the harm caused by alcohol and drugs*' [132]. More recently, such data was included within the current administration's Public Health

Outcomes Framework under Health improvement *Objective 2: People are helped to live healthy lifestyles, make healthy choices and reduce health inequalities*; although this looks likely to be an indicator which estimates alcohol related admissions based on primary diagnoses only, a much narrower measure than previously (272). At the same time, however, it should be emphasised that reductions in alcohol-attributable hospital admissions is likely to be a longer-term measure of intervention effect (77), and therefore may not be appropriate for assessing impact in the shorter-term.

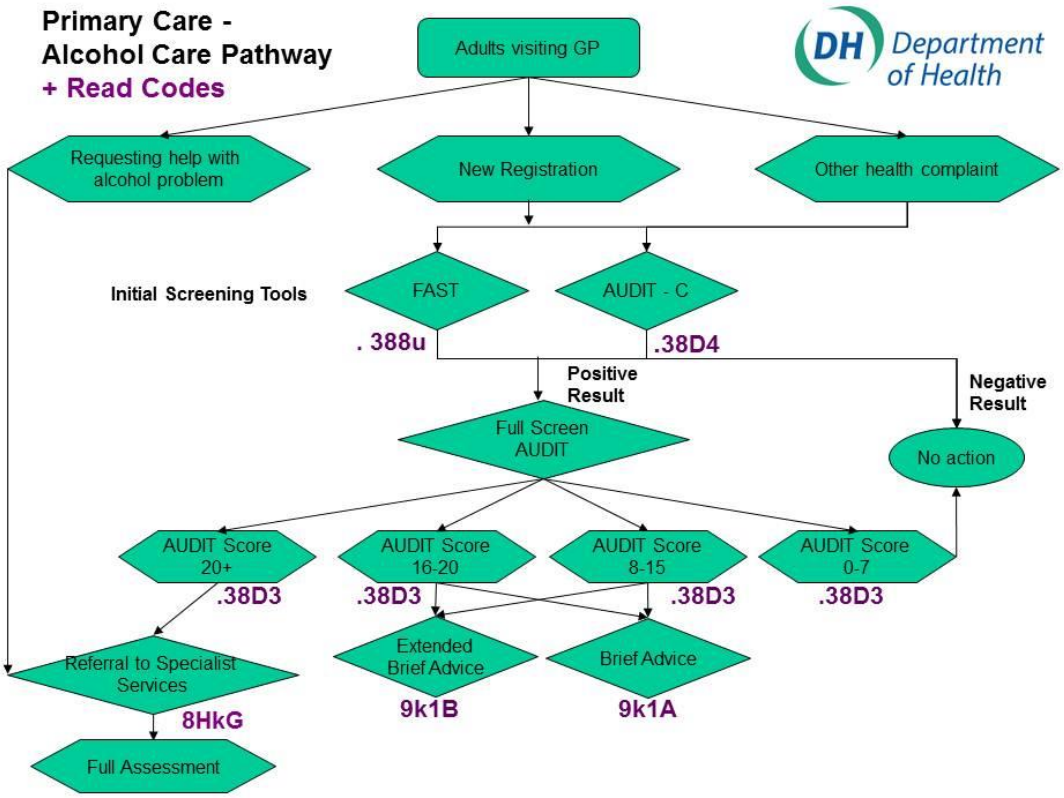
Since 2004, the introduction of payment by incentives for delivery of a range of Enhanced Services by GPs has provided additional sources of data on screening and brief alcohol interventions in primary care that crucially offers the promise of more immediacy over hospital admissions and thus may help to assess their implementation. As already detailed, the delivery of the current alcohol Directed Enhanced Service is supported by an alcohol Primary Care Service Framework, which covers the recommended screening and brief alcohol intervention process, and provides a suite of supportive resources and tools [116]. Importantly, it also specifies the types of data that service providers should collect to demonstrate service effectiveness and performance. Thus, general practices must provide an annual audit of:

- the number of newly registered patients aged 16 and over within the financial year who have had the short standard case-finding test (FAST or AUDIT-C);
- the number of newly registered patients aged 16 and over who have screened positive using a short case-finding test (as above) during the financial year, who then undergo a fuller assessment using a validated tool (AUDIT) to determine Hazardous, Harmful or likely dependent drinking;
- the number of Hazardous or Harmful drinkers who have received a brief intervention to help them reduce their alcohol-related risk;
- the number of patients scoring 20+ on AUDIT who have been referred for specialist advice for dependent drinking.

This data should be recorded using the appropriate new GP Read codes associated with the identification and management of risky drinking in primary care, which were introduced in 2008 to support the delivery of Enhanced Services for alcohol. The

diagram below shows how these Read codes map onto the alcohol care pathways advised by the UK Department of Health (note that this diagram and associated Read codes were produced by the Department of Health and include a misleading error; in that, an AUDIT score of 16-19 not 16-20 should prompt Extended Brief Intervention).

Figure 3: Alcohol Primary Care Pathway (with Read codes) (273)



To date, such Read code data has generally been reported manually on a local basis by practices, although the UK Government recently announced that the automated calculating quality reporting service (CQRS) would replace the manual systems for calculating and reporting performance data for many general practice services, including some enhanced services such as that for alcohol, in the near future (239). However, research (188) suggests that general practice level screening data is reasonably comprehensive, at least for new patients, with Read code data available for 76% of newly registered adults patients.

1.4.3 Advantages of using routine data in research and evaluation

Whilst gathered primarily to support the day-to-day delivery of healthcare services, it is also the case that such data offer a range of potential secondary uses. In particular, it has been argued that the routine data generated in primary care settings can aid

health-care decision making, support professional self-evaluation (274) and as already suggested, inform research to determine whether certain interventions are being implemented successfully to relevant patients (248) or to highlight variations in measured performance between different providers (275). Indeed, as part of the increased focus on improving efficiency, evidence-based practice and patient outcomes in the NHS (276), measurement of progress remains heavily dependent on the availability of meaningful, accessible and cost-effective data (277). In theory, such data could represent a valuable potential information source to help understand the implementation of screening and brief alcohol interventions in routine primary health care.

Importantly, such data possess a number of key advantages as an information source for researchers. First, as such data is by definition collected as part of the routine management and delivery of healthcare services, it represents a cost-effective and relatively unobtrusive means of gathering information (248). This is particularly the case when compared with direct observation or the introduction of behavioural measures, both of which are complex and costly to use (274) and introduce the possibility of the 'Hawthorne Effect' (278), whereby the act of participating in research can influence clinical practice. Second, routine health data offer an especially comprehensive information source: they are readily available in multiple settings; and provide a rich source of information about large numbers of patients (275), in many cases, providing details of a patient's diagnoses, management and health outcomes over the full life course (254). In addition, in theory at least, such data sets are generally comparable throughout the NHS, meaning practitioners, commissioners and researchers can compare care across locations (248).

Finally, it has been argued that the trend towards increasingly computerised medical records has been driven in part at least, by an expectation that such systems will support the improvement of the 'quality' of care (279). A systematic review reported that the main benefits of computerised information systems were increased adherence to guidelines, enhanced surveillance and monitoring, and decreased medication efforts (280). This point was reiterated in another systematic review, which found a number of studies suggesting the positive association between electronic health records and the completeness and accuracy of routine medical records (281).

Importantly, a further study also confirmed the likelihood of higher quality records in paperless practices, in addition to highlighting the positive impact on record *legibility* of electronic versus paper-based versions (282).

1.4.4 Challenges associated with using routine health data sets for research

At the same time, previous research has highlighted the difficulties of using clinical records such as Read Code data for research purposes (263, 283, 284). This is potentially unsurprising, given that the different needs and priorities of clinical users as opposed to the research community will inform the degree of care or consistency with which routine data is recorded in day-to-day practice (285). On this basis, van der Lei and others have proposed that data should *"be used only for the purposes for which they were collected"* (286). In particular, the logic underpinning arguments around the potential of routine data to support the monitoring and evaluation of healthcare value rely on a fundamental assumption: that *"it is possible to make attributions of causality between the services provided and the observed* quality measures" (275). A range of evidence suggests this assumption may be flawed in a number of respects. Drawing on Weiskopf and Weng's three fundamental dimensions of data quality – completeness, correctness (or accuracy), and currency (or timeliness) (285) – as a starting point, the following section explores these issues in more depth.

First, there is the question of the extent to which routine data in primary care settings can be considered 'complete'. On a superficial level, the concept of completeness appears relatively simple: for data to be 'complete' there is an assumption that every real world instance of a concept has been recorded. For some, therefore, completeness is closely aligned to the concept of sensitivity (287). Thus for 'complete' data on the diagnosis of an alcohol use disorder, every patient known to have an alcohol use disorder in a given population (e.g. practice registered list) would have that fact recorded. However the problem in this scenario is how to determine first what is meant by "known to have", second, how to define and code the different levels of alcohol use disorders in patients, and even how to determine when the identification and coding of a patient's alcohol use status is "necessary" and / or relevant to their needs.

Further, the absence of important clinical details in data gathered for primarily administrative purposes, and their low sensitivity for capturing certain dimensions of service delivery (288), particularly in relation to management and treatment of chronic conditions, also impacts on record 'completeness'. For example, the findings of a review by Hrisos et al (274) on valid proxy measures of clinical behaviour suggested that the completeness of medical records varied according to the type of clinical behaviour or action that was being measured. Records were more likely to be thorough for actions relating to physical examination, blood pressure measurements, laboratory tests, and screening services than for actions relating to the provision of a wide range of counselling services, including alcohol counselling (274). Next, it is also the case that unless screening is carried out on a universal basis, for various reasons, patients may not actively 'present' for alcohol use screening, despite (or potentially because of) the presence of relevant symptoms (as is the case in other areas of healthcare (289)). Finally, assessing data 'completeness' in relation to alcohol consumption is of course further complicated by the fact that there is no true comparable 'gold standard' of data: our best prevalence data are derived from local area synthetic estimates generated from statistical models combining national survey and local area level data (290).

Second, there is the question of data *correctness* or accuracy. For some, this dimension is analogous with the measure of positive predictive value (the proportion of positive data that are true positives (291)). However, correctness relates not just to the question of whether we can say that the information contained in routine medical records is 'true' (and thus in part linked to completeness), but also to whether the data itself has been recorded correctly. In this respect, it is important to be aware that information recorded on GP systems is seldom homogeneous (292). Routine data in primary care is the result of *"the collective action of teams made up of individuals with different roles. Diagnostic, prescribing, administrative, and clinical management information… may each depend on different groupings of people, working in different contexts, and carrying out different actions"* (256). Such factors can combine to compromise the reliability of routine data, further compounded by the fact that multiple individuals may be involved in data collection and recording over time (288).

In addition, as already described in section 1.4.1, a given piece of information may be recorded in several different ways. It may be coded or written in free text, which may contain acronyms or abbreviations. Coding may be based on using national, local or even practice level recording guidelines and / or codes themselves. Although some local Read codes are created by suppliers and are essential to support normal system functions, others have been developed to augment or in some cases duplicate existing Read codes. Such codes cannot be rendered fully interoperable (i.e. cannot be understood if transferred to other supplier systems) (293), and undermine the consistency of patient health records. This is a particularly salient point with regards to the recording of alcohol interventions, as evidence suggests that despite efforts by various organisations (particularly at a local level), there remains confusion around the recording of screening and brief alcohol intervention delivery due to successive changes in terminology and Read coding for the alcohol DES (294).

Third, data quality is also affected by its currency or timeliness. For example, whether there is a time-lag between the capture and the publication or availability of routine data (289). As already mentioned (section 1.4.3), one key advantage of primary care Read code data is generally considered to be its immediacy in comparison to other routine data sets. However, and linked to the above issues of ensuring accurate and homogenous coding practices, there is possibly more doubt over the extent to which such data are actually *available,* whether that concerns accessibility from a researchers perspective, or that of the practitioner themselves. In general, structured data (e.g. coded information) will be more rapidly available than free text; however as already highlighted, inconsistent coding and the use of practice-based euphemisms may reduce accessibility. Further, the architecture of the computerised practice record also impacts on the ease with which information can be accessed. Not all systems facilitate effective data linkage and in particular, the lack of a reliable unique identifier for patients makes linkage with other systems challenging (263).

Underlying all three dimensions of data quality is the issue of *relevancy*. That is, GPs and their practice teams are most likely to record information if they believe it to be important or relevant to a given situation or context *at the time of recording*. In particular, there is strong evidence that payments to GPs can distort coding practice, with research in this field emphasising the potential for manipulation (or gaming) of

these administrative data items to improve the apparent performance of provider organizations by physicians and other health care workers (295-297). As Lusignan writes *"when GPs receive payments for specific diagnoses (pneumonia but not upper respiratory tract infection), interventions (for prescribing, but not for advice or wait-and-see) or performances (home visits, but not for nurse-led clinic) it is likely that GP records will report antibiotics-treated pneumonia in a home visit, rather than common cold that was advised by the nurse to wait-and-see"* (263). Such recording behaviour throws into question the extent to which practice records can be taken as a proxy measure of effective treatment (92, 187, 190, 202, 298).

Finally, as increasingly digitalised health records provide an ever-more accessible resource for researchers, it is essential to frame these concerns around the quality and validity of routine data sets within a broader ethical context. Above all, it must be acknowledged that using private medical data for purposes other than the immediate health needs of the individual patient arguably represents a breach of confidentiality (289). Whether such a breach of confidentiality is justified, is a subject for continued debate, and as Foster and Young highlight, often rests somewhat uncomfortably on conventional and morally simplistic assumptions of research as a process which implicitly 'benefits' the public 'other' (299). This can be a dangerous assumption. After all, not all research is 'good' research (objective, independent, beneficent), and the use (or misuse) of routine health data can result in some real and damaging consequences for patients that extend well beyond their initial interaction with the health system. For example, allowing insurance companies access to certain types of medical data could seriously jeopardise a patient's financial status, affecting their ability to access credit or to secure health insurance (300).

1.5 Rationale for the research

On the basis that there is now robust evidence to support the wider implementation of screening and brief alcohol intervention implementation in UK primary care settings (301, 302), the research agenda has arguably now moved on to examining the question of whether initiatives introduced to date, to accelerate the pace of adoption, including the introduction of financial incentives, have actually been successful. Routine data sets, and in particular GP Read code data potentially represent a timely, cost-effective and comprehensive source of information to support the evaluation of such initiatives

(188), and crucially, the collection of such data are inherently embedded within their actual delivery (303).

At the same time, however, previous research confirms the sizeable challenges associated with using clinical records such as Read Code data for such secondary purposes. Further, given the acknowledged complexity of the implementation process itself, it remains questionable as to whether such routine data can accurately reflect the multifaceted dimensions of intervention adoption (304), not least, as the literature confirms the multiple and interrelated factors that influence individual physicians adoption and use of the various healthcare systems that support the collection of routine data in the first place. For example, a systematic review of barriers to the acceptance of electronic medical records (EMRs) by physicians revealed a wide range of possible barriers to implementation, including primary barriers such as financial, technical and time constraints; alongside secondary barriers related to psychological, social and change process issues (305).

In the case of screening for alcohol use disorders, for example, whilst recent research suggests high rates of newly registered adult patients (76% nationally) are currently being screened for an alcohol use disorder in English general practice settings (188), it is important to emphasise that there remain some unanswered questions about the screening process itself which this fails to answer. Importantly, whilst the study by Khadjesari et al was based on analysis of The Health Improvement Network (THIN) data, and therefore represents a robust and broadly representative sample of 382,609 patients drawn from over 500 general practices, the fact that the information is only disaggregated at regional level, and measurement is strongly reliant on pre-determined quantitative Read codes, represent key limitations. For example, although the study found significantly higher rates of recorded screening in certain regions, including the North East of England, it was unable to determine the extent to which financial incentives, particularly local level incentives, might have influenced such differences (188). In addition, there was notable discrepancy between the levels of alcohol consumption recorded in the GP data available to the researchers when compared with general population survey estimates, suggesting that practitioners may be under-recording alcohol use disorders and over-recording incidences of non-

drinking patients (188), but little insight as to what might actually be driving such a trend.

1.6 Aims and objectives

Against this background, the doctoral research presented in this thesis is concerned with the question of whether routinely collected data represents a sufficiently accurate research tool to study the implementation of screening and brief alcohol intervention delivery in primary health care. The issues of ensuring effective knowledge translation, i.e. how successfully evidence-based policy translates into real-life practice, and of performance management, i.e. how these activities can most meaningfully be measured and assessed, formed the crux of the rationale for this research. Building on this research question, the study sought to deliver the following substantive objectives:

1. To conduct a systematic literature review, of both qualitative and quantitative research, to identify which factors influence the recording of routine practice data by Primary Care Physicians (PCPs) in the UK;
2. To quantitatively compare and contrast the delivery of screening and brief alcohol interventions for alcohol across a sample of general practices and former primary care trust areas (PCTs) in North East of England using routinely collected electronic General Practitioner (GP) Read Code data;
3. To qualitatively understand the barriers and facilitators impacting on GPs recording and delivery of screening and brief alcohol interventions in primary care settings;
4. To draw on data from both the qualitative and quantitative phases in order to triangulate the overall findings and return to the original research question of whether we can use routinely collected data to monitor and evaluate alcohol screening and brief interventions.

1.7 Structure of the thesis

The remainder of the thesis is presented in six chapters, the content of which is outlined below.

Chapter 2 presents the historical and political context to the research through an exploration of the rise of Total Quality Management in UK healthcare, highlighting the growth in measurement and monitoring in the NHS over the past three decades, alongside increased use of financial incentives to stimulate improvements in care.

Chapter 3 introduces the overall research strategy, including providing a justification for the mixed-methods research design, alongside an overview of the research paradigm: critical realism. It then describes the sequence of research phases and summarises the approach to data integration.

Chapters 4, 5 and 6 present the methodology, method and findings from the three core components of the doctoral study. Namely, a systematic literature review to identify what factors influence the recording of routine clinical data by Primary Care Physicians (PCPs) in the UK (Chapter 4); secondary analysis of alcohol Read code data extracted directly from a sample of GP practices based in the North East of England (Chapter 5); and semi-structured interviews with General Practitioners to explore the barriers and facilitators impacting on their recording of screening and brief interventions for alcohol in primary care settings (Chapter 6).

Finally, **Chapter 7** provides a mixed-methods synthesis of the findings from this research, and the strengths and limitations of the approach taken are acknowledged. The thesis concludes by identifying recommendations for policy, practice and future research.

Chapter 2 Paying for performance? A review and critique of the rise of quality management initiatives in UK healthcare

2.1 Introduction

The UK government has introduced a range of measures to foster the mainstreaming of screening and brief alcohol intervention in primary healthcare settings in recent years. In particular, this has included a strong focus on the use of financial incentives to encourage the successful implementation of screening and brief alcohol intervention in routine general practice (238). This example of paying for 'performance' in public services is far from isolated, particularly within the UK health sector. Indeed recent decades have witnessed a steady increase in the use of private sector-style tools and techniques in the organisation and management of the National Health Service and its constituent parts, ensuring an eventful ride for those at the forefront of delivering and commissioning healthcare services. (306).

In order to understand the context in which alcohol screening and brief intervention is currently delivered, it is important to understand these developments. As such, this chapter explores the rising phenomenon of 'performativity' within UK healthcare, highlighting the growth in measurement and monitoring in the NHS over the past three decades, alongside increased use of financial incentives to stimulate improvements in care. In particular, it focuses on the period from the late 1970s onwards, which encompasses a series of significant changes in the culture, management and organisation of the NHS which are particularly pertinent to the historical, political and theoretical context of this study.

2.2 The changing face of the NHS: 1979-2012

The UK National Health Service (NHS) has undergone over six decades of development and restructuring since its establishment in 1948. Originally set up as a relatively simple tripartite system (307), comprising hospital services; self-employed family doctors, dentists, opticians and pharmacists; and local authority health services, it has evolved through a number of organisational permutations over its sixty year history. One key change during that period has been the gradual blurring of public-private boundaries in the ownership and delivery of health services in the UK. Today's NHS, although still essentially true to its original aim of being a service provided to all

without payment, no longer necessarily provides such services through a fully publicly-owned infrastructure (307). A market-based approach to provision, comprising both private practices and the involvement of public-private partnerships in a widening range of activities, makes for a far more complex organisation than its forbears could have envisaged.

At the same time however, it is important to stress the long-standing nature of many of the issues that continue to challenge the NHS. Indeed, Rivett's authoritative account of the history of the NHS, makes this point succinctly: *"The fundamental questions that tested Bevan and his colleagues - how best to organise and manage the service, how to fund it adequately, how to balance the often conflicting demands and expectations of patients, staff and taxpayers, how to ensure finite resources are targeted where they are most needed - continue to exist"* (307). Above all, fulfilling the ever-expanding financial needs of the UK health service has always been a challenge, with demand perennially outstripping resources.

Substantial increases in the number and types of available medical technologies in recent decades, combined with an ageing population exhibiting an increased prevalence of chronic diseases and multi-morbidities (308, 309), have resulted in escalating healthcare costs to governments (in 2010 the UK devoted more than twice the share of its gross domestic product (GDP) to public plus private healthcare spending as it did in 1960 (310)). Set against successive financial challenges, from the oil crisis of 1974 to the more recent global economic downturn, such rising costs have tested the organisation's growth and development throughout its lifetime. This first section considers some common characteristics of the key policy responses UK government's have introduced in an effort to tackle these challenges.

2.2.1 Thatcher's NHS and The Patients' Charter: 1979-1997

1979 proved a watershed election for Britain in many respects. Importantly, under Britain's first female Prime Minister, the newly elected Conservative government was to launch what many commentators regarded as a 'revolution' (311) in Britain's public sector. Undoubtedly, economic factors played a strong role in driving this period of reform: indeed Pollitt and Bouckaert have described the reforms as 'born' out of the global economic recession experienced during the 1970s, with governments under

increased pressure to make more efficient use of limited financial resources (312, cited in 313). However, although it was initially galvanised by the need to arrest processes of relative economic decline, public sector reform also had political and social drivers. In particular they were fuelled by 'New Right' ideology (314), where the notion of 'rights' to universal welfare provision, along with the rationale of 'intervention' by government in economic and social affairs were being increasingly questioned (315).

Certainly, during the late 1960s and 1970s, the public had become progressively more dissatisfied with the cumbersome administrative hierarchy of public sector service delivery, and the perceived inflexibility that came from a focus upon impartiality and uniformity (316). For many policy makers, it seemed as though the only way to respond to these challenges was to focus on making the public sector more efficient, economical and effective (317). In response to demands for greater quality and accountability, and in pursuit of cost efficiency and reduced government expenditure, market principles were now applied to the provision of public services.

Collectively, this prolonged phase of public sector reform has come to be known as New Public Management (NPM) (318, 319) and is characterised by a series of core doctrinal components, closely linked to strategic management (including: explicit standards and measures of performance; a shift to greater competition in the public sector (320, 321); an emphasis on private-sector styles of management practice; and parsimony in resource use (319, 322). Finally, commentators generally agree on the key contribution of economic theory to New Public Management. As Hughes states, it is *"heavily overlaid with both the language and practice of management by accounting, with the emphasis on explicit standards, measurement of performance and output."* (323).

Of course management through targets and incentives was not a new phenomenon for the NHS. In primary care for example, the incentive-based approach to healthcare provision and improvement was introduced as far back as the 1950s in response to the Royal Commission on doctors' pay (the new GPs' Charter, which clarified the performance-based financial awards scheme). We also see beginnings of target-orientated delivery from that period on, and a stronger focus on 'better' management (see in particular, the Cogwheel Report of 1967, resulting in the organisation of

medical work into specialities amongst other changes (324)). However, the need to tackle the enormous financial pressures of the NHS (Thatcher's *"bottomless financial pit"* (325)), led to some particularly radical changes in policy and practice from the late 1970s onwards (326, 327). In health, a series of initiatives were introduced aimed at maximising cost-efficiency so that services could be improved and extended without adding to the overall bill (327). This period also saw the publication of the first 'performance indicators' on the NHS, covering clinical services, finance, manpower and estate management (327) and the introduction of competitive-tendering for some non-clinical services. The publication of the 1983 Griffiths Report (328) marked a distinct change in the organisational culture of the NHS. Engaged by Margaret Thatcher to produce a report on the management of the National Health Service (NHS), businessman Sir Ernest Roy Griffiths (8 July 1926 – 28 March 1994) recommended the establishment of a Health Services Supervisory Board, a full-time NHS Management Board and the introduction of general managers throughout the NHS. These changes have been described by some as a managerial 'revolution' which represented a significant challenge to the previous relative autonomy of the medical profession (327).

Further large scale NHS reform was introduced to the UK later that decade, triggered by the publication of the 'Working for Patients' White Paper in 1989 (329). This led to a series of reforms to create a 'quasi-market' in healthcare (330-332) and represents a further shift not only in the culture of the NHS as an organisation, but in the role of the GP within it as well (although Le Grand et al argue that the impacts on patients themselves were rather more limited) (333, 334). Crucially, this period saw the introduction of the 'purchaser-provider' split in the NHS, aimed at stimulating competition between providers which would in turn (theoretically) lead to gains in quality and efficiency (332, 334). As well as establishing a purchasing role for health authorities (the 'population focussed' arm), this also attempted to introduce a similar role for general practices through GP fundholders (the 'patient-focused' element)(332). Subsequent government publications (335, 336) sought to build on this move towards a more consumer-led healthcare service, with both increased choice for patients (e.g. over GP or treatment), and a greater role for the private sector.

The reforms of the late 1980s and early 1990s also involved a clear emphasis on promoting quality and efficiency through more explicit performance management of the public sector (337). The Citizen's Charter (1991) was billed as John Major's (the then Prime Minister) 'big idea' and set out six principles for public services: consultation of users and customers; increased information to enable citizens to find out what services are available; more and better choice; greater accessibility; greater responsiveness when things go wrong; and importantly, clear published standards. In conjunction with the publication of regular performance league tables, the Citizen's Charter represented an extension of the New Public Management reforms that had characterised the Thatcher period. Although it conferred no legal entitlement, by being clear about the quality of services that users could expect, the Citizen's Charter sought to strengthen the accountability of service providers to users. The 'Charter' concept proliferated across a number of departmental spheres, including the NHS, through the Patient's Charter (338). This set out a series of explicit 'rights' for patients, in addition to nine charter standards setting out key service specifications: a shift in power from providers to consumers that as Klein comments was symbolic of *"a new rhetoric and a new set of expectations in the NHS"* (326).

2.2.2 'New' Labour and the Health Service: 1997-2010

In 1997, after 18 years in opposition, the Labour Party was elected to Government under the banner of 'New' Labour. Central to this rebranding was the ideological repositioning of the Party in the centre ground of the British political landscape via Labour's introduction of the so-called 'Third Way', which sought to unite previously polarised individualist and collectivist stances by synthesising right-wing economic with left-wing social policies (339, in 340). For many commentators however, this 'Third Way' was in many respects simply an extension of the Conservative-initiated New Public Management programme (341), through the Modernisation Agenda (see 342), and in particular, the notion of Best Value (312-314, 343), which promoted continuous improvement in local government through the greater use of competitive tendering, alongside new performance management, inspection, and audit routines. Indeed, despite 'New' Labour's emphasis on the language of 'partnership' and 'joined-up government', commentators have remarked on the ideological continuity in this respect (344).

In health, certainly, some core characteristics of the previous regime were retained. Labour's 10 year vision for the NHS was set out in a White Paper: *The New NHS – Modern, Dependable* (345). Importantly, the purchaser-provider split was retained and overall responsibility for commissioning health services remained with health authorities (346). However, there were also some important changes. In the main, these entailed the abolition of GP fund-holding and the creation of primary care groups (PCGs), which would take the place of all previous fund-holding and primary-care led commissioning schemes. As Smith et al observe, PCGs were always intended as transitional bodies, and were eventually replaced (from 2000 on) by Primary Care Trusts (PCTs) (346). PCTs were new statutory bodies that would combine the management of local primary and community services with a much extended role in commissioning of health services (346): a development enshrined in law with the publication of the Department of Health's (DoH) *Shifting the Balance of Power* (347). In 2007, Labour launched its 'world class commissioning' programme, designed to improve the performance of PCTs further (although doubts were expressed over the ability of PCTs to successfully respond to this challenge in several areas of core competencies (348)).

In the latter years of the Labour administration however, there was a pronounced shift in emphasis in health back to a market-driven system reminiscent of its Conservative predecessors (332). The reforms introduced from 2002 onwards therefore focussed on increased choice, diversity and competition in hospital services; for example by providing more rights for patients over hospital provider, and through the introduction of NHS foundation trusts (332, 349, 350). Further, although PCTs were given statutory responsibility for purchasing, the reforms also delivered a variation on the GP fund-holding theme through 'practice-based commissioning', with the aim of introducing increased competition in primary and community healthcare services (332).

Importantly, the Labour administration also took a resolute step towards a pay-for-performance based healthcare system with the introduction of a new GP contract in 2004. Prior to this point, most GPs in England had been employed under a nationally negotiated General Medical Services (GMS) contract, with the payment mechanism driven by claim and patient list-size (capitation) (351). The 2004 contract introduced a new annually re-defined baseline payment, driven by a combination of: practice list

profile; agreed service level categorisation and quality marker target attainment, with payment tailored to reflect the specific needs of differing practice populations. This latter element involved the launch of the Quality and Outcomes Framework (QOF), a voluntary *"system of financial incentives that reward practices for providing high-quality care"* (255, 352).

The revised contractual arrangements also enabled GPs to provide a range of 'enhanced services' to their patients, which would also be rewarded with financial incentives. These additional voluntary enhanced services comprised (taken from The King's Fund briefing on *General Practice in England* (255)):

- **Directed Enhanced Services (DES).** Services or activities provided by GP practices that have been negotiated nationally – for example, providing extended opening hours, improving treatment of heart failure. Practices are not contractually obliged to provide these services but most do and payment is at a nationally agreed rate;
- **National Enhanced Services (NES).** Services that a PCT, using national specifications, can choose to commission from a practice – for example, minor injury services and enhanced care for the homeless. Again, payment is at nationally agreed rates; and
- **Local Enhanced Services (LES).** Locally developed services designed to meet local health needs – for example, enhanced medical care of asylum seekers, and specific services for people with learning disabilities; these are commissioned by PCTs and fees for these services are locally negotiated.

The previously piloted Personal Medical Services contract was also adopted as a permanent arrangement in 2004, with the aim of enabling individual contracts with practices that are appropriate to the needs of local populations (353), along with the introduction of two further contracts: *Alternative Provider Medical Services* (APMS) and *Primary Care Trust Medical Services* (PCTMS) (255).

Alongside these developments in the organisation and payment structure of primary healthcare, the change in Government also brought with it a new centrally managed performance 'framework' for public services such as the NHS (345, 354). Indeed a key

element of Labour's Modernising Government drive was a focus on delivering 'high quality' public services achieved through prescriptive targets and rigorous performance monitoring (348). Importantly therefore, the publication of *Modern public services for Britain* introduced Public Service Agreements (PSAs) that would tie department's budgets to their performance targets (355). The introduction of two new institutions: The National Institute for Health and Clinical Excellence (NICE) and the Council for Health Improvement (CHIMP), would support this centralist approach to performance management by monitoring and enforcing performance standards (345). In particular, the creation of NICE in April 1999, was designed to make more effective use of limited NHS resources through a markedly evidence-based approach to clinical 'best' practice (356), and in particular, the provision of clinical guidelines, recommendations on audit methods to enable the monitoring of clinical performance; and appraisals of the clinical- and cost-effectiveness of new and existing health technologies (357). The following table summarises some key milestones in the development of Labour's performance management regime for the NHS.

Table 3: Key milestones in the development of the performance management regime under New Labour (348)

Year	Milestone
1997	**Performance Assessment Framework** The framework compiled and published performance reporting by health authorities and (for some measures) acute trusts across six themes: health improvement, fair access, the effective delivery of appropriate health care, efficiency, patient/carer experience, and health outcomes.
1998	**Public Service Agreements (PSAs)** These were first introduced alongside the Comprehensive Spending Review. The first health PSAs included challenging, outcome-focused public health targets, together with a dozen others, including some on reducing waiting lists and waiting times.
2000	**NHS Plan** This included more than 100 new targets, ranging from commitments to invest in equipment and infrastructure, to increasing staff numbers and establishing maximum waiting times for treatments. The Department of Health put hospital chief executives under strong pressure to meet these targets as part of the broader performance management system (Harrison and Appleby 2005; National Audit Office 2001).
2000	**Star-ratings system** Under this system, trusts were given a single summary score, between 0 and 3, according to their performance. Results were made public, and intended to hold the system to account through a process of 'naming and shaming', under which chief executives of zero-rated trusts were at risk of losing their jobs (Bevan 2006). Full responsibility for collating and publishing these shifted to the regulator in 2002.
2004	**Further targets** More targets were introduced between 2000 and 2004, including targets to: reduce inequalities in life expectancy and infant mortality; establish a maximum 18-week wait from referral to treatment for hospital care, and to halve rates of MRSA.
2007	**Vital signs** These were introduced in the NHS Operating Framework for 2008/09, dividing performance priorities for the service into three tiers: national 'must dos', national 'must dos' for which delivery is to be determined locally, and options for other issues from which local areas can select priorities.

The continued focus on targets was further emphasised in 'Excellence and Fairness', which focused on the introduction of clear national standards and targets to 'drive up' performance (358), supported by increased devolution of incentive setting and greater diversity in provision. The publication of the Health Act 2009, conferred a legal duty on the part of commissioners and providers of NHS services to 'have regard to' the new NHS Constitution, which included rights to choice of GP, to access care and to a patient's own health records (359). Underpinning many of these developments, substantial funding was provided to primary health care services, in the form of investment in information technology systems, and the creation of a major new database to support the collection of data from practice computer systems (352, 360). This vision of a more responsive, accountable and flexible NHS continues to shape policy today (361-366).

2.2.3 'Clinicians in the driving seat': NHS under the Coalition Government

The May 2010 election resulted in the end of Labour's longest serving administration with the formation of the Conservative-Liberal Coalition. Directly on gaining office, the new Government pronounced the end of *"big government"* and the failure of *"centralisation and top-down control"* with the publication of their joint programme for Government (367). There was also a clear message that tackling the public debt was the most urgent issue facing the UK, along with a warning that tackling this would undoubtedly result in some *"difficult decisions"* being made (367).

The publication of their first budget the following month confirmed the new Government's determination to introduce austerity measures, with the introduction of what some have described as a 'regressive' (368) budget which included a £40bn package of emergency tax increases, welfare cuts and Whitehall spending restraint designed to slash the budget deficit by the end of the parliament (369). Whilst the government confirmed that NHS spending would be ring-fenced, it would nevertheless experience zero real-terms growth, with the Quality, Innovation, Productivity and Prevention (QIPP) programme introduced to help achieve productivity savings worth £20 billion by 2015 (370, 371). The central guiding tenets of more decentralised and cost-efficient NHS have arguably guided health policy decision-making ever since.

The 2010 White Paper, *Equality and excellence: Liberating the NHS* (372) announced plans for transformational reforms of the organisation and delivery of healthcare, aimed at hastening progress towards what they described as a truly 'patient-led' NHS (372). 'Accountability' and 'autonomy', and by virtue of that, greater devolution in decision making (less 'political micromanagement') were strong emphases in the Coalition White Paper. Importantly, and as subsequently enshrined in law with the publication of the Health and Social Care Act 2012, this would involve the abolition of primary care trusts in England from April 2013 (240).

This had two key impacts on the structure and organisation of the NHS, particularly at a local level. First, it heralded the introduction of GP-based commissioning, whereby groups of GP practices would work in consortia to commission the majority of NHS services for their patients, and supported by a new NHS Commissioning Board, thus removing this role from primary care trusts (372). In some respects, it could be argued that this built on Labour's practice-based commissioning approach, and before it, the conservative-initiated total purchasing pilots. Clinical commissioning groups (CCGs) now control around two thirds of the NHS budget, and are responsible not only for commissioning secondary and community care services for their local populations, but also have a legal duty to support quality improvement in general practice (373). Second, under what the White Paper described as a move toward great "*local democratic legitimacy"* (372), primary care trust responsibilities for public health improvement and behaviour change would be transferred from PCTs to local authorities in April 2013. Each local authority has taken on the function of joining up the commissioning of local NHS services, social care and health improvement, and a new executive agency of the Department of Health, Public Health England, supports the system and provides overall national-level leadership (371).

Next, and importantly, in the context of this research, the White Paper stressed that there would be a new focus on 'outcomes' as opposed to 'process' and / or top-down targets that lacked clinical credibility or a sound evidence-base (372). As such, Labour's PSA performance regime of departmental responsibility would be replaced with a series of separate frameworks for outcomes (374). This included the introduction of a new NHS Outcomes Framework, covering what were described as the three main domains of quality: the effectiveness; safety and overall experience of the

care received by patients (375), alongside Outcomes Frameworks for Public Health (376), and for Social Care (377). The Department of Health also announced their intention to renegotiate the 2004 GP contract, with the particular aim of improving access to primary care in disadvantaged areas, and in particular, via a substantial reduction in the size of the Quality and Outcomes Framework (378, 379). At the same time, despite the government's focus on abolishing target-driven care, recent reports from The King's Fund have highlighted the fact that data demonstrating progress against most NHS targets is still collected (371). Further, performance management of providers has essentially continued under this Government, with the NHS Commission Board playing a strong role in this respect as a 'quasi regulator' of local commissioners (380).

2.3 Impact of quality improvement initiatives on the UK health service

Despite some differences in emphases and specific policy tools, the previous section thus identifies some broadly homogenous influencers shaping the design and delivery of UK health care over the past three decades. In addition to a shift towards a more market-based approach to healthcare (319, 322), a key departure from the 'old' style public administration paradigm of service delivery has been an escalating interest in the measurement and comparison of service quality and service outcomes within government (381, 382). This emphasis on 'performativity' has drawn on management tools and principles generally originating from outside the public sector, and in particular Total Quality Management and Business Process Re-engineering (382). Bevan and Hood have described such governance by targets as a form of 'homeostatic control' (306), whereby measurable targets are specified in advance, a system exists to monitor progress against that specification, and there are appropriate feedback mechanisms, including some level of public accountability. As already described, the Labour government of 1997-2010 in particular, introduced a strong emphasis on the use of prescriptive targets and rigorous performance monitoring as part of its modernisation agenda (348). Despite recent indications on the part of the Coalition government of their intent to move away from an emphasis on process and towards more 'outcomes' focussed targets (375), the underlying theme of an accountable and responsible NHS remains. The following section considers the impacts of this broadly shared approach on the health service itself.

2.3.1 Positive effects on service quality and patient outcomes

For the proponents of New Public Management, this period of change has led to some positive developments in both the NHS, and other key spheres of the public sector. There is some evidence to support this view. A review of literature examining the impact of these types of quality-focused improvements on the UK public sector by Hodgson et al, found that the introduction of various forms of target setting and quality-focussed operational change strategies (benchmarking, business-process-reengineering, performance-related pay, audit procedures) had resulted in beneficial effects (383). In particular, the review cites a number of studies which found such changes led to tangible and positive impacts on public sector staff in terms of increased motivation, recruitment and retention in addition to speedier and more responsive services for the public (see for example 384, 385). Other studies highlight the beneficial effects arising from increased investment in public services by Labour during this period (386, cited in 387). Bouvaird and Halachmi focus on the positive impacts of Best Value in particular in this respect (381).

More specifically, in healthcare, a 2010 report from The King's Fund (348) concluded that despite criticisms of the use of targets and strong performance management in the Labour Government, there had been tangible and positive impacts on patients during this period. In particular, they cite the example of reduced hospital waiting times, warning that *"any future government needs to be aware of all of the potential consequences for patients of removing or reducing the number of targets"* (348). Campbell et al have also suggested that the introduction of the Quality and Outcomes Framework in primary care improved intermediate outcomes, and in particular the control and management of diabetes-related conditions (388). A further review of the effects of QOF on services by Van Herck et al, also suggests that impacts were overall, positive (389).

In addition, as already highlighted, the introduction of pay-for-performance also resulted in further investment in primary health care infrastructure, such as increased numbers of nursing and administrative staff, the establishment of chronic-disease clinics and increased computerisation (293, 352), which in turn, helped consolidate evidence-based methods for care (390). There is also some evidence to suggest that inequalities of care between the most and least deprived areas narrowed as a result of

QOF (360), with positive impacts equitable across socio-economic groups (391, 392). Thus, potentially as a result of such improvements, analysis by Grosso suggests that despite a general downward trend across Europe for public satisfaction in their healthcare system since the 1970s, this was less evident in the UK in comparison to similar countries as a result of these successive health reforms (393).

2.3.2 Questionable impacts on health outcomes and health inequalities

At the same time, it has also been argued that many of the benefits outlined above are at best, partial and contested (394), and in fact, may have resulted in some unintended and harmful consequences for UK healthcare provision. Crucially, a number of commentators have pointed toward the lack of reliable data on impacts, seemingly disproving the functionalist perspective on New Public Management described in the previous section (395, 396). This includes a recent Cochrane review which found poor evidence that financial incentives in primary care had improved patients' wellbeing (397), a finding echoed in both Downing et al's study examining the link between observed health in practice populations and their QOF scores (398), and in Sermuga et al.'s examination of the effect of pay-for-performance on hypertension outcomes (399).

Further, even where data are suggestive of improvements in health-related outcomes, it is important to recognise that a common criticism of pay-for-performance programmes is that they merely promote better *recording* of care rather than better care itself (400-402). So, financial incentives may have simply served to stimulate changes in clinical recording: any observed improvements in performance are more the results of differential (or even, inaccurate) recording of care, as opposed to 'real' improvements in quality of service (403) (although one study by Steel et al suggests this was not the case (404)). For example, whilst official sources reported reduced waiting times in emergency departments in 2002/03, there were strong discrepancies between government rates and the figures quoted in independent patient surveys (306). Thus, as Sheldon writes *"evaluations are usually tautological in the sense that the yardsticks used to evaluate the impact of performance assessment are the same potentially imperfect instruments used in the assessment itself"* (405).

Finally, there is also the issue of the extent to which the introduction of fiscal quality stimulants, and in particular the QOF, have been responsible for any identified improvements in care, or whether such improvements would have taken place regardless. For example, research by Campbell et al found evidence that the 2004 contract had resulted in only a modest acceleration in improvement in relation to diabetes and asthma care, but suggested that such improvements were already taking place prior to its introduction (400, 406). Certainly it is worth noting that an assessment of GPs' performance during the first year of implementation of the 2004 new contract found that practitioners achieved 98% of the available points for clinical indicators (407). This was significantly above the levels anticipated (75%), with the result that the average family practitioner saw their gross income increase by around £23,000 (407).

2.3.3 The perverse and unintended consequences of management-by-targets

Concern has also been raised in relation to the ways in which the adoption of overly narrow or ill-conceived targets in the public sector have sometimes skewed performance in less desirable directions; particularly from proponents of the 'public value' school of thought (408). In health, for example, the use of targets (in particular the distorting effects of incentivising process as opposed to outcomes) has been criticised for leading to harmful – if mostly unintended – results, and for contributing to what has been described as a regime of *"targets and terror"* within the NHS (348). Such impacts have included: distortions in clinical priorities; undermining professional autonomy and local leadership; encouraging 'silo-based' rather than integrated approaches to providing care; and promoting a focus on process rather than outcomes (348). In primary care, there were reports under Labour that the introduction of the target for GPs in England to see their patients within 48 hours resulted in many areas preventing patients booking appointments more than two days in advance (409).

The findings of a recent King's Fund report highlight the ways in which the pressures to deliver results in the form of nationally prescribed targets, has detracted from NHS managers ability to actually meet the needs of their patients (348). The report called for more support for NHS managers to enable them to *"deliver targets in ways that do not undermine the ultimate purpose of service provision"* (348). This concern was echoed in research by McDonald et al, which cautioned against the potential for pay-

for-performance to reduce primary health care to a set of biomedical tasks, dubbing this almost mechanistic, production-line approach to clinical practice as 'Fordist' (410). In addition, concerns have been voiced as to whether certain areas – both clinical and geographic – are neglected where financial incentives are lacking (411). In particular, it has been suggested that despite the fact that QOF has encouraged greater consistency in care across localities, the possibility of excluding hard-to-reach patients via exception reporting may have the effect of limiting its impact on health inequalities (412). Further, Heath et al have drawn attention to the fact that three quarters of the population do not have any of the diseases listed in the quality and outcomes framework (413).

2.4 Incentivising quality and the role of the GP

Whilst the above section identifies a range of impacts of New Public Management at a systematic level, there have been profound consequences for individual practitioners working within the NHS, and above all, for UK general practitioners. In particular, the introduction of an explicit pay-for-performance scheme with the launch of the Quality and Outcomes Framework in 2004 (351), has changed the structure of primary care away from a traditional professional bureaucracy, where there was implicit trust in clinicians, and towards a distinctly private-sector 'managerialist' delivery model (400, 411), informed by strong business discourse (414), and in which the clinical autonomy of health professionals is diminished through increased use of surveillance techniques (410, 415). However, the extent to which such measures have been effective (and indeed acceptable or appropriate) in terms of changing clinician behaviour, and in turn, improving the quality of primary care provision, remains questionable.

2.4.1 Extrinsic motivation 'crowding out' intrinsic professional drivers

The use of financial incentives (as part of a wider set of contracted mechanisms) as *"positive reinforcers"* (236) to stimulate desired behaviours (generally more effort, and higher performance) is essentially based on economic agency theory (416). However, there is substantial evidence to indicate that extrinsic motivation (contingent rewards) can in reality conflict with intrinsic motivation (an individual's desire to perform a task for its own sake) (236, 417), particularly when it comes to professionals working in the healthcare sector (418). Indeed, some commentators have argued that management by incentives neglects, or even 'crowds out' key elements of a physician's 'professional

repertoire' such as emotion, morality and trust, much of which stimulated their desire to work in the health sector in the first place (419). Further, the extent to which centralised monitoring systems can – and indeed should – ever replace the quality check of trustworthy professionals has also been questioned (405).

GPs themselves have focused in particular on the way in which the Quality and Outcomes Framework has encouraged clinicians to direct their efforts towards incentivised population-based service goals at the expense of a more holistic, patient-centred approach (393, 420, 421), a shift that could also be characterised as shifting general practice away from the bio-psychosocial to the biomedical model (410) (Stewart suggests that a consultation cannot be patient-centred if it is disease or technology-centred (422)). An observational study by Chew-Graham et al appears to confirm this perception, finding evidence that the requirements of the QOF agenda, did indeed appear to 'crowd out' opportunities to discuss non-incentivised patient concerns (423). Further, and despite the increases in salary already identified (407), the perception that QOF has led to an almost 'tick-box' rather than 'generalist' approach to patient care appears to have reduced job satisfaction for doctors (420).

2.4.2 'Gaming' the system for financial reward

However, whilst such perverse impacts are in the main unintended, there is some evidence to suggest the existence of a practice known as 'gaming' in healthcare, whereby some clinicians may purposefully manipulate delivery and recording of care to boost financial reward. This could either refer to instances where care is recorded, but not delivered (or at least not to the required standard), or where performance is reduced in areas which are not incentivised or where it already exceeds requirements (306). Le Grand has employed the concepts of 'knights' (whose strong public service ethos overrides any consideration of concealing or manipulating performance) versus 'knaves' (who may either reactively or deliberately engineer data to provide a false picture of performance) to describe health providers' possible motivations for, and opportunities to, 'game' the system (424). In primary care, Le Grand argues that the perverse nature of financial incentives can turn GP 'knights' into 'knaves' by rewarding certain outcomes over others and thus effectively encouraging 'gaming' behaviour (424).

There are several reported examples of such 'gaming' in primary healthcare. For example, the GP contract which introduced the Quality and Outcomes Framework included provision to allow GPs to exclude patients from eligibility for specific indicators in the performance calculations, known as 'exception reports'. Critics have argued that this has allowed practitioners to increase their income by inappropriately excluding patients for whom they have missed targets (352). However, it should also be stressed that the evidence on this issue is far from clear-cut. A review conducted by the Audit Commission of PCT reporting arrangements for QOF concluded that there was no real evidence to suggest any systematic gaming by GPs (425). However it remains a serious concern for policy makers, not least as the effectiveness of governance-through-targets relies on the assumption that the 'knights' substantially outnumber the 'knaves', and that the system does not influence a significant shift from the former category to the latter (306, 424).

2.4.3 Professional boundaries and maintaining 'hierarchies of appropriateness'

At the same time, it is also important to stress that other research highlights examples of clinician's deliberately circumventing the QOF process to ensure adequate time is available to discuss the patient's concerns (426), suggesting overall, the initiative has not damaged internal motivations of clinicians or crowded out their core values (410). Further, it is also the case, that in reality, a significant proportion of the routine 'tick-box' elements of care are now delegated to either nursing staff (for example via nurse-led disease clinics), or where possible, newly employed healthcare assistants (for example taking blood samples or blood pressure) following the introduction of the Quality and Outcomes Framework (410). As such, far from representing a shift in professional roles, it has been argued that QOF instead served to reconstruct traditional professional boundaries and clinical hierarchies (393), in which GPs make the difficult, more complex decisions, and remain resistant to standardisation and protocols (410, 420, 427, 428) and nursing staff deal with the straightforward, everyday task-(and template-) based work (akin to Charles-Jones et al.'s 'hierarchies of appropriateness' (429)).

2.5 Challenge of performance managing the UK public sector

It could be argued that transferring the aforementioned focus on targets and 'performativity' from the private to the public sector will always be fraught with difficulties, considering the increasingly pressurised environment in which public sector employees must work which limits their potential to innovate and thus 'perform'. Budgetary constraints and heavy workloads mean that public sector workers benefit from very little 'organisational slack', particularly at more junior levels, with few routes by which 'bottom up' innovators can secure resources to invest in their innovation (430, cited in 431). In addition, there is a lack of incentives to support innovation within the public sector, as Kamarck emphasises, financial 'rewards' are more likely to accrue to the state or at the least, the organisation, not to the individual themselves (cited in 431). As such, change can only ever be evolutionary as opposed to revolutionary, an approach fundamentally at odds with certain quality management tools such as Business Process Re-engineering (382).

Further, as Bevan and Hood highlight, performance indicators are only valid on an assumption of 'synecdoche' (taking a part to stand for the whole) (306). In this respect, it must be acknowledged that public sector workers work within an authorising as opposed to a market environment, with a complex web of stakeholders (313, 432), further exacerbated by the bureaucratic nature of public organisations (433). This stakeholder model of decision-making creates a far more complex – and far less deterministic - structure and strategic process than in the relatively simple accountability model found in modern private sector organisations (313). Thus, in the case of healthcare for example, the link between actions and outcomes is much less direct than in most production processes, being *"modified or confounded by other activities, patient case mix, and other non-health care factors"* (405). This point is illustrated in research by Giuffrida et al (434) which investigated the impact of factors outside the control of primary care on performance indicators proposed as measures of the quality of primary care. Their study showed that hospital admission rates in a number of key areas of health (asthma, diabetes, and epilepsy) were all substantially influenced by factors out-side the control of the primary care team, and in particular, by the socio-economic characteristics of their population and the supply of secondary care resources.

Finally, it is also important to acknowledge the fact that the public to which such organisations are accountable has changed significantly in recent years. Simply put, people now expect more from their public services, expecting them to not only be accessible at all times (the '24/7 society'), but also to be increasingly personalised (431). These rising expectations that have in part been shaped by peoples' experiences as private sector 'consumers' where technological advances have enabled mass communication, quicker response times and communication with institutions using telephone, text message and online (435). Of course, it could be argued that such rising expectations have been a key factor driving change in the UK public sector. For in contrast to the centralised and highly bureaucratic post-war models of public administration, which relied on the positioning of 'Joe Public' as inarticulate and deferential to the experts in power, modern systems depend on a more informed, and more demanding citizenship (436).

However, this development has profound consequences for governments. As Aucoin and Neintzman have written, it means that they must now govern in a context *"where there are greater demands for accountability for performance on the part of a better educated and less deferential citizenry, more assertive and well-organised interest groups and social movements, and more aggressive and intrusive mass media operating in a highly competitive information-seeking and processing environment"* (437). This creates particular challenges for the public sector as public perception can be entirely at odds with the reality of provision, so that even increasing investment and improving performance will not necessarily deliver 'customer-based' strategic goals: the so-called 'delivery paradox'. Finally, to add to such challenges, organisations are tasked with meeting these higher public expectations in increasingly challenging economic times, when growth in public expenditure is slowing.

2.6 Summary

This chapter has summarised some of the major developments in the culture, management and organisation of the NHS which have taken place over the past three decades. In doing so, it has sought to situate the research within the wider socio-political and historical debates that continue to shape the delivery of UK primary healthcare. As the chapter has shown, neoliberal ideology, as manifested in New Public Management, now informs much of government thinking around the provision of

health services in the UK (438). In particular, primary healthcare has been undergoing a *"sustained, if quiet, revolution"* since the 1990s (350), marked by the constant modification and re-modification of the commissioning arrangements, and by the changed and developing role of the GP within the sector. As previously discussed (section 2.3.3), it has been argued that these developments have resulted in some perverse and unintended consequences for the delivery of primary healthcare in the UK, distorting clinical priorities, undermining professional autonomy, and promoting a focus on process rather than outcomes (348). Finally, and importantly, such developments also inform our understanding of the focus topic of this study - the usefulness of routine data to evaluate the (financially incentivised) implementation of alcohol interventions in primary health care - and in particular, the possible factors influencing GPs' recording of such data.

Chapter 3 Research methodology

3.1 Introduction

The purpose of this chapter is first to introduce the overall research methodology, including a justification for the mixed-methods research design, alongside an overview of the research paradigm: critical realism. It then describes the sequence of research phases and summarises the approach to data integration. The actual methods (or instruments) employed in the delivery of the research study itself are described fully in the results chapters (4, 5 and 6).

3.2 The role and importance of a research paradigm

A research paradigm can be viewed as an *"accepted model or pattern"* (439) that provides an organising structure and set of assumptions to help ground both explanations of the *nature* of the (social) world and about the knowability of this world (440, 441). For some theorists, this belief system model is more accurately viewed as *"epistemological stances…concentrating on one's worldviews about issues within the philosophy of knowledge"* (442). Harrits proposes that a research paradigm can also refer to a common research practice (443) (akin to Kuhn's research *"communities"* (444)), where members of a particular scientific speciality share a consensus view on which questions are most meaningful and which procedures are most appropriate for answering those questions (442). Linked to this version, a further group of theorists focus on the development of paradigmatic case studies which act as exemplar research designs, an approach particularly evident in mixed methods studies, such as in the work of Cresswell, Hanson et al (445, 446).

Of course, these two broad versions of research paradigms are far from mutually exclusive. Indeed, Morgan suggests that it may be more helpful to view these paradigm versions as *"nested"* within one another (442). According to Guba, therefore, a fully developed research paradigm can be characterised through its: ontology (what is reality?); epistemology (how do you know something?); and methodology (how do you go about finding out?) (447). These three key characteristics create a holistic view of how knowledge is viewed; how we see ourselves in relation to this knowledge and, in directing the methodological strategies we use to discover it (440). In contrast, the

research methods (or instruments) themselves, can be defined as procedures and activities for selecting, collecting, organising and analysing data (448).

3.2.1 The importance of an explicit theoretical paradigm

Since the mid-twentieth century, Western science has been largely dominated by two broad theoretical paradigms, namely positivist and interpretivist approaches (449, 450). Positivism holds that there is an absolute, singular reality, which can be measured, studied and understood, without being influenced by pre-existing values (451). Traditionally, positivism is associated with the natural sciences and in particular, with quantitative research methodologies. Alternatively, interpretivism (along with constructivist and critical theory paradigms, generally associated with social science and qualitative research methodologies) contends that this 'scientific' model is ill-suited to the study of social phenomena, where the goal is less *explanation*, and more *understanding* of complex and often changing entities (451, 452). Crucially, interpretivists assert that there is no such thing as a single objective reality (440), rather there are multiple constructed realities, because different people are likely to experience the world in differing ways (453), including of course the researcher themselves (452).

There is an acknowledged tendency amongst health services researchers to adopt a standard research methodology without considering the philosophical assumptions on which they are based (454) or to utilise a generic and poorly defined methodological strategy (described by Appleton and King as a 'pick and mix' approach (455)). Alise and Teddlie assert that these weaknesses are particularly evident amongst researchers reporting empirical studies, with both positivists and constructivists often working within implicit research paradigms *"because they assume that readers of a particular journal (especially in ''pure'' traditional disciplines) are already familiar with that orientation"* (456). Further, as Kuhn emphasised, the longstanding dominance of positivism in science, has served to "normalise" this research paradigm (444), with the resultant lack of theoretical challengers meaning that researchers often lack awareness of the belief systems and methodological practices that inform their work (442).

However, such implicit paradigms are arguably naïve constructs, for as Gramsci writes *"everyone is a philosopher, though in his own way and unconsciously, since even in the slightest manifestation of any intellectual activity whatever, in 'language' there is contained a specific conception of the world"* (cited in 457). Thus, any research study reflects a worldview of at least the three philosophical layers described above: ontological beliefs; epistemological assumptions and methodological choices (458). Further, these layers are intrinsically inter-related: particular ontological beliefs lead us to make particular epistemological assumptions; which in turn lead us to choose certain methodologies over others.

3.2.2 Mixed methods: conflict resolution for the paradigm wars?

Determining an appropriate and meaningful theoretical paradigm is far from a case of making a simple choice between positivism and interpretivism however. Alongside their acknowledged dominance in Western thought, there has also been a *"long-lasting, circular, and remarkably unproductive debate"*(440) concerning the advantages and disadvantages of these alternative worldviews in research, sometimes described as the *''paradigm wars"*(459). The strengths of positivist (and generally quantitative) approaches include their capacity to operationalize and measure a specific construct; to conduct between group comparisons; to examine the strength of association between variables of interest; and to test research hypotheses (460). However, a key limitation is that the resultant data can be divorced from its original ecological 'real-world' context (461), a phenomenon referred to as decontextualization (462). In contrast, whilst the interpretivist (generally qualitative) approach delivers a more fully contextualized, rich detailed account of human experiences (463), sample sizes are generally small, with data collection ceasing at the point of saturation, limiting the generalizability of the results (464). Thus, in selecting one philosophical orientation over another, a researcher is implicitly making a choice to prioritise both certain types of knowledge, and particular modes of knowledge construction.

At the same time, it is also the case that presenting the choice as an 'either/or' scenario may lead to the creation of inflated and misleading distinctions between the two paradigmatic orientations. For example, qualitative research has been accused of 'covert' positivism through its emphasis on the importance of empirical, data-grounded knowledge (451); and researchers housed within both paradigms place great

emphasis on the need to minimise confirmation bias and maximise the internal and external validity of the results (465). As Guba and Lincoln have discussed, therefore, it is simply not sensible to separate paradigms into *"airtight categories"* (442), due to the considerable overlap, and necessary 'permeability' between paradigmatic boundaries (466). It could therefore be argued that mixed-methods represent an attractive middle ground, sitting both between these two extremes, and offering a pragmatic response to the on-going and circular so-called *"paradigm wars"* (440, 443). Mixed methods research has been defined by Burke Johnson and Onwuegbuzie as *"the class of research where the researcher mixes or combines quantitative and qualitative research techniques, methods, approaches, concepts or language into a single study"* (467). As such, it has been referred to as the third major research paradigm (468), offering a multi-dimensional approach to knowledge theory and practice that includes both quantitative and qualitative methodologies. However, its benefits relate to more than merely paradigmatic conflict resolution.

In particular, the use of mixed methods to triangulate data (i.e. seeking convergence and corroboration of results from different methods studying the same phenomenon (468)) has been much discussed in the literature over the past sixty years (469-471). Thus, mixed-methods approaches have also been credited with their capacity to 'add-value' in terms of delivering richer, more nuanced data through complementarity (472); and to help initiate, expand or even reframe the research question by exploring contradictions in results from alternative modes of inquiry (472, 473). Importantly, a number of proponents of mixed-methods research approaches cite the particular value of these approaches in answering complex and multi-faceted research questions (the *"wicked problems"* of public health (474)). As Burke Johnson and Onwuegbuzie write *"today's research is becoming increasingly inter-disciplinary, complex and dynamic…taking a non-purist or compatibilist or mixed position allows researchers to mix and match design components that offer the best chance of answering their specific research questions"* (467).

At the same time, it would be simplistic to represent mixed methods as a conflict-free option. In epistemological terms, for example, it has been argued that the fundamental paradigmatic incompatibility (475) of positivism and interpretivism, renders their combination a *"violation"* of basic philosophical principles (442). Indeed, Max Weber

was strongly critical of the naïve assumption that *"simply because positions differ from one another, a "mid-point" synthesis that steers a line among them is somehow more objective and less partisan"* (476). Further within the mixed-methods community itself, there is marked disparity in how this research paradigm is both operationalized (what is mixed; when, where and why the mixing is carried out (468)), and indeed defined (from Thomas' 'blended' research (477), to Johnson and Christensen's broader 'mixed' research term, which of course implies more than just mixing methods (478)). Within the health services research community, for example, O'Cathain et al have highlighted a lack of transparency around mixed-methods research design and approach to data integration in particular (479).

In electing to employ mixed-methods to answer a particular question, it is therefore essential to address these questions of function, process and crucially, philosophy in justifying and clarifying the research approach. The next section of this chapter looks in turn, therefore, at: the justification for using a mixed-methods approach to the research; the overarching theoretical framework that informs this research; and finally, how this translates on an operational level in terms of the research process itself.

3.3 Description of and justification for mixed-methods approach

3.3.1 Overview of study design

The intent of this three-phase, sequential mixed-methods study was to investigate the usefulness of routinely collected medical information in evaluating the implementation of screening and brief alcohol interventions in primary health care. In the first phase, a systematic review and critical interpretive synthesis sought to identify factors which have been reported as influencing the recording of routine practice data by Primary Care Physicians (PCPs). Second, quantitative research methods were used to numerically describe, compare and contrast the information that GPs have used to record their delivery of screening and brief interventions in routine general practice settings across a sample of general practices in North East of England. More specifically, this phase examined GPs' use of electronic Read codes to record structured data on their case finding activities to identify potential problem drinkers, and to evidence their delivery of interventions to help address risky drinking. In the third and final phase, qualitative interviews with GPs, with subjects drawn from both participating and non-participating practices in the previous phase of the study, were

carried out to verify the influencing factors identified in the systematic review, probe significant results from the quantitative phase and explore the barriers and facilitators impacting on individual alcohol Read coding behaviour. In doing so, the study aimed to develop a robust, comprehensive and contextualised picture of the phenomenon under investigation.

3.3.2 Justification and purpose

A mixed-methods approach (471) was selected for three main reasons. First and foremost, the application of different methods allowed the study to answer different dimensions of the overarching research question, and so lead to a more in-depth, contextualised and therefore 'authentic' understanding of the phenomenon under investigation. Thus, the primary purpose of using mixed methods was enhanced causal *explanation* through what is probably best described as data 'triangulation'. Campbell and Fiske introduced the idea of triangulation (which they termed *"multiple operationalism"*) whereby multiple methods are employed primarily as a construct validation technique (480); a concept extended further by Webb, Campbell, Schwartz and Sechrest (470); and in turn, by Cook through *"critical multiplism"* (481). There remains divergence on the definition and application of triangulation as a research concept, in particular, whether 'true' triangulation is possible in sequential mixed methods research designs (473). However this study resisted alignment with either conjunctive or disjunctive conceptions of triangulation, but alternatively adopted Mathison's holistic model (482), thereby seeking to bring together both convergent and discordant data under a more comprehensive explanatory framework (483).

Second, by using mixed-methods, the study sought to address the acknowledged weaknesses of single method research designs. For example, using a structured questionnaire falls into the quantitative and therefore positivist research tradition, in its aim to objectively quantify trends. However, respondents may not interpret the questions in the same way as the survey authors, their responses may be subject to social desirability (where rather than reflecting an individuals own values or beliefs, respondents provide answers they assume deliver a positive representation of self (484)), and the analysis may leave little room for the incorporation or interpretation of the *"unwanted noise"*, such as additional annotated notations, or contextual data surrounding non-responders, in the survey process (450). Thus it is questionable as to

the extent to which the analysed survey data adequately explains the depth and complexity of the phenomenon under investigation. At the same time, however, qualitative approaches are arguably limited in their ability to assess links and / or associations between observations, cases or constructs (461); and result in the creation of essentially subjective and potentially idiosyncratic realities that has little or no generalisability beyond the study sample (467).

In the case of this research, therefore, determining the usefulness of routine alcohol data demanded an understanding of not merely the measurable trends that could be observed in purely statistical terms, but of the social, cultural, political and behavioural factors that shape how, when and where an individual clinician records such data (including a critical consideration of the quality of the data itself). For as Coiera suggests, medical informatics is necessarily a hybrid *"sociotechnical"* field of research (485). Quantitative analysis of Read code data would therefore allow the strength of the association between key variables of interest to be tested (enhanced service for alcohol status, NHS organisational area, size/type of practice, and individual practice level) and crude rates of alcohol screening and brief intervention recording. Whereas gathering additional qualitative data via semi-structured interviews with GPs based in the participant practices would support the development of a more fully contextualized, in-depth narrative of how and why primary care practitioners use routine data to record alcohol interventions through an exploration of their complex individual, social and cultural reasoning processes (445, 486, 487).

Third, through the use of a sequential study design, there was also a deliberative developmental logic to the use of mixed-methods, whereby the findings from one research phase informed the next at a variety of levels. As Greene et al describe, strong development-led mixed-methods designs use dissimilar methods of equal status to examine the same or similar phenomena (473). In this study, data from a systematic review to identify which factors influence the recording of routine practice data by Primary Care Physicians (PCPs) (Phase 1), and the trends identified from descriptive analysis of routine alcohol Read code data, informed both the development of the topic guide utilised in the GP interviews in Phase 3, and the identification of suitable interview participants.

3.4 Rationale for a Critical Realist paradigm

3.4.1 Overview of critical realism

Emerging as a response to the *"crisis"* of positivism (488), critical realism was originally proposed by Roy Bhaskar as a philosophy of science (489), and as an argument for the careful application of the scientific method to the study of society (490). Essentially, critical realism is a realist theory that has been used to explain and ground claims of knowledge, truth, progress and reality in both natural and social science research (491). However, it differs from traditional realism in a number of respects. Unlike strict empiricists or linguistic realists, the world is composed not only of *"events, states of affairs, experiences, impressions, and discourses, but also of underlying structures, powers and tendencies that exist, whether or not detected or known through experience and / or discourse*" (476). However, the different levels (experiences and events) may be 'out-of-synch' (492) with each other, and even though the underlying level may possess particular capabilities or a predisposition towards certain outcomes, these may not actually be realised (476).

For critical realists therefore, in contrast to positivist accounts of causality (493), science is not merely a straightforward deductive process of identifying constant causative relationships, but one that aims to explore the wider contextual factors (pre-existing institutional, organisational and social conditions) that combine to influence the course of events (476). As scientists, Bhaskar wants us to ask *"what must be true in order [for the scientific activity] to be possible?"*(489). Thus, structure and agency are linked, in that both individual (self) and situated (social) activity take place within a wider and deeper relational context (494). However they are not inseparable, indeed a key concern is to investigate their interplay over time, *"how pre-existing structure may constrain action and how action reproduces or transforms existing structures"* (490). This is a generative model of causation: how mechanisms interact with context to produce different outcomes, akin to Pawson and Tilley's middle-range theory of 'context-mechanism-observation' (495). Further, and importantly, context here is not a static construct, such outcome patterns only reflect the researchers current understanding of mechanisms and contexts shaping the phenomenon under investigation (495).

3.4.2 Value and relevance of a critical realist approach to the study

It has been argued that critical realism is a particularly 'suitable' theoretical paradigm for mixed-methods research. Indeed, as a research approach, it rejects methodological individualism as *"naïve and reductionist"* (491) and unable to account for the complex and changing nature of causation at play in the 'real world' (489, 496). Further, in contrast to pragmatism, critical realism challenges the view that mixed-methods represents an a-philosophical, *"over-harmonistic middle-class"* and middle-ground ideology (497). Rather, critical realism offers the opportunity to engage with and challenge the *"extremities"* that create the possibility of a certain understanding of the middle ground (476). Against positivism, critical realism contends that individuals are not reducible to mere *"social dupes"* (498), unconsciously manipulated by structural forces, and criticises positivists' tendency to focus on observable events with little reference to the influence of prior theoretical frameworks on such observations (499). At the same time, critical realism resists the epistemological, ontological and ethical relativism of interpretivism (491), and in particular, its failure to take account of the underlying social structures or networks which may enable or constrain individual behaviour (499). Rather, critical realism is underpinned by 'retroduction', wherein researchers are required to move from the *"level of observations and lived experience to postulate about the underlying structures and mechanisms that account for the phenomena involved"* (499).

3.4.3 Implications for epistemology, ontology, methodology and axiology

A key attribute of critical realism is a commitment to epistemological pluralism or 'opportunism' (476), which is in turn tied to a central belief that ontological concerns have priority over epistemological ones. Otherwise, by settling epistemological questions in advance of ontological questions, one effectively limits *"what is, to what can be known, given X epistemology"* (494). The priority of ontology coupled with epistemological opportunism also affects the choice of methodology for scientific enquiry, in that it promotes methodological pluralism. Importantly, with critical realism, assumptions of a conflict (or incommensurability) between alternative paradigms of inquiry are rejected: the question (or object) of inquiry is the starting point in determining the methodological decision-making process. Thus, in Wight's words, *"differing object domains will require differing methods and any attempt to*

specify methodological structures in advance of ontological considerations can only be arbitrary" (494).

