A TOBACCO-FREE FUTURE

AN ALL-ISLAND REPORT ON TOBACCO, INEQUALITIES AND CHILDHOOD

2013

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Published by the Institute of Public Health in Ireland (IPH) and the TobaccoFree Research Institute Ireland (TFRI).

November 2013

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To be cited as:
McAvoy, H., Kabir, Z., Reulbach, U., McDaid, O., Metcalfe, O. and Clancy, L. (2013). A Tobacco-Free Future – an all-island report on tobacco, inequalities and childhood. Dublin: Institute of Public Health in Ireland and TobaccoFree Research Institute Ireland.

ISBN 978-0-9570083-3-5

Designed by Slick Fish Design

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The full report is available on the IPH website www.publichealth.ie and the TFRI website www.tri.ie

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Glossary of terms

ADHD	Attention Deficit Hyperactivity Disorder
Atherosclerosis	A condition characterised by thickening of the arterial walls due to the accumulation of fatty deposits
At risk of poverty	A measure of poverty used in the Republic of Ireland calculated as the percentage of persons with an equivalised household income of less than 60% of the national median income
Brand-standing	A play on the term grandstanding which can be defined as conduct that attempts to impress onlookers. A marketing term referring to similar actions to advertise and market a product brand
Communicable disease	Clinically evident illness resulting from infection
Cotinine levels	Cotinine levels, measured from blood, are used to monitor the level of exposure to tobacco smoke including SHS
CHETS	Childhood Exposure to Tobacco Smoke Study
Deprived life expectancy gap	The deprived life expectancy gap refers to the difference between life expectancy in the 20% most deprived areas and life expectancy in Northern Ireland generally
DHSSPS	Department of Health, Social Services and Public Safety
ESPAD	European School Survey Project on Alcohol and Drugs
ESRI	The Economic and Social Research Institute
FAS	Family Affluence Scale – a measure of family affluence used in the HBSC
FCTC	Framework Convention on Tobacco Control – a World Health Organization treaty signed by 168 countries which sets out standards governing the production, sale, distribution, advertisement and taxation of tobacco
Group 1 carcinogen	An agent that is considered by the International Agency for Research on Cancer to be directly involved in causing cancer in humans
GUI	Growing Up in Ireland – the National Longitudinal Study of Children
HBSC	Health Behaviour in School-aged Children Survey
Health inequalities	Preventable and unjust differences in health status evident among certain population groups. Health inequalities often exist along a social gradient – the more favourable your social and economic circumstances, the more likely you are to enjoy good health
Heavy smoking	Smoking twenty or more cigarettes a day
ICU	Intensive Care Unit
IPH	Institute of Public Health in Ireland
ISAAC	International Study of Asthma and Allergies in Childhood

Low birthweight	Babies weighing less than 2.5kg at birth
Non-communicable disease	A disease or condition which is non-infectious and non-transmissible between persons
Noble Multiple Deprivation Measure	An official measure of spatial/ area-based deprivation used in Northern Ireland. The measure is based on a weighted combination of seven deprivation domains including income, employment, health, education, proximity to services, living environment and crime.
NI	Northern Ireland
NISRA	Northern Ireland Statistics and Research Agency
NHS	National Health Service
NPRS	National Perinatal Reporting System Republic of Ireland
NRT	Nicotine Replacement Therapy
NS-SEC	National Statistics Socio-economic Classification
OTC	Office of Tobacco Control
Otitis media	Middle ear infection/ inflammation of the middle ear
Perinatal mortality	Stillbirths and deaths occurring in the first week of life
RoI	Republic of Ireland
RYO	Roll-your-own tobacco or hand rolled cigarettes
Self-efficacy	Competence in completing tasks and reaching personal goals, beliefs held by an individual regarding their power to affect their own situation
SES	Socio-economic status
SGA	Small for gestational age (age of pregnancy) - most commonly defined as a weight below the tenth percentile for the gestational age
SHS	Second-hand smoke
SIDS	Sudden Infant Death Syndrome
SLÁN	Survey of Lifestyles, Attitudes and Nutrition
TFRI	TobaccoFree Research Institute
Tobacco control	A field of public health science, policy and practice dedicated to reducing tobacco use and tobacco-related harm
UK	United Kingdom
Wheeze	A continuous coarse sound produced by obstruction or narrowing of the respiratory airways due to asthma or other causes
WHO	World Health Organization
YPBAS	Young Persons Behaviour and Attitudes Survey Northern Ireland.

