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**Patients' perceptions and experiences of cardiovascular disease and diabetes prevention programmes: a systematic review and framework synthesis using the Theoretical Domains Framework**

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1 **Patients' perceptions and experiences of cardiovascular disease and diabetes prevention**  
2 **programmes: a systematic review and framework synthesis using the Theoretical**  
3 **Domains Framework**

4  
5 **Background:** This review provides a worked example of 'best fit' framework synthesis using  
6 the Theoretical Domains Framework (TDF) of health psychology theories as an a priori  
7 framework in the synthesis of qualitative evidence. Framework synthesis works best with  
8 'policy urgent' questions. **Objective:** The review question selected was: what are patients'  
9 experiences of prevention programmes for cardiovascular disease (CVD) and diabetes? The  
10 significance of these conditions is clear: CVD claims more deaths worldwide than any other;  
11 diabetes is a risk factor for CVD and leading cause of death. **Method:** A systematic review and  
12 framework synthesis were conducted. This novel method for synthesizing qualitative evidence  
13 aims to make health psychology theory accessible to implementation science and advance the  
14 application of qualitative research findings in evidence-based healthcare. **Results:** Findings  
15 from 14 original studies were coded deductively into the TDF and subsequently an inductive  
16 thematic analysis was conducted. Synthesized findings produced six themes relating to:  
17 knowledge, beliefs, cues to (in)action, social influences, role and identity, and context. A  
18 conceptual model was generated illustrating combinations of factors that produce cues to  
19 (in)action. This model demonstrated interrelationships between individual (beliefs and  
20 knowledge) and societal (social influences, role and identity, context) factors. **Conclusion:**  
21 Several intervention points were highlighted where factors could be manipulated to produce  
22 favourable cues to action. However, a lack of transparency of behavioural components of  
23 published interventions needs to be corrected and further evaluations of acceptability in  
24 relation to patient experience are required. Further work is needed to test the

25 comprehensiveness of the TDF as an a priori framework for ‘policy urgent’ questions using  
26 ‘best fit’ framework synthesis.

27 **Keywords:** Cardiovascular diseases; diabetes; health check; behaviour change intervention;  
28 theoretical domains framework

29

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## 1 **Introduction**

2 Substantial advances in methodology for reviewing and synthesizing qualitative evidence  
3 have been made (e.g. Pope, Mays & Popay, 2007; Shaw, 2010) and clear arguments exist for  
4 including non-trial, context-sensitive evidence within reviews of effectiveness; this offers a  
5 route for patient perspectives to be incorporated into good practice guidance if methods for  
6 qualitative evidence synthesis are taken up (Kelly, Stewart, Morgan et al., 2009; Shaw,  
7 Larkin & Flowers, 2014; SIGN, 2011). However, qualitative evidence synthesis can be labour  
8 intensive and requires a high level of expertise in qualitative methodology. The recent  
9 development of ‘best fit’ framework synthesis (Carroll, Booth & Cooper, 2011; Carroll,  
10 Booth, Leaviss & Rick, 2013) offers an alternative systematic methodology based on  
11 framework analysis (Ritchie & Spencer, 1994). It adopts an a priori theoretical framework to  
12 guide data extraction and synthesis making it more efficient and accessible as an approach for  
13 reviewing and synthesizing ‘policy-urgent’ questions without sacrificing theory.

14 This paper offers a novel application of framework synthesis using the Theoretical Domains  
15 Framework (TDF; Cane, O’Conner & Michie, 2012; Michie, Johnson, Abraham et al., 2005).  
16 The TDF was chosen as the theoretical framework for this review because it was developed  
17 following a systematic review and synthesis of health psychology theories (Michie et al.,  
18 2005), thus completing the initial step in ‘best fit’ framework synthesis (Booth & Carroll,  
19 2015). The review identified 14 theoretical domains and 84 component constructs (Michie et  
20 al., 2005). These were then validated (Cane et al., 2012) and have been used to explain  
21 implementation problems, to develop theory-informed behaviour change interventions, and to  
22 assess which theoretical domains are relevant to particular interventions (e.g. French et al.,  
23 2012; Francis, Stockton, Eccles et al., 2009; McKenzie, O’Connor, Page et al., 2010). Using  
24 the TDF as an a priori framework to guide the synthesis enabled insights from a wider range  
25 of theoretical constructs than using one theory alone. This is the first review of which we are

26 aware that brings together the TDF with 'best fit' framework synthesis to offer a rigorous and  
27 theoretically informed method for synthesizing qualitative research studies.

28 The 'policy urgent' review question selected was: What are patients' experiences of  
29 prevention programmes for cardiovascular disease (CVD) and diabetes? These conditions  
30 were selected because they feature in many public health programmes around the world (see  
31 for example: Holland, Cooper, Shaw, Pattison & Cooke, 2013). One reason for both  
32 conditions being the focus of prevention programmes is that they are related. CVD, including  
33 coronary heart disease and stroke, account for more deaths globally than any other diseases  
34 (WHO, 2011a); in 2008, 30% of deaths worldwide were attributed to CVD (WHO, 2011b).  
35 Diabetes is a risk factor for CVD and the World Health Organisation (WHO) predicts  
36 diabetes will be the seventh leading cause of death globally by 2030 (WHO, 2011a).  
37 Furthermore the incidence of type 2 diabetes mellitus globally is rising, specifically in  
38 younger age groups (Alberti, Zimmet, Shaw, Bloomgarden, Kaufman & Silink, 2004).  
39 Lifestyle changes can reduce the risk and prevent further complications of CVD and diabetes  
40 and evidence suggests that early detection may lead to better health outcomes (NICE, 2010;  
41 WHO, 1999).

42 Previous reviews of prevention programmes have considered reduction in risk measurements  
43 and cost-effectiveness or years of life added as outcomes (Ebrahim, Taylor, Ward et al.,  
44 2011) but have not considered behavioural aspects. A recent review by Holland et al. (2013)  
45 focused on behaviour change elements within coronary heart disease (CHD) and diabetes  
46 prevention programmes and revealed mixed benefits. They found that feedback regarding risk  
47 level, an evidence-based behaviour change technique (Michie, Ashford, Sniehotta et al.,  
48 2011), prompts successful behaviour change (e.g. Robertson, Phillips & Mant, 1992).  
49 Furthermore, those at higher risk have been shown to be more likely to change their  
50 behaviour following dialogue (Craigie, Barton, Macleod et al., 2011; Koelewijn-van Loo, van

51 der Weijden, Ronda et al., 2010). Nevertheless, despite ongoing research in the field, it is not  
52 clear why prevention programmes do not have more reliable effects on behaviour change. A  
53 review of patient perspectives and experiences of such programmes may help to answer this  
54 question.

## 55 **Method**

56 This review adopted the methodology endorsed by the PRISMA (Preferred Reporting Items  
57 for Systematic Reviews and Meta-Analyses) Statement (Moher, Liberati, Tetzlaff & Altman,  
58 2009) and followed the step-by-step procedure for 'best fit' framework synthesis (Booth &  
59 Carroll, 2015).

### 60 *Study inclusion criteria and search strategy*

61 Inclusion criteria. Qualitative research studies reporting evaluations of existing early  
62 detection or prevention or screening programmes for CVD or diabetes; in primary care or in  
63 the community; for adults; including patients' perspectives; using qualitative methods; since  
64 1990; in English. Search terms were adapted from Holland et al. (2013) and included the  
65 qualitative methods filter (qualitative, findings, interview\*; Grant, 2004) identified as an  
66 efficient method for identifying qualitative research (within the restraints of limited subject  
67 headings in bibliographic databases for qualitative methods; Shaw, Booth, Sutton et al.,  
68 2004). Web of Knowledge and PubMed were searched and reference chaining of relevant  
69 studies conducted. The full search strategy is included in Additional File 1.