For this study, therefore, various methods employed were selected for their potential to access the different structures, experiences and events shaping the recording of alcohol-related data in routine primary care practice (Bhaskar's stratified ontology (492)). Thus, quantitative methods were employed to help identify any underlying causal (structural) mechanisms that might explain patterns of association between key variables (such as financial incentives) and outcomes of interest (such as recorded rates of intervention delivery) (500). Alternatively , qualitative methods would help *"illuminate complex concepts and relationships that are unlikely to be captured by predetermined response categories or standardised quantitative measures"* (499). Indeed, given the 'wicked' nature of many of the questions posed by public health researchers (1), there is growing recognition of the value of qualitative methods in supporting our understanding of both the complexity of interventions themselves, and the complexity of the social contexts in which such interventions are tested (2-4). As Morse comments *"Qualitative research is . . .essential to the knowledge development of the health care disciplines"* (5). This role is now formally recognised by the UK Medical Research Council framework for the development and evaluation of complex interventions (6). As such, semi-structured interviews with GPs would inform the understanding of how individual practitioners' values, experiences and perspectives can interact with these underlying causal mechanisms to determine their delivery and recording of screening and brief alcohol interventions (9).

However it was also vital that such a critical realist-led study was grounded within an in-depth *historical* understanding of the social and political context in which the research took place (501). Thus, in the case of the research question under investigation (whether routine data can be used to evaluate the implementation of alcohol interventions in primary health care), a critical realist approach demanded an understanding of not just how individuals interact within a specific context, but additionally, the underlying generative mechanisms that have shaped that context. As Orlikowski writes *"technology embodies and hence is an instantiation of some of the rules and resources constituting the structure of an organisation"* (502). The way in which actors (or agents, i.e. the developers and users) interact with structure (the

technology) over time becomes the focus of investigation. Thus, information systems are recognised as not merely *"passive instruments but become 'actors' in the essentially social world of clinicians and patients"* (503, cited in 504).

3.5 Operationalising the mixed-methods research process

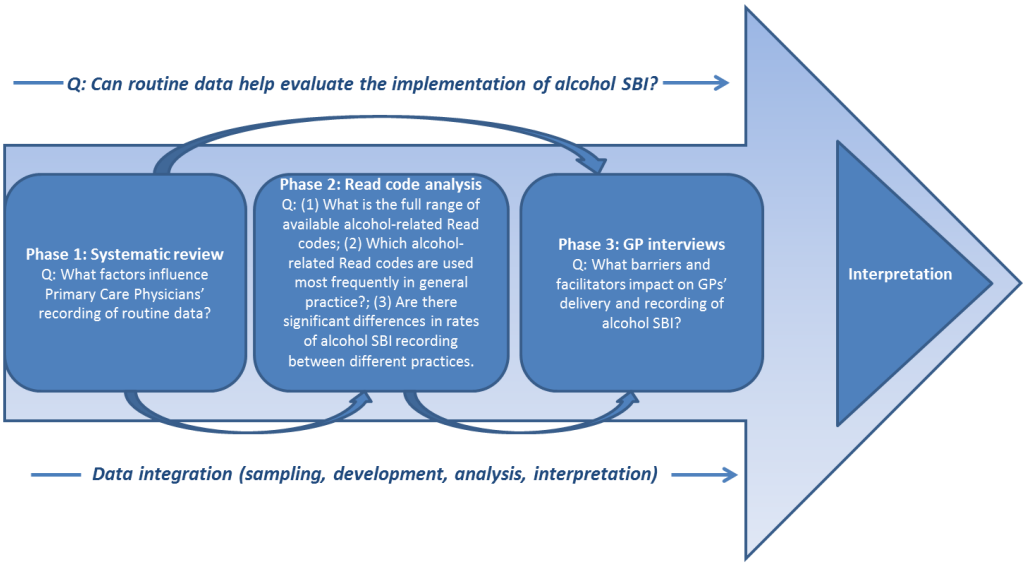
3.5.1 Summary of the sequential, explanatory mixed-methods research design

A range of mixed-methods research designs are reported in the literature. However there are arguably two main factors which determine the approach selected (445, 505, 506): first, the priority, weight or emphasis of different study methods (i.e. whether each research component (method) is assigned the same status as another); and second, the time orientation informing the process of data collection itself (i.e. whether data are collected in parallel or at different, successive time points). Cresswell et al have grouped the potential combinations of these two factors into six most frequently used models, which include three concurrent (in which all research components are conducted simultaneously), and three sequential designs (in which one research component is conducted after another) (445).

Amongst these various designs, the equal-weight sequential explanatory mixed-methods design is particularly popular among researchers (507), and generally implies collecting and analysing first quantitative, and then qualitative data in two consecutive phases within one study. The rationale for this approach is that the quantitative data and their subsequent analysis provide a general understanding of the research problem, whereas the qualitative data and their analysis refine and explain those statistical results by exploring participants' views in more depth (445, 505). In theory at least, it represents a more straightforward, if often more time-consuming, approach to mixed-methods in comparison to concurrent models of research (508).

For this study, an equal-weight, sequential explanatory mixed-methods design was selected. This overarching sequential study design is summarised in the figure below (4), which highlights the equal weighting of the quantitative and qualitative data within the analysis and interpretation of results, and the multi-level data integration that occurred throughout the research process. The issues of sequence, prioritisation, integration and interpretation of data are explored in more depth in the sections to follow.

Figure 4: Visual representation of the mixed-methods research design



3.5.2 Sequence of study components

First, the findings of the systematic review to identify which factors influence the recording of routine practice data by Primary Care Physicians (PCPs) (Phase 1) were used to both contextualise the study on a macro level, as well as to inform the development of the topic guide utilised in the semi-structured GP interviews in Phase 3. Next, quantitative methods were employed to compare and contrast the delivery of screening and brief alcohol interventions for alcohol across a sample of general practices in North East of England using routinely collected electronic GP Read Code data (Phase 2), with the subsequent qualitative interviews (Phase 3) used to probe significant results emerging from the descriptive statistical analysis. In addition, a purposeful nested sampling approach allowed the quantitative phase to inform recruitment of the interview participants in the qualitative component of the research, by highlighting *"information-rich cases"* of GPs' use of routine data to record alcohol screening and brief interventions that would benefit from further investigation (509).

Specifically, the study employed stratified purposeful sampling in order to ensure that one or two interview cases were recruited that exemplified the key traits and degree of variation relevant to understanding the target phenomenon (510). The nested sampling strategy also informed the recruitment of the case study general practice, using convenience sampling. This case study would facilitate the in-depth investigation of the range of available alcohol Read codes in primary health care, as well as helping

to inform understanding of the extent to which these available Read codes are actually used in day-to-day practice by clinicians.

3.5.3 Prioritization of data from individual research components

As well as specifying the sequential research process, it is also necessary to consider the issue of how the data arising from the three individual study phases would be *prioritised*. Priority refers to the weight or attention assigned by the researcher to each component of the research throughout the data collection and analysis process. Generally speaking, in the sequential explanatory design, priority is given to the quantitative approach because the quantitative data collection comes first in the sequence of data collection, and moreover it often represents the major aspect of the mixed-methods data collection process. However, it is by no means a straightforward decision to make, and this common prioritisation is far from prescriptive. Cresswell et al suggest that choices should be based on: the specific interests of the researcher; the target audience for the findings; and the focus of the research itself (445). As the aim of this research was to determine the usefulness of routine data to assess GPs' delivery of screening and brief alcohol interventions, the results from both the quantitative phase (in which the data itself would be analysed) and the qualitative phase (which explored GPs' own perspectives on their use of such data) were seen as carrying equal status in contributing to the overall research findings.

3.5.4 Approach to mixed-methods data integration and interpretation

Referring back to Burke Johnson and Onwuegbuzie's definition of mixed-methods research, using this approach must entail some level of 'mixing' or 'combining' data (467). As such, a key element of fully mixed-methods research is effective data integration. Indeed, without an explicit and well-considered framework for data integration, it has been argued that many so-called mixed methods studies remain unable to *"transcend the forced dichotomy of quantitative and qualitative methods and data*"(440), and continue to present results as separate, disconnected data sets. Alternatively, 'true' integration relies on examining phenomena from multiple perspectives in order to gain a more rich and comprehensive understanding (511).

In this study, data integration took place at three broad levels. First, as emphasised above, a key function of the sequential research design was to integrate the findings

from one phase of the research directly within the following phase: thus the development and refinement of the research as it progressed was directly supported by mixed-methods data integration. In particular, findings from Phases 1 and 2 (a systematic review of factors influencing recording of routine data by PCPs and secondary data analysis of alcohol Read code data) informed the content and direction of the semi-structured interviews conducted in Phase 3 with North East GPs; as well as the selection of the GP participants themselves.

Second, data integration took place at the analysis stage, where both convergent and discordant data gained from each phase of the research were blended in order to generate a more comprehensive explanatory framework of the phenomenon under investigation (483). In terms of how this was operationalized within the research process, as both qualitative and quantitative data were available on a number of GP case study practices, the use of a mixed methods matrix (originally developed by Miles and Huberman (512)) was felt to be of value. Within a mixed methods matrix, the rows represent the cases for which there is both qualitative and quantitative data, and the columns display different data collected on each case (see Figure 5). This allows researchers to pay attention to surprises and paradoxes between types of data on a single case and then look for patterns across all cases (513) in a qualitative cross-case analysis (512). Therefore, results from each phase were summarised and displayed in a matrix once individual-level, single-method analysis had been carried out. This allowed the identification of both meta-inferences, i.e. overarching converging messages from all individual component inferences, at the same time as helping to highlight areas of divergence and discrepancy.

Figure 5: Example of a mixed methods matrix based on Miles and Huberman (512)

Example of a mixed methods matrix for a study exploring the relationship between types of teams and integration between qualitative and quantitative components of studies*[22]

Study	Evidence of integration in report†	Types of publications emerging‡	Qualitative expertise on the team	Team working	Respect for team members
1	1	5	Yes	Close and friendly	Yes
2	1	5	Yes	Single researcher	Yes
3	1	4	No senior qualitative expertise on team but project researcher worked hard at it	Integrated team. The qualitative and quantitative researchers were in same department	Yes
4	2	4	Yes. There was also expertise developing in mixed methods research	Integrated team. The lead researcher worked closely with qualitative and quantitative researchers	Initially some team members did not respect the qualitative research but learnt to as the study progressed
5	2	4	Reported as no problem even though junior staff had no expertise	The junior researcher delivered both the qualitative and the quantitative components. The team was geographically close	Lead researcher did not respect the qualitative research but other senior team members did
6	2	4	Yes, including mixed methods expertise	Worked well together. Lead researcher worked closely with qualitative and quantitative researchers	Yes

*Shows the first six cases and a selection of themes from the full matrix. The content of some of the original cells has been changed to increase comprehension and protect confidentiality.
† 1=yes, 2=yes but more possible, 3=no.
‡1=none, 2=only qualitative, 3=only quantitative, 4=both published separately, 5=mixed methods article.

Third and finally, mixed-methods data integration occurred at the interpretation stage of the study. Specifically, the discussion section of this thesis sought to explore the emerging themes in more depth, and in turn, to situate these meta-inferences within the broader published literature in the field. As such, the conclusion sought to use fully integrated quantitative and qualitative data to answer to overarching research question: can routine data help evaluate the implementation of alcohol screening and brief intervention?

3.6 Summary

This chapter has presented a justification and rationale for employing a mixed-methods approach to this research study. Specifically, the application of mixed-methods seeks: to support the development of a more in-depth contextualised understanding of the phenomenon under investigation; to address the acknowledged weaknesses of single method research designs; and to support the on-going development of the actual study results. In terms of how this translates on an operational level for the research process itself, an equal weight sequential explanatory mixed-methods design was selected, incorporating elements of data integration throughout the study at multiple levels. Finally, the process and broad methodological approach are informed by a critical realist approach, reflecting the need to understand not just how individuals interact within a specific context, but additionally, the underlying generative mechanisms that have shaped that context. The following three chapters 4, 5 and 6, present the methods (or instruments) employed in the delivery of the research study itself, alongside the results from each respective research component.

Chapter 4 What factors influence primary care physicians' recording of routine data? A systematic review and critical interpretive synthesis of the literature

4.1 Introduction

This chapter presents a systematic review of the literature to identify factors that have been reported to influence the recording of routine clinical data by primary care physicians in the UK. It begins with an overview of the aims and objectives of the review; the search strategy (including inclusion and exclusion criteria); and the approach to data collection, analysis and quality assessment. Next, it details the review process itself and describes the eligible studies, before going on to summarise the methodological quality of eligible papers. The chapter then presents a critical interpretive synthesis of the findings of the included papers; and concludes with an assessment of the overall synthesis product and a brief consideration of its implications for the wider thesis.

4.2 Method

4.2.1 Rationale, aim and objectives

Systematic reviews perform a vital role in supporting evidence based health care and medicine (514), helping to *"identify, evaluate and summarise the findings of all relevant individual studies, thereby making the available evidence more accessible to decision-makers"* (515). Importantly, in addition to providing a robust yet easily digestible source of information on a particular topic, systematic reviews also help to demonstrate where knowledge is lacking (516). In this sense, Harden and Thomas (2005) argue that systematic reviews can be conceptualised as akin to primary research: they require rigorous and highly focussed data collection methods; resultant data is subject to thorough analysis and quality assessment; and the findings aim to produce *"new knowledge by bringing the results of many studies together"* (517).

The primary aim of this review was to identify what factors influence the recording of all routine (i.e. as opposed to alcohol-related) clinical or practice data by primary care physicians in the UK. In doing so, it sought to fulfil three broad objectives:

- To identify, evaluate and summarise the findings of all relevant individual studies (516); at the same time as helping to demonstrate key knowledge gaps in the subject field (518).
- To draw on the evidence generated to help inform a better conceptual understanding of the factors influencing how, when and why primary care physicians record their delivery of screening and brief alcohol interventions.
- To use the findings to aid the design of the topic guide to be used in qualitative interviews with General Practitioners that would be conducted as part of the study (see Chapter 6 for results from this phase of the research).

The *interpretivist* approach inferred in the second objective was deliberate. Although traditionally, systematic reviews have been used to answer questions of effectiveness ('what works?'), the past decade has seen a rise in what could be described as a more 'theory-driven' application of the method, in particular, realist synthesis, which seeks to *"unpack the relationships between context, mechanism and outcomes"* (519) and Greenhalgh's (2005) meta-narrative technique (520). In the context of this research, interpretation as opposed to merely aggregation was a crucial element of the review in order to support the development of a theory of primary care physician recording practices that could be explored and 'tested' in subsequent phases of the research. The synthesis method adopted – Critical Interpretive Synthesis – is described in more depth below (521).

4.2.2 Criteria for considering studies for this review

Studies

An initial scoping exercise, comprising key word searches (physician, primary care, routine data, electronic health records, audit, attitudes and evaluation) in MEDLINE and Google Scholar, suggested that a range of study designs could potentially be relevant for inclusion in the review (259, 263, 284, 291, 305, 522-526). However, given the behavioural and attitudinal focus of this review, it was considered that the study types most likely to yield data of relevance were: (1) trials to identify effective mechanisms to improve routine data recording by primary care physicians; and (2) descriptive and / or observational studies that examined physicians' views and

experiences of recording routine data, including research examining the use and adoption of electronic and paper-based patient records in primary health care settings. In addition, it was anticipated that some studies of the financing and organisation of primary health care may include discussion of recording practices and / or behaviour, and would therefore prove relevant to the review. Therefore, the review also considered studies which investigate the presence and organisation of quality monitoring mechanisms; and / or implementation studies that include some examination of physician routine data recording practices in primary health care.

The inclusion of a range of study designs was subject to the proviso that the relative strengths and weaknesses of individual research designs were recognised to prevent over-interpretation of the findings. Further, on-going studies were included only if preliminary data were obtainable and appraised. The incorporation of recognised quality assessment tools (see following sections and appendices) into the design and delivery of the review helped to ensure this.

For this review, all electronically stored patient-specific data, collected on a regular and universal basis as part of the process of delivering healthcare within primary care settings, was included as falling within the definition of routine data. Some of these data are collected on behalf of provider organisations, specifically for central returns or contracting (such as for the former Primary Care Trusts); while other data are collected by healthcare professionals or clinical teams to inform the delivery of care to individual patients (249). Data sources include: General Medical Services (GMS) data; Royal College General Practice (RCGP) Weekly Returns Service data; General Practice Research Database (GPRD); National Database for Primary Care Groups and Trusts; General Household Survey, Primary Care Information Service (PRIMIS); Morbidity, Information Query and Export Syntax (MIQUEST); Practice based disease registers; Practice based health promotion data; Prescribing Analysis and Cost (PACT) data ; Quality Management and Analysis System (QMAS); and The Health Improvement Network (THIN) (254).

Participants

Primary care physicians are medically qualified physicians who provide primary health care. This includes general practitioners, family doctors, family physicians, family

practitioners and other physicians working in general practice settings who fulfil primary health care tasks. The review focussed on physicians as opposed to other primary health care workers such as nursing staff due to the key role they play in directing and delegating recording activity within primary care settings (261).

Setting

Any UK primary health care setting was acceptable for inclusion. For the purposes of this review, primary health care was defined as all immediately accessible, integrated general health care which covers a broad range of presenting problems, and which can be accessed by a wide range of patients on demand, and not as the result of a referral for specialist care (177). Such provision should be delivered by clinicians who are accountable for addressing a large majority of personal health care needs, developing a sustained and continuous relationship with patients, and practice in the context of family and community (527). In the UK National Health Service, therefore, the main provider of primary health care is general practice.

This review limited its remit to UK primary care settings only due to the unique history, culture, organisation, and funding arrangements of the UK National Health Service (NHS). Funded directly by the government through general taxation, the UK NHS is a highly centralised version of only a handful of single-payer health systems around the world and is relatively unique in a number of important respects. Importantly, unlike restricted single-payer systems like Medicare in the USA or Australia's Medicare which uses a system of top-ups for certain services, all those ordinarily resident in the UK are entitled to health care that is largely free at point of access, with the exceptions of prescription charges, dental care and optician services (260, 528). Further, in contrast to single-payer systems like those of Canada and Norway, the majority of physicians and nurses are government employees (528).

Publication date

The review initially considered studies published between January 2000 and March 2011. Searches were updated in January 2014 to include the period April 2011 to December 2013. This period encompasses a series of key developments, in UK health policy, linked to performance monitoring and recording health interventions, including the growth in centralised performance management and use of financial incentives in

primary health care. In particular, this covers: the launch of the NHS Plan in 2000, along with the star-ratings system for former Primary Care Trusts the same year (88); key changes to GPs contractual arrangements in 2004 such as via the Quality and Outcomes Framework (QOF) (529); and the introduction of the 'Vital Signs' performance indicators in 2007 as part of the new NHS Operating Framework (530).

Outcome measures

It was anticipated that the studies included in the review would report a wide variety of outcomes due to the heterogeneous nature of the target material. However, key outcome measures of interest included:

- Any objective measure of written or electronic clinical or administrative recording behaviour using either:
  - standardised patient (an individual who is trained to act as a real patient in order to simulate a set of symptoms or problems);
  - trained observer (such as a researcher);
  - video or audio recording.
- Any objective measure of general clinical performance or process outcome such as:
  - number of tests ordered or decision to prescribe a particular drug;
  - patient health outcomes (e.g. blood pressure, length of hospital stay).
- Any subjective measure of primary care physicians' knowledge, attitudes or satisfaction with clinical and administrative health records.

4.2.3 Inclusion and exclusion criteria

Inclusion criteria

- Studies reporting data on UK based primary care physicians;
- Studies published between January 2000 and December 2013;
- Peer-reviewed studies available in the public domain.

Exclusion criteria

- Studies that only include data on non-UK primary care physicians;

- Studies published before January 2000;
- Grey or unpublished literature that has not been subject to peer-review as a means of quality controlling the resultant evidence.
- Studies not reported in English.

4.2.4 Search strategy for identification of studies

Electronic searches

A search strategy was designed with the help of an information specialist to locate relevant studies of interest in this review (see Appendix A for full details). As detailed above, the review elected to limit its search to published, peer-reviewed material that was readily available in the public domain. Although it is acknowledged that the decision to exclude grey literature such as theses, conference abstracts, unpublished studies and reports carried with it the risk of publication bias, it was felt that this approach offered a more reliable way of accessing relevant data that had already been subject to a level of quality control via peer review.

The following databases were searched by AOD (Amy O'Donnell): MEDLINE; PsycINFO; EMBASE; and Scopus. This selection of databases included two high performing medical databases (MEDLINE and EMBASE) (531), a database specifically focussed on behavioural sciences (PsycINFO), and finally Scopus, which covers additional open access sources and various scientific websites (532). Further, evidence suggests that searching three or more databases is likely to achieve optimal coverage of potential records (533, 534). In addition, the reference lists of located papers were scanned for additional relevant material using a 360 degree citation process; and reference lists already held by reviewers were searched.

Search terms

Search terms were agreed following a scoping search carried out in collaboration with the review team information specialist. The search has been split into three core concepts:

Set 1: Participants:

Primary care physicians (for example: GP; general practitioners; doctors; primary health care practitioners; family physicians).

Set 2: Influencing Factors

Any behavioural or attitudinal factors that influence the recording of routine clinical and administrative health data.

Set 3: Routine health data

Read codes; electronic medical records; electronic patient records; patient records.

Specific search terms used according to the requirements of individual databases are presented as Appendix A.

4.2.5 Data collection and analysis

Screening

The title and abstract of all records identified by electronic searches were retrieved and screened for relevance and downloaded to a bibliographic software programme (EndNote X7). Any duplicate records were removed, along with any non-UK-based studies, using a series of Endnote searches. Next, all titles and abstracts were screened in order to assess which studies met the inclusion criteria. An initial list of potential studies for inclusion was then reviewed by a second reviewer, with any outstanding discrepancies and / or queries resolved through referral to a third party as necessary. The Cochrane Group emphasise the importance of involving two reviewers in the final selection of studies (535), as this limits the potential for relevant material to be discarded (536). Finally, full text copies of all potentially relevant papers were retrieved for in-depth review by two independent reviewers (AOD and KH (Katie Haighton)), according to the inclusion and exclusion criteria, in order to determine eligibility.

Quality / risk-of-bias assessment

Although the quality of studies was not stipulated as an inclusion or exclusion criterion for this review, it was nevertheless viewed as an important element of the review process in order to inform some sort of 'measure' of the robustness of the available evidence in this subject area, or as Khan et al describe it *"to guide interpretation of findings, help determine the strength of inferences, and guide recommendations for future research and clinical practice"* (537).

According to Verhagen et al, methodological quality assessment involves some level of evaluation of internal validity (the degree to which a study's design, conduct and analysis have minimised biases) and external validity (the extent to which the results of a study can be generalised outside the experimental situation)(538). For this review, the methodological quality of included studies was assessed by a single reviewer (AOD) using one of two method-appropriate tools. First, for quantitative studies, the component-based tool developed by the Effective Public Health Practice Project, Canada (539), was used (see Appendix B), which possesses a relatively high degree of inter-rater reliability in comparison to alternative tools (540, 541). Second, qualitative research studies were assessed using the Critical Review Form for Qualitative Studies (542) originally developed by the McMaster University Occupational Therapy Evidence-Based Practice Research Group and revised by Letts et al., 2007 (see Appendix C). A second reviewer (KH) assessed a random sample of twenty per cent of all papers in order to independently verify the findings of this process.

4.2.6 Critical Interpretive Synthesis of data

Critical Interpretive Synthesis (CIS) was used to analyse and synthesise data, with a deliberate focus on the interpretive function of this approach (521). Although this included an element of aggregation (that is, identifying those findings that recur most frequently across included studies (543)), the primary function of synthesis here was *interpretation*. As Harden writes: *"rather than pooling findings from studies, key concepts are translated within and across studies, and the synthesis product is a new interpretation"* (544). Thus, in contrast to merely aggregating review findings, emerging themes were used as a "jumping-off point" (543), to allow influencing factors to be linked together in ways not necessarily addressed in the primary research reports.

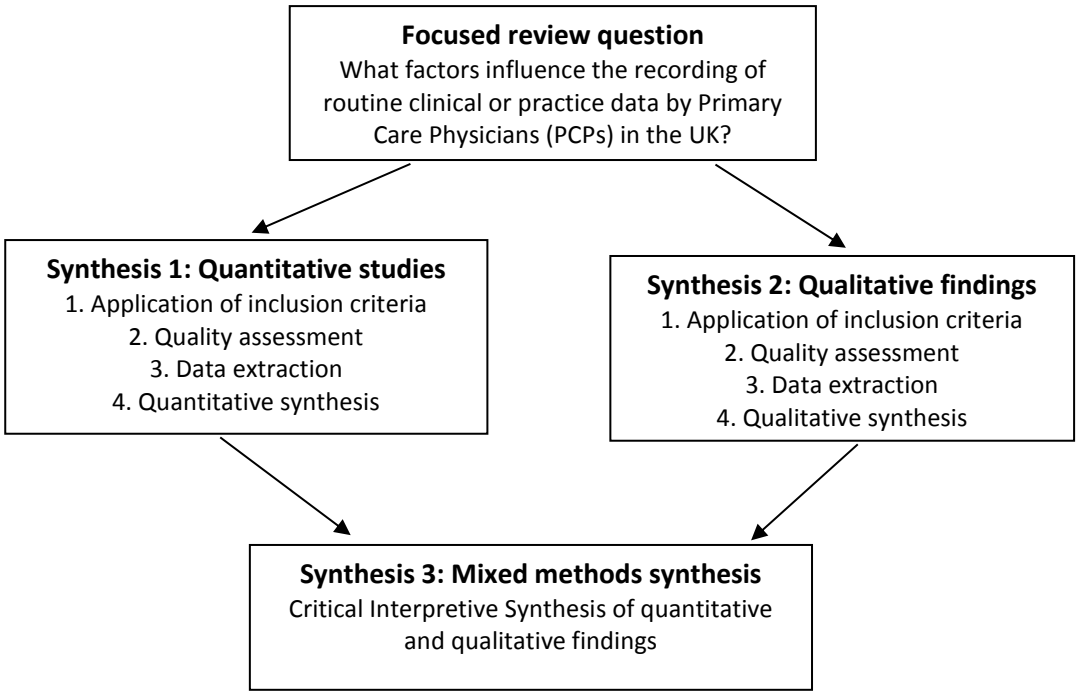
Critical Interpretative Synthesis as opposed to meta-analysis was selected as the mode of reporting results for two main reasons. Firstly, as reported above, the studies selected for inclusion in the review were highly heterogeneous in both design and methods. This diversity had been anticipated in the findings of the initial scoping search conducted in the early stages of the review, the findings of which suggested that it would not be possible (or potentially appropriate) to pool findings from the available evidence. CIS offered a more relevant method of critically analysing a

complex body of literature which also incorporated the transparent, structured and accountable means of identifying and accessing literature offered by more traditional systematic review approaches (545).

Secondly, and importantly, the stated goal of this phase of the research was not to produce an overall pooled estimate of effect size in terms of which interventions work best to improve recording practices in primary care physicians (what one might see as a more 'typical' style of review (544)). Rather, the review sought to identify which factors influence physician's recording practices in order to build a better conceptual understanding of which contexts are more or less supportive of effective recording. Thus, rather than seeing this as a limitation of the review, it was felt that, as Harden argues, integrating multiple methods evidence would actually serve to *"enhance its utility and impact"* (544).

This interpretive approach to data synthesis comprised three separate syntheses: 1. A narrative synthesis of the results recorded in quantitative papers; 2. thematic analysis of qualitative data presented in qualitative or mixed methods papers; and 3. a mixed methods synthesis using Critical Interpretive Synthesis of both quantitative and qualitative findings (517). The process of synthesis is represented in diagrammatical form in Figure 6 below, with further detail provided in the next section.

Figure 6: Process of synthesising multi-method evidence (based on Harden & Thomas, 2005 (517))



Data extraction of eligible studies

Data was extracted from all included papers in tabular form using a tailored data extraction pro-forma in Excel. This was carried out by one review author (AOD), using a checklist based on criteria developed by EPOC (The Cochrane Effective Practice and Organisation of Care Group) (546) and modified for the purposes of this review. As above, a random sample of twenty per cent of all papers was also reviewed by a second reviewer (KH) in order to independently verify the findings of the data extraction process. Data were extracted on: aim, design, and study methods; setting, participants and sample size; data source and outcome measures; results; conclusions and key limitations of the research (see Table 4 further in this section). Data was also collected on the quality of the papers and reported in the extraction tables, based on method-appropriate quality assessment tools (summarised in Section 4.4). Drawing on the extracted and quality assessed data, narrative synthesis and thematic analysis was employed for the quantitative and qualitative data respectively to combine and organise the findings, described in more detail below.

Synthesis 1: Narrative synthesis of findings from trials and other quantitative studies

In the first synthesis, key data from all included quantitative studies was extracted, including summary statistics as available. Results were presented as a narrative synthesis, whereby statistically significant relationships between a particular intervention or identified influencing factor were grouped together on a thematic basis, and placed into one of three categories: positive (facilitating); negative (barrier); or no relationship.

Narrative synthesis as opposed to meta-analysis was selected as the means of combining and presenting data for two main reasons. First, the scoping exercise carried out at the start of the review had suggested that the heterogeneity of the populations, interventions and outcome measures of the evidence base was likely to be substantial, therefore pooling results would not be appropriate. Second, and importantly, the stated goal of this phase of the research was not to produce an overall pooled estimate of effect size in terms of which interventions work best to improve recording practices in primary care physicians (what one might see as a more 'typical' style of review (544)). Rather, the review sought to identify which factors

influence physician's recording practices in order to build a better conceptual understanding of which contexts are more or less supportive of effective recording.

Synthesis 2: Thematic analysis of qualitative data

Next, in the second synthesis, the results and conclusions sections of all eligible papers comprising an identifiable qualitative element (including relevant elements of mixed methods papers) were entered verbatim into NVivo software designed for qualitative data analysis and line-by-line coding of the findings of primary studies was carried out. These codes were linked and organised to allow the construction of a predominantly descriptive hierarchical framework (517), based on key emergent themes, concepts and categories of influencers.

The initial coding themes drew on the work of Boonstra and Broekhuis as a starting point, whose systematic review sought to identify, categorise and analyse barriers perceived by physicians to the adoption of Electronic Medical Records and thus bore some useful similarities to the topic under consideration (305). New themes were added as appropriate in order to more accurately capture the on-going interpretation of the qualitative data (451, 547). Along with the synthesis of quantitative data (1) described above, this phase was most akin to Element 2 described by Rodger's et al, where they develop a *"preliminary synthesis"* (548).

Synthesis 3: Mixed methods synthesis of qualitative and quantitative findings

Finally, in Synthesis 3, relationships within and between studies were explored in order to formulate a new interpretation that integrated these findings into what might be described as a typology of influencing factors. The individual synthesis mentioned above were re-grouped (or 'clustered' (548)) into barriers versus facilitators of robust recording practices by primary care physicians. This phase also helped identify instances in which certain factors worked in divergent ways (i.e. acted as both facilitators AND barriers to recording); alongside examples of which combinations of factors worked together to produce varying effects.

This allowed the review to 'go beyond' the content of the original research, described as the *"defining characteristic"* of the synthesis process, akin to the 'third order interpretations' employed in meta-ethnography based on the 'lines-of-argument'

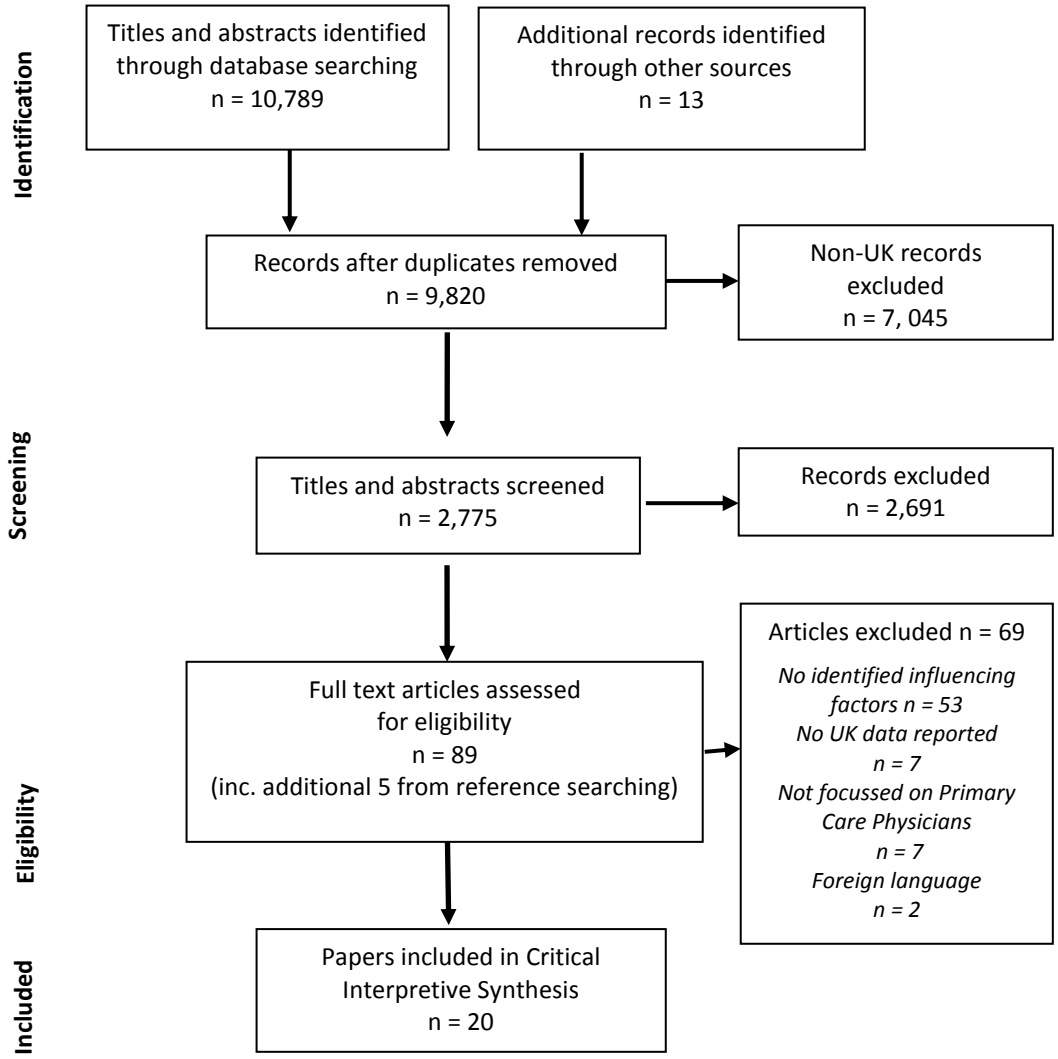
synthesis developed by Noblit and Hare (517, 549). Dixon-Woods et al conceptualise this approach as a *"synthesising argument*" which *" integrates evidence from across the studies in the review into a coherent theoretical framework comprising a network of constructs and the relationships between them"* (521). This process may require what they described as *"synthetic constructs"* in which the primary evidence is transformed into new interpretations. This interpretivist approach was a crucial component of the review in supporting the development of a theory on primary care physician recording practices which could be 'tested' in subsequent phases of the research.

4.3 Description of included studies

The search strategy identified 2,405 potentially eligible papers, the titles and abstracts of which were screened against the eligibility criteria. The eligibility of the full text of a total of eighty-one papers was assessed independently by two reviewers (AOD and KH), with any disagreements resolved by discussion with an external party (Eileen Kaner (EK)). Fifty-nine papers were excluded at this stage. The main reasons for exclusion were: no clear influencing factor was identified (53); the paper did not report any UK data (7); the paper did not focus on primary care physicians (7); and the paper was not reported in English (2). As a result, a total of twenty papers, based on nineteen different studies (282, 550-568), were deemed to fulfil the inclusion criteria. For all eligible studies, data was extracted on the type of behaviour targeted or overarching aim of the study; the study design and individual methods employed; setting, participants and sample size; source of study data; outcome measure(s) used (if appropriate); and results, including an assessment of the overall quality of the paper.

The study selection process is shown overleaf as a flow diagram in Figure 7.

Figure 7: PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flow diagram of systematic review (546)



Of the nineteen studies covered by the twenty eligible papers: the majority (fifteen studies in sixteen papers) reported on research that was purely quantitative in design (550, 551, 553-557, 559-564, 566-568); three were described as mixed-methods studies (282, 552, 565); and one paper was fully based on a qualitative study (558).

4.4 Methodological quality of included studies

The agreement between the reviewers in quality assessing the 20% sample of eligible papers (four papers) was analysed with a kappa statistic for multiple-raters, which resulted in a value of k = 0.824. Assessed this way, the strength of agreement was considered to be 'very good'. At the same time, it is also important to stress that the reporting style of some included papers made evaluation of the methodological quality

of the study challenging (540). For example, a number of quantitative papers did not explicitly state the research design (552, 554, 556, 557, 562); and none of the four papers with a qualitative element made their theoretical perspective explicit (282, 552, 558, 565). Where it was not possible to draw a firm conclusion in relation to particular quality assessment criteria employed by the selected tools, it is simply reported as "can't tell" in the quality assessment tables (see Appendix D). With this in mind, the main findings are described below, organised by overall methodological approach.

4.4.1 Quality of included quantitative papers

Looking first at the internal validity of the eligible papers, there was marked variation in the quality of study design. Of the eighteen studies with an identifiable quantitative element, including three mixed methods studies (282, 552, 565): two were described as Randomised Controlled Trials (RCTs) (559, 563); one study (reported in two papers) described itself as a Randomised Crossover Trial (550, 569); six were broadly longitudinal in design and / or utilised interrupted time series methods (553, 554, 557, 562, 566, 568); two termed themselves data 'audits' or 'evaluations' (552, 560); a further two were cross-sectional studies (282, 556) ; two could be defined as cohort studies (555, 564); one study employed visual techniques (567) and a final study was described as a prospective uncontrolled intervention study (561).

In relation to selection bias, only one study was rated as strong in this respect (552), with the remainder judged potentially unrepresentative of the target population for a number of reasons. In particular, participants were often drawn from practices signed up to various data improvement networks so unrepresentative of the wider practice population (553, 554, 557, 564). Sample sizes varied significantly, from relatively small-scale studies involving ten to twenty GP practices (551, 556, 559-561, 565, 567); to studies based on sizeable national patient datasets (553, 562, 566, 568). Finally, looking at the quality of data collection and analysis in the eligible papers, none of the included studies used what could be described as validated data collection tools. Few studies controlled for confounders and no study reported that participants were 'blinded' to the research question; a recognised cornerstone of internal validity, although usually more applicable to the quality assessment of randomised control trials. Only six studies reported on withdrawals and drop-outs from the study (282, 551, 552, 559, 563, 564).

Focussing next on external validity, seven studies considered local populations such as general practitioners based in Norfolk (551), London (556, 560), and Trent (282); and patients and general practitioners based in Leicestershire (555), North Staffordshire (561) and Greater Manchester (563) practices. Two studies considered regional populations of general practices (552, 559); and the remaining five studies considered national samples of patient data, drawn from a range of general practice databases (553, 554, 557, 562, 564). For the nine studies that sampled participants: three studies used random selection (282, 552, 563); two studies used a convenience sample (551, 564) and five studies did not explicitly specify their sampling strategy (555, 556, 559, 560, 567). One study drew participants from both a national database and a purposive selection of general practices (565). Again, the remainder were based on national GP databases (553, 554, 557, 562, 566, 568).

Overall, of the fifteen fully quantitative studies, the majority (eleven) were categorised as weak (550, 551, 553, 555-557, 560-562, 564, 567) in methodological quality, one was categorised as moderate (568) and a further two strong (559, 563). The quantitative element of a further three mixed methods papers was moderate (282, 552) or weak (565).

4.4.2 Quality of included qualitative studies

Four papers reported on studies with an identifiable qualitative element, including one interview-based study (558) and three mixed methods papers (282, 552, 565). All papers stated the purpose of the study but generally lacked detail on the actual research design or did not identify a particular theoretical perspective. Whilst the evidence available would suggest all three pieces of research were generally phenomenological in approach, this was not always explicit, and overall, the papers were located at the low-inference end of the qualitative research spectrum. Sampling approaches varied. One study employed a purposeful sampling strategy, with additional interviews carried out until data saturation was achieved (558). Two mixed methods studies used a random stratified sample, although it was unclear as to whether sampling had been carried out until redundancy in data was reached (282, 552). The final mixed methods study employed essentially convenience sampling to identify suitable participants (565).

In terms of the papers' description of their respective data collection procedures, all detailed the study site and participants, but were less precise with regards to possible issues of research bias, or the potential impact of the researcher-participant relationship on the research process. Two of the four papers explained the approach taken to data analysis (thematic analysis, using the constant comparative approach (282, 558)). Finally, all papers provided generally credible findings based on the evidence reported, although the transferability of the findings was limited, mainly due to small or unrepresentative sampling. Overall, the quality of the four papers with a qualitative component were categorised as strong (558) and moderate (282, 552, 565).

Table 4: Summary of key characteristics of included studies

Citation	Setting Participants & Sample	Methods	Results	Quality (Assessment tool)
Brown et al[a] (2003) "Randomised crossover trial comparing the performance of Clinical Terms Version 3 and Read Code 5 byte set coding schemes in general practice" **(551)** and Brown et al[b] (2003) "A methodology for the functional comparison of coding schemes in primary care" **(550)**	Setting: UK primary care (Norfolk) Participants: GPs Sample: 10	Randomised crossover trial in which clinicians coded patient records using both coding schemes after being randomised in pairs to use alternate combinations of one scheme before the other.	• Exact matches were more common with Clinical Terms (70% (95% confidence interval 67% to 73%)) than with Read Codes (50% (47% to 53%)) (P < 0.001); and this difference was significant for each of the 10 participants individually. • The pooled proportion with exact and identical matches by paired participants was greater for Clinical Terms (0.58 (0.55 to 0.61)) than Read Codes (0.36 (0.33 to 0.39)) (P < 0.001). • The time taken to code with Clinical Terms (30 seconds per term) was not significantly longer than that for Read Codes.	Weak (EPHPP)
Campbell et al (2002) "Quality assessment for three common conditions in primary care: validity and reliability of review criteria developed by expert panels for angina, asthma and type 2 diabetes" **(552)**	Setting: UK primary care (covering 3 English NHS regions) Participants: General practice staff Sample: 60 practices	Mixed methods study comprising analysis of quantitative audit data, a postal questionnaire data and semi-structured interviews	• 54%, 59%, and 70% of relevant criteria rated valid by the expert panels for angina, asthma, and type 2 diabetes respectively were found to be usable, valid, reliable, and acceptable for assessing quality of care. • General practitioners and practice nurses agreed with panellists that these criteria were valid but not that they should always be recorded in the medical record.	Weak (EPHPP)/ Moderate (Critical Review Form)
Carey et al (2009) "Blood pressure recording bias during a period when the Quality and Outcomes Framework was introduced" **(553)**	Setting: UK primary care Participants: National sample of patient data Sample size: 3,164, 189 BP measurements from 236 467 patients, with the ischaemic heart disease, stroke and hypertension diagnoses from 2000 to 2005.	Longitudinal study which examined blood pressure data from 2000-2005 to produce: (1) histograms of SBP recording distribution, pre- and post-QOF periods; (2) crude calculations of 'expected' value for each BP integer increment; (3) examination of degree to which the level of SBP influenced the likelihood of achieving DBP of 90 or less & whether there was any change in this influence over time; (4) assessment of treatment for hypertension through Read code searches for 1st 3 months of 2005; (5) examination of variation between practices in 2004–05, by classifying them according to the degree to which they tended to record just under the 150mmHg threshold.	• Over this period, recorded systolic BP (SBP) fell: 36% had SBP 4150mmHg in 2000–2001, and only 19% in 2004–2005. • There was a trend towards recording systolic values just below the 150 cut-off. In 2000–2001, 2.3% of patients had 148–149 recorded and 1.8% had 151–152. In 2004–2005, the figures were 4.2 and 1.3%, respectively. • By smoothing the distribution, estimated that the true percentage of patients with SBP 4150mmHg in 2004–2005 was 23%, rather than the 19% recorded. • Moreover, patients with a recorded SBP¼148–149 were more likely to have a recorded diastolic BPp90 (93%) than patients with SBP 151–152 (78%). • However, patients just below the 150mmHg cut-off received more antihypertensive treatment than those just above it (odds ratio¼1.20, 95% confidence interval 1.01–1.41).	Weak (EPHPP)

Citation	Setting Participants & Sample	Methods	Results	Quality (Assessment tool)
Coleman et al (2007) Distributing questionnaires about smoking to patients: impact on general practitioners' recording of stop--smoking advice **(555)**	Setting: UK primary care (Leicestershire) Participants: Patients, GPs Sample size: 32 GPs and 6775 patients	Controlled before-and-after study in which researchers: (1) distributed questionnaires on smoking behaviour to patients in surgeries; (2) obtained medical records for these patients & for a comparator group who had not received the questionnaire; and (3) compared documenting of stop smoking advice in patient's medical records between 2 groups.	• Discussion of smoking was recorded in 8.0% (220/2739) of medical records when questionnaires were distributed versus 4.6% (116/2537) where these were not. • After controlling for relevant potential confounders (inc. age, gender), odds ratio for recording of information in the presence of questionnaire distribution (versus none) was 1.78 (95% CI, 1.36 to 2.34).	Weak (EPHPP)
Coleman et al (2007) "Impact of contractual financial incentives on the ascertainment and management of smoking in primary care" **(554)**	Setting: UK primary care (national) Participants: GPs, patient data Sample: 32 GPs	Longitudinal study which analysed data from patients aged 15–75 years including annual incidence of recording smoking status / advice to stop smoking and prescriptions for nicotine addiction in current smokers, for each year from 1990 to 2004.	• Smoking status recording increased temporarily 1993–4 & then rose gradually from 2000. • This rise was more marked from 2003, with an 88% increase between the first quarters of 2003 & 2004. Latter ¼ was just before introduction of new GP contract & higher rates of recording smoking status were sustained for subsequent year. • In smokers, there was a broadly similar pattern for the proportion recorded as having received brief cessation advice. • However, while there was a sharp rise in nicotine addiction treatment prescriptions for 2000+, no comparable acceleration 2003+ was apparent.	Moderate (EPHPP)
Dalton et al (2010) "Implementation of the NHS Health Checks programme: baseline assessment of risk factor recording in an urban culturally diverse setting" **(556)**	Setting: UK primary care (NW London) Participants: General practices Sample size: 14	Cross sectional study which analysed data extracted from electronic medical records in 14 general practices between December 2008 and January 2009. The completeness of blood pressure, smoking, body mass index (BMI) and cholesterol recording was examined by practice and patient characteristics.	• Recording of blood pressure [85.6% (practice interquartile range = 10.1)] and smoking status [95.8% (2.6)] was very high. • Recording of BMI [72.8% (23.4)] and cholesterol [55.6% (25.3)] was considerably lower. • Large differences in recording between practices (range for cholesterol: 33.6–78.0%), though these were largely explained by patient characteristics. • Hypertensive patients [adjusted odds ratio (AOR) = 36.3, 95% confidence interval (CI) 21.0–62.9], women [AOR = 2.88 (95% CI 2.64–3.15)] and older patients [AOR = 2.75 (95% CI 2.28–3.32) for 65–74 against 35–44 years had better recording of blood pressure as well as BMI and cholesterol. • Recording of blood pressure [AOR = 1.38 (95% CI 1.09–1.75)] and cholesterol [AOR = 1.47 (95% CI 1.30–1.66)] was significantly higher among South Asian patients.	Weak (EPHPP)

Citation	Setting Participants & Sample	Methods	Results	Quality (Assessment tool)
Lusignan et al (2002) "Does Feedback Improve the Quality of Computerized Medical Records in Primary Care?" **(557)**	Setting: UK primary care (national) Participants: General practices Sample size: 500+ general practices	Longitudinal study which examined data markers used since 1992 to determine whether the feedback of "useful" data quality markers led to a statistically significant improvement.	• Three quality markers improved significantly over the period of the study at the 5% level. These were (1) the use of highly specific "lower-level" Read Codes (p=0.004) and the linkage of (2) repeat prescriptions (p=0.03) and (3) acute prescriptions (p=0.04) to diagnosis. • Clinicians who fall below the target level for linkage of repeat prescriptions to diagnosis receive more detailed feedback; the effect of this was also statistically significant (p<0.01.)	Weak (EPHPP)
Lusignan et al (2003) "Managers See the Problems Associated with Coding Clinical Data as a Technical Issue whilst Clinicians also See Cultural Barriers" **(558)**	Setting: UK primary care (South Thames Primary Care Research Network area) Participants: GPs, nurses & practice managers Sample size: 15	Qualitative Research involving semi-structured interviews	• For clinicians the recording of structured data within a consultation is not a neutral activity, they are highly aware of diagnostic uncertainty and sensitive to the potential impact of both a correct and incorrect diagnostic label on their relationship with their patient. • Clinicians accept that data has to be coded if they are to demonstrate that appropriate evidence based care has been provided to populations; but alongside this they require free-text as a more powerful reminder of the individual human encounter. • Managers felt they could encourage clinicians to code data for re-use as part of population data or as quality target indicators rather than as an enabler of the next consultation.	Strong ((Critical Review Form)
Lusignan et al (2004) An educational intervention to improve data recording in the management of ischaemic heart disease in primary care **(564)**	Setting: UK primary care (England, 8 PCTs) Participants: General practices Sample: 87 practices (based on practice population of 600 000)	Before and after study of impact of Primary Care Data Quality (PCDQ) Programme on key data measures of quality of ischaemic heart disease care recording in 87 general practices. PCDQ intervention comprised 1 hour didactic introductory meeting with practice representatives; collection, analysis and presentation of key data using MIQUEST at baseline and thereafter at 6 monthly data quality workshops of 2-3 hours involving a GP, nurse and practice manager from each practice.	• Recorded prevalence of ischaemic heart disease increased by about 10 % (from 29 to 32 per 1000 patients). • Nearly 10 000 (50%) additional patients with ischaemic heart disease were recorded as being given advice to stop smoking, a further 2000 (10%) had their smoking habit recorded and their cholesterol measured and nearly 1000 (5%) had their aspirin status recorded. • Concluded that an educational approach, focused on a narrow clinical area where there are interventions of known effectiveness that GPs can make, appears to result in a modest but clinically significant increase in the identification of cases of ischaemic heart disease and in data recording on these patients in primary care.	Weak (EHPP)

Citation	Setting Participants & Sample	Methods	Results	Quality (Assessment tool)
Hippisley-Cox (2003) "The electronic patient record in primary care - regression or progression? A cross sectional study" **(282)**	Setting: UK primary care (Trent region) Participants: GPs Sample: 53	Cross sectional study which reviewed of medical records and conducted interviews with general practitioners.	• Compared with paper based records, more paperless records were fully understandable (89.2% v 69.9%, P=0.0001) and fully legible (100% v 64.3%, P < 0.0001). • Paperless records were significantly more likely to have at least one diagnosis recorded (48.2% v 33.2%, P=0.05), to record that advice had been given (23.7% vs 10.7%, P=0.017), and, when a referral had been made, were more likely to contain details of the specialty (77.4% v 59.5%, P=0.03). • When a prescription had been issued, paperless records were more likely to specify the drug dose (86.6% v 66.2%, P=0.005). • Paperless records also contained significantly more words, abbreviations, and symbols (P < 0.01 for all). • At doctor interview, there was no difference between the groups for the proportion of patients or consultations that could be recalled. Doctors using paperless records were able to recall more advice given to patients (38.6% v 26.8%, P=0.03).	Moderate (EPHPP) / Moderate (Critical Review Form)
Holt (2010) "Automated electronic reminders to facilitate primary cardiovascular disease prevention: randomised controlled trial" **(559)**	Setting: UK primary care (West Midlands) Participants: General practices Sample: 19	Randomised Control Trial of the E-Nudge system. Four groups of patients aged 50+ were identified on the basis of estimated cardiovascular risk and adequacy of risk factor data in general practice computers. The E-Nudge intervention involved screen messages to highlight individuals at raised risk and prompt users to complete risk profiles where necessary.	• Intervention led to an increase in the proportion of patients with sufficient data who were identifiably at risk, with a difference of 1.94% compared to the control group (95% confidence interval [CI] = 1.38 to 2.50, P<0.001). • Corresponding reduction occurred in the proportion potentially at risk but requiring further data for a risk estimation (difference = –3.68%, 95% CI = –4.53 to –2.84, P<0.001). • No significant difference was observed in the incidence of cardiovascular events (rate ratio = 0.96, 95% CI = 0.85 to 1.10, P = 0.59).	Strong (EPHPP)

Citation	Setting Participants & Sample	Methods	Results	Quality (Assessment tool)
Kontopantelis (2012) "Recorded quality of primary care for patients with diabetes in England before and after the introduction of a financial incentive study: a longitudinal observational study" **(568)**	Setting: UK primary care (national) Participants: General practices Sample: 148 (covering 653 500 patients inc. 23780 diabetes patients in regression analyses)	Longitudinal observational study. Quantified annually recorded quality of care as measured by 17 QOF diabetes indicators using Interrupted Time Series Design	• Recorded quality of care improved for all subgroups in the pre-incentive period. • In year 1, composite quality improved over-and above this pre-incentive trend by 14.2% (13.7–14.6%). • By year 3, the improvement above trend was smaller, but still statistically significant, at 7.3% (6.7–8.0%). • After 3 years, recorded levels of care varied significantly for patient gender, age, years of previous care, no. of co-morbid conditions and practice diabetes prevalence. • Financial incentives were associated with improvements in recorded quality of diabetes care, mostly related to the documentation of recommended aspects of clinical assessment as opposed to patient outcomes.	Moderate (EPHPP)
Kumarapeli (2006) "Ethnicity recording in general practice computer systems" **(560)**	Setting: UK (London) primary care. Participants: General practices Sample size: 16 practices covering 117 out of 158 patients.	Audit and evaluation which assessed the effect of the Individual Patient Registration Profile Project (IPRP) intervention on ethnicity recording levels.	• Baseline recording of ethnicity data was poor (<1% of practice population). Median level of ethnicity recording after the study was 46.85% (IQR 12.85%); minimum/maximum levels were 14.01/74.77%, respectively. • Ethnicity recording generally increased with age: from 46.74% (17 709/37 888) for patients 40+ to 54.94% (6349/11 556 for patients over 65 (with high levels for young adults). • More codes were recorded for females than males (medians: M - 57.15 (IQR 3.9%); F - 46.03% (IQR 7.6%). • Ethnicity recording was primarily carried out using '9S...' (68.37%) and '9i...' codes (28.18%). • Commonest recorded category was 'White' (60.88%, 34 013/55 871). Black/Black British' recorded for 22.99% (12 844/55 871) & 'Mixed', 'Asian/Asian British' 3% of ethnicity codes. 'Chinese or other' ethnic group more likely to have ethnicity recorded using the 9i hierarchy / local EMIS codes. • Mixed use of hierarchies and use of non-specific codes made it difficult to identify individuals in specific high-risk groups. • Most practices used full range of hierarchies & proportions of people in each ethnic category was not statistically different from 2001 census.	Weak (EPHPP)

Citation	Setting Participants & Sample	Methods	Results	Quality (Assessment tool)
Kumarapeli (2013) "Using the computer in the clinical consultation; setting the stage, reviewing, recording, and taking actions: multi-channel video study" **(567)**	Setting: UK primary care (SE London) Participants: General practices Sample: 16 GPs based in 11 general practices covering 163 real-life consultations (101 female patients; 62 male patients)	Multi-channel video study using tailored toolkit (ALFA: Activity Log File Aggregation) to classify and quantify patient-doctor consultations using four EPR brands. This included a visual study of the consultation room and coding of interactions between clinician, patient, and computer.	• Patients looked at the computer twice as much (47.6 s vs 20.6 s, p<0.001) when it was within their gaze. A quarter of consultations were interrupted (27.6%, n=45); and in half the clinician left the room (12.3%, n=20). • The core consultation takes about 87% of the total session time; 5% of time is spent preconsultation, reading the record and calling the patient in; and 8% of time is spent post-consultation, largely entering notes. Consultations with more than one person and where prescribing took place were longer (R2 adj=22.5%, p<0.001). • The core consultation can be divided into 61% of direct clinician–patient interaction, of which 15% is examination, 25% computer use with no patient involvement, and 14% simultaneous clinician–computer–patient interplay. The proportions of computer use are similar between consultations (mean=40.6%, SD=13.7%). • There was more data coding in problem-orientated EPR systems, though clinicians often used vague codes.	Weak (EPHPP)
Porcheret (2004) "Data Quality of General Practice Electronic Health Records: The Impact of a Program of Assessments, Feedback and Training" **(561)**	Setting: UK primary care (North Staffordshire). Participants: GP practices Sample size: 7 (covering 59,337 patients	Cohort study (described as prospective uncontrolled intervention study) which involved a combination of feedback sessions, training and other agreed strategies to improve data quality in participant practices.	• On repeat assessments all practices improved or maintained their levels of coding and over time rates increased to levels comparable with, or above, MSGP4 rates.	Weak (EPHPP)

Citation	Setting Participants & Sample	Methods	Results	Quality (Assessment tool)
Rait (2009) "Recent trends in the incidence of recorded depression in primary care" **(562)**	Setting: UK primary care Participants: All adults aged 16 and over, and registered with acceptable General Practices Sample Size: 298 practices, with 2 982 registered patients aged 16 years and over	Longitudinal study in which annual incidence rates were calculated using data from 298 UK general practices between 1996 and 2006, adjusted for year of diagnosis, gender, age and deprivation.	• Incidence of recorded diagnoses fell from 22.5/1000 PYAR in 1996 to 14.0/1000 PYAR in 2006 (IRR = 0.64, 95% CI 0.57–0.71). Females were more than twice as likely to have a diagnosis recorded than males; people aged 25-44 had the highest rate of diagnosed depression; and people in most deprived group had nearly twice the rate of depression diagnosis compared with the least deprived group. • Incidence of recorded depressive symptoms rose threefold from the baseline of 5.11/1000 PYAR in 1996 to 15.5/1000 PYAR in 2006. Females had symptoms recorded twice as often as males; 25-44 age group had highest rate of depression symptoms, compared with those in aged 16-24; most deprived group had depressive symptoms recorded nearly twice as often as least deprived group. • Overall, results demonstrate a fall in the recorded incidence of diagnosed depression but an increase in recorded depressive symptoms, although the combined incidence rates varied little over time.	Weak (EPHPP)
Taggar (2012) "The impact of the Quality and Outcomes Framework (QOF) on the recording of smoking targets in primary care medical records: cross-sectional analyses from The Health Improvement Network (THIN) database **(566)**	Setting: UK primary care (national) Participants: GP practices Sample: 446 covering 6 million + patients	Cross-sectional analyses using THIN data to calculate annual proportions of i) patients who had a record of smoking status made in the previous 27 months and ii) current smokers recorded as receiving cessation advice in the previous 15 months were calculated. Multivariate logistic regression was used to investigate individual-level characteristics associated with the recording of smoking status and cessation advice.	• Rapid increases in recording smoking status and advice occurred around the introduction of QOF in 2004. Subsequently, compliance to targets has been sustained, although rates of increase have slowed. • By 2008 64.5% of patients aged 15+ had smoking status documented in the previous 27 months and 50.5% of current smokers had cessation advice recorded in the last 15 months. • Adjusted odds ratios show pre and post- QOF, those with chronic medical conditions, greater social deprivation and women were more likely to have a recent recording of smoking status or cessation advice. • Post-QOF, the strongest characteristic associated with recording activities was the presence of co-morbidity.	Moderate (EPHPP)

Citation	Setting Participants & Sample	Methods	Results	Quality (Assessment tool)
Thapar (2002) "A pragmatic randomised controlled trial of a prompt and reminder card in the care of people with epilepsy" **(563)**	Setting: UK primary care Participants: GP practices Sample: People with active epilepsy (n = 1275) from 82 practices.	Pragmatic cluster randomised controlled trial in which practices were randomly categorised as 'control', 'doctor-held card' (card in patient records), or 'patient-held card' practices.	• Compared with control practices, recording of seizure frequency was significantly increased in doctor-held card practices (57.4% versus 42.8%, P = 0.003) but not in patient-held card practices (44.6% versus 42.8%). • No differences were found in the proportion of seizure-free patients (doctor-held card [56.0%] versus control [51.5%]; patient-held card [58.1%] versus control [51.5%]) or in the proportion on monotherapy. • Patients in both intervention groups reported more medication-related side-effects and patients in doctor-held card practices were less satisfied with information provision about epilepsy. • Participating GPs found the card useful. The doctor-held card was retrieved and completed more often than the patient-held card.	Strong (EPHPP)
Woodman (2012) "A simple approach to improve recording of concerns about child maltreatment in primary care records: developing a quality improvement intervention" **(565)**	Setting: UK primary care(North East, East Midlands, East England & South East) Participants: GP practices Sample: 11 study practices plus 442 practices in The Health Improvement Network (THIN)	Development of a quality improvement intervention via 4 phase mixed methods approach including clinical audit, a descriptive survey, telephone interviews, a workshop, database analyses and consensus development.	• The rate of children with at least one maltreatment-related code was 8.4/1000 child years (11 study practices, 2009–2010), and 8.0/1000 child years (THIN, 2009–2010). • Of 25 patients with known maltreatment, six had no maltreatment-related codes recorded, but all had relevant free text, scanned documents, or codes. • When stating their reasons for undercoding maltreatment concerns, GPs cited damage to the patient relationship, uncertainty about which codes to use, and having concerns about recording information on other family members in the child's records. • Consensus recommendations are to record the code 'child is cause for concern' as a red flag whenever maltreatment is considered, and to use a list of codes arranged around four clinical concepts, with an option for a templated short data entry form.	Weak (EPHPP) Moderate (Critical Review Form)

4.5 Critical Interpretive Synthesis

4.5.1 Synthesis 1: Narrative synthesis of findings from quantitative studies

There was substantial clinical heterogeneity of the populations studied, and variable outcome measures employed, which made it inappropriate to combine results through meta-analysis (cited in 541, 570). Of the 18 studies with a quantitative element (including three mixed methods studies, and reported in 19 papers, see Tables 4 and 5), there was considerable variation in the area of clinical focus (including smoking cessation management; angina, asthma and diabetes; blood pressure recording; cardiovascular events; epilepsy; child maltreatment; and depression); and outcome measures employed also ranged widely (from simple recording of clinical events to measures to determine coding accuracy). The results of the narrative synthesis are summarised in Table 5, with a descriptive narrative detailing the findings in more depth presented below.

Interventions which appear to influence practitioner coding behaviour

Use of prompts and reminders

Three papers found statistically significant evidence to suggest that prompts and reminders, in both electronic and paper form, can positively influence the recording of routine data (559, 560, 563). First, the Individual Patient Registration Profile Project (IPRP) intervention to improve ethnicity recording in general practice computer systems found that limiting GP computer systems to display only a preferred list of codes can both help improve data quality and rates of ethnicity data recording (560). At the start of the intervention, baseline recording of ethnicity data in participant practices was poor (<1% of practice population); whereas median level of ethnicity recording after the study was 46.85% (IQR 12.85%); with rates varying from minimum to maximum range of 14% to 75%, respectively.

Second, an RCT carried out by Holt et al tested the effects of a system of electronic reminders (the 'e-Nudge') on cardiovascular events and the adequacy of data for cardiovascular risk estimation (559). They found that the e-Nudge had a positive impact on the adequacy of risk factor information recorded by clinicians. Specifically, the intervention led to an increase in the proportion of patients with sufficient data who were identifiably at risk, with a difference of 1.94% compared to the control

group (95% confidence interval [CI] = 1.38 to 2.50, P<0.001) (559). A corresponding reduction occurred in the proportion potentially at risk but requiring further data for a risk estimation (difference = –3.68%, 95% CI = –4.53 to –2.84, P<0.001).

Finally, Thapar's pragmatic RCT of a prompt and reminder card for the care of people with epilepsy also demonstrated the positive impact of prompts on the recording of clinical information (563). In this study, practices were either allocated to the 'control' group, to the 'doctor-held card' group (where the card was inserted into the patients' records) or to the 'patient-held card' group (where the patient held the card). In terms of the intervention's impact on recording practices, results seemed to favour the doctor-held card. For example, compared with control practices, recording of seizure frequency was significantly increased in doctor-held card practices (57.4% versus 42.8%, p = 0.003) but not in patient-held card practices (44.6% versus 42.8%, p = 0.49). The card retrieval and completion rate was also higher for patients in the doctor-held card group than for patients in the patient-held card group (91.5% versus 43.4%; and 56.4% versus 49% respectively).

At the same time, however, alongside such positive effects, there was also evidence that there may be unintended consequences of using coding 'prompts' in general practice. In relation to Thapar's study (563), for example, although participating GPs found the card useful, the impact on patient relevant outcomes (seizure frequency) was marginal. Further, patients in both intervention groups reported more medication-related side-effects, and patients in doctor-held card practices in particular were less satisfied with information provision about epilepsy. The authors concluded therefore that whilst a doctor-held prompt and reminder was effective in improving the recording of key clinical information for people with epilepsy, it did not improve outcomes, and may actually have resulted in less patient-centred care (563).

Further, there was inconclusive evidence as to whether patient-delivered 'prompts' were as effective as system-based or doctor-held prompts in stimulating clinicians to code in consultations. On the one hand, a study by Coleman et al found that the distribution of questionnaires about smoking to patients had a positive impact on general practitioners' recording practices, with discussion of smoking recorded in 8.0% (220/2739) of medical records when questionnaires were distributed, versus 4.6%

(116/2537) where these were not (odds ratio 1.78 (95% CI, 1.36 to 2.34)) (555). However, results from Thapar's RCT of a prompt and reminder card in the care of people with epilepsy, suggest that patient-delivered prompts were generally less effective than 'prompt'-based interventions delivered via doctors themselves (563).

Training and feedback

In terms of whether technology-focussed training and feedback can help to improve the quality of data recorded in consultations, the evidence from three papers appears 'cautiously' positive. Porcheret et al investigated the impact of a programme of repeated assessments, feedback, and training on the quality of coded clinical data in general practice (561). They found that on repeat assessments, all participating practices improved or maintained their levels of coding, and over time rates increased to levels comparable with, or above, National Study of Morbidity Statistics from General Practice (MSGP4) rates. However it is important to stress that the practices that participated in the study were able to provide time and resources for feedback and training sessions. Therefore, the authors conceded that whilst the programme may be generalizable to other practices, it required a trained support team to implement it that had clear implications for cost and resources (561).

In addition, similarly positive results emerged from a before and after study by Lusignan et al examining the impact of the Primary Care Data Quality (PCDG) programme on recording of ischaemic heart disease in English general practices (564). They found that the intervention (comprising a one hour didactic introductory meeting with practice representatives; the collection, analysis and presentation of key data using MIQUEST at baseline and thereafter at 6 monthly data quality workshops of 2-3 hours involving a GP, nurse and practice manager from each practice) led to an increase in the recorded prevalence of ischaemic heart disease by about 10 % (from 29 to 32 per 1000 patients). However, participant practices volunteered to take part in the research, and were all actively seeking tools to help them raise standards (indeed most already had higher baseline levels of data recording than the researchers found in previous studies), therefore the results may not be generalizable to standard general practices.

Finally, a further study by Lusignan et al, offered a more measured verdict on the impact of feedback on recording practices. This study examined the impact of feedback of data quality markers within the MediPlus database to see whether this led to a more rapid improvement in data quality than that generally occurring in primary care (557). They found that three quality markers improved significantly over the period of the study at the 5% level. These were the use of highly specific "lower-level" Read Codes (p=0.004); and the linkage of repeat prescriptions (p=0.03) and acute prescriptions (p=0.04) to diagnosis. However for the remainder of the data quality markers measured (see Table 5 for details), there was no significant improvement over the same period. The authors concluded, therefore, that feedback alone, whilst potentially a low cost tool, was not a reliable mechanism to ensure improved data quality, thus more research into what data quality markers should be fed back, how and by whom was needed (557).

Technical characteristics of the recording system

Different clinical coding schemes

The relative advantages of one coding scheme over another were reported in a small-scale RCT (which led to two linked papers (550, 551)). Thus Brown et al compared the accuracy and consistency of alternative clinical coding schemes (Read Version 3, Clinical Terms Version 3 versus the earlier of this coding scheme, Version 2, 5-Byte Read) in coding electronic patient records. It found that in both respects, Clinical Terms Version 3 outperformed Read Codes 5 byte. Exact matches were more common with Clinical Terms (70% (95% confidence interval 67% to 73%)) than with Read Codes (50% (47% to 53%))($P < 0.001$); and the pooled proportion with exact and identical matches by paired participants was greater for Clinical Terms (0.58 (0.55 to 0.61)), than Read Codes (0.36 (0.33 to 0.39)) ($P < 0.001$).

A study by Kumarapeli and Lusignan, which analysed GP consultation data recorded via their multi-channel video and data capture toolkit (ALFA: Activity Log File Aggregation), also suggested that certain coding schemes may be associated with increased (and / or more rapid) coding activity in comparison to others (567). They found that the consultations that used EMIS-LV and EMIS-PCS systems had the least number of codes recorded (1.5 codes, SD 1.5 per consultation), compared with 2.9 codes recorded in

Vision and Synergy (p=0.001). Consultations with PCS had the shortest mean duration for entering coded data (mean 5.6 s, SD 3.4 s). Both LV and Vision took significantly longer to code (LV: mean 9.0s, SD 6.1s; Vision: mean 8.8s, SD 3.9s; T tests comparing LV and Vision with PCS: p<0.001). Part of the reason for the faster coded data entry among the PCS users (mean 1.8 s, SD 0.8 s) was the 'auto suggestion' feature where the computer suggested a coded term during free-text entry. In the other three systems it took nearly 3 s (LV 2.8 s, Vision 2.8s, Synergy 3.0 s) to navigate to the coding screen prior to commencing the coding process.