Acknowledgements

We wish to acknowledge the cooperation and contributions of the following individuals and groups to the content of this report

- Dr Noelle Cotter, Dr Joanna Purdy and Ms Tara Burke (Institute of Public Health in Ireland)
- External reviewers Dr Fenton Howell and Mrs Gerry Bleakney

Data was provided by many sources to inform this report. We wish to acknowledge the contributions of the following individuals and organisations in providing data and support and advice on analysis

- Irish Social Science Data Archive
- United Kingdom Data Archive
- Professor Sean Daly (Coombe Women and Infants University Hospital)
- Dr Saoirse NicGabhainn and Mr Jakub Gajewski, Health Promotion Research Centre National University of Ireland Galway and Irish co-ordinating centre for the WHO Health Behaviour in School-aged Children Study (HBSC) who produced a short report on relevant aspects of the HBSC study to inform this report
- The Growing Up in Ireland Longitudinal Study of Children in Ireland. Growing Up in Ireland data have been funded by the Government of Ireland through the Department of Children and Youth Affairs; have been collected under the Statistics Act, 1993, of the Central Statistics Office. The project has been designed and implemented by the joint ESRI-TCD Growing Up in Ireland Study Team. © Department of Children and Youth Affairs.
- Dr Sharon Jamison in the Hospital Information Branch DHSSPS
- Staff of the Public Health Information Research Branch DHSSPS
- The Health Research Board of Ireland for supporting Dr Zubair Kabir through the Career Development Award (PD/2009/34)
- Analysis on GUI and SLÁN data in this report was conducted by Dr. Udo Reulbach. Analysis on Coombe and ISAAC data was conducted by Dr. Zubair Kabir.

Foreword

Tackling tobacco use remains a key priority for public health policy makers on the island of Ireland. Recent decades have seen a decline in prevalence rates but too many people continue to smoke and too many young people are taking up the habit. Individual and societal costs with respect to mortality, morbidity and economics remain excessive and expensive.

As Ministers we are determined to reduce the burden tobacco use places on individuals and on society but we are also determined to address health inequalities with their inherent toll of morbidity and mortality for those who are less well off in our societies.

This report reinforces our belief that protecting children from the tobacco-related harm from both active and passive smoking is a priority action in enhancing population health and reducing health inequalities. The report contributes to knowledge on the exposure of children to the harmful effects of tobacco smoke at various stages of their development.

Drawing on a range of data sources from the Republic of Ireland and Northern Ireland it skilfully presents key findings on smoking in pregnancy, child smoking and children's exposure to second-hand smoke. These findings will support policy makers and service providers in their efforts to make tobacco free childhoods a reality on the island of Ireland.

We would like to commend the Institute of Public Health in Ireland and the TobaccoFree Research Institute Ireland on the production of such a comprehensive report on the issue of tobacco use which we are both determined to continue to address.

Dr James Reilly TD

Minister for Health

Mr Edwin Poots MLA

Minister for Health, Social Services and Public Safety

Executive Summary

Rationale and context

Children growing up in disadvantaged circumstances face a number of threats to their health and development. Protecting children from the burden of tobacco-related harm from both active and passive smoking is a priority action in enhancing population health and reducing health inequalities. Population health strategies on the island of Ireland are increasingly focussing on addressing the root causes of health inequality through social determinants of health approaches and through focussing on early childhood as a key period for intervention (Dept of Health, 2013; DHSSPS, 2012). At the same time, governments in both jurisdictions are working to enhance their approaches to effective tobacco control (Dept of Health 2013; DHSSPS, 2012).

The World Health Organization considers that there are three key 'windows of exposure' in terms of tobacco-related harm in childhood – in the womb (associated with active or passive smoking by the mother), directly through children taking up smoking and through exposure to second hand smoke (SHS) in indoor and outdoor environments. This report presents findings on these three windows of exposure based on a range of data sources in the Republic of Ireland and Northern Ireland.

The central aim of the report is to contribute to knowledge on the exposure of children to the harmful effects of tobacco smoke at various stages of their development. The findings of the report can support policy makers and service providers in their efforts to make tobacco-free childhoods a reality on the island of Ireland.