### 70 *Quality assessment of studies*

71 Studies were appraised using prompts (Dixon-Woods, Shaw, Agarwal & Smith, 2004)  
72 devised specifically to determine the quality of qualitative research which focus on  
73 transparency, a key indicator of trustworthiness (Carroll, Booth & Lloyd-Jones, 2012;  
74 Lincoln & Guba, 1985). A rating system, adapted from Dixon-Woods, Sutton, Shaw et al.

75 (2007), was then used to categorise original studies. In the revised system only studies to be  
76 included were appraised; no studies were excluded on grounds of quality.

### 77 *Data extraction and synthesis*

78 Data were extracted from the results sections of included studies directly into the *a priori*  
79 framework, i.e. the TDF, using a deductive process. This included themes or categories of  
80 findings presented by authors, primary data extracts, and author commentary about those  
81 data. Subsequently, an inductive (data-driven) thematic analysis (Braun & Clarke, 2006) was  
82 conducted in order to code any data that did not fit into the TDF to ensure nothing was  
83 missed.

84 Concepts from the TDF and inductive thematic analysis were then clustered and synthesized  
85 into a final set of themes representing the whole dataset. This involved interpretative work to  
86 identify relationships between themes and mediating factors between individual-societal-  
87 organisational based aspects within them. All stages of analysis were discussed within the  
88 review team until consensus was reached.

### 89 *Sensitivity analysis*

90 It has been argued that the transparency of reporting of qualitative studies is crucial to their  
91 utility in secondary analysis (Carroll et al., 2012). 'Thin' descriptions of people's views, with  
92 inadequately reported research questions or methods, cannot be relied upon and so the  
93 strength of secondary analyses rests on the quality of included studies (Harden, Garcia,  
94 Oliver et al., 2004). A sensitivity analysis (Carroll et al., 2012) was conducted with and  
95 without the poorer quality studies to determine the impact on coding against the TDF and the  
96 generation of inductive themes. Further analysis was conducted to examine whether the  
97 presence/absence of (a) the theoretical domains from the TDF and (b) the inductively  
98 generated themes affected the final set of themes and conceptual model in order to ensure the



99 synthesis of findings was not skewed in favour of either the TDF or the inductive thematic  
100 analysis.

## 101 **Results**

### 102 *Included studies*

103 Following removal of duplicates 585 potentially relevant records were identified. These were  
104 screened at title and abstract level to leave 50 studies to be assessed for eligibility. After  
105 further exclusions against inclusion criteria 42 studies were excluded, leaving eight included  
106 studies. Reference chaining identified six additional studies, resulting in 14 studies judged  
107 relevant for inclusion (see Figure 1 for the PRISMA flow diagram). Full details of studies are  
108 available in Table 1. Six studies were conducted in the United Kingdom (UK), three studies  
109 reported findings from one Danish study, two were based in the United States (US), one in  
110 Australia, one in Sweden, and one in Thailand. Six studies described prevention programmes  
111 for diabetes and pre-diabetes; five of which involved prevention programmes for CVD. Two  
112 studies focused on the UK National Health Service (NHS) Health Check, a prevention  
113 programme targeting cardiovascular disease, diabetes, stroke and kidney disease; one focused  
114 on CHD and the other on CHD risk. Four studies collected data from healthcare professionals  
115 as well as patients; the remaining ten included patients only. Individual interviews were the  
116 dominant method of data collection ( $n=12$ ) with some using focus groups ( $n=3$ ) and one  
117 study used both; analysis methods included Content Analysis ( $n=1$ ), Framework Analysis  
118 ( $n=3$ ), Grounded Theory ( $n=2$ ), Interpretative Phenomenological Analysis ( $n=1$ ), Thematic  
119 Analysis ( $n=5$ ) and two were unstated.

120 **[INSERT FIGURE 1 ABOUT HERE]**

121 **[INSERT TABLE 1 ABOUT HERE]**

122

123 *Quality of included studies*

124 Studies were appraised and rated independently by the first and last author. Any differences  
125 were discussed in full, and a rating agreed (see Table 2 for ratings). Overall, study quality  
126 was good with good levels of transparency and detailed discussion of data included. Using an  
127 adaptation of Dixon-Woods et al. (2007), *key papers* were those which fitted the review  
128 question and met all quality criteria; *satisfactory* studies fitted the review question and met  
129 most criteria. Studies categorised as *unsure* did not meet all the quality criteria and were  
130 treated cautiously because we were unsure about their trustworthiness. Studies rated *poor* did  
131 not include sufficient data extracts to judge whether conclusions were evidenced and some  
132 omitted their method of analysis.

133 **[INSERT TABLE 2 ABOUT HERE]**

134

135 *Sensitivity analyses*

136 Sensitivity analyses confirmed that no final theme was reliant on a single original study and  
137 excluding those of rated unsure did not affect the results; they acted to support higher quality  
138 studies which reported ‘thick descriptions’ (Geertz, 1973) of findings. None of the studies  
139 rated unsure was represented in the inductive thematic analysis because of the lack of data  
140 included. One theme (Cue to (in)action; see below) was generated largely from the inductive  
141 analysis alone but others were representative of both.

142 Findings from included studies supported the theoretical constructs included in the TDF  
143 which demonstrated the utility of the framework (see Table 3 for full descriptions of  
144 theoretical domains and constructs in the TDF and in which studies they were identified).  
145 However, some elements of original findings were not addressed in the TDF which meant  
146 additional themes were identified in the inductive thematic analysis. Furthermore, some

147 original studies cited theories *not* in the TDF, suggesting further development of the  
148 framework may be necessary: the Common Sense Model of Illness Representations  
149 (Leventhal, Nerenz, Steele, Taylor & Singer, 1984) and the Health Promotion Model (Pender,  
150 1996) (see Table 4 for additional theoretical constructs and in which studies they were  
151 identified). Related to illness representations, the thematic analysis highlighted the  
152 physiological signs of illness which were related to people's confidence in their (in)ability to  
153 identify CVD or diabetes through their bodily sensory perceptions, i.e., their impact on self-  
154 efficacy (Bandura, 1977). Self-efficacy is described in the TDF as beliefs about an  
155 individual's self-confidence, perceived behavioural control and empowerment regarding  
156 behaviour.

157 **[INSERT TABLE 3 ABOUT HERE]**

158 **[INSERT TABLE 4 ABOUT HERE]**

#### 160 *Framework synthesis*

161 Below, the final set of themes is presented followed by a summary of the conceptual model.

#### 162 Knowledge.

163 This theme represents what is often considered the starting point for behaviour change;  
164 knowing what the prevention programme entails and why it is important to reduce risk for  
165 CVD and diabetes. Original studies reported a range of knowledge levels in their patients and  
166 one paper reported low levels of knowledge among healthcare professionals  
167 (Sranacharoenpong & Hanning, 2011).

168 In general, there was a lack of awareness of prevention programmes for CVD and diabetes  
169 prior to being invited to attend one (Burgess, Wright, Forster et al., 2014; Chipchase,  
170 Waterall & Hill, 2013; Harkins, Shaw, Gillies, Sloan et al., 2010). However, a common

171 conceptualisation of prevention programmes once they have been introduced is that they are  
172 like a general health check.

173 My perception of reading through things was that it was going to be a good overhaul.  
174 You know, overall body check for everything, so I don't think it was as in-depth as I  
175 thought it was going to be. (Rachel; participant; Chipchase et al., 2014, p.24)

176 Although perceived as a *general* health check there was an expectation that the tests would be  
177 tailored to individuals.

178 I thought it was more particular to me, you know trying to sort out just how bad I was  
179 whatever, didn't realise it was a separate little screening as opposed to just for myself.  
180 (Patient 43; participant; Goyder, Carlisle, Lawton & Peters, 2009, p. 88)

181 That the programme was a public health intervention aimed at the whole population seemed  
182 to undermine patients' perceptions of its importance to them as individuals; "a separate little  
183 screening". Not knowing what the tests involved was also likely to dissuade patients from  
184 attending.