Kumarapeli and Lusignan highlighted the particular example of blood pressure recording, which varied significantly between brands (p=0.032). Synergy was the fastest (mean duration - 9.7 s, SD 3.4 s), and Vision and LV were the next fastest, with similar mean durations for data recoding (mean 10.6 s for both; LV: SD 2.7 s, Vision: SD 2.4 s). As the authors emphasised however, there were some key differences in the process required by individual coding schemes. For example, LV required the data entry page or form to be opened using the keyboard; and Vision users either used an icon or had menu led access. In contrast, although the auto-suggestion feature offered in PCS recognizes the clinician's attempt to record BP values and automatically initiates presenting the blood pressure recording interface, the delay between the text recognition and interface presentation lengthened the actual coding time (mean 14 s, SD 3.7 s).

Electronic versus paper-based patient records

A cross sectional study by Hippisley-Cox et al examined both whether paperless medical records contained less information than paper-based medical records, and whether that information was harder to retrieve (282). They found no evidence to suggest either that paperless records were truncated or that they contained more local abbreviations than electronic versions; or that the absence of writing decreased subsequent recall. Conversely, paperless records compared favourably with manual records, potentially suggesting that electronic patient records stimulate more detailed and consistent coding. Importantly, compared with paper-based records, more paperless records were fully understandable (89.2% v 69.9%, P=0.0001) and fully legible (100% v 64.3%, P < 0.0001); and also contained more clinical detail. For example, paperless records were significantly more likely to have at least one diagnosis

recorded (48.2% v 33.2%, P=0.05), to record that advice had been given (23.7% vs 10.7%, P=0.017), and, when a referral had been made, were more likely to contain details of the specialty (77.4% v 59.5%, P=0.03).

Number of available Read codes

Work by Woodman et al to develop a quality improvement intervention to address poor recording of child maltreatment in primary care records (565) determined the existence of 350 maltreatment-related Read codes, of which only 82 were recorded more than once in the 11 general practices surveyed, or more than ten times in the THIN data analysed as part of the study. The study also found that although the overall concepts of maltreatment remained relatively constant across the data extracted from the practices and THIN, the specific Read codes actually used varied somewhat.

Impact of financial incentives on coding

Coleman et al looked at the impact of a new payment made to general practitioners for their health promotion activity on the ascertainment and management of smoking in primary care between 1990 and 2004 (554). This study found that the recording of smoking status increased temporarily during 1993 to 1994, then rose gradually from 2000, with a more marked increased from 2003. An 88% increase between the first quarters of 2003 and 2004 coincided with the introduction of the new GP contract, which included clear financial incentives to record the smoking status of key categories of patients. Crucially, this also appeared to have translated into an increase in smoking cessation activities, as there was a broadly similar pattern for the proportion of smokers recorded as having received brief cessation advice. However, while there was a sharp rise in nicotine addiction treatment prescriptions from 2000, no comparable acceleration from 2003 was apparent (558).

A further paper by Tagger et al (566) examined the impact of the Quality and Outcomes Framework on the recording of smoking targets in primary care using THIN data. The study found that overall, a greater proportion of patients had a record of smoking status and cessation advice following the introduction of financial incentives. Pre-incentives, in 2002, 29.6% of women and 21.5% of men had their smoking status recorded, and 12.5% of female and 10.1% of male smokers had a record of cessation advice. In contrast, in 2008, four years after the introduction of incentives, 70.4% of

women and 58.6% of men had their smoking status recorded, and 57.1% of female and 44.6% of male smokers had a record of cessation advice.

In addition, Carey et al examined the impact of the introduction of Quality and Outcomes Framework (QOF) targets on blood pressure (BP) recording over the period 2000 to 2005 (553). This study found that during this period recorded systolic BP (SBP) fell (36% had SBP 150mmHg in 2000–2001 compared with only 19% in 2004–2005). However, this coincided with a trend towards recording systolic values just below, rather than just above the 150 cut-off (in 2000–2001, 2.3% of patients had 148–149 recorded and 1.8% had 151–152; whereas in 2004–2005, the figures were 4.2 and 1.3%, respectively). By smoothing the distribution, the authors estimated that the true percentage of patients with SBP 4150mmHg in 2004–2005 was 23%, rather than the 19% recorded. Moreover, patients with a recorded SBP 148–149 were more likely to have a recorded diastolic BP90 (93%) than patients with SBP 151–152 (78%); and patients just below the 150mmHg cut-off received more antihypertensive treatment than those just above it (odds ratio 1.20, 95% confidence interval 1.01–1.41). Overall, the study concluded that whilst blood pressure levels in UK primary care continued to fall through the introduction of QOF, this fall was exaggerated due to values being clustered just below the QOF target (although importantly, there was no evidence of adverse effects of this on clinical management) (553).

Next, research by Kontopantelis et al (568) into the recorded quality of diabetes recording in primary care following the introduction of financial incentives, found that recorded quality of care across the 148 study practices increased for all individual indicators between 2000/1 and 2006/7, with absolute improvements ranging from 4.2% (control of HbA1c levels ≤10%) to 85.5% (providing smoking cessation advice). Further, recorded QOF care as measured by the composite quality of care score increased from 46.5% in 2000/1 to 81.0% in 2006/7, with scores increasing for all subgroups.

Impact of patient demographics on practitioner coding

Dalton et al's examination of risk factor recording found that differences in recording between practices could be explained by individual patient socio-demographic characteristics (556). Focussing on levels of cardiovascular disease (CVD) risk factor

recording, in regression analysis, Dalton et al found that women (AOR = 2.88 (95% CI 2.64–3.15)) and older patients (AOR = 2.75 (95% CI 2.28–3.32) for 65–74 against 35–44 years of age) had better recording of blood pressure, as well as body mass index (BMI) and cholesterol. Further, recording of blood pressure (AOR = 1.38 (95% CI 1.09–1.75)) and cholesterol (AOR = 1.47 (95% CI 1.30–1.66)) was significantly higher among South Asian patients (556).

Kumarapeli et al also looked at the variation in recording of patient socio-demographic characteristics in general practice computer systems, focussing in particular on ethnicity recording (560). The original study was concerned with whether the Individual Patient Registration Profile Project (IPRP) intervention, essentially a tailored data template, improved the recording of ethnicity and other patient characteristics in participating practices. In addition to the results relating to the impact of the intervention itself (which were positive - see previous section), the study also found that ethnicity recording generally increased with age from 46.74% (17 709/37 888) for patients 40+ to 54.94% (6349/11 556) for patients over 65; and that more codes were recorded for females than males (medians were 57.15 (IQR 3.9%) and 46.03% (IQR 7.6%) respectively) (560).

Results from a third paper suggest that patients with a history of particular conditions were more likely to have certain factors coded than other patients. A cross-sectional study by Dalton et al examined the baseline levels of CVD risk factor recording in general practices located in Ealing, North West London, focussing on the completeness of blood pressure, smoking, BMI and cholesterol recording in electronic patient records (556). Dalton et al found that although the recording of blood pressure (85.6% (practice interquartile range = 10.1)) and smoking status (95.8% (2.6)) was very high in all practices, the recording of BMI (72.8% (23.4)) and cholesterol (55.6% (25.3)) was considerably lower. Crucially, there were large differences in recording between practices (range for cholesterol: 33.6–78.0%), which were largely explained by patient characteristics. In regression analysis, hypertensive patients (adjusted odds ratio (AOR) = 36.3, 95% confidence interval (CI) 21.0–62.9), had better recording of blood pressure as well as BMI and cholesterol.

Finally, the findings from research by Taggar et al into the impact of the Quality and Outcomes Framework on the recording of smoking targets in primary care also suggested an association between certain patient characteristics and increased odds of coded smoking (566). For example, there was a greater recording of smoking status and cessation advice with advancing Townsend score (greater deprivation), and this was most apparent post introduction of financial incentives. In 2008, 67.8% and 53.0% of patients had smoking status and cessation advice recorded in the most deprived quintile, respectively, compared with 26.5% and 11.9% in 2002. Multivariate analyses for 2008 showed that patients with greater deprivation were 35% more likely to have smoking status recorded (OR 1.35, 95% CI 1.21-1.49, $p<0.001$) and 20% more likely to have cessation advice recorded (OR 1.20, 95% CI 1.10-1.30, $p<0.001$), than those less deprived.

However, this contrasts with the results of the Kontopantelis study of diabetes recording, which found that recorded care (as measured by key practice covariates) did not vary significantly by area deprivation before or after the introduction of the incentive scheme (47.5% in least deprived quartile versus 49.0% in the most deprived quartile in 2000/01, compared with 81.8% in least deprived quartile versus 81.5% in the most deprived quartile in 2006/07) (568).

The following table summarises the results of the included quantitative papers organised by identified influencing factor, and whether this was positive, negative or no influence.

Table 5: Statistically significant influencing factors

	Factor	Positive	Negative	No influence
INTERVENTIONS INFLUENCING CODING BEHAVIOUR	Feedback and training *(Lusignan et al, 2002) (557)*	• 3 quality markers improved significantly over the study period at 5% level: (1) use of highly specific "lower-level" Read Codes (p=0.004); and the (2) linkage of repeat prescriptions (p=0.03); and (3) acute prescriptions (p=0.04) to diagnosis	• No data	• No data
	Feedback and training *(Porcheret, 2004) (561)*	• Programme of repeat assessments led to practices improving or maintaining their levels of coding in relation to (1) % of consultations assigned a Read coded problem title and stratified by primary care centre consultation; (2) % patients prescribed a selected drug or drug types with relevant morbidity code.	• No data	• No data
	Feedback and training *(Lusignan et al, 2004) (564)*	• PCDQ intervention involving initial training and ongoing 2-3 hrs data quality workshops led to increase in recorded prevalence of ischaemic heart disease by about 10 % (29-32 per 1000 patients).	• No data	• No data
	Prompts and reminders *(Holt, 2010) (559)*	• Intervention led to an increase in the proportion of patients with sufficient data who were identifiably at risk, with difference of 1.94% compared to the control group (95% confidence interval [CI] = 1.38 to 2.50, P<0.001).	• Corresponding reduction occurred in the proportion potentially at risk but requiring further data for a risk estimation (difference = –3.68%, 95% CI = –4.53 to –2.84, P<0.001).	• No significant difference was observed in the incidence of cardiovascular events (rate ratio = 0.96, 95% CI = 0.85 to 1.10, P = 0.59).
	Prompts and reminders *(Thapar, 2002) (563)*	• Compared with control practices, recording of seizure frequency was significantly increased in doctor-held card practices (57.4% versus 42.8%, P = 0.003) but not in patient-held card practices (44.6% versus 42.8%).	• Patients in both intervention groups reported more medication-related side-effects and patients in doctor-held card practices were less satisfied with information provision about epilepsy.	• No differences found in the proportion of seizure-free patients (doctor-held card [56.0%] versus control [51.5%]; patient-held card [58.1%] versus control
	Prompts and reminders *(Coleman et al, 2007) (555)*	• Discussion of smoking was recorded in 8.0% (220/2739) of medical records when questionnaires were distributed versus 4.6% (116/2537) where these were not • After controlling for potential confounders (inc. age, gender), odds ratio for recording of information in the presence of questionnaire distribution (versus none) was 1.78 (95% CI, 1.36 to 2.34).	• No data	• No data
TECHNICAL CHARACTERISTICSS OF THE CODING SYSTEM	Coding scheme *(Brown et al, 2003) (551)*	• Exact matches more common with Clinical Terms (70% (95% confidence interval 67% to 73%)) than with Read Codes (50% (47% to 53%)) (P < 0.001) • Pooled proportion with exact and identical matches by paired participants was greater for Clinical Terms (0.58 (0.55 to 0.61)) than Read Codes (0.36 (0.33 to 0.39)) (P < 0.001).	• No data	• Time taken to code with Clinical Terms (30 seconds per term) not significantly longer than that for Read Codes.
	Coding scheme *(Kumarapeli & Lusignan, 2012) (567)*	• Consultations using Vision and Synergy had most number of codes record (2.9 codes per consultation (p=0.001)). • Consultations with PCS had the shortest mean duration for entering coded data (mean 5.6 s, SD 3.4 s)	• EMIS-LV and EMIS-PCS systems had the least number of codes recorded (1.5 codes, SD 1.5 per consultation). • LV and Vision took significantly longer to code (LV: mean 9.0 s, SD 6.1 s; Vision: mean 8.8 s, SD 3.9 s; t tests comparing LV and Vision with PCS, p<0.001).	• No data

	Factor	Positive	Negative	No influence
	Electronic records *(Hippisley-Cox, 2003) (282)*	• Compared with paper based records, paperless records were fully understandable (89.2% v 69.9%, P=0.0001) and fully legible (100% v 64.3%, P < 0.0001) • Paperless records significantly more likely to have at least one diagnosis recorded (48.2% v 33.2%, P=0.05), to record advice given (23.7% vs 10.7%, P=0.017) & when a referral had been made, more likely to contain details of the specialty (77.4% v 59.5%, P=0.03) • When a prescription had been issued, paperless records were more likely to specify the drug dose (86.6% v 66.2%, P=0.005) • Paperless records also contained significantly more words, abbreviations, and symbols (P < 0.01 for all)	• No data	• No data
	Number of Read Codes *(Woodman et al, 2012) (565)*	• No data	• 350 maltreatment-related Read codes existed of which only 82 were recorded more than once in the 11 general practices surveyed, or more than ten times in the THIN data analysed as part of the study. • Whilst overall concepts of maltreatment remained relatively constant across practices and THIN, the specific Read codes actually used varied.	• No data
FINANCIAL INCENTIVES	Financial incentives *(Carey et al, 2009) (553)*	• There was a trend towards recording systolic values just below, rather than just above the 150 cut-off. In 2000–2001, 2.3% of patients had 148–149 recorded and 1.8% had 151–152. In 2004–2005, the figures were 4.2 and 1.3%, respectively	• Recorded systolic BP (SBP) fell: 36% had SBP 4150mmHg in 2000–2001, and only 19% in 2004–2005. • By smoothing the distribution, estimated that the true % of patients with SBP 4150mmHg in 2004–2005 was 23%, rather than the 19% recorded	• No data
	Financial incentives *(Coleman et al, 2007) (554)*	• Smoking status recording increased temporarily 1993–4 and then rose gradually from 2000 • Rise was more marked from 2003, with an 88% increase between the first quarters of 2003 and 2004. • In smokers, there was a broadly similar pattern for the proportion recorded as having received brief cessation advice.	• No data	• While there was a sharp rise in nicotine addiction treatment prescriptions for 2000+, no comparable acceleration from 2003 was apparent.
	Financial incentives *(Tagger et al, 2012) (564)*	• Greater proportion of patients had a record of smoking status/cessation advice post- introduction of financial incentives. • Pre-incentives, in 2002, 29.6% of women and 21.5% of men had their smoking status recorded, and 12.5% of female and 10.1% of male smokers had a record of cessation advice. • In 2008, four years after the introduction of incentives, 70.4% of women and 58.6% of men had their smoking status recorded, and 57.1% of female and 44.6% of male smokers had a record of cessation advice.	• No data	• No data

	Factor	Positive	Negative	No influence
	Financial incentives *(Kontopantelis et al, 2012) (568)*	• Recorded quality of care across the 148 study practices increased for all individual indicators between 2000/1 and 2006/7, with absolute improvements ranging from 4.2% (control of HbA1c levels ≤10%) to 85.5% (providing smoking cessation advice). • Recorded QOF care as measured by the composite quality of care score increased from 46.5% in 2000/1 to 81.0% in 2006/7.	• No data	•
PATIENT DEMOGRAPHICS	Gender, age and ethnicity *(Dalton et al, 2010) (556)*	• In regression analysis, hypertensive patients [adjusted odds ratio (AOR) = 36.3, 95% confidence interval (CI) 21.0–62.9], women [AOR = 2.88 (95% CI 2.64–3.15)] and older patients [AOR = 2.75 (95% CI 2.28–3.32) for 65–74 against 35–44 years of age] had better recording of blood pressure as well as BMI and cholesterol • Recording of blood pressure [AOR = 1.38 (95% CI 1.09–1.75)] and cholesterol [AOR = 1.47 (95% CI 1.30–1.66)] was significantly higher among South Asian patients.	• No data	• No data
	Gender and ethnicity *(Kumarapeli, 2006) (560)*	• More codes were recorded for females than males; the medians were 57.15 (IQR 3.9%) and 46.03% (IQR 7.6%), respectively • Overall, commonest recorded ONS ethnic category was 'White' (60.88%, 34 013/55 871). Black or Black British' recorded for 22.99% (12 844/55 871) & 'Mixed', 'Asian or Asian British' about 3% of ethnicity codes. 'Chinese or other' ethnic group more likely to have ethnicity recorded using 9i hierarchy/local EMIS codes.	• No data	• Despite inter-practice variation in rate of ethnicity recording most practices used full range of hierarchies & proportions of people in each ethnic category was not statistically different from 2001 census.
	Gender, age and socio-economic status *(Rait, 2009) (562)*	• Females were more than twice as likely to have a diagnosis recorded than males; people in the 25 to 44 age group had the highest rate of diagnosed depression; and people in the most deprived group had nearly twice the rate of depression diagnosis compared with the least deprived group.	• No data	• No data
	Socio-economic status *(Tagger et al, 2012) (564)*	• In 2008, 67.8% and 53.0% of patients had smoking status and cessation advice recorded in the most deprived quintile, respectively, compared with 26.5% and 11.9% in 2002. • In 2008, patients with greater deprivation were 35% more likely to have smoking status recorded (OR 1.35, 95% CI 1.21-1.49, p<0.001) and 20% more likely to have cessation advice recorded (OR 1.20, 95% CI 1.10-1.30, p<0.001), than those least deprived.	• No data	• No data
	Socio-economic status *(Kontopantelis, 2012) (566).*	• No data.	• No data.	• Recorded care did not vary significantly by area deprivation before or after the introduction of financial incentives. • 47.5% in least deprived quartile versus 49.0% in the most deprived quartile in 2000/01, compared with 81.8% in least deprived quartile versus 81.5% in the most deprived quartile in 2006/07)

4.5.2 Synthesis 2: Thematic analysis of qualitative data

Technology

The first factor identified in the included studies concerned the impact that the clinical coding scheme itself can have on practitioner recording practices, with a number of papers focussing on the inherent limitations of existing systems. In Lusignan et al's qualitative study of the barriers to recording structured information in computerised medical records (558), he emphasised the potential for the sheer volume of available Read codes to undermine recording practices: to put it more simply, there are too many options. *"Long and complex picking lists"* led to clinicians simply not coding *"for fear of assigning the wrong diagnostic label"* or to view 'free text' as a pragmatic alternative to rigid coding (558). Lusignan et al found that this was particularly the case when dealing with complex or emerging diagnoses.

The broader concern of whether the essentially biomedical model imposed through existing coding schemes is able to reflect the complex social interaction of real-life clinical consultations, also emerged in the qualitative literature. The same study by Lusignan et al determined that for clinicians at least, the recording of structured data within a consultation was not viewed as a *"neutral activity, they are highly aware of diagnostic uncertainty and sensitive to the potential impact of both a correct and incorrect diagnostic label on their relationship with their patient"* (558). He found that although clinicians accepted the need to code certain data in order to demonstrate that the appropriate quality of care had been provided, there was a perceived mismatch with the broader 'holistic' needs of the individual clinical encounter, and the challenges of capturing emerging diagnoses or labelling patients with potentially stigmatising conditions. This theme was echoed in Woodman et al's research around the development of a quality improvement intervention for child maltreatment recording in primary care (565). Interviews with GPs exploring disincentives to coding cases, highlighted concerns for the potentially harmful impact this might have on both children and parents, including perceived legal barriers to recording third-party information about parent risk factors , or maltreatment of a sibling, in a child's records.

In addition, a general lack of IT skills, combined with inadequate training, was highlighted in two papers (552, 558), as a further barrier to the effective use of coding

systems. Lusignan's research into the barriers to recording structured information in computerised medical records highlighted the negative impact of poor keyboard skills on the part of clinical staff (558). As he emphasises, computerization has only happened relatively recently, with a gradual transition from written to computer records alongside a steadily increasing proportion of structured data. Whilst incentives could serve to improve data quality in areas; a lack of IT skills and skilled personnel may still mean that some primary care professionals who want to record data cannot (558). Interviews conducted by Campbell et al as part of their study into recording of angina, asthma and type 2 diabetes also suggested that inadequate or inconsistent information technology and insufficient computer training contributed to poor coding performance (552).

At the same time, results of a mixed-methods study by Hippisley-Cox et al, suggested that the constraints of computer entry (such as keyboard skills) did not lead to any *"impoverishment of clinical records"* in practices that had moved to Electronic Patient Records (282). Nor did the interviews with GPs carried out as part of this research determine any significant difference in recall of a patient or consultation between practices using paper-based as opposed to electronic records, although overall, recall rates were low in both types of practice (see Chapter 6). The researchers suggest that such low levels of specific recall suggests that *"the doctor-patient relationship may not be as personal as many suppose"* (282).

Finally, under this broader theme of 'technology' Lusignan et al's examination of the barriers to recording structured information in computerised medical records found that templates helped to structure data entry, alongside memory joggers such as lists of codes (558). Coding templates were highlighted as a *"structured means of entering data"* along with lists of key codes and so forth (558). At the same time, however, Campbell et al stressed that poor data recording templates could also have the opposite effect on recording practices, resulting in poor data coding performance (552).

Resources

The second influencing factor arising from the qualitative literature concerned the impact of available resources on recording practices. For example, the study by

Campbell et al discussed the *"trade-off"* clinicians feel they are making between, on the one hand, the time it takes to record data, and on the other, time spent with patients (552). They suggested that this was particularly the case in relation to dealing with lifestyle issues with patients, such as smoking and weight-management (552). At the same time, Lusignan et al's 2003 study of the barriers to clinical coding found that the need to report progress towards targets or to demonstrate that appropriate evidence based care had been provided to populations was a positive influencer for both clinicians and practice managers: in this study, money is described as a *"powerful motivator to change"* (558).

Patient-related factors

Third, and finally, a series of patient-related factors were suggested as impacting on recording. Evidence from one study suggested that clinicians may record the provision of preventative care less consistently than other areas of primary healthcare. Campbell et al investigated the acceptability, validity and reliability of review criteria developed by RAND Corporation expert panels to measure quality of care around angina, asthma and type 2 diabetes (552). The study found a number of examples where doctors and nurses felt confident that necessary care had been provided but had not been recorded. In particular, it found that criteria relating to preventive care and the recording of related symptoms were less frequently met than criteria for procedures and investigations.

In addition, the challenge of successfully integrating the clinical coding process within a 'patient-centred' consultation was also explored in several of the papers reviewed. This was emphasised in Lusignan et al's 2003 study (558), which examined the barriers to recording structured information in computerised medical records from the perspective of both clinicians and practice managers. A key finding was that clinicians often viewed coding as a barrier to an effective consultation process (558). Linked to this theme, Lusignan et al also found that clinicians were particularly concerned that the meaning and interpretation of coding within the consultation could cause anxiety on the part of the patient (558). In particular, using a classification scheme that applied what were described as *"diagnostic labels"* could be damaging to the doctor-patient relationship, whether these labels were correct or not. In response, Lusignan reported

that *"the pragmatic solution that clinician's have come up with to avoid this problem is to avoid coding data in the consultation!"* (558)

An additional study by Rait et al reinforces Lusignan's suggestion that clinicians may sometimes be reluctant to formalise potentially stigmatising health conditions through coding (562). Rait used electronic patient data from The Health Improvement Network (THIN) to look at the incidence and socio-demographic variation in GP-recorded depression diagnoses and depressive symptoms between 1996 and 2006. Overall, the study found that whilst instances of recorded depression diagnoses fell, there was a threefold rise in incidence of recorded depressive symptoms, suggesting that the way that GPs choose to record depression changed over this time period. Although the categorisation by GPs reflected what is known about depression (with diagnoses being more commonly recorded for women and in areas of greater deprivation), the overall number of depression diagnoses was lower than that reported in studies on GP attendees using active case-finding. The authors felt this suggested that GPs may often choose not to use formal psychiatric criteria to define people's illnesses.

4.5.3 Synthesis 3: Mixed methods synthesis of quantitative and qualitative findings

In the final synthesis, relationships within and between studies were explored in order to formulate a new interpretation that integrated these findings into what is described here as a 'typology' of influencing factors. Findings from the individual syntheses of quantitative and qualitative material were *"clustered"* (548) into barriers versus facilitators of robust recording practices by primary care physicians. This phase also helped identify instances in which certain factors worked in divergent ways (i.e. acted as both facilitators and barriers to recording); alongside examples of which combinations of factors worked together to produce varying effects. A critical consideration and synthesis of the evidence base in its entirety produced two broad spheres of influence on PCPs recording of routine data. These are summarised in Table 6, and described in depth below.

The influence of systems, structure and environment on coding

A significant body of evidence focused on what could broadly be described as 'technological influencers' of recording practices. For example, both the clinical coding

scheme itself (550, 551, 567), and the introduction of data prompts and coding templates can positively influence the accuracy and consistency of routine data recording (558-560, 563), particularly as clinicians emphasise the challenge of navigating the excessive number of available Read codes (558, 565). Crucially, clinical notions need to be represented as coded concepts that are both 'user friendly' and easily retrievable in order for information technology to be fully adopted (550, 551). However, it is also the case that the design of coding templates and prompts must be mindful of the need to put patient-centred care first in order to be effective (563).

The way in which systems are resourced can also impact on routine data recording. In particular, there is strong evidence that the use of financial incentives, such as through the Quality and Outcomes Framework, can stimulate increased recording rates of key data in primary health care (566, 568). However it is also important to emphasise that there can be 'unintended' effects of such incentive systems, which result in the distortion of routine data recording (553). Overall, despite some concerns voiced around the challenges of integrating diverse record types in general practice, there is robust evidence that the introduction of an electronic system of patient records leads to more accurate and consistent coding on the part of PCPs (282). However, lack of that vital resource, time, is cited by clinicians as a barrier to coding within the pressurised consultation context (552).

Third, there is some evidence that the delivery of targeted training and feedback around coding can improve the quality of recorded data (557, 561), although this is by no means a reliable mechanism, and implies a level of available resources that not all practices will have access to. In addition, lack of general IT skills, such as keyboard skills, potentially results in lower rates of coding on the part of some individual clinicians (552, 558).

Table 6: Summary of systems, structure and environment influencing factors

	Barriers	Facilitators
Technology	▪ Data prompts can lead to less patient-centred care (563); and patient-held versions are less effective (555) ▪ Badly designed coding templates can lead to poor data recording (552) ▪ Excessive number of available codes can undermine routine data recording (558, 565)	▪ Displaying only a preferred list of codes can improve the quality and rates of routine data recording (558, 560) ▪ Prompting clinicians to record key information can have positive impact on adequacy of recorded data (558, 559, 563) ▪ Clinical coding scheme can positive influence the accuracy and consistency of routine data recording (550, 551, 567)
Equipment & resources	▪ Financial incentives can 'distort' coding (553, 571) ▪ Lack of time to code within consultation (552, 571) ▪ Paper-held records contain less detail and less consistent data (282)	▪ Financial incentives can stimulate increased recording rates of key data (553, 554, 558) ▪ Electronic patient records improves detail and consistency of coding (282)
Education & Training	▪ Lack of IT skills (552, 558)	▪ Training and feedback can improve the quality of recorded data (557, 561, 564)

<u>Psycho-social influencers: how doctors respond to the needs and characteristics of the patient through coding</u>

In addition to the structural and systematic factors identified above, there are a series of psycho-social influencers that can affect the recording of routine data by physicians (summarised below in Table 7). First, a number of articles suggest that the behaviour and characteristics of patients themselves can impact on physician recording practices. For example, findings from two of the studies reviewed imply that the presenting health condition can influence what a physician records (552, 556). In particular, the provision of preventative care appears to be less well recorded than other conditions (552). Finally, patients with related pre-existing conditions are more likely to have certain data recorded (556); and three further studies suggest that patients with certain socio-demographic characteristics are more likely to have particular conditions coded than others (556, 560, 566), although the evidence around this factor is by no means conclusive (568).

Second, physicians' perspectives on their roles as care-givers, and by implication, their responsibilities towards patients can influence what routine data they record in a

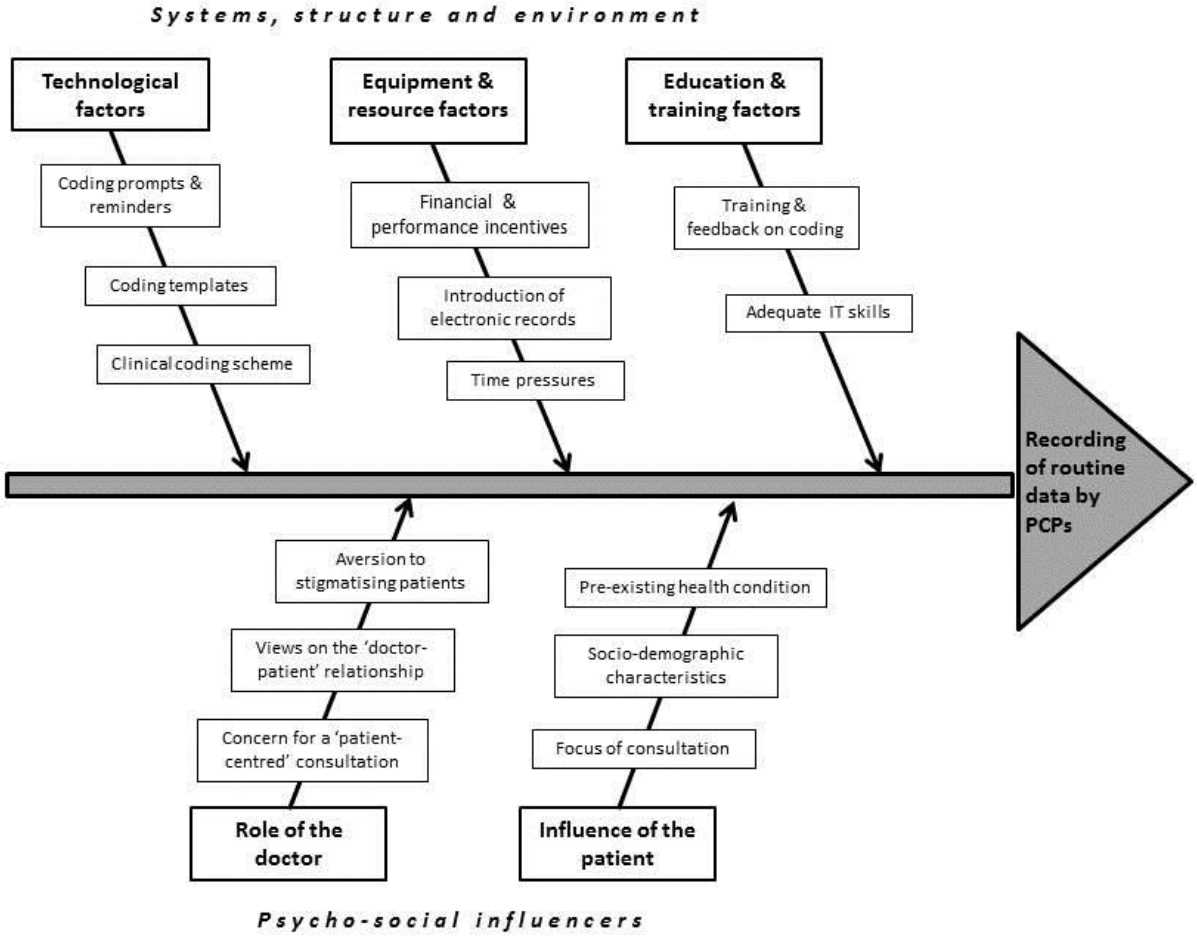
variety of respects (as might be expected, these factors were predominately highlighted in the qualitative literature). For primary care physicians who are strongly committed to the concept of a 'patient-centred' consultation process, coding activity that detracts from that focus is viewed negatively (558). This is partly related to the time pressures highlighted previously, but also to concern about assigning certain codes to patients that could potentially have a stigmatising effect (562, 565). Moreover, the literature points towards what might be described as a 'culture-clash' between the essentially rigid biomedical coding system and the more complex psycho-social narrative of the consultation process, that physicians must continually attempt to resolve (558, 565). This problematic interface between the 'human' and the 'technical' shapes how PCPs record routine data in everyday practice.

Table 7: Summary of psycho-social influencing factors

	Barriers	Facilitators
Influence of the patient	▪ Younger patients, men and certain ethnic groups tend to have less data recorded (556, 560) ▪ Provision of preventative care less well recorded than other conditions (552) ▪ Challenge of coding complex and / or developing conditions (558, 565).	▪ Older patients, women and certain ethnic groups tend to have more data recorded (556, 560) ▪ Patients with related pre-existing conditions are more likely to have certain data recorded (556)
Role of the doctor	▪ Concern for a patient-centred consultation (558) ▪ Concerns about stigmatising patients (562, 565) ▪ Mismatch of biomedical coding system with psycho-social consultation process (558)	

Figure 8 overleaf combines both spheres of influence into an overarching typology of influencing factors.

Figure 8: Fishbone diagram of factors influencing the recording of routine data by PCPs



4.6 Strengths and limitations of the review

There are a number of process-related issues connected to the review strategy that should be acknowledged. For example, the review limited its search to published, peer-reviewed material that was readily available in the public domain. The decision to exclude grey literature is of course acknowledged to carry the risk of publication bias, in that studies that show statistically significant, "positive" results are more likely to be published than those that do not, potentially leading to exaggerated intervention effect sizes (572). However, it was felt that this approach offered a more reliable way of accessing relevant data that had already been subject to a level of quality control via peer review. In addition, the fact that only a small sample of papers were quality assessed by a second reviewer (n=4, 25%), is a further limitation. If adequate time and resources had been available, it would of course been preferable to double-quality check all included papers. However it should also be stressed that nevertheless, the strength of agreement between the reviewers in quality assessing this sample of eligible papers was rated as 'very good' (k = 0.824).

A number of broader methodological criticisms need to be acknowledged in relation to the data synthesis adopted in this review. For example, there are identified disadvantages of using narrative synthesis in combining quantitative data. Most critically, in comparison to meta-analysis, this approach does not provide an effect size, and artefact variance such as sampling and measurement errors could not be accounted for. At the same time, however, it must be stressed that the clinical heterogeneity of the populations studied, and variable outcome measures employed, made it inappropriate to combine results (cited in 541, 570). Of the 18 studies with a quantitative element (reported in 19 papers), there was substantial variation in the area of clinical focus (including smoking cessation management; angina, asthma and diabetes; blood pressure recording; cardiovascular events; epilepsy and depression); and the outcome measures employed also ranged widely (from simple recording of clinical events to measures to determine coding accuracy). Rather than viewing the use of narrative synthesis of the quantitative findings as a weakness of the review, however, as Rodgers et al conclude, it was felt that the incorporation of additional contextual data above and beyond simple effect size calculations, would in fact add further meaning and value to the findings in comparison with traditional meta-analysis (548).

There are also debates as to the appropriateness of synthesising qualitative research findings. Critics argue that a key advantage of qualitative, in comparison to quantitative research, is its ability to deliver rich data on a particular set of participants, for a particular time and context: the findings are essentially not generalizable (573). In seeking to bring such data together within a thematic synthesis, therefore, *"reviewers are open to the charge that they de-contextualise findings and wrongly assume that these are commensurable"* (574). At the same time, as detailed earlier in this chapter, the qualitative research carried out in the selected papers was generally done at the basic, low-inference descriptive level. As such, the data was not suitable for synthesis methods reliant on highly interpretive findings, and thus in some respects, more *"comparable in interpretive depth to the descriptive findings"* of the quantitative evidence reviewed (543).

Finally, it is important to acknowledge that the more interpretive approach employed in mixed-methods data synthesis (based on Critical Interpretive Synthesis), is a

subjective and potentially idiosyncratic process, detached from traditional review approaches which simply present research findings as originally reported. In the case of this review, it must be stressed however that the methodological heterogeneity and varied research focus of the included evidence base made the assimilation of data highly challenging using conventional means. As Voil et al highlight, the assimilation of data in the absence of a common metric or language can be highly challenging, and that focussing on the qualitative versus quantitative binary can result in the creation of *"false distinctions"* between essentially comparable sources of evidence (543). In such a situation, Critical Interpretive Synthesis helped provide a meaningful, theory-driven approach to synthesising mixed-methods data, helping to blur the line between the different methods and methodologies employed by included studies, and thus foster a sense of a comparable body of evidence on the subject.

Further, whilst there was undoubtedly a high level of within-topic diversity in terms of the individual study methods and outcome measures employed, it is important to emphasise that the mixed-methods synthesis demonstrated notable similarity in the overarching themes evident across the evidence base as a whole. Moreover, integrating evidence from varied study types helped offer multiple perspectives on the phenomenon under investigation. For example, in the case of influencing factors that appear to work in divergent ways, qualitative data can more easily show how different contexts can influence direction, whereas *"the same variable operating in opposing ways in quantitative studies will yield a statistically non-significant main effect"* (543).

4.7 Summary and discussion

The findings from this review suggest a range of factors can influence primary care physicians' recording of routine data. A number of these concern system and structure, such as the design and delivery of the coding scheme itself, and the way in which recording practices are resourced in both financial and temporal terms. However it is also apparent that psycho-social factors can affect the adoption and use of even the best designed systems.

Thus, the coding of primary care consultations is a socially, behaviourally and techno-structurally situated activity. Further, and importantly, it is the complex interface between these broad spheres of influence that shapes the quality and significance of

the resultant data over time. This framework of coding influencers shares some strong commonalities with Greenhalgh and Stone's work examining the impact of information technology programmes on healthcare settings (575), which links Gidden's structuration theory (576) with actor-network theory (577). Their resulting theoretical model links together structure, human agency and technologies in a recursive relationship, which constantly evolves in complex and unpredictable ways (578).

One particular area of interest within the context of this research concerns the influence of financial incentives on clinicians' recording practices. As this review indicates, however, the relationship is far from straightforward. Overall, it would appear that pay-for-performance initiatives may stimulate increased rates of coding in the associated areas of care (553, 554, 558), suggesting incentives could represent an effective means of influencing clinician behaviour. However, the findings from this review and other comparable evidence, also underline medical professionals' strong resistance to 'standardisation' initiatives, and highlight the mechanisms they often employ to negotiate, circumvent or even disregard the recording process (558). This is particularly the case if there is a perceived lack of evidence to support incentivised practices (427), or where there is a sense that coding detracts from their primary focus, the patient-centred consultation (558). As such, in primary care at least, electronic primary care recording systems are not necessarily the large-scale oppressive Foucauldian instruments of surveillance they possibly represent in other spheres of governance (579).

Given the fundamentally symbiotic relationship between the effective performance-management of primary health care and the availability of accurate, meaningful practice data, these findings have profound implications for policy and practice (415, 420). Importantly, they suggest that policy makers and service commissioners seeking to design recording systems that enable the effective monitoring and delivery of primary health care must treat their development as the 'complex intervention' electronic patient records truly are (580). As emphasised in actor-network analyses of this field, electronic records (and in turn, coding systems), are not merely empty vessels to be filled with data, but rather often play a transformative, 'actant' role in the system (581). Further, there is a need to work in close proximity to the context and

users of such systems in order to ensure technology is sufficiently flexible and sophisticated to meet their needs (575, 582, 583).

Finally, the results of this review lend weight to calls for more contextualised and theoretically-grounded accounts of physicians' attitudes towards using electronic patient records (518). Subsequent phases of this research will provide an opportunity to further examine this typology of influencing factors using the example of routine data on alcohol interventions in primary health care, analogous to Greenhalgh's recursive research tradition of studying not technologies and contexts in isolation, but 'technologies-in-use' (578). In particular, it will explore whether there are any key gaps in the literature-based model that might affect recording practices, such as policy-level influencers, or the provision of local-level alcohol services. As such, it will help to *"unpack the relationships between context, mechanism and outcomes"* (519), and thus better inform our understanding of whether current primary care recording environments are likely to result in meaningful routine data sets for alcohol.

Chapter 5 A descriptive and comparative analysis of the use of Read Code data to record screening and brief alcohol interventions in routine general practice

5.1 Introduction

This chapter presents a descriptive analysis of alcohol Read code data extracted directly from a sample of GP practices based in the North East of England. First, it describes the aims and objectives of this phase; summarises the key characteristics of the study sample and presents the findings from the analysis of Read code data. It then considers the strengths and limitations of this component of the study, and discusses the main messages emerging from the results.

5.2 Method

5.2.1 Rationale, aims and objectives

The usefulness of Read code data as a source of information about alcohol intervention delivery is strongly reliant on the completeness and consistency of the recorded data itself. As the previous chapter (4) has highlighted, a range of inter-related factors influence general practitioners' recording of routine data, including technical and psycho-social influencers, all of which may impact on the validity of the resultant data. In particular, how recording processes are *structured* (for example, the choice of clinical coding system, whether data prompts and / or templates are used, and the volume of available Read codes), and *incentivised* (mainly through financial incentives) can all shape how, why and when certain data is recorded, including which codes are actually used by GPs in routine practice.

The primary objective of the quantitative phase of the research was to compare and contrast the delivery of screening and brief alcohol interventions for alcohol across a sample of general practices and former primary care trust areas (PCTs) in North East of England using routinely collected electronic General Practitioner (GP) Read Code data. In doing so, the research sought to deliver the following secondary objectives:

1. To identify and categorize the full range of Read codes currently available to general practitioners to record alcohol intervention (including prevention, treatment and diagnoses) in general practice.

2. To investigate which Read codes were used most frequently to record alcohol treatment and diagnoses in general practice.
3. To explore whether there were significant differences in rates of routine recording of alcohol screening and brief interventions and patient alcohol consumption levels between: individual practices; Enhanced Service for alcohol status; NHS organisational area; and size of practice.

Screening and brief interventions for alcohol have been financially incentivised at two key levels in recent years. First, practices could voluntarily sign up to delivery of the national Directed Enhanced Service (DES) for alcohol, whereby participating practices were paid £2.33 for each newly registered patient aged 16 and over who had received screening using either FAST or AUDIT-C (584). Second, where available, practices could also sign up to Local Enhanced Service schemes (LES), such as the one offered by NHS South of Tyne and Wear (237). In this case, participating practices based in NHS South of Tyne and Wear received additional payments for screening and providing eligible patients with brief advice (£8.00); and for referring eligible patients to community detox programmes (£80.00).

Onsite extraction of alcohol-related Read code data was selected as the primary mode of quantitative data collection as opposed to using centralised databases of general practice data such as The Health Improvement Network (THIN) (585) or QRESEARCH (586). Crucially, onsite collection would allow analysis at individual practice level which would not be possible using standard general practice databases. Further, general practices that contribute to databases such as THIN undergo assessment to ensure they are using their computer systems correctly, and thus they may not be representative of 'standard' practices (587). In combination with the qualitative interview data gathered from GPs based at the participant practices, this would inform a better understanding of the delivery contexts that potentially influence alcohol screening and brief intervention recording practices in primary health care.

5.2.2 Sample and strategy

The target population in this study was general practices based in the NHS North of Tyne and NHS South of Tyne and Wear organisational areas (encompassing the former Newcastle PCT, North Tyneside PCT, and Northumberland Care Trust; and Gateshead

PCT, South Tyneside PCT, and Sunderland Teaching PCT respectively). As such, this would allow the comparison of alcohol screening and brief intervention Read coding in an area in which a Local Enhanced Service specification for alcohol had been launched (South of Tyne and Wear (237)) and one where only the voluntary national level Directed Enhanced Service for alcohol was available (588). In other words, it would compare recording rates in those practices receiving various levels of financial incentives, and subject to the various recording systems introduced as part of that process, with those practices not receiving any additional funding for alcohol screening and interventions. In addition, the sample would include practices based in two former PCT areas identified in the North East Public Health strategy Better Health, Fairer Health (234) for accelerated alcohol screening and brief intervention implementation (Newcastle PCT and North Tyneside PCT), and thus potentially subject to additional policy-level influences on routine intervention delivery which could in turn impact on recording practices.

A sequential, mixed-methods research design, in which the quantitative phase informed subsequent qualitative interviews and the identification of a case study practice, was employed, using nested samples in two broad phases described below:

- First, stratified purposive sampling was used to identify potential practices based on three key variables: NHS organisational location; enhanced service for alcohol status (either national and / or local schemes); and practice size. According to the North East Primary Care Services Agency, as at April 2010 there were a total of 214 practices in the selected geographical areas (589). The proposed sample size at the outset of recruitment was twenty general practices, representing approximately 9-10% of GP practices based in the target PCT areas (i.e. 20 out of 214 practices). The limited sample size reflected the exploratory nature of the study (10% is recommended in a number of texts on adequate samples for efficacy studies, small-scale trials and other similar pilot research (590-592)). The key concerns for determining an adequate sample size were therefore that the characteristics (key variables) of the participating practices were representative of the characteristics of the overall study population (GP

practices in the target NHS organisational areas) in order to provide an adequate indicator of alcohol-intervention recording trends in the target localities.

- Second, a single general practice was identified from within the wider sample for the purpose of an in-depth case study. Given that this element of the quantitative phase would involve a particularly time-consuming data extraction process, the use of a convenience sampling approach was proposed to identify an eligible practice that was willing and able to accommodate the requirements of the study.

Figure 9 and Table 8 below illustrates the planned sample design and stratified sample scheme for the research. Additional details of the qualitative sampling strategy are provided in the following chapter of this thesis (Chapter 6).

Figure 9: Research sample design

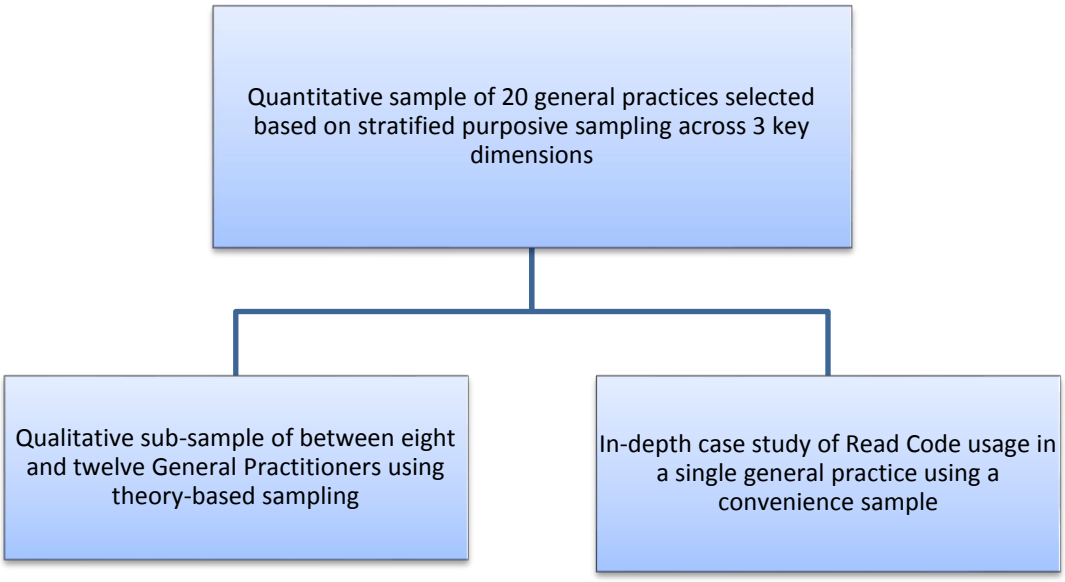


Table 8: Stratified purposive sample scheme for quantitative research phase

NHS Organisation	Smaller than average practice size (≤ 6,499)		Larger than average practice size (≥6,500)		Multi-site practice group	
	Enhanced Service	No Enhanced Service	Enhanced Service	No Enhanced Service	Enhanced Service	No Enhanced Service
North of Tyne	2	2	2	2	1	1
South of Tyne and Wear	2	2	2	1	1	1

Specific inclusion and exclusion criterion for research participants in both elements of the quantitative phase are described below.

Inclusion criteria:

- GP practice of any model (i.e. multi-partner, sole practices, salaried practices, Darzi-units)
- Based within either NHS South of Tyne and Wear or NHS North of Tyne; and
- Willing to participate in the project.

Exclusion criteria:

- Located outside either NHS South of Tyne and Wear or NHS North of Tyne and Wear.

5.2.3 Ethical approval

The research was reviewed by Newcastle and North Tyneside Research Ethics Committee 1 (10/HO906/47), and granted full ethical approval on 16th September 2010. An NHS Research Passport to enable the study to commence recruitment was obtained in February 2011.

5.2.4 Recruitment

GP practices were identified and subsequently contacted using a range of channels, as described below, in three broad rounds of recruitment carried out between March 2011 and April 2012.

Round 1: March to August 2011

In the first round of recruitment, potential participants were identified from publicly available lists available via the NHS choices website (www.nhs.uk) and the North East Primary Care Services Agency (www.nefhsa.nhs.uk), and lists of research active practices provided by contacts within the Research and Development departments of relevant Primary Care Trusts. At this stage, a strictly purposive approach to recruitment was adopted, whereby only practices that were identified as 'fitting' the sample scheme were targeted. An initial letter or email correspondence (where email addresses were available) was sent to Practice Managers (Appendix E), inviting them to

participate in the study. This correspondence included a project 'flyer' (Appendix F), which offered a brief introduction to the research, and explained why their involvement was required and what participation would involve. The flyer was produced and designed on the advice of PCT contacts who suggested this was the most effective means of making initial contact with busy practice managers and clinicians.

Based on the response to this initial email or postal contact, a full Project Information Sheet was available for their perusal (see Appendix G), which included more detail on the data to be collected, and the manner in which the research would be conducted. Practice Managers also received a copy of a confidentiality agreement at that stage (Appendix H) between practices and the researcher, which outlined the conditions of access to practice data that the researcher would adhere to throughout the study. In total, sixty-three practices were emailed or written to at this point (March to August 2011), with follow-up calls made where named contacts were available. This round yielded only a small number of interested practices (five), with many practices responding that time demands or existing research commitments prevented their participation in the research.

Round 2: September to December 2011

In the second round, the search was broadened to include an additional ninety potential practices, using publicly available lists available via the NHS choices website (www.nhs.uk/Service-Search/GP/LocationSearch/4) and the North East Primary Care Services Agency (www.nefhsa.nhs.uk) to identify potential practices, and matching the sample scheme requirements as far as it was possible. The first round had underlined the importance of identifying personal email addresses for practice managers: requests in writing almost always resulted in non-response; whereas all successes thus far had resulted from personal email contacts. A database of potential email contacts for all ninety practices was therefore produced using online searches for Freedom of Information requests for practice manager email addresses. Again, follow-up calls were made to boost the response rate, targeting practices that filled identified gaps in the sample. Again, this round delivered limited success, with a further six practices recruited between September and December 2011.

Round 3: January to April 2012

In the final round of recruitment, the search strategy focussed on filling the gaps in the sample base: working with former PCTs to contact practices signed up to enhanced services; additionally targeting practices not listed on PCT Local Enhanced Service lists to address an identified shortfall in practices not signed up to an enhanced service; and returning to practices that had expressed an interest earlier in the research but did not fulfil a sample requirement (for example, practices that had signed up to an enhanced service when practices not signed up were actually required). A further forty-nine practices were contacted at this point (January to April 2012). This markedly pragmatic approach to recruitment was viewed as essential in order to make up the shortfall in the sample needed. Five practices agreed to participate at this stage, making sixteen practices in total.

5.2.5 Description of study sample

A total of sixteen GP practices were recruited to the study, as presented in Table 9 below. This section explores the key characteristics of the study sample, namely: practice size (by number of registered patients); geographic location; deprivation ranking; age profile; alcohol consumption rates; and other relevant contextual data gathered during the course of the fieldwork.

Table 9: Recruited research sample

NHS Organisation	Smaller than average practice size (≤ 6,499)		Larger than average practice size (≥6,500)		Multi-site practice group	
	Enhanced Service	No Enhanced Service	Enhanced Service	No Enhanced Service	Enhanced Service	No Enhanced Service
North of Tyne	2	1	2	2	1	1
South of Tyne and Wear	5	0	2	0	0	0

Size of participant practices

Half (n=8; 50%) of the study practices were classed as 'smaller than average' single site practices in terms of the number of registered patients (range: 596 to 6,261). Just over 37% (n=6) were classed as 'larger than average' single site practices (range: 7,540 to 16,430 registered patients). The remainder (n=2; 12.5%) were classed as multiple-site practices, with the total number of patients able to use the various practice sites

ranging from 6,759 to 16,497. Overall, the mean number of registered patients for the study practices was 6,667 patients, which compares well with the national average practice list size of 6,487 patients (593).

Additional contextual data on the recruited sample

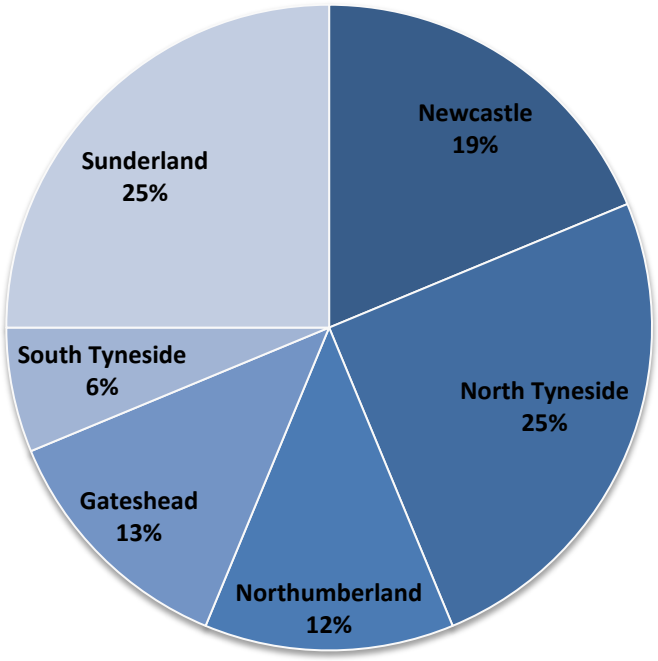
Additional data gathered during the course of the fieldwork highlighted a range of further variables of interest. For example, two study practices in the North of Tyne area (NOTW1 and NOTW8) had opened relatively recently (in 2009 and 2011 respectively) as a result of Lord Darzi's review of the NHS which recommended improving access to primary care through the introduction of additional GP-led health centres (polyclinics - so-called 'Darzi practices')(594). In these instances, all GPs were salaried and the practice as a whole subject to additional performance measures above and beyond the standard Quality and Outcomes Framework or Enhanced Service requirements. In addition, around a third of practices (n=6; 37%) identified themselves as teaching practices (NOTW3, NOTW4, NOTW9, SOTW1, SOTW7) and one practice stated explicitly that they were 'research active' (SOTW2). Finally, five practices (31%) had either what might be described as a 'local opinion leader' in the alcohol prevention field within the senior team (SOTW1) or had been involved in alcohol-related research or initiatives in the past (NOTW2, NOTW3, NOTW5 and NOTW9). Importantly, this factor often appeared to have led to the development of Read Codes and coding templates specifically tailored to the practice concerned. However, it is also worth noting that the longer term impacts on individual practice approach to delivering or recording alcohol screening and brief intervention varied considerably, for example, where research funding had ended or where particular personnel had moved on.

Geographic location of practices

Whilst recruitment was achieved in all six target PCT areas, there was a higher representation of Sunderland, North Tyneside and Newcastle PCTs within the sample (at 25%, 25% and 19% respectively), compared with Gateshead, Northumberland and South Tyneside (13%, 12% and 6%). Practices based in the overall North of Tyne NHS organisational area were also over-represented in comparison to South of Tyne and

Wear, (at 56% versus 44% respectively). The geographic breakdown of the sample is illustrated in Figure 10 below.

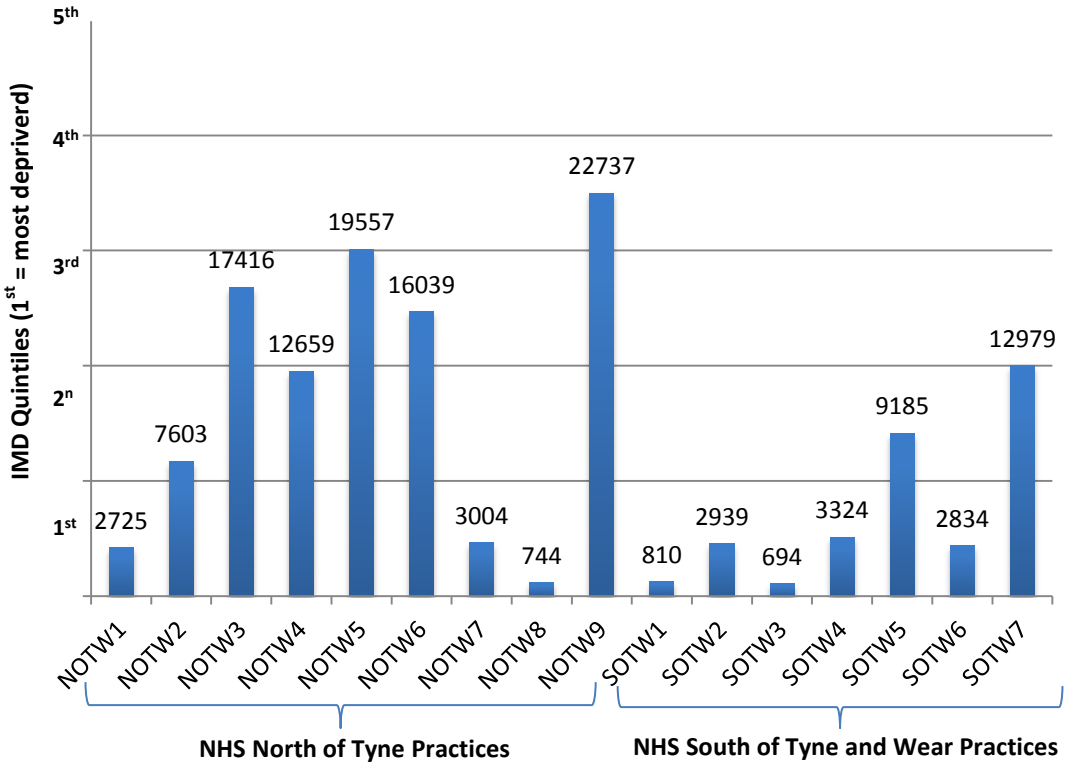
Figure 10: Study sample by Primary Care Trust



Deprivation ranking of practice sample

The postcode of each participating practice was mapped against English Indices of Deprivation data (595) in order to provide a proxy measure of deprivation. As shown in Figure 11, this would suggest that practices in the North of Tyne organisational area were generally based in less deprived localities in comparison with the South of Tyne and Wear-based sample.

Figure 11: Deprivation rank of study sample practices by IMD quintile



Age profile of sample patient population

The age profile of the participant GP practices for 2010-2011 is presented to follow, by gender, and compared to England population estimates using Office for National Statistics Mid-2011 Population Estimates (596). As evident from Table 10, overall, the age profile of most practices compared with that of England as a whole. The main exception was practice ID SOTW2, whose age profile was noticeably older than that of the sample as a whole, with more patients aged between 25 and 34 than in other recruited practices. This was a smaller than average practice, based in a relatively deprived part of Sunderland.

It is important to emphasise the fact that the age profile of practices was based on the total number of registered patients at the time point surveyed (2010-2011) and therefore may not accurately reflect the age profile of the community in which the practice was located.

Table 10: Age profile of sample practices 2010-2011 by gender (M = male; F = female) (%)

	0-16		17-24		25-34		35-44		45-54		55-64		65-74		75+	
PRACTICE ID	***M***	***F***	***M***	***F***	***M***	***F***	***M***	***F***	***M***	***F***	***M***	***F***	***M***	***F***	***M***	***F***
NOTW1	29	25	11	16	22	25	17	16	10	9	6	6	3	2	1	2
NOTW2	20	18	10	9	12	12	14	15	16	14	13	12	9	10	7	10
NOTW3	19	17	9	8	15	15	13	13	14	15	14	13	9	9	7	10
NOTW4	17	18	9	10	10	10	13	13	15	15	16	15	12	11	8	7
NOTW5	15	15	10	9	11	10	14	13	18	16	14	13	10	12	9	13
NOTW6	20	17	8	7	9	8	11	13	17	16	15	14	11	13	10	12
NOTW7	21	19	10	9	11	12	14	14	16	14	12	12	8	9	7	10
NOTW8	26	26	20	21	15	19	14	15	11	9	8	6	4	2	2	2
NOTW9	19	16	14	14	14	13	14	13	15	14	11	11	7	7	7	10
SOTW1	16	17	11	11	20	21	15	13	15	14	12	11	7	7	5	8
SOTW2	8	8	34	47	26	22	16	9	9	7	4	4	1	2	1	1
SOTW3	28	24	16	14	17	14	12	15	13	11	6	8	4	6	4	8
SOTW4	25	23	12	11	15	15	15	15	13	13	12	12	6	5	2	4
SOTW5	19	16	12	9	12	11	14	14	15	16	12	13	9	10	6	10
SOTW6	22	19	10	11	15	15	14	13	16	15	11	10	7	8	5	9
SOTW7	16	15	8	7	11	11	13	12	14	13	15	15	12	14	9	12
ENGLAND	**21**	**19**	**11**	**10**	**14**	**13**	**14**	**14**	**14**	**14**	**12**	**12**	**8**	**9**	**6**	**9**

Alcohol consumption rates in sample practice Local Authority areas

The following table (11) presents mid-2009 synthetic estimates of different levels of alcohol consumption at population level by relevant Local Authority (LA) organisational areas (i.e. the LA areas in which the sample practices were based), for the North East Government Office region, and for England as a whole (597). Synthetic alcohol consumption prevalence estimates are derived from a statistical model which models the probability of abstaining or being a lower, increasing or higher risk drinker (of the drinking population only) using a combination of individual level (age, sex, ethnicity), area level (Index of Multiple Deprivation) and alcohol-specific hospital admission data (290).

As the data shows, whilst synthetic estimates of lower, increasing and higher risk drinking rates were generally comparable both between different LA areas, and in relation to regional and national rates; clear differences emerged at either end of the consumption spectrum. Overall the North East had a lower rate of abstainers than nationally (14.6% as opposed to 16.5%) alongside significantly higher rates of binge drinking amongst those adults that drink (30.1% for the North East compared with 20.1% for England). Generally speaking, these consumption trends were reflected

across the respective practice LA areas, although Newcastle LA was notable in having both a higher prevalence of alcohol abstainers, and of both higher risk and binge drinking adults.

Table 11: Mid-2009 synthetic estimate of the percentage within the total population of abstainers, lower risk, increasing risk, high risk and binge drinkers in local authority populations aged 16 yrs+

Area	Abstainers[3]			Lower risk drinking[4]			Increasing risk drinking[5]			Higher risk drinking[6]			Binge Drinkers[7]		
	% population aged 16 years+	Lower 95% CI	Upper 95% CI	% drinking population aged 16 +	Lower 95% CI	Upper 95% CI	% drinking population aged 16+	Lower 95% CI	Upper 95% CI	% drinking population aged 16+	Lower 95% CI	Upper 95% CI	% drinking population aged 16+	Lower 95% CI	Upper 95% CI
Newcastle	17	12	21	73	51	85	20	11	38	8	3	23	34	31	37
N. Tyneside	14	9	18	74	51	86	20	11	37	7	2	21	30	27	33
North'land	14	9	17	73	51	86	20	11	39	7	2	21	30	27	32
Gateshead	15	9	19	74	53	87	19	11	36	7	3	22	30	27	34
S. Tyneside	15.5	10.3	19.9	74.5	52.7	86.8	19.0	10.4	36.6	6.5	2.4	21.2	28.7	25.6	32.1
Sund'land	14.2	9.3	18.5	74.2	52.6	86.2	19.2	10.7	37.0	6.6	2.4	21.6	29.8	27.2	32.5
North East	14.6	9.6	18.7	73.7	51.9	85.9	19.6	10.9	37.6	6.7	2.4	21.7	30.1	26.2	34.4
England	16.5	11.1	20.6	73.3	51.1	86.4	20.0	10.8	38.5	6.7	2.4	21.8	20.1	19.4	20.8

Enhanced service for alcohol status

Seventy-five per cent (n = 12) of the practices in the study sample were signed up to an enhanced service for alcohol at either the national or local level. Within the practices based in the South of Tyne and Wear NHS organisational area, coverage was 100%, with all practices signed up to both the national Directed Enhanced Service for Alcohol introduced in 2008, and a Local Enhanced Service introduced in 2009-10 (n = 7). Despite the lack of a local-level enhanced service for alcohol in place in the north of the sample area, the majority of practices were signed up to the national service (56%) (n = 5), and these were spread across all PCT areas involved (one in Newcastle PCT; two in both Northumberland and North Tyneside PCTs respectively) (see Figure 12).

3 Proportion (%) of adults aged 16+ who report in abstaining from drinking alcohol.

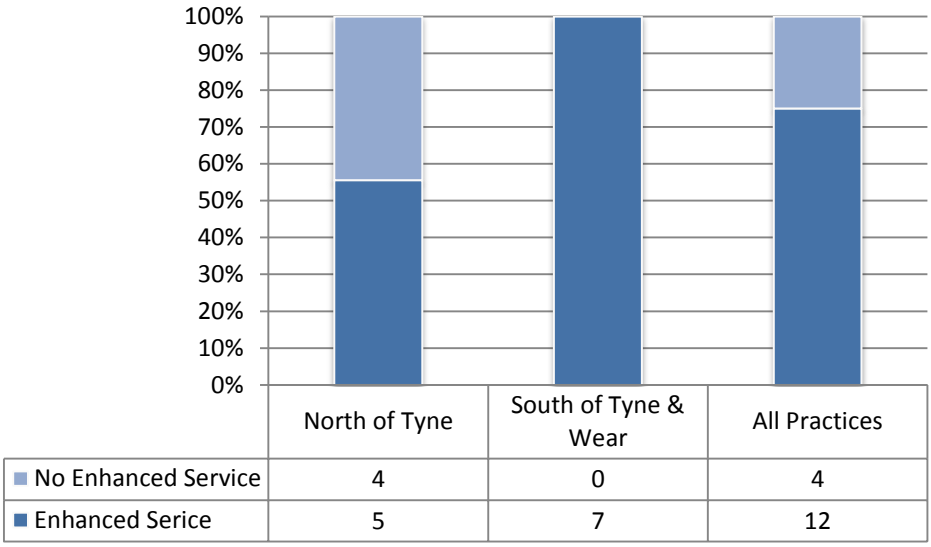
4 Proportion (%) of adults aged 16+ (not including abstainers) aged 16 years and over who report engaging in lower risk drinking, defined as consumption of less than 22 units of alcohol per week for males, and less than 15 units of alcohol.

5 Proportion (%) of adults aged 16+ (not including abstainers) who report engaging in increasing risk drinking, defined as consumption of between 22 and 50 units of alcohol per week for males, and between 15 and 35 units of alcohol per week for females.

6 Proportion (%) of adults aged 16+ (not including abstainers) who report engaging in higher risk drinking, defined as more than 50 units of alcohol per week for males, and more than 35 units of alcohol per week for females.

7 Proportion (%) of adults aged 16+ who consume at least twice the daily recommended amount of alcohol in a single drinking session (that is, 8 or more units for men and 6 or more units for women).

Figure 12: Enhanced service for alcohol status of study sample



Summary of all sample practice characteristics

The following table (12) summarises the aforementioned practice characteristics.

Table 12: Key characteristics of sample practices

	Enhanced Service for Alcohol Status		Size of Practice				North of Tyne Practices			South of Tyne & Wear Practices			Index of Multiple Deprivation		
PRACTICE ID	DES	LES	No. registered patients	Larger than average	Smaller than average	Multi-site	Newcastle	North Tyneside	Northumberland	Gateshead	South Tyneside	Sunderland	Score	Rank (1=most)	Quintile (1st = most)
NOTW1	0	0	1372	0	1	0	1	0	0	0	0	0	47.25	2725	1st
NOTW2	0	0	16497	0	0	1	0	1	0	0	0	0	31.38	7603	2nd
NOTW3	1	0	9826	1	0	0	0	1	0	0	0	0	15.9	17416	3rd
NOTW4	1	0	2950	0	1		0	0	1	0	0	0	21.81	12659	2nd
NOTW5	0	0	7651	1	0	0	0	1	0	0	0	0	13.73	19557	4th
NOTW6	1	0	6759	0	0	1	0	0	1	0	0	0	17.48	16039	3rd
NOTW7	0	0	8019	1	0	0	1	0	0	0	0	0	45.97	3004	1st
NOTW8	1	0	596	0	1	0	1	0	0	0	0	0	60.92	744	1st
NOTW9	1	0	8793	1	0	0	0	1	0	0	0	0	10.99	22737	4th
SOTW1	1	1	4890	0	1	0	0	0	0	1	0	0	60.15	810	1st
SOTW2	1	1	1230	0	1	0	0	0	0	0	0	1	46.21	2939	1st
SOTW3	1	1	3017	0	1	0	0	0	0	0	0	1	61.61	694	1st
SOTW4	1	1	4834	0	1	0	0	0	0	0	0	1	44.59	3324	1st
SOTW5	1	1	6261	0	1	0	0	0	0	0	0	1	27.88	9185	2nd
SOTW6	1	1	7540	1	0	0	0	0	0	0	1	0	46.66	2834	1st
SOTW7	1	1	16430	1	0	0	0	0	0	1	0	0	21.36	12979	3rd
TOTALS	**12**	**7**	**106665**	**6**	**8**	**2**	**3**	**4**	**2**	**2**	**1**	**4**	-	-	
%	**75**	**44**	-	**38**	**50**	**13**	**19**	**25**	**13**	**13**	**6**	**25**	-	-	

5.2.6 Characteristics of the case study practice

The recruited case study practice was based in a relatively deprived part of Gateshead, within the NHS South of Tyne and Wear organisational area (ranked in the first (most deprived) quintile according to the Index of Multiple Deprivation (598)). The practice was signed up to both the national Directed Enhanced Service for alcohol, in addition to the Local Enhanced Service. With a patient population of 4,890, it is classed as smaller than average in relation to the standard GP practice. The practice is also research-active, and notably, the practice team included a GP that could be described as a 'local alcohol champion'. In comparison with England as a whole, the related local authority area alcohol consumption compared with trends evident across with the wider North East region, demonstrating a relatively lower rate of abstainers, and higher prevalence of binge drinkers than nationally (see Table 13 below).