Overview of report structure and content

Chapter 1 presents a general introduction to the report including the policy context, the aim and objectives of the report. An overview of the approach and methodology is presented. The findings in the report represent a blend of previously published findings as well as new findings from secondary analysis of existing surveys. While the primary focus of the report is on smoking behaviours, some data on tobacco-related harms is also included particularly in the context of childhood asthma and other health related outcomes recorded in representative surveys of children on the island of Ireland.

Chapter 2 presents findings relevant to smoking in pregnancy. For Northern Ireland, published findings from the Infant Feeding Survey, Millennium Cohort Study, Child Health Information System and DHSSPS Statistics on Smoking Cessation Services are featured. For the Republic of Ireland findings are based on secondary analyses of data from the Growing Up in Ireland (GUI) Longitudinal Study of Children and the Coombe Women and Infants University Hospital (Dublin) dataset.

Chapter 3 presents findings relevant to child smoking. For Northern Ireland, findings are based on the Young Persons Behaviour and Attitudes Survey (YPBAS) and the DHSSPS Statistics on Smoking Cessation Services. For the Republic of Ireland findings are based on analyses of the Health Behaviour in School – aged Children Survey (HBSC) and the International Survey of Asthma and Allergies in Childhood (ISAAC), together with published findings from the European School Survey Project of Alcohol and Drugs (ESPAD). Topline findings on trends in young people's preferred tobacco brands are presented based on an analysis of the Office of Tobacco Control/MRBI survey.

Chapter 4 presents findings relevant to the exposure of children to second-hand smoke. For Northern Ireland, findings are based on the Young Persons Behaviour and Attitudes Survey (YPBAS) as well as published findings from the Childhood Exposure to Tobacco Smoke (CHETS) study. Findings are also drawn from Health Survey Northern Ireland and the One-Year and Three-Year Reviews of Smoke-Free Legislation in Northern Ireland. Hospital in-patient activity among children for various SHS-related illnesses in Northern Ireland is also presented. For the Republic of Ireland, findings are based upon the International Survey of Asthma and Allergies in Childhood (ISAAC) and the Growing Up in Ireland (GUI) Longitudinal Study of Children.

Each chapter includes a discussion of the key findings. Chapter 5 presents an overall discussion and recommendations.

Key findings – smoking in pregnancy

- Smoking in pregnancy has declined on the island of Ireland. Across a number of data sources, the smoking rates during pregnancy fell by around a third over a 9 to 10 year period. A 35.7% reduction was observed in GUI data 1997/98-2007/8 (Republic of Ireland). A 34.8% reduction was observed in Infant Feeding Survey data 2000-2010 (Northern Ireland).

- Levels of smoking in pregnancy remain high. It is estimated that around 17-18% (GUI data – births in 2007/2008) / (Coombe data 2008) of all expectant mothers smoked in the Republic of Ireland. Survey estimates from Northern Ireland suggest that 15% of expectant mothers in Northern Ireland smoked throughout their pregnancy in 2010, whereas figures from the Child Health System estimate the prevalence of smoking in pregnancy at 17%.

- Smoking in pregnancy is strongly socially patterned across the island with age and socioeconomic factors including employment, social class and deprivation status acting as key determinants of smoking prevalence. Socioeconomic inequalities in smoking during pregnancy have persisted against a background of overall declines in prevalence of smoking during pregnancy. Expectant mothers in the 'never worked' socioeconomic groups had the highest smoking rates (41%) compared to all other groupings in Northern Ireland.

- In Northern Ireland the proportion of mothers that smoked from the most deprived areas fell by a fifth (21%) between 2005 and 2011 compared to a 16% decline in the region generally. This would be indicative of a small but significant narrowing of inequalities. However, despite such improvements, the proportion of mothers that smoked during pregnancy in the most deprived areas remained more than three times greater than that in the least deprived areas in 2011.

- Mothers in Northern Ireland were least likely to give up smoking during pregnancy (47%) compared to all other jurisdictions in the UK. However a significant increase in pregnant mothers engaging with specialist smoking cessation services in Northern Ireland was observed.

- Among babies born 1997/1998, smoking prevalence was higher among mothers of low birthweight babies compared to those who did not have a low birthweight baby (43.8% v 27.2%) in the Republic of Ireland. The median birthweight of babies born to expectant mothers who smoked was 3.3kg compared to 3.6kg among non-smoking mothers. Smoking in pregnancy was significant in patterns of low birthweight, prematurity and SGA in maternity hospital data.