185 Lack of awareness emerged as a general theme across both those who accepted and  
186 those who declined the health check. It may be that lack of clarity and understanding of  
187 what the health check involved had discouraged attendance. (authors; Burgess et al.,  
188 2014, p. 4)

189 I didn't know what it was about, I didn't know if they'd have me on a treadmill or  
190 anything like that and I wasn't wanting that. (Respondent 1, Group 1; participant;  
191 Harkins et al., 2010, p. 5)

192 As well as indicating limited knowledge about the tests themselves, included studies revealed  
193 poor knowledge about CVD and diabetes (Goyder et al., 2009; Harkins et al., 2010; Lanza,

194 Albright, Zucker & Martin, 2044; Sranacharoenpong & Hanning, 2011; Williams, Mason &  
195 Wold, 2001). Some participants perceived screening as an opportunity to provide information  
196 and thereby improve knowledge about risk factors and disease prevention among patients  
197 (Goyder et al., 2009) and healthcare staff (Sranacharoenpong & Hanning, 2011).

### 198 Beliefs.

199 This theme demonstrates the complexity of beliefs and how they play out in people's  
200 perceptions of lifestyle related diseases, risks and their own capacity to make lifestyle  
201 changes. The original studies revealed a range of beliefs about different aspects of prevention  
202 programmes which sometimes interacted with knowledge levels. Sometimes beliefs can  
203 change with increased knowledge; equally, one's knowledge may be stunted by a belief that  
204 acts as a barrier to information provision. Sometimes this meant that patients did not believe  
205 test results which indicated an elevated risk.

206 I don't know what they found to make them think I am at risk in the future...what  
207 would make them believe that I will develop diabetes. I don't know why. (N13;  
208 participant; Troughton, Jarvis, Skinner et al., 2008, p. 90)

209 Others actively avoided obtaining new knowledge specific to their own risk in response to  
210 their belief that getting high risk results from the tests would elicit negative feelings,  
211 something to be avoided.

212 Negative beliefs about the consequences of having a health check included potentially  
213 being given bad news or being 'told off'. Non-attendance was sometimes linked to a  
214 belief that it might be better not to know that one might have an undiagnosed condition  
215 or be at risk of developing one. (authors; Burgess et al., 2014, p. 8)

216 Patients' beliefs about capabilities were cited in relation to their perceived ability to make  
217 lifestyle changes if they were found to be at risk of CVD or diabetes. These reflected internal

218 beliefs about their “self-motivation and self-concept” and were split into negative beliefs  
219 about themselves, e.g. “lack of self-discipline” and “no willpower to exercise” and positive  
220 beliefs about themselves being “able to do more” and “looking better” as a result of  
221 beginning to make lifestyle changes which encouraged them to continue (Ray, 2001). The  
222 link to self-efficacy is clear; one needs to feel able to make a change and be encouraged by  
223 initial steps toward change for it to be initiated.

224 Some beliefs acted as barriers to prevention programmes. One was a belief in a connection  
225 between the mind and illness (Nielsen, Dyhr, Lauritzen & Malterud, 2009). For the patient in  
226 this study a prevention programme was not necessary because she believed that a strong and  
227 positive mind would protect her against lifestyle related conditions. For her, this rationalised  
228 abstinence from the prevention programme and any health behaviour change.

229 [Patients] discussed the mind as a powerful tool to maintain good health. The mind can  
230 make you ill, cure you, keep you well or kill you. A woman stated that someone who  
231 feels well, is not so likely to catch a disease. It is important to avoid stress and be  
232 positive. This makes you stronger and gives you a chance of a better and longer life.  
233 (authors; Nielsen et al., 2004, p. 30)

234 A second belief that acted as a barrier to prevention programmes was a national sense of  
235 pride in health that was closely associated to perceptions of citizenship. In the Danish studies,  
236 being a good citizen was linked to the ability to work and poor health perceived as a  
237 weakness which would bring into question one’s ability to work. Thus, accessing healthcare  
238 services was perceived as a weakness which would prohibit participation in prevention  
239 programmes.

240 The traditional strong connection between health and work influenced both attitudes  
241 and feelings. One informant described her mother saying; “She never complained, even

242 if she was in pain. She struggled for a long time and was extremely enduring and I am  
243 proud of that". This *pride* in being strong was still there today. (authors and participant;  
244 Emmelin, Weinhall, Stenlund, Wall & Dahlgren, 2007, p. 8)

245 Although the authors observed a change among the younger generation, the legacy of this  
246 underlying societal belief of illness as a weakness remained a powerful influence. This is an  
247 example of how societal beliefs can impact on individuals' decision-making and readiness to  
248 engage in prevention programmes.

#### 249 Cue to (in)action.

250 The focus of the prevention programmes in the included studies was twofold: to identify risk  
251 levels; and to foster positive health behaviour change and thereby prevent the risk of CVD or  
252 diabetes from increasing further. The first part was reported in terms of CVD risk scores or  
253 the detection of pre-diabetes; the second part was not always clearly described but involved  
254 advice about nutrition, physical activity, and smoking cessation. This theme demonstrates  
255 that sometimes the prevention programme was perceived as a cue to action, i.e. to make  
256 lifestyle changes, but sometimes it was perceived as reinforcement of good health which did  
257 not require action. In the Danish Ebeltoft Project (reported in: Nielsen et al., 2009; Nielsen,  
258 Dyhr, Lauritzen & Malterud, 2005; Nielsen, Dyhr, Lauritzen & Malterud, 2004) it was clear  
259 that patients' beliefs that they were in good health had been confirmed following a test result  
260 which indicated a low or medium risk profile.

261 The screening confirmed the participants' feeling of being in good health and they put  
262 emphasis on this acquired peace of mind. Participants used the results to eliminate  
263 worries and confirm their lifestyle up to now [...] though others remarked on the risk of  
264 becoming over-complacent. (authors; Nielsen et al., 2009, p.113-4)

265 That this reinforcement of good health acted as a cue to inaction reveals a belief that  
266 preventative action, i.e. changes in lifestyle, was only necessary if risk was already elevated.  
267 This belief undermines the essence of prevention programmes; preventative action can  
268 always be taken even in the absence of risk. There was an awareness of this however in the  
269 concern about over-complacency; clearly some participants were aware that their risk profile  
270 may change over time and that taking preventative action may be required further down the  
271 line. Of greater concern, was that the same kind of reaction was observed by those in higher  
272 risk categories (Nielsen et al., 2005). If an elevated CVD risk score was identified but other  
273 tests proved normal (e.g. lung capacity), those normal results tended to overshadow the fact  
274 that they were a member of a high risk group.

275 It was great to get the “all-clear” on a whole lot of things I’d been wondering about. I  
276 wasn’t in quite such bad shape as I’d thought. (J3-1; participant; Nielsen et al., 2005, p.  
277 236)

278 These findings demonstrate a tendency toward unrealistic optimism which cued patients  
279 toward inaction. Further consolidation of this perceived confirmation of good health came  
280 from patients’ fundamental belief that illness was always symptomatic (Burgess et al., 2014;  
281 Harkins et al., 2010).

282 I just didn’t feel I needed it (screening) I just didn’t feel...ill. (Respondent 4, Group 2;  
283 participant; Harkins et al., 2010, p. 5)

284 There was a clear belief that signs of CVD or diabetes would be felt in the body as  
285 symptoms; this expectation to feel the illness or to feel it coming was found to influence  
286 participants’ perceptions of whether they were at risk and their decisions about the necessity  
287 of lifestyle change. Thus, the lack of embodied symptoms was often perceived as a cue to  
288 inaction (Burgess et al., 2014) illustrating the significance of the physiological or the ‘felt



289 sense' (Gendlin, 1996) of illness within the body and patients' perceptions of their illness  
290 (Leventhal et al., 1984).