Table 13: Mid-2009 synthetic estimate of the percentage within the total population of abstainers, lower risk, increasing risk, high risk and binge drinkers in local authority populations aged 16 yrs+

Local Authority Area	Abstainers[8]			Lower risk drinking[9]			Increasing risk drinking[10]			Higher risk drinking[11]			Binge Drinkers[12]		
	% population aged 16 years+	Lower 95% CI	Upper 95% CI	% drinking population aged 16 +	Lower 95% CI	Upper 95% CI	% drinking population aged 16+	Lower 95% CI	Upper 95% CI	% drinking population aged 16+	Lower 95% CI	Upper 95% CI	% drinking population aged 16+	Lower 95% CI	Upper 95% CI
Gateshead	**14.6**	9.4	18.9	**74.3**	52.5	86.5	**19.0**	10.5	36.3	**6.7**	2.5	22.2	**30.2**	27.1	33.5
North East	**14.6**	9.6	18.7	**73.7**	51.9	85.9	**19.6**	10.9	37.6	**6.7**	2.4	21.7	**30.1**	26.2	34.4
England	16.5	11.1	20.6	73.3	51.1	86.4	20.0	10.8	38.5	6.7	2.4	21.8	20.1	19.4	20.8

5.2.7 Data management

All Read Code data were extracted in-situ at the relevant GP practice, with the researcher working alongside practice managers or data administrators to run a series of Read Code queries (see Table 14 for details) derived primarily from Department of Health recommended coding for screening and brief alcohol interventions (273). The data were anonymised and aggregated before they were transferred from the

8 Proportion (%) of adults aged 16+ who report in abstaining from drinking alcohol.

9 Proportion (%) of adults aged 16+ (not including abstainers) aged 16 years and over who report engaging in lower risk drinking, defined as consumption of less than 22 units of alcohol per week for males, and less than 15 units of alcohol.

10 Proportion (%) of adults aged 16+ (not including abstainers) who report engaging in increasing risk drinking, defined as consumption of between 22 and 50 units of alcohol per week for males, and between 15 and 35 units of alcohol per week for females.

11 Proportion (%) of adults aged 16+ (not including abstainers) who report engaging in higher risk drinking, defined as more than 50 units of alcohol per week for males, and more than 35 units of alcohol per week for females.

12 Proportion (%) of adults who consume at least twice the daily recommended amount of alcohol in a single drinking session (that is, 8 or more units for men and 6 or more units for women).

research site onto University computers via an encrypted, password protected USB stick; therefore no sensitive or personal data left any of the participant NHS sites. Microsoft Excel was used for data management purposes, and for the generation of basic descriptive statistics, rates of recording (percentages, %), and confidence intervals (CI); with tests for heterogeneity between key variables carried out in Stata (599). Storage on University computers was password protected and only accessed by the Chief Investigator (AOD). This stringent approach to data security was detailed in a tailored confidentiality agreement between the researcher and the participant practice, which was signed by both parties prior to data extraction taking place (see Appendix H).

5.2.8 Data collection and analysis

(1) Identifying the range of alcohol Read Codes available to General Practitioners

The first element of the quantitative research phase comprised the identification and categorisation of the full range of Read Codes currently available to general practitioners to record alcohol-related clinical services in general practice settings. EMIS (an acronym which stands for Egton Medical Information Systems) was searched in order to generate a comprehensive list of alcohol Read Codes that could potentially be used to record treatment of alcohol use disorders and / or interventions for alcohol by practitioners. EMIS was selected as the initial means of identifying the appropriate Read codes as it is the dominant GP computer system in the UK at present (it is used by 53% of all GP practices in the UK (600)).

The process of identifying alcohol-related Read codes utilised a series of search features within EMIS (specifically: alcohol; alcohol consumption; and alcohol screening); alongside World Health Organisation ICD-10 codes for alcohol (5) (F10: Mental and behavioural disorders due to use of alcohol). An additional list of alcohol-related Read Codes published in 2008 was identified via an online search of deposited papers in the UK Parliament (601). The two initial lists of Read codes were merged in Excel, duplicates were deleted, and a number of unique codes added to the generally available Read code lexicon by the case study practice were also removed. The resultant list of alcohol-related Read Codes was grouped and categorised using the related more detailed textual descriptors. Importantly, this information informed

subsequent work to establish which Read Codes are used most frequently to record alcohol treatment and diagnoses in general practice (see section (2) Case study: frequency of alcohol Read Code use).

(2) Case study: frequency of alcohol Read Code use

Next, a case study of a single GP practice based in NHS South of Tyne and Wear was undertaken in order to explore which alcohol-related Read Codes are currently used most frequently in general practice settings. First, using the comprehensive list of alcohol Read Codes developed in part 1 (above), patient records were searched using each individual Read Code in order to identify the number of occasions it had been used to record alcohol-related treatment and diagnoses over the period 2007-2011 inclusive. Crucially, this covered the introduction and implementation of the national alcohol Directed Enhanced Service and alcohol LES for South of Tyne and Wear.

Next, tables were generated, resulting in aggregated numbers of instances on which individual codes had been used, presented by age using standard Korner Bands, and gender (see Figure 13 for an example output). Finally, the aggregated data was analysed to identify: zero incidence Read Codes by year; most frequently used Read Codes by year; and the proportion of all available alcohol Read Codes in most frequent use.

(3) Differences in rates of recording of routine alcohol screening and brief intervention data

Finally, descriptive statistics were used to compare and contrast recording rates between GP practices in relation to the delivery of screening and brief interventions for alcohol (the incomplete, basic and heterogeneous nature of the data meant it was inappropriate to conduct inferential statistical tests). This component of the research sought to identify differences in recorded rates of clinical activity relating to the identification, treatment and management of alcohol-use disorders. Alcohol-use disorders cover a wide range of mental health problems as recognised within the international disease classification systems (ICD-10, DSM-IV) (5). These include hazardous and harmful drinking and alcohol dependence (602). Therefore, the key coding areas of interest were as follows:

1. **Alcohol Consumption:** As the population of interest comprised patients identified as drinking above recommended limits, it was important to identify the rates of recorded excessive alcohol consumption (hazardous or harmful level drinking over recommended limits) in practices. Hazardous drinking was defined as drinking over the recommended weekly limit of alcohol (21 units for men and 14 units for women); harmful drinking was defined as drinking over the recommended weekly limit of alcohol and experiencing health problems directly related to alcohol. This would provide a crude indicator of the population that could potentially benefit from screening and brief intervention for alcohol.
2. **Screening for alcohol use:** Next, the study was interested in determining the rates of recorded delivery of one of three pre-determined screening tests for alcohol use; namely, FAST (148), AUDIT-C (603) and the full AUDIT (143, 604). Due to overlap and variations in coding practices, coded instances of administration of AUDIT-C and FAST were aggregated into a single over-arching 'brief screening test' category, with rates of recorded delivery of the full AUDIT presented separately.
3. **Brief advice or interventions for hazardous or harmful alcohol use:** Third, the research sought to identify the rates of patients that had scored positively on one of the above screening tests and as a result, had either received: brief advice for alcohol (around 5 minutes in length, also sometimes coded as a brief intervention for alcohol) or an extended brief intervention (up to four sessions of 20 to 40 minutes length).
4. **Referral to specialist treatment:** Finally, the study wanted to establish the rates of patient referrals to specialist alcohol treatment, such as detoxification and/or psychosocial interventions, in order to reduce or cease their drinking. The extent to which practitioners were coding instances of referral to community detox was of particular interest as a new financial incentive had been introduced in the South of Tyne and Wear area during the course of the research (237).

A set of Read code search strategies were developed for the interrogation of general practice systems, drawing on the intelligence gathered in the previous elements of the

quantitative phase, alongside guidance published by the Department of Health (273) and Haringey Drug and Alcohol Action Team (294) on the optimal recording of alcohol screening and brief intervention activity. However it is acknowledged that some practices may have recorded the core concepts outlined above (1-4) using alternative Read codes. This set of Read code queries was further piloted and refined at one of the participant practices prior to full roll-out of this element of the research. This pilot phase also offered an opportunity to gather informal observational data that informed subsequent revisions to the overall research approach and in particular, more effective working practices with practice staff. Two separate sets of Read codes were developed for use in either EMIS (605) or SystmOne (606) clinical computing systems, as these emerged as the main software used in UK GP practices (600, 607). Importantly, both systems were also recommended by the GP Systems of Choice scheme through which the NHS funded the provision of GP clinical IT systems in England (608). The Read Code queries conducted at each participating practice are detailed below.

Table 14: Alcohol Read Code queries

Description		SystmOne	5 byte (EMIS, Vision, Torex)
Q: Number of patients drinking at hazardous levels between 2006-2011			
1	Male weekly unit consumption (upper limit 49; lower limit 22)	Ub171	136..
2	Female weekly unit consumption (upper limit 35; lower limit 15)	Ub171	136..
Q: Number of patients drinking at harmful levels between 2006-2011			
3	Male weekly unit consumption (upper limit 99; lower limit 50)	Ub171	136..
4	Female weekly unit consumption (upper limit 99; lower limit 36)	Ub171	136..
Q: Number of patients drinking at hazardous levels between 2010-2011			
5	Male weekly unit consumption (upper limit 49; lower limit 22)	Ub171	136..
6	Female weekly unit consumption (upper limit 35; lower limit 15)	Ub171	136..
Q: Number of patients drinking at harmful levels between 2010-2011			
7	Male weekly unit consumption (upper limit 99; lower limit 50)	Ub171	136..
8	Female weekly unit consumption (upper limit 99; lower limit 36)	Ub171	136..
Q: Number of patients screened with FAST or AUDIT-C between 2010-2011			
9	FAST Screenings	XaNO9	9k16
10	AUDIT C Screenings	XaORP	9k17

Q: Number of patients with a positive FAST or Audit-C score between 2010-2011			
11	No of positive FAST screenings (upper limit 16; lower limit 3)	XaNO9	.388u
12	No. of positive AUDIT-C screenings (upper limit 12; lower limit 5)	XaORP	9k17
Q: Number of patients given full AUDIT assessment between 2010-2011			
13	No. of full AUDIT conducted	XM0aD	9k15/.38D3
Q: Number of patients given brief advice/intervention/extended intervention between 2010-2011			
14	Brief advice	XaFvp	8CAM
15	Brief intervention	XaPPv	9K1A
16	Extended intervention	XaPPy	9K1B
Q: Number of patients with a full AUDIT score of 20 or more referred to specialist alcohol treatment services between 2010-2011			
17	Referred to specialist alcohol treatment services	XaORR	8HkG
18	Referred to community detox	8BA8	8BA8

Simple count data for the above queries were extracted from practice computers. In order to maintain patient confidentiality, data were extracted in aggregated form as tables showing total counts by Korner band age groups and by gender for the specified time period. The figure below (relating to a query on number of male patients recorded as drinking at hazardous or harmful levels) illustrates the typical table format of data extracted from practice systems.

Figure 13: Example table of aggregated Read Code counts extracted from general practice systems

```
Q1 (25.1.2012) . BASE IS PRACTICE POPULATION
 ------------------------------------------------------------------------------
|Age groups |0-4   5-16  17-24 25-34 35-44 45-54 55-64 65-74 75-84 85-89 90+    |
|------------------------------------------------------------------------------|
|Males         0     0     90    65    63   143   161   106    48    15    6   |
|------------------------------------------------------------------------------|
|Base        236   548   590   573   593   618   459   307   196    55   27   |
|------------------------------------------------------------------------------|
|Percent       0%    0%   15%   11%   11%   23%   35%   35%   24%   27%   22%  |
|------------------------------------------------------------------------------|
|Females       0     0     0     0     0     0     0     0     0     0     0   |
|------------------------------------------------------------------------------|
|Base        233   523   647   615   619   643   515   336   300    98   62   |
|------------------------------------------------------------------------------|
|Percent       0%    0%    0%    0%    0%    0%    0%    0%    0%    0%    0%  |
|------------------------------------------------------------------------------|
|Total males      : 697          Base : 4202             Percent : 17%         |
|------------------------------------------------------------------------------|
|Total females    : 0            Base : 4591             Percent : 0%          |
|------------------------------------------------------------------------------|
|Total both sexes : 697          Base : 8793             Percent : 8%          |
 ------------------------------------------------------------------------------
```

The aggregated count data were transferred into Excel for data management and analysis purposes. Analysis of the resultant data involved the following:

a. Rates (proportions) were calculated for each variable by dividing the aggregated counts (the numerator) by the patient population for each practice (the denominator population). In statistical terms, these populations were 'open': patients may have entered or left the population during the specified time period (through ageing, migration, birth, death, and so forth), each contributing different periods at risk (609).
b. 95 % confidence intervals for rates (proportions) were determined using the binomial distribution and calculated using the Wilson Score method (610). The Wilson Score method is the preferred method of the Association of Public Health Observatories (609) and has been evaluated and recommended by Newcombe and Altman (611, 612). Importantly, this method can be used with any data values, including small samples, and, unlike some methods, it does not fail to give an interval when the numerator count, and therefore the proportion, is zero (609). The calculations were carried out in Excel using an 'add-on' function programmed with visual basic as detailed in Figure 14.

Figure 14: Visual basic Wilson Score Add-on for Excel

```
Option Compare Database
Option Explicit

Function WilsonCI(dNumerator As Double, dDenominator As Double, _
            dZ As Double, iUpper As Integer) As Double
Dim dPartA As Double, dPartB As Double, dPartC As Double, dProportion As Double
Dim dPtB1 As Double, dPtB2 As Double

 ' This function implements the Wilson method for calculating
 ' a confidence interval for a proportion.  It takes 4 arguments.
 ' dNumerator and dDenominator have their obvious meanings.
 ' dZ is the value expressed as
 '          Z
 '           1-a/2
 ' This is the 1-a/2 percentile of a standard normal distribution.
 ' For a = 95% it will be 1.96
 ' iUpper indicates if the upper (value - 1) or lower (value - 0)
 ' confidence interval is required.

 If dDenominator = 0 Then Exit Function

 dProportion = dNumerator / dDenominator

 dPartA = dProportion + ((1 / (2 * dDenominator)) * (dZ ^ 2))
 dPtB1 = ((dProportion * (1 - dProportion)) / dDenominator)
  dPtB2 = (dZ ^ 2 / (4 * (dDenominator ^ 2)))
 dPartB = dZ * Sqr(dPtB1 + dPtB2)
 dPartC = 1 + ((1 / dDenominator) * (dZ ^ 2))
```

```
If iUpper = 1 Then
   WilsonCI = (dPartA + dPartB) / dPartC
Else
   WilsonCI = (dPartA - dPartB) / dPartC
End If

End Function
```

c. Heterogeneity between key variables (sex; individual practices; enhanced service for alcohol status; NHS organisation; and size / type of practice) was tested using the Cochrane Q test (613). Statistical analyses were performed using Stata 12.0 (StataCorp, College Station, Texas), with the metan macros used for meta-analytic procedures. P values <0.05 were considered statistically significant.

(4) Field notes

In addition, a research journal and field notes also contributed to the data gathered as part of the research. These notes detailed observations made during the fieldwork process using a brief pro-forma and to record any additional data obtained outside of the formal Read Code searches. In particular, these more informal observations, generally based on unstructured conversations with practice managers and other administrative practice staff, provided a rich source of data that could complement the qualitative GP interview findings in the following phase of the research.

5.3 Results

5.3.1 Q1: What alcohol-related Read codes are available to UK General Practitioners?

A total of 287 unique alcohol-related Read Codes were identified once locally generated, practice-specific codes had been eliminated (see Appendix I for full list). This comprehensive list of codes was analysed to determine: the main categories of alcohol-related Read codes; any areas of duplication in available Read codes; and finally any Read codes which the associated textual accompanier suggest were out-dated. These findings are presented to follow.

Main categories of alcohol-related GP Read codes

The textual identifiers accompanying each of the 287 codes were reviewed and grouped according to overarching coding categories: the identification and treatment

of alcohol use disorders; the acute physical or psychological consequences of alcohol; and the social consequences of excessive drinking.

The largest volume of the available Read Codes at just over half (n = 147, 52%) were associated with the identification, treatment and management of alcohol use disorders. Within this group, however, there were clear sub-categories of Read Codes. First, there were a series of codes relating to the recording of a patient's alcohol consumption (n = 51, 18%) or the categorisation of their drinking 'type' (n = 34, 12%). The remainder codes related to the administration of screening tests (both questionnaire-based and biomedical) (n = 37, 13%); the delivery of brief or extended interventions, or the distribution of information and advice (including alcohol-related 'lifestyle' guidance) (n = 10, 4%); referring patients from or to specialist treatment services (n = 13, 5%); and finally, there were a small number of purely administrative codes concerned with enhanced service management (n=2, 1%).

An additional 135 (47%) Read codes concerned the more acute clinical consequences of alcohol abuse, including alcohol-related poisoning and toxic effects (n = 68, 24%); physical and psychological conditions and disorders (n = 59, 21%); and the impacts of alcohol use on foetal and maternal health (n = 8, 3%). A final small number of Read codes covered what might be described as the social consequences of alcohol misuse (n = 6, 2%), including codes for a personal or family 'history' of alcohol abuse. This data is summarised in the following table (15).

Table 15: Main categories of all alcohol-related Read codes

Read Code Category	Count	%
Identification and treatment of AUDs	**147**	**52**
▪ *Alcohol consumption pattern*	*51*	*18*
▪ *Screening test administered (self-report questionnaire or biomedical)*	*37*	*13*
▪ *Alcohol Use Disorder identified*	*34*	*12*
▪ *Referral to / from specialist treatment services*	*13*	*5*
▪ *Delivery of brief advice / intervention or an extended intervention*	*10*	*4*
▪ *Enhanced service administration*	*2*	*1*
Acute physical / psychological consequences	**135**	**47**
▪ *Alcohol-related poisoning / toxicity*	*68*	*24*
▪ *Alcohol-related physical / psychological conditions*	*59*	*21*
▪ *Foetal / Maternal Health*	*8*	*3*
Social Consequences	**6**	**2**
Total	**287**	**100**

Areas of duplicate alcohol-related Read codes

The GP Read code system is a dynamic entity, and updated regularly to reflect changes in clinical practice. However, due to the need to ensure continuity in data aggregation over time (265), old codes are not deleted; but rather when newer codes supersede previous versions, the overall Read code lexicon is simply augmented to include *all* potential Read codes. Currently two versions, Version 2 (v2) and Version 3 (CTV3 or v3), are actively maintained by the NHS UK Terminology Centre (UKTC). As such, there are potentially areas of Read coding where there is considerable duplication, and where outmoded Read codes continue to be available that have since been superseded by updated and more appropriate terminology.

Given the previous phase of research (a systematic review of factors influencing GP recording practices, see Chapter 4) had determined that the sheer volume of available Read codes impacted negatively on the accuracy and consistency of clinician coding practices, it was important to determine the extent to which excessive and duplicate Read coding could potentially affect GPs' recording of alcohol treatment and diagnoses. Thus, in the next stage of analysis, additional textual identifiers were considered to ascertain any notable areas of duplication in the available alcohol-related Read codes. As detailed in the table below (16), the main area of duplication that emerged concerned those Read codes concerned with classifying a patient's alcohol consumption level. For patients classed as lower risk, increasing risk and higher

risk drinkers, there were a possible six Read codes that could be potentially selected by practitioners, and five potential codes to classify an alcohol abstainer.

Table 16: Alcohol consumption Read codes

Alcohol Use Category	V2 Read Code	CTV3 Preferred Term
ABSTAINER	1361	Teetotaller
	1361-1	Non-drinker alcohol
	1361-2	Non-drinker alcohol
	136M	Current non drinker
	1367	Stopped drinking alcohol
LOWER RISK DRINKER	1362	Trivial drinker - <1u/day
	1363	Light drinker - 1-2u/day
	136N	Light drinker
	136L.	Alcohol intake within recommended sensible limits
	136G	Alcohol intake within rec limit
	136d	Lower risk drinking
INCREASING RISK DRINKER	1364	Moderate drinker - 3-6u/day
	136O	Moderate drinker
	136a	Increasing risk drinking
	136S.	Hazardous alcohol use
	136K.	Alcohol intake above recommended sensible limits
	136F	Alcohol intake above rec limit
HIGHER RISK / HARMFUL DRINKER	136P	Heavy drinker
	1365	Heavy drinker - 7-9u/day
	1366	Very heavy drinker - >9u/day
	136Q	Very heavy drinker
	136c	Higher risk drinking
	136R	Binge drinker
	136T.	Harmful alcohol use

Outmoded alcohol-related GP Read codes

In addition, to the more standard alcohol consumption categories highlighted above, there were a series of 'ex' drinking status Read codes in existence (136A - Ex-trivial drinker (<1u/day); 136B - Ex-light drinker - (1-2u/day); 136C -Ex-moderate drinker - (3-6u/d); 136D - Ex-heavy drinker - (7-9u/day); or 136E - Ex-very heavy drinker-(>9u/d)). Finally, there were a group of alcohol-related Read codes which refer to the usual type of alcohol consumed (136L and 136F both relate to 'Spirit drinker'; 136G and 136K to 'Beer drinker'; 136H - Drinks beer and spirits; 136I - Drinks wine; and 136J - Social drinker), although they do not allow the clinician to capture the volume of alcohol consumed, or any related risk or harm.

5.3.2 Q2: How frequently are available alcohol-related Read codes used in routine primary health care? A single GP practice case study

The primary objective of the case study was to investigate, in detail, which Read codes were used most frequently to record alcohol treatment and diagnoses in general practice. Secondary objectives were to identify which alcohol-related Read codes were unused during the surveyed period, and to identify any areas of duplication in alcohol-related Read codes. In addition, the case study offered an opportunity to pilot the set of alcohol-related Read code queries developed for use in the subsequent element of the quantitative research; and finally, to gather additional contextual data about the process of routine Read coding in GP practices that could inform the remainder of the research.

As detailed in section 5.2.8, practice electronic records were searched using the comprehensive list of alcohol-related Read Codes developed in the previous element of this research phase (see Appendix I) in order to identify the number of occasions each Read code had been used over the periods 2007 to 2011 inclusive.

<u>High incidence Read Codes between 2007-2011</u>

All the top ten highest incidence Read codes fell within the broad category of the identification and treatment of alcohol use disorders (AUD). As illustrated in both the table (17) and line graph (15), throughout the period surveyed, Read code 136.0, which relates to a patient's alcohol consumption (usually with the addition of relevant weekly units consumed recorded in the electronic patient records), was by far the most frequently used code. The recorded rate of use of 136.0 was relatively consistent throughout the surveyed period, ranging from 34.5% (n = 1,707) in 2007, to its peak usage in 2010, at 39.4% (n = 1947). This was followed by relatively high rates of use of Read code 8CAM (Patient advised about alcohol), although this increased noticeably from 15.4% (n = 764) in 2007 to around 25% (n = 1238-1272) during the period 2008 to 2011 inclusive.

Use of the new Read Codes established as part of the introduction of the Directed Enhanced Service for alcohol increased from 2008 onwards. For example, rates of recording of Read Code 388u (FAST alcohol screening test), increased from 0.8% (n = 38) in 2008, to 7.5% (n = 373) in 2011. There were also small increases for Read Code

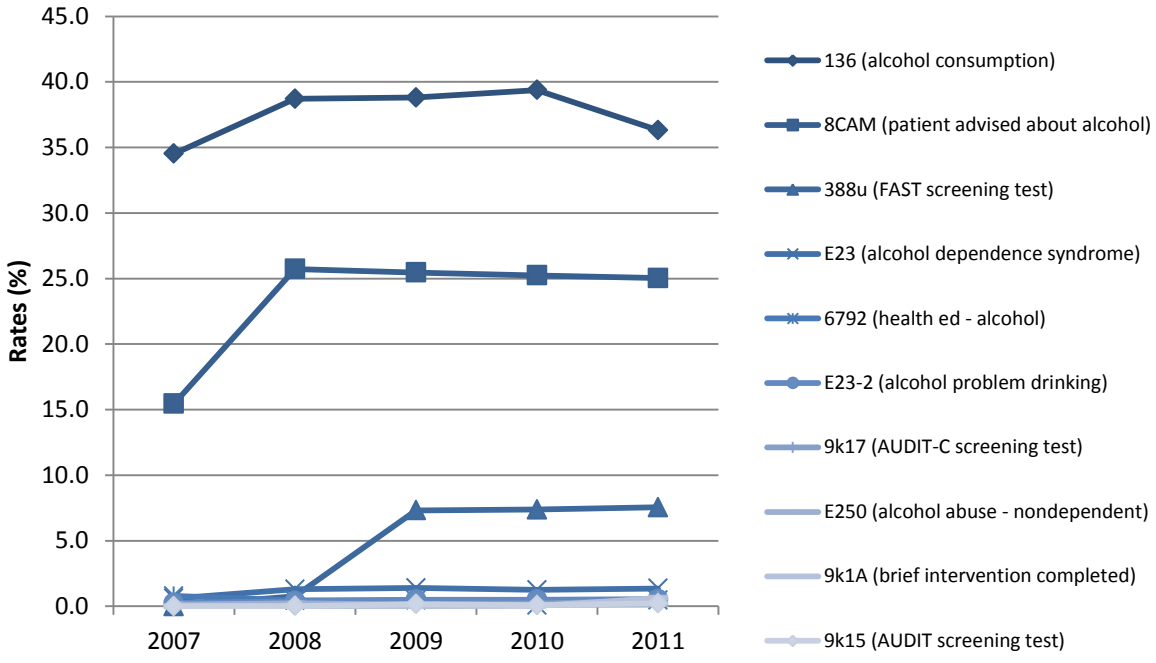
9k17 (Alcohol screen – AUDIT-C completed: 0.0% (n = 0) in 2008 to 0.4% (n = 21) in 2011); 9k1A (BI for excessive alcohol consumption completed: 0.0% (n = 0) in 2008 to 0.6% (n = 31) in 2011); and 9k15 (Alcohol screen – AUDIT completed: 0.0% (n = 0) in 2008 to 0.2% (n = 11) in 2011).

The table (17) and figure (15) below illustrate the top ten most frequently used alcohol-related Read codes in the case study practice during the surveyed period

Table 17: Top ten highest incidence alcohol-related Read codes between 2007-2011

	2007		2008		2009		2010		2011	
V2 Read Code (Preferred Term)	**%**	**No.**	**%**	**No,**	**%**	**No.**	**%**	**No.**	**%**	**No.**
136.0 (Alcohol consumption)	34.5	1707	38.7	1914	38.8	1919	39.4	1947	36.3	1796
8CAM (Patient advised about alcohol)	15.4	764	25.7	1272	25.5	1259	25.2	1248	25.0	1238
388u (Fast alcohol screening test)	0.0	0	0.8	38	7.3	362	7.4	365	7.5	373
E23 (Alcohol dependence syndrome)	0.6	30	1.3	64	1.4	69	1.3	62	1.4	67
6792.0 (Health ed. – alcohol)	0.8	39	0.4	22	0.5	23	0.1	3	0.5	23
E23-2 (Alcohol problem drinking)	0.2	12	0.4	19	0.5	25	0.5	25	0.5	27
9k17 (Alcohol screen - AUDIT C completed)	0.0	0	0.0	1	0.2	9	0.2	10	0.4	21
E250 (Alcohol abuse – nondependent)	0.1	7	0.2	11	0.1	6	0.1	5	0.1	7
9k1A (BI for excessive alc. consumption completed)	0.0	0	0.0	0	0.0	0	0.0	2	0.6	31
9k15 (Alcohol screen - AUDIT completed)	0.0	0	0.0	1	0.2	8	0.1	4	0.2	11

Figure 15: Top ten high incidence alcohol-related Read codes between 2007-2011



Overall, of the forty Read codes that had been used during the surveyed period (2007-2011), the majority related to the identification and treatment of alcohol use disorders (82.5%, n = 33), with a smaller number relating to acute physical or psychological effects of alcohol dependence such as mental or behavioural disorders due to alcohol or seizures due to alcohol withdrawal (17.5%, n = 7).

Zero incidence Read codes between 2007-2011

The remaining 247 Read codes (86% of available codes) were not used at all during the period 2007-2011 (see Appendix J for full list of Read codes). Over half of these (n = 129, 52%) related to acute physical or psychological consequences of harmful alcohol use, many of which, would of course occur relatively rarely in a standard patient population. However, a further 113 Read codes (45.75%) were related to the identification and treatment of AUDs. A number of these included the out-dated Read codes identified in section 5.3.1 (for example, 136L / 136F both relate to 'Spirit drinker'; 136G / 136K 'Beer drinker'; 136J 'Social drinker'). The full list of zero incidence codes is provided in Appendix J.

5.3.3 Q3: Are there significant differences in the rates of alcohol screening and brief intervention Read coding at individual GP practice level?

The following section presents the findings from the analysis of Read code data extracted from the sixteen North East based GP practices. The aim of this final element of the quantitative research was to explore whether there were significant differences in rates of routine recording of alcohol screening and brief interventions and patient alcohol consumption levels between different types of GP practice.

Recorded rates of screening and brief interventions for alcohol

The Read codes of interest concerned the following coding categories: the recording of individual patients' alcohol consumption; recorded screening for alcohol use disorders using validated self-report questionnaire tools; the delivery of alcohol interventions via any modality (i.e. recorded as either advice, brief or extended intervention); and recorded referral to either specialist services or into community detox. Table 18 presents the extracted Read code data in aggregated form, with more detailed results to follow by coding category.

Differences in recording rates are reported by both individual practice and between key variables of interest, namely enhanced service for alcohol status, and by size / type of practice. For enhanced service status, practices were divided into three categories: (1) those which had not signed up to either a local or national level enhanced service (all of these were based in the North of Tyne); (2) those signed up to only the DES (again, all based in North of Tyne); and (3) those practices which had signed up to both the LES and DES for alcohol (all of which were based in the South of Tyne and Wear). Analysis was also carried out to compare recording rates between different NHS organisational areas (i.e. whether practices were based in the NHS North of Tyne or NHS South of Tyne and Wear areas). In reality, however, given that all practices in NHS South of Tyne and Wear were signed up to both national and local Enhanced Service for alcohol schemes, results are presented by DES / LES status only (i.e. the recording rates at NHS organisational level mirrored enhanced service status).

Finally, recording rates were calculated by dividing the aggregated Read code counts by the total registered patient population for each practice. Thus, rates were determined by the number of patients both registered at a GP practice during the surveyed period who were also screened and / or advised or referred about their alcohol consumption. As such, it is important to note that women's tendency to present more frequently in primary health care, could potentially affect results (471, 614).

Table 18: Recorded rates of alcohol screening, delivery of brief advice / intervention and specialist referrals by practice and gender

				Rate (%)															
		Base		Hazardous and Harmful Drinking		Short Screen		Full Audit		Brief Advice		Brief Intervention		Extended Intervention		Specialist Referrals		Community Detox	
	Practice	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
NHS North of Tyne	NOTW1	690	682	2.5	0.3	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NOTW2	8076	8421	4.3	1.5	0.0	0.0	0.6	0.1	0.6	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NOTW3	4944	4882	8.1	7.8	0.0	0.0	0.4	0.2	4.6	6.3	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0
	NOTW4	1552	1539	1.0	0.7	4.9	5.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NOTW5	3813	3838	5.7	2.5	0.0	0.0	0.0	0.0	11.4	7.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1
	NOTW6	3291	3468	3.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NOTW7	3870	4149	4.6	2.1	0.0	0.0	0.0	0.0	12.8	7.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	NOTW8	284	312	2.8	1.3	54.6	57.7	7.0	3.5	0.0	0.0	9.9	6.1	0.0	0.0	0.7	0.0	0.0	0.0
	NOTW9	4202	4591	13.0	4.2	6.6	8.0	10.5	12.4	9.8	13.5	12.4	11.6	0.0	0.0	0.0	0.0	0.1	0.0
NHS South of Tyne and Wear	SOTW1	2577	2313	12.5	3.6	7.0	7.1	0.0	0.0	24.7	22.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	SOTW2	712	518	30.6	42.3	25.8	34.9	0.7	1.0	16.7	19.3	0.3	0.0	0.0	0.0	0.1	0.0	0.1	0.0
	SOTW3	1465	1552	19.9	19.2	16.3	14.8	1.1	0.4	10.7	8.0	0.3	0.1	0.0	0.0	0.1	0.0	0.0	0.0
	SOTW4	2444	2390	18.2	22.9	0.0	0.0	0.0	0.0	8.8	10.3	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0
	SOTW5	2935	3326	0.4	0.4	4.1	4.2	0.0	0.0	0.7	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0
	SOTW6	3633	3907	6.4	2.9	2.3	0.9	1.9	0.6	6.9	4.8	1.8	0.1	0.1	0.1	0.3	0.2	0.1	0.0
	SOTW7	8078	8352	9.1	4.3	0.1	0.1	7.4	9.6	7.0	3.8	1.1	0.4	0.0	0.0	0.1	0.0	0.0	0.0

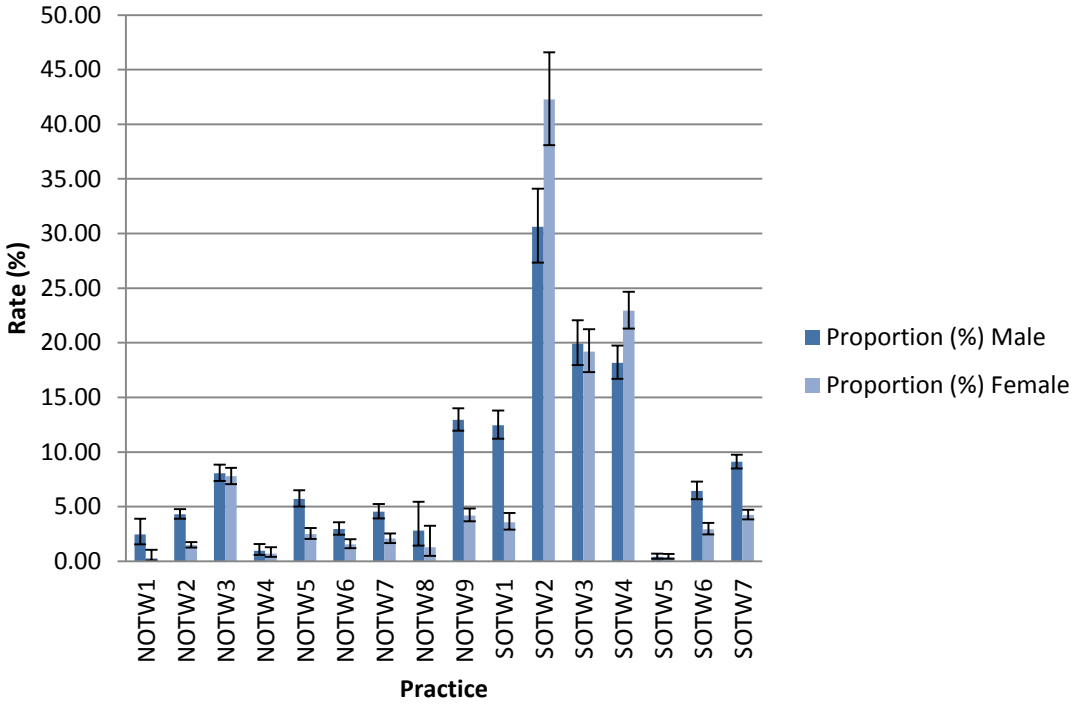
Recorded rates of hazardous and harmful level alcohol consumption

The first area of alcohol Read coding examined concerned the rate of patients recorded by participant practices as drinking above recommended limits (either at hazardous or harmful levels). This data could have been recorded on a variety of occasions. Primarily, however, practices reported that alcohol consumption would be collected in three main ways: as part of the standard data set captured at the point of a new patient registration; during an annual health review carried out by a nurse practitioner; or more opportunistically during the course of a standard GP consultation.

Variation by practice

At practice level, the rate of recorded hazardous and harmful alcohol consumption ranged considerably, between 0.41% and 30.62% for males, and between 0.29% and 42.28% for females. The heterogeneity between individual practices was significant (males: $p < 0.001$; females: $p < 0.001$). As shown in figure 16 to follow, those practices with the highest rates of recorded hazardous or harmful alcohol use were classed as smaller than average in terms of patient population, were all based in Sunderland PCT in relatively deprived areas, and were all signed up to both the national and local enhanced service for alcohol.

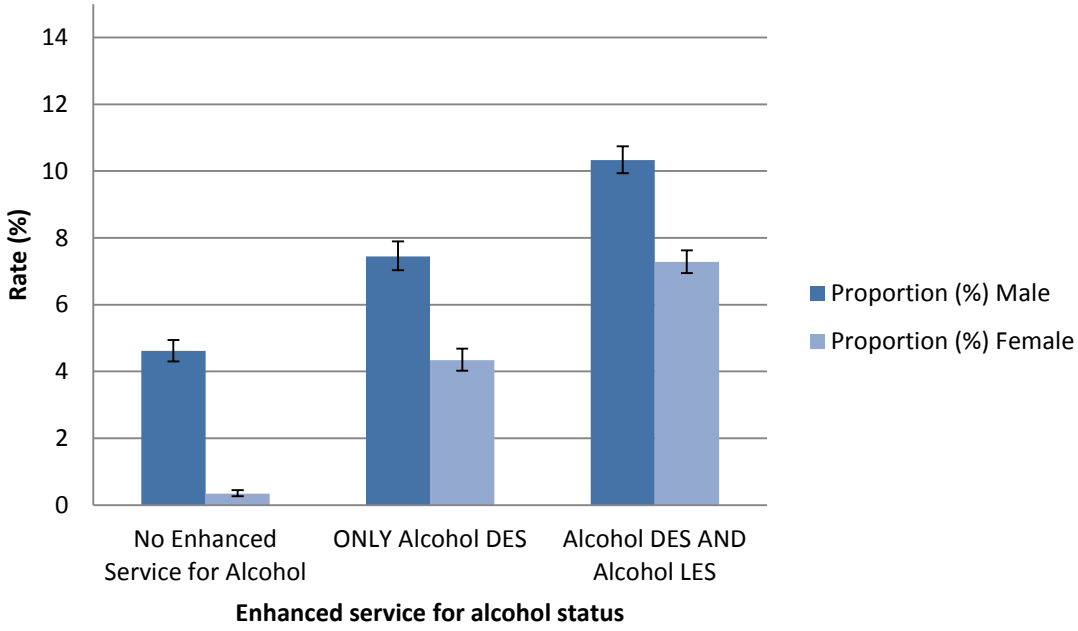
Figure 16: Rates of recorded hazardous and harmful level alcohol consumption 2010-2011 by individual practice and gender



Variation by enhanced service status

The variation by enhanced service status referred to above was more clearly evident when recording rates were compared between those practices signed up to an enhanced service and those not in receipt of financial incentives (see figure 17). Rates of recorded hazardous and harmful alcohol consumption ranged from 4.61% males (95% CI: 4.30-4.95) / 0.35% females (95% CI: 0.27-0.45) in practices with no enhanced service; to 7.45% males (95% CI: 7.03-7.89) / 4.34% females (95% CI: 4.02-4.68) in those signed up to the DES only; and were highest in practices signed up to both LES and DES, at 10.33% males (95% CI: 9.93-10.74)/ 7.28 females (95% CI: 6.95-7.63). The difference between these groups of practices was significant (males: $p < 0.001$; females: $p < 0.001$).

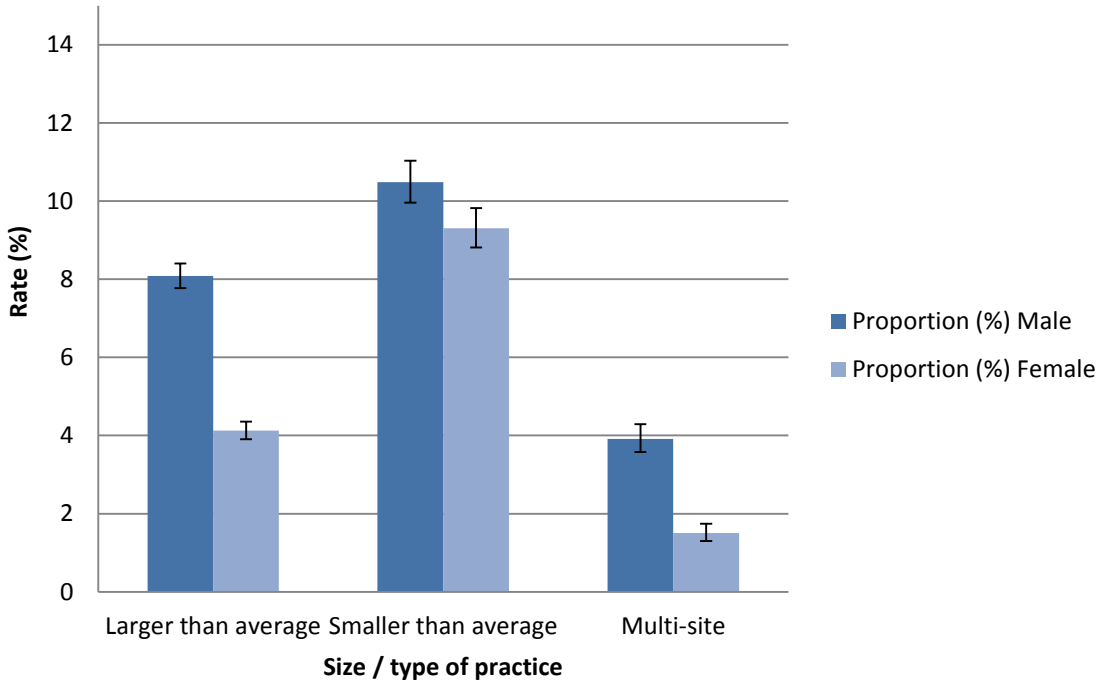
Figure 17: Rates (%) of recorded hazardous and harmful level alcohol consumption 2010-2011 by enhanced service status and gender



Variation by size of practice

Rates of alcohol consumption recording also varied by practice size, with smaller than average practices recording higher rates of hazardous and harmful level drinkers (Male: 10.48%, 95% CI: 9.96-11.03; Female: 9.30%, 95% CI: 8.81-9.82) in comparison both to larger than average practices (Male: 8.08%, 95% CI: 7.77-8.40; Female: 4.12, 95% CI: 3.90-4.35) and multi-site practices (Male: 3.91%, 95% CI: 3.57-4.29%; Female: 1.51%, 95% CI: 1.30-1.74). These differences in recording rates were significant (male: $p < 0.001$; female: $p < 0.001$).

Figure 18: Rate (%) of recorded hazardous and harmful level alcohol consumption 2010-2011 by size / type of practice and gender



Recorded rates of screening for alcohol use disorders

The next area of alcohol-related Read coding examined was the recorded rate of delivery of a screening test for alcohol use disorders using a validated self-report questionnaire tool. For the purposes of this research, GP systems were searched for recorded delivery of either the brief or full versions of the DH recommended screening tests (specifically AUDIT-C, FAST, or the full AUDIT) (615). Again, these data could have been recorded in a number of situations, primarily when a new patient registered at the practice (as required by both national and local level enhanced service for alcohol schemes), or during the course of a standard GP consultation. Note that data for recording rates of brief versions of the recommended screening tests represent a combined value for both recorded incidence of FAST and / or AUDIT-C delivery.

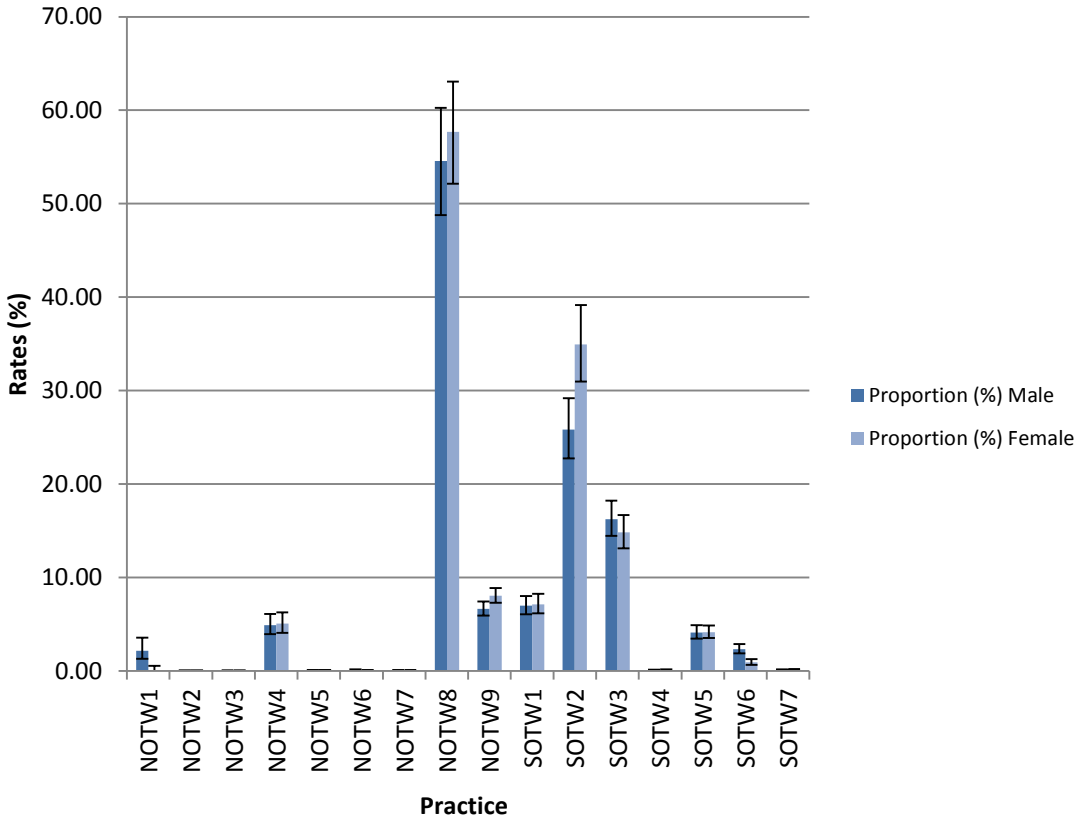
Variation by practice

There was a significant variation at practice level in terms of the recorded rate of both the brief and full versions of the alcohol use disorder screening tests (AUDIT-C and FAST combined, and the full AUDIT). As Figure 19 illustrates, use of AUDIT-C and FAST

combined ranged from 0.00% to 54.58% for males, and between 0.00% and 57.69% for females, and this heterogeneity was significant (males: $p < 0.001$; females: $p < 0.001$).

Practices with the highest rates of screening tool delivery included a recently opened 'Darzi' practice (NOTW8), and two Sunderland-based practices (SOTW2 and SOTW3), which were located in relatively deprived areas. In contrast, those practices reporting very low rates of brief screening tool delivery were mostly based in the North of Tyne organisational area, and included three practices (NOTW3, NOTW5 and NOTW7) that reported zero recordings of AUDIT-C or FAST delivery during 2010-2011. Notably, two of these practices were not signed up to the national enhanced service for alcohol. However NOTW3 did report DES status, and interestingly was a practice that reported having participated in alcohol-related research in the past.

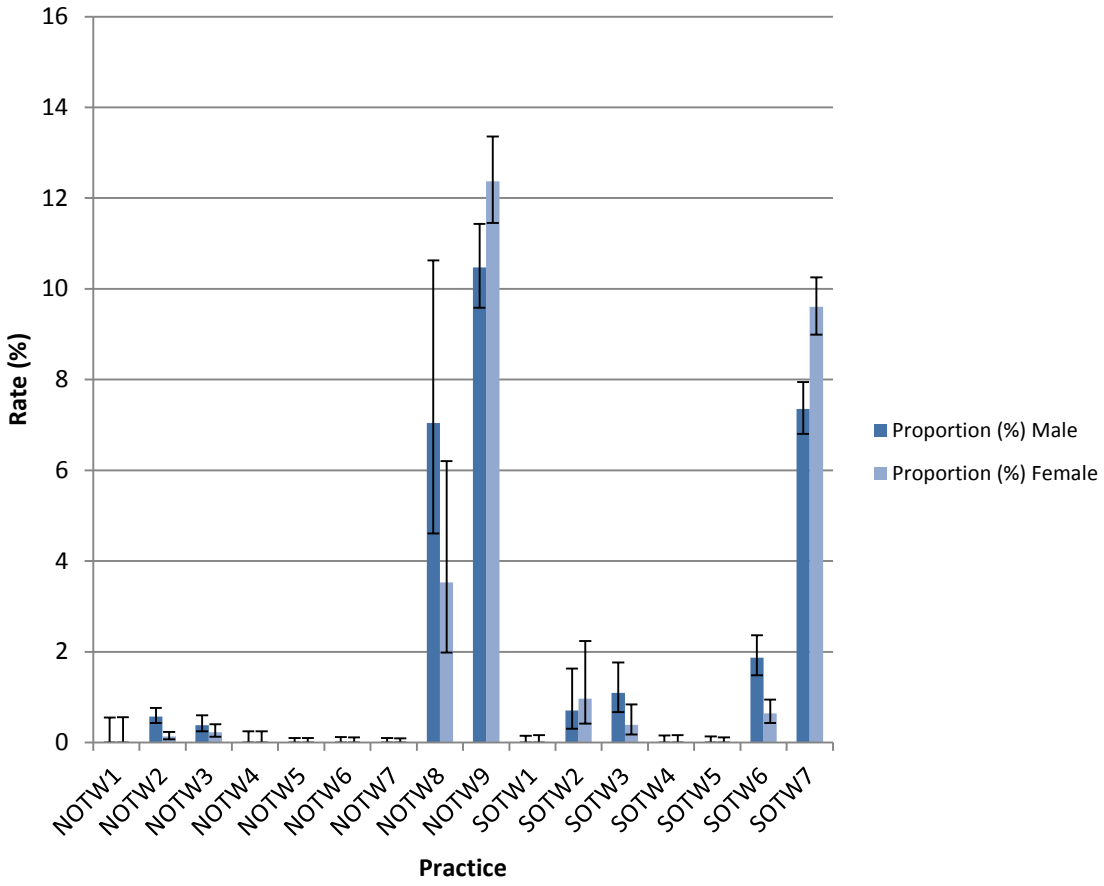
Figure 19: Rates of short screening tool (FAST or AUDIT-C) 2010-2011 by gender and individual practice



The rate of recorded delivery of the full AUDIT also ranged substantially, between 0.00% and 10.47% (males), and between 0.00% and 12.37% (females), and this heterogeneity was significant (males: $p < 0.001$; females: $p < 0.001$). Again, NOTW8 (a 'Darzi' practice), showed higher rates of delivery of the full AUDIT test; alongside

NOTW9 and SOTW7 (both larger than average practices which had previously participated in alcohol-related research). Overall, recorded rates of delivery were higher in the South of Tyne and Wear, with the majority of practices in the North of Tyne area having recorded zero incidence of full AUDIT delivery during the time period surveyed (NOTW1, NOW4, NOTW5, NOTW6 and NOTW7).

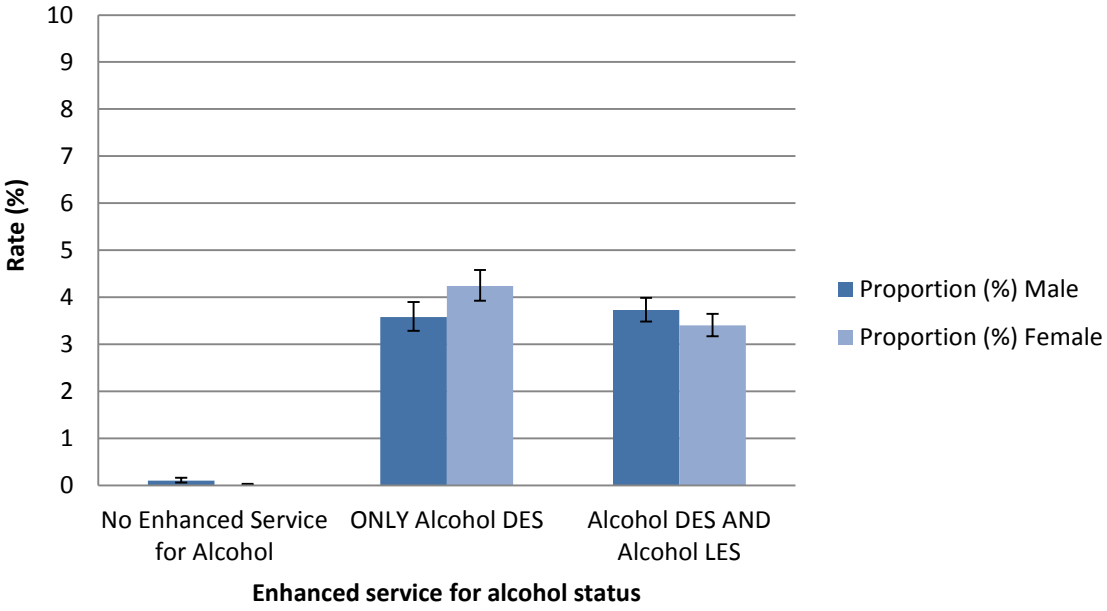
Figure 20: Rates of full AUDIT screening tool 2010-2011 by gender and individual practice



Variation by enhanced service for alcohol status

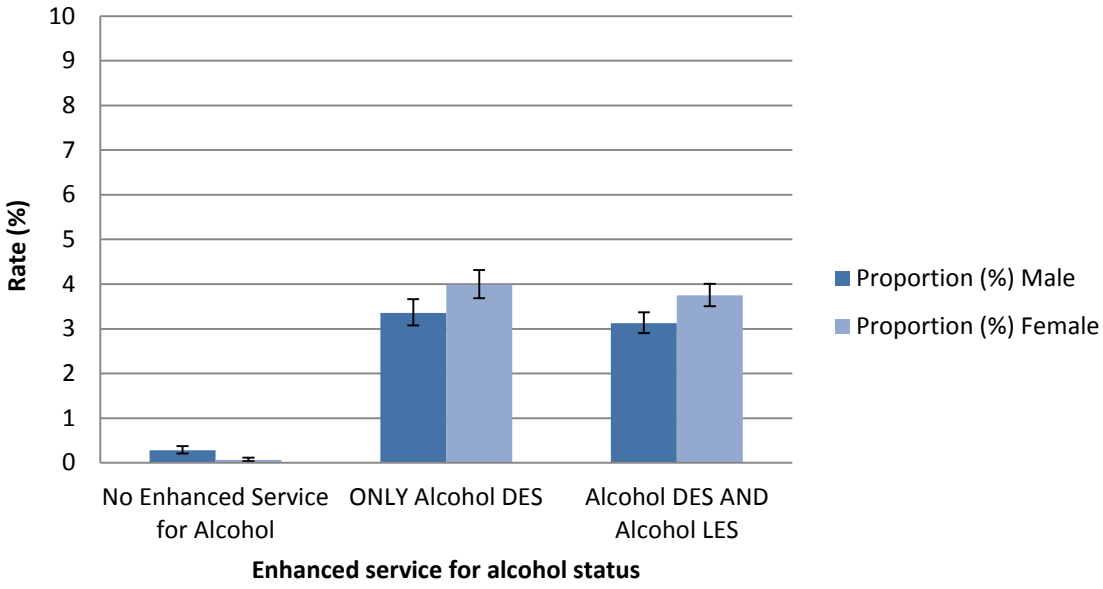
Looking at differences in recorded rates of the delivery of a brief screening test (either AUDIT-C or FAST) for alcohol according to enhanced service for alcohol status, again, there was significant variation. Rates were lowest in practices with no enhanced service (0.097% males (95% CI: 0.06-0.16) / 0.01% females (95% CI: 0.00-0.03)). Rates were higher in practices signed up to both LES and DES (3.73% males (95% CI: 3.48-3.99)/ 3.40% females (95% CI: 3.17-3.64)); and were highest of all in practices signed up to the DES only at 3.58% males (95% CI: 3.29-3.90) / 4.24% females (95% CI: 3.93-4.58). The difference between these groups of practices was significant (males: $p < 0.001$; females: $p < 0.001$).

Figure 21: Rates (%) of recorded delivery of short screening test (FAST or AUDIT-C) for alcohol use disorders 2010-2011 by enhanced service status and gender



For recorded delivery of the full AUDIT, there was also significant heterogeneity (males: $p < 0.001$; females: $p < 0.001$). Again, practices not signed up to an enhanced service had the lowest recorded rates (males: 0.28%, 95% CI: 0.21-0.37; females: 0.06%, 95% CI: 0.04-0.12). However those signed up to both enhanced services had lower recorded rates (males: 3.13%, 95% CI: 2.90-3.37; females: 3.75%, 95% CI: 3.51-4.01) in comparison to practices signed up to only the national DES (all of which were based in the North of Tyne) (males: 3.36%, 95% CI: 3.07-3.66; females: 3.99%, 95% CI: 3.51-4.01).

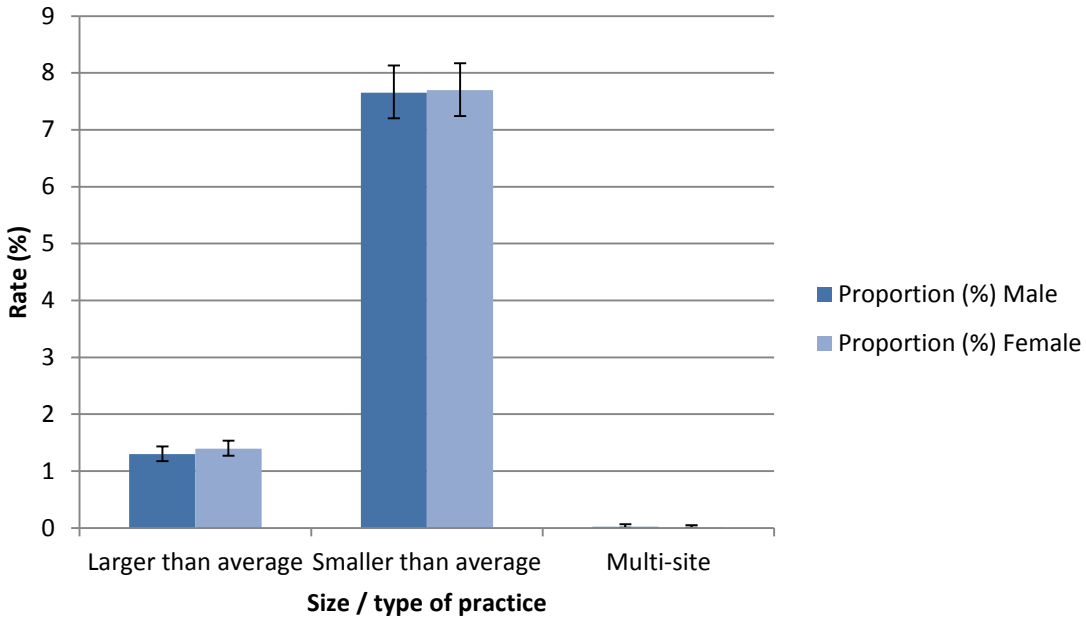
Figure 22: Rates (%) of recorded delivery of full AUDIT screening test for alcohol use disorders 2010-2011 by enhanced service status and gender



Variation by size of practice

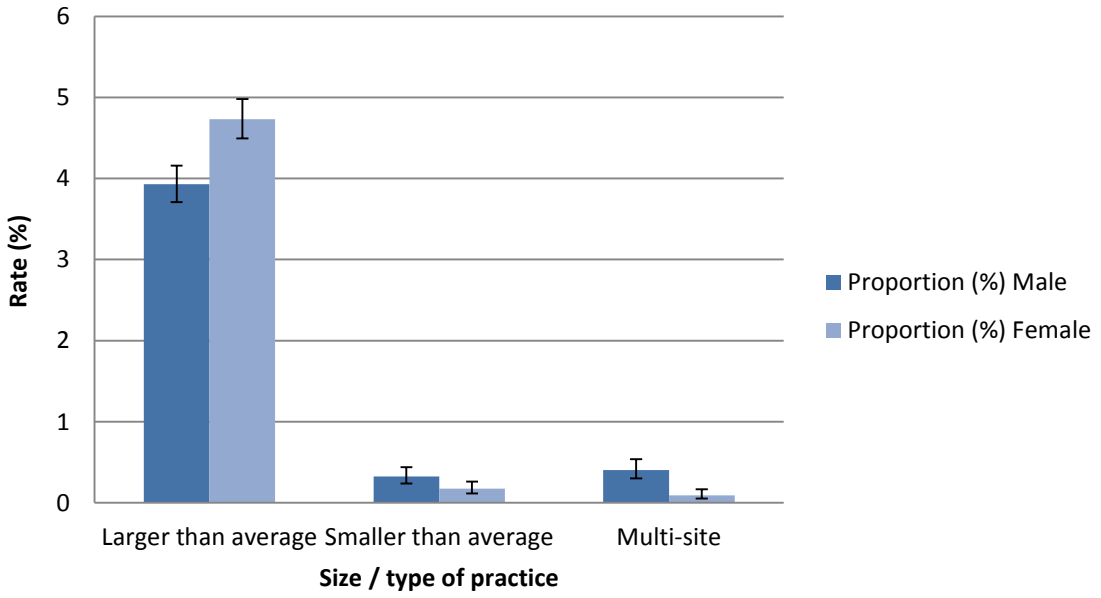
Finally, smaller than average practices had higher rates of recorded brief screening tests for alcohol (AUDIT-C or FAST) (males: 7.65%, 95% CI: 7.20-8.13; females: 7.69, 95% CI: 7.24-8.17) in comparison to larger than average practices (males: 1.30, 95% CI: 1.17-1.43; females: 1.40, 95% CI: 1.27-1.54). Rates were very low in multi-site practices (males: 0.02%, 95% CI: 0.00-0.06; females: 0.01, 95% CI: 0.00-0.05). This difference was significant (males: $p < 0.001$; females: $p < 0.001$).

Figure 23: Rates (%) of recorded delivery of short screening test (FAST or AUDIT-C) for alcohol use disorders 2010-2011 by size / type of practice and gender



However, larger than average practices had higher rates of recorded delivery of the full AUDIT in comparison with other types of practices (males: 3.93%, 95% CI: 3.71-4.16; females: 4.73%, 95% CI: 4.50-4.98), as opposed to lower recorded rates in smaller than average practices (males : 0.32%, 95% CI: 0.24-0.44; females: 0.17, 95% CI: 0.12-0.26) and in multi-site practices (males: 0.40, 95% CI: 0.30-0.54; females: 0.09, 95% CI: 0.05-0.17). Again, this heterogeneity was significant (males: $p < 0.001$; females: $p < 0.001$).

Figure 24: Rates (%) of recorded delivery of full AUDIT screening test for alcohol use disorders 2010-2011 by size / type of practice



Read coding rates of any mode of alcohol intervention or advice

Read code data were extracted separately on the recorded rate of delivery of brief advice, brief intervention or an extended intervention for alcohol.

Initial analysis indicated clear recording preference between practices signed up to the different levels of enhanced service schemes. Rates of recorded delivery of brief advice for alcohol consumption was highest in practices signed up to both a local and national enhanced service (males: 8.99% (95% CI: 8.62-9.38); females: 6.74% (95% CI: 6.42-7.08)) in comparison with either practices not signed up to an enhanced service (males: 5.95% (95% CI: 5.60-6.32); females: 3.50% (95% CI: 3.23-3.79)), or those only signed up to the national DES (males: 4.48% (95% CI: 4.15-4.83); females: 6.25% (95% CI: 5.87-6.66)). This heterogeneity was significant ($p < 0.001$).

In contrast, rates of recorded delivery of a brief intervention for alcohol were highest in practices signed up to only the national enhanced service (males: 3.90% (95% CI: 3.59-4.23); females: 3.81% (95% CI: 3.51-4.13)) in comparison with either practices not signed up to an enhanced service (males: 0.03% (95% CI: 0.01-0.07); females: 0.02 (95% CI: 0.01-0.05)), or those signed up to both enhanced service schemes (males: 0.74% (95% CI: 0.64-0.86); females: 0.17% (95% CI: 0.13-0.24)). Only two of the sample practices had recorded the delivery of an extended intervention for alcohol. As a result, the crude rate of recorded delivery of a brief intervention for alcohol use ranged between just 0.00% and 0.06% (males); and 0.00% and 0.08% (females) and the heterogeneity between individual practices was not significant (males: $p = 1.000$; females: $p = 1.000$).

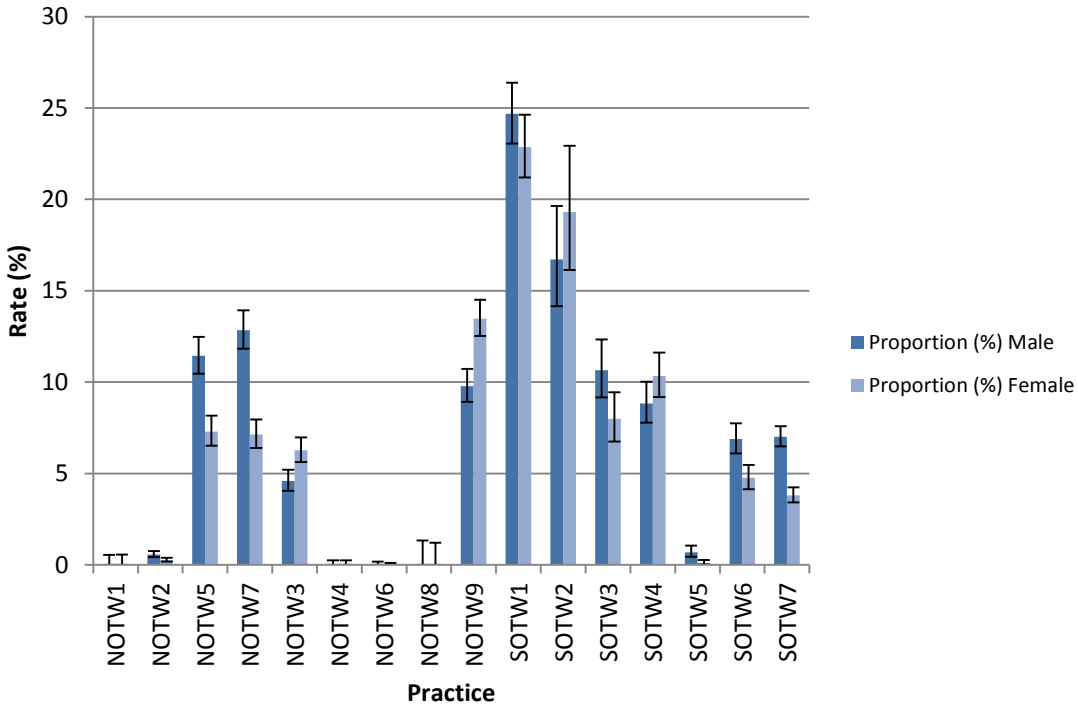
In order to capture the total volume of brief advice or interventions for alcohol currently delivered within the sample practices, counts of recorded delivery of either Brief Advice, a Brief Intervention or an Extended Intervention were combined, with the resultant recording rates presented to follow.

Variation by individual practice

Rates of recording of any mode of brief intervention or advice varied between practices (male: 0.00-24.68; female: 0.00-25.11), and this heterogeneity was significant (male: $p < 0.001$; female: $p < 0.001$). Overall, recorded delivery of brief intervention or

advice was highest in practices based in the South of Tyne and Wear area: two practices in the North of Tyne area (NOTW1 and NOTW4) did not record any such intervention during the surveyed time period. However, paradoxically, two of out three practices reporting relatively high recording rates in North of Tyne (NOTW5 and NOTW7) were not signed up to the alcohol DES.

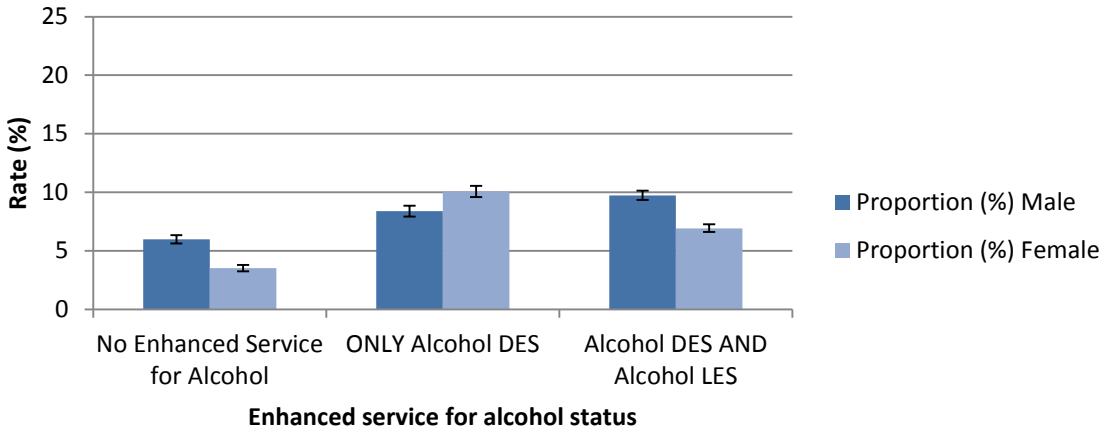
Figure 25: Rates (%) of recorded delivery of brief advice, brief intervention and /or extended intervention for alcohol 2010-2011 by individual practice and gender including lower and upper confidence intervals



Variation by enhanced service for alcohol status

However, when all instances of recorded brief intervention were combined, rates were highest in practices signed up to an enhanced service for alcohol. Interestingly, the combined intervention activity was highest for male patients in practices signed up to both a local and national enhanced service (9.74%, 95% CI: 9.36-10.14) but for female patients, more activity had been recorded in practices signed up to the national enhanced service only (10.06%, 95% CI: 9.59-10.55). As in other alcohol-related Read coding areas, rates of recording of any type of intervention activity were lowest in practices not signed up to either enhanced service (male - 5.98%, 95% CI: 5.63-6.35; female – 3.52%, 95% CI: 3.25-3.80). The heterogeneity between enhanced service status groups was significant (male: $p < 0.001$; female: $p < 0.001$).