- In the Republic of Ireland, a multivariate analysis of the Growing Up in Ireland data showed smoking in pregnancy was associated with the subsequent development of adverse outcomes in 9 year old children including ADHD. Causality is not assumed.

Key findings – child smoking

- In the Republic of Ireland in 2010, 11.9% of children aged 10-17 were current smokers. In Northern Ireland, 8% of children aged 11–16 were current smokers – the exclusion of 17 year olds from the Northern Ireland survey data means that child smoking estimates are not comparable.

- Smoking among school-children has declined across the island of Ireland. In the Republic of Ireland, the proportion of children aged 10-17 reporting that they had ever smoked fell from 36% to 27% between 2006 and 2010. In Northern Ireland, the proportion of 11-16 year olds reporting that they had ever smoked decreased from 24% to 19% between 2007 and 2010.

- In general a pattern of low intensity smoking was evident among school-children in terms of both frequency of smoking and the number of cigarettes smoked. A positive trend was evident in terms of declines in the number of cigarettes smoked by child smokers over time. 41.4% of regular child smokers smoked less than one pack of cigarettes (20 cigs) a week in 2007 whereas 72.4% of regular child smokers smoked less than one pack of cigarettes a week in 2010.

- Children are trying their first cigarette at a very young age but there are some signs of improvement. Between 2002 and 2010 there was a significant decline in the proportion of young people in the Republic of Ireland who reported having their first cigarette aged 13 or younger. Among 11-16 year olds in Northern Ireland the median age of trying a first cigarette was 12 years and this had not changed between 2003 and 2010.

- Social disadvantage was associated with children trying smoking at a younger age. This association was evident in respect of children from low affluence families in the Republic of Ireland and in respect of children in receipt of free school meals in Northern Ireland.

- Smoking in childhood was associated with a range of socioeconomic factors. Social class was significantly associated with smoking behaviours among Republic of Ireland school-children. Financial disadvantage in families (as measured by the Family Affluence Scale in Ireland and the receipt of free school meals in Northern Ireland) was significantly associated with childhood smoking.

- Lower academic achievement was associated with child smoking. In the Republic of Ireland, school children with below average academic achievement were more likely to report smoking and trying smoking at a younger age.

- Smoking in childhood was significantly associated with a range of asthma outcomes. The prevalence of current asthma in the Republic of Ireland has increased among both smoking and non-smoking children. The proportion of children reporting that they had wheezing/whistling in the chest over the past 12 months was consistently higher among 13 to 14 year olds who smoke than who do not smoke - 55% of child smokers reported this experience in 2007, compared to 37% of non-smoking children. The overall prevalence of severe asthma was consistently higher among child smokers than non-smoking children in 2007 (24.2% v 14.3%).

- Most child smokers on the island of Ireland want to quit. Among Northern Ireland school-children aged 11 to 16 who reported smoking at least once a week, 70.7% stated that they would like to give up smoking altogether. The number of 11 to 16 year olds attending specialist smoking cessation services in Northern Ireland more than doubled over the period 2005/06 – 2010/11. Similarly, in the 2007 Republic of Ireland ESPAD sample, the majority of 15-16 year old smokers in the Republic of Ireland had attempted to quit (70.4%).

- Children who smoke appear to have less success in quitting than other age groups. 32% of 11 – 16 year olds attending specialist smoking cessation services in Northern Ireland succeeded in quitting at 4 weeks, compared to 52% of all service users.

Key findings – children's exposure to second-hand smoke

- Exposure of children to SHS in the home is common. In the Republic of Ireland, 22% of primary caregivers of 9 year olds reported that smoking occurs in the same room as their child. Smoking in the home was allowed in 19% of Northern Ireland family homes containing children in 2010.

- Exposure of children to SHS in the car occurs less frequently. Among adults (age 16+) who live with children in Northern Ireland, 15% of those who had a family car allowed smoking in the family car. In the Republic of Ireland, 14.8% of children aged 13-14 years reported exposure to smoking in cars in 2007.