### 291 Social Influences.

292 This theme describes the impact of social influences—cultural, economic, political, social—  
293 on patients' decisions to engage in prevention programmes and any subsequent lifestyle  
294 changes. One study explicitly drew upon social networks to test different methods of  
295 invitation (Harkins et al., 2010): the first was a social media campaign which depended on  
296 'glossy' information leaflets sent to postal addresses requesting that local residents phone the  
297 GP surgery to make an appointment; the second a community development project which  
298 employed community outreach workers to invite local residents by word of mouth to a drop-  
299 in clinic. There was resistance to being accessed by post for a number of reasons (including  
300 letters being perceived as junk mail, frequent changes of address, escaping debt or benefit  
301 fraud). In contrast, positive responses to face to face interactions with the outreach workers  
302 were reported.

303 Meeting the woman (community outreach worker) she was great, I wouldn't have  
304 bothered otherwise. (Respondent 3, Group 2; participant; Harkins et al., 2010, p. 4)

305 Other ways that social networks influenced patients was in their knowledge of CVD and/or  
306 diabetes. Some were influenced by their friends' experience of having diabetes, which to  
307 them did not appear to be serious (Eborall, Davies, Kinmouth, Griffin & Lawton, 2007).  
308 Among those declining screening in the Ebeltoft project (Nielsen et al., 2009, 2005, 2004)  
309 social comparisons provided legitimacy to a fatalist view which justified a passive approach  
310 to health.

311 Several informants gave the example of people who had become ill or died young  
312 despite giving up smoking, alcohol or unhealthy food. They told stories about people

313 who had been drinking, smoking and eating whatever they liked and yet enjoyed good  
314 health and lived to a ripe old age. Thus, the informants questioned whether too many  
315 restrictions were a good thing, hinting that they might be unhealthy or spoil one's  
316 happiness. (authors; Nielsen et al., 2004, p.30)

317 This position relates to beliefs about health but also whether health – or preventative  
318 behaviour to reduce risk - is prioritised when set in the context of quality of life. Enjoyment  
319 of risky behaviours or the threat to happiness created by knowing one's risk in these cases  
320 outweighed the benefits of engaging in a prevention programme. The example described  
321 above of the pride associated with good health and the close link between health and ability  
322 to work demonstrates how social influences can impact on individuals' decision-making  
323 processes and health behaviours (Emmelin et al., 2007). In these cases, public health  
324 campaigns must also seek to change perceptions of health if prevention programmes are  
325 going to be taken up and make a difference in disease incidence on a national level.

#### 326 Role and identity.

327 Factors related to social influence, and context, were aspects of role and identity attributed by  
328 patients to themselves and healthcare professionals. This theme describes how for some  
329 patients identity was a key factor that influenced their readiness to take up a healthier  
330 lifestyle. The extract below demonstrates how a person's belief about their quality of life can  
331 reflect their identity, in this case as a smoker/ex-smoker, and prevent them from taking  
332 preventative action because the costs outweigh the benefits.

333 My life was better when I smoked, took five minutes off to sit and relax...I couldn't sit  
334 still [when I gave up smoking], I couldn't relax enough to drink a cup of coffee with  
335 my wife. I've really thought about this a lot; we only live once, I've almost made up my

336 mind that I'm going to take a gamble and smoke rather than torment myself. (J3-14;  
337 participant; Nielsen et al., 2005, p. 236)

338 For this participant, the sense of wellbeing from engaging in a risky behaviour was perceived  
339 as more important than denying such pleasures in order to reduce risk. There was a sense in  
340 some accounts that population-level prevention programmes were badly received because  
341 they challenged participants' sense of autonomy.

342 They [participants] stressed the importance of autonomy and the individual's  
343 incontestable right to determine his [*sic*] own lifestyle himself [*sic*] and even to enjoy  
344 risky habits. (authors; Nielsen et al., 2004, p. 30)

345 Some expressed trust toward healthcare professionals and readily accepted the need to rely on  
346 the healthcare system to identify risk levels because they were unable to measure their own  
347 blood pressure, blood glucose or cholesterol (Goyder et al., 2009; Nielsen et al., 2004).  
348 Others reacted negatively toward being invited to a prevention programme and receiving  
349 reminders if they did not attend. This was coupled with a rebellion against being told what to  
350 do by the state.

351 Receiving more than one invitation made some feel that the authorities were being  
352 over-officious. They also underlined the risk of giving people a guilty conscience and  
353 the negative effects on one's quality of life. The informants neither wanted nor needed  
354 the doctor to ask them to cut down on smoking or lose weight unless they had asked for  
355 advice. Telling them to do so might simply irritate them and make them more reluctant  
356 to try. (authors; Nielsen et al., 2004, p. 30)

357 This emphasizes the challenge of getting the balance right between information provision and  
358 encouragement to make lifestyle changes and the sensitivities people feel about their health  
359 which is bound up with their sense of identity. This means that having one's health criticised

360 may be perceived as an assault on the self. These emotional responses related to the role of  
361 the healthcare system and the individual in prevention programmes were summarised in one  
362 paper which categorised the different positions taken up by participants (Emmelin et al.,  
363 2007). Some participants were reported to perceive the programme as a “disappointment”  
364 because they felt they did not belong to the risk groups identified which meant their high  
365 expectations of the programme were not met. Others felt the programme as an “insult”.

366 They expressed ambivalence towards the programme even if they may have applauded  
367 it at the start. Their participation was more based on feelings than on their own health  
368 problems. However, they may have had the targeted risk factors but felt that they could  
369 not meet the demands from the programme. They felt criticised and worried over not  
370 being able to do something about it. In this group there was also a greater suspicion  
371 about the collective ambition of the programme. (authors; Emmelin et al., 2007, p. 9)

372 The embedded emotion in these reactions implies that prevention programmes were not  
373 always evaluated rationally. There was also an underlying sense of moralisation, as  
374 demonstrated above with the belief that health is something good, an indicator of citizenship  
375 or “civic responsibility” (Burgess et al., 2014, p. 6). This notion of ‘doing good’ was also  
376 observed in the perceived role of healthcare professionals who were described or described  
377 themselves as educators or facilitators (Goyder et al., 2009).

### 378 Context.

379 This final theme brings together the impact of social influences and role and identity to focus  
380 on the context of interactions between healthcare professionals and patients within prevention  
381 programmes. This includes micro-contextual factors such as whether interactions were face-  
382 to-face up to macro-contextual factors such as whether the programme received  
383 governmental support. It was clear that patients valued face-to-face interactions or

384 conversations on the telephone (Goyder et al., 2009; Harkins et al., 2010; Lanza et al., 2007;  
385 Srarancharoenpong & Hanning, 2011; Troughton et al., 2008). This enabled patients to ask  
386 questions and gave healthcare professionals the opportunity to explain to patients the process  
387 and benefits of knowing their risk level. As stated above, letters and written information were  
388 often ignored, negating their utility in this context but there was little imagination about how  
389 else to communicate with the public about such programmes and about the risks of CVD and  
390 diabetes (Goyder et al., 2009; Harkins et al., 2010; Troughton et al., 2008).

391 The benefits of face-to-face interactions were also highlighted in the comparison between  
392 social media based invitations and community based verbal invitations (Harkins et al., 2010).  
393 Setting these conversations in a community context rather than in a healthcare setting was  
394 preferable to some because it prevented a feeling of “getting lectured to” (Respondent 3,  
395 Williams et al., 2001) with the intention of boosting attendance and breaking down the barrier  
396 of asking people to make a special trip to a clinic for the tests. Whether such time intensive  
397 resources were available was related to the level of organisational commitment to the  
398 programme. In almost all studies there was a clear indication of support both in terms of  
399 financial investment and infrastructure. Furthermore, some participants appreciated the  
400 community spirit and enjoyed feeling part of something larger (Emmelin et al., 2007; Nielsen  
401 et al., 2004; Nielsen et al., 2009). A striking exception to this was the lack of organisational  
402 and governmental commitment evident in the Thai study (Srarancharoenpong & Hanning,  
403 2011) which raised significant questions regarding the sustainability of the programme.