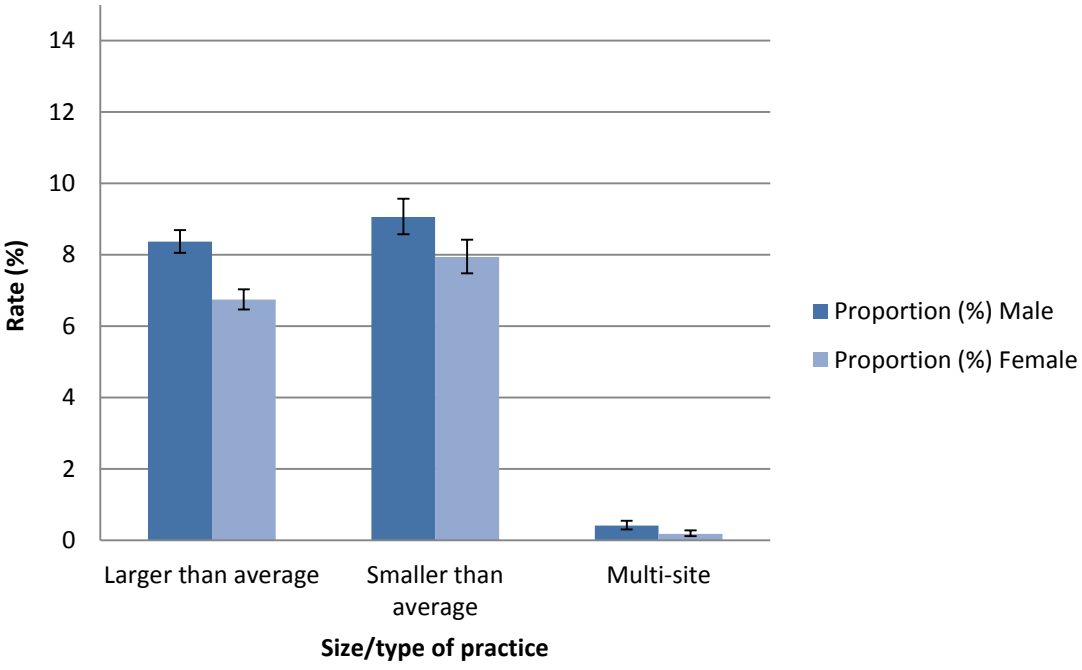
Figure 26: Rates (%) of recorded delivery of brief advice, brief intervention and /or extended intervention for alcohol 2010-2011 by enhanced service for alcohol and gender including lower and upper confidence intervals



Variation by size of practice

The highest rates of intervention recording were found in larger than average practices (male – 10.78%, 95% CI: 10.43-11.15; females – 8.72%, 95% CI: 8.40-9.04); and low in practices based across multiple sites (male – 0.43%, 95% CI: 0.33-0.57; female – 0.20%, 95% CI: 0.14-0.30). This heterogeneity was significant (male - $p < 0.001$; female - $p < 0.001$).

Figure 27: Rates (%) of recorded delivery of brief advice, brief intervention and /or extended intervention for alcohol 2010-2011 by size / type of practice and gender including lower and upper confidence intervals



Recorded rates of referral to specialist services for alcohol

The final area of analysis concerned the recorded rates of patient referrals to either specialist services for alcohol or to community detox programmes. The extent to which practitioners were coding instances of referral to Community detox was of particular interest as a new element of the Local Enhanced Service had been introduced in the South of Tyne and Wear area during the course of the research which could have potentially influenced delivery rates (2). These results are presented narratively, however, as a very small incidence of referrals were recorded in any of the participant practices. The full data extracted is presented in Appendix L.

Variation by individual practice

The rate of recorded referral to either specialist services for alcohol or community detox ranged between 0.00% and 0.70% (males) and 0.00% and 0.15% (females); and 0.00% and 0.14% (males) and 0.00% and 0.15% (females) respectively. However the heterogeneity between individual practices was not significant in either case (specialist services - males: $p = 0.192$; females: $p = 0.695$; community detox – males: $p = 0.999$; females: $p = 1.000$).

Variation by enhanced service for alcohol status

Only practices signed up to an enhanced service for alcohol had recorded any patient referrals to specialist alcohol services (DES only – males: 0.03% (95% CI: 0.01-0.07); females: 0.01% (95% CI: 0.00-0.05); and DES plus LES – males: 0.11% (95% CI: 0.07-0.16); females 0.07% (95% CI: 0.04-0.11)). The heterogeneity between different enhanced service statuses was significant (males: $p < 0.001$; females: $p = 0.001$). Heterogeneity was also significant between different NHS organisational areas (males: $p < 0.001$; females: $p = 0.001$).

For referral to community detox, all practices had recorded similarly low levels of activity (no enhanced service – males: 0.01% (95% CI: 0.00-0.03); females: 0.01% (95% CI: 0.00-0.04); only DES – males: 0.01% (95% CI: 0.00-0.05); females: 0.01% (95% CI: 0.00-0.04); and both DES and LES – males: 0.01% (95% CI: 0.00-0.04); females: 0.01% (95% CI: 0.00-0.04)). Heterogeneity was not significant, either in terms of enhanced service status (males: $p = 1.000$; females: $p = 1.000$) or NHS organisational area (males: $p = 0.712$; females: $p = 0.712$).

Variation by size of practice

Finally, there was heterogeneity with regards to the rates of recorded referrals to specialist alcohol services between practices of varying sizes and types (male: p = <0.000; female: p = 0.010). Crude rates in all groups were low however, and neither of the groups of multi-site practices had recorded delivery of any specialist referrals during the study period. Rates of referrals to community detox were also very low (again, neither of the multi-site practices had recorded delivery), however the difference was not significant in statistical terms (male: p = 0.352; female: p = 0.351).

5.4 Strengths and limitations

In considering the implications of these results for policy and practice, it is important to first acknowledge any limitations. In particular, given the quantitative design of this phase of the research, consideration must be given to the external validity of the recruited sample. For although the purposive sampling approach employed sought to engage a group of practices broadly illustrative of the key variables of interest (enhanced service for alcohol status, NHS organisational area and size/type of practice), it is nevertheless the case that sample selection was not randomised and thus the potential for self-selection must be recognised.

As previously described, recruitment was a challenging, protracted process, complicated by the fact that there is no national database of practices signed up to the Directed Enhanced Service. However, whilst even former PCTs did not seem to have access to a comprehensive list of Local Enhanced Service for alcohol practices, Trust-level intelligence suggested that universal coverage of the LES was achieved during the recruitment period in two out of the three former PCT areas concerned, meaning that the potential sample base became increasingly restricted. In total, it took 13 months to engage the 16 participant practices, and whilst most variables of interest were covered in this sample, it was not possible to recruit a practice *not* signed up to an enhanced service for alcohol in the South of Tyne and Wear NHS organisational area.

There are several factors that could have acted as a barrier to research participation for GP practices. For example, the sensitive nature of the research, which involved the scrutiny of practice records relating to their financial reimbursement claims, could have made some GPs' less likely to participate, particularly given alcohol is already

viewed as a 'delicate' topic for discussion (191, 194). In addition, time pressures were commonly reported as a key reason for non-participation, reflecting the experiences of other researchers working in primary health care settings (616, 617). At the same time, there are also factors that could have made certain types of practices *more* likely than others to participate. For instance, previous research suggests that an interest in improving quality of care in the focus research area increases participation rates (618), and that GPs working in practices that deliver more preventive services are also more likely to participate in studies overall (619).

Certainly, it would seem likely that practices that were more engaged with the alcohol prevention agenda, had greater awareness of the importance of Read coding (and in turn, had better developed alcohol Read coding systems in place) or identified themselves as 'research-active', were more inclined to agree to participate in the study. Thus, more overtly ('measurably') high performing practices around alcohol screening and brief intervention provision could have been more motivated to participate in the research than moderately performing ones (617), thus limiting the generalizability of the data (620). This was particularly the case for the case study practice, which was signed up to both national and local level enhanced services for alcohol, and benefitted from having a local opinion leader in the alcohol field within the senior partners, potentially making it atypical.

Next, looking at the Read code data itself, there are further limitations that need to be recognised in terms of the 'validity' and 'reliability' of the measures employed (both of which must be in place to enable useful comparisons of sets of data to take place (291)). Measures of validity tell us whether an item measures what it is supposed to, that is, whether a measurement is true. Thus Neal et al's definition of record validity states that *"medical records…are valid when all those events that constitute a medical record are correctly recorded and all the entries in the record truly signify an event"* (621). So, for example, in the case of this study, a measure of validity would be judged on the basis of whether the presence of a Read code for hazardous alcohol consumption in the clinical database truly means that the patient is drinking at risky levels. And conversely, the non-presence of a Read code representing the delivery of brief advice or intervention, would imply that no such activity had taken place. In this respect, however it must be stressed in the absence of corroborating observational

data (such as the use of audio or video taping of consultations), it was only possible to assess the rates of alcohol screening and brief intervention delivered through what was formally coded. Therefore it is possible that these data were not an accurate (or 'valid') record of the care that was actually given (622). Further, searches were limited to Read coded as opposed to free text data, and to only the set of pre-determined Read Codes developed for the query set, thus practices routinely using alternative codes or care recorded in free text would not have been picked up.

In addition, looking at the 'reliability' of the extracted data sets (here meaning the consistency or reproducibility of the search process), there are also limitations that further limit the degree of validity that is possible. These relate firstly to issues experienced with the process of data collection during the fieldwork that could potentially have compromised the consistency of the extracted data. In total, three different GP clinical systems were used across the practice sample (EMIS LV, EMIS PCS and SystmOne), each of which employed different data structures, data definitions and search mechanisms. Further, different practices had often developed additional Read codes tailored to the (perceived) needs of the individual practice context. Thus, although system-specific query sets had been developed for the research, the process of extracting and analysing data nevertheless remained challenging. In most cases, the data extraction process was strongly reliant on the skills and attitudes of the assisting staff member at the practice. These varied considerably and in particular, difficulties were encountered in accessing some systems because the staff concerned were not available, trained or particularly cooperative. Finally, it needs to be acknowledged that the data collection process took place over the period of approximately one year. Whilst the same time periods of data were searched in all practices, given the fast changing nature of primary health care policy during the fieldwork, it is possible that the approach to electronic patient recordkeeping may have changed over the year, including the potential for some retrospective coding in order to meet contractual obligations relating to enhanced service payments.

At the same time, despite the limitations outlined above, it is also important to emphasise some key strengths of the research approach employed. Importantly, as previously described, all Read code data was extracted onsite as opposed to using a centralised database of general practice data such as THIN (585) or QRESEARCH (586).

This facilitated analysis at identifiable individual practice level, which would not be possible using a standard general practice database. As such, it was possible to gather additional contextual data to inform analysis (such as Enhanced Service Status, size / type of practice, knowledge and awareness of screening and brief alcohol intervention) that would not have been available if a centralised database was used.

Additionally, this 'in-situ' approach to data collection afforded an opportunity to gain valuable understanding of how primary care IT systems are used in everyday practice. Informal exchanges with practice managers and clinical system administrators during the course of data extraction sessions served to reveal considerable variation in attitudes towards alcohol work as part of the overall practice workload, approaches to Read coding and the electronic patient record, and individual practice orientations towards financial incentive systems. In combination with the qualitative interview data gathered from GPs based at the participant practices, such information would help inform a more contextualised understanding of alcohol screening and brief intervention recording in primary health care (see Greenhalgh et al on 'technologies-in-use' (578)).

In addition to informing the overall findings of the research, the 'situated' approach to quantitative data collection also played a valuable developmental role in this mixed-methods sequential study. Importantly, it helped to establish positive relationships with local practices that were instrumental in securing GP participation in the qualitative interview phase of the research. The results also informed the development of the interview schedule used with GP interviewees, suggesting additional themes for discussion, and ensuring the interviewer was sufficiently knowledgeable about routine Read coding practices to interpret participants' responses.

5.5 Summary and discussion

This chapter has explored how alcohol-related Read codes are used in routine general practice in order to determine their value as an information source on alcohol screening and brief intervention delivery. The results suggest three key findings of significance for this research.

First, the case study has helped illuminate the sheer volume of possible Read codes that are available to GPs. The results suggest that a minimum of 287 Read codes exist

for the recording of alcohol-related findings and procedures in primary care settings. However, the implications from this research are that only a small minority of these are in regular use, and that these generally relate to the identification, treatment and management of alcohol use disorders. Overall, between 2007 and 2011, only a small proportion of available Read Codes were actually used by clinicians in the case study practice (13.94%, n = 40), with none of the remainder recorded on a single occasion over that five year period (86.06%, n = 247). Further, whilst many unused Read Codes are associated with relatively rare alcohol-related conditions, analysis showed that a significant number of little used alcohol-use disorder related codes relate to duplicate, outmoded and unhelpful drinking terminology. This situation is potentially problematic as previous research by Lusignan et al tells us that the excessive number of Read codes can lead to inaccurate coding practices, which in turn reduces the validity of the resultant data (558).

The second significant finding relates to how these codes are actually used in day-to-day practice. Importantly, the findings from the case study would suggest that Read codes relating to patient alcohol consumption (136.0) are used much more frequently than codes relating to the delivery of an alcohol use disorder screening test (such as 388u for FAST or 9k17 for AUDIT-C). Indeed all participant general practices in the wider study sample captured relatively large quantities of data on patients' alcohol consumption, whilst recorded rates of screening and brief alcohol intervention delivery were relatively low. This echoes findings from previous research highlighting GPs' reliance on the use of consumption as a means of screening patients as opposed to using a validated questionnaire such as AUDIT (188).

However, whilst it is encouraging to see that most practices are asking patients about their alcohol consumption, this is an unreliable means of detecting risky drinking. For example, across the sample, consumption was generally recorded as the number of standard units of alcohol an individual patient reported drinking on a weekly basis. This reflects previous guidance from the Royal College of Physicians (623) which recommended that men should drink no more than 21 units of alcohol, and women 14 units of alcohol per week. However it is important to stress that this has since been superseded by the current Department of Health advice which now offers *daily* rather than *weekly* drinking guidelines, recommending that men should not regularly drink

more than 3–4 units of alcohol a day and women should not regularly drink more than 2–3 units a day (624). Further, as already emphasised in Chapter 1, evidence suggests patients both struggle to translate standard drink measures into their actual consumption reports; and that they may actually underestimate their overall consumption (189). In comparison, both the full AUDIT, and its briefer alternatives, offer a highly specific and sensitive screening test which has been specifically designed to counter variations in both practitioner's attitudes and experience, and the potential for misinterpretation by patients (121).

The final finding of significance concerns what this research tells us about the practice variables that seem to be associated with higher rates of recorded screening and brief alcohol intervention activity. Overall, the data would suggest that being signed up to both a national and local enhanced service for alcohol seems to be the strongest determinant of higher rates of recorded screening and brief alcohol intervention activity in general practices. In contrast, practices not signed up to either Enhanced Service demonstrated the lowest rates of recording across all measured indicators of service. As a result, given that a local enhanced service was only available to practices in the NHS South of Tyne and Wear organisational area, there was also a clear geographic differential, with higher rates of recording in the south compared with the north of the sample. On this basis, policy makers and commissioners would be advised to consider whether existing national level pay-for-performance arrangements are sufficiently persuasive, particularly in relation to the weight this finding lends to continued campaigns to include alcohol within the Quality and Outcomes Framework.

At the same time, however, it is also important to acknowledge the limitations of the Read Code data collected here, both in terms of their *validity* (that is, whether presence (or absence) of an alcohol-related Read Code represents a true measure of service delivery), and moreover, what the data signify about the *quality* of the service delivered. Further, it is also important to highlight that the available data reveal little about whether it is the particular features of the local enhanced service available in the South of Tyne and Wear that stimulate increased rates of activity, or the combined influence of signing up for two sets of financial incentives, or indeed, whether there are additional features of the higher 'recorders' that the quantitative phase was unable to detect. The next phase of research, qualitative interviews with GPs, will

therefore explore any additional factors that might be influencing individual physician's recording of alcohol screening and brief interventions, and thus help inform a more nuanced understanding of which contexts support more robust recording practices.

Chapter 6 General Practitioners' perspectives on what shapes their recording of screening and brief alcohol interventions

6.1 Introduction

This chapter presents the findings of qualitative research conducted with a sample of GPs based in the NHS North of Tyne and South of Tyne and Wear organisational areas in North East England. First, it describes the aims and objectives of this phase; outlines the sampling and recruitment strategy; and summarises the approach employed to data analysis. It then presents the characteristics of the recruited study sample, followed by the major themes that emerged from analysis of the interview data. Finally, the chapter considers the strengths and limitations of this component of the research, and discusses the key implications of the results.

6.2 Method

6.2.1 Rationale, aims and objectives

The primary aim of this third phase of the research was to understand the barriers and facilitators impacting on GPs' recording of their delivery of screening and brief alcohol interventions in routine primary care. In doing so, it would deliver the following objectives:

- To explore the feasibility and acceptability of the Read code system to General Practitioners;
- To identify any contextual issues that might affect GPs' use of routine data to record screening and brief alcohol interventions, in particular the introduction of financial incentives; and
- To investigate GPs' perspectives on the validity of Read code data as a useful measure of performance of alcohol-related care.

Semi-structured interviews were selected as the method of qualitative data collection in this doctoral study for several reasons. First, in comparison to unstructured or more narrative approaches, the 'structured' nature of the interviews provided an opportunity to co-create meaning with interviewees around a set of pre-determined focus questions of interest: in this case, helping to reconstruct participants' perceptions of events and experiences related to the recording and delivery of

screening and brief alcohol interventions (625, 626). Further, from a logistical perspective, semi-structured interviews represented a relevant research approach, given both the ethical and time constraints of conducting fieldwork in busy general practice settings. Importantly, unlike less structured methods, this method lent itself to being scheduled in advance at a designated time and location outside of everyday events (625).

At the same time, the iterative nature of the qualitative research process, in which preliminary data analysis coincided with data collection, would allow questions to be developed to reflect emerging findings in the topic of interest, or for questions that proved ineffective at eliciting the necessary information to be dropped and new ones added (625). Furthermore, although organised around a set of predetermined open-ended questions, semi-structured interviews would allow for the emergence of additional questions based on the direction that the dialogue between interviewer and interviewee took. Such digressions can be very productive, as they enable the interview to follow the interviewee's interest and knowledge, and thus acquire unanticipated and novel data on the focus topic (627).

GPs were selected as interview subjects as opposed to other practice staff such as nurses, in recognition of the vital role they play in relation to the recording and delivery of screening and brief alcohol interventions. Whilst nursing staff are also involved in the routine delivery and coding of alcohol screening tests in particular (202), and practice managers strongly influence the overall recording culture of a practice (558), the way in which most primary care is financed and organised places GPs in a unique position in terms of directing, delegating and delivering both the coding and alcohol-related clinical activity itself (261).

6.2.2 Sampling, recruitment and participants

For this study, a purposeful sampling strategy was employed (using Patton's broad definition of the term) in order to access 'information-rich' cases (628) of GPs' use of routine data to record alcohol screening and brief interventions (509). As such, the overarching sample of interviewees was relatively homogenous as a professional group of participants, and importantly, shared critical similarities related to the research question (629). In order to achieve maximum variation of participant perspectives,

however, the sampling approach built on both the findings of previous phases of the research and the overarching theoretical framework of the research (630), with participants thus selected on the basis of their potential to represent key relational and conceptual constructs of interest (631-633).

Specifically, interview participants were recruited to represent both different practice settings (geographically and in terms of Enhanced Service for alcohol status), and GPs' professional identities (either salaried or partner). Salaried GPs have fixed salary, contracted duties and hours and generally work under direction of the employing GP partners, or in some instances, practice management. In contrast, GP Partners benefit from a share of the practice profits, including those derived from participation in financial incentives schemes, and generally have more opportunity to be involved in the overall development of the practice (634).

The rationale behind these units of interest was essentially two-fold. First, previous literature examined as part of the systematic literature review (Chapter 4) had underlined the strong influence of structure and environment on GP recording of routine data, in particular, the impact of financial incentives (553, 554, 558); and the role of technology, such as the use of coding prompts and data templates in general practice (558-560, 563). Further, in the specific example of routine alcohol screening and brief intervention recording, secondary data analysis of GP Read code data conducted in the quantitative phase of the research (Chapter 5) suggested that higher rates of screening and brief alcohol intervention recording were evident in practices receiving financial incentives for alcohol work. It was therefore of particular interest to interview GPs subject to alternative salary arrangements, based at contrasting practices in relation to the use of financial incentives for alcohol, and located within varying organisational contexts with corresponding differences in technological systems and processes; and thereby help ensure cross-case comparability (451, 635).

For recruitment purposes, the target population was General Practitioners (GPs) working in primary care settings and based in either NHS North of Tyne or NHS South of Tyne and Wear organisational areas (encompassing the former: Newcastle PCT; North Tyneside PCT; Northumberland Care Trust; Gateshead PCT; South Tyneside PCT; and Sunderland Teaching PCT at the time of recruitment). This component of the study

was primarily interested in interviewing GP representatives drawn from the 16 general practices that had been recruited to the study during the previous research phase (secondary analysis of GP Read code data, see Chapter 5 for details) in order to explore in more depth any contextual factors that might shape recording rates. For these practices, potential interview subjects were generally nominated by the respective Practice Managers based in each practice; or had 'volunteered' their involvement during the previous phase of fieldwork. However, in recognition of the potential for the 'Hawthorne Effect' (278), whereby the act of participating in research, for whatever reason, can influence clinical practice, and in turn, research findings (636) as a result of the *"psychological stimulus of being singled out and made to feel important"* (637), GP participants were also sought from outside the original sample.

The sampling framework itself, as illustrated in Table 19 below, was developed to ensure that at least one interview subject was recruited with the characteristics from each of the 8 cells (a - h). In addition, the sample also aimed to include an identified local alcohol 'champion', a GP Registrar and an Academic GP.

Table 19: Purposive sample scheme

	Enhanced Service for Alcohol		No Enhanced Service for Alcohol	
	Salaried GP	**Partner**	**Salaried GP**	**Partner**
NHS North of Tyne	a	b	c	d
NHS South of Tyne & Wear	e	f	g	h

6.2.3 Ethics and consent

Eligible participants were first contacted via telephone or email, at which point the study was explained in more detail and they were provided with an opportunity to ask questions. With all potential participants, it was explained that participation in the study was entirely voluntary and that a decision to not participate would not have any effect upon their legal rights. It was also explicitly stated that participants could withdraw consent at any time, without giving reason, and that this would also have no effect upon their legal rights. Once a GP had indicated their willingness to participate in the research, an interview was arranged, at a time and location convenient to them.

Generally, interviews either took place in the respective GPs consulting room, or over the telephone. At the interview appointment itself, participants were asked to give written informed consent for an audio-recorded interview (Appendix M). To give informed consent, potential participants needed to be fully aware as to what participation involved, therefore a tailored Participant Information Sheet for GPs was provided, and clinicians were given the opportunity to ask questions (Appendix N). On average, interviews lasted between thirty and forty minutes. All interviews were recorded using digital recording equipment.

6.2.4 Data management

After consent, each participant was allocated a unique identification number. Audio recordings of interviews and any related data was identified by this identification number and not by a personal identifier. All anonymised data was kept on a password protected drive. Audio recordings were transcribed verbatim, with any potentially identifying details removed at that point. This included the removal of all direct identifiers connected to the data, along with any indirect identifiers that could potentially result in a breach of confidentiality (such as geographical information, personal information on an individual patient or practice setting). In the transcripts of the textual data, any direct and indirect identifiers were either removed or replaced with pseudonyms or vaguer descriptors prior to write-up. An anonymisation log (table) of all replacements, aggregations or removals made was created to ensure consistency and accuracy, with unedited versions to be retained for the purposes of archival preservation. The audio recordings were permanently deleted once the transcription process was completed. All data analysis was based on the anonymised transcripts: direct quotations from the interviews are used in this thesis, however they are presented according to role and corresponding practice ID (e.g. GPX (NHS AREA)).

6.2.5 Data collection and analysis

An initial outline interview guide was developed as part of the NHS ethics process at the start of the project. Statistical data gathered in the previous phase of the research and key findings from the systematic review were used to further inform the development of the interview guide. In addition, based on advice from contacts in the primary care sector relating to the limited interview time available with GPs, the topic

guide was further refined until the most concise form of the interview questions was achieved. The final version of the interview topic guide is presented in Appendix N.

Transcriptions were then analysed in accordance with the principles of thematic analysis, using Framework Analysis to aid data management. Framework Analysis is deemed to be an appropriate approach for qualitative health research where the objectives are closely linked to quantitative investigation (638). As such, the gathered data were sifted, charted and sorted in accordance with key issues and themes. According to Ritchie and Spencer, this involves a five step process: 1. familiarisation; 2. identifying a thematic framework; 3. indexing; 4. charting; and 5. mapping and interpretation (639).

Using a small section of the data, an initial coding framework was developed, based on the themes emerging from the data. In identifying key themes that might inform the framework, Ryan and Bernard's advice to look for a range of evidence in the interview data, such as repetitions, transitions, linguistic connectors, theory-related material and missing data (547) was followed. During analysis, a process of constant modification and re-modification of the original coding framework occurred as new themes emerged and / or other themes became redundant, thus enhancing the credibility of the thematic framework and interpretation (640, 641). This process continued until a final framework was developed and the whole data set was coded and analysed (642). NVivo Qualitative Research software (version 9.2), which is fully compatible with a Framework Analysis approach (643), was employed to support this process. Finally, in order to stimulate a reflective approach to the interview process, and to further inform framework development, a fieldwork diary was kept throughout the data collection phase and incorporated into the analysis.

6.3 Results

6.3.1 Characteristics of the recruited sample

Fourteen GPs agreed to participate in the interviews, as detailed in Tables 20 and 21 below. Ten of these GPs were drawn from practices that had participated in the previous phase of the research study, with four additional interviews conducted with GPs external to the original quantitative sample. Participants were evenly split along gender lines (seven male and seven female participants), and in terms of their

employment status (seven were partners, six were salaried GPs and one participant was a GP Registrar). The sample also included one GP who could be described as a 'local alcohol champion', and one 'Academic' GP. The length of time spent in general practice varied between interview participants. However overall, the recruited sample could be described as relatively experienced. In total, half of the interviewees reported having over 15 year's clinical experience, either based at their current practice or elsewhere (seven participants), with the remainder reporting practicing medicine for between five and 15 years (three participants), and less than five 5 years (four participants). The two tables below present a summary of the combined sample characteristics, alongside information on the key sample variables of each GP participant.

Table 20: Summary characteristics of qualitative interview participants

		N (14)	%
Gender	Male	7	50
	Female	7	50
Experience in practice	>5 years	4	29
	5-15 years	3	21
	>15 years	7	50
Employment status	Partner	7	50
	Salaried GP	6	43
	Registrar	1	7
Location	North of Tyne NHS	7	50
	Newcastle PCT	*3*	*21*
	North Tyneside PCT	*3*	*21*
	Northumberland PCT	*1*	*7*
	South of Tyne and Wear NHS	7	50
	Gateshead PCT	*4*	*29*
	South Tyneside PCT	*0*	*0*
	Sunderland PCT	*3*	*21*
Enhanced service status	No Enhanced Service	3	21
	Directed Enhanced Service	4	29
	Directed Enhanced Service & Local Enhanced Service	7	50
Practice IMD Quintile	1st (most deprived)	5	36
	2nd	3	21
	3rd	2	14
	4th	4	29
	5th (least deprived)	0	0

Table 21: Key characteristics of individual interview participants

ID	NHS Area	Gender	Enhanced Service	Professional Status
GP1	North of Tyne	female	No Enhanced Service for Alcohol	Salaried
GP2	North of Tyne	Male	Directed Enhanced Service for Alcohol	Partner
GP3	North of Tyne	female	No Enhanced Service for Alcohol	Partner
GP4	North of Tyne	female	Directed Enhanced Service for Alcohol	Salaried
GP5	North of Tyne	female	Directed Enhanced Service for Alcohol	Partner
GP6	North of Tyne	male	No Enhanced Service for Alcohol	Partner (Academic GP)
GP7	South of Tyne and Wear	male	Directed and Local Enhanced Service for Alcohol	Partner (Local Opinion Leader)
GP8	South of Tyne and Wear	male	Directed and Local Enhanced Service for Alcohol	Salaried
GP9	South of Tyne and Wear	female	Directed and Local Enhanced Service for Alcohol	Salaried
GP10	South of Tyne and Wear	male	Directed and Local Enhanced Service for Alcohol	Salaried (Registrar)
GP11	South of Tyne and Wear	male	Directed and Local Enhanced Service for Alcohol	Partner
GP12	South of Tyne and Wear	female	Directed and Local Enhanced Service for Alcohol	Partner
GP13	South of Tyne and Wear	female	Directed and Local Enhanced Service for Alcohol	Salaried
GP14	North of Tyne	male	Directed Enhanced Service for Alcohol	Partner

As the table above shows (Table 21), an even representation of practices from each NHS organisation area of interest was achieved (seven in both the North of Tyne and South of Tyne and Wear NHS areas). However, at Primary Care Trust (PCT) level, it was not possible to recruit any GP participants based in the former South Tyneside PCT area, and only one Northumberland-based GP. Practices were also varied in terms of the socio-demographic characteristics of the local patient population, although overall, the recruited practices tended to cover more as opposed to less deprived populations. Further, practices ranged in size, funding arrangements and length of establishment. For example, a number were relatively newly established practices, including a walk-in centre and a 'Darzi' polyclinic (594). A further practice was unusual in that it was funded via the local hospital. One had come about following a merger of two smaller practices five years earlier.

6.3.2 Overview of the interviews

The semi-structured interviews explored a range of topics related to participants' experiences of delivering and recording alcohol-related activity. The first set of questions sought to elicit GPs' perspectives on the process of delivering screening and brief alcohol interventions, focussing on the feasibility, acceptability and effectiveness of tackling risky drinking in routine primary healthcare. In particular, practice-level approaches to case identification were examined, such as targeted versus universal screening approaches, and the use of validated screening questionnaires as opposed to alternative and / or more informal methods. The roles played by different practice staff in this delivery process, from nurses and healthcare assistants to GPs themselves, were also explored.

Next, the interviews explored participants' views on, and experiences of, using Read codes to record their delivery of screening and brief alcohol interventions. In particular, questions aimed to identify the key barriers and facilitators affecting the recording of alcohol-related activity, including the impact of financial incentives, as well as highlighting which aspects of screening and brief alcohol interventions GPs found more or less straightforward to codify. Participants were also asked for their views on the use of Read codes more generally as a means of capturing patient-related information, as well as the role played by narrative free text and computer coding templates with their wider recording repertoire. Finally, GPs' perspectives on the value and validity of using Read code data to document patient care were investigated, including their views on the extent to which Read Code and other routine data offered a useful source of information on the quality of primary healthcare being delivered.

Analysis of the resultant data from the GP interviews suggested the existence of five overarching and closely inter-related themes. The first three themes concerned a series of structural influencers on GPs' recording practices. First, participants highlighted the ways in which certain elements of the design and functionality of practice IT and Read code systems shaped their coding behaviours. Second, interviewees framed coding behaviour, and in particular, which types of coding areas were most prioritised by physicians, as closely associated with the perceived hierarchy of different financial incentive schemes. Third, GPs suggested the existence of a strong synergy between practice-level processes for screening patients for risky drinking, and

the process of coding such activity employed by individual clinicians. Next, in addition to these structural influencers, a further two clear themes emerged in the analysis. Interviews demonstrated the impact that GPs' views on both the acceptability and feasibility of delivering brief alcohol interventions in routine care could have on their Read coding of such activity. Finally, the way in which individual clinicians' conceptualised the role of the general practitioner, and in turn, how that role shaped the doctor-patient relationship, emerged as a strong influencer on coding practices. These five themes are explored in more depth below.

6.3.3 Theme 1: The design and functionality of GP practice IT systems

Interviewees described a practice culture in which both the clinical and administrative processes were highly technologized. Electronic Read coding represented the normal process of routine data capture for the majority of GPs, with clinical encounters computerised as standard practice. As such, the use of Lloyd George paper records was purely historical and at the very least, interviewees described their practice as *"paper light"* (GP6, male, no enhanced service). Yet, despite the routinized and near-universal adoption of electronic patient records, accounts suggested that training and guidance to support their use was relatively minimal. The more experienced GP interviewees described being given an initial round of training when the Read code system was first launched in the late 1980s. However more commonly, interviewees emphasised the role played by individual GPs with a particular interest in health informatics in taking responsibility for the development of practice IT systems, and in particular, the creation of tailored coding templates. Interviewees also mentioned receiving communications from practice managers about which Read codes to use, in particular, relating to data to support the Quality and Outcomes Framework, on a regular basis. Generally, however, it appeared that coding skills were acquired more informally and experientially through individual GPs' daily use of the coding systems. As such, the utility, accessibility and perceived relevance of the Read code system – in short, how 'user-friendly' clinicians found the system - strongly influenced GP coding practices. This was evidenced in three key common interview sub-themes: navigating the complex Read code system; the challenge of coding developing diagnoses and / or unexplained conditions; and GPs' aversion to the use of electronic coding templates.

First, a number of GP interviewees emphasised the difficulty of locating the correct Read code in everyday practice. In part, this concerned the challenge of navigating the sheer volume of available Read codes, as one interviewee commented *"…the trouble with Read codes, is there's so many*" (GP6, male, no enhanced service). The high number of possible Read code options available to clinicians delivered a clear time-burden when managing the search process itself. However, more commonly, GP interviewees talked about navigational barriers in terms of the negative impact of multiple code options on how confident they felt about selecting the 'right' code to use in particular situations. As one interviewee commented, whilst discussing their experience of the process of choosing the correct alcohol screening Read code:

> *"…you are never quite sure whether it is that one that you have to use…if they took away everything that they didn't want us to use from the entire system, it will be very helpful. But they leave the things on that we shouldn't be using, I don't know what for."*
>
> GP4, female, directed enhanced service

Indeed, for many GPs, the detection and selection of the appropriate code was described as almost a 'wildcard' process. There was limited awareness that particular Read codes were more or less appropriate to use in particular circumstances, with GPs often relying on using the keyword search facility of their clinical IT system to locate a suitable code. Focusing on alcohol intervention coding in particular, this 'wildcard' approach seemed evident across GPs from different types of practices, irrespective of their Enhanced Service status. The quote below describes this type of inconsistent Read coding practice well:

> *"I might well record something like, 'Discussed alcohol.' Or 'Advice about alcohol.' Or something like that. I'd have to admit it wouldn't be systematic in using the same code for the same thing every time. You know we use SystmOne, so I'd right click in the box and see what came up. You know type in alcohol, see what came up under that rubric and pick one."*
>
> GP6, male, no enhanced service

At the same time, it was also evident that the lack of confidence on the part of some GP interviewees around selecting the correct Read code resulted in a tendency to avoid formalising care through coding entirely. In these situations, individual level

anxiety about choosing the right Read code meant clinicians simply used the less structured (and as previously discussed in Chapter 1, less accessible) alternative of narrative free text to record elements of the patient consultation. For these interviewees, there was a strong sense of the possible implications of selecting a particular Read code for the practice, given their use as proxy measures of care for the purpose of clinical audit. As one interviewee explained:

> *"Obviously data quality is important, so you've got to be careful if you've got a Read Code and you want to use it in a particular way. And you put something that makes sense in the English language, but then somebody's reserved that code for something else, and you shouldn't have used it and you've got all these ones all over the place that you shouldn't touch. And sometimes I think perhaps it's better to put things in free text if you're not sure."*
>
> GP8, male, directed and local enhanced service

Second, in addition to this general challenge of navigating the high volume of Read codes, interviewees also talked about some particular conditions and diagnoses they found difficult to translate into code. Indeed, despite the fact that many interviewees highlighted the excessive number of codes as a barrier to accurate coding, it was also clear that in many instances the Read code lexicon lacked application to some common general practice situations. For example, many interviewees reported finding unexplained or developing conditions particularly challenging to Read code:

> *"The whole area of medically unexplained symptoms or functional illness, which is a huge area of our practice, is a little bit, there's a kind of dearth of appropriate codes. That's why I say multiple symptoms or vague symptoms, might be something that I might use there, well as a sort of holding code until either an organic diagnosis is made or it is apparent that it…But I don't think there is a code for medically unexplained symptoms."*
>
> GP6, male, no enhanced service

Against these accounts of the challenge of coding developing diagnoses, interviews nevertheless suggested that GPs felt a keen sense of responsibility to code every consultation, or at least to Read code what was described as the primary presenting 'problem', in addition to any actual diagnoses or tests. Coding the formal (or 'quantifiable') diagnosis appeared to be an approach learned early on in GP practice.

As one respondent said *"It's drilled into you, erm, you've got to have the problem, the main presenting problem."* (GP7, male, directed and local enhanced service). Connected to this issue, a number of GPs suggested that they found it more straightforward to record units of alcohol consumption as opposed to using the Read codes associated with the delivery of alcohol screening and brief alcohol interventions. As the following quote implies, the fact that alcohol consumption involves the recording of a fixed numeric value, appeared to enhance its 'code-able' properties for a GP:

> *"…if I am going to code it properly, I would put the alcohol units …because one, there's a figure, one it's recorded and then two, it's always on the summary screen so I know for next time how much this person is drinking….and I think for that one, at least it's clear, and it's consistent as well."*
>
> GP9, female, directed and local enhanced service

GP participants also highlighted the issues experienced in using system Read code templates in routine practice. In theory, Read codes templates represent an effective means of speeding up data entry, ensuring that all appropriate information about a patient is obtained and facilitating consistent recording of that patient information across a practice. However, whilst two interviewees talked positively about the impact of IT system templates on recording practices (GP3, female, no enhanced service, and GP7, male, directed and local enhanced service), the more general view on templates was far more critical. Further, even those who described templates in relatively benign terms, did so from the perspective of the nurse rather than the clinician as their primary user *("The nurses are much better at doing templates than doctors are, so it's usually done properly when the nurse does it and a bit ad hoc when the GPs do it"* (GP5, female, directed enhanced service)).

There were some specific criticisms made of the alcohol screening and intervention templates in use at some GP practices, particularly in comparison to those used to record tobacco interventions. As a result, one interviewee admitted sometimes avoiding using that template entirely (GP2, male, directed enhanced service). Another GP also expressed frustration at the existing alcohol intervention template design:

"They're a bit of a scrawl, a bit of a mess. They certainly don't fit well into what the nurses like, which is just a very linear thing that you go through. They probably might appeal more to nurses, but not – you have to fill in every last bit of it …it's a little bit buggy. Some of them, I can't, I have to minimise the task bar in order to click out of it when I've finished and that sort of thing. So it's a bit clumsy to use."

They continued:

"Doctors, by their very nature, do not like templates…You know, it's just a cultural thing. We feel hemmed in, I think."

GP8, male, directed and local enhanced service

6.3.4 Theme 2: Coding as a reflection of the hierarchy of incentive schemes

Alongside the technological factors described above, it was also clear that the way in which screening and brief alcohol interventions were resourced also affected coding. In particular, financial incentives were positioned as driving not only the direction of care provided by GPs, but also how they captured such care through code. This overarching influencer was articulated in terms of three clear sub-themes: the primacy of the Quality and Outcomes Framework as a driver of Read coding; the strong associative relationship between the design of individual incentive schemes and the Read coding prioritised by practice staff; and finally, GPs' limited belief in Read code data as a meaningful measure of healthcare.

In some respects, this symbiotic relationship between coding and incentives is to be expected given that practices use Read code data to evidence clinical activities in order to trigger payment. As highlighted in Chapter 1, this data must be collected in order to evidence performance against both the more established, universal Quality and Outcomes Framework (257), as well as the national and local voluntary Enhanced Service schemes for alcohol [116]. However, interviewees suggested the existence of a definite hierarchy of coding priorities for clinicians in routine practice, with data recording relating to the Quality and Outcomes Framework positioned as more important than that for other types of incentives. As one interviewee commented *"…it's one third of our income, we have to get QOF or we would go out of business."* (GP11, female, directed and local enhanced service). This resulted in a keen awareness of the importance of coding areas of care related to the QOF thoroughly amongst all GPs:

"…you're driven by what's important or what you have to categorise. Somebody smoking is QOF-related so I find a way to read-code somebody's smoking status. Especially if there's a reminder at the bottom right of the screen, so I would do that fairly comfortably and there's lots of different ways of recording it, you can say x light smoker, or x heavy smoker or current 20 a day or current 17 a day or whatever you want to put down, so I would do that erm, and, but also record diagnoses, I'd also record symptoms and that would be generally helpful to have that coming up on top of the screen, erm so, we do go through the notes and highlight diagnoses that we want added later on, and then we'd also go through the records and then pass on results of say diabetic retinal screening so that our data entrist can record that, but that's QOF-driven."

GP11, male, directed and local enhanced service

Further, and connected to the previous theme related to the impact of technology on coding, the high priority accorded to the recording of QOF-related data also appeared evident in both the design of the IT systems in place to support their collection, and in the way in which administrators encouraged clinicians to code accurately. As one respondent reported:

"We have better systems in the practice to make sure that the QOF data is collected and there are more reminders on the screen if it's not done. Back office staff will chase people up and things like that for QOF data"

GP2, male, directed enhanced service

Another GP commented:

"They keep emailing me or tasking me or sending notification in the patient's notes to say, "Can you Read Code this, related to your consultation on this day?" Or, "Can you Read this for that one?" Or, "Are you able to Read Code this based on your consultation update that has been picked up on QOF?" or something like that. I keep getting those on and off."

GP4, female, directed enhanced service

Accounts of the influence of the various Enhanced Services for alcohol suggested arrangements were very different to support coding of screening and brief alcohol interventions. Those interviewees that worked in practices signed up to an Enhanced Service for alcohol emphasised the importance of coding interventions accurately in

order to qualify for payment. However, unlike coding connected to QOF target areas, GP interviewees implied that nursing staff were responsible for capturing the vast majority of Read code data to evidence delivery of screening and brief alcohol interventions. In particular, this was connected to the important role that nurses play in gathering lifestyle data as part of standardised patient processes, such as the annual health checks for patients with chronic conditions or registration of new patients to a practice. One interviewee summarised this practice of coding alcohol screening tests within a wider healthy lifestyle focus well:

> *"…that tends not to be done by the doctors, the AUDIT-C, that tends to be done by our healthcare assistants and nurses who are delivering the health promotion stuff, so everybody who comes through the hypertension clinic, the diabetic clinic, COPD, the asthma, the just the standard man off the street just wanting his cholesterol done, they all get fed through that template."*
>
> GP11, female, directed and local enhanced service

Further, it was also evident that the design of the Enhanced Services for alcohol, particularly the national scheme, also served to prioritise the collection of certain elements of data relating to screening and brief alcohol intervention over others. Specifically, as practices were generally paid on the basis of the number of screening tests coded, as opposed to their subsequent delivery and coding of brief alcohol interventions on the basis of a patient's screening score, the recording of intervention data was far less systematised. In fact, in reality, many interviewees suggested they would be more likely to use free text to record data on alcohol-related discussions in patient consultations rather than using specific codes introduced as part of the incentive schemes. Thus, talking about whether alcohol interventions would be coded, one GP commented:

> *"No…not unless there was a particular reason for it…So if you were saying would I record delivered brief intervention on alcohol, I wouldn't unless there was QOF driven reason for it or it was important to put in their notes but er, a vaguer type of thing such as …personal alcohol consumption heavy, for example might be a reasonable thing"*
>
> GP11, male, directed and local enhanced service

This reliance on free text to capture the delivery of interventions or advice on alcohol was evident in all GPs interviewed. However, responses suggested that formal Read

coding was least consistent of all in GPs based in those practices not signed up to an Enhanced Service for Alcohol (as one GP put it, *"You'd probably find I use a different term every time."* GP6, male, no enhanced service). It should be stressed however, that delivery of care and the subsequent Read coding of that care were not considered synonymous in such practices: as one interviewee commented:

> *"…as long as I know somebody's drinking 50 units and I know that I've talked them through it and I know that they're coming back to see me about it, whether I've coded it on the system or not, so what? The intervention's been done."*
>
> GP5, female, directed enhanced service

The above quote highlights a common belief set that emerged from the interviews in relation to the validity of Read code data as representing quality of care. Generally speaking, for Quality and Outcomes Framework indicators at least, most clinicians appeared to see the routine data gathered as part of the audit process as providing only a crude measure of care. A number of interviewees were doubtful that the essentially 'tick-box' nature of Read code data could adequately capture the complexity of day-to-day care. One GP explained *"it's almost trying to analyse something that can't be analysed. It's like a good piece of music. It just has to be heard".* (GP7, male, directed and local enhanced service). Indeed, as a further interviewee commented, using Read codes to assess quality and performance merely served to "atomise" care:

> *"Because the really important things about care are, well as important as doing the checks on a patient with diabetes, are all the other bits that, all the stuff between that, which is the human interaction and you know all those kind of things which are, that's the essence of care."*
>
> GP6, male, no enhanced service

There was also some concern about whether the Read code data gathered to evidence progress towards QOF targets accurately measured differences in the quality of care, in particular at individual clinician level. The following account illustrates this concern well:

> *"I sat with somebody observing their consultation and once the patient had left, they just Read Coded things like lifestyle advice regarding smoking, lifestyle advice regarding alcohol, lifestyle advice regarding*

diet… 'How many do you smoke?' 'Okay.' 'Do you drink alcohol?' 'Okay.' 'How many units do you think it is?' And, 'Well, you know, you realise you are overweight, you need to lose weight.'… So that's what it meant. But you could go to some other person who would just then say, 'Well, have you thought about stopping smoking?' 'No.' 'How confident do you feel on 0 to 10?' 'Seven.' 'Okay, so what is it that makes it seven rather than five?'

You know, the same information, so the Read Codes, I don't think necessarily capture the content of the discussion. It is just very much a mechanical robotic activity of just ticking the box or putting the Read Code. There is a flashing icon on your right hand side, QOF: 'ask smoking'. Then you will just ask the smoking status and quickly write it down. You are aware it is 10 minutes and you have to quickly ask this question and hope that it doesn't open a can of worms or something like that."

GP4, female, directed enhanced service

6.3.5 Theme 3: Individual coding practices and local-level screening processes – a synergistic relationship

In addition to the impact of technology and financial resources on recording practices, a further structural influencer concerned the way in which practice-level care pathways supporting the delivery of screening for alcohol use disorders shaped clinician coding behaviour. This was evidenced in terms of: first, the impact of targeted versus universal screening approaches on coding practices, and how these approaches were in turn professionally delineated; second, GPs' reluctance to use validated screening questionnaires to assess risk; and finally, a strong correlation between formalised screening and formalised Read coding (and vice versa). These sub-themes are discussed further below.

First, interviewees talked about a variety of situations in which the alcohol use disorder screening process would be 'triggered' for an individual patient. Broadly speaking, these fitted into what might be described as 'targeted' (whereby potentially 'at risk' patients are identified on the basis of pre-determined characteristics) versus 'universal' (whereby all adult patients are eligible) alcohol screening approaches. In terms of more 'targeted' approaches, a number of interviewees described how screening was incorporated within various annual health check processes such as for the management of chronic diseases, or as part of the recently introduced NHS Health

Checks for adults aged 40 to 74. In these instances, the delivery of an alcohol screening test would be automatically coded by the use of the associated electronic template. However, most GP interviewees emphasised that nursing staff were generally responsible for delivering such health checks, and in turn using the alcohol screening templates. In contrast, 'targeted' screening as delivered by GPs, was in reality a far more ad-hoc and far less systematic process. For example, it was evident that some clinicians were more likely to screen an individual patient depending on their presenting condition, and its perceived relationship with alcohol use. It was often unclear as to whether this perceived relationship was objective and evidence-based, or more the accumulation of what might be described as 'learned clinical experience'. One interviewee mentioned mental health as an example of this screening approach, *"…because alcohol is so, you know, entwined with mental health…it would be unusual not to ask how much"* (GP7, male, directed and local enhanced service). Another interviewee expanded further on this approach:

> *"…depends on a present patient, erm maybe if there is a history of depression or erm, they present that they have got concerns …or maybe they get an abnormal liver test and that issue is raised. …I guess as a GP mainly it is I suppose through the presentation of the patient…. and then you take it from there."*
>
> GP9, female, directed and local enhanced service

Some interviewees also talked about what might be termed a more 'universal' screening approach, whereby all patients (those aged sixteen and over) would be screened. As might be expected, this was a more dominant theme in the interviews held with GPs based in practices signed up to an enhanced service for alcohol, where financial incentives supported such universal screening. However, again, the concept of universal screening did not appear to be thoroughly embedded across all practice staff concerned. For those practices paid on the basis of screening all newly registered patients, nursing staff or healthcare assistants ensure that screening data was captured consistently, supported by the associated electronic template. GPs' translation of universal screening, however, was far less uniform. Two key factors impacting on universal screening practices emerged here: availability of time, usually in terms of accommodating alcohol screening against other practice priorities; and again, a sense that it was important to tailor the screening approach to the needs of

the individual patient (as one respondent emphasised: *"the consultation is driven by patient need"* (GP7, male, directed and local enhanced service). As a result, 'universal' screening appeared anything but, with delivery in practice remaining very much 'ad hoc', as the following quotes illustrate:

> *"…we do the bit they come about, their agenda, and then there's a whole host of practice issues…QOF issues…and it depends on what's flavour of the month…how much space we've got left in the consultation"*
>
> GP7, male, directed and local enhanced service

> *"… we certainly don't routinely screen every consultation… its partly just because that's the way we've always done things, that its just to do things from experience rather than reverting to tools. And I think partly because people usually consult with other problems and alcohol is a bi-product of the consultation. So often the screening is quite an add-on at the end."*
>
> GP2, male, directed enhanced service

Further, it is important to stress that alcohol 'screening' here often seemed to be discussed synonymously with recording alcohol consumption (i.e. using weekly unit consumption as opposed to the use of a validated screening tool such as AUDIT-C or FAST, which also incorporate questions on alcohol-related risk or harm). As the quote below suggests, an initial question on weekly alcohol consumption was almost used as a pre-screening mechanism, whereby patients who reported drinking over recommended limits were then subject to additional questions about whether they had experienced any alcohol-related harm:

> *"I ask them whether they smoke, they drink, they use drugs, erm, but obviously take it forward only if I feel that you know there is eh, an alcohol use beyond or above recommended limits…. I ask them how many units do they drink a week and if there has been any problems."*
>
> GP4, female, directed enhanced service

In contrast, a number of GP interviewees described using screening tools as a prompt to bring up the issue of alcohol consumption within the consultation, and in turn, to help them to ask the 'right' questions. In this sense, validated screening tools were translated less as prescriptive and absolute, and more as an aide-memoire to stimulate discussion of a patients drinking status during the consultation (*"…they certainly*

remind you of which questions to ask and perhaps fill in some of the details that you sometimes don't ask" (GP2, male, directed enhanced service)). Some interviewees also described how they sometimes 'tailor' the tool to meet the perceived needs of the patient. Thus, screening is also interpreted as a flexible and adaptive process as opposed to an approach that should be followed 'to the letter'. The following quote illustrates this point well, with the GP in question suggesting that screening may need to be altered depending on the individual concerned:

> *"… It's just some patients if they're a bit cagey about their alcohol, bringing out a piece of paper doesn't always work. So I think it's very much about looking at what you've got in front of you, and adapting the consultation accordingly."*
>
> GP5, female, directed enhanced service

For some, this reluctance to 'stick to the script' was also related to a sense of discomfort with the rigid, formulaic screening tool process. As one GP, talking about their personal use of AUDIT-C, commented:

> *"…in terms of doing it in a systematic and structured way, that always feels slightly clunky and I've always got to be very convinced that it's worth doing it."*
>
> GP8, male, directed and local enhanced service

Also implicit in the above statement is a sense that the GP in question is expressing a sense of professional entitlement to withhold screening unless they are convinced it will be 'worth it'. Another GP interviewee echoed this viewpoint, describing a highly experience-led approach to screening, where practitioners are more likely to draw on their own skills and expertise as opposed to relying on formal tools:

> *"So where there are issues that alcohol comes up, then you possibly use the brief intervention screening. Probably not as often as we should I would imagine. We probably ask more about alcohol and do our own sort of version of brief interventions rather than use the formal screening tool. Or I probably do but that's because I'm not good at using screening tools….I think it's partly just because that's the way we've always done things, that it's just to do things from experience rather than reverting to tools."*
>
> GP2, male, directed enhanced service

In terms of the actual *coding* of alcohol screening test delivery, this trend of informalised and individualised patient assessment had profound implications. Importantly, there was a strong link between the use of a formalised, validated tool, and a more formalised approach to Read coding. This led to a coding 'Catch-22', whereby unsystematic delivery of alcohol screening and intervention engendered unsystematic recording practices, and vice versa. The following exchange demonstrates this process well:

Interviewer: *Thinking about when you deliver either an intervention that's sort of based on a formal tool or kind of any more ad hoc activity, would you tend to record that? Would you Read code that conversation?*

Respondent: *If I'd used a tool yes.*

Interviewer: *If you hadn't used a tool?*

Respondent: *I wouldn't Read code.*

Interviewer: *You wouldn't Read code it? You'd free text?*

Respondent: *Yes.*

GP2, male, directed enhanced service

A further structural factor influencing the recording of alcohol interventions related to the alcohol service context in which individual practices were situated. Crucially, some interviewees reported that a lack of specialist alcohol services in the local area translated into a reluctance to formalise alcohol issues through Read coding. In particular, this was a strong theme in the interviews conducted in the North of Tyne NHS organisational area, a part of the region that has been previously identified as lacking adequate specialist treatment services (92). For example, as one GP commented:

"… part of the whole problem of helping people with alcohol problems is that there's not an adequate service. And we don't record where they've got help from or where they're getting help from. Partly because there isn't a very good service……if we had very good services, that we could refer people on to, we might code more about, you know, offered this, offered that."

GP3, female, no enhanced service

However, it was also an issue raised in a practice based in the South of Tyne and Wear NHS area which covered a relatively large number of 'middle-class' patients. The GP concerned described inappropriate specialist services as a barrier to formally codifying alcohol-related care for female middle-class patients in particular:

> *"… somehow I sometimes feel we fail those people a bit, because they can wriggle themselves out of the red list, do you see what I mean? … I think that some of them it's like too posh to push, they don't want to go to central Gateshead…they don't perceive that the free alcohol services, the ones that don't involve the priory and a lot of money, the free alcohol services tend to be where the problems are gravest which is correct, in parts of town that one doesn't really use to go to. Alcohol workers are lovely bunch, I like them all, but they often look a little bit, they didn't look right."*
>
> GP11, female, directed and local enhanced service

6.3.6 Theme 4: The acceptability and feasibility of brief alcohol interventions

In addition to the structural factors shaping the coding of alcohol screening tests identified in the previous three sections, GPs' views on both the acceptability and feasibility of delivering brief alcohol interventions in routine care, and the extent to which this was seen as an effective approach to tackling risky drinking, also influenced recording practices. As discussed below, limited belief in the universal effectiveness of brief alcohol interventions, and in particular, GPs' perception that interventions could only be impactful in certain types of patients, strongly influenced the way in which they both delivered and recorded such activity.

The first clear message from the interviews relating to this theme concerned the varied degrees of confidence expressed by GPs in the *universal* efficacy of brief alcohol interventions. Whilst most GPs believed alcohol interventions could be effective in certain contexts, and with certain patients, there were also situations in which such an approach was viewed as unlikely to be impactful. Indeed, only one participant could be described as holding an unreservedly positive view on their effectiveness:

> *"… I personally find that it actually often makes them think or say or at least start them on the path or often you know help them either reduce their drinking to, to the recommended or you know even go to stopping it if necessary…so yes it does work."*
>
> GP4, female, directed enhanced service

In contrast, most other participants questioned whether such an essentially standardised approach could be effective in all patients. For example:

> *"You can feel like you've had a very good consultation and they'll still go on drinking. Or you can do something really quickly and say 'You know for heaven's sake you've got to stop drinking.' And they'll come back in three months and say 'Do you know when you said that I was really shocked, I've stopped drinking.' And you think 'Oh my goodness!' It's very hard to predict who you're going to have an effect on."*
>
> GP3, female, no enhanced service

Interestingly, this view was even expressed by those that could be considered fully engaged in the alcohol agenda. The following quote is taken from an interview with a GP who could be described as a 'local opinion leader' in the field, and therefore fully aware of the evidence base supporting brief alcohol intervention:

> *"I'm realistic, it doesn't work every time… that's one of the mysteries, you don't quite know who it's gonna work with, or when it's gonna work."*
>
> GP7, male, directed and local enhanced service

For some interviewees, this lack of faith in the universal effectiveness of brief alcohol interventions related to a belief that a patient needed to be 'ready to change' for interventions to work. As such, GPs rationed their delivery (and in turn, recording) of alcohol interventions to 'changeable' patients, with this assessment of whether a patient was 'ready to change' based on an instinctive 'gut' reaction (*"sometimes…when you're dealing with an individual in front of you, you get that kind of gut feeling that it is worth spending a bit of time"* (GP8, male, directed and local enhanced service)). Several interview accounts illustrated this perspective, for example:

> *"I suppose one of the key things I feel with alcohol to some extent is, I suppose people have to be wanting to change before you can take them too far down the road of an intervention. And so sometimes yes, they know they're drinking too much but they're not that ready to change, so going through a whole pathway doesn't always help."*
>
> GP2, male, directed enhanced service

"…I will try and explore where somebody is at in a sort of behaviour change cycle. You know are they in a place where they're actually thinking about it, or is it not even on their radar, or is it just, you know that's what they've come to talk about. So that's what I would do next."

GP6, male, no enhanced service

6.3.7 Theme 5: The role of the GP within the patient-centred consultation

The final theme concerned how GPs' recording of screening and brief alcohol interventions was affected by various sociocultural factors. In particular, the way in which individual clinicians' conceptualised the role of the general practitioner, and in turn, how that role shaped the doctor-patient relationship, emerged as a strong influencer on coding practices. This was articulated in four distinct sub-themes: first, how alcohol work is positioned within the generalist role of the primary care physician; second, GPs' concern to deliver a 'patient-centred consultation'; third, the limitations of formal Read codes for capturing contextual data; and fourth, the potentially stigmatising effect of formalising sensitive or uncertain diagnoses through code.

First, it is important to emphasise the fact that the majority of interviewees defined themselves primarily as medical 'generalists'. For interviewees with several years in practice, this generalism was positioned as being synonymous with the role of the GP. For example, one of the more experienced interviewees labelled the bulk of their work as being *"mainly your straightforward general practice"* (GP2, male, directed enhanced service); and another expressed their job in terms of *"mainly general practice, with general being the operative word"* (GP3, female, no enhanced service). For less experienced GPs, however, this label of clinical generalism appeared more connected with their on-going development as a clinician and less in terms of a fixed role identity. For example, one interviewee described their lack of clinical specialism in the context of *"still developing, yeah, trying to figure out which area that I like"* (GP9, female, directed and local enhanced service). Importantly however, only a small minority of interview subjects described themselves as having either a particular interest or declared specialism in alcohol or substance-related work. Further, even in the case of GP interviewees who might be seen as 'local opinion leaders' in the field, any specialist alcohol work was nevertheless strongly situated within their wider generalist role, as the comment below illustrates:

> *"I'm a normal GP most of the time but then I run two special clinics for addictions, but that's mainly opiate addiction. So the clinics aren't just for alcohol…I would see alcohol in my normal everyday work"*
>
> GP7, male, directed and local enhanced service, male

Next, alongside this generalist identity, interviewees also positioned their role as overwhelmingly focused on delivering the 'patient-centred consultation'. This was also articulated as putting the patient's 'agenda' first: as one interviewee put it *"… a good GP will always stay on the patient's agenda"* (GP12, female, directed and local enhanced service). Further, delivery of the patient-centred consultation was thus a necessarily individualised activity, strongly informed by a patient's social and familial circumstances. As the same GP continued:

> *"… when patients come to the doctors it's not a hole in the wall situation…doctors aren't automatons and each patient is an individual. It's a bit different…to perhaps a lot of other countries where you go to ER and you are basically a stranger every time you go."*
>
> GP12, female, directed and local enhanced service

Another interviewee commented:

> *"… sometimes a quick social chat at the end of a consultation you learn more about them, what motivates them, who their family is and so on and sometimes it can really unlock doors".*
>
> GP11, female, directed and local enhanced service

This socially-situated and patient-centred consultation delivery had distinct implications for both what Read coding was prioritised in routine practice, and how such Read coding was carried out. For as one interviewee explained *"I don't like codes; you know…I'm a clinician, I love the clinical encounter… the commitment [is] to what has gone on with the patient"* (GP7, male, directed and local enhanced service).

In terms of which factors drive clinicians to formally Read code alcohol screening and brief intervention, several interviewees framed their commitment to coding within the wider context of supporting continuity of care: *"it helps you search, and for other people to keep track on what's happening"* (GP7, male, directed and local enhanced service). In this sense, Read coding was seen as a preferable means of capturing consultation information in comparison to free texting. This was particularly the case

in larger practices, where multiple clinicians could be caring for an individual patient. As one interviewee explained:

> *"I don't like free text, erm, at all, because I feel that, especially if you need to, if another doctor needs to go back to a problem, it's important that they can actually see what went on, and having to go through free text is just difficult."*
>
> GP9, female, directed and local enhanced service

At the same time, many of the GP interviewees held firm beliefs on the limitations of formal Read code data in terms of providing information about a patient's social and historical circumstances. In contrast, most interviewees expressed a belief that free text allowed clinicians to capture greater depth and more complexity around the consultation narrative. As one GP expressed it, free text *"can help and inform and give a level of sort of continuity of care by kind of explaining conversations and a bit of background to the situation."* (GP9, female, directed and local enhanced service). Another interviewee discussed this point at length in relation to the specific context of providing care for people with alcohol-related problems:

> *"…because, you know the situation is usually so complex, in terms of the person's own personal and social history and what's led them to heavy drinking. And then all the factors that influence their motivation to change and the constraints and so on, on that process. You know Read coding, simple coding can't capture all that sort of, not by a long shot…you could perfectly well have instances in which the codes tell you that the doctor or the nurse has done the right things in terms of an intervention. But actually if the relationship and the trust and the understanding of the person's social context isn't there, then you don't know the whole story.*
>
> GP6, male, no enhanced service

A small number expressed this in even stronger terms. For two respondents, Read codes were clearly viewed as less 'important' to the clinical encounter than free text, particularly for complex cases. As one respondent said, *"most of the information to be honest that I would value is free texted; if you took the free text away, I would be lost."* (GP8, male, directed and local enhanced service).

In addition to a keen sense of the limitation of Read codes for capturing social, contextual information, some GPs also articulated their reluctance to code certain

sensitive or uncertain diagnoses in electronic health records. As the quote below suggested, this was in part to do with GPs' concerns not to formally label ambiguous complaints. However, some interviewees also presented such reluctance in terms of the potentially stigmatising nature of Read coding a patient and the serious implications such stigma could carry:

> *"…we're getting a lot of undifferentiated stuff coming through as general practitioners. And particularly before you've made a clear cut diagnosis, the last thing on Earth you want to do is code somebody with something, because it's got implications if you make a diagnosis. So, the for example; I'd say what is the difference between asthma and COPD? About £200 on your holiday insurance!"*
>
> GP8, male, directed and local enhanced service

It should be stressed however, that this anxiety not to stigmatise patients through Read coding was not shared universally. A number of interviewees strongly resisted the idea that stigma influenced individual coding practices. Another interviewee explained that concerns about stigma did not prevent coding, rather it led to what might be described as 'adaptive' coding practices to accommodate such concerns, *"if there's sensitive issues relating to the patient…we code those as 'minor past', so they don't appear on the front screen".* (GP5, female, directed enhanced service)

A further consequence of GPs' concern to keep the patient at the heart of the consultation was the manner in which it influenced the actual *sequence* of Read coding within the consultation process. When asked about the actual process of coding, the vast majority described Read coding as a retrospective activity, detached from the business of the consultation itself. Predominantly, clinicians justified this approach in terms of their concern to ensure that the consultation remained 'patient-centred'. In particular, they emphasised the importance of maintaining eye contact during the consultation discussion. As one respondent commented:

> *"I just don't like using the computer when you're talking to the patient, so that's the only reason. It's not that I'm- I could say to a patient "If you just hang on, I'll just enter that into the computer." But I tend to just out of habit do it afterwards, yes."*
>
> GP5, female, directed enhanced service

One final point of interest in relation to this theme of the GP as a 'patient-centred generalist' is how this contrasts with their representations of nurse-led Read coding. In particular, interviewees portrayed nurses as responsible for the delivery of more 'routine' and tightly defined patient care. Thus, whereas many interviewees described free text as often more appropriate for capturing the in-depth contextual and varied data that would usefully inform the GP consultation, Read codes were viewed as more suitable for nursing activity (*"I think doctors probably use free text, practice nurses use the read codes"* (GP5, female, directed enhanced service)). This discussed specifically in relation to the delivery of alcohol screening tests by nursing staff. The following examples demonstrate this perspective well:

> *"…the practice nurses probably have a much more structured approach….most of their work is chronic disease management and they tend to be filling in screening tools. So that's what they do all the time, so they're much better at it."*
>
> GP2, male, directed enhanced service

> *"…if you're wanting to record it, it works best when the doctors aren't doing it…all task-led work is much better done by people who aren't having to think out of the box about the patients work… doctors are trained to diagnose and treat things, nurses are trained to do task orientated work, it's the way we think … Equally if somebody was to come in and… even if it's really obvious and screaming out of what they should expect, blinkering, clinical blinkering means it often isn't getting picked up. So I wonder how the nurse not notice that, well she wasn't doing a consultation, she was doing a hypertension review so she didn't notice the cauliflower lesion on his left ear, as a doctor might and not record anything they'd talked about in the previous ten minutes but only deal with that.."*
>
> GP11, female, directed and local enhanced service

6.4 Strengths and limitations

Before considering the key findings from the interviews, and their implications for the wider study, is important to acknowledge some limitations of this phase of the research.

The first limitation concerns whether 14 GP interviews were sufficient to gain an adequate understanding of the phenomenon under investigation. In this respect, a key factor influencing the appropriate number of interviewees concerns the point at which

data saturation is deemed to have been achieved (644). However, decisions are often subjective and there are few clear guidelines on how to establish whether one has in fact achieved saturation. Romney et al represent one attempt to operationalize the concept of saturation via the development of the 'Cultural Consensus Model' (CCM) for their ethnographic work (645). CCM suggests that each 'culture' has a shared view of the world, creating an overall 'cultural consensus'. Although there may be variation on the *level* of consensus around an issue, the number of views are nevertheless finite, allowing the development of a comprehensive model of potential cultural viewpoints through factor analysis (645). In relation to this research, analysis of the interview data suggests a finite set of viewpoints emerged on the topic under investigation. In terms of GPs' views on delivering and recording alcohol screening and brief intervention activity, there appeared to be a high level of homogeneity in viewpoints, particularly in relation to perspectives on screening patients for alcohol use disorders, and the barriers and drivers of alcohol-related (and wider) Read coding.

Further, looking at the recruited participants, the sampling approach was purposive and aimed to achieve maximum variation against key variables of interest (type of GP, enhanced service status, and geographic location). As such, there was a 'sociological logic' to the systematic selection of interview subjects (646), whereby cases were selected to facilitate the exploration of emerging theory from the previous phases of the research that financial incentives encourage higher rates of delivery, and in turn recording, of alcohol screening and brief intervention. Importantly, therefore, it should be emphasised that the recruited sample included at least one GP from each of the categories of interest, with the exception of one group: GPs based in South of Tyne and Wear organisational area and <u>not</u> signed up to an enhanced service. However, as reported in the previous chapter (5), given universal coverage of the combined Directed and Local Enhanced Service for alcohol was achieved during the recruitment period across South of Tyne and Wear, the potential sample base became increasingly restricted. Thus, the majority of interviewees (eleven out of fourteen) were drawn from practices signed up to at least a national level enhanced service for alcohol. It has to be acknowledged, therefore, that interview accounts could have varied if it had been possible to recruit additional GPs from practices less formally engaged in alcohol intervention activities across the full geographic area of interest.

Before embarking on the interview phase of the research, it was anticipated that concerns around 'professional liability' could have resulted in GPs providing more guarded, less truthful accounts of alcohol screening and brief intervention activity, particularly where activities connected with payment of financial incentives were concerned. Further, given the significant challenges experienced in recruiting adequate numbers of GPs to the study, it is postulated that such concerns could well have negatively influenced individual and practice-level decisions around whether to participate in the interviews. In contrast, however, it needs to be stressed that clinicians' accounts were frequently far more honest than expected (for example, in relation to their confessions around not using formal screening tools, and widespread cynicism on the impact of financial incentives as driving quality). Further, even if these were on occasion, socially constructed accounts of screening and brief alcohol intervention activity based on clinicians' perceptions of how they wished to represent themselves (as opposed to the reality), the resultant data are still valuable. As Rapley argues, if we accept our inability to access a person's 'intimate interior' through the interview, we can start to consider its value in other terms (647). Thus all representations, including those offered in the relative artifice of the interview situation, are valid, for one purpose or another (648, 649). In the context of this research, therefore, the qualitative data helped provide some insight not only in terms of the 'surface level' responses to the actual questions asked, but in providing additional insight into what clinician's see as an acceptable public persona, and in particular, how acceptable they feel it is to be openly ad-hoc as practitioners around alcohol work.