- Adult and child reports of children's exposure to SHS differ considerably. Children's reported level of exposure tends to exceed considerably that of adults in both jurisdictions. 45% of 13 to 14 year old children in the Republic of Ireland reported exposure to second hand smoke in their home in 2007. Similarly, nearly half (49.8%) of 11-16 year old school-children in the Young Persons Behaviour and Attitudes Survey conducted in Northern Ireland in 2010 reported that adults smoked inside their home.

- The proportion of children living with non-smoking adults and in homes where adults do not smoke inside the house is increasing. In Northern Ireland, the proportion of children living in households with adult smokers fell from 51.8% in 2003 to 41.8% in 2010. 78.6% of 11-16 year olds reported that adults smoked inside their home in 2003 compared to 49.8% in 2010.

- The ban on smoking in workplaces and indoor public places was not associated with any increase in SHS exposure among children in the home in either jurisdiction. The proportion of children in Northern Ireland reporting that adults smoke in the home environment declined from 57.3% in 2007 to 49.8% in 2010.

- Disadvantaged children are more likely to live in households with smoking adults and are at greater risk of exposure to SHS. Nine year old children in the Republic of Ireland living in the lowest income quintile families were twice as likely to be exposed to SHS in the home as children in the highest income quintile families. Nearly one in three 9 year old children in the lowest income quintile were exposed to SHS in the home, according to their primary caregiver.

- Infants living with a smoking mother are at an increased risk of illness in the first 9 months of life. Among infants in the Republic of Ireland, having a mother who smoked was associated with an increased risk of consulting health services for respiratory illnesses and ear infections in the first 9 months of life.

- SHS exposure among children with asthma was common. SHS exposure was associated with a higher risk of reporting current asthma. The prevalence of current asthma among children exposed to SHS was consistently and significantly higher than the prevalence of current asthma among non-exposed children in all four waves of the ISAAC study (1995 – 2007). In 2007, 42.9% of SHS exposed children reported 'current asthma' ie that they has wheezing/ whistling in their chest over the past 12 months compared to 35.7% of non-exposed children.

- SHS exposure was associated with severe asthma. The prevalence of severe asthma among children exposed to second-hand smoke was consistently higher than the prevalence of severe asthma among non-exposed children in all four waves of the ISAAC study (1995- 2007). 17.4% of exposed children reported severe asthma compared to 13.6% of non-exposed in 2007.

Chapter 1

Introduction

1.1 Context and rationale

'Giving every child the best start in life' has become a central theme in public health strategies aiming to improve population health and reduce health inequalities (World Health Organization, 2008; Marmot, 2010). Population health strategies on the island of Ireland are increasingly focussing on addressing the root causes of health inequality through social determinants of health approaches and through focussing on early childhood as a key period for intervention (Dept of Health, 2013; DHSSPS, 2012). At the same time, governments in both jurisdictions are working to enhance their approaches to effective tobacco control through the development of new strategies and initiatives (Dept of Health, 2013; DHSSPS, 2012).

Inequalities in child health are evident from birth to adolescence with children's health and development trajectories strongly patterned according to the social and economic status of the family. In 2011, 18.8% of children in the Republic of Ireland were considered at risk of poverty (Dept Children and Youth Affairs, 2013) with rates of poverty observed among children consistently higher than the general population. In Northern Ireland, child poverty rates are the highest in the UK, varying from 13% in North Down to 43% in West Belfast (Padley, 2013). Children growing up in disadvantaged settings face a number of threats to their health and development including poor housing, unsafe local environments as well as food and fuel poverty. In addition, children growing up in disadvantaged communities are more likely to be resident in neighbourhoods where there are high levels of smoking. As low income smokers tend to smoke more heavily and also tend to smoke for a longer period of time this has significant implications for their risk of tobacco-related harm including chronic diseases and premature mortality. Current patterns of smoking at population level pose a significant threat to the health of children, particularly those growing up in disadvantaged communities. Smoking and tobacco-related illness, premature death and disability are interlinked with intergenerational cycles of poverty and disadvantage. The direct cost to budgets in households where nicotine addiction is present and which are characterised by high unemployment and falling income is significant. There is also a very significant indirect effect in terms of the additional costs lower income households may be forced to face as a result of tobacco-related chronic illness and disability. Protecting children and disadvantaged children in particular from the additional burden of tobacco-related harm from both active and passive smoking is therefore a priority action to achieve better child health on the island, to reduce inequalities in population health in the long term and indeed to address child poverty and deprivation.