#### 404 The conceptual model.

405 The themes reported above were combined to create a conceptual model of patients’  
406 perceptions and experiences of prevention programmes (represented in Figure 2). This  
407 conceptual model of prevention programmes brings together what were identified as active  
408 components in the prevention programmes evaluated in the original studies. Synthesizing this

409 evidence with theoretical constructs from the a priori framework and other health psychology  
410 theories cited in the original studies has informed the development of this model particularly  
411 with respect to the relationships between the themes generated.

412 The diagram depicts *social influences* feeding into *knowledge* and *beliefs*. Social influences  
413 included social constructions of health in terms of citizenship which influenced patients'  
414 sense of identity in relation to judgements about risky behaviours and quality of life.

415 Similarly, some patients' sense of autonomy led them to rebel against a population level  
416 prevention programme designed to help them manage their health, because they felt that was  
417 their own responsibility. *Knowledge* and *beliefs* were often described as interconnected and  
418 sometimes interdependent, hence the two-way arrow. Knowledge can be targeted through  
419 educational programmes, but we know that knowledge alone does not predict behaviour.

420 Indeed, most health psychology theories of behaviour—Theory of Planned Behaviour (Ajzen,  
421 1991), Protection Motivation Theory (Rogers, 1983), the Health Action Process Approach  
422 (Schwarzer, 1992)—argue that knowledge informs beliefs, which in turn, influence more  
423 proximal predictors of behaviour such as self-efficacy and intentions. Furthermore, the  
424 synthesis suggested that *beliefs* could manifest as barriers to education confirming that  
425 changes in beliefs may be required for prevention programmes to be successful.

426 On the right hand side of the diagram is *context*. Some patients conceptualized healthcare  
427 professionals as educators and associated them with a formal consultation in which  
428 information and advice were provided to increase patients' knowledge and understanding of  
429 CVD and/or diabetes. Setting the prevention programme within a community context altered  
430 the *role* played by community workers or healthcare professionals involved in delivering the  
431 intervention; face-to-face contact in a non-health setting deformed the programme and  
432 facilitated access.

433 Together, *social influences, knowledge and beliefs, context, and role and identity* fed into  
434 *cues to (in)action*. The nature of participants' beliefs and their level of understanding of risk  
435 factors and CVD or diabetes influenced their readiness to act. Likewise, the setting, the role  
436 adopted by healthcare professionals, the perceived role of the programme itself, individuals'  
437 sense of identity, and societal factors worked together to influence readiness to engage in  
438 prevention programmes and associated behaviour change. Each interconnected theme on the  
439 right hand side manifested as either a barrier or facilitator of action and competed with the  
440 factors on the left to produce a cue to action or inaction. Together, they were all related to  
441 social influences, which cuts across the model as a foundational factor. There was limited  
442 evidence to suggest prioritisation of any one factor over another which is why they are  
443 presented as equivalent in this model. Nevertheless, the evidence suggests that the  
444 significance of each factor is not fixed and that different combinations of factors will play out  
445 differently on different occasions.

446 **[INSERT FIGURE 2 ABOUT HERE]**

447

## 448 **Discussion**

449 The conceptual model generated from themes identified in included studies illustrates the  
450 complex interactions at play between the individual and their social context and between  
451 healthcare professionals and organisational structures. These complex factors combine to  
452 generate a cue to action or inaction. There are number of entry points within this model  
453 where healthcare interventions could manipulate factors affecting (in)action. For these entry  
454 points to work as active ingredients they need to be targeted within a supportive context, i.e.  
455 through government policy and funding at both national and local levels. An initial entry  
456 point might be through *knowledge* and information provision. There is an urgent need to  
457 move away from written materials and to invest in resources to facilitate face-to-face

458 healthcare professional-patient interactions through *role and identity*. Secondly, a move  
459 toward focusing more strongly on smaller communities may work to produce productive  
460 *social influences*. Although prevention programmes are often delivered at the population  
461 level, there is a need to make them more accessible for the local community which may  
462 involve taking them out of the healthcare setting and putting them into workplaces or  
463 community centres with additional support available by telephone. Indeed, prevention  
464 programmes delivered in primary care or in the community may need to be accompanied by  
465 large scale public health messages focusing on lifestyle related to specific behaviours that  
466 help to reduce CVD and diabetes risk, e.g. stop smoking, eat well, engage in physical  
467 activity. There would then be a foundation on which to build better understanding in  
468 individual consultations when tests are conducted.

469 In terms of the content of the programmes evaluated as potential *cues for (in)action*, there  
470 was a marked absence of discussion of goals in the included studies; healthcare professionals  
471 gave advice about nutrition and physical activity but it was not clear from the way they were  
472 reported whether efforts were made to tailor this advice to the individual or indeed to engage  
473 in goal-setting. These findings resonate with empirical work published following the  
474 completion of this review (Shaw, Pattison, Holland & Cooke, 2015). The lack of tailored  
475 advice identified was disappointing because there is evidence to demonstrate that making  
476 specific plans to reach a goal is a successful behaviour change technique for promoting  
477 adoption of healthy behaviours (Michie et al., 2011; Snihotta, Scholtz & Schwarzer, 2006).  
478 Furthermore, there is a need to change people's *beliefs* about symptoms in relation to lifestyle  
479 related conditions. The absence of symptoms, and feeling well, were common reasons for  
480 non-engagement with programmes which justified *inaction* or confirmed participants'  
481 perceptions that their current lifestyle did not need to be changed. This link between a 'felt  
482 sense' of illness in the body is not included in the TDF but discussed in the original studies



483 with reference to Leventhal et al.'s (1984) Common Sense Model of Illness Representations  
484 and physiological factors contributing to self-efficacy (Bandura, 1977). It is clear from these  
485 qualitative studies that illness perceptions are a significant contributor to *beliefs* which then  
486 help to formulate *cues to (in)action*, i.e. whether individuals take up invitations to prevention  
487 programmes.

488 Of course taking action is not only the responsibility of the patient; the behaviour of  
489 healthcare professionals is also important and should be considered a proximal determinant  
490 for the quality of care that patients receive (French et al., 2012). Thus, in reviewing the  
491 effectiveness of interventions, especially in terms of context and acceptability, it is necessary  
492 to examine patient *and* healthcare professional perspectives regarding the reception and  
493 delivery of interventions, their impact on patients' everyday lives, and the training and  
494 support required to enable healthcare professionals to follow protocols faithfully and deliver  
495 them competently (Bellg et al., 2004; Shaw et al., 2014). Unfortunately few studies included  
496 accounts from healthcare professionals which means there is insufficient evidence on which  
497 to draw conclusions about their role in CVD and diabetes prevention programmes.

498 Finally, these qualitative studies made clear that people's perceptions and reactions to  
499 prevention programmes may not always be rational. This highlighted the need to strike a  
500 careful balance between information provision and encouragement from healthcare  
501 organisations to make lifestyle changes so as not to cause insult or prompt a rebellious denial.  
502 Each element of the prevention programme needs to be carefully crafted to ensure it is  
503 positively received. The best way to achieve this is to work together with patients and  
504 families. Using rigorous qualitative research can be vital in formulating an intervention that  
505 will be acceptable and feasible within a specific context (for an example of intervention  
506 development using qualitative methods, see: Hudson, Duncan, Pattison & Shaw, 2015).

507 *Strengths and limitations of original studies*

508 Limitations of original studies included missing details of the behavioural components of  
509 interventions and lack of transparency making it difficult to determine which aspects of the  
510 interventions were successful. Nevertheless, the transparent reporting of the analysis of  
511 primary data in high quality studies meant that data extracts were available providing a  
512 greater depth of understanding.