Additionally, some logistical constraints of the circumstances in which the interviews were carried out should be acknowledged. The interviews lasted between thirty minutes and one hour 15 minutes, with an average of around 40 minutes in total. The relatively restrictive interview timeframe had been a necessary condition of negotiating access to this group of participants. As a result, the flow of dialogue in some interviews was slightly more constrained and structured in style, and on a small number of occasions, verbal and non-verbal clues suggested that further probing and / or exploration of initial responses was not welcome or feasible. In addition, a number of the interviews conducted in the GPs consultation room were interrupted by patient

or administration related calls, which further challenged the natural development of the interview narrative. At the same time, it needs to be stressed that this was a professional, generally highly articulate group of interview participants, who in the main were able to quickly grasp and verbalise complex issues. Of course, this was not always the case. For three participants for example (GP4, female, directed enhanced service, GP9, female, directed and local enhanced service and GP10, male, directed and local enhanced service), English was not their first language, which sometimes represented a barrier to understanding and communicating the issues under discussion.

Further, both telephone (two) and face-to-face (twelve) interviews were conducted as part of this research, and this might also have implications for the emergent data. It was necessary to conduct two of the interviews via telephone due to access challenges (GP4, female, directed enhanced service and GP9, female, directed and local enhanced service). This represents a potentially significant difference in delivery mode. Face-to-face interviews are uniquely characterised by the fact that they facilitate synchronous communication in both time and place. As such, they allow interviewers access to what might be described as 'social' cues, such as voice or body language, which can help provide additional information to a respondent's verbal answer (650). In contrast, although telephone interviews are of course advantageous in facilitating extended access to participants (651), there are some notable disadvantages when compared with face-to-face interviews. In particular, a key disadvantage of asynchronous communication of place by telephone is the reduction in available social cues: the interviewer does not see the interviewee, so body language in particular cannot be used as a source of extra information (650, 652). On reflection, from a researcher's perspective, the telephone interviews were more demanding to conduct in comparison with their face-to-face counterparts, particularly as technology was not always helpful, with one interview in particular disjointed as a result of problems with the telephone line. At the same time, it should also be noted that both telephone interviewees were non-native English speakers, therefore it is arguable as to whether these conversations would have 'flowed' as easily as others regardless of delivery mode.

Finally, it is also worth highlighting the positive contribution that the experience of conducting GP interviews within some of these somewhat challenging contexts made to the research study. A key limitation of semi-structured interviews can be their necessary detachment from the social, cultural and professional contexts in which they take place. In contrast to participatory or ethnographic approaches, there is a strong reliance on what information can be gleaned from a participants' verbal accounts of the phenomena under investigation, and the interview itself usually represents an interruption of the informants natural flow of events (451). By situating the majority of the GP interviews within the pressured and unpredictable general practice setting, therefore, this afforded an opportunity for a more sensitive and nuanced appreciation of the contexts in which practitioners must deliver and record alcohol interventions.

6.5 Summary and discussion

The interviews conducted with GPs in the qualitative phase of this study have served to highlight the unsystematic and adaptive nature of both the delivery and recording of screening and brief alcohol interventions in primary care. Indeed despite the introduction of a series of policy endorsements in recent years, including financial incentives, for GPs at least, the alcohol care pathway remains a somewhat inconsistent process, with the interpretation, application and recording of screening and brief alcohol interventions highly personalised and opportunistic.

To some extent, these findings reflect the issues identified by previous research on the challenges GPs experience in both delivering screening and brief alcohol interventions in routine general practice, and in using the Read code system to record such activity. In particular, the interviews underlined the multiple factors that contribute to the inconsistent nature of GP-led screening and brief alcohol interventions, including physicians' discomfort at discussing alcohol within the patient consultation (190, 201, 208, 653-657), and the way in which competing demands on limited time can lead to the de-prioritisation of preventive care, and divergence from recommended clinical guidelines (191, 194, 208). The interviews also support the findings of previous studies examining GPs' use of alcohol disorder screening tools in routine practice, demonstrating how their delivery was often tailored to perceived patient need, with a strong reliance on the use of weekly alcohol consumption measures to assess risk as opposed to validated screening questionnaires (188, 658). Further, and closely echoing

the literature reviewed in Chapter 4, as with other areas of clinical practice in primary care, the use of routine data to record screening and brief alcohol intervention appeared subject to a series of structural and psychosocial influencers (659). For example, low awareness of the correct codes amongst practitioners was in turn exacerbated by the challenge of navigating the mammoth Read code system (552, 558). Additionally, GPs struggled with the perceived inadequacy of the essentially rigid biomedical coding system in terms of capturing the more complex psycho-social narrative of the consultation (558, 660).

Importantly, the interview analysis would suggest that the themes described above are closely interrelated, resulting in a synergistic relationship between the process of delivering screening and brief alcohol interventions, and in turn, how this activity is Read coded. Thus, formal interventions delivered via formal, validated tools, resulted in more formalised coding practice. Conversely, more adaptive, less systematised interventions, whose delivery is contextualised within the broader narrative of an individual patient's social circumstances, were more inclined to be (informally) free texted. Further, these coding practices were professionally situated, with nurses more likely to record alcohol screening activity through Read codes, and GPs more comfortable with the complexity allowed by free text data when delivering intervention work. Additionally, however, these findings also have significant implications for our understanding of impact of strategies employed to date to encourage the implementation of screening and brief alcohol interventions on primary care clinicians, and in turn, the relevancy of the systems available to measure such impact.

First, therefore, the interviews suggest that whilst financial incentives in general were viewed as key influencers of both clinical and coding practice, their impact on the delivery and recording of alcohol screening and brief intervention seems to be more ambiguous. For GPs at least, it would appear that introduction of the enhanced service specifications for alcohol have not routinely stimulated either more consistent recording practices or more defined intervention delivery in the way that the Quality and Outcomes Framework appears to have done for other areas of clinical practice (553, 554, 558). However, it is important to stress that interview accounts imply this was not the case at overall practice level, where alcohol screening delivery and

recording did appear to be increasingly routinized. Nurses and healthcare assistants seemed responsible for driving such improvement, with their work supported in particular by the incorporation of alcohol screening questions within the various Read code templates for new patient registration and the management of chronic conditions. It is of course worth highlighting at this point that the national enhanced service in particular rewards practices only for their delivery of alcohol screening tests (238). In this way, it would appear that the emphasis of the incentive scheme, and the development of coding templates to support its delivery, have served to construct alcohol work as *"professionally delineated"* (661). Thus, nurses have taken on responsibility for the necessarily uniform business of monitoring and managing screening work, with clinicians positioned more as consultants, focussed on the delivery of complex, individualised and in turn, less measureable, alcohol interventions (410, 420, 427, 428, 661), arguably a further example of Charles-Jones et al.'s *"hierarchies of appropriateness"* (429).

Next, in terms of the overarching research question, the messages emerging from the interview analysis also cast doubt on the question of quality of the routine screening and brief alcohol intervention data currently captured in primary care settings. GPs confusion around the correct Read codes to use, and their occasional reluctance to codify alcohol activity at all, would strongly suggest that not every real world instance of screening or brief alcohol intervention delivery is being recorded at present. In addition, these findings also illustrate the limitations of routine data for capturing certain dimensions of service delivery (288), particularly in relation to recording less easily quantifiable activity such as behavioural interventions (274). Further, the interview findings also question the extent to which the data currently recorded by GPs can be considered accurate, in particular as a result of the heterogeneous coding practices evident in practitioners (288, 292, 293) , especially in relation to the recording of alcohol screening and brief intervention delivery (294).

Chapter 7 Discussion and conclusion

7.1 Introduction

This final chapter begins with a mixed-methods integration of the key findings identified by each phase of the study in order to identify areas of commonality and discordance. This is followed by discussion of the implications for the research in relation to the four key dimensions of data quality, namely: completeness; accuracy; accessibility; and relevancy. Next, the strengths and limitations of the overall research approach are considered, and some recommendations for policy and practice arising from the findings outlined. The chapter concludes by highlighting potential areas for future research and by offering some closing remarks.

7.2 Mixed methods data integration

The findings from all three phases of the research were drawn together and reviewed to determine common themes across the study as a whole. In addition, a mixed-methods matrix approach (512) was employed to support cross-case analysis of results from the nine GP practices where both qualitative and quantitative data were available. Recorded rates of hazardous or harmful level alcohol consumption, and the delivery of screening and brief alcohol interventions by individual practice were placed into quartiles based on the overall sample range. Interview transcripts from GP representatives of the same practices were reviewed for statements relating to the delivery and coding of screening and alcohol interventions. The emergent matrix is presented in Appendix O. These processes allowed the identification of both meta-inferences (i.e. converging messages from all individual component inferences), at the same time as helping to highlight areas of divergence and discrepancy. The emergent overarching themes are presented to follow.

7.2.1 Emerging meta-inferences from the research

First, being signed up to a national and / or a local enhanced service for alcohol emerged as the strongest determinant of higher rates of recorded screening and brief alcohol intervention activity in participating North East UK-based general practices. Analysis of the Read code data extracted from these practices demonstrated that recorded rates were lowest in practices with no enhanced service, and highest in practices signed up to at least one enhanced service for alcohol, with the difference

between these different groups of practices statistically significant (males: $p < 0.001$; females: $p < 0.001$ for all elements of intervention delivery). To focus on the recorded delivery of brief screening test for alcohol use disorders for example, the data showed that delivery of FAST or AUDIT-C was lowest in practices not signed up to an enhanced service for alcohol (0.097% males (95% CI: 0.06-0.16) / 0.01% females (95% CI: 0.00-0.03)); was significantly higher in practices signed up to both the local and national schemes (3.73% males (95% CI: 3.48-3.99), 3.40% females (95% CI: 3.17-3.64)); and was marginally higher still in practices signed up to the national scheme only (3.58% males (95% CI: 3.29-3.90), 4.24% females (95% CI: 3.93-4.58)).

This trend was also reflected in the qualitative data, with GP interviewees working in practices signed up to an enhanced service reporting that financial incentives were key stimulants of coding activity connected to the delivery of screening and brief alcohol interventions. This positive relationship was supported by the development and implementation of electronic coding templates within practices, which served to prompt the more systematic, accurate and consistent Read coding of interventions, either as embedded within standard processes for registering new patients and for the management of chronic conditions, or as stand-alone screening and brief alcohol intervention templates. The positive impact of tailored computer templates on the delivery and recording of screening and brief alcohol intervention was also highlighted in Hamilton et al's research on financial incentives for targeted alcohol work in primary care (245).

Financial incentives also emerged as a strong positive influencer of coding activity in several studies analysed as part of the systematic review of previous literature in this field, which demonstrated clinicians' keen awareness of the importance of evidencing progress towards primary health care targets (553, 554, 558). At the same time, however, a strong implication of the interviews was that whilst financial incentives increased the recording of intervention activity at overall practice level, this did not necessarily equate to an increase in recorded screening and brief alcohol intervention activity at individual clinician level. In particular, the qualitative findings would suggest that nurses and healthcare assistants were mostly responsible for the delivery and coding of alcohol use disorder screening tests in primary care. Indeed, there were multiple accounts in support of this hypothesis, with interviewees reporting that

nursing staff were more likely to both deliver, and in turn record, alcohol screening activity compared to GPs.

Second, the high number of potential alcohol-related Read codes served to undermine the accurate and consistent recording of intervention activity in primary care. Several GP interviewees emphasised the difficulty of locating the correct Read code in everyday practice, and in particular, participants commented that they found it challenging and time-consuming to navigate the sheer volume of potential codes. Moreover, the existence of multiple possible Read code options appeared to undermine GPs' confidence to select the correct code, which in turn resulted in a tendency to avoid formalising care through coding entirely and to instead rely on narrative free text to record more ambiguous elements of the patient consultation. Again, this practice confirmed the findings of the systematic review, and in particular, Lusignan's 2003 research (558), which highlighted primary care clinicians' propensity to free text where doubt existed in relation to coding.

In addition, the results of the case study practice analysis highlighted the existence of 287 Read codes in the system for the recording of alcohol-related activity in primary care. However, it determined that only a small minority of these codes were in regular use (13.94%, n = 40), and that these generally related to the identification, treatment and management of alcohol use disorders. Further, and significantly, whilst many unused Read Codes were associated with relatively rare alcohol-related conditions, a significant number related to duplicate, outmoded and unhelpful drinking terminology. The continued availability of such outmoded alcohol-use terminology to GPs is highly problematic. Whilst recent research suggests that evidence that alcohol involvement can be considered in both categorical and continuous terms (662), it remains the case that clear, accurate definitions of medical conditions and disorders are important for both research and clinical practice. Crucially, the use of evidence-based and unambiguous terminology in relation to the classification of an individuals drinking status serves to reduce heterogeneity in the diagnostic category so that more can be learned about treatment response (663, 664), and also reduces the potential for stigma, an issue which is recognised as a key barrier to the delivery of alcohol interventions in primary health care (191, 194-196).

Third, Read codes relating to patient alcohol consumption (136.0) were used far more frequently than codes relating to the delivery of an alcohol screening tool (such as 388u for FAST or 9k17 for AUDIT-C) across all practices. Indeed all practices captured relatively large quantities of data on patients' alcohol consumption, whilst recorded rates of screening and brief alcohol intervention delivery were comparatively low. The findings from both the systematic literature review and analysis of GP interviews helped provide further insight as to the possible reasons behind this trend. Interview data suggested that GPs prioritised the coding of the presenting 'problem', in addition to any formal diagnoses or tests. The importance of ensuring such patient data was captured was learned early during their medical training. However, the design and structure of the Read code system itself served to facilitate the detailing of the quantifiable and essentially biomedical over the more complex and psychosocial information. Thus, when recording screening and brief alcohol interventions, GPs reported that they found it more straightforward (and less ambiguous) to record units of alcohol consumption as opposed to using the standard Read codes associated with the delivery of validated alcohol screening tools, which were viewed as a more flexible, adaptive and thus ultimately more contestable measure of alcohol use. This finding reflects previous research examining GPs' use of alcohol disorder screening tools in routine practice, demonstrating their strong preference for asking quantity–frequency questions as opposed to using self-report screening questionnaires (188, 658).

In addition, although many interviewees highlighted the excessive number of codes as a barrier to accurate coding, it was also clear that in many instances the Read code lexicon lacked application to some common general practice situations. For example, many interviewees reported finding unexplained or developing conditions particularly challenging to Read code. A number of GPs emphasised the value of contextual data as part of summing up the background factors impacting on an individual patient's relationship with alcohol. However, there was a shared sense of inadequacy around the existing Read code system, meaning that such information was most likely to be entered in free-text form as opposed to being formally coded. The key advantage of structured data, however, is the potential it offers for simplicity and consistency, and thus enhanced accessibility of the resultant information. Importantly, coded data facilitates the "simple" representation of often complex information, that allows it to

be processed within the general practice system (263). Further, in selecting the most appropriate code, clinicians generally use a list of options, potentially via the use of a keyword search, or through the use of a standardised data template. Thus, coded data also perform a vital function in helping to rationalise the multiple ways in which clinical concepts can be represented in healthcare.

7.2.2 Explaining discordance and 'filling in the gaps'

Whilst there were several common themes across the research, there were some notable areas of dissonance across the data, including a number of divergent cases where the quantitative data contradicted the general trend, and where the qualitative results were probed in order to help explain the discrepancy.

At an aggregated level, there was a strong association between practices that were in receipt of financial incentives for alcohol-related activity, and higher recorded rates of delivery of alcohol screening tests. However, this relationship was by no means consistent. For example, focussing first on the delivery and recording of screening activity, both NOTW3 and some of the practices based in the South of Tyne and Wear area were paid to screen newly registered patients for risky drinking, but in fact demonstrated recorded rates of delivery that placed them in the lowest quartile in comparison to the rest of the sample. Several practical factors could potentially explain such discord in the data. For example, the rates of delivery were based on the number of occasions on which practitioners recorded their provision of an alcohol screening test using a pre-specified Read code. Therefore, if they had delivered the test but either failed to record the activity, or indeed, had used an alternative Read code (such as a practice-specific code); the analysis would not have picked this up.

The qualitative data also suggested that the GPs in these practices tended to describe themselves as employing a relatively unstructured approach to screening. In addition, the same GPs verbalised a clear preference for using unit alcohol consumption as a preliminary assessment tool for possible risky drinking in their day-to-day practice. This is problematic for a range of reasons. For example, evidence suggests patients both struggle to translate standard drink measures into their actual consumption reports; and that they may actually underestimate their overall consumption regardless (188, 189). In addition, a review by Mitchell et al of the clinical recognition and recording of

alcohol disorders by clinicians in primary and secondary care served to highlight the considerable difficulty healthcare practitioners experience in identifying problem drinking in clinical practice via informal means. The meta-analysis conducted as part of their review determined that by using clinical judgement as opposed to validated screening tools, primary care physicians only identified about four in ten of attendees with an alcohol use disorder, and that their medical records were accurate in less than three out of ten cases (658).

A logical response to this gap between desired and actual practice would presumably involve further education around the added-value of screening using the AUDIT tool or comparable. It is interesting to note, however, that a number of the GPs in practices receiving financial incentives recorded relatively low rates of screening activity. These individuals portrayed themselves as trained, experienced and knowledgeable in screening and brief alcohol interventions, implying that the barrier was less to do with awareness or expertise, and potentially more to do with the socio-cultural, interactional and attitudinal factors that influence their delivery (190-192). These include: continued scepticism in relation to the universal efficacy of alcohol interventions (192-194); the perception of alcohol as a sensitive and stigmatising discussion subject (191, 194-196); and the impact that practitioners' own drinking practices may have on intervention delivery (186).

Next, looking at the association between higher recorded rates of brief alcohol intervention delivery, again, this was by no means a consistent relationship. Whilst the accounts of single GPs cannot of course represent the entirety of views and experiences of a complete practice, it was nevertheless clear that practices in which recorded rates of delivery of alcohol interventions were low (i.e. placed them in the lowest quartile) reported both a much less structured approach to the delivery of alcohol interventions, alongside a verbalised lack of awareness as to whether certain Read codes were more or less appropriate to use. Conversely, despite not being signed up to an enhanced service scheme, and expressing some cynicism around the effectiveness of brief alcohol interventions themselves, some GP recording comparatively higher delivery rates, reported that they had benefitted from previous training, which explained their more consistent approaches. Further, GPs in the practices reporting the highest recorded rates of delivery were experienced and

interested in, and often displayed a positive orientation towards, alcohol-interventions (NOTW9 and SOTW1).

Finally, it was also evident that the design of the enhanced service for alcohol, and in particular the national scheme, served to prioritise the collection of certain elements of data relating to screening and brief alcohol intervention over others. Specifically, interviews with GP representatives of the participating practices implied that as payments for the national scheme were made on the basis of the number of screening tests coded as opposed to the subsequent delivery (and coding) of brief alcohol interventions resulting from a patient's screening test score. Thus the recording of intervention activity was far less systematised than case finding work. This echoes the findings of research by Coleman et al, which found that whilst the recording of smoking status increased dramatically in 2003-04 following the introduction of financial incentives, there was no comparable rise in nicotine addiction treatment prescriptions from 2003 (554), as notably, such treatment is not incentivised under Quality and Outcomes Framework (351).

In the current study, whilst aggregate rates of brief alcohol intervention delivery were fairly comparable between groups of practices signed up to both national and local enhanced services , and those signed up to the national scheme only, this trend masks substantial variation at individual practice level. For example, NOTW3 and NOTW8 demonstrated recorded rates of intervention delivery in the lowest quartile, despite both practices being signed up to the national enhanced service scheme. In addition, a further practice in the North of Tyne area (NOTW4) did not record any such intervention activity during the surveyed time period, despite being signed up to the national enhanced service for alcohol.

7.3 Interpretation of the findings

With robust evidence supporting the effectiveness of screening and brief alcohol intervention in primary health care at reducing harmful level drinking (158-176), recent years have witnessed a justifiable focus by UK policy makers on encouraging their routine delivery, in particular, via the introduction of financial incentives (231, 232, 238). In assessing the impact of these policy endorsements for brief alcohol interventions on their successful implementation, electronic GP Read codes arguably

represent a comprehensive, cost-effective and unobtrusive source of data, that is available on large numbers of patients and across multiple general practice settings (188, 254, 275). This is particularly the case when compared with direct observation or the introduction of behavioural measures, both of which are complex and costly to use (274) and introduce the possibility of the 'Hawthorne Effect' (278), whereby the act of participating in research can influence clinical practice. This doctoral study has sought to determine the extent to which this data might provide a valid measure of alcohol screening and brief intervention delivery by examining both the trends evident in the alcohol-related Read code data extracted from GP practices in the North East of England, alongside clinicians' own perspectives on, and experiences of, using such data in their day-to-day work.

At face-value at least, the Read code data analysed as part of this research would suggest that such policy initiatives have been successful in encouraging an increased focus on the identification and addressing of risky drinking in UK primary care in recent years. Participating practices in receipt of financial incentives to support the delivery of screening and brief alcohol interventions recorded higher rates than those not paid to do so. In addition, this trend was also reflected in the qualitative data analysis, with GP interviewees working in practices signed up to an enhanced service reporting that financial incentives were key stimulants of coding activity connected to the delivery of screening and brief alcohol interventions. Further, across all practices, relatively large quantities of data on patients' alcohol consumption were captured, reflecting findings from other studies highlighting GPs' preference for unit consumption over the use of validated screening questionnaires (188). The disadvantages of using consumption as a means of detecting risky drinking have been stressed, however it does potentially evidence increased alcohol-related activity in a general sense in primary health care.

However, the validity of the trends summarised above are dependent on the quality of the data on which they are based. In this respect, it is important to remind ourselves that previous research confirms such data is frequently lacking in some essential dimensions of quality – completeness, correctness (or accuracy), currency (or timeliness) and relevancy (285) – for a whole host of logistical, technical and interpersonal reasons (92, 187, 190, 202, 256, 263, 274, 288, 289, 292-298). To return to the overarching research question – whether GP Read code data can help evaluate

the implementation of screening and brief alcohol intervention in primary health care – it would seem appropriate therefore to begin with an exploration of the extent to which the findings suggest alcohol-related Read codes represent an acceptable 'quality' measure based on these four key dimensions. This section also considers some of the issues related to the approach employed for the extraction and analysis of the alcohol-related Read code data in this thesis that also influences interpretation of the results.

7.3.1 Dimension 1: The completeness of screening and brief alcohol intervention Read code data

First, can we consider GP alcohol intervention Read code data as 'complete'? As already discussed, this would require us to have a degree of confidence that every real world instance of the delivery of screening and / or brief alcohol interventions had been recorded by the participating general practices. On this issue, the available evidence was indicative of a fairly clear divide between the completeness of screening data, and that of brief intervention data. The analysis of Read code data itself suggested relatively significant quantities of screening data was captured at practice level, particularly in those practices incentivised for their delivery. Given that the interview data implied that nursing staff were mainly responsible for the delivery of screening tests in primary health care, and that clinicians felt they were recording this activity on a reasonably consistent basis, the implication would seem to be that available screening Read code data is relatively complete, if admittedly, still representing a fairly low level of patient coverage.

In contrast, as GPs were generally more responsible for carrying out brief alcohol interventions, and less likely to record such activity using formal Read codes, one could conclude that the recorded rates of interventions under-reported true levels of activity within the surveyed practices. A number of factors appeared to contribute to this likely under-reporting. Some concerned the design and structure of the Read code system. For example, a lack of confidence and / or awareness around selecting the correct Read code (from numerous competing alternatives) which in turn often resulted in free-texting of intervention activities as opposed standardised coding. In addition, a perceived lack of available Read codes to record psycho-social aspects of intervention activity also appeared to give rise to under-reporting. This echoes previous research by

Strange and by Hrisos et al which suggests that the completeness of medical records is highly interrelated with the type of clinical activity being recorded (288), and that counselling services, including alcohol counselling, were less like to be recorded than more easily quantifiable activities such as tests and diagnoses (274). However, both the design of the enhanced service for alcohol, alongside its position within the wider pay-for-performance delivery context, also influenced GPs' recording behaviour. Crucially of course, as practices were primarily incentivised to record screening behaviour, as opposed to brief interventions, there was no tangible benefit for practitioners to codify the latter activity. Yet what further compounded the under-prioritisation of recording intervention data was the relatively weak position of enhanced services for alcohol in comparison to the activities financed through the more lucrative quality and outcomes framework.

In addition, for many GPs, the more structured, formalised intervention approach associated with the enhanced service for alcohol was not seen as delivering a significant advantage over their existing more ad hoc and (perceivably) more bespoke (or patient centred) approach to alcohol-related discussions with patients. Alternatively, GPs based in those practices not in receipt of financial incentives but demonstrating relatively high recorded rates of delivery, described themselves as more positively disposed toward alcohol interventions, or had worked in the past with identified 'local champions' in field. The sum effect of these factors illustrates some of the complexity inherent in the successful implementation of improvement initiatives in primary care practice. Designated funding streams may encourage change, but as both Rogers and subsequently Greenhalgh and others have emphasised, it is also vital that the characteristics of the change itself deliver unambiguous benefits to the practitioners responsible for its delivery, in both financial and clinical terms (214, 216, 217). Otherwise, expert opinion leaders may in fact stimulate higher rates of take-up than those achieved by incentives (225, 226).

7.3.2 Dimension 2: The accuracy of recorded alcohol intervention data

Next, there is the question of data *correctness* or accuracy: first, whether we can say that the alcohol intervention-related information contained in routine medical records is 'true' (i.e. does it represent actual events), and second, whether the data itself has been recorded correctly (i.e. were appropriate Read codes used).

In relation to the first element of correctness, and given the strong evidence for the distorting effect of financial incentives on coding practice (295-297), it was of particular interest to explore whether 'gaming' behaviour impacted on the accuracy of screening and brief intervention data as proxy measures of treatment. However, despite the potential financial benefits that might have been associated with recording additional instances of screening delivery, this study did not identify any examples of deliberate erroneous coding on the part of GPs. In reality, GP screening and intervention activity appeared, if anything, to be routinely under-reported. Thus, one implication of the findings may be that there is little evidence to suggest that the practices engaged in this particular study were deliberately 'gaming' the system to boost practice income derived from screening and brief alcohol intervention activity. Or to put it another way, one could be reasonably confident that when GPs recorded a brief alcohol intervention Read code, they believed it represented their actual delivery of such an intervention.

However, looking at the second element of correctness, the qualitative data in particular would strongly imply that for GPs in particular, low awareness of the correct screening and brief alcohol intervention Read codes, combined with some resistance to the use of electronic templates, potentially leads to their inaccurate coding on a fairly widespread basis. Indeed, for many GPs, the detection and selection of the appropriate code emerged as a 'wildcard' process, with clinicians reliant on using the keyword search facility of their clinical IT system to locate a suitable code. Importantly, this 'wildcard' approach seemed evident across GPs from different types of practices, irrespective of their Enhanced Service status.

7.3.3 Dimension 3: The currency and accessibility of alcohol screening and intervention data

Third, the need for data to be current, which also implies accessibility, is also a key consideration of quality. In theory, the introduction of electronic Read code templates to support the delivery and coding of screening and brief alcohol intervention should be supporting the capture of more timely and accessible data in general practice settings. Indeed, a key reported advantage of pay-for-performance in primary care has generally been its positive impact on computerised records, particularly via the use of templates (293, 352).

In this respect, the major concern arising from this study relates to GPs' tendency to free text brief alcohol interventions in particular, rather than using structured Read code data. Use of free text, combined with inconsistent coding and the use of practice-based codes, reduced the extent to which screening and brief alcohol intervention data was accessible to this study, and of course to policy evaluators or practitioners themselves. Some GPs appeared resistant to using Read code templates, articulating such mechanisms as restrictive and counter-cultural. This is a key finding which confirms previous research illustrating the socially, behaviourally and techno-structurally situated nature of information technology adoption in general practice (575, 578), and in particular Swinglehurst et al's ethnographic case study of disease template use (661). Thus, for GPs, alcohol templates are not simply organised around alcohol use disorders, but around a particular version of those disorders, reflecting the assumptions and requirements of those designing the template (661). As such, the quantifiable (and essentially auditable) takes primacy, as a finite measure of care delivery for the purposes of financial reimbursement, with the contextual narrative detail unaccounted for, or rather absorbed within the back screen recording process of free-text.

7.3.4 Dimension 4: The relevancy of screening and brief alcohol intervention Read code data

Fourth, and arguably underpinning all three dimensions of data quality discussed above, is the need for relevancy. That is, GPs and their practice teams are most likely to record information if they believe it to be important or relevant to a given situation or context at the time of recording. In this sense, a strong theme from both the qualitative and systematic review phases of this research was the manner in which the primary motivators of continuity of care and a 'patient-centred' consultation appeared to result in increasingly disconnected if not outright conflicting heuristics for clinicians where alcohol recording was concerned (665, 666), with accurate Read coding seen as crucial for auditing purposes, but free text narrative more important where the patient-clinician encounter was concerned. This tension has been described by some authors as a *"rational-reality gap"* (667) and by Swinglehurst et al as requiring clinicians to maintain a *"dual orientation"* towards coding (661).

There are some strong parallels between the conflicting relationship evident in GPs' recording of screening and brief alcohol interventions, and those previously observed between the extrinsic motivational factors used to encourage improvements in care, and the individual clinician's intrinsic motivation to perform a task for its own sake (236, 417, 418). Thus, in the same way that management by incentives can neglect or 'crowd out' key elements of care (such as emotion, morality and trust (419)) in favour of their achievement of population-based service goals (393, 420, 421, 423), so the recording system de-values (or even disallows) the coding of such associated psychosocial activity by clinicians, despite the fact that often appears to be the very activity they find most relevant to patient care and professional practice.

However, whilst this dual orientation (661) could undoubtedly create an uncomfortable delivery and recording context for primary care physicians, this study suggests that its impact on the actual care delivered may be less acute. From the narrative free-texting of alcohol intervention activity, to the persistent use of alcohol consumption data as a screening measure, there were numerous examples of GPs purposefully subverting the screening and brief alcohol intervention process to allow their routine practice to more closely align with their preferred 'patient-centred' approach. Instead, the routine 'tick-box' elements of alcohol-related care, and in particular the delivery and recording of screening tests, were devolved to nursing staff or healthcare assistants. In this sense, the implementation of the enhanced service for alcohol in the UK, both in terms of its care pathway, the incentive design, and the underlying Read code system, rather than transforming practice, has potentially only served to reconstruct traditional *"hierarchies of appropriateness"* (429).

7.3.5 Approach to the extraction and analysis of alcohol-related Read code data in this thesis

Read codes

There were some limitations in the way that I dealt with Read codes in this thesis. In addition to the original wording thought to best describe the concept at the time the code was developed (the 'preferred term'), Read codes have an additional 2-byte term (the 'term code') that can extend their meaning or provide alternative ways of describing the same concept. However it does not constitute the main body of the Read Code and should therefore be considered alternative as opposed to additional to

the original preferred term. For example, the Read code 1361 represents 'Teetotaller', whereas the Read codes 1361-1 and 1361-2 both represent 'Non-drinker alcohol' through the additional '-1' and '-2' term codes. As I included both preferred and synonymous codes, my precise statement of the number of alcohol-related Read codes may have inconsistently dealt with term codes, and would not apply to both Version 2 5-byte and Ctv3.

Ontologies

There has been a long-standing use of controlled terminologies (such as Read codes) in healthcare to enable physicians to store and communicate general medical knowledge and patient-related information more efficiently (668). However, as such terminologies are by definition, generally optimised for the purposes of human processing, they are characterized by a significant amount of implicit knowledge, which limits their interoperability across different technological systems and health contexts. The construction of medical domain ontologies for representing such medical terminology helps facilitate more interoperable information systems (669), and the more efficient automation of guideline-based healthcare (670). Domain ontologies describe detailed concepts and their relationships in a clear and unambiguous way (671, 672), and are thus linked closely to the Semantic Web movement, *"in which information is given well-defined meaning, better enabling computers and people to work in cooperation*" (673).

In processing the alcohol Read code data that formed the basis of this doctoral research (and in the absence of a standardized ontological framework for classifying, evaluating and linking such data) I formed a number of informal ontologies which grouped together (or clustered) related clinical codes into meaningful categories. For example, codes relating to the administration of an alcohol use disorder screening test or for the delivery of a brief preventative intervention, were grouped together to explore instances of duplication or redundancy in the overall screening and brief alcohol intervention Read code lexicon. Given the limitations in the treatment of Read codes identified above, however, there is a clear need to further develop these informal ontologies in the future, utilising more robust devices such as the Web Ontology Language (OWL) (a family of knowledge representation languages for authoring ontologies (674)) and Protégé (a free, open-source platform that provides a

suite of tools to construct domain models and knowledge-based applications with ontologies (675)).

Codifying context

Drawing on the issues outlined above in the sections on data completeness, correctness, currency and relevancy (7.3.1-4), there may also be scope to codify the context in which clinical coding does, or does not take place. Some data quality initiatives introduced in areas such as heart disease, diabetes, depression and chronic kidney disease have resulted in higher quality coding better reflecting clinical care (568). In other areas such as child safeguarding, this has proved more challenging (565, 676). Findings from this research may be used to support improved understanding of which contextual factors connected to the delivery and Read coding of alcohol-related activity are currently promoting or inhibiting the capture of good quality routine data.

7.4 Strengths and limitations of the research

The strengths and limitations of the individual phases of this study have already been considered in the respective results chapters (4, 5 and 6). This section, therefore, focusses on the strengths of the overarching mixed-methods research design, at the same time as considering both the limitations inherent to this approach, as well as reflecting on the possible implications of some of the logistical challenges experienced during the conduct of the study.

First and foremost, employing a mixed-methods approach to the issue of whether routine data can help evaluate the implementation of screening and brief alcohol interventions in primary health care provided a novel means of answering this important research question. The systematic integration of data from three inter-related research components has delivered a richer, more nuanced and contextualised response to the question of 'usefulness' (472), which is arguably more relevant to such a complex (or 'wicked') public health issue (467, 474). Further, the sequential design ensured that the findings from one research phase informed the next at a variety of levels and importantly, this study sought to achieve transparency in relation to the approach to data integration, in contrast to some previous research (479). Second, the use of multiple methods also helped address some weaknesses of the individual method study components. For example, the 'silences' evident in the aggregated Read

code data (low recorded rates of intervention delivery in particular) would have remained unexplained without the benefit offered by the GP interviews to explore the reasons behind these statistical trends. At the same time, the quantitative analysis of GP Read code data has provided invaluable indicators of the association between key variables of interest and rates of screening and brief alcohol intervention recording, which would not have been possible with purely qualitative methods (461).

There are of course some limitations to this approach which must also be considered. Importantly, it needs to be acknowledged that mixed-methods research, whilst increasingly popular, remains controversial, with some arguing there is a fundamental paradigmatic conflict between quantitative and qualitative approaches (475). Clearly, by using mixed-methods, and for all the reasons outlined above and in Chapter 3, this suggestion of incommensurability between the epistemological and ontological assumptions of alternative methods is strongly resisted. Again, critical realism is proposed as providing a sound theoretical justification to the selection of the various methods employed. Thus, the different methods were selected for their potential to access the different structures, experiences and events shaping the recording of alcohol-related data in routine primary care practice (492). This is not to say that the actual delivery of this mixed-methods doctoral study was without its challenges. In particular, the execution of the equal-weight sequential explanatory mixed-methods design was both time-consuming, and highly demanding in terms of the contrasting specialist skills required by the single researcher responsible.

7.5 Recommendations

The findings of this doctoral research have several important implications for policy and practice relating to the implementation and subsequent evaluation of screening and brief alcohol interventions in routine primary health care in the UK.

7.5.1 Fostering a GP-friendly approach to screening and brief alcohol interventions

Whilst GPs appear to demonstrate increased awareness of the key role they play in helping to reduce the harmful effects of risky drinking within the wider primary health care system, their adoption and delivery of the associated intervention tools and techniques remains somewhat piecemeal. This study suggests two important areas for future work.

First, there is a clear demand for improved GP education around the limitations and challenges associated with using unit alcohol consumption as a means of assessing a patient's level of risk, alongside a reiteration of the practical, clinical and scientific benefits of using validated screening tests instead. One key interpretation of this research is that GPs feel more comfortable with assessing patients using a single score in response to a single question that is more tangibly linked to the quantity of alcohol consumed, however there are well-established limitations of using alcohol consumption as the sole means of identifying risky drinking (188, 189, 658). As such, whilst acknowledging the superiority of the full AUDIT and its associated briefer versions as a highly sensitive and specific means of case-identification in primary health care (121, 129, 143, 144), there may also be a case for encouraging the more systematised use of the Single Alcohol Screening Questionnaire (149) by GPs as a pre-screening tool to quickly filter out negative cases (677, 678).

Second, many GPs articulated their resistance to overly formalised, prescriptive interventions, preferring instead what they considered to be a more adaptive and patient-centred approach. Of course, in reality, there may be little difference between the intervention approach GPs imagine they are resisting, and the ones they actually deliver. As highlighted previously, brief intervention is an umbrella term, representing a wide variety of lengths and styles of activity (68, 177). Whilst there remain some knowledge gaps around the essential 'active' ingredients of brief interventions, recent research would suggest that the provision of simple feedback and written information about alcohol may be enough to stimulate behaviour change (679). Thus, the key message for clinicians could well be that so long as they incorporate those elements within their otherwise tailored interventions, they should be effective at supporting patients to reduce their risk related to alcohol.

7.5.2 Improving the design of the alcohol-related GP Read code system

Next, the findings of this study also have profound consequences for the design, structure and implementation of the GP Read code system and the tools supporting its use by primary health care staff. Certain improvements are crucial in order to both make alcohol-related Read codes more usable and meaningful for clinicians, and in turn, to enhance their value as evaluation data for policy makers and service commissioners.

First, 287 Read codes seems to be an excessive number of recording options for busy clinicians, and this study has confirmed the findings of previous research in this area that the volume of potential codes has a detrimental effect on GP coding practices. Given this study has also demonstrated the high degree of duplication of alcohol-related Read codes, and the existence of numerous out-dated codes, there must surely be a strong case for the immediate retirement of inappropriate Read codes, combined with some serious pruning and rationalisation of surplus coding to facilitate more confident, accurate and meaningful recording of alcohol intervention activity in the future. At the same time, it is also clear that GPs are consistently employing free-text data to capture some of the more complex, psychosocial narrative around alcohol interventions because the current Read code system is not fit for purpose. Thus, whilst it is important to streamline the overall coding lexicon, there is also a need to consider the introduction of additional Read codes to support the recording of social, familial and historical factors related to a patient's alcohol status, at the same time as exploring the potential for the enhanced, more systemised utilisation of free text data (680), which to date remains challenging (681).

In addition, whilst electronic templates appear to support more systematic Read coding of alcohol screening test delivery by nursing staff, in their current format at least, they sit uneasily with the way in which GPs conceptualise their role as clinicians, their preferred use of IT in patient consultations, and their approach to intervention delivery per se. Given their potential to improve the quality of GP brief alcohol intervention data however, system designers should be encouraged to work more closely with clinicians in designing Read code templates that are more sympathetic to their preferred way of working, and importantly, maintain their desired focus on patient-centred care (661).

7.5.3 Re-thinking the role of enhanced services in stimulating alcohol activity

Finally, there was a strong implication that whilst financial incentives drive practice, and in turn coding, where GPs are concerned at least, not all incentive schemes are created equal. In terms of both prioritising delivery, and in turn, the Read coding of clinical activity, GPs are keenly aware of the fundamental role of activity incentivised via the quality and outcomes framework to practice income. As result, despite often good intentions, and set within the pressured context of routine primary health care,

enhanced service activities slip to the bottom of the pile against the more lucrative QOF areas of practice. This is of course despite the fact that in England, almost a quarter of men and around one in five women continue to drink above recommended levels (or around a third of adults in the North East of England) (62), whereas three quarters of the population do not have any of the diseases listed in the quality and outcomes framework (413).

Given the radical reduction to the number of clinical indicators covered by the forthcoming 2014/15 QOF(682), the inclusion of screening and brief alcohol interventions in future iterations of the scheme would appear unlikely. However, if policy makers and local commissioners are serious about encouraging GPs and other primary health care staff to routinely deliver screening and brief alcohol interventions, this research would lend additional support to existing calls for a more sustainable approach to the funding of alcohol prevention activities.

7.6 Areas for future research

This study focused on the part played by UK GPs in the delivery and recording of screening and brief alcohol interventions. However, findings from both this investigation, and previous research in the field, have highlighted the key role of nurses and receptionists (202, 683, 684), practice managers and increasingly healthcare assistants, within these processes. Indeed in some cases, these individuals may have been leading the implementation of comprehensive alcohol screening initiatives in practices. Further research to explore their motivations and approaches toward recording such screening activity would arguably generate a fuller understanding of the usefulness of alcohol Read code data in its entirety. In addition, as already acknowledged earlier in this chapter, the accounts of single GPs cannot represent the entirety of views and experiences of a complete practice.

Next, there were some areas of discord between the results from individual study phases that also suggest further research would be useful. For example, as the rates of delivery were based on the number of occasions on which practitioners recorded their provision of an alcohol screening test using a pre-specified Read code, if they had delivered the test but used an alternative Read code (such as a practice-specific code), the analysis would not have picked this up. Further interrogation of practice IT systems

using a wider set of GP Read code queries would potentially help to identify some possible 'missing' cases of screening activity.

In addition, the variation identified in the recorded rates of alcohol interventions at individual practice level was only partially explained by the interview findings, and the qualitative data implied that interventions were under-reported in general. Future research could potentially employ alternative methods, such as the video-taping of consultation activity and the examination of intervention-related narrative free-text data, to facilitate increased understanding of the GPs' approach to addressing risky drinking in routine practice. The systematic review conducted by Mitchell et al on clinical recognition and recording of alcohol disorders by clinicians in primary care found that studies which had videotaped or observed consultations determined that alcohol-related discussions were often superficial and yielded little information regarding patients' drinking practices (658). However, none of the studies covered were based in the UK, and the most recent was published in 1997 (685-687).

Finally, this study has served to underline the continued challenges associated with using routine Read code data to evaluate the implementation of screening and brief alcohol interventions in primary health care, despite their numerous advantages over alternative means of assessment, such as direct observation or the introduction of behavioural measures (274, 278). The recommendations made in the previous section highlighted the need for: sympathetic coding templates to facilitate more seamless intervention data capture; the rationalisation of the existing alcohol-related Read code system; and the introduction of mechanisms to support more systematic free-text data mining in order to enhance their usefulness as an information source. However, such improvements will require further research to advance our understanding of these evolving areas of health informatics, and to enable the development of implementation strategies that incorporate more meaningful mechanisms of ongoing evaluation and feedback in the future.

7.7 Concluding remarks

This concluding chapter has presented the main findings from a mixed-methods investigation into the question of whether routinely collected data can help evaluate the implementation of screening and brief alcohol interventions in primary health

care. It has determined that the quality of the available alcohol Read code data is deficient across a number of key dimensions of quality. Overall, the data is suggestive of a degree of success in the various policy initiatives introduced in recent years to stimulate increased alcohol prevention activity in UK primary health care, and in particular, the use of financial incentives. However, the question of the adequacy of the available Read code data to support the evaluation of screening and brief alcohol intervention activity delivered by the practices participating in this study arguably goes well beyond the utility of the current GP Read code system. The findings from this research have served to highlight some deeper, structural factors that shape GPs delivery and recording of interventions that also warrant further consideration in developing more appropriate evaluation measures in the future.

Appendices

Appendix A: Systematic review search terms

CONCEPT	MEDLINE*	EMBASE*	PsycINFO*	SCOPUS* / OTHER DATABASES
Participants	Physician/ **Keywords:** doctor$; "medical practitioner$"; GP$; pediatrician$; obstetrician$; "medical personnel; clinician$".	Physician/ **Key words:** GP$; Pediatrician$; Obstetrician$; "Medical personnel"; Clinician$; "General Practitioner$"; "Family Physician$"; "Primary Care Physician$".	Physicians/ **Keywords:** GP$; "Medical Practitioner$"; Clinician$; "Primary Care Physician$".	**Keywords:** "associate physician*"; clinician*; doctor*; "family physician*"; "general Practitioner*"; GP*; gynaecologist*; "medical doctor*"; "medical personnel"; "medical practitioner*"; obstetrician*; "occupational health physician*"; paediatrician*; physician*; "primary care physician*".
Focus of study	Attitude/; Health Services Administration/; Quality of Health Care/ **Keywords:** "clinical audit$"; "health care economic$"; "health care policy"; "Health Care Service$"; "program$ evaluation$"; "process assessment$"; "health care quality"; "health care evaluation$"; "clinical governance"; "quality indicator$"; "case management"; "health care delivery".	Health Personnel Attitude/; Health Care Quality/ **Keywords:** "patient care management"; quality of health care"; "attitude to computer$"; "computer attitude$"; "case management"; "health care delivery"; "clinical audit$".	Health Personnel Attitudes/; Health Care Administration/ **Keywords:** "computer attitude$"; "health attitude$"; "attitude to computer$"; "computer attitude$"; "attitude to health"; "health care quality"; "quality of health care"; "health care evaluation"; "patient care management".	**Keywords: "**attitude* of health personnel"; "attitude* to computer*"; "attitude* to health"; "case management"; "clinical audit*"; "clinical governance"; "computer attitude*"; "health care delivery"; "health care economic*"; *health care evaluation*; *health care personnel attitude*"; "health care policy"; "health care service*"; "health service* research*; "healthcare evaluation"; "organisation and administration"; "patient care management"; "process assessment$"; "program evaluation"; "quality assurance"; "quality indicator*"; "quality of care research"; "quality of health care"; "health care quality".
***Health Records**	Medical records/ **Key words:** electronic health record$; forms and record$ control; medical data storage; medical record$; medical transcription$; patient record$; data processing; patient history; medical archive$; "read code$"; "read coding".	Medical Record/ Read Coding/ **Keywords:** "read code$"	Medical Records/ **Keywords:** "electronic health record$"; "forms and record$ control"; "medical data storage"; "medical record$"; "medical transcription$"; "patient record$"; "medical record linkage"; "medical record$ system$", computerized"; "health record$"; "medical archive$"; "read code$"; "read coding".	Record*; "read code*"; "read coding"; "physician* practice pattern*"; "client record*"; "data collection"; "data processing"; record*; "electronic health record*"; "form* and record* control"; "health record*"; "hospital administration"; "hospital record"; "medical archive"; "medical data storage"; "medical record linkage"; "medical record*"; "medical transcription*"; "patient history"; "patient record".

*MeSH, EMTREE, APA Thesaurus subject headings are presented underlined/

Appendix B: Quality assessment tool for quantitative data

QUALITY ASSESSMENT TOOL FOR QUANTITATIVE STUDIES

COMPONENT RATINGS

A) SELECTION BIAS

(Q1) Are the individuals selected to participate in the study likely to be representative of the target population?

1 Very likely
2 Somewhat likely
3 Not likely
4 Can't tell

(Q2) What percentage of selected individuals agreed to participate?

1 80 - 100% agreement
2 60 – 79% agreement
3 less than 60% agreement
4 Not applicable
5 Can't tell

RATE THIS SECTION	STRONG	MODERATE	WEAK
See dictionary	1	2	3

B) STUDY DESIGN

Indicate the study design

1 Randomized controlled trial
2 Controlled clinical trial
3 Cohort analytic (two group pre + post)
4 Case-control
5 Cohort (one group pre + post (before and after))
6 Interrupted time series
7 Other specify _____
8 Can't tell

Was the study described as randomized? If NO, go to Component C.

No Yes

If Yes, was the method of randomization described? (See dictionary)

No Yes

If Yes, was the method appropriate? (See dictionary)

No Yes

RATE THIS SECTION	STRONG	MODERATE	WEAK
See dictionary	1	2	3

1

C) CONFOUNDERS

(Q1) Were there important differences between groups prior to the intervention?

1 Yes
2 No
3 Can't tell

The following are examples of confounders:

1 Race
2 Sex
3 Marital status/family
4 Age
5 SES (income or class)
6 Education
7 Health status
8 Pre-intervention score on outcome measure

(Q2) If yes, indicate the percentage of relevant confounders that were controlled (either in the design (e.g. stratification, matching) or analysis)?

1 80 – 100% (most)
2 60 – 79% (some)
3 Less than 60% (few or none)
4 Can't Tell

RATE THIS SECTION	STRONG	MODERATE	WEAK
See dictionary	1	2	3

D) BLINDING

(Q1) Was (were) the outcome assessor(s) aware of the intervention or exposure status of participants?

1 Yes
2 No
3 Can't tell

(Q2) Were the study participants aware of the research question?

1 Yes
2 No
3 Can't tell

RATE THIS SECTION	STRONG	MODERATE	WEAK
See dictionary	1	2	3

E) DATA COLLECTION METHODS

(Q1) Were data collection tools shown to be valid?

1 Yes
2 No
3 Can't tell

(Q2) Were data collection tools shown to be reliable?

1 Yes
2 No
3 Can't tell

RATE THIS SECTION	STRONG	MODERATE	WEAK
See dictionary	1	2	3

F) WITHDRAWALS AND DROP-OUTS

(Q1) Were withdrawals and drop-outs reported in terms of numbers and/or reasons per group?

1 Yes
2 No
3 Can't tell
4 Not Applicable (i.e. one time surveys or interviews)

(Q2) Indicate the percentage of participants completing the study. (If the percentage differs by groups, record the lowest).

1 80 -100%
2 60 - 79%
3 less than 60%
4 Can't tell
5 Not Applicable (i.e. Retrospective case-control)

RATE THIS SECTION	STRONG	MODERATE	WEAK	
See dictionary	1	2	3	Not Applicable

G) INTERVENTION INTEGRITY

(Q1) What percentage of participants received the allocated intervention or exposure of interest?

1 80 -100%
2 60 - 79%
3 less than 60%
4 Can't tell

(Q2) Was the consistency of the intervention measured?

1 Yes
2 No
3 Can't tell

(Q3) Is it likely that subjects received an unintended intervention (contamination or co-intervention) that may influence the results?

4 Yes
5 No
6 Can't tell

H) ANALYSES

(Q1) Indicate the unit of allocation (circle one)

community organization/institution practice/office individual

(Q2) Indicate the unit of analysis (circle one)

community organization/institution practice/office individual

(Q3) Are the statistical methods appropriate for the study design?

1 Yes
2 No
3 Can't tell

(Q4) Is the analysis performed by intervention allocation status (i.e. intention to treat) rather than the actual intervention received?

1 Yes
2 No
3 Can't tell

GLOBAL RATING

COMPONENT RATINGS
Please transcribe the information from the gray boxes on pages 1-4 onto this page. See dictionary on how to rate this section.

A	**SELECTION BIAS**	**STRONG**	**MODERATE**	**WEAK**	
		1	2	3	
B	**STUDY DESIGN**	**STRONG**	**MODERATE**	**WEAK**	
		1	2	3	
C	**CONFOUNDERS**	**STRONG**	**MODERATE**	**WEAK**	
		1	2	3	
D	**BLINDING**	**STRONG**	**MODERATE**	**WEAK**	
		1	2	3	
E	**DATA COLLECTION METHOD**	**STRONG**	**MODERATE**	**WEAK**	
		1	2	3	
F	**WITHDRAWALS AND DROPOUTS**	**STRONG**	**MODERATE**	**WEAK**	
		1	2	3	Not Applicable

GLOBAL RATING FOR THIS PAPER (circle one):

1	STRONG	(no WEAK ratings)
2	MODERATE	(one WEAK rating)
3	WEAK	(two or more WEAK ratings)

With both reviewers discussing the ratings:

Is there a discrepancy between the two reviewers with respect to the component (A-F) ratings?

No Yes

If yes, indicate the reason for the discrepancy

1	Oversight
2	Differences in interpretation of criteria
3	Differences in interpretation of study

Final decision of both reviewers (circle one):

1	**STRONG**
2	**MODERATE**
3	**WEAK**

Appendix C: Quality assessment tool for qualitative data

Critical Review Form - Qualitative Studies (Version 2.0)

CITATION:

	Comments
STUDY PURPOSE: Was the purpose and/or research question stated clearly? ○ yes ○ no	Outline the purpose of the study and/or research question.
LITERATURE: Was relevant background literature reviewed? ○ yes ○ no	Describe the justification of the need for this study. Was it clear and compelling?
	How does the study apply to your practice and/or to your research question? Is it worth continuing this review?[1]
STUDY DESIGN: What was the design? ○ phenomenology ○ ethnography ○ grounded theory ○ participatory action research ○ other _____	Was the design appropriate for the study question? (i.e., rationale) Explain.

Was a theoretical perspective identified? O yes O no	Describe the theoretical or philosophical perspective for this study e.g., researcher's perspective.
Method(s) used: O participant observation O interviews O document review O focus groups O other _____	Describe the method(s) used to answer the research question. Are the methods congruent with the philosophical underpinnings and purpose?
SAMPLING: Was the process of purposeful selection described? O yes O no	Describe sampling methods used. Was the sampling method appropriate to the study purpose or research question?
Was sampling done until redundancy in data was reached?[2] O yes O no O not addressed	Are the participants described in adequate detail? How is the sample applicable to your practice or research question? Is it worth continuing?
Was informed consent obtained? O yes O no O not addressed	
DATA COLLECTION: **Descriptive Clarity** Clear & complete description of site: O yes O no participants: O yes O no Role of researcher & relationship with participants: O yes O no Identification of assumptions and biases of researcher: O yes O no	Describe the context of the study. Was it sufficient for understanding of the "whole" picture? What was missing and how does that influence your understanding of the research?

Procedural Rigour Procedural rigor was used in data collection strategies? ○ yes ○ no ○ not addressed	Do the researchers provide adequate information about data collection procedures e.g., gaining access to the site, field notes, training data gatherers? Describe any flexibility in the design & data collection methods.
DATA ANALYSES: **Analytical Rigour** Data analyses were inductive? ○ yes ○ no ○ not addressed Findings were consistent with & reflective of data? ○ yes ○ no	Describe method(s) of data analysis. Were the methods appropriate? What were the findings?
Auditability Decision trail developed? ○ yes ○ no ○ not addressed Process of analyzing the data was described adequately? ○ yes ○ no ○ not addressed	Describe the decisions of the researcher re: transformation of data to codes/themes. Outline the rationale given for development of themes.
Theoretical Connections Did a meaningful picture of the phenomenon under study emerge? ○ yes ○ no	How were concepts under study clarified & refined, and relationships made clear? Describe any conceptual frameworks that emerged.

OVERALL RIGOUR Was there evidence of the four components of trustworthiness? Credibility ○ yes ○ no Transferability ○ yes ○ no Dependability ○ yes ○ no Comfirmability ○ yes ○ no	For each of the components of trustworthiness, identify what the researcher used to ensure each. What meaning and relevance does this study have for your practice or research question?
CONCLUSIONS & IMPLICATIONS Conclusions were appropriate given the study findings? ○ yes ○ no The findings contributed to theory development & future OT practice/ research? ○ yes ○ no	What did the study conclude? What were the implications of the findings for occupational therapy (practice & research)? What were the main limitations in the study?

Appendix D: Quality assessment tables

Table D1: Quality of quantitative studies (selection bias, study design, confounders)

CITATION	(A) Selection Bias			(B) Study Design					(C) Confounders		
	Are the individuals selected to participate in the study likely to be representative of the target population?	What % of selected individuals agreed to participate?	Rate section	Indicate the study design	Was the study described as randomised?	Was the method of randomisation described?	Was the method appropriate?	Rate section	Were there important differences between groups prior to the intervention?	If YES, indicate the % of relevant confounders that were controlled?	Rate section
Brown et al (a) (2003) "Randomised crossover trial comparing the performance of Clinical Terms Version 3 and Read Code 5 byte set coding schemes in general practice" and Brown et al (b) (2003) "A methodology for the functional comparison of coding schemes in primary care"	3	4	3	1	Yes	Yes	Yes	1	3	4	3
Campbell et al (2002) "Quality assessment for three common conditions in primary care: validity and reliability of review criteria developed by expert panels for angina, asthma and type 2 diabetes"	1	1	1	7	yes	yes	Yes	3	1	2	2
Carey et al (2009) "Blood pressure recording bias during a period when the Quality and Outcomes Framework was introduced"	1	4	2	7	no	N/A	N/A	3	3	n/a	3
Coleman et al (2007) Distributing questionnaires about smoking to patients: impact on general practitioners' recording of stop--smoking advice	4	4	3	3	No	N/A	N/A	3	3	n/a	3
Coleman et al (2007) "Impact of contractual financial incentives on the ascertainment and management of smoking in primary care"	2	4	2	7	no	N/A	N/A	3	1	1	1
Dalton et al (2010) "Implementation of the NHS Health Checks programme: baseline assessment of risk factor recording in an urban culturally diverse setting"	2	4	3	7	no	N/A	N/A	3	1	1	1
Lusignan et al (2002) "Does Feedback Improve the Quality of Computerized Medical Records in Primary Care?"	2	4	2	7	No	N/A	N/A	3	3	4	3
Lusignan et al (2004) An educational intervention to improve data recording in the management of ischaemic heart disease in primary care	3	4	3	5	No	N/A	N/A	3	2	n/a	3
Hippisley-Cox (2003) "The electronic patient record in primary care - regression or progression? A cross sectional study"	2	3	2	7	No	N/A	N/A	3	1	1	1
Holt (2010) "Automated electronic reminders to facilitate primary cardiovascular disease prevention: randomised controlled trial"	2	3	2	1	Yes	Yes	Yes	1	2	n/a	2

Kontopantelis (2012) "Recorded quality of primary care for patients with diabetes in England before and after the introduction of a financial incentive study: a longitudinal observational study"	1	4	2	6	No	N/A	N/A	2	N/A	n/a	n/a
Kumarapeli (2006) "Ethnicity recording in general practice computer systems"	3	4	3	7	No	N/A	N/A	3	N/A	n/a	3
Kumarapeli (2013) "Using the computer in the clinical consultation; setting the stage, reviewing, recording, and taking actions: multi-channel video study"	3	1	3	7	No	N/A	N/A	3	N/A	n/a	3
Porcheret (2004) "Data Quality of General Practice Electronic Health Records: The Impact of a Program of Assessments, Feedback and Training"	3	1	3	5	No	N/A	N/A	3	3	4	3
Rait (2009) "Recent trends in the incidence of recorded depression in primary care"	2	4	2	7	No	N/A	N/A	3	N/A	n/a	3
Taggar (2012) "The impact of the Quality and Outcomes Framework (QOF) on the recording of smoking targets in primary care medical records: cross-sectional analyses from The Health Improvement Network (THIN) database	1	4	2	6	No	N/A	N/A	2	N/A	n/a	n/a
Thapar (2002) "A pragmatic randomised controlled trial of a prompt and reminder card in the care of people with epilepsy"	1	3	2	1	Yes	Yes	Yes	1	1	1	1
Woodman (2012) "A simple approach to improve recording of concerns about child matreatment in primary care records: developing a quality improvement intervention"	2	1	2	7	No	N/A	N/A	3	N/A	n/a	n/a

Table D2: Quality of quantitative studies (blinding, data collection, withdrawals)

	(D) Blinding			(E) Data Collection Methods			(F) Withdrawals and Drop-Outs		
CITATION	Was (were) the outcome assessor(s) aware of the intervention or exposure status of participants?	Were the study participants aware of the research question?	Rate section	Were data collection tools shown to be valid?	Were data collection tools shown to be reliable?	Rate section	Were withdrawals and drop-outs reported in terms of numbers and / or reasons per group?	Indicate the % of participants completing the study	Rate section
Brown et al (a) (2003) "Randomised crossover trial comparing the performance of Clinical Terms Version 3 and Read Code 5 byte set coding schemes in general practice" and Brown et al (b) (2003) "A methodology for the functional comparison of coding schemes in primary care"	3	1	2	3	3	3	1	1	1
Campbell et al (2002) "Quality assessment for three common conditions in primary care: validity and reliability of review criteria developed by expert panels for angina, asthma and type 2 diabetes"	N/A	1	3	3	3	3	1	1	1
Carey et al (2009) "Blood pressure recording bias during a period when the Quality and Outcomes Framework was introduced"	N/A	N/A	N/A	3	3	3	4	5	4
Coleman et al (2007) Distributing questionnaires about smoking to patients: impact on general practitioners' recording of stop--smoking advice	N/A	1	3	3	3	3	4	2	4
Coleman et al (2007) "Impact of contractual financial incentives on the ascertainment and management of smoking in primary care"	N/A	N/A	N/A	3	3	3	4	5	4
Dalton et al (2010) "Implementation of the NHS Health Checks programme: baseline assessment of risk factor recording in an urban culturally diverse setting"	N/A	N/A	N/A	3	3	3	4	5	4
Lusignan et al (2002) "Does Feedback Improve the Quality of Computerized Medical Records in Primary Care?"	3	2	3	3	3	3	4	5	4
Lusignan et al (2004) An educational intervention to improve data recording in the management of ischaemic heart disease in primary care	N/A	N/A	N/A	3	3	3	1	1	1
Hippisley-Cox (2003) "The electronic patient record in primary care - regression or progression? A cross sectional study"	N/A	N/A	N/A	3	3	3	1	1	1
Holt (2010) "Automated electronic reminders to facilitate primary cardiovascular disease prevention: randomised controlled trial"	1	2	2	3	3	3	1	1	1

Kontopantelis (2012) "Recorded quality of primary care for patients with diabetes in England before and after the introduction of a financial incentive study: a longitudinal observational study"	N/A	N/A	N/A	1	1	1	3	1	2
Kumarapeli (2006) "Ethnicity recording in general practice computer systems"	N/A	N/A	N/A	3	3	3	3	1	2
Kumarapeli (2013) "Using the computer in the clinical consultation; setting the stage, reviewing, recording, and taking actions: multi-channel video study"	N/A	N/A	N/A	1	1	1	3	4	3
Porcheret (2004) "Data Quality of General Practice Electronic Health Records: The Impact of a Program of Assessments, Feedback and Training"	N/A	N/A	N/A	3	3	3	3	4	3
Rait (2009) "Recent trends in the incidence of recorded depression in primary care"	N/A	N/A	N/A	3	3	3	4	5	4
Taggar (2012) "The impact of the Quality and Outcomes Framework (QOF) on the recording of smoking targets in primary care medical records: cross-sectional analyses from The Health Improvement Network (THIN) database	N/A	N/A	N/A	1	1	1	3	1	2
Thapar (2002) "A pragmatic randomised controlled trial of a prompt and reminder card in the care of people with epilepsy"	2	2	1	3	3	3	1	1	1
Woodman (2012) "A simple approach to improve recording of concerns about child matreatment in primary care records: developing a quality improvement intervention"	N/A	N/A	N/A	3	3	3	3	1	2

Table D3: Quality of quantitative studies (intervention integrity, analyses)

CITATION	(G) Intervention Integrity			(H) Analyses			
	What % of participants received the allocated intervention or exposure of interest?	Was the consistency of the intervention measured?	Is it likely that subjects received an unintended intervention (contamination or co-intervention)	Indicate the unit of allocation	Indicate the unit of analysis	Are the statistical methods appropriate for the study design?	Is the analysis performed by intervention allocation status (ie intention to treat) rather than the actual intervention received?
Brown et al (a) (2003) "Randomised crossover trial comparing the performance of Clinical Terms Version 3 and Read Code 5 byte set coding schemes in general practice" and Brown et al (b) (2003) "A methodology for the functional comparison of coding schemes in primary care"	1	1	3	individual	individual	1	1
Campbell et al (2002) "Quality assessment for three common conditions in primary care: validity and reliability of review criteria developed by expert panels for angina, asthma and type 2 diabetes"	1	3	3	N/A	individual	1	N/A
Carey et al (2009) "Blood pressure recording bias during a period when the Quality and Outcomes Framework was introduced"	N/A	N/A	N/A	N/A	individual	1	N/A
Coleman et al (2007) Distributing questionnaires about smoking to patients: impact on general practitioners' recording of stop--smoking advice	1	3	3	N/A	individual	1	N/A
Coleman et al (2007) "Impact of contractual financial incentives on the ascertainment and management of smoking in primary care"	N/A	N/A	N/A	N/A	individual	1	N/A
Dalton et al (2010) "Implementation of the NHS Health Checks programme: baseline assessment of risk factor recording in an urban culturally diverse setting"	N/A	N/A	N/A	N/A	individual & practice	1	N/A
Lusignan et al (2002) "Does Feedback Improve the Quality of Computerized Medical Records in Primary Care?"	N/A	N/A	N/A	N/A	individual	1	N/A
Lusignan et al (2004) An educational intervention to improve data recording in the management of ischaemic heart disease in primary care	1	1	1	practice	individual practice	1	N/A
Hippisley-Cox (2003) "The electronic patient record in primary care - regression or progression? A cross sectional study"	1	3	3	N/A	individual GP	1	N/A
Holt (2010) "Automated electronic reminders to facilitate primary cardiovascular disease prevention: randomised controlled trial"	1	1	3	N/A	individual	1	N/A
Kontopantelis (2012) "Recorded quality of primary care for patients with diabetes in England before and after the introduction of a financial incentive study: a longitudinal observational study"	N/A	N/A	N/A	individual	individual	1	N/A

Kumarapeli (2006) “Ethnicity recording in general practice computer systems”	1	3	3	N/A	individual patient	1	N/A
Kumarapeli (2013) “Using the computer in the clinical consultation; setting the stage, reviewing, recording, and taking actions: multi-channel video study”	N/A	N/A	N/A	Consultation	Consultation	1	N/A
Porcheret (2004) “Data Quality of General Practice Electronic Health Records: The Impact of a Program of Assessments, Feedback and Training”	1	1	1	N/A	indivudal patient & practice	1	N/A
Rait (2009) “Recent trends in the incidence of recorded depression in primary care”	N/A	N/A	N/A	N/A	individual patient	1	N/A
Taggar (2012) “The impact of the Quality and Outcomes Framework (QOF) on the recording of smoking targets in primary care medical records: cross-sectional analyses from The Health Improvement Network (THIN) database	N/A	N/A	N/A	individual	Individual	1	N/A
Thapar (2002) “A pragmatic randomised controlled trial of a prompt and reminder card in the care of people with epilepsy”	1	3	3	practice	individual patient	1	1
Woodman (2012) “A simple approach to improve recording of concerns about child matreatment in primary care records: developing a quality improvement intervention”	N/A	N/A	N/A	practice	practice	1	N/A

Table D4: Quality of quantitative studies (section ratings, overall rating)

CITATION	Section Ratings						OVERALL RATING
	Selection Bias	Study Design	Confounders	Blinding	Data Collection Method	Withdrawals and Drop-outs	
Brown et al (a) (2003) "Randomised crossover trial comparing the performance of Clinical Terms Version 3 and Read Code 5 byte set coding schemes in general practice" and Brown et al (b) (2003) "A methodology for the functional comparison of coding schemes in primary care"	3	1	3	2	3	1	Weak
Campbell et al (2002) "Quality assessment for three common conditions in primary care: validity and reliability of review criteria developed by expert panels for angina, asthma and type 2 diabetes"	1	3	2	3	3	1	Weak
Carey et al (2009) "Blood pressure recording bias during a period when the Quality and Outcomes Framework was introduced"	2	3	3	N/A	3	4	Weak
Coleman et al (2007) Distributing questionnaires about smoking to patients: impact on general practitioners' recording of stop--smoking advice	3	3	3	3	3	4	Weak
Coleman et al (2007) "Impact of contractual financial incentives on the ascertainment and management of smoking in primary care"	2	3	1	N/A	3	4	Weak
Dalton et al (2010) "Implementation of the NHS Health Checks programme: baseline assessment of risk factor recording in an urban culturally diverse setting"	3	3	1	N/A	3	4	Weak
Lusignan et al (2002) "Does Feedback Improve the Quality of Computerized Medical Records in Primary Care?"	2	3	3	3	3	4	Weak
Lusignan et al (2004) An educational intervention to improve data recording in the management of ischaemic heart disease in primary care	3	3	3	N/A	3	1	Weak
Hippisley-Cox (2003) "The electronic patient record in primary care - regression or progression? A cross sectional study"	2	3	1	N/A	3	1	Weak
Holt (2010) "Automated electronic reminders to facilitate primary cardiovascular disease prevention: randomised controlled trial"	2	1	2	2	3	1	Strong
Kontopantelis (2012) "Recorded quality of primary care for patients with diabetes in England before and after the introduction of a financial incentive study: a longitudinal observational study"	2	2	N/A	N/A	1	2	Moderate
Kumarapeli (2006) "Ethnicity recording in general practice computer systems"	3	3	3	N/A	3	2	Weak
Kumarapeli (2013) "Using the computer in the clinical consultation; setting the stage, reviewing, recording, and taking actions: multi-channel video study"	3	3	N/A	N/A	1	3	Weak

Porcheret (2004) "Data Quality of General Practice Electronic Health Records: The Impact of a Program of Assessments, Feedback and Training"	3	3	3	N/A	3	3	Weak
Rait (2009) "Recent trends in the incidence of recorded depression in primary care"	2	3	3	N/A	3	4	Weak
Taggar (2012) "The impact of the Quality and Outcomes Framework (QOF) on the recording of smoking targets in primary care medical records: cross-sectional analyses from The Health Improvement Network (THIN) database	2	2		N/A	1	2	Moderate
Thapar (2002) "A pragmatic randomised controlled trial of a prompt and reminder card in the care of people with epilepsy"	2	1	1	1	3	1	Strong
Woodman (2012) "A simple approach to improve recording of concerns about child matreatment in primary care records: developing a quality improvement intervention"	2	3	N/A	N/A	3	2	Weak

Table D5: Quality of qualtitative studies (study purpose, literature)

Citation	Study Purpose		Literature		
	Clear research question?	Outline the purpose of the study and / or research questions	Relevant background literature reviewed?	Clear / compelling need for research?	How does the study apply to your research question?
Campbell et al (2002) "Quality assessment for three common conditions in primary care: validity and reliability of review criteria developed by expert panels for angina, asthma and type 2 diabetes"	Yes	To field test the reliability, validity, and acceptability of review criteria for angina, asthma, and type 2 diabetes which had been developed by expert panels using a systematic process to combine evidence with expert opinion.	Yes	Clear need - to support development of best practice measure of care (valid, reliable & transparent)	Extent to which quality focus in health care improves recording practices
Lusignan et al (2003) "Managers See the Problems Associated with Coding Clinical Data as a Technical Issue whilst Clinicians also See Cultural Barriers"	Yes	To examine the barriers to recording structured information in computerised medical records; and to explore whether managers and clinicians had different perspectives in how these barriers should be overcome.	Yes	Refers to findings from previous PCRN study which contrasting views on barriers to clinicial coding between practice managers and clinicians. This study wanted to build on that subject in more depth.	Includes investigation of clinician recording barriers - relates directly to my review question
Hippisley-Cox (2003) "The electronic patient record in primary care - regression or progression? A cross sectional study"	Yes	To determine whether paperless medical records contained less infomaion than paper baed medical records and whether that information was harder to retrieve	Yes	Yes	Relevant in terms of whether EPR encourage better data recording by physicians
Woodman (2012) "A simple approach to improve recording of concerns about child matreatment in primary care records: developing a quality improvement intervention"	Yes	To determine how the recording of child maltreatment concerns can be improved	Yes	Highlights fact that despite child maltreatment being relatively common, many affected children fail to reach the threshhold for investigation and there is a lack of information on how often English GPs report child maltreatment.	Investigation focusses on development of an intervention to improve GP recording of child maltreatment

Table D6: Quality of qualtitative studies (study design)

Citation	Study Design					
	Design?	Design appropriate for the study question?	Theoretical perspective identified?	Theoretical or philosophical perspective	Methods	Method(s) used to answer the research question.
Campbell et al (2002) "Quality assessment for three common conditions in primary care: validity and reliability of review criteria developed by expert panels for angina, asthma and type 2 diabetes"	Mixed methods	Yes - allowed rounded picture of recording practice to be built up - although not much information to explain why particular methods chosen	No - very much policy focussed	not clear	Statistical analysis of audit data, questionnaire and semi-structured interviews	Methods appropriate for research question but no explicit theoretical perspective so unable to make judgement in this respect
Lusignan et al (2003) "Managers See the Problems Associated with Coding Clinical Data as a Technical Issue whilst Clinicians also See Cultural Barriers"	Not stated but presume Phenomenology	Yes - research question focusses on exploring views on / experience of recording from individual perspective of clinician / manager	No	N/A	Semi-structured interviews	Yes
Hippisley-Cox (2003) "The electronic patient record in primary care - regression or progression? A cross sectional study"	Not stated but presume Phenomenology	Yes	No	Can't tell	Interviews	Methods appropriate for research question but no explicit theoretical perspective so unable to make judgement in this respect
Woodman (2012) "A simple approach to improve recording of concerns about child matreatment in primary care records: developing a quality improvement intervention"	Mixed methods	Yes	No	No clear	Telephone interviews, a GP workshop and a consensus development meeting	Yes

Table D7: Quality of qualtitative studies (sampling)

Citation	Sampling				
	Process of purposeful selection described?	Describe sampling methods used	Was sampling done until redundancy in data was reached?	Are the participants described in adequate detail?	Was informed consent obtained?
Campbell et al (2002) "Quality assessment for three common conditions in primary care: validity and reliability of review criteria developed by expert panels for angina, asthma and type 2 diabetes"	No - mixed methods so random, stratified sampling approach adopted	Multi-level randomised, stratified sampling to identify 60 GP practices from 2 health authorities each in 3 english regions. 20 patients selected per practice - using random numbers - with appropriate diagnosis & also taking commonly prescribed medication. Interviews with 3 reps per practice	Not addressed	Yes - and relevant to my review	Not addressed
Lusignan et al (2003) "Managers See the Problems Associated with Coding Clinical Data as a Technical Issue whilst Clinicians also See Cultural Barriers"	Yes	Purposeful sample frame was developed taking into account different primary care professions, age of interviews, single handed v group practices, diff computer systems, non-coders v coding enthusiasts - seems appropriate to question given it was looking at exploring diffs between mgrs / clinicians in more depth	Yes - additional interviews were conducted until thematic saturation was achieved	Sample frame provided which details key characteristics of participants. Includes GPs therefore relevant to my review question	Yes
Hippisley-Cox (2003) "The electronic patient record in primary care - regression or progression? A cross sectional study"	Yes	Randomised using number tables, based on key characteristics of interest	Not addressed	No - little detail provided	yes
Woodman (2012) "A simple approach to improve recording of concerns about child matreatment in primary care records: developing a quality improvement intervention"	Yes	Convenience sample of GPs with known interest in either child protection or coding.	Not addressed	Minimal detail - but information provided suggests relevancy	Not addressed

Table D8: Quality of qualtitative studies (data collection)

Citation	Data Collection							
	Site description?	Participant description?	Role of researcher & relationship with participants?	Identification of assumptions and biases of researcher description?	Describe the context of the study. Was it sufficient for understand of the "whole" picture?	What was missing and how does that influence your understanding of the research?	Procedural rigour used?	Do the resarchers provide adequate information about data collection procedures?
Campbell et al (2002) "Quality assessment for three common conditions in primary care: validity and reliability of review criteria developed by expert panels for angina, asthma and type 2 diabetes"	Yes	Yes	No	No	Yes - focus on issue of developing meaningful measures of quality of care. Involved detailed multifactorial quality assessment of a nationally representative sample of 60 randomly selected practices in England.	Nothing key missing	Yes	Reasonable amount of detail. (1) Data abstracted for up to 20 patients per condition per practice using standardised forms - took on average 20 minutes per patient. (2) Questionnaire asking respondents to rate validity of various criteria sent to a nurse and doctor in 59 practices (with 1 practice used as a pilot); and (3) 1 researcher visited 59 practices (1 used as pilot) to conduct semi-structured interviews with staff. No mention of fieldnotes taken, access, flexibility etc
Lusignan et al (2003) "Managers See the Problems Associated with Coding Clinical Data as a Technical Issue whilst Clinicians also See Cultural Barriers"	Yes	Yes	Not much detail provided on this	No	Yes - explains both development of computerised practice in UK (including need to demonstrate meeting standards etc with clinical data); issues around recording standardised (Read Code) v free text data; and findings from previous research study which highlighted different views on barriers to coding between clinicians and practice managers	No information on practice context itself - socio-economic context, PCT policy / practice influencers etc	Yes	Interviews took place in the interviewees' primary care location, where possible, so the interviewee could show the researcher the Read Coding interface that they used. Following the 1st interview, interviewee was asked to code two problems on their clinical system. Interviews were conducted by one researcher. Structure of the interviews evolved as early interviews were analysed.