Smoking, more than any other identifiable factor, contributes to the gap in healthy life expectancy between those most in need, and those most advantaged.
(A Five Year Tobacco Action Plan, DHSSPS, 2003-2008)

1.2 Aim and objectives

The central aim of this report is to contribute to knowledge on the exposure of children to the harmful effects of tobacco smoke at various stages of their development.

The World Health Organization considers that there are three key 'windows of exposure' in terms of tobacco-related harm in childhood – in the womb (associated with active or passive smoking by the mother), directly through children taking up smoking and through childhood exposures to second-hand smoke (SHS) in indoor and outdoor environments (World Health Organization, 2011). A strategic

approach requires attention to each of these domains if tobacco-free childhoods are to become a reality. The report presents findings on each of these windows.

It is acknowledged that any approach to addressing tobacco in childhood must recognise that children's behaviours and exposures are strongly determined by the family and neighbourhood contexts and principally by their parents. Children are more likely to smoke if they have a parent or parents who smoke. The choices of parents play a critical role in determining the exposure of their infants and children to SHS (Öberg, 2010). In this regard, ongoing support for effective smoking cessation for adults, as current, future and especially expectant parents, represents an important component of achieving tobacco-free childhoods on the island of Ireland. However, for the purposes of this report, data on smoking and relating to smoking cessation among adults on the island is not included on the basis this is well documented elsewhere. There is a considerable volume of international literature on inequalities in smoking as well as several published reports on social class patterns of smoking among adults on the island of Ireland (Brugha et al, 2009; DHSSPS, 2012).

The report objectives are to

- present findings on smoking behaviours that affect children on the island of Ireland
- present findings relevant to different phases of child growth and development including maternal smoking in pregnancy, uptake of smoking in adolescence and exposure to second-hand smoke in childhood
- present some preliminary findings on evidence of tobacco-related harm among children on the island of Ireland and explore relationships with these smoking behaviours
- synthesise findings based on published data as well as conduct original analyses where appropriate
- compare aspects of tobacco and childhood in the Republic of Ireland and Northern Ireland where data permitted
- explore trends in inequalities in tobacco exposures and smoking behaviours among children over time where data permitted
- consider and discuss the implications of these findings for tobacco control policy and interventions across the island.

The intention is that the evidence compiled in the report

- raises awareness of current patterns of smoking behaviours on the island and their potential impacts on child health and development
- supports the development of tobacco control policy and health promotion practice that is inclusive of child health and wellbeing issues
- contributes to the further development on North-South cooperation on tackling health inequalities and tobacco-related harm and improving child health.

1.3 Approach and methodology

1.3.1 Overview of approach

This report employed an exploratory approach to the investigation of smoking behaviours and childhood on the island of Ireland. The findings presented here are a blend of previously published findings as well as new findings from secondary data analysis of existing surveys in the Republic of Ireland and Northern Ireland. The report considers the findings from relevant existing analyses alongside findings from targeted analyses on key issues considered to warrant further analysis. Where new analyses were undertaken, these were conducted with the aim of supplementing published data and reports to enhance our understanding of policy-relevant issues. In particular, issues relevant to recent developments in tobacco control and public health policies on the island were explored. For example, the role of tobacco in the context of early years as a critical intervention point in improving population health and tackling inequalities was a key concern - e.g. smoking in pregnancy and the exposure of young children to SHS. Similarly, data on children's uptake of smoking was explored in the context of current debates relating to the role of the tobacco industry with regard to youth smoking in aspects such as tobacco branding, products and pricing. In view of the pivotal role of mothers in determining the exposure of their infants to tobacco smoke, aspects of gender and social inequalities in women smoking was explored including aspects of smoking in teenagers, teenage pregnancy and lone parenthood, as recommended by previous reports (Brugha et al, 2009).

A data mining approach allowed for investigation into many aspects of inequalities in smoking throughout childhood in the absence of suitably comparable all-island data. The report aims to bring together findings across many stages of child development from womb to adolescence. Adopting a life-course approach, with due attention to gender differences and wider family and community contexts has become the recommended approach to exploring inequalities in health (World Health Organization Regional Office for Europe, 2012). While the primary focus of the report is on smoking behaviours, some data on tobacco-related harm is also included particularly in the context of childhood asthma and other health outcomes recorded in longitudinal studies of children on the island of Ireland.