513 *Strengths and limitations of the review*

514 This is the first synthesis of evidence relating to prevention programmes for CVD and  
515 diabetes which uses the TDF as an a priori framework. This meant the synthesis was  
516 informed both by a range of health psychology theories *and* empirical findings in the  
517 included studies. This review is limited by the quality of original studies, though we note that  
518 none of the 14 included studies was rated as poor, and it is limited in scope by its question.  
519 Furthermore, additional work is required to test the use of the TDF and its coverage; several  
520 theoretical constructs in included studies were not represented. This suggests further  
521 development of the TDF is required for it to fully serve as an a priori framework that  
522 comprehensively represents the breadth of existing health psychology theory. Thus, an update  
523 of the systematic review of health psychology theories may be required before the TDF could  
524 be packaged alongside 'best fit' framework synthesis as a methodological exemplar for  
525 'policy urgent' systematic reviews in health psychology.

526 **Conclusion**

527 The conceptual model, developed from this synthesis, enhances the emphasis on the complex  
528 interactions between individuals' beliefs, knowledge and identity, their social networks,  
529 wider societal constructions of health and organisational factors. At the centre of the model  
530 are the *cues to (in)action* which are created through different combinations of factors. More  
531 research is needed to make explicit the behavioural components of prevention programmes

532 which focus on patients' and also healthcare professionals' perceptions and experiences to  
533 discern which behavioural elements are active in which contexts. Furthermore, programmes  
534 for the identification of risk and prevention of CVD and diabetes need to take account of the  
535 person-in-context and therefore of the individual within the system. Thus, healthcare  
536 providers need to take seriously patients' health beliefs and the context in which programmes  
537 operate when identifying intervention points. Public health campaigns to improve knowledge  
538 and change beliefs and behaviour need to be combined with practical steps to facilitate  
539 equivalent access across socio-demographic boundaries.

540

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- 732

**Table 1. Description of the original studies included in this review.**

<b>Paper</b>	<b>Author (Year)</b>	<b>Research Question/Aim</b>	<b>Sampling Method and Size (n)</b>	<b>Intervention</b>	<b>Location</b>	<b>Data Collection Method</b>	<b>Data Analysis Method</b>	<b>Quality Rating</b>
<b>P1</b>	Burgess (2014)	To explore patterns of uptake; influences on decision to attend screening	Patients ( $n=27$ ), Purposive	NHS Health Check	UK	Interviews	Framework analysis	Key Paper
<b>P2</b>	Chipchase (2013)	To explore impact of NHS Health Check with patients	Patients ( $n=10$ ), Random	NHS Health Check	UK	Interviews	Interpretative phenomenological analysis	Satisfactory
<b>P3</b>	Eborall (2007)	To provide insight into factors contributing to anxiety; to explore expectations & reactions to screening experience	Patients & HCPs ( $n=23$ ), Purposive	ADDITION trial Type 2 diabetes screening	UK	Interviews	Grounded theory	Key Paper
<b>P4</b>	Emmelin (2007) <sup>a</sup>	To describe changes in self-rated health related to risk factors; to describe health related norms & attitudes toward CVD programme	Patients ( $n=9$ ), Purposive	Cardiovascular risk factors screening	Sweden	Interviews	Grounded theory	Key Paper
<b>P5</b>	Goyder (2009)	To examine perceptions of staff & patients involved in screening	Patients ( $n=49$ ) & HCPs ( $n=23$ ), Purposive	Diabetes screening	UK	Interviews	Framework analysis	Key Paper
<b>P6</b>	Harkins (2010)	To explore perceived barriers & facilitators to engaging in CHD primary prevention programme	Patients ( $n=13$ )	CHD prevention programme	UK	Focus groups	Thematic analysis	Key Paper
<b>P7</b>	Lanza (2007) <sup>a</sup>	To evaluate the Diabetes Detection Initiative	Patients ( $n=20-32$ ) <sup>c</sup> , Purposive	Diabetes Detection Initiative	US	Discussion groups	Not stated	Unsure
<b>P8</b>	Nielsen (2009) <sup>b</sup>	To explore individuals' responses to a low cardiovascular risk score	Patients ( $n=22$ ), Purposive	Ebeltoft Project CVD	Denmark	Interviews	Thematic analysis using Malterud's principles	Satisfactory

<b>P9</b>	Nielsen (2005) <sup>b</sup>	To explore individuals' responses to an elevated cardiovascular risk score	Patients ( $n=14$ ), Stratified, Purposive	Ebeltoft Project CVD	Denmark	Interviews	Thematic analysis using Malterud's principles	Key Paper
<b>P10</b>	Nielsen (2004) <sup>b</sup>	To explore non-participants' views on invitations to health screenings	Patients ( $n=47$ ), Stratified, Purposive	Ebeltoft Project CVD	Denmark	Interviews	Thematic analysis using Malterud's principles	Satisfactory
<b>P11</b>	Ray (2001)	To explore behavioural changes of those attending screening	Patients ( $n=135$ ), Self-selected	Heart risk screening	Australia	Telephone interviews	Content analysis	Satisfactory
<b>P12</b>	Sranacharoenpong (2011)	To investigate barriers to & support for community-based diabetes prevention programme	Patients & HCPs ( $n=43$ ), Purposive	Diabetes prevention programme	Thailand	Interviews and focus groups	Thematic analysis	Key Paper
<b>P13</b>	Troughton (2008)	To ascertain individuals' experience of screening	Patients & HCPs ( $n=15$ ), Purposive	Pre-diabetes	UK	Interviews	Framework analysis	Key Paper
<b>P14</b>	Williams (2001) <sup>a</sup>	To examine the impact of a culturally appropriate recruitment strategy to CVD screening	Patients ( $n=66$ ) in work context	Healthier People Risk Appraisal CVD	US	Interviews	Not stated	Unsure

**Note.** CVD – Cardiovascular disease. HCPs – Health care professionals. UK – United Kingdom. US – United States. <sup>a</sup> Mixed methods study – only the qualitative elements of these studies were included in this review. <sup>b</sup> These studies report results from the same study. <sup>c</sup> Exact sample size of qualitative element not stated.

<sup>d</sup> Quality Rating: Key paper – meets all quality criteria and clearly fits with review question. Satisfactory – meets most quality criteria and fits well to review question. Unsure – mixed responses to quality criteria and lack of clarity regarding relevance to review question. Poor – does not meet quality criteria.

**Table 2. Appraisal of original studies included in this review.**

Prompt	Reviewer	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14
1. Are the research questions clear?	1	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y
	2	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y
2. Are the research questions suited to qualitative inquiry?	1	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y
	2	Y	-	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y
3. Is the sampling clearly described?	1	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
	2	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	N
4. Is the data collection clearly described?	1	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y
	2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
5. Is the analysis clearly described?	1	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	N
	2	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y
6. Is the sampling appropriate to the research question?	1	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y	Y	Y
	2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-
7. Is the data collection appropriate to the research question?	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
8. Is the analysis appropriate to the research question?	1	Y	Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	-
	2	Y	Y	Y	Y	Y	Y	-	-	-	-	Y	Y	Y	Y
9. Are the claims made supported by sufficient evidence?	1	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	N
	2	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	N
10. Are the data, interpretations, and conclusions clearly integrated?	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y
	2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N
11. Does the paper make a useful contribution?	1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N
<b>Overall Rating<sup>a</sup></b>	1	KP	SAT	KP	KP	SAT	KP	UNS	SAT	KP	SAT	SAT	KP	KP	SAT
	2	KP	SAT	KP	KP	KP	KP	UNS	SAT	SAT	SAT	KP	KP	KP	Poor
<b>Agreed Rating</b>		<b>KP</b>	<b>SAT</b>	<b>KP</b>	<b>KP</b>	<b>KP</b>	<b>KP</b>	<b>UNS</b>	<b>SAT</b>	<b>KP</b>	<b>SAT</b>	<b>SAT</b>	<b>KP</b>	<b>KP</b>	<b>UNS</b>

**Note.** P – Papers that were coded for the particular dimension; see Table 1 for corresponding Author (Year). <sup>a</sup>Quality Rating: KP: Key paper – meets all quality criteria and clearly fits with review question; SAT: satisfactory – meets most quality criteria and fits well to review question; UNS: unsure – mixed responses to quality criteria and lack of clarity regarding relevance to review question; Poor – does not meet quality criteria.