Hippisley-Cox (2003) "The electronic patient record in primary care - regression or progression? A cross sectional study"	Yes	yes	Not addressed	Not addressed	Yes		Yes	Yes
Woodman (2012) "A simple approach to improve recording of concerns about child matreatment in primary care records: developing a quality improvement intervention"	Yes	Yes	Not addressed	Not addressed	Yes	Nothing key missing	Yes	Yes. Practice and GP characteristics were captured using an online questionaire; recording practices were explored through short, structured telephone interviews and the half-day workshop comprised GP presentations and a free-ranging discussion. Confirms that no patient identifiable data was accessed by the research team / or left the practice.

Table D9: Quality of qualtitative studies (data analyses)

Citation	Data Analyses							
	Data Analyses were inductive?	Findings consistent with & reflective of data?	Describe method(s) of data analysis. What were the findings?	Decision trail developed?	Process of describing the data was described adequately?	Describe the descisions re: transformation of data to codes / themes.	Did a meaningful picture of the phenomenon under study emerge?	How were concepts under study clarified and refined, and relationships made clear?
Campbell et al (2002) "Quality assessment for three common conditions in primary care: validity and reliability of review criteria developed by expert panels for angina, asthma and type 2 diabetes"	not addressed	difficult to tell	Not explained	Not addressed	Not addressed	Not addressed	Yes - to limited extent	No conceptual model mentioned / tested etc
Lusignan et al (2003) "Managers See the Problems Associated with Coding Clinical Data as a Technical Issue whilst Clinicians also See Cultural Barriers"	Yes	Yes	Thematic analysis	Yes - eg of paper analysis carried out plus informatics experts interviews in order to triangulate data	Yes	Explains process of thematic analysis & tools employed. Also supported by expert panel input	Yes	Confirmed that clinicians/managers have different views on barriers to coding and underlined mismatch between goals of clinical consultation v audit
Hippisley-Cox (2003) "The electronic patient record in primary care - regression or progression? A cross sectional study"	yes	yes	Yes	yes	yes	Yes	yes	n/a
Woodman (2012) "A simple approach to improve recording of concerns about child matreatment in primary care records: developing a quality improvement intervention"	not addressed	difficult to tell	Not explained	Not addressed	Not addressed	Not addressed	Yes	No conceptual model mentioned / tested etc

Table D10: Quality of qualtitative studies (overall rigour)

Citation	Overall Rigour								
	Credability?	Identify what the research used to ensure this	Transferability?	Identify what the research used to ensure this	Dependability?	Identify what the research used to ensure this	Confirmability?	Identify what the research used to ensure this	What meaning and relevance does this study have for your practice or research question?
Campbell et al (2002) "Quality assessment for three common conditions in primary care: validity and reliability of review criteria developed by expert panels for angina, asthma and type 2 diabetes"	Yes	Mixed methods design allowed for in depth investigation into quality measurement, further supported by randomised, stratified sample design.	Mixed	Limited extent - results may be condition specific (i.e. angina etc) rather than transferable to other more rare conditions	Not clear	Not enough information	No	Not enough information provided	Illustrates operational problems associated with using certain quality measures - underlining need fr tesing prior to use in field. Shows that even though practitioners agree that measures of care are valid - quality can remain variable. Demonstrates impact of varied levels of computerisation on quality audit.
Lusignan et al (2003) "Managers See the Problems Associated with Coding Clinical Data as a Technical Issue whilst Clinicians also See Cultural Barriers"	Yes	Gathered range of perspectives on subject (clinicians and management staff) plus employed external expert panel to ensure findings credible	Yes - mostly	Describes purposeful sample frame in detail and types of participants interviewed HOWEVER more information on practice context would have been helpful	Yes	Triangulation of data / multiple perspectives	Yes - to limited extent	Again - data triangulation - although more information on interviewee / interviewer interaction etc would have been useful	Underlines issue of different perspectives of management v clinical staff

Hippisley-Cox (2003) "The electronic patient record in primary care - regression or progression? A cross sectional study"	yes		Not clear		Yes	Triangulation of data / multiple perspectives	yes	Again - data triangulation - although more information on interviewee / interviewer interaction etc would have been useful	Study supports other evidence that electronic records do not reduce quality / depth of recorded information, and in fact support improved data capture.
Woodman (2012) "A simple approach to improve recording of concerns about child matreatment in primary care records: developing a quality improvement intervention"	Yes	Mixed methods design supported development of in-depth, tailored quality improvement intervention.	Not clear	Limited extent - results may be subject / participant specific (i.e. child maltreatment management by interested / experienced GPs etc) rather than transferable more generally	Yes	Triangulation of data / multiple perspectives	Yes	Again - data triangulation - although more information on interviewee / interviewer interaction etc would have been useful	Illustrates range of barriers to coding senstive areas of clinical practice - such as the potential harm for the child or parents having seen documented concerns, any legal consquences of recording child harm.

Table D11: Quality of qualtitative studies (conclusion, overall assessment)

Citation	Conclusion & Implications			Overall assessment
	Appropriate conclusions?	Findings contributed to future practice / research/theory?	What did the study conclude?	Weak / Moderate / Strong
Campbell et al (2002) "Quality assessment for three common conditions in primary care: validity and reliability of review criteria developed by expert panels for angina, asthma and type 2 diabetes"	Yes	Yes	54%, 59%, and 70% of relevant criteria rated valid by the expert panels for angina, asthma, and type 2 diabetes, respectively, were found to be usable, valid, reliable, and acceptable for measuring quality of care. General practitioners and practice nurses agreed with panellists that these criteria were valid but not that they should always be recorded in the medical record. onclusion: Quality measures derived using expert panels need field testing before they can be considered valid, reliable, and acceptable for use in quality assessment. These findings provide additional evidence that the RAND panel method develops valid and reliable review criteria for assessing clinical quality of care. Main limitations were: fact some review criteria were out of date; problems that medical records don't full reflect quality of care / not ideal proxy measure	Moderate
Lusignan et al (2003) "Managers See the Problems Associated with Coding Clinical Data as a Technical Issue whilst Clinicians also See Cultural Barriers"	Yes	Yes	Primary care consultation is a complex social interaction, and coding of the medical diagnosis in itself imposes the bio-medical model, carries assumptions about certainty, and is perceived by clinicians to potentially jeopardise their relationships with their patient. Further research to elicit patients' views may help clarify the magnitude of this barrier. Demonstrates conflict between audit v consultation data needs. Main limitations included - study population not representative (high % teaching practices)	Strong
Hippisley-Cox (2003) "The electronic patient record in primary care - regression or progression? A cross sectional study"	Yes	Yes	Study found no evidence to support the hypotheses that paperless records would be truncated and contain more local abbreviations; and that the absence of writing would decrease subsequent recall. Conversely it found that the paperless records compared favourably with manual records. Main limitations included - descriptive nature of study, and potentially unrepresentative study sample.	Moderate
Woodman (2012) "A simple approach to improve recording of concerns about child matreatment in primary care records: developing a quality improvement intervention"	Yes	Yes	GPs under-record maltreatment-related concerns in children's electronicmedical records. As failure to use codesmakes it impossible to search or audit these cases, an approach designed to be simple and feasible to implement in UK general practice was recommended. Main limitations included - the small size and unrepresentative nature of the study sample.	Moderate

Appendix E: Letter to practice managers to participate in the study

Dear [INSERT NAME]

An invitation to take part in research on the use of routinely collected data to monitor and evaluate alcohol screening and brief interventions

I am a PhD research student based within FUSE (Centre for Translational Research in Public Health) at Newcastle University. I am carrying out research to explore whether we can use routinely collected clinical and administrative data to monitor and evaluate the delivery of alcohol screening and brief interventions in primary healthcare. I am inviting your practice to take part in this study which we hope will give us a better understanding of this important public health issue.

I attach an information sheet which explains the research in more detail and what it would involve for the practice should you choose to take part. Please take the time to read through the following information carefully. As participating in this research study will inevitably involve your colleagues, I would encourage you to talk to other members of staff based within your practice in case they have any queries or concerns. If any of this information is not clear, or if you would like more information about the research, please get in touch.

I will call you in around two weeks time to find out whether you would like to take part in the study and to arrange a time for me to come and visit the practice. In the meantime, if after reading the information sheet you have any queries or concerns, you can call me (Chief Investigator) on Tel: 0191 222 7400 / Mobile: 07973 899 401; email me at a.j.o'donnell@ncl.ac.uk; or write to me at the above address.

Thank you for reading this. I look forward to hearing from you.

Yours sincerely,

Amy O'Donnell

Chief Investigator
ESRC PhD Student
FUSE (Centre for Translational Research in Public Health)

Appendix F: Project flyer

Newcastle University

NHS North of Tyne

Working on behalf of Newcastle and North Tyneside Primary Care Trusts and Northumberland Care Trust

NHS South of Tyne and Wear

serving Gateshead Primary Care Trust, South Tyneside Primary Care Trust and Sunderland Teaching Primary Care Trust

RESEARCH STUDY: USING ROUTINELY COLLECTED TO MONITOR AND EVALUATE ALCOHOL SCREENING AND BRIEF INTERVENTIONS

INFORMATION FOR GP PRACTICES

Background

This research will look at the use of routine data to monitor and evaluate the delivery of Screening and Brief Interventions (SBIs) for alcohol in primary healthcare. This reflects a key public health priority to respond to alcohol misuse and alcohol-related harm; and in particular, growing support for SBIs for alcohol as a cost-effective preventative approach. The research will draw on a range of newly available data to investigate the delivery of SBIs for alcohol in 20 general practices based across six Primary Care Trusts (PCTs) in North East England: Newcastle; North Tyneside, Northumberland; Gateshead; South Tyneside and Sunderland. This data analysis will be followed by one-to-one interviews with GPs about their experiences of using routine data to record alcohol SBIs in real-life primary healthcare settings. The study has full NHS Research Ethics Approval and the support of the R&D Team at the PCT.

Project Aims

The aim of the study is to determine whether we can use routinely collected data to monitor and evaluate the delivery of alcohol SBIs in primary healthcare. The research will form the basis of a PhD studentship funded by the Economic and Social Research Council (www.esrc.org.uk) and based within FUSE (Centre for Translational Research in Public Health) at Newcastle University (www.fuse.ac.uk).

What we would like you to do

You will be asked to assist with the extraction of anonymised routine data on the delivery of alcohol SBIs in your practice. This is likely to include: baseline data to capture current levels of patients drinking at hazardous, harmful and dependent levels in the practice population; service delivery data such as numbers of patients who have been screened / given brief advice / referred to specialist alcohol misuse services during the past 12 months; and (where relevant) the review and analysis of DES returns to the relevant PCT. One nominated GP will also be asked to take part in a one-to-one interview following data collection and analysis, to focus on their experiences of delivering and recording alcohol interventions.

What the practice will be offered

This is not an NIHR Portfolio study therefore no funding is available to support participation in this project. However your involvement will provide practice staff with a valuable opportunity to share their views on this important subject. Further, all participants will be provided with detailed feedback on the research findings.

If you are interested in helping with this important study or would like further information, please contact Chief Investigator: Amy O'Donnell on tel: 0191 222 7400; mobile: 07973 899 401 or email her at a.j.o'donnell@newcastle.ac.uk.

THANK YOU FOR YOUR INTEREST

E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL

fuse The Centre for Translational Research in Public Health

Appendix G: Study information sheet for GP practices

Practice Information Sheet

Your practice is being invited to take part in a research study. Before you decide whether to take part in the research, it is important for you to understand why the research is being done and what your participation in the study will involve. Please take time to read the following information carefully. I would encourage you to talk to other members of staff based within your practice about the study if you wish. Part 1 explains the purpose of the study and what will happen to you if you take part. Part 2 gives you more detailed information about the conduct of the study. I will go through this information sheet with you, so please feel free to ask me questions if there is anything you are unsure about. This should take 10-15 minutes.

Part 1: About the research

What is the purpose of the study?

This research will look at the use of routinely collected medical data to monitor and evaluate the delivery of Screening & Brief Interventions (SBIs) for alcohol in primary healthcare. This reflects a key public health priority to respond to alcohol misuse and alcohol-related harm; and in particular, growing support for SBIs for alcohol as a cost-effective preventative approach. The research will draw on a range of newly available medical data to investigate the delivery of SBIs for alcohol in 20 general practices based across six primary care trusts in North East England: Newcastle; North Tyneside, Northumberland; Gateshead; South Tyneside and Sunderland. Key new data sources include new Read Codes associated with the identification and management of risky drinking in primary care and Hospital Episode Statistics (HES) data. This data analysis will be followed by one-to-one interviews with General Practitioners about their experiences of delivering and recording SBIs for alcohol in real-life primary care settings.

Why have I been invited?

Your practice has been invited to take part in this study because you are a GP practice based in one of our target PCT areas. You and your staff will have first hand experience of delivering SBIs for alcohol in primary healthcare.

Do I have to take part?

Taking part in the research is entirely voluntary: it is up to you to decide whether to join the study. If you agree to participate, confidentiality would be discussed and the potential implications for staff working at the practice. I will then ask you to sign a confidentiality agreemen. Individual GPs that take part in the research will also have opportunity to discuss the research, ask questions and sign a consent form before I interview them. Your practice is free to withdraw at any time, without providing a reason and without your legal rights being affected.

What will happen if I take part?

What the researcher will do:

- Collect data on the recording of alcohol SBIs that take place at your practice over a twelve month period;
- Seek consent from GPs based at your practice to take part in a one-to-one interview;
- Maintain informal contact with practice staff including receptionists, IT staff, nurses and the practice manager.

To undertake the research the researcher will request access to the following personnel, records and/or practice facilities:

- Anonymised Read Code and performance data relating to the delivery and management of alcohol SBIs;
- Conduct a single one-to-one interview with a GP based at your practice.

What the practice personnel will be asked to do:

- Assist with the extraction of and / or provide baseline data on excessive alcohol consumption recorded in the practice population over a 12 month period, alcohol SBI recording practices, and service provision of SBIs. This is likely to include:
    - Number and percentage of patients drinking at hazardous (i.e. those drinking >recommended units per week) and harmful (i.e. those drinking over medically recommended levels & showing evidence of alcohol-related problems) levels in the practice population seen in the last 12 months;
    - No. of patients who have been screened using, FAST or Audit-C in the last 12 months;
    - No. of patients with a positive FAST or Audit-C score and full AUDIT assessment in last 12 months;
    - No. of patients given brief advice in the last 12 months; and

    - No. of patients with a full AUDIT score of 20 or more who have been referred to specialist alcohol treatment services in the last 12 months.
- One nominated GP will be asked to take part in a single one-2-one interview towards the end of the 12 month period focusing on their experiences of delivery and recording alcohol interventions.

What are the possible disadvantages and risks of taking part?

No risks are envisaged for you as a result of taking part in this study. The only possible disadvantage is that you and the other staff at your practice will be giving up some of your time to take part in the research.

What are the possible benefits of taking part?

Taking part in this research will offer staff members an opportunity to share their views on this important subject and to know that their views are valued.

Part 2: Conduct of the research

What will happen if I don't want to carry on with the study?

You can withdraw from the study at any time. Information we have already collected with your consent will be retained and used in the study. Withdrawal from the study will not affect your legal rights.

What if there is a problem?

If you have a concern about any aspect of the study, you should contact me and I will do my best to answer your questions. Contact details are provided at the end of this information sheet. If you remain unhappy and wish to complain formally, you can do this via the Research and Development Manager of the appropriate NHS organisation.

Will my taking part in this study be kept confidential?

Yes. I will follow ethical and legal practice and all information about you will be handled in confidence. The interview data will be kept confidential and reported anonymously. Any direct quotation will be attributed to general job title only (e.g. "Service Manager A"). The information collected will be stored securely in locked university offices, computers will be password protected. The interviews will be recorded and transcribed. In line with the Newcastle University's code of conduct for research, the interview transcripts will be destroyed ten years after publication of the study's findings.

What will happen to the results of the research study?

This research will be used as a Doctoral Degree project (PhD) and will be submitted to examiners at Newcastle University. Research papers and conference presentations will also be produced. Participants will receive a summary of the findings after the final report has been disseminated.

Who are the researchers and who is funding the research?

The research forms the basis of a PhD studentship funded by the Economic and Social Research Council (www.esrc.org.uk) based within FUSE (the Centre for Translational Research in Public Health). Amy O'Donnell will be the Chief Investigator on this research study and will be supervised by a group of experienced academics and practitioners based at Newcastle University, the North East Public Health Observatory and BALANCE (the regional alcohol office).

Who has reviewed this study?

The research has been reviewed [INSERT NAME] Research Ethics Committee, independent of the University, to protect your interests.

How can I get further information?

If you would like any further information, please do not hesitate to contact me:

Amy O'Donnell, FUSE (The Centre for Translational Research in Public Health)
Institute of Health and Society, Newcastle University
Room 3.77 Baddiley-Clark Building
Richardson Road, Newcastle Upon Tyne NE2 4AX

Tel: 0191 222 7400 Email: a.j.o'donnell@ncl.ac.uk

Thank you for taking the time to read this information sheet

Appendix H: Confidentiality agreement between researcher and GP Practice

Name of Researcher:	**Amy O'Donnell**
GP Practice:	
Project Title:	**Can routine data help assess the delivery of alcohol screening and brief interventions?**

Conditions of Access

I, the undersigned, acknowledge, understand and agree to adhere to the following conditions of access:

- I will maintain the privacy and confidentiality of all accessible project data and understand that unauthorised disclosure of personal/confidential data is an invasion of privacy and may result in disciplinary, civil, and/or criminal actions against me.
- I will not disclose data or information to anyone other than those to whom I am authorised to do so.
- I will access data only for the purposes for which I am authorised explicitly. On no occasion will I use project data, including personal or confidential information, for my personal interest or advantage, or for any other business purposes.
- I will comply at all times with the practice's data security policies and confidentiality code of conduct.
- I am aware that the references to personal, confidential and sensitive information in these documents are for my information, and are not intended to replace my obligations under the Data Protection Act 1998.
- I understand that where I have been given access to confidential information I am under a duty of confidence and would be liable under common law for any inappropriate breach of confidence in terms of disclosure to third parties and also for invasion of privacy if I were to access more information than that for which I have been given approval or for which consent is in place.
- Should my work in relation to the project discontinue for any reason, I understand that I will continue to be bound by this signed Confidentiality Agreement.

_____	_____	_____
Name of Researcher	*Signature*	*Date*
_____	_____	_____
Name of Practice Manager	*Signature*	*Date*

Contact details for further information

Amy O'Donnell
FUSE (The Centre for Translational Research in Public Health)
Institute of Health and Society, Newcastle University
Room 3.77 Baddiley-Clark Building, Richardson Road, Newcastle Upon Tyne NE2 4AX
Tel: 0191 222 7400
Email: a.j.o'donnell@ncl.ac.uk

Appendix I: Full list of alcohol-related Read codes[13]

Code	Preferred term
1361	Teetotaller
1362	Trivial drinker - <1u/day
1363	Light drinker - 1-2u/day
1364	Moderate drinker - 3-6u/day
1365	Heavy drinker - 7-9u/day
1366	Very heavy2 drinker - >9u/day
1367	Stopped drinking alcohol
1368	Alcohol consumption unknown
2577	O/E - breath - alcohol smell
6892	Alcohol consumption screening
136..	Alcohol intake
1361-1	Non-drinker alcohol
1361-2	Non-drinker alcohol
136A	Ex-trivial drinker (<1u/day)
136a	Increasing risk drinking
136B	Ex-light drinker - (1-2u/day)
136b	Feels should cut down drinking
136C	Ex-moderate drinker - (3-6u/d)
136c	Higher risk drinking
136D	Ex-heavy drinker - (7-9u/day)
136d	Lower risk drinking
136E	Ex-very heavy drinker-(>9u/d)
136F	Alcohol intake above rec limit
136F	Spirit drinker
136G	Alcohol intake within rec limt
136G	Beer drinker
136H	Drinks beer and spirits
136I	Drinks wine
136J	Social drinker
136K	Beer drinker
136K.	Alcohol intake above recommended sensible limits
136L	Spirit drinker
136L.	Alcohol intake within recommended sensible limits
136M	Current non drinker
136N	Light drinker
136O	Moderate drinker
136P	Heavy drinker
136Q	Very heavy drinker
136R	Binge drinker
136V.	Alcohol units per week
136X	Alcohol units consumed on heaviest drinking day
136Y	Drinks in morning to get rid of hangover
136Z.	Alcohol consumption NOS
68S..	Alcohol consumption screening
81A7	Alcohol consumption screening test declined

[13] Note that one code (DAVIEOC1) was subsequently removed from this list as it was identified as a locally-generated Read code.

E250.	Drunkenness NOS
E250.	Hangover from alcohol
E250-4	Intoxication - alcohol
ZV113	[V]Personal history of alcoholism
ZV4KC	[V] Alcohol use
1282	Alcoholic in the family
1282	Alcoholic offspring
1282	Family history of alcoholism
1369	Suspect alcohol abuse - denied
1462	H/O: alcoholism
6792	Health education - alcohol
12X0.	Family history of alcohol misuse
136S.	Hazardous alcohol use
136T.	Harmful alcohol use
136W.	Alcohol abuse
13Y8.	Alcoholics anonymous
13ZY.	Disqualified from driving due to excess alcohol
1B1c.	Alcohol induced hallucinations
1D19.	Pain in lymph nodes after alcohol consumption
388u.	Fast alcohol screening test
38D2.	Single alcohol screening questionnaire
38D3.	Alcohol use disorders identification test
38D4.	Alcohol use disorder identification test consumption questionnaire
38D5.	Alcohol use disorder identification test Piccinelli consumption questionnaire
4191-1	Breath alcohol level
63C7.	Maternal alcohol abuse
66e..	Alcohol disorder monitoring
66e0.	Alcohol abuse monitoring
67A5.	Pregnancy alcohol advice
67H0.	Lifestyle advice regarding alcohol
7P221	Delivery of rehabilitation for alcohol addiction
8BA8.	Alcohol detoxification
8CAM.	Patient advised about alcohol
8CAv.	Advised to contact primary care alcohol worker
8CE1.	Alcohol leaflet given
8G32.	Aversion therapy - alcoholism
8H35.	Admitted to alcohol detoxification centre
8H7p.	Referral to community alcohol team
8HHe.	Referral to community drug and alcohol team
8HkG.	Referral to specialist alcohol treatment service
8HkJ.	Referral to alcohol brief intervention service
8IA7.	Alcohol consumption screening test declined
918b.	Carer of a person with alcohol misuse
9EQ	H0/RTS-police:venesect alc
9k1..	Alcohol misuse - enhanced services administration
9k10	Community detoxification registered
9k11.	Alcohol consumption counselling
9k12.	Alcohol misuse - enhanced service completed
9k13.	Alcohol questionnaire completed
9k14.	Alcohol counselling by other agencies
9k15.	Alcohol screen - alcohol use disorder identification test completed
9k16.	Alcohol screen - fast alcohol screening test completed

9k17.	Alcohol screen - alcohol use disorder identification test consumption questions completed
9k18.	Alcohol screen - alcohol use disorder identification test Piccinelli consumption questions completed
9k19.	Alcohol assessment declined - enhanced services administration
9k19-1	Alcohol assessment declined
9k1A.	Brief intervention for excessive alcohol consumption completed
9k1B.	Extended intervention for excessive alcohol consumption completed
9NN2.	Under care of community alcohol team
C1505	Alcohol-induced pseudo-Cushing's syndrome
E01.	Alcoholic psychoses
E010	Alcohol withdrawal delirium
E010.	Delirium tremens
E011	Alcohol amnestic syndrome
E011.	Korsakov psychosis
E0110	Korsakov psychosis
E0111	Korsakov's alcoholic psychosis with peripheral neuritis
E011z	Alcohol amnestic syndrome NOS
E012.	Alcoholic dementia NOS
E012.	Other alcoholic dementia
E0120	Chronic alcoholic brain syndrome
E013.	Alcohol withdrawal hallucinosis
E014.	Pathological alcohol intoxication
E015.	Alcoholic paranoia
E01y.	Other alcoholic psychosis
E01y0	Alcohol withdrawal syndrome
E01yz	Other alcoholic psychosis NOS
E01z.	Alcoholic psychosis NOS
E23	Alcohol dependence syndrome
E23.	Chronic alcoholism
E230.	Acute alcoholic intoxication in alcoholism
E2300	Acute alcoholic intoxication, unspecified, in alcoholism
E2301	Continuous acute alcoholic intoxication in alcoholism
E230-1	Alcohol dep+acute alcohol intox
E2302	Episodic acute alcoholic intoxication in alcoholism
E2303	Acute alcoholic intoxication in remission, in alcoholism
E230z	Acute alcoholic intoxication in alcoholism NOS
E231.	Chronic alcoholism
E2310	Unspecified chronic alcoholism
E2311	Continuous chronic alcoholism
E2312	Episodic chronic alcoholism
E2313	Chronic alcoholism in remission
E231z	Chronic alcoholism NOS
E23-2	Alcohol problem drinking
E23z.	Alcohol dependence syndrome NOS
E250.	Inebriety NOS
E250.	Nondependent alcohol abuse
E2500	Nondependent alcohol abuse, unspecified
E2501	Nondependent alcohol abuse, continuous
E2502	Nondependent alcohol abuse, episodic
E2503	Nondependent alcohol abuse in remission
E250z	Nondependent alcohol abuse NOS
Eu10.	[X]Mental and behavioural disorders due to use of alcohol
Eu100	[X]Mental and behavioural disorders due to use of alcohol: acute intoxication

Eu101	[X]Mental and behavioural disorders due to use of alcohol: harmful use
Eu102	[X]Mental and behavioural disorders due to use of alcohol: dependence syndrome
Eu102-1	Alcohol addiction
Eu103	[X]Mental and behavioural disorders due to use of alcohol: withdrawal state
Eu104	[X]Mental and behavioural disorders due to use of alcohol: withdrawal state with delirium
Eu105	[X]Mental and behavioural disorders due to use of alcohol: psychotic disorder
Eu106	[X]Mental and behavioural disorders due to use of alcohol: amnesic syndrome
Eu106-1	[X] Korsakov's alcohol induced
Eu107	[X]Mental and behavioural disorders due to use of alcohol: residual and late-onset psychotic disorder
Eu107-2	[X] Chronic alcohol brain syndr
Eu108	[X]Alcohol withdrawal-induced seizure
Eu10y	[X]Mental and behavioural disorders due to use of alcohol: other mental and behavioural disorders
Eu10z	[X]Mental and behavioural disorders due to use of alcohol: unspecified mental and behavioural disorder
F11x0	Alcoholic encephalopathy
F1440	Alcoholic cerebellar degeneration
F25B.	Alcohol-induced epilepsy
F375.	Alcohol-related polyneuropathy
F3941	Alcoholic myopathy
G555.	Alcohol-induced heart muscle disease
G8523	Oesophageal varices in alcoholic cirrhosis of the liver
HO/0	Ho/Rts-Police: Venesect Alcohol
J153.	Alcoholic gastritis
J610.	Alcoholic fatty liver
J611.	Acute alcoholic hepatitis
J612.	Alcoholic cirrhosis of liver
J612.	Florid cirrhosis
J612.	Portal cirrhosis
J6120	Alcoholic fibrosis and sclerosis of liver
J613.	Alcoholic liver damage unspecified
J6130	Alcoholic hepatic failure
J615.	Portal cirrhosis
J615z	Cirrhosis of liver NOS
J615z	Cryptogenic cirrhosis
J615z	Fibrosis of liver
J615z	Macronodular cirrhosis
J617.	Alcoholic hepatitis
J6170	Chronic alcoholic hepatitis
J6710	Alcohol-induced chronic pancreatitis
L254-1	Suspect fetal alcohol damage
L2553	Maternal care for (suspected) damage to fetus from alcohol
PK80.	Fetal alcohol syndrome
PK83.	Fetus and newborn affected by maternal use of alcohol
Q0071	Fetal alcohol syndrome
Q0071	Fetus or neonate affected by placental or breast transfer of alcohol
R103.	[D]Alcohol blood level excessive
SLH3.	Alcohol deterrent poisoning
SM0..	Alcohol causing toxic effect
SM00.	Ethyl alcohol causing toxic effect
SM001	Denatured alcohol causing toxic effect
SM002	Grain alcohol causing toxic effect

SM00z	Ethyl alcohol causing toxic effect NOS
SM01.	Methyl alcohol causing toxic effect
SM011	Wood alcohol causing toxic effect
SM01z	Methyl alcohol causing toxic effect NOS
SM02.	Isopropyl alcohol causing toxic effect
SM022	Rubbing alcohol causing toxic effect
SM02z	Isopropyl alcohol causing toxic effect NOS
SM030	Amyl alcohol causing toxic effect
SM031	Butyl alcohol causing toxic effect
SM032	Propyl alcohol causing toxic effect
SM0y.	Other alcohol causing toxic effect
SM0z.	Alcohol causing toxic effect NOS
SyuG0	[X]Toxic effect of other alcohols
T90..	Accidental poisoning by alcohol, NEC
T900.	Accidental poisoning by alcoholic beverages
T901.	Accidental poisoning by other ethyl alcohol and its products
T9010	Accidental poisoning by denatured alcohol
T9012	Accidental poisoning by grain alcohol NOS
T901z	Accidental poisoning by ethyl alcohol NOS
T902.	Accidental poisoning by methyl alcohol
T9021	Accidental poisoning by wood alcohol
T902z	Accidental poisoning by methyl alcohol NOS
T903.	Accidental poisoning by isopropyl alcohol
T9032	Accidental poisoning by rubbing alcohol substitute
T9033	Accidental poisoning by secondary propyl alcohol
T903z	Accidental poisoning by isopropyl alcohol NOS
T90y.	Accidental poisoning by other alcohols
T90z.	Accidental poisoning by alcohol NOS
TJH3.	Adverse reaction to alcohol deterrents
U1A9.	[X]Accidental poisoning by and exposure to alcohol
U1A90	[X]Accidental poisoning by and exposure to alcohol, occurrence at home
U1A91	[X]Accidental poisoning by and exposure to alcohol, occurrence in residential institution
U1A92	[X]Accidental poisoning by and exposure to alcohol, occurrence at school, other institution and public administrative area
U1A93	[X]Accidental poisoning by and exposure to alcohol, occurrence at sports and athletics area
U1A94	[X]Accidental poisoning by and exposure to alcohol, occurrence on street and highway
U1A95	[X]Accidental poisoning by and exposure to alcohol, occurrence at trade and service area
U1A96	[X]Accidental poisoning by and exposure to alcohol, occurrence at industrial and construction area
U1A97	[X]Accidental poisoning by and exposure to alcohol, occurrence on farm
U1A9y	[X]Accidental poisoning by and exposure to alcohol, occurrence at other specified place
U1A9z	[X]Accidental poisoning by and exposure to alcohol, occurrence at unspecified place
U209.	[X]Intentional self poisoning by and exposure to alcohol
U2090	[X]Intentional self poisoning by and exposure to alcohol, occurrence at home
U2091	[X]Intentional self poisoning by and exposure to alcohol, occurrence in residential institution
U2092	[X]Intentional self poisoning by and exposure to alcohol, occurrence at school, other institution and public administrative area
U2093	[X]Intentional self poisoning by and exposure to alcohol, occurrence at sports and athletics area
U2094	[X]Intentional self poisoning by and exposure to alcohol, occurrence on street and highway
U2095	[X]Intentional self poisoning by and exposure to alcohol, occurrence at trade and service area

U2096	[X]Intentional self poisoning by and exposure to alcohol, occurrence at industrial and construction area
U2097	[X]Intentional self poisoning by and exposure to alcohol, occurrence on farm
U209y	[X]Intentional self poisoning by and exposure to alcohol, occurrence at other specified place
U209z	[X]Intentional self poisoning by and exposure to alcohol, occurrence at unspecified place
U409.	[X]Poisoning by and exposure to alcohol, undetermined intent
U4090	[X]Poisoning by and exposure to alcohol, occurrence at home, undetermined intent
U4091	[X]Poisoning by and exposure to alcohol, occurrence in residential institution, undetermined intent
U4092	[X]Poisoning by and exposure to alcohol, occurrence at school, other institution and public administrative area, undetermined intent
U4093	[X]Poisoning by and exposure to alcohol, occurrence at sports and athletics area, undetermined intent
U4094	[X]Poisoning by and exposure to alcohol, occurrence on street and highway, undetermined intent
U4095	[X]Poisoning by and exposure to alcohol, occurrence at trade and service area, undetermined intent
U4096	[X]Poisoning by and exposure to alcohol, occurrence at industrial and construction area, undetermined intent
U4097	[X]Poisoning by and exposure to alcohol, occurrence on farm, undetermined intent
U409y	[X]Poisoning by and exposure to alcohol, occurrence at other specified place, undetermined intent
U409z	[X]Poisoning by and exposure to alcohol, occurrence at unspecified place, undetermined intent
U60H3	[X]Alcohol deterrents causing adverse effects in therapeutic use
U60H3-1	[X] Adv react alcoh deterrents
U80..	[X]Evidence of alcohol involvement determined by blood alcohol level
U800.	[X]Evidence of alcohol involvement determined by blood alcohol level of less than 20 mg/100 ml
U801.	[X]Evidence of alcohol involvement determined by blood alcohol level of 20-39 mg/100 ml
U802.	[X]Evidence of alcohol involvement determined by blood alcohol level of 40-59 mg/100 ml
U803.	[X]Evidence of alcohol involvement determined by blood alcohol level of 60-79 mg/100 ml
U804.	[X]Evidence of alcohol involvement determined by blood alcohol level of 80-99 mg/100 ml
U805.	[X]Evidence of alcohol involvement determined by blood alcohol level of 100-119 mg/100 ml
U806.	[X]Evidence of alcohol involvement determined by blood alcohol level of 120-199 mg/100 ml
U807.	[X]Evidence of alcohol involvement determined by blood alcohol level of 200-239 mg/100 ml
U808.	[X]Evidence of alcohol involvement determined by blood alcohol level of 240 mg/100 ml or more
U80z.	[X]Evidence of alcohol involvement determined by presence of alcohol in blood, level not specified
U81..	[X]Evidence of alcohol involvement determined by level of intoxication
U810.	[X]Evidence of alcohol involvement determined by level of intoxication, mild alcohol intoxication
U811.	[X]Evidence of alcohol involvement determined by level of intoxication, moderate alcohol intoxication
U812.	[X]Evidence of alcohol involvement determined by level of intoxication, severe alcohol intoxication
U813.	[X]Evidence of alcohol involvement determined by level of intoxication, very severe alcohol intoxication
U814.	[X]Evidence of alcohol involvement determined by level of intoxication, alcohol involvement, not otherwise specified
ZV1A0	[V]Family history of alcohol abuse
ZV57A	[V]Alcohol rehabilitation
ZV6D6	Alcohol abuse counselling and surveillance
ZV704-1	Medicolegal blood alcohol

ZV70L	[V]Blood-alcohol and blood-drug test
ZV791	[V]Screening for alcoholism

Appendix J: Full list of zero-incidence Read codes[14]

Code	Preferred term
1282	Alcoholic in the family
1282	Alcoholic offspring
1282	Family history of alcoholism
1364	Moderate drinker - 3-6u/day
1365	Heavy drinker - 7-9u/day
1366	Very heavy drinker - >9u/day
1367	Stopped drinking alcohol
1368	Alcohol consumption unknown
1369	Suspect alcohol abuse - denied
1462	H/O: alcoholism
2577	O/E - breath - alcohol smell
6892	Alcohol consumption screen
12X0	Family history of alcohol abuse
1361-1	Non-drinker alcohol
1361-2	Non-drinker alcohol
136A	Ex-trivial drinker (<1u/day)
136a	Increasing risk drinking
136B	Ex-light drinker - (1-2u/day)
136b	Feels should cut down drinking
136C	Ex-moderate drinker - (3-6u/d)
136c	Higher risk drinking
136D	Ex-heavy drinker - (7-9u/day)
136d	Lower risk drinking
136E	Ex-very heavy drinker-(>9u/d)
136F	Alcohol intake above rec limit
136F	Spirit drinker
136G	Alcohol intake within rec limt
136G	Beer drinker
136H	Drinks beer and spirits
136I	Drinks wine
136J	Social drinker
136K	Alcohol intake above rec limit
136K	Beer drinker
136L	Spirit drinker
136N	Light drinker
136O	Moderate drinker
136P	Heavy drinker
136Q	Very heavy drinker
136V	Alcohol units per week

[14]Note that one code (PC0077) was subsequently removed from this list as it was identified as a non-Read code.

136X	Alcohol units consumed on heaviest drinking day
136Y	Drinks in morning to get rid of hangover
13Y8	Alcoholics anonymous
13ZY	Disqualified from driving due to excessive alcohol
1D19.	Pain in lymph nodes after alcohol consumption
38D2	Single alcohol screening test
38D3.	Alcohol use disorders identification test
38D4.	Alcohol use disorder identification test consumption questionnaire
38D5.	Alcohol use disorder identification test Piccinelli consumption questionnaire
4191-1	Breath alcohol level
63B7	Apgar at 10 minutes = 6
63C7	Maternal alcohol abuse
66e	Alcohol disorder monitoring
66eO	Alcohol abuse monitoring
67A5	Pregnancy alcohl advice
7P221	Delivery of rehabilitation for alcohol addiction
81A7	Alcohol consumtion screening test declined
8CAv.	Advised to contact primary care alcohol worker
8G32	Aversion therapy - alcohol
8H35	Admitted to alcohol detoxification centre
8HHe.	Referral to community drug and alcohol team
8HkJ.	Referral to alcohol brief intervention service
8IA7.	Alcohol consumption screening test declined
918b.	Carer of a person with alcohol misuse
9EQ	H0/RTS-police:venesect alc
9k1	Alcohol misuse - enhanced services administration
9K1	D750 form photo card driving licence
9k10	Community detoxification registered
9k11	Alcohol consumption counselling
9k14	Alcohol counselling by other agencies
9k16	Alcohol screen - fast alcohol screening test completed
9k18	Alcohol screen - AUDIT PC completed
9k19	Alcohol assessment declined - enhanced services admin
9k19-1	Alcohol assessment declined
9k1B	Extended intervention for excessive alcohol consumptn complt
9kl	Alcohol misuse - enhanced services administration
9NN2	Under care of community alcohol team
C1505	Alcohol-induced pseudo-Cushing's syndrome
E01.	Alcoholic psychoses
E010	Alcohol withdrawal delirium
E011	Alcohol amnestic syndrome
E0110	Korsakov psychosis
E0111	Korsakov's alcoholic psychosis with peripheral neuritis
E011z	Alcohol amnestic syndrome NOS
E012.	Alcoholic dementia NOS

E0120	Chronic alcoholic brain syndrome
E014	Pathological alcohol intoxication
E015.	Alcoholic paranoia
E01y.	Other alcoholic psychosis
E01yz	Other alcoholic psychosis NOS
E01z.	Alcoholic psychosis NOS
E230.	Acute alcoholic intoxication in alcoholism
E2300	Acute alcoholic intoxication, unspecified, in alcoholism
E2301	Continuous acute alcoholic intoxication in alcoholism
E230-1	Alcohol dep+acute alcohol intox
E2302	Episodic acute alcoholic intoxication in alcoholism
E2303	Acute alcoholic intoxication in remission, in alcoholism
E230z	Acute alcoholic intoxication in alcoholism NOS
E231.	Chronic alcoholism
E2310	Unspecified chronic alcoholism
E2311	Continuous chronic alcoholism
E2312	Episodic chronic alcoholism
E2313	Chronic alcohol. - in remission
E231z	Chronic alcoholism NOS
E2500	Alcohol abuse - unspecified
E2500	Nondependent alcohol abuse, unspecified
E2501	Alcohol abuse - continuous
E2501	Nondependent alcohol abuse, continuous
E2502	Nondependent alcohol abuse, episodic
E2503	Alcohol abuse - in remission
E2503	Nondependent alcohol abuse in remission
E250z	Nondependent alcohol abuse NOS
Eu10	Mental and behavioural disorders due to use of alcohol
Eu100	[X] Mental & behav dis due to use alcohol: acute intoxication
Eu100	Mental & behv dis due to use of alcohol: acute intoxication
Eu101	[X] Mental & behav dis due to use alcohol: harmful use
Eu101	Mental & behv dis due to use of alcohol: harmful use
Eu103	[X] Mental & behav dis due to use alcohol: withdrawal state
Eu104	[X] Mental & behav dis due to use alcohol: withdrawl state with delirium
Eu106	[X] Mental & behav dis due to use alcohol: amnesic syndrome
Eu106-1	[X] Korsakov's alcohol induced
Eu107	[X] Mental & behav dis due to use alcohol: resid & late-onset psychot dis
Eu107-2	[X] Chronic alcohol brain syndr
Eu10y	[X] Mental & behav dis due to use alcohol: oth men & behav dis
Eu10z	[X]Mental and behavioural disorders due to use of alcohol: unspecified mental and behavioural disorder
F11x0	Alcoholic encephalopathy
F1440	Alcoholic cerebellar degeneration
F25B.	Alcohol-induced epilepsy

F375.	Alcohol-related polyneuropathy
F3941	Alcoholic myopathy
G555.	Alcohol-induced heart muscle disease
G8523	Oesophageal varices in alcohol cirrhosis of the liver
HO/0	Ho/Rts-Police: Venesect Alcohol
J153.	Alcoholic gastritis
J610.	Alcoholic fatty liver
J611.	Acute alcoholic hepatitis
J612.	Alcoholic cirrhosis of liver
J612.	Florid cirrhosis
J612.	Portal cirrhosis
J6120	Alcoholic fibrosis and sclerosis of liver
J613.	Alcoholic liver damage unspecified
J6130	Alcoholic hepatic failure
J615.	Portal cirrhosis
J615z	Cryptogenic cirrhosis
J615z	Fibrosis of liver
J617.	Alcoholic hepatitis
J6170	Chronic alcoholic hepatitis
J6710	Alcohol-induced chronic pancreatitis
L254-1	Suspect fetal alcohol damage
L2553	Maternal care for (suspected) damage to fetus from alcohol
PK80	Fetal alcohol syndrome
PK83	Fetus and newborn affected by maternal use of alcohol
Q0071	Fetus/neonate affected by placental/breast transfer alcohol
Q0071 -1	Fetal alcohol syndrome
R103	[D] Alcohol blood excess
SLH3	Alcohol deterrent poisoning
SM0	Alcohol - toxic effect
SM00	Ethyl alcohol - toxic effect
SM001	Denatured alcohol causing toxic effect
SM002	Grain alcohol - toxic effect
SM00z	Ethyl alcohol causing toxic effect NOS
SM01	Methyl alcohol causing toxic effect
SM011	Wood alcohol - toxic effect
SM02.	Isopropyl alcohol causing toxic effect
SM022	Rubbing alcohl cuasing toxic effect
SM02z	Isopropyl alcohol causing toxic effect NOS
SM030	Amyl alcohol - toxic effect
SM031	Butyl alcohol - toxic effect
SM032	Propyl alcohol causing toxic effect
SM0y	Other alcohol - toxic effect
SM0z	Alcohol - toxic effect NOS
SyuG0	[X]Toxic effect of other alcohols

T90	Accidental poisoning by alcohl NEC
T900.	Accidental poisoning by alcoholic beverages
T901.	Accidental poisoning by other ethyl alcohol and its products
T9010	Accidental poisoning by denatured alcohol
T9012	Accidental poisoning by grain alcohol NOS
T901z	Accidental poisoning by ethyl alcohol NOS
T902	Accidental poisoning by methyl alcohol
T9021	Accidental poisoning by wood alcohol
T902z	Accidental poisoning by methyl alcohol NOS
T903	Accidental poisoning by isopropyl alcohol
T9032	Accidental poisoning by rubbing alcohol substitute
T9033	Accidental poisoning by secondary propyl alcohol
T903z	Accidental poisoning by isopropyl alcohol NOS
T90y.	Accidental poisoning by other alcohols
T90z	Accidental poisoning by alcohol NOS
TJH3	Adverse reaction to alcohol deterrents
U1A9	[X] Accident poisoning/exposure to alcohol
U1A90	[X] Accident poison/exposure to alcohol at home
U1A91	[X] Accid poison/expos to alcohol at res institut
U1A92	[X] Acc poison/expos alcohol school/pub admin area
U1A93	[X] Accid pois/expos alcohol in sport/athletic area
U1A94	[X] Accid poison/expos to alcohol in street/highway
U1A95	[X] Accid poison/expos to alcohol trade/service area
U1A96	[X] Accid pois/expos alcohol indust/construct area
U1A97	[X] Accident poison/exposure to alcohol on farm
U1A9y	[X] Accid pois/expos to alcohl other spec place
U1A9z	[X] Accid poison/expos to alcohol unspecif place
U209	[X] Intent self poison/exposure to alcohol
U2090	[X] Int self poison/exposure to alcohol at home
U2091	[X] Intent self poison alcohol at res institut
U2092	[X] Int self poison alcohol school/pub admin area
U2093	[X] Int self poison alcohol in sport/athletic area
U2094	[X] Intent self poison alcohol in street/highway
U2095	[X] Intent self pois alcohol trade/service area
U2096	[X] Int self pois alcohol indust/construct area
U2097	[X] Int self poison/exposure to alcohol on farm
U209y	[X] Int self poison alcohol other spec place
U209z	[X] Intent self poison alcohol unspecif place
U409	[X] Poisoning/exposure, ? Intent, to alcohol
U4090	[X] Poison/exposure ?intent, to alcohol at home
U4091	[X] Pois/expos ?intent to alcohol at res institut
U4092	[X] Pois/exp ?intent alcohol school/pub admin area
U4093	[X] Pois/exp ?intent alcohol in sport/athletic area
U4094	[X] Pois/expos ?intent to alcohol in street/highway
U4095	[X] Pois/expos ?intent to alcohol trade/service area

U4096	[X] Poison/exposure ?intent, alcohol indust/construct area
U4097	[X] Poison/exposure ?intent, to alcohol on farm
U409y	[X] Pois/exp ?intent to alcohol other spec place
U409z	[X] Pois/expos ?intent to alcohol unspecif place
U60H3	[X] Alcohol deterrents caus adverse effects in therapeut use
U60H3-1	[X] Adv react alcoh deterrents
U80	[X] Evidence of alcohl involv determin by blood alcohl level
U800.	[X]Evidence of alcohol involvement determined by blood alcohol level of less than 20 mg/100 ml
U801.	[X]Evidence of alcohol involvement determined by blood alcohol level of 20-39 mg/100 ml
U802.	[X]Evidence of alcohol involvement determined by blood alcohol level of 40-59 mg/100 ml
U803.	[X]Evidence of alcohol involvement determined by blood alcohol level of 60-79 mg/100 ml
U804.	[X]Evidence of alcohol involvement determined by blood alcohol level of 80-99 mg/100 ml
U805.	[X]Evidence of alcohol involvement determined by blood alcohol level of 100-119 mg/100 ml
U806.	[X]Evidence of alcohol involvement determined by blood alcohol level of 120-199 mg/100 ml
U807.	[X]Evidence of alcohol involvement determined by blood alcohol level of 200-239 mg/100 ml
U808.	[X]Evidence of alcohol involvement determined by blood alcohol level of 240 mg/100 ml or more
U80z.	[X]Evidence of alcohol involvement determined by presence of alcohol in blood, level not specified
U81	[X] Evid of alcohol involv determind by level of intoxication
U810.	[X]Evidence of alcohol involvement determined by level of intoxication, mild alcohol intoxication
U811.	[X]Evidence of alcohol involvement determined by level of intoxication, moderate alcohol intoxication
U812.	[X]Evidence of alcohol involvement determined by level of intoxication, severe alcohol intoxication
U813.	[X]Evidence of alcohol involvement determined by level of intoxication, very severe alcohol intoxication
U814.	[X]Evidence of alcohol involvement determined by level of intoxication, alcohol involvement, not otherwise specified
ZV113	[V]Personal history of alcoholism
ZV1A0	Family history of alcohol abuse
Zv4KC	Alcohol use
ZV57A	Alcohol rehabilitation
ZV704-1	Medicolegal blood alcohol
ZV70L	[V]Blood-alcohol and blood-drug test
ZV791	Alcoholism screening

Appendix K: Full Read code analysis tables for all variables

Table K1: Rates (%) of recorded hazardous and harmful level alcohol consumption 2010-2011 by individual practice, enhanced service status, size of practice and gender including lower (LCI) and upper (UCI) confidence intervals

		Male					Female				
		Base	Count	Rate	LCI	UCI	Base	Count	Rate	LCI	UCI
Individual Practice	NOTW1	690	17	2.46	1.54	3.91	682	2	0.29	0.08	1.06
	NOTW2	8076	348	4.31	3.89	4.77	8421	125	1.48	1.25	1.77
	NOTW3	4944	399	8.07	7.34	8.86	4882	380	7.78	7.06	8.57
	NOTW4	1552	15	0.97	0.59	1.59	1539	11	0.71	0.40	1.28
	NOTW5	3813	218	5.72	5.02	6.50	3838	96	2.50	2.05	3.04
	NOTW6	3291	97.	2.95	2.42	3.58	3468	54	1.56	1.20	2.03
	NOTW7	3870	176	4.55	3.94	5.25	4149	86	2.07	1.68	2.55
	NOTW8	284	8	2.82	1.43	5.46	312	4	1.28	0.50	3.25
	NOTW9	4202	5440	12.95	11.96	14.00	4591	193	4.20	3.66	4.82
	SOTW1	2577	321	12.46	11.24	13.79	2313	83	3.59	2.90	4.43
	SOTW2	712	218	30.62	27.34	34.10	518	219	42.28	38.10	46.57
	SOTW3	1465	292	19.93	17.97	22.05	1552	298	19.20	17.32	21.24
	SOTW4	2444	444	18.17	16.69	19.75	2390	548	22.93	21.29	24.66
	SOTW5	2935	12	0.41	0.23	0.71	3326	13	0.39	0.23	0.67
	SOTW6	3633	234	6.44	5.69	7.29	3907	115	2.94	2.46	3.52
	SOTW7	8078	735	9.10	8.49	9.75	8352	355	4.25	3.84	4.70
Enhanced service	None	16449	759	4.61	4.30	4.95	17090	59	0.35	0.27	0.45
	Only DES	14273	1063	7.45	7.03	7.89	14792	642	4.34	4.02	4.68
	DES & LES	21844	2256	10.33	9.93	10.74	22358	1628	7.28	6.95	7.63
Size / type of practice	Larger than average	28540	2306	8.08	7.77	8.40	29719	1225	4.12	3.90	4.35
	Smaller than average	12659	1327	10.48	9.96	11.03	12632	1175	9.30	8.81	9.82
	Multi-site	11367	445	3.91	3.57	4.29	11889	179	1.51	1.30	1.74

Table K2: Rates (%) of recorded delivery of short screening test (FAST or AUDIT-C) for alcohol use disorders 2010-2011 by individual practice and gender including lower and upper confidence intervals

	Male					Female				
Practice	**Base**	**Count**	**Rate**	**LCI**	**UCI**	**Base**	**Count**	**Rate**	**LCI**	**UCI**
NOTW1	690	15	2.17	1.32	3.56	682	0	0.00	0.00	0.56
NOTW2	8076	1	0.01	0.00	0.07	8421	1	0.01	0.00	0.07
NOTW3	4944	0	0.00	0.00	0.08	4882	0	0.00	0.00	0.08
NOTW4	1552	76	4.90	3.93	6.09	1539	78	5.07	4.08	6.28
NOTW5	3813	0	0.00	0.00	0.10	3838	0	0.00	0.00	0.10
NOTW6	3291	1	0.03	0.01	0.17	3468	0	0.00	0.00	0.11
NOTW7	3870	0	0.00	0.00	0.10	4149	0	0.00	0.00	0.09
NOTW8	284	155	54.58	48.76	60.27	312	180	57.69	52.15	63.05
NOTW9	4202	279	6.64	5.93	7.43	4591	369	8.04	7.29	8.86
SOTW1	2577	180	6.98	6.06	8.03	2313	165	7.13	6.15	8.26
SOTW2	712	184	25.84	22.76	29.18	518	181	34.94	30.96	39.15
SOTW3	1465	238	16.25	14.45	18.22	1552	230	14.82	13.14	16.67
SOTW4	2444	0	0.00	0.00	0.16	2390	0	0.00	0.00	0.16
SOTW5	2935	121	4.12	3.46	4.90	3326	138	4.15	3.52	4.88
SOTW6	3633	85	2.34	1.90	2.88	3907	36	0.92	0.67	1.27
SOTW7	8078	6	0.07	0.03	0.16	8352	10	0.12	0.07	0.22

Table K3: Rates (%) of recorded delivery of short screening test (FAST or AUDIT-C) for alcohol use disorders 2010-2011 by enhanced service status and gender including lower and upper confidence intervals

	Male					Female				
Enhanced service	**Base**	**Count**	**Rate**	**LCI**	**UCI**	**Base**	**Count**	**Rate**	**LCI**	**UCI**
None	16449	16	0.097	0.06	0.16	17090	1	0.01	0.00	0.03
Only DES	14273	511	3.58	3.288	3.90	14792	627	4.24	3.93	4.58
DES & LES	21844	814	3.73	3.48	3.99	22358	760	3.40	3.17	3.64

Table K4: Rates (%) of recorded delivery of short screening test (FAST or AUDIT-C) for alcohol use disorders 2010-2011 by size / type of practice and gender including lower and upper confidence intervals

	Male					Female				
Size of practice	Base	Count	Rate	LCI	UCI	Base	Count	Rate	LCI	UCI
Larger than average	28540	370	1.30	1.17	1.43	29719	415	1.40	1.27	1.54
Smaller than average	12659	969	7.65	7.20	8.13	12632	972	7.69	7.24	8.17
Multi-site	11367	2	0.02	0.00	0.06	11889	1	0.01	0.00	0.05

Table K5: Rates (%) of recorded delivery of full AUDIT screening test for alcohol use disorders 2010-2011 by individual practice, enhanced service for alcohol status, size/type of practice and gender

		Male					Female				
		Base	**Count**	**Rate**	**LCI**	**UCI**	**Base**	**Count**	**Rate**	**LCI**	**UCI**
Individual Practice	NOTW1	690	0	0.00	0.00	0.55	682	0	0.00	0.00	0.56
	NOTW2	8076	46	0.57	0.43	0.76	8421	11	0.13	0.07	0.23
	NOTW3	4944	19	0.38	0.25	0.60	4882	11	0.23	0.13	0.40
	NOTW4	1552	0	0.00	0.00	0.25	1539	0	0.00	0.00	0.25
	NOTW5	3813	0	0.00	0.00	0.10	3838	0	0.00	0.00	0.10
	NOTW6	3291	0	0.00	0.00	0.12	3468	0	0.00	0.00	0.11
	NOTW7	3870	0	0.00	0.00	0.10	4149	0	0.00	0.00	0.09
	NOTW8	284	20	7.04	4.60	10.63	312	11	3.53	1.98	6.20
	NOTW9	4202	440	10.47	9.58	11.43	4591	568	12.37	11.45	13.36
	SOTW1	2577	0	0.00	0.00	0.15	2313	0	0.00	0.00	0.17
	SOTW2	712	5	0.70	0.30	1.63	518	5	0.97	0.41	2.24
	SOTW3	1465	16	1.09	0.67	1.77	1552	6	0.39	0.18	0.84
	SOTW4	2444	0	0.00	0.00	0.16	2390	0	0.00	0.00	0.16
	SOTW5	2935	0	0.00	0.00	0.13	3326	0	0.00	0.00	0.12
	SOTW6	3633	68	1.87	1.48	2.37	3907	25	0.64	0.43	0.94
	SOTW7	8078	594	7.35	6.80	7.94	8352	802	9.60	8.99	10.25
Enhanced service	None	16449	46	0.28	0.21	0.37	17090	11	0.06	0.04	0.12
	Only DES	14273	479	3.36	3.07	3.66	14792	590	3.99	3.69	4.32
	DES & LES	21844	683	3.13	2.90	3.37	22358	838	3.75	3.51	4.01
Size / type of practice	Larger than average	28540	1121	3.93	3.71	4.16	29719	1406	4.73	4.50	4.98
	Smaller than average	12659	41	0.32	0.24	0.44	12632	22	0.17	0.12	0.26
	Multi-site	11367	46	0.40	0.30	0.54	11889	11	0.09	0.05	0.17

Table K6: Rates (%) of recorded delivery of brief advice for alcohol 2010-2011 by individual practice and gender including lower and upper confidence intervals

	Male					Female				
Practice	**Base**	**Count**	**Rate**	**LCI**	**UCI**	**Base**	**Count**	**Rate**	**LCI**	**UCI**
NOTW1	690	0	0.00	0.00	0.55	682	0	0.00	0.00	0.56
NOTW2	8076	46	0.57	0.43	0.76	8421	22	0.26	0.17	0.40
NOTW3	4944	227	4.59	4.04	5.21	4882	306	6.27	5.62	6.98
NOTW4	1552	0	0.00	0.00	0.25	1539	0	0.00	0.00	0.25
NOTW5	3813	436	11.43	10.46	12.48	3838	280	7.30	6.51	8.16
NOTW6	3291	1	0.03	0.01	0.17	3468	0	0.00	0.00	0.11
NOTW7	3870	497	12.84	11.83	13.93	4149	296	7.13	6.39	7.96
NOTW8	284	0	0.00	0.00	1.33	312	0	0.00	0.00	1.22
NOTW9	4202	411	9.78	8.92	10.72	4591	619	13.48	12.53	14.50
SOTW1	2577	636	24.68	23.05	26.38	2313	529	22.87	21.20	24.63
SOTW2	712	119	16.71	14.15	19.63	518	100	19.31	16.14	22.92
SOTW3	1465	156	10.65	9.17	12.33	1552	124	7.99	6.74	9.44
SOTW4	2444	216	8.84	7.78	10.03	2390	247	10.33	9.18	11.62
SOTW5	2935	20	0.68	0.44	1.05	3326		0.09	0.03	0.26
SOTW6	3633	250	6.88	6.10	7.75	3907	186	4.76	4.14	5.47
SOTW7	8078	567	7.02	6.48	7.60	8352	318	3.81	3.42	4.24

Table K7: Rates (%) of recorded delivery of brief advice for alcohol 2010-2011 by enhanced service status and gender including lower and upper confidence intervals

	Male					Female				
Enhanced service	Base	Count	Rate	LCI	UCI	Base	Count	Rate	LCI	UCI
None	16449	979	5.95	5.60	6.32	17090	598	3.50	3.23	3.79
Only DES	14273	639	4.48	4.15	4.83	14792	925	6.25	5.87	6.66
DES & LES	21844	1964	8.99	8.62	9.38	22358	1507	6.74	6.42	7.08

Table K8: Rates (%) of recorded delivery of brief advice for alcohol 2010-2011 by size/type of practice, and gender including lower and upper confidence intervals

	Male					Female				
Size/type of practice	Base	Count	Rate	LCI	UCI	Base	Count	Rate	LCI	UCI
Larger than average	28540	2388	8.37	8.05	8.69	29719	2005	6.75	6.47	7.04
Smaller than average	12659	1147	9.06	8.57	9.57	12632	1003	7.94	7.48	8.42
Multi-site	11367	47	0.41	0.31	0.55	11889	22	0.19	0.12	0.28

Table K9: Rates (%) of recorded delivery of brief intervention for alcohol 2010-2011 by individual practice and gender including lower and upper confidence intervals

	Male					Female				
Practice	**Base**	**Count**	**Rate**	**LCI**	**UCI**	**Base**	**Count**	**Rate**	**LCI**	**UCI**
NOTW1	690	0	0.00	0.00	0.55	682	0	0.00	0.00	0.56
NOTW2	8076	2	0.02	0.01	0.09	8421	2	0.02	0.01	0.09
NOTW3	4944	9	0.18	0.10	0.35	4882	10	0.20	0.11	0.38
NOTW4	1552	0	0.00	0.00	0.25	1539	0	0.00	0.00	0.25
NOTW5	3813	3	0.08	0.03	0.23	3838	1	0.03	0.00	0.15
NOTW6	3291	0	0.00	0.00	0.12	3468	0	0.00	0.00	0.11
NOTW7	3870	0	0.00	0.00	0.10	4149	0	0.00	0.00	0.09
NOTW8	284	28	9.86	6.91	13.88	312	19	6.09	3.93	9.31
NOTW9	4202	519	12.35	11.39	13.38	4591	534	11.63	10.74	12.59
SOTW1	2577	0	0.00	0.00	0.15	2313	0	0.00	0.00	0.17
SOTW2	712	2	0.28	0.08	1.02	518	0	0.00	0.00	0.74
SOTW3	1465	4	0.27	0.11	0.70	1552	1	0.06	0.01	0.36
SOTW4	2444	0	0.00	0.00	0.16	2390	0	0.00	0.00	0.16
SOTW5	2935	0	0.00	0.00	0.13	3326	0	0.00	0.00	0.12
SOTW6	3633	67	1.84	1.45	2.34	3907	3	0.08	0.03	0.23
SOTW7	8078	89	1.10	0.90	1.35	8352	35	0.42	0.30	0.58

Table K10: Rates (%) of recorded delivery of brief intervention for alcohol 2010-2011 by enhanced service status and gender including lower and upper confidence intervals

	Male					Female				
Enhanced service	Base	Count	Rate	LCI	UCI	Base	Count	Rate	LCI	UCI
None	16449	5	0.03	0.01	0.07	17090	3	0.02	0.01	0.05
Only DES	14273	556	3.90	3.59	4.23	14792	563	3.81	3.51	4.13
DES & LES	21844	162	0.74	0.64	0.86	22358	39	0.17	0.13	0.24

Table K11: Rates (%) of recorded delivery of brief intervention for alcohol 2010-2011 by size / type of practice and gender including lower and upper confidence intervals

	Male					Female				
Size/type of practice	Base	Count	Rate	LCI	UCI	Base	Count	Rate	LCI	UCI
Larger than average	28540	687	2.41	2.24	2.59	29719	583	1.96	1.81	2.13
Smaller than average	12659	34	0.27	0.19	0.38	12632	20	0.16	0.10	0.24
Multi-site	11367	2	0.02	0.00	0.06	11889	2	0.02	0.00	0.06

Table K12: Rates (%) of recorded delivery of extended intervention for alcohol 2010-2011 by individual practice and gender including lower and upper confidence intervals

	Male					Female				
Practice	Base	Count	Rate	LCI	UCI	Base	Count	Rate	LCI	UCI
NOTW1	690	0	0.00	0.00	0.55	682	0	0.00	0.00	0.56
NOTW2	8076	0	0.00	0.00	0.05	8421	0	0.00	0.00	0.05
NOTW3	4944	1	0.02	0.00	0.11	4882	0	0.00	0.00	0.08
NOTW4	1552	0	0.00	0.00	0.25	1539	0	0.00	0.00	0.25
NOTW5	3813	0	0.00	0.00	0.10	3838	0	0.00	0.00	0.10
NOTW6	3291	0	0.00	0.00	0.12	3468	0	0.00	0.00	0.11
NOTW7	3870	0	0.00	0.00	0.10	4149	0	0.00	0.00	0.09
NOTW8	284	0	0.00	0.00	1.33	312	0	0.00	0.00	1.22
NOTW9	4202	0	0.00	0.00	0.09	4591	0	0.00	0.00	0.08
SOTW1	2577	0	0.00	0.00	0.15	2313	0	0.00	0.00	0.17
SOTW2	712	0	0.00	0.00	0.54	518	0	0.00	0.00	0.74
SOTW3	1465	0	0.00	0.00	0.26	1552	0	0.00	0.00	0.25
SOTW4	2444	0	0.00	0.00	0.16	2390	0	0.00	0.00	0.16
SOTW5	2935	0	0.00	0.00	0.13	3326	0	0.00	0.00	0.12
SOTW6	3633	2	0.06	0.02	0.20	3907	3	0.08	0.03	0.23
SOTW7	8078	0	0.00	0.00	0.05	8352	0	0.00	0.00	0.05