This research approach focussed principally on analyses based on well-validated survey instruments generalisable to the national population in each jurisdiction. Outcomes of interest and socioeconomic status measures were based on well-validated approaches in the literature. Nonetheless, data sources analysed in this study were not specifically designed to address the research objectives and some limitations resulted from the data mining approach employed, primarily related to the heterogeneity of data collection and measurement approaches. Harmonisation of data sets was not possible due to differences in indicator variables and outcome variables of interest between many datasets used in the research both within and across jurisdictions. Limitations generally relate to data paucity within surveys limiting the ability to investigate some outcomes of interest, for example some surveys did not include a measure of socioeconomic status, thereby limiting examination of inequalities. Different approaches to weighting survey data and sampling methods employed across consecutive waves of the same surveys also posed a challenge. Furthermore, there was a noted lack of standardized questioning between waves of surveys. Meaningful comparisons of some of these smoking behaviours and trends in smoking related outcomes between survey findings across different years and across different jurisdictions were therefore limited.

Specifically, there was no uniform approach to measuring what constitutes a smoker, as smoking status was conceptualised differently in different data sets. Similarly, several approaches drawing on

varying conceptualisations were applied in the measurement of socioeconomic status thereby limiting meaningful comparison of socioeconomic inequalities between jurisdictions. Socioeconomic status measurement was particularly problematic when examining inequalities relating to active smoking and SHS exposure among children.

Comparison of socioeconomic effects linked to smoking in childhood proved particularly challenging in this report owing to the varied approaches adopted in data sources North and South and the limited focus afforded to socioeconomic status (SES) measurement in some of the studies used. Appropriate and meaningful estimation of SES in childhood is a difficult task and the issues have been well documented in the literature (Bradley, 2002). An inherent challenge is the social location of children within households and neighbourhoods. This necessitates measuring the socioeconomic status of the child using some proxy measure of parental or household status at an individual level or deprivation status at an area level. It has been documented that different measures attributed to children may be capturing varying dimensions of SES status (Hauser, 1994) and to date there has been no agreement on the best approach. Nonetheless, available indicators examined in this report do provide an indication of inequality in childhood experiences.

Notwithstanding the limitations outlined here, clarity is provided as far as possible through detailed presentation of all variables and measurement approaches employed in each dataset. A range of datasets were utilised in this study. Some datasets were used to inform analyses in several chapters. For ease of interpretation, Appendix 1 provides a full summary of data sources: their coverage; sample size according to each year of survey; the sampling frame adopted as well as survey methodology. While some general limitations run throughout the analysis, there are also limitations related to analyses in each chapter. Where relevant such limitations are discussed in each chapter to contextualise the findings of the analyses.

This report adopted a data mining approach to examine a range of publically available datasets in both the Republic of Ireland and Northern Ireland. Data on most recent waves of survey datasets may not have been made publically available at time of analysis.

1.3.2 Overview of datasets used in each chapter of the report

Chapter 2 presents findings relevant to smoking in pregnancy. For Northern Ireland, published findings from the Infant Feeding Survey, Millennium Cohort Study, Child Health Information System and DHSSPS Statistics on Smoking Cessation Services are featured. For the Republic of Ireland findings are based on secondary analyses of data from the Growing Up in Ireland Longitudinal Study of Children and the Coombe Women and Infants University Hospital dataset.

Chapter 3 presents findings relevant to child smoking. For Northern Ireland, findings are based on the Young Persons Behaviour and Attitudes Survey (YPBAS). For the Republic of Ireland findings are based on analyses of the Health Behaviour in School – aged Children Survey (HBSC) and the International Survey of Asthma and Allergies in Childhood (ISAAC), together with published findings from the European School Survey Project of Alcohol and Drugs (ESPAD). Topline findings on trends in young people's preferred tobacco brands are presented based on an analysis of the Office of Tobacco Control/ MRBI survey.

Chapter 4 presents findings relevant to the exposure of children to second-hand smoke. For Northern Ireland, findings are based on the Young Persons Behaviour and Attitudes Survey (YPBAS) as well as

published findings from the Childrens Exposure to Tobacco Smoke (CHETS) study and the One-Year and Three-Year Reviews of Smoke-Free Legislation in Northern Ireland conducted by DHSSPS. For the Republic of Ireland, findings are based upon the International Survey of Asthma and Allergies in Childhood (ISAAC) and the Growing Up in Ireland Longitudinal Study of Children.