**Table 3. Coding of included studies against the *a priori* framework: Theoretical domains framework.**

DOMAINS and Constructs*	Studies ( <i>k</i> ) Coded For Domain	Analytic Observations
<b>D1 KNOWLEDGE</b> Knowledge; procedural knowledge; knowledge of task environment	<b><i>k</i>=13</b> P1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14	Generally knowledge is poor If knowledge is good it doesn't always lead to behaviour change – it interacts with other mediating factors
<b>D2 SKILLS</b> Skills; skills development; competence; ability; interpersonal skills; practice; skill assessment	<b><i>k</i>=3</b> P2, 3, 12	Healthcare professionals need to be trained & supported
<b>D3 SOCIAL/PROFESSIONAL ROLE AND IDENTITY</b> Professional identity; professional role; social identity; identity; professional boundaries; professional confidence; group identity; leadership; organisational commitment	<b><i>k</i>=7</b> P3, 4, 9, 10, 12, 13, 14	Identity in relation to individuals & organisations are mediating factors
<b>D4 BELIEFS ABOUT CAPABILITIES</b> Self-confidence; perceived competence; self-efficacy; perceived behavioural control; beliefs; self-esteem; empowerment; professional confidence	<b><i>k</i>=6</b> P4, 8, 10, 11, 12, 13	A mixture of terms are used including: self-efficacy, perceived behavioural control, confidence
<b>D5 OPTIMISM</b> Optimism; pessimism; unrealistic optimism; identity	<b><i>k</i>=4</b> P1,3,9,13	Sometimes unrealistic optimism linked to inaction
<b>D6 BELIEFS ABOUT CONSEQUENCES</b> Beliefs; outcome expectancies; characteristics of outcome expectancies; anticipated regret; consequents	<b><i>k</i>=8</b> P1, 2, 3, 4, 5, 8, 10, 13	Expectations of results influence decision-making
<b>D7 REINFORCEMENT</b> Rewards; incentives; punishment; consequents; reinforcement; contingences; sanctions	<b><i>k</i>=4</b> P4, 8, 11, 13	Confirmation of (good) health status
<b>D8 INTENTIONS</b>	<b><i>k</i>=6</b>	



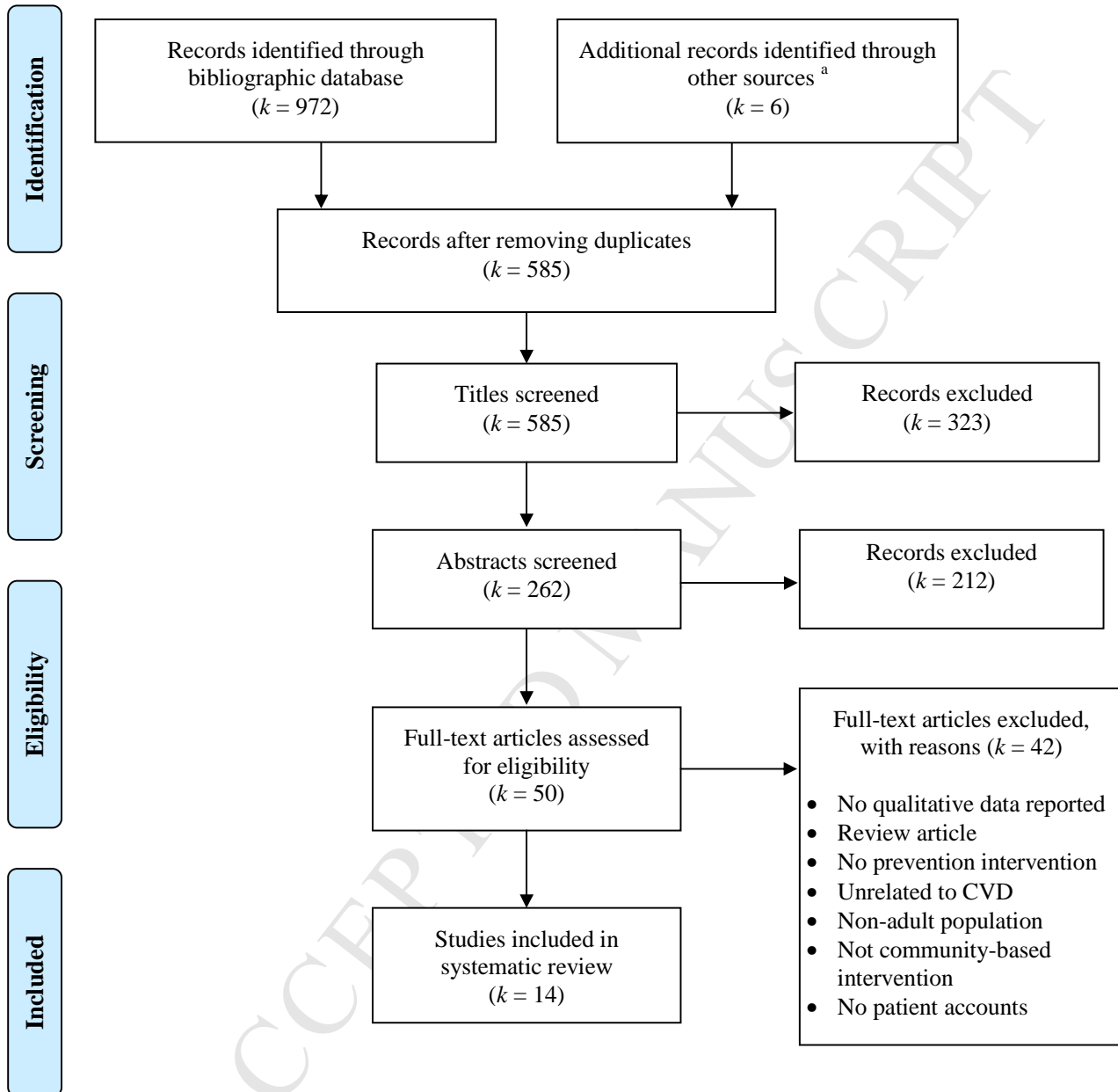
Stability of intentions; stages of change model; transtheoretical change model and stages of change	P4, 8, 9, 10, 11, 13	Talk of changes included but in no detail
<b>D9 GOALS</b>	<b>k=3</b>	
Goals; goal priority; goal/target setting; goals (autonomous/controlled); action planning; implementation intention	P4,9,11	Talk of changes made but not in language of behaviour change techniques
<b>D10 MEMORY, ATTENTION AND DECISION PROCESSES</b>	<b>k=2</b>	
Memory; attention; attention control; decision making; cognitive overload/tiredness	P5, 8	Decision-making
<b>D11 ENVIRONMENTAL CONTEXT AND RESOURCES</b>	<b>k=13</b>	
Environmental stressors; resources/material resources; organisational culture/climate; salient events/critical incidents; person x environment interaction; barriers and facilitators	P1, 2, 3, 4, 5, 6, 9, 10, 11, 12, 13, 14	Materials & resources; person x organisation interaction includes patient × healthcare professional interaction
<b>D12 SOCIAL INFLUENCES</b>	<b>k=11</b>	
Social pressure; social norms; group conformity; social comparisons; group norms; social support; power; intergroup conflict; alienation; group identity; modelling	P2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13	Community/collective effort; social pressures; power issues relating to doctor-patient relationship
<b>D13 EMOTION</b>	<b>k=7</b>	
Fear; anxiety; affect; stress; depression; positive/negative affect; burn-out	P4, 5, 6, 8, 9, 10, 11	Positive/negative affect; some anxiety
<b>D14 BEHAVIOURAL REGULATION</b>	<b>k=1</b>	
Self-monitoring; breaking habit; action planning	P11	Self-reported changes

*Note.* \*All definitions are based on definitions from the American Psychological Association's Dictionary of Psychology; adapted from Cane et al. (2012).  
P – Papers that were coded for the particular dimension; see Table 1 for corresponding Author (Year).