Table K13: Rates (%) of recorded delivery of extended intervention for alcohol 2010-2011 by enhanced service status and gender, including lower and upper confidence intervals

	Male					Female				
Enhanced service	**Base**	**Count**	**Rate**	**LCI**	**UCI**	**Base**	**Count**	**Rate**	**LCI**	**UCI**
None	16449	0	0.00	0.00	0.02	17090	0	0.00	0.00	0.02
Only DES	14273	1	0.01	0.00	0.04	14792	0	0.00	0.00	0.03
DES & LES	21844	2	0.01	0.00	0.03	22358	3	0.01	0.00	0.04

Table K14: Rates (%) of recorded delivery of extended intervention for alcohol 2010-2011 by enhanced service status and gender, including lower and upper confidence intervals

	Male					Female				
Size /type of practice	Base	Count	Rate	LCI	UCI	Base	Count	Rate	LCI	UCI
Larger than average	28540	3	0.01	0.00	0.03	29719	3	0.01	0.00	0.03
Smaller than average	12659	0	0.00	0.00	0.03	12632	0	0.00	0.00	0.03
Multi-site	11367	0	0.00	0.00	0.03	11889	0	0.00	0.00	0.03

Table K15: Rates (%) of recorded delivery of brief advice, brief intervention and /or extended intervention for alcohol 2010-2011 by individual practice and gender including lower and upper confidence intervals

	Male					Female				
Practice	**Base**	**Count**	**Rate**	**LCI**	**UCI**	**Base**	**Count**	**Rate**	**LCI**	**UCI**
NOTW1	690	0	0.00	0.00	0.55	682	0	0.00	0.00	0.56
NOTW2	8076	48	0.59	0.45	0.79	8421	24	0.29	0.19	0.42
NOTW3	4944	237	6.22	5.49	7.03	4882	316	8.23	7.41	9.15
NOTW4	1552	0	0.00	0.00	0.10	1539	0	0.00	0.00	0.09
NOTW5	3813	439	8.88	8.12	9.70	3838	281	5.76	5.14	6.44
NOTW6	3291	1	0.06	0.01	0.36	3468	0	0.00	0.00	0.25
NOTW7	3870	497	15.10	13.92	16.37	4149	296	8.54	7.65	9.51
NOTW8	284	28	9.86	6.91	13.88	312	19	6.09	3.93	9.31
NOTW9	4202	930	22.13	20.90	23.41	4591	1153	25.11	23.88	26.39
SOTW1	2577	636	24.68	23.05	26.38	2313	529	22.87	21.20	24.63
SOTW2	712	121	16.99	14.41	19.93	518	100	19.31	16.14	22.92
SOTW3	1465	160	10.92	9.43	12.62	1552	125	8.05	6.80	9.51
SOTW4	2444	216	8.84	7.78	10.03	2390	247	10.33	9.18	11.62
SOTW5	2935	20	0.68	0.44	1.05	3326	3	0.09	0.03	0.26
SOTW6	3633	319	8.78	7.90	9.75	3907	192	4.91	4.28	5.64
SOTW7	8078	656	8.12	7.54	8.74	8352	353	4.23	3.82	4.68

Table K16: Rates (%) of recorded delivery of brief advice, brief intervention and /or extended intervention for alcohol 2010-2011 by enhanced service for alcohol and gender including lower and upper confidence intervals

	Male					Female				
Enhanced service	**Base**	**Count**	**Rate**	**LCI**	**UCI**	**Base**	**Count**	**Rate**	**LCI**	**UCI**
None	16449	984	5.98	5.63	6.35	17090	601	3.52	3.25	3.80
Only DES	14273	1196	8.38	7.94	8.85	14792	1488	10.06	9.59	10.55
DES & LES	21844	2128	9.74	9.36	10.14	22358	1549	6.93	6.60	7.27

Table K17: Rates (%) of recorded delivery of brief advice, brief intervention and /or extended intervention for alcohol 2010-2011 by size / type of practice and gender including lower and upper confidence intervals

	Male					Female				
	Base	**Count**	**Rate**	**LCI**	**UCI**	**Base**	**Count**	**Rate**	**LCI**	**UCI**
Larger than average	28540	3078	10.78	10.43	11.15	29719	2591	8.72	8.40	9.04
Smaller than average	12659	1181	9.33	8.83	9.85	12632	1023	8.10	7.64	8.59
Multi-site	11367	49	0.43	0.33	0.57	11889	24	0.20	0.14	0.30

Table K18: Rates (%) of recorded delivery of specialist referrals for alcohol 2010-2011 by individual practice and gender including lower and upper confidence intervals

	Male					Female				
Practice	Base	Count	Rate	LCI	UCI	Base	Count	Rate	LCI	UCI
NOTW1	690	0	0.00	0.00	0.55	682	0	0.00	0.00	0.56
NOTW2	8076	0	0.00	0.00	0.05	8421	0	0.00	0.00	0.05
NOTW3	4944	2	0.04	0.01	0.15	4882	2	0.04	0.01	0.15
NOTW4	1552	0	0.00	0.00	0.25	1539	0	0.00	0.00	0.25
NOTW5	3813	0	0.00	0.00	0.10	3838	0	0.00	0.00	0.10
NOTW6	3291	0	0.00	0.00	0.12	3468	0	0.00	0.00	0.11
NOTW7	3870	0	0.00	0.00	0.10	4149	0	0.00	0.00	0.09
NOTW8	284	2	0.70	0.19	2.53	312	0	0.00	0.00	1.22
NOTW9	4202	0	0.00	0.00	0.09	4591	0	0.00	0.00	0.08
SOTW1	2577	0	0.00	0.00	0.15	2313	0	0.00	0.00	0.17
SOTW2	712	1	0.14	0.02	0.79	518	0	0.00	0.00	0.74
SOTW3	1465	1	0.07	0.01	0.39	1552	0	0.00	0.00	0.25
SOTW4	2444	2	0.08	0.02	0.30	2390	2	0.08	0.02	0.30
SOTW5	2935	4	0.14	0.05	0.35	3326	4	0.12	0.05	0.31
SOTW6	3633	9	0.25	0.13	0.47	3907	6	0.15	0.07	0.33
SOTW7	8078	6	0.07	0.03	0.16	8352	3	0.04	0.01	0.11

Table K19: Rates (%) of recorded delivery of community detox for alcohol 2010-2011 by individual practice and gender including lower and upper confidence intervals

	Male					Female				
Practice	Base	Count	Rate	LCI	UCI	Base	Count	Rate	LCI	UCI
NOTW1	690	0	0.00	0.00	0.55	682	0	0.00	0.00	0.56
NOTW2	8076	0	0.00	0.00	0.05	8421	0	0.00	0.00	0.05
NOTW3	4944	0	0.00	0.00	0.08	4882	0	0.00	0.00	0.08
NOTW4	1552	0	0.00	0.00	0.25	1539	0	0.00	0.00	0.25
NOTW5	3813	1	0.03	0.00	0.15	3838	2	0.05	0.01	0.19
NOTW6	3291	0	0.00	0.00	0.12	3468	0	0.00	0.00	0.11
NOTW7	3870	0	0.00	0.00	0.10	4149	0	0.00	0.00	0.09
NOTW8	284	0	0.00	0.00	1.33	312	0	0.00	0.00	1.22
NOTW9	4202	2	0.05	0.01	0.17	4591	1	0.02	0.00	0.12
SOTW1	2577	0	0.00	0.00	0.15	2313	0	0.00	0.00	0.17
SOTW2	712	1	0.14	0.02	0.79	518	0	0.00	0.00	0.74
SOTW3	1465	0	0.00	0.00	0.26	1552	0	0.00	0.00	0.25
SOTW4	2444	0	0.00	0.00	0.16	2390	0	0.00	0.00	0.16
SOTW5	2935	0	0.00	0.00	0.13	3326	1	0.03	0.01	0.17
SOTW6	3633	2	0.06	0.02	0.20	3907	0	0.00	0.00	0.10
SOTW7	8078	0	0.00	0.00	0.05	8352	2	0.02	0.01	0.09

Table K20: Rates (%) of recorded delivery of specialist referrals for alcohol 2010-2011 by enhanced service status and gender including lower and upper confidence intervals

	Male					Female				
Enhanced service	Base	Count	Rate	LCI	UCI	Base	Count	Rate	LCI	UCI
None	16449	0	0.00	0.00	0.02	17090	0	0.00	0.00	0.02
Only DES	14273	4	0.03	0.01	0.07	14792	2	0.01	0.00	0.05
DES & LES	21844	23	0.11	0.07	0.16	22358	15	0.07	0.04	0.11

Table K21: Rates (%) of recorded delivery of community detox for alcohol 2010-2011 by enhanced service status and gender including lower and upper confidence intervals

	Male					Female				
Enhanced service	Base	Count	Rate	LCI	UCI	Base	Count	Rate	LCI	UCI
None	16449	1	0.01	0.00	0.03	17090	2	0.01	0.00	0.04
Only DES	14273	2	0.01	0.00	0.05	14792	1	0.01	0.00	0.04
DES & LES	21844	3	0.01	0.00	0.04	22358	3	0.01	0.00	0.04

Table K22: Rates (%) of recorded delivery of specialist referrals for alcohol 2010-2011 by size/type of practice and gender including lower and upper confidence intervals

	Male					Female				
	Base	Count	Rate	LCI	UCI	Base	Count	Rate	LCI	UCI
Larger than average	28540	17	0.06	0.04	0.10	29719	11	0.04	0.02	0.07
Smaller than average	12659	10	0.08	0.04	0.15	12632	6	0.05	0.02	0.10
Multi-site	11367	0	0.00	0.00	0.03	11889	0	0.00	0.00	0.03

Table K23: Rates (%) of recorded delivery of community detox for alcohol 2010-2011 by size/type of practice and gender including lower and upper confidence intervals

	Male					Female				
	Base	Count	Rate	LCI	UCI	Base	Count	Rate	LCI	UCI
Larger than average	28540	5	0.02	0.01	0.04	29719	5	0.02	0.01	0.04
Smaller than average	12659	1	0.01	0.00	0.04	12632	1	0.01	0.00	0.04
Multi-site	11367	0	0.00	0.00	0.03	11889	0	0.00	0.00	0.03

Appendix L: Interview consent form

Please tick the appropriate boxes:

I have read and understood the project information sheet dated 01/01/2012.	☐
I have been given the opportunity to consider the information, ask questions, and have had these answered satisfactorily.	☐
I understand that my taking part is voluntary; I can withdraw from the study at any time, without giving reason and without my legal rights being affected. I understand that if I withdraw, that information already collected with my consent will be retained and used in the study.	☐
I understand that my personal details will not be revealed to people outside the project.	☐
I understand that the confidentiality of the information collected will be maintained, it will be stored securely in locked university offices and computer files will be password protected.	☐
I understand that, during the course of the study, should any unprofessional, or unethical, or unsafe practices be identified, the researcher has a duty to inform the relevant authorities.	☐
I consent to the use of audio taping, with the possible use of anonymous direct quotes in the study report.	☐
I have read and understood the information and I agree to take part in this study.	☐

_____	_____	_____
Name of Participant	*Signature*	*Date*
Amy O'Donnell	_____	_____
Name of Researcher	*Signature*	*Date*

Contact details for further information:

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Appendix M: GP Interview Participant Information sheet

You are being invited to take part in a research study. Before you decide it is important for you to understand why the research is being done and what your participation in the study will involve. Please take time to read the following information carefully. Talk to others about the study if you wish. Part 1 explains the purpose of the study and what will happen to you if you take part. Part 2 gives you more detailed information about the conduct of the study. I will go through this information sheet with you, please feel free to ask me questions if there is anything you are unsure about or if you would like further information. This should take 5-10 minutes.

Part 1: About the research

What is the purpose of the study?

This research will look at the use of routinely collected medical data to monitor and evaluate the delivery of Screening and Brief Interventions (SBI) for alcohol in primary healthcare. This reflects a key public health priority to respond to alcohol misuse and alcohol-related harm; and in particular, growing support for SBIs for alcohol as a cost-effective preventative approach. The research will draw on a range of newly available medical data to investigate the delivery of SBIs for alcohol in 20 general practices based across six primary care trusts in North East England: Newcastle; North Tyneside, Northumberland; Gateshead; South Tyneside and Sunderland. Key new data sources include new Read Codes associated with the identification and management of risky drinking in primary care and Hospital Episode Statistics (HES) data. This data analysis will be followed by one-to-one interviews with General Practitioners about their experiences of delivering and recording SBIs for alcohol in real-life primary care settings.

Why have I been invited?

You have been invited to take part in this study because as a practicing GP, you have firsthand experience of delivering SBIs for alcohol in primary healthcare. I am particularly interested hearing your views on using Read Codes to record alcohol interventions and any benefits and / or challenges that might present.

Do I have to take part?

Taking part in the research is entirely voluntary: it is up to you to decide whether to join the study. If you agree to participate, confidentiality would be discussed and I will then ask you to sign a consent form. You are free to withdraw at any time, without providing a reason and without your legal rights being affected.

What will happen if I take part?

If you decide to take part, a single (one-to-one) interview will take place at a time, date and location convenient for you. I will conduct the interview in either a face-to-face situation or over the telephone, depending on your preference, and it will last no longer than 30 minutes. Once completed, your involvement in the research will end. There is no longer term follow up. The interview will be audio-recorded but none of your personal details will be identified. The recording will then be transcribed so that I can analyse the results.

What are the possible disadvantages and risks of taking part?

No risks are envisaged for you as a result of taking part in this study. The only possible disadvantage is that you are giving up some of your time to take part in the interview. I also acknowledge that you might find talking about your work behavior uncomfortable but must stress the confidential nature of our discussions and your right to withdraw from the study at any point.

What are the possible benefits of taking part?

Taking part in this interview will offer you the opportunity to share your views on this subject and to know that your views are being listened to and are valued.

Part 2: Conduct of the research

What will happen if I don't want to carry on with the study?

You can withdraw from the study at any time. Information we have already collected with your consent will be retained and used in the study. Withdrawal from the study will not affect your legal rights.

What if there is a problem?

If you have a concern about any aspect of the study, you should contact me and I will do my best to answer your questions. Contact details are provided at the end of this information sheet. If you remain unhappy and wish to complain formally, you can do this via the Research and Development Manager of the appropriate NHS organisation.

Will my taking part in this study be kept confidential?

Yes. I will follow ethical and legal practice and all information about you will be handled in confidence. The interview data will be kept confidential and reported anonymously. Any direct quotation will be attributed to general job title only (e.g. "GP A"). The information collected will be stored securely in locked university offices, computers will be password protected. The interviews will be recorded and transcribed. In line with the Newcastle University's code of conduct for research, the interview transcripts will be destroyed ten years after publication of the study's findings.

What will happen to the results of the research study?

This research will be used as a Doctoral Degree project (PhD) and will be submitted to examiners at Newcastle University. Research papers and conference presentations will also be produced. Participants will receive a summary of the findings after the final report has been disseminated.

Who are the researchers and who is funding the research?

The research forms the basis of a PhD studentship funded by the Economic and Social Research Council (www.esrc.org.uk) based within FUSE (the Centre for Translational Research in Public Health). Amy O'Donnell will be the Chief Investigator on this research study and will be supervised by a group of experienced academics and practitioners based at Newcastle University, the North East Public Health Observatory and BALANCE (the regional alcohol office).

Who has reviewed this study?

The study has full NHS Research Ethics Approval and the support of the R&D Team at the PCT.

How can I get further information?

If you would like any further information, please do not hesitate to contact me:

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FUSE (The Centre for Translational Research in Public Health)
Institute of Health and Society, Newcastle University
Room 3.77 Baddiley-Clark Building, Richardson Road, Newcastle Upon Tyne NE2 4AX
Tel: 0191 222 5425 Email: a.j.o'donnell@ncl.ac.uk

Thank you for taking the time to read this information sheet

Appendix N: Interview topic guide

Notes to Interviewer

- Introduce myself and thank participant for agreeing to talk to me; provide them with the research information sheet.
- Explain that I am a PhD research student based at Newcastle University looking at the question of whether we can use routinely collected medical data to monitor and evaluate the delivery of Screening & Brief Interventions (SBIs) for alcohol in primary healthcare. They have been invited to take part in this study because as a practicing GP, they have first-hand experience of delivering SBIs for alcohol in primary healthcare. I am particularly interested in hearing their views on using Read Codes to record alcohol interventions and more generally and to hear about any benefits and / or challenges that using Read Codes in practice might present.
- Advise participant that the interview should last approximately 30-45 minutes. They will not be identified in the report; however I would prefer to record the interview as this helps us to capture exactly what is said. Check that they are comfortable with that.
- Ensure the consent form is signed and ask if they have any questions before I start.

Section 1: Background, roles and responsibilities

I would like to start by finding out some background information about this practice and your role within it.

Q1. First, could you tell me a bit about this practice? *Prompts: Local area, size, history / recent notable changes, strengths / challenges.*

Q2. What is your role within this practice? *Prompt: how long have you been based here; what are your particular interests / specialisms / responsibilities; experience of using electronic v paper recording.*

Section 2: Delivering SBIs for alcohol

This next set of questions focus on your experience of delivering and recording alcohol SBIs.

Q3. How long have you been involved in delivering alcohol SBIs?

Q4. Could you describe the process of delivering alcohol SBIs here at this practice? *Prompt: talk through process e.g. how do you identify potential patient; what happens next /process of delivery?*

Q5. How would you describe SBIs in terms of ease of delivery? *Prompt: straightforward; challenging; etc? Probe for specific examples.*

Q6. Do you think alcohol SBIs 'work'? What evidence do you have? *Prompt: own experience; patient outcomes; research evidence?*

Q7. Do you have experience of using Read Codes to record SBIs for alcohol?

Q8. What drives you to record SBIs using Read Codes? *Prompts: potential drivers include providing record of treatment; financial incentives (DES/LES) etc.*

Q9. Are there any aspects of alcohol SBIs that you find difficult to record? *Prompts: reluctance to formalise alcohol issues; difficulty in using coding templates; concern about stigmatising patients; codes don't match reality of intervention / procedure.*

Section 3: Using GP Read Codes

Now I'd now like to explore your experience of and views on, using Read Codes in general.

Q10. Do you use Read Codes to record most aspects of patient consultations?

- What do / don't you record? *Prompt: e.g. preventative care & symptoms versus measures relating to investigations / procedures; concerns about stigmatising / labelling patients etc; need to record care to trigger QOF / enhanced service payments etc.*
- When might you prefer to use free text? *Probe for examples.*

Q11. Do you find it easy to incorporate the use of Read Codes into the consultation process? *Prompts: time pressures; issues with using computers; barrier to effective patient consultation.*

Q12. Is it straightforward to locate the correct Read Code in consultations? Are some symptoms / types of treatment and care more difficult to code than others? *Prompts: volume of available Read Codes; mismatch between codes and more complex symptoms / treatments etc.*

Q13. What support or guidance have you received on using Read Codes? How useful has this support been? *Prompt: any specific training; provision of templates / coding reminders; advice from clinical or administrative colleagues; information from PCT / NHS etc?*

Q14. How important do you feel it is to use accurate and comprehensive Read Codes to record patient care? *Prompts: helps provide good quality clinical record; supports continuity of care.*

Section 4: Measuring and evaluating performance in healthcare

One of the reasons you might record alcohol SBIs and other aspects of care using Read Codes is to provide evidence of delivery in order to trigger practice payments and / or to meet local or national level healthcare targets.

Q15. How useful is Read Code and / or other routine data as a source of information on the quality and delivery of healthcare services? *Prompts: e.g. value to individual practitioners, as a practice, for the PCT?; what's missing from the picture – i.e. what doesn't the data tell you?*

Q16. Could we measure 'quality' of service more effectively / usefully? *Prompts: by demonstrating outcomes v meeting delivery targets.*

End of interview

That completes my questions. Before we finish:

- Do you have any questions? Is there anything you would like to add? Is there anything you feel we didn't talk about that is relevant?

Finally:

- Thank participant for their time. Remind them how material will be used:
    - Once we have completed our interviews with GPs, the findings will be analysed to identify key issues / research themes. This data will inform a Doctoral Degree project (PhD) and will be submitted to examiners at Newcastle University. Research papers and conference presentations will also be produced. Participants will receive a summary of the findings after the final report has been disseminated.
    - All quotes / opinions will be anonymised – any direct quotation will be attributed to general job title only (e.g. “GP 1”).
    - Ensure I have the consent form.

Appendix 0: Mixed methods matrix: case-by-case key data trends

STUDY CASE CHARACTERISTICS				QUANTITATIVE DATA[15]								QUALITATIVE DATA	
Practice		GP		Haz./Harm. Drinking		Short Screen		Full Audit		All Interventions			
ID	Enhanced Service / Size	ID	Type	M	F	M	F	M	F	M	F	Delivering / Coding Screening	Delivering / Coding Interventions
NOTW1	None / Smaller than average (Walk-in centre)	GP1	Salaried	Q1	Q1	Q1	Q1	Q1	Q1	Q1	Q1	• Practice template in development • Preference for consumption over validated screening tool • Nurse-led screening more structured • No awareness of correct screening codes	• No experience of delivering alcohol interventions • No awareness of correct Read codes • No sense of stigma around recording sensitive items
NOTW3	DES / Larger than average	GP2	Partner	Q2	Q2	Q1	Q1	Q1	Q1	Q1	Q2	• Nurse-led more structured screening approach • GP-led unstructured screening approach	• Trained / experienced in interventions • Viewed interventions as mostly effective • No sense of stigma when coding sensitive items • Patient context is free-texted
NOTW5	None / Larger than average	GP3	Partner	Q2	Q1	Q1	Q1	Q1	Q1	Q2	Q2	• Nurse-led more structured screening approach in various health checks • GP-led unstructured screening approach • Practice template used	• Previous training in brief interventions • Patient context is free-texted • Viewed interventions as not always effective • Inadequate specialist services deterrent to interventions • Read coding low priority
NOTW8	DES / Smaller than average (Darzi practice)	GP4	Salaried	Q1	Q1	Q4	Q4	Q3	Q2	Q1	Q1	• Practice template used • Nurse-led more structured screening in various health checks • Preference for consumption over validated screening tool	• Unstructured approach to interventions but some experience • Views interventions as effective • Low awareness of correct coding • Patient context is free texted
NOTW9	DES / Larger than average	GP5	Partner	Q3	Q1	Q1	Q1	Q4	Q4	Q2	Q3	• Practice template used • Nurse-led more structured screening in various health checks • Preference for consumption over validated screening tool	• Interest and experience in interventions • Read coding low priority • Lack of specialist services as deterrent to interventions • Patient-context free-texted • Awareness of stigma potential when

[15] Recorded rates of alcohol-related clinical activity have been grouped into quartiles, where Q1 represents the lowest recorded rates and Q4 the highest recorded rates

STUDY CASE CHARACTERISTICS				QUANTITATIVE DATA[15]								QUALITATIVE DATA	
Practice		GP		Haz./Harm. Drinking		Short Screen		Full Audit		All Interventions			
ID	Enhanced Service / Size	ID	Type	M	F	M	F	M	F	M	F	Delivering / Coding Screening	Delivering / Coding Interventions
													coding sensitive items
SOTW1	LES/DES / Smaller than average	GP7	Partner (Local opinion leader)	Q3	Q1	Q1	Q1	Q1	Q1	Q4	Q4	• Preference for consumption over validated screening tool • Nurse-led structured screening within various health checks • Practice template used	• Experienced and knowledgeable about alcohol interventions • Viewed interventions as effective
SOTW4	LES/DES/ Smaller than average	GP8	Salaried	Q4	Q4	Q1	Q1	Q1	Q1	Q2	Q2	• Preference for consumption over validated screening tool • Unstructured approach to screening • Low awareness of correct codes for screening • Low awareness of alcohol template	• Unstructured approach to intervention delivery • Trained and experienced in alcohol interventions but limited belief in effectiveness • Patient context is free-texted • Awareness of stigma potential when coding sensitive items
SOTW5	LES/DES/ Smaller than average	GP9	Salaried	Q1	Q1	Q1	Q1	Q1	Q1	Q1	Q1	• Nurse-driven screening more structured in comparison to GP approach • Preference for consumption over validated screening tool	• Limited experience / unstructured approach to delivering • Low awareness of appropriate Read codes for interventions • Some awareness of stigma around Read coding sensitive information • Low awareness of appropriate intervention codes
SOTW7	LES/DES/ Larger than average	GP10	Salaried (Registrar)	Q2	Q1	Q1	Q1	Q3	Q4	Q2	Q1	• Limited experience of screening • Preference for consumption over validated screening tool • Limited awareness of appropriate coding for screening	• No experience of delivering interventions
SOTW7	LES/DES/ Larger than average	GP12	Partner	Q2	Q1	Q1	Q1	Q3	Q4	Q2	Q1	• Nurse-led structured screening in various health checks • Practice template used	• Inadequate alcohol services is disincentive to intervene

Appendix P: The impact of brief alcohol interventions in primary healthcare: A systematic review of reviews

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The Impact of Brief Alcohol Interventions in Primary Healthcare: A Systematic Review of Reviews

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Abstract — **Aims:** The aim of the study was to assess the cumulative evidence on the effectiveness of brief alcohol interventions in primary healthcare in order to highlight key knowledge gaps for further research. **Methods:** An overview of systematic reviews and meta-analyses of the effectiveness of brief alcohol intervention in primary healthcare published between 2002 and 2012. **Findings:** Twenty-four systematic reviews met the eligibility criteria (covering a total of 56 randomized controlled trials reported across 80 papers). Across the included studies, it was consistently reported that brief intervention was effective for addressing hazardous and harmful drinking in primary healthcare, particularly in middle-aged, male drinkers. Evidence gaps included: brief intervention effectiveness in key groups (women, older and younger drinkers, minority ethnic groups, dependent/co-morbid drinkers and those living in transitional and developing countries); and the optimum brief intervention length and frequency to maintain longer-term effectiveness. **Conclusion:** This overview highlights the large volume of primarily positive evidence supporting brief alcohol intervention effects as well as some unanswered questions with regards to the effectiveness of brief alcohol intervention across different cultural settings and in specific population groups, and in respect of the optimum content of brief interventions that might benefit from further research.

INTRODUCTION

A range of interventions exist for the prevention and treatment of alcohol-related risk and harm, from health-promoting input aiming at reducing hazardous and harmful drinking, to more intensive and specialist treatment for severely dependent drinking. Primary healthcare is seen as an ideal context for the early detection and secondary prevention of alcohol-related problems, due to its high contact-exposure to the population (Lock *et al*., 2009), and the frequency with which higher-risk drinkers present (Anderson, 1985).

In particular, screening and brief intervention for alcohol has emerged as a cost-effective preventative approach (Hutubessy *et al.*, 2003), which is relevant and practicable for delivery in primary healthcare (Raistrick *et al.*, 2006), where patients tend to present with less acute conditions, return regularly for follow-up appointments (Bernstein *et al.*, 2009) and build long-term relationships with their GP (Lock, 2004). These interventions are typically short in duration (5–25 min), designed to promote awareness of the negative effects of drinking and to motivate positive behaviour change (HoC Health Committee, 2010).

Despite considerable efforts over the years to persuade practitioners to adopt brief interventions in practice, most have yet to do so. Indeed, there is an international literature on barriers to brief alcohol intervention (Heather, 1996; Kaner *et al.*, 1999; Babor and Higgins-Biddle, 2000; Aalto *et al.*, 2003; Aira *et al.*, 2003; Wilson *et al.*, 2011), the majority focussing on primary healthcare. These barriers include: lack of time, training and resources; a belief that patients will not take advice to change drinking behaviour; and a fear amongst practitioners of offending patients by discussing alcohol. It has therefore been argued that today's challenge is more about how to encourage the uptake and use of brief alcohol intervention in routine practice (Anderson *et al.* 2004; Nilsen *et al.*, 2006; Johnson *et al.*, 2010; Kaner, 2010a; Gual and Sabadini 2011), and less about financing additional research on its effectiveness. It would seem timely, therefore, to evaluate the extent to which the primary healthcare brief alcohol intervention evidence base is now saturated, or whether there are any remaining knowledge gaps requiring further investigation.

This paper reports on the EU co-funded research BISTAIRS (brief interventions in the treatment of alcohol use disorders in relevant settings) project, which aims to intensify the implementation of brief alcohol intervention by identifying, systematizing and extending evidence-based good practice across Europe. Given the existence of several reviews in this field, and the overarching BISTAIRS timescale, the first phase of the project comprised a systematic overview of published reviews to provide a structured, comprehensive summary of the evidence base on the effectiveness of brief alcohol intervention in primary healthcare.

The focus on effectiveness (how an intervention performs in real world conditions) as opposed to efficacy (how an intervention performs under optimal or ideal world conditions) is deliberate. There is a well-established literature on the distinction between efficacy and effectiveness trials (Flay, 1986), although the terms explanatory or pragmatic trials are sometimes also used (Thorpe *et al.*, 2009). However, placing trials into one category or other is challenging since there is wide agreement that they actually sit on a continuum from optimized to naturalistic conditions (Gartlehner *et al.*, 2006). Moreover, efficacy must be demonstrated before effectiveness is assessed and the latter is a necessary pre-condition for wider dissemination (Flay *et al.*, 2005). The US Society for Prevention Research (Flay *et al.*, 2004, 2005) has outlined that efficacy testing requires at least two rigorous trials involving: tightly defined populations; psychometrically sound measures and data collection procedures; rigorous statistical analysis; consistent positive effects (without adverse effects); and at least one significant long-term follow-up. This requirement has been comprehensively established in a field where over 60

high-quality brief intervention trials have been reported in peer-reviewed journals, with over half based in primary healthcare (Kaner, 2010b).

This paper focuses on effectiveness, adding clinical breadth to methodological rigour by: extending the range of patients and delivery agents in trials; specifying details of necessary training and technical support; clarifying the nature of comparison or control conditions; assessing intervention fidelity; and conducting unbiased (generally intention to treat) analyses, which also considers effects on different sub-groups of patients and differing outcome exposures (Flay *et al.*, 2005; Thorpe *et al.*, 2009). To add to the brief alcohol intervention literature, we synthesize the findings from a rapidly growing number of systematic reviews to answer four questions: (a) does the cumulative evidence base continue to show that brief alcohol intervention is effective when delivered in primary healthcare settings? (b) is brief alcohol intervention equally effective across different countries and different healthcare systems? (c) is the brief alcohol intervention evidence base applicable across different population groups? and (d) what is the optimum length, frequency and content of brief alcohol intervention, and for how long is it effective?

METHODS

Standard systematic reviewing methods were tailored to identify existing reviews rather than primary research (CRD, 2001). Reporting was carried out according to PRISMA statement guidelines (Moher *et al.*, 2009) (see Supplementary material, Appendix 1 for full details). The review team comprised international experts in the field of brief alcohol interventions (EK, PA) and in systematic reviewing methods (DNB).

One author (AO) searched MEDLINE, EMBASE, PsycInfo, The Cochrane Database, The Database of Abstracts of Reviews of Reviews and the Alcohol and Alcohol Problems Science Database between July and August 2012 using appropriate MeSH terms. The search was split into three core concepts: (a) setting: general practice, general practitioners, physician, family practice, primary health care, community health services and family physician; (b) intervention: alcohol, brief intervention, early intervention, alcohol therapy, counselling and intervention; and (c) study design: systematic review, review and meta-analysis (full details of database-specific search terms are available upon request from the corresponding author). Reference lists of selected reviews and relevant websites, including the National Institute for Health and Care Excellence and the World Health Organisation, were also searched and appropriate experts contacted in order to identify unpublished reviews. The title and abstract of all records were screened by a single reviewer (AO), with full text copies of potentially relevant papers retrieved for in-depth review against the inclusion criteria. Any queries were resolved through discussion with the wider review team (AO, DNB, EK, PA).

Full systematic reviews and meta-analyses of studies examining the effectiveness of brief alcohol intervention in comparison to control conditions in primary healthcare settings and published between 2002 and 2012 were eligible for inclusion. Primary healthcare was operationalized to include all immediately accessible general healthcare facilities but not emergency settings. Brief intervention was defined as a single session and/or up to a maximum of five sessions of engagement with a patient, and the provision of information and advice designed to achieve a reduction in risky alcohol consumption or alcohol-related problems. Primary outcomes of interest included changes in self- or other reports of drinking quantity and/or frequency, drinking intensity and drinking within recommended limits.

The methodological quality of eligible studies was assessed independently by two reviewers (AO and DNB) using the Revised Amstar tool (R-AMSTAR) (Kung *et al.*, 2010). Data were extracted on: healthcare setting; characteristics of the target population; authors' conclusions; and any identified evidence gaps. Data were extracted against a data abstraction template by one author (AO) and checked by another (DNB) with reference to the full article text. Extracted data also included inclusion/exclusion criteria, reported analyses and analysis type. No statistical analyses or meta-analyses were conducted. Instead, the existing analyses reported in the articles reviewed were extracted systematically, with the findings reported in a structured narrative synthesis.

RESULTS

Twenty-four individual systematic reviews met the eligibility criteria (see Figure 1) (Chang, 2002; Moyer *et al.*, 2002; Beich *et al.* 2003; Berglund *et al.* 2003; Huibers *et al.*, 2003; Ballesteros *et al.*, 2004a,b; Cuijpers *et al.*, 2004; Whitlock *et al.*, 2004; Bertholet *et al.*, 2005; Littlejohn, 2006; Gordon *et al.*, 2007; Kaner *et al.*, 2007; Parkes *et al.*, 2008; Solberg *et al.*, 2008; Peltzer, 2009; Jackson *et al.*, 2010; Latimer *et al.*, 2010; Saitz, 2010; Bray *et al.*, 2011; Gilinsky *et al.*, 2011; Sullivan *et al.*, 2011; Jonas *et al.*, 2012; Babor *et al.*, 2013). Establishing the precise number of unique trials covered by this evidence base is challenging due to the slightly different emphases of some reviews. Nevertheless, we identified 56 primary healthcare trials reported across 80 separate publications.

The mean R-AMSTAR score for the 24 included reviews was 29 (median 30.5; range 13–44). These numeric scores translated into grades as follows: 13–20 = D; 21–28 = C; 29–36 = B; and 37–44 = A. Using R-AMSTAR scoring, five reviews were categorized as an 'A' grade publication (Huibers *et al.*, 2003; Bertholet *et al.*, 2005; Kaner *et al.*, 2007; Sullivan *et al.*, 2011; Jonas *et al.*, 2012), eight were categorized as 'B' (Beich *et al.*, 2003; Ballesteros *et al.*, 2004a,b; Jackson *et al.*, 2010; Latimer *et al.*, 2010; Bray *et al.*, 2011; Gilinsky *et al.*, 2011; Babor *et al.*, 2013), seven as 'C' (Cuijpers *et al.*, 2004; Whitlock *et al.*, 2004; Littlejohn, 2006; Gordon *et al.*, 2007; Parkes *et al.*, 2008; Solberg *et al.*, 2008; Saitz, 2010) and four as 'D' (Chang, 2002; Moyer *et al.*, 2002; Berglund *et al.*, 2003; Peltzer, 2009). Table 1 and the following sections report the key findings against each focus review question, with additional characteristics of the included reviews available in Supplementary material, Appendix 2.

Question 1: is brief alcohol intervention effective when delivered in primary healthcare settings?

Across the eligible reviews, it is consistently reported that brief alcohol interventions are effective at reducing hazardous and harmful drinking in primary healthcare (Moyer *et al.*, 2002; Beich *et al.*, 2003; Berglund *et al.*, 2003; Ballesteros *et al.*, 2004a,b; Cuijpers *et al.*, 2004; Whitlock *et al.*, 2004;

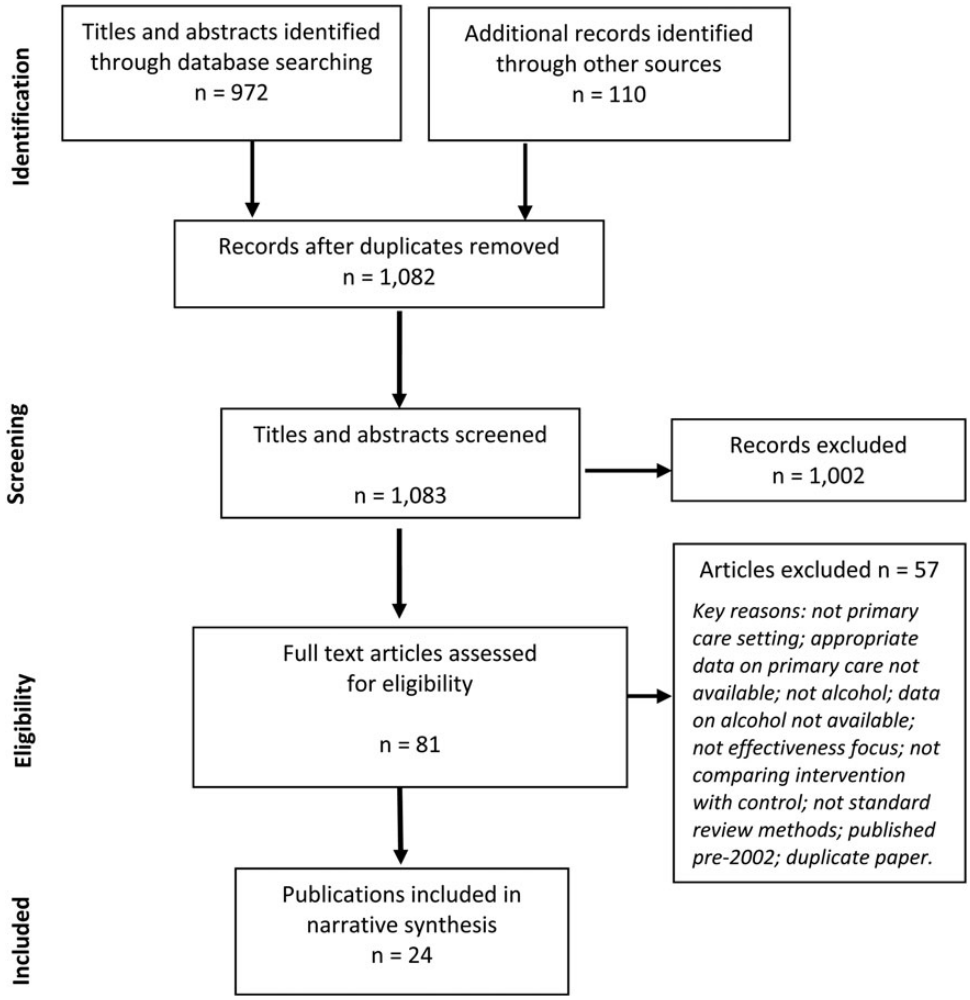

Fig. 1. Flow chart showing the number of potentially relevant references identified by searches and number meeting inclusion criteria and included in the narrative review of systematic reviews.

Bertholet *et al.*, 2005; Littlejohn, 2006; Gordon *et al.*, 2007; Kaner *et al.*, 2007; Solberg *et al.*, 2008; Peltzer, 2009; Jackson *et al.*, 2010; Latimer *et al.*, 2010; Saitz, 2010; Bray *et al.*, 2011; Gilinsky *et al.*, 2011; Jonas *et al.*, 2012). Whilst the overall evidence base suggests that brief alcohol interventions are effective in such settings, some individual trials have reported a null finding. Indeed a large UK trial (SIPS), not included in the reviews due to recency, has reported improvements in hazardous and harmful drinking in patients receiving simple feedback and a patient information leaflet (the control condition) as well as in those receiving 5 min of structured advice, and those receiving a further 20 min brief lifestyle counselling (Kaner *et al.* 2013). This null finding (no significant difference between the three conditions) accords with three systematic reviews focussing on control conditions only, which found consistently reduced drinking in these groups over time (Jenkins *et al.* 2009; Bernstein *et al.* 2010; McCambridge and Kypri 2011). Thus the mere fact of enrolment in a brief intervention trial may be associated with positive behaviour change due to a general 'Hawthorn Effect', whereby increased attention or scrutiny influences drinking, or volunteering in itself means that the individual has started a change process. Screening or assessment reactivity (a simple response to screening procedures or measurement of drinking behaviour) could also explain these reduced drinking trends. Lastly, regression to the mean is a real possibility in this field, since heavy drinking can spontaneously fall over time. Nevertheless, the cumulative (pooled) analyses reported in successive systematic reviews reveal positive brief intervention effects *over and above* those seen in control conditions who typically received assessment only, treatment as usual or written advice.

Weekly alcohol consumption was the most commonly reported outcome, and meta-analysis by Kaner *et al.* (2007) showed that compared with control conditions, brief intervention reduced the quantity of alcohol drunk by 38 g per week (95% CI (confidence interval): 23–54 g). This is slightly less than the overall effect size found by Jonas *et al.* (2012), which suggested that brief intervention compared with controls in primary healthcare reduced alcohol consumption by 49 g per week for adults aged 18–64 (95% CI: 33–66 g). However, the latter review also found average weekly reductions of 23 g (95% CI 8–38 g) for older adults aged 65 and over, and 23 g (95% CI 10–36 g) for young adults/college students aged 18–30 following brief alcohol intervention.

Delivery by a range of practitioners in primary healthcare settings has beneficial effects (Huibers *et al.*, 2003), although findings of one review suggest that the effect sizes are greater

Table 1. Summary of authors' conclusions and identified evidence gaps

Study	Q1: Is alcohol BI for alcohol effective when delivered in primary health care settings?	Q2: Is alcohol BI equally effective across different countries/health care systems?	Q3: Is the alcohol BI evidence base applicable to all population groups?	Q4: What is the optimum length/ frequency/content of alcohol BI and how long is it effective?
Babor *et al*. (2013) (in press)	Consistently reported that BI was clinically and cost-effective for non-treatment seeking populations.	Majority of evidence has limited or no LAMIC (low and middle income countries) applicability. Whilst there is some evidence to suggest that alcohol BI equality effective in HIC (high income countries) and LAMIC, however context-specific health issues may not be adequately addressed solely by HIC research findings. Therefore more culturally-specific research needed in LAMIC.	Brief intervention in primary health care appears to be most impactful in non-treatment seeking populations. Inconclusive findings on alcohol BI in antenatal settings.	Question not addressed in this review
Ballesteros *et al*. (2004a)	Results suggest BI equally effective in both men and women.	Question not addressed in this review	Results support the equality of BI outcomes for reducing hazardous alcohol consumption in both men and women.	Question not addressed in this review
Ballesteros *et al*. (2004b)	Although indicating smaller effect sizes than previous meta-analyses, results support the moderate efficacy of BIs.	Question not addressed in this review	BI appears to have greater efficacy when applied in general screening programs to non-treatment seeking populations.	Suggested more research needed to establish whether extended BI more efficacious than BI. Also, identified need for further naturalistic studies on long-term BI efficacy.
Beich *et al*. (2003)	Results suggests alcohol BI effective, though at lower levels than reported previously (pooled absolute risk reduction from BI was 10.5% (95% CI 7.1–13.9%) A random effects model yielded a similar result: 10% (6–14%). The pooled number needed to treat (NNT) was 10 (7 to 14)).	Question not addressed in this review	Question not addressed in this review	Question not addressed in this review
Berglund *et al*. (2003)	Majority (18 of 25 RCTs) showed BI had a significant positive effect in health care settings (primary care and hospital settings). Some evidence for positive impact on number of hospital days/incidence of new injuries and need for hospital care.	Question not addressed in this review	(Limited) evidence suggests alcohol BI equally effective in men and women. However notes that most studies conducted with populations consisting of middle-aged male heavy drinkers. Lack of evidence on treatment of homeless patients and for patients with psychiatric co-morbidity. Although some studies included dependent patients, review excluded any studies focused on this group of patients only.	However, uncertainty/limited evidence on longer-term effect sizes of alcohol BI (past 2 years). Review excluded studies that compared BI with extended BI but highlighted lack of evidence on design of optimal BI.
Bertholet *et al*. (2005)	Alcohol BI effective in reducing alcohol consumption at 6 and 12 months (adjusted intention-to-treat analysis showed a mean pooled difference of −38 g/week in favour of the BI group). Limited evidence on impact on reduction of health care utilization.	Question not addressed in this review	BI was concluded to be beneficial in men and women in a primary care context.	Lack of evidence of alcohol BI on morbidity, mortality and quality of life measures. More research needed to identify which components of BI present evidence of efficacy in primary health care.

Continued

Table 1. *Continued*

Study	Q1: Is alcohol BI for alcohol effective when delivered in primary health care settings?	Q2: Is alcohol BI equally effective across different countries/health care systems?	Q3: Is the alcohol BI evidence base applicable to all population groups?	Q4: What is the optimum length/ frequency/content of alcohol BI and how long is it effective?
Bray *et al*. (2011)	Alcohol BI has a small, negative effect on emergency department utilization. However no significant effect was found for outpatient or in patient health care utilization.	Question not addressed in this review	Question not addressed in this review	Question not addressed in this review
Chang (2002)	Findings suggest that alcohol BI do not appear to be consistently helpful to women drinkers.	Question not addressed in this review	Mixed/inconsistent evidence for alcohol BI effectiveness in both genders. However, pregnant women were found to reduce their drinking in two of the studies reviewed; thus pregnancy may provide a powerful incentive to reduce alcohol drinking.	Question not addressed in this review
Cuijpers *et al*. (2004)	Findings suggest positive impact of alcohol BI on reducing mortality (although limited detailed/verified data available from alcohol BI trials on mortality rates between pre-test and follow-up). Pooled relative risk (RR) of dying in BI compared to control conditions was 0.47 for the four studies (95% CI: 0.25, 0.89). The pooled RR of all 32 studies was comparable (RR = 0.57; 95% CI: 0.38, 0.84).	Meta-analysis of mortality only included USA, UK and Australian data.	Acknowledged fact that study populations differed considerably, although sensitivity analyses suggested comparable outcomes.	Acknowledges variation in content of included interventions but emphasizes that multiple sensitivity analyses excluding particular studies/sets of studies, all resulted in comparable BI outcomes.
Gilinsky *et al*. (2011)	There was some evidence from a small number of studies that singe session face to face brief interventions resulted in positive effects on the maintenance of alcohol abstinence during pregnancy. Women choosing abstinence as their drinking goals and heavier drinking women who participated with a partner were more likely to be abstinent at follow up. However more intensive interventions may be required to encourage women who continue to drink during pregnancy to reduce their consumption.	Question not addressed in this review	Identified lack of high quality evidence for effectiveness of alcohol BI in pregnant women. Overall, there was insufficient evidence to determine whether such interventions delivered during the antenatal period are effective at helping women to reduce alcohol consumption during pregnancy.	Question not addressed in this review
Gordon *et al*. (2007)	Although alcohol and dietary interventions appeared to be economically favourable (cost-effective), it is difficult to draw conclusions because of the variety in study outcomes. Generally, the costs of the behavioural interventions reviewed were low relative to those for other healthcare interventions such as pharmaceutical management. The behavioural interventions aimed at populations with high-risk factors for disease were more cost-effective than those aimed at healthy individuals.	Question not addressed in this review	Noted tendency to omit cultural minorities in studies across multiple behavioural intention cost effectiveness studies. General lack of evidence (across multiple behavioural intention areas) of cost effectiveness for disadvantaged populations.	Question not addressed in this review

Huibers *et al*. (2003)	Not possible to draw an overall conclusion concerning the effectiveness of 'psychosocial interventions by general practitioners' since studies were not comparable in numerous aspects (intervention, outcome, population). In relation to alcohol, review found that GP-delivered BI seem no more effective than other, more simple interventions or when delivered by a nurse practitioner.	Question not addressed in this review	Question not addressed in this review	Question not addressed in this review
Jackson *et al*. (2010)	Evidence found for the positive impact of alcohol BI on alcohol consumption, mortality, morbidity, alcohol-related injuries, alcohol-related social consequences, and healthcare resource use. Further, alcohol BI were shown to be effective in both men and women.	Question not addressed in this review	Study populations made up primarily of adults therefore limited evidence identified for the effectiveness of brief interventions in young people. Participants were mainly Caucasian in origin and ethnicity of study populations was poorly reported in general. Although socioeconomic status was not shown to influence the effectiveness of BI, there was limited evidence in this area. Limited evidence (only one review) of BI effectiveness in patients with dual diagnosis of psychiatric condition and alcohol misuse Relationship between the level of alcohol dependence and the effectiveness of brief interventions was unclear.	Limited evidence suggests that even very brief interventions may be effective in reducing negative alcohol-related outcomes. The benefit arising from increased exposure or the incorporation of motivational interviewing principles was unclear. Due to the extensive heterogeneity/lack of reported detail in the characteristics of the brief interventions evaluated, it is difficult to define the effective components of brief interventions.
Jonas (2012)	Overall, evidence supports the effectiveness of behavioural interventions for improving several intermediate outcomes for adults, older adults, and young adults/college students (average reduction of 3.6 drinks per week for adults compared with control, 11% increase in the % of adults achieving recommended drinking limits over 12 months).	Question not addressed in this review	Limited data on effectiveness for *pregnant* women in terms of consumption; insufficient evidence with regards to reduction in heavy drinking episodes or with pregnant women, particular at 6 months+. Insufficient evidence on effectiveness in reducing heavy drinking episodes for older adults; on drinking within recommended limits for college age students; or on mean consumption, heavy drinking episodes or drinking within recommended limits for adolescents. Ethnicity data generally not reported for participants and low rates of non-White participants except for two included trials (one conducted in Thailand, 100% Thai) and one in urban academic practice (80–82% non-white). Not clear whether findings applicable to people with comorbid medical or psychiatric conditions.	Brief multi-contact interventions have the best evidence of effectiveness across populations, outcomes, and have follow-up data over several years. However, differences between control and intervention groups not statistically significant past 48 months; and in general, insufficient evidence on effectiveness 6 months +. Insufficient evidence to draw firm conclusions on required intensity of intervention, including which specific components needed to be included.

Continued

Table 1. *Continued*

Study	Q1: Is alcohol BI for alcohol effective when delivered in primary health care settings?	Q2: Is alcohol BI equally effective across different countries/health care systems?	Q3: Is the alcohol BI evidence base applicable to all population groups?	Q4: What is the optimum length/ frequency/content of alcohol BI and how long is it effective?
Kaner *et al*. (2007)	Overall, brief interventions significantly lowered alcohol consumption at one year (mean difference: −38 grams/week, 95% CI: −54 to −23). Absence of a difference in outcomes between efficacy and effectiveness trials suggested that this literature was relevant to routine primary care.	Question not addressed in this review	Insufficient data on ethnic differences. Results suggest no significant positive effect of alcohol BI in women however there was a general lack of available evidence disaggregated by gender.	Evidence suggests that longer duration of counseling has little additional effect.
Latimer *et al*. (2010)	Screening plus brief intervention is cost effective in the primary care setting.	Question not addressed in this review	Lack of evidence of long-term impacts of alcohol BI for young people.	Lack of evidence on long-term impacts of alcohol BI, particularly in relation to impact of re-application versus maintenance of original intervention impact. Uncertainty with regards to longer term health care resource us, crime and motor vehicle accident effects; and limited evidence on impact of alcohol BI on HRQL. Very brief interventions are likely to be more cost effective than extended brief interventions but highlighted heterogeneity of evidence base on length of BI.
Littlejohn (2006)	Post recruitment, patients' SES does not appear to influence intervention outcome, with alcohol BI equally effective in patients of different socio-economic status.	Question not addressed in this review	Equivocal evidence with regards to link between SES and intervention participation. Suggested more research needed to better understand the characteristics of those who decline to participate in BI research.	Question not addressed in this review
Moyer *et al*. (2002)	34 trials focused on prevention found small to medium aggregate effect sizes in favour of brief interventions in non-treatment seeking populations across different follow-up points.		Lack of evidence on effectiveness of alcohol BI in dependent patients. No significant difference in effect observed between men and women, but highlights lack of gender-focused studies in this field.	Limited evidence on longer-term effects of alcohol BI (12 months +) and in general, results suggest a decay over time in impact. Overall, no significant difference in effects between brief versus extended interventions.
Parkes *et al*. (2008)	Some (limited) evidence to suggest alcohol BI can be effective in pregnant women and in women of child-bearing age.	Question not addressed in this review	Mixed evidence of efficacy of BI for pregnant women. In particular, lack of evidence of effect on different ethnic groups for pregnant women and on different income levels.	No evidence on long-term impact as follow up limited to 9 months at most in the included studies.
Peltzer (2009)	Brief alcohol interventions in sub-Saharan health settings showed positive results.	Although positive impacts identified, review highlights small number of trials and challenges experienced to embed in practice in sub-Saharan settings.	Question not addressed in this review	Question not addressed in this review

Saitz (2010)	Alcohol screening and BI has efficacy in primary care for patients with unhealthy but not dependent alcohol use.	Question not addressed in this review	Lack of evidence to support efficacy of alcohol BI in very heavy or dependent drinkers. Further, small sample sizes and other study design factors limit generalizability of findings.	Question not addressed in this review
Solberg *et al*. (2008)	Brief screening and counselling for alcohol misuse in primary care is both more effective/cost-effective than most other effective preventative services. Sparse data on efficacy in preventing alcohol-attributable morbidity and mortality.	Question not addressed in this review	Highlights fact that dependent drinkers excluded or lack of disaggregated data on efficacy/adherence for dependent as opposed to non-dependent drinkers.	Limited evidence of long-term effectiveness (12 months +) and no studies at 5 years +
Sullivan *et al*. (2011)	Review offers preliminary support for the benefit of brief interventions for unhealthy alcohol use by non-physicians, either alone or in combination with physicians. There is evidence that non-physician-based interventions are as effective as physician-based interventions and when added to physician-based interventions can significantly improve drinking outcomes. However, summary effect size observed for non-physician interventions of 1.7 fewer standard drinks per week is smaller than that observed for other clinician-based interventions in primary care settings (2.7 fewer standard drinks per week but within the 95% CI [1.6–3.9 standard drinks] of that result).	Question not addressed in this review	Question not addressed in this review	Question not addressed in this review
Whitlock *et al*. (2004)	Alcohol BI in primary health care settings reduced risky and harmful alcohol use for several alcohol outcomes (at 6–12 months, brief counseling interventions (with up to 15 min contact and at least 1 follow-up) reduced the average number of drinks per week by 13–34% more than controls. The proportion of participants drinking at 'safe' levels was 10–19% greater than controls).	Question not addressed in this review	No consistent differences found between men and women. Some evidence to suggest alcohol BI effective in older populations in comparison with younger adults. Low or non-reported non-white participation	Results suggested brief, multi-contact interventions more effective than very brief or brief single-contact interventions. Lack of evidence to determine relationship between intervention effects and specific BI components. Although all interventions that showed significant improvements in outcomes included at least 2 out of 3 key elements (feedback, advice and goal setting). Mixed/limited data on long-term mortality and morbidity benefits, especially for groups other than males, with less severe drinkers and with low-intensity interventions. One study reported maintenance of improved drinking at 4 years follow-up.

if delivered by doctors (Sullivan *et al.*, 2011). Finally, whilst available evidence remains limited, results from one meta-analysis found indications of the effectiveness of brief alcohol intervention on mortality outcomes, estimating a reduction in problem drinkers of about 23–36% (Cuijpers *et al.*, 2004).

Question 2: is brief alcohol intervention equally effective across different countries and different health care systems?

There is a geographic bias, with the majority of previous research conducted in high-income regions, and in particular, English and Nordic speaking countries. Out of the 24 eligible reviews, fewer than half included data from studies based outside Europe and/or the developed world (ten reviews: Moyer *et al.*, 2002; Berglund *et al.*, 2003; Cuijpers *et al.*, 2004; Whitlock *et al.*, 2004; Bertholet *et al.*, 2005; Peltzer, 2009; Latimer *et al.*, 2010; Saitz, 2010; Jonas *et al.*, 2012; Babor *et al.* 2013). As the review of reviews by Babor *et al* (2013) emphasizes, research findings from developed countries may not be generalizable to developing and transitional countries on a number of grounds. In addition to structural and political differences, there are known differences in drinking patterns and abstention rates between lower and higher income countries, and health consequences vary. Although the behavioural theory that underpins the design and delivery of brief intervention is *likely* to be 'universally' effective (Anderson *et al.*, 2009), and certainly Jonas *et al.* (2012) found similar effectiveness for brief alcohol intervention both within and outside the USA, a need remains for further culturally-specific research in countries outside the USA and Western Europe in order to demonstrate this conclusively (Peltzer, 2009).

It is also worth mentioning that half the included reviews (12 reviews: Beich *et al.*, 2003; Whitlock *et al.*, 2004; Littlejohn, 2006; Gordon *et al.*, 2007; Parkes *et al.*, 2008; Peltzer, 2009; Latimer *et al.*, 2010; Saitz, 2010; Bray *et al.*, 2011; Gilinsky *et al.*, 2011; Sullivan *et al.*, 2011; Jonas *et al.*, 2012) were based exclusively on studies published in the English language. Given the resulting potential for publication bias (authors are more likely to publish significant results in English-language journals (Egger *et al.*, 1997)), this suggests a need for increased linguistic (alongside geographic) diversity in future systematic reviews in this field (Babor *et al.*, 2013).

Question 3: is the brief alcohol intervention evidence base applicable across different population groups?

Although overall the evidence implies that brief alcohol intervention is equally effective in men and women (Ballesteros *et al.*, 2004a; Whitlock *et al.*, 2004; Bertholet *et al.*, 2005), most studies to date have either focussed on male drinkers or not reported the data disaggregated by sex (Moyer *et al.*, 2002; Berglund *et al.*, 2003; Kaner *et al.*, 2007). One review suggested that brief alcohol intervention may not be consistently helpful to women, or at least the results are more equivocal (Chang, 2002); and there is an identified lack of high-quality evidence on its effectiveness in pregnant women drinkers (Parkes *et al.*, 2008; Gilinsky *et al.*, 2011; Jonas *et al.*, 2012; Babor *et al.*, 2013). Whilst one review indicated that pregnancy itself may provide a powerful incentive to reduce alcohol drinking (Chang, 2002), another found insufficient evidence to determine the effectiveness of brief intervention delivered during the antenatal period, suggesting that more intensive interventions may be required to encourage women who continue to drink during pregnancy to successfully reduce their consumption (Gilinsky *et al.* 2011).

Further, whilst brief intervention appears to improve alcohol-related outcomes for adults aged eighteen and over, evidence on effectiveness at either end of the age spectrum is less conclusive. Previous research (predominantly conducted in US college settings) suggests that effects appear less long-lived for young adults and college-age students, and there is insufficient evidence of brief alcohol intervention effectiveness in both adolescents (Kaner *et al.* 2007; Jackson *et al.* 2010; Latimer *et al.* 2010) and older adults (Kaner *et al.* 2007; Jonas *et al.* 2012), with only one review showing effect in adults aged 65 and over (Whitlock *et al.* 2004)).

There was limited consideration of the impact of socio-economic status on the effectiveness of brief alcohol intervention in the majority of the included reviews, with a general acknowledgment of the lack of evidence for disadvantaged populations in those that did (Littlejohn, 2006; Gordon *et al.*, 2007; Jackson *et al.*, 2010). Further, a number of reviews noted the tendency for studies either to omit ethnic minorities (Gordon *et al.*, 2007) or to be poorly reported where non-White participants were included (Whitlock *et al.*, 2004; Kaner *et al.*, 2007; Jackson *et al.*, 2010; Jonas *et al.*, 2012).

Finally, a number of reviews suggest that brief alcohol intervention was most impactful in non-treatment seeking, non-dependent patient populations (Moyer *et al.*, 2002; Ballesteros *et al.*, 2004b; Babor *et al.*, 2013). However, other reviews highlight the equivocal nature of the existing evidence base (Jackson *et al.*, 2010), and/or emphasize the exclusion or lack of disaggregated data in primary studies for dependent versus non-dependent patients (Berglund *et al.*, 2003; Solberg *et al.*, 2008). There was also a lack of conclusive evidence on the use of brief alcohol intervention in patients with co-morbid medical or psychiatric conditions (Berglund *et al.*, 2003; Jackson *et al.*, 2010; Jonas *et al.*, 2012).

Question 4: what is the optimum length, frequency and content of brief alcohol intervention, and for how long is it effective?

Evidence also points towards a need for greater understanding of the temporal limits of brief alcohol intervention impact. Research shows that effect sizes are largest at the earliest follow-up points, with decay in intervention effects over time. This overview found limited information on the longer-term effectiveness of brief alcohol intervention past 48 months post-intervention (Moyer *et al.*, 2002; Latimer *et al.*, 2010; Jonas *et al.*, 2012). In addition, although recent evidence suggests that greater effect sizes may be achieved with brief multi-contact interventions (each contact up to 15 min), compared with very brief (up to 5 min) and brief (>5 min, up to 15 min) single-contact interventions (Jonas *et al.*, 2012), it is important to note that the 2007 Cochrane Review found that longer (more intensive) brief interventions offered no significant additional benefit over shorter input (Kaner *et al.*, 2007).

Few reviews considered the impact of the actual content of interventions on their effectiveness (Berglund *et al.*, 2003; Cuijpers *et al.*, 2004; Whitlock *et al.*, 2004; Jonas *et al.*, 2012). In general, these reviews highlighted a lack of available evidence on this issue, mainly due to the heterogeneity of the included studies. Whitlock *et al.* (2004) reported that all

interventions demonstrating statistically significant improvements in alcohol outcomes included at least two of the following three elements—feedback, advice and goal-setting—but added that, given that the most effective interventions were multi-contact, inevitably these also comprised additional assistance and follow-up. Further, as Beich *et al.* (2003) highlights, conversations about alcohol can take place in different ways in primary healthcare settings, thus the effectiveness of brief intervention may be as much down to the well-established 'helping relationship' between patient and practitioner as the frequency or content of contact *per se*.

DISCUSSION

This review of systematic reviews supports the effectiveness of brief intervention at reducing alcohol-related problems across 56 trials and a wide range of patients in primary healthcare. However, it highlights knowledge gaps regarding the effectiveness of brief alcohol intervention with pregnant women, with older and younger drinkers, with those from ethnic minority groups, and in transitional and low income countries. There is also a need to determine the optimum length, frequency and necessary content of brief intervention required to maintain longer-term effects.

Further, although the general consensus is that brief alcohol interventions are ill-suited to the needs of dependent drinkers, who require more specialist and intensive support (Saitz, 2010), it is inevitable that routinely screening patients for excessive alcohol use in primary healthcare—an essential precursor to intervention—will identify those at the dependence end of the spectrum. Whilst primary healthcare practitioners clearly have an important role to play in terms of 'signposting' alcohol-dependent patients to more specialist treatment, they are also presented with a prime opportunity to deliver an intervention themselves at that point. Along with pharmacotherapy, modelling work by Rehm and Roerecke (2013) suggests that brief intervention in hospital settings is most effective at reducing mortality in alcohol-dependent patients. However, at present, comparable modelling data for this group of drinkers in primary healthcare settings are not available due to lack of alcohol consumption or diagnosis information (Purshouse *et al.*, 2013). With fewer than 10% of people affected by alcohol dependence currently receiving treatment (Alonso *et al.*, 2004), there may be considerable value in furthering our understanding of the extent to which brief interventions delivered in primary healthcare work in dependent drinkers. Given the dose–response relationship of alcohol consumption and related harms, greater health gains can be achieved with a 10% reduction from a dependent drinker than from a 10% reduction from a hazardous or harmful drinker (Rehm and Roerecke, 2013).

Yet even in populations and settings where brief alcohol intervention is known to be effective, there remain unanswered questions about which 'active ingredients' make for successful interventions (Kaner, 2010a). Research in primary healthcare settings shows that most control groups report a decrease in alcohol consumption, suggesting the possibility of either regression to the mean (in which extreme measures of behaviour tend to shift to less extreme positions over time), or that screening or assessment reactivity affects outcomes (i.e. assessments of alcohol use themselves contain a therapeutic element) (Bertholet *et al.*, 2005; Jonas *et al.*, 2012). Findings from three recent reviews appear to support this latter explanation (Jenkins *et al.*, 2009; Bernstein *et al.*, 2010; McCambridge and Kypri, 2011) and most recently, the results of the SIPS alcohol screening and brief intervention research programme also suggest that their trial control condition, consisting of simple feedback and written information about alcohol, may have contained active factors of behaviour change (Kaner *et al.*, 2013).

Further, as Mitchie *et al.* (2012) acknowledge, the issue of treatment fidelity presents an additional obstacle to our understanding of brief alcohol intervention effectiveness. For a variety of reasons, busy physicians dealing with alcohol in routine practice settings may deviate from guidelines and protocols of care (Moriarty *et al.*, 2012), as happens in other areas of clinical practice (Dew *et al.*, 2010). Thus, even when practitioners can be persuaded to engage in brief alcohol intervention, it is not possible to establish conclusively the causal chain between interventions as designed, and their subsequent outcomes (an issue that further complicates questions around which intervention components have most impact on alcohol-related outcomes (McCambridge, 2013)).

These evidence gaps are not merely an academic concern. Given that the demand for healthcare is always likely to outstrip supply, determining the essential intervention elements is vital in order to inform the design, commissioning and delivery of more cost-effective measures to address alcohol-related harm (McCambridge, 2013). Thus there is a need for further research in the aforementioned areas where genuine knowledge gaps exist. Moreover, available research indicates that significant public health gains could be achieved if even the basic elements of brief alcohol intervention were mainstreamed in primary healthcare. Whilst acknowledging the inadequacy of the existing implementation evidence base, previous studies highlight the positive role of alcohol-specific, multi-component, and ideally, practitioner-tailored training programmes in routinising brief alcohol intervention delivery (Anderson *et al.*, 2004; Nilsen *et al.*, 2006). However, workload demands remain a fundamental barrier to mainstream adoption, irrespective of individual knowledge levels and attitudes (Johnson *et al.*, 2010). On this basis, current research would suggest that time-pressed clinicians should focus on the following three 'easy' wins.

Short and simple is still effective

First, busy practitioners need to be reassured that there is little evidence to suggest that longer or more intensive input provides additional benefit over shorter, simpler input (Moyer *et al.*, 2002; Kaner *et al.*, 2007). Although one review found greater effect sizes associated with brief multi-contact interventions compared with other intensities (Jonas *et al.*, 2012), overall, there appears no significant advantage of extended brief intervention in reducing alcohol consumption (Kaner *et al.*, 2007, 2013). Even a single, 5-min session of structured brief advice on alcohol using a recognized, evidence-based resource based on FRAMES principles (**F**eedback, **R**esponsibility, **A**dvice, **M**enu, **E**mpathy and **S**elf-efficacy) is still likely to be effective.

Use the most active ingredients

Second, given the weak relationship between duration of counselling and outcome, it may be the case that the structure and

content of brief interventions has more influence on patients' drinking than the total length of delivery (Kaner *et al.*, 2009). Whilst there remains an identified knowledge gap around the most 'active ingredients' of brief alcohol intervention, one must acknowledge some important developments in this field in recent years, not as yet reflected in published systematic reviews. Mitchie *et al*. (2012) sought to identify which specific behaviour change techniques (BCTs) led to improved outcomes for brief alcohol interventions (42 BCTs reviewed in total, although not all associated with brief alcohol intervention). They concluded that prompting self-recording of alcohol intake was associated with greater effect sizes from brief intervention, and called for further research to extend and develop this approach. A systematic review by McCambridge and Kypri (2011) also found that answering questions on drinking, including consumption, in brief alcohol intervention trials appeared to alter subsequent self-reported behaviour in non-intervention control groups. On this basis, asking the simple question 'how much do you drink?' may be enough to trigger a positive behaviour change.

Target the 'right' patients

Finally, whilst there is a recognized need for further evidence on the effectiveness of brief alcohol intervention in certain groups of patients (pregnant women, younger and older drinkers), given the large number of trials showing consistently positive outcomes in middle-aged men, at the very least, practitioners should target their efforts in this direction. Indeed, as two-thirds of all alcohol-attributable deaths in the 20- to 64-year-old EU population occur in those aged 45–64, Rehm *et al*. (2011) have argued tackling harmful use in this age group would be most effective in helping to rapidly reduce alcohol's health burden to society overall.

There are several limitations associated with this review of reviews, including some inherent weaknesses with this methodological approach in general. First, although there is a range of published reviews on brief alcohol intervention effectiveness, some questions of interest were only partially addressed by the available evidence base. For example, there were limited data available on the effectiveness of brief alcohol intervention in different models of primary healthcare systems, beyond the broad comparison on geographic grounds. Second, in basing our conclusions on the findings of previous systematic reviews, this review is necessarily limited by individual authors' decisions regarding the exclusion/inclusion of particular studies, further confounded by the fact that the standard of reporting, analysis and interpretation, whilst generally high, varied across the included papers. Third, our reliance on previous systematic reviews limits the immediacy of our findings as the most recent primary research is not included. Whilst our discussion sought to supplement the findings with the results from more recent primary studies, this approach was unsystematic. Fourth, we did not verify the information reported in the reviews by consulting individual studies, which may have introduced bias (e.g. resulting from inaccurate reporting of findings (Smith *et al.*, 2011)). However, the overlap in results, and broad agreement in responses to the questions posed by this review of reviews, suggests that our representation of the evidence is likely to limit potential bias.

CONCLUSION

Despite the limitations identified above, this paper illuminates some commonalities across the existing evidence base. There remain unanswered questions around the effectiveness of brief alcohol intervention across different settings, different population groups, about the optimum intervention content, and the longevity of intervention effects. However, available evidence suggests that time-pressed clinicians looking for maximum impact with minimal input should direct their efforts to the delivery of short, simple interventions which focus on prompting individuals to record their alcohol intake, and that these are likely to be most effective in middle-aged, male drinkers.

SUPPLEMENTARY MATERIAL

Supplementary material is available at *Alcohol and Alcoholism* online.

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