Further details on datasets and variables explored in the analyses are presented in the relevant chapters and further background on the surveys is presented in Appendix 1.

1.3.3 Approach to empirical analysis

Several of the data sets examined in analyses are conducted using complex sample designs. A key concern of using survey data is how the sampling design influences estimation of the variance for given parameters. Sampling design in population level surveys is accounted for by incorporating survey weights into analyses. Where provided, estimated data is analysed incorporating design weights.

All variables of interest were initially examined using descriptive statistics. Data are presented as frequencies, percentages and weighted percentages with 95% confidence intervals where weighted data were available. Descriptive statistics are presented in tables and graphically displayed where appropriate. In the case of multiple regression analyses, each of the hypothesised independent predictors was examined for bivariate associations with the outcome of interest. Other covariates were also examined in relation to both the independent predictors and outcomes. After preliminary analysis of the data, hypothesised predictors, apparent confounders and effect modifiers were included in the multivariate regression models. Odds Ratios (ORs) and corresponding confidence intervals were computed based on the adjusted model. ORs were used to estimate the odds of the outcomes given exposure, controlling for other covariates for binary outcome variables. Results of bivariate and multivariate logistic regression analysis are then presented as odds ratios with corresponding 95% confidence intervals and/or p-values. All statistical associations are examined at the conventional 95% significance level unless explicitly stated in the text. In cases where significance did not reach the conventional level (i.e. 95%) but estimates are significant at the less conservative 90% level, these are generally discussed in the findings.

In general data are presented as valid percentages and missing data is omitted. It should be noted that omitting missing cases may bias the results of analyses. However, variables with large proportions of missing cases were not examined in analyses. Given the nature of secondary data analyses, ethical approval was not explicitly sought for this particular study, however, each of the study datasets examined in analyses had been granted ethical approval.

Chapter 2

Inequalities in smoking in pregnancy

2.1 Context and rationale

2.1.1 Introduction

Smoking in pregnancy is harmful to the health of mother and baby. Reducing smoking in pregnancy is therefore a distinct policy target within many tobacco control policies including the Northern Ireland 10 Year Tobacco Control Strategy, which sets specific targets for reducing the prevalence of smoking among pregnant women (DHSSPS, 2012). Wider health and child policy developments are now bringing a renewed focus to the issue of smoking in pregnancy. In particular, public health strategies in both jurisdictions are placing increasing emphasis on intervention in the early years, including the antenatal period, as a critical component of addressing health inequalities in the longer term (Dept of Health, 2013; DHSSPS, 2012). Similarly, tackling inequalities in neonatal outcomes including low birthweight is now recognised as a valid target for policies aimed at increasing social mobility across the life course – the principle being to prevent children from being disadvantaged from the start (HM Government, 2011).

Against the backdrop of these policy developments, this chapter begins with a brief overview of evidence relating to the impact of maternal smoking in pregnancy on perinatal and child health outcomes. A similar brief overview of evidence on the impact of second-hand-smoke in pregnancy is also presented.

Following an outline of data and methodology issues, findings on smoking in pregnancy in the Republic of Ireland and Northern Ireland are presented and discussed.

2.1.2 Overview of impact of maternal smoking in pregnancy on perinatal outcomes

Toxins present in tobacco smoke and the mother's blood-stream readily cross the placenta and enter foetal circulation. It has been estimated that active maternal smoking causes up to 5,000 miscarriages, 300 perinatal deaths, 19,000 babies with low birth weight, and 2,200 premature singleton births in the UK each year (Royal College of Physicians, 2010). Smoking in pregnancy is estimated to account for approximately 20-30% of low birthweight babies and increase perinatal mortality by 150% (Schneider et al, 2008).

In 2010, some 99,039 babies were born on the island of Ireland (75,600 in the Republic of Ireland, including 355 stillbirths and 25,315 births in Northern Ireland, including 105 stillbirths). The proportion of babies who are born preterm or who are born low birthweight on the island has been estimated at around 5-8% (ESRI, 2012; Data.Gov.UK – accessed 2013). To date, no definitive estimate of the contribution of smoking to perinatal outcomes has been conducted