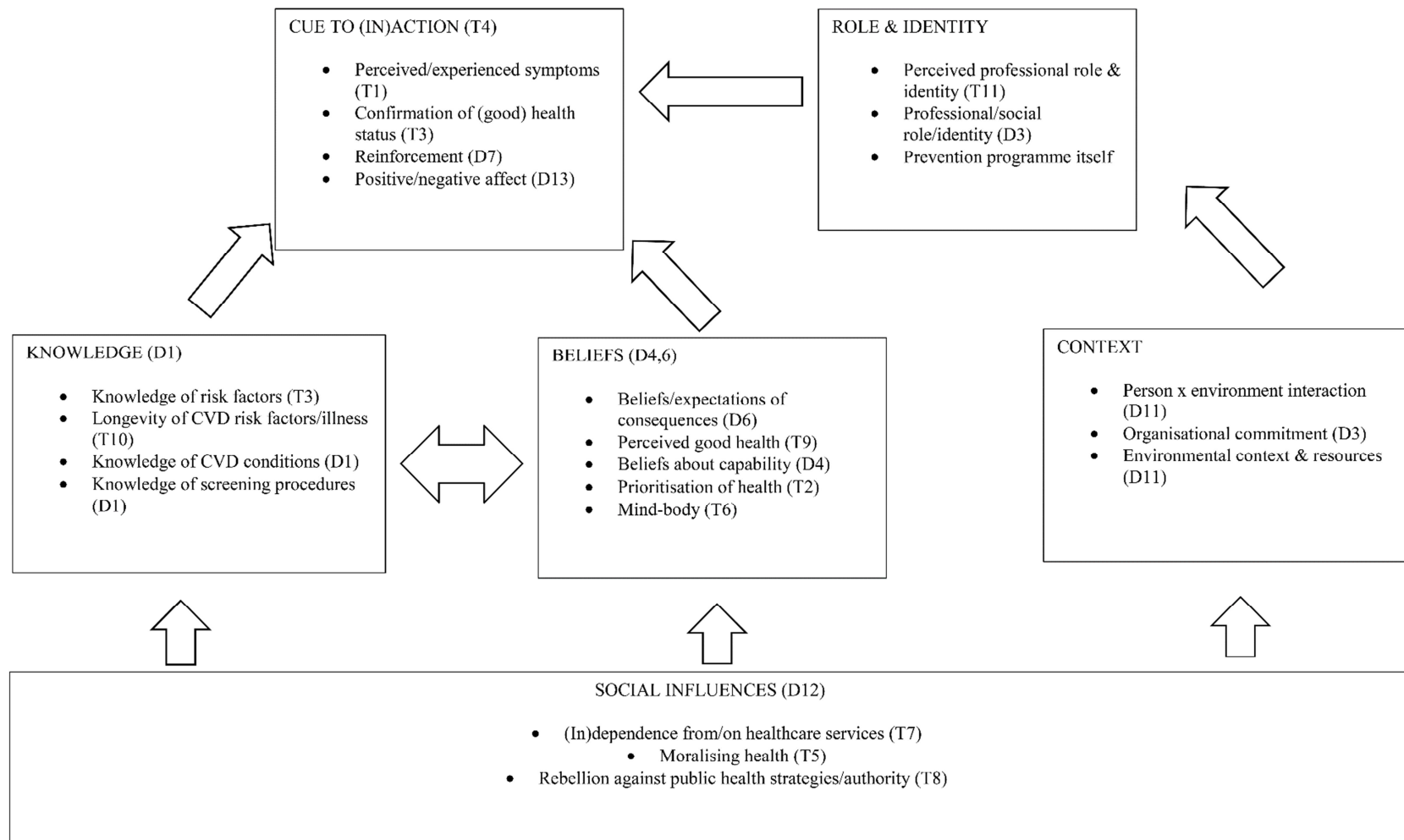
**Table 4. Inductive thematic analysis of included studies: Concepts not included in the Theoretical domains framework.**

	<b>Themes</b>	<b>Studies (<i>k</i>) Coded For Themes</b>	<b>Analytic Observations</b>
<b>T1</b>	Perceived/Experienced Symptoms	<i>k</i> =5 P1, 3, 6, 10, 13	Cited reason for not screening/not taking action (T4)
<b>T2</b>	Prioritisation of health/behaviour change in relation to quality of life	<i>k</i> =3 P2, 9, 12	Cited reason for not taking action (T4)
<b>T3</b>	Reassurance/confirmation of (good) health status	<i>k</i> =5 P1, 2, 4, 8, 13	Knowledge of risk factors & relationship of lifestyle on CVD mediate this confirmation of good health (D1); relates to beliefs/expectations of consequences (D6)
<b>T4</b>	Cue to (in)action	<i>k</i> =4 P3,4,9,10	Either prompts action or not depending on interaction with T1,2,9; related to D7,13
<b>T5</b>	Moralising health	<i>k</i> =3 P3, 4, 8	Good health perceived to equate to good person; relates to social influences (D12)
<b>T6</b>	Mind-body/whole person approach to health	<i>k</i> =2 P4, 10	Physical symptoms not experienced is perceived to equate to absence of illness; relates to D1
<b>T7</b>	(in)dependence from/on healthcare services	<i>k</i> =3 P8, 10, 13	Caution against passivity/dependence on healthcare system; individual choice
<b>T8</b>	Rebellion against public health strategies/authority/community approach	<i>k</i> =2 P6, 10	Related to moralising health – reaction against notion of common good/authority
<b>T9</b>	Perceived good health/lack of symptoms	<i>k</i> =4 P2, 6, 10, 11	Cited reason for inaction (T4)
<b>T10</b>	Longevity of risk factors/illness	<i>k</i> =1 P10	Related to knowledge of risk factors over time (T1)
<b>T11</b>	Perceived professional role and identity	<i>k</i> =7 P3, 4, 9, 10, 12, 13, 14	Related to professional role and identity (D3) but focuses on patients' perceptions of professionals

*Note.* \*All definitions are based on definitions from the American Psychological Association's Dictionary of Psychology; adapted from Cane et al. (2012).  
P – Papers that were coded for the particular dimension; see Table 1 for corresponding Author (Year).



**Figure 1. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Flow Diagram.** <sup>a</sup> Other sources: Reference changing, contacting authors. CVD – Cardiovascular disease.



**Figure 2. Conceptual model of patients' perceptions and experiences of prevention programmes.** D – Domains; Theoretical domains and constructs in the theoretical domains framework (see Table 3 for details). T – Themes (identified through inductive thematic analysis); Theoretical constructs *not* included in the theoretical domains framework (see Table 4 for details). CVD – Cardiovascular disease.

## **Patients' perceptions and experiences of cardiovascular disease and diabetes prevention programmes: a systematic review and framework synthesis of qualitative evidence**

### **Research highlights**

- Framework synthesis offers robust review methodology for 'policy urgent' questions
- The Theoretical Domains Framework combines constructs; more development work on its comprehensiveness is needed
- Qualitative research studies tell us about patient acceptability of prevention programmes
- Organisation and social context create distinctive professional-patient interaction
- Knowledge and beliefs about risk & symptoms combine to create cues to (in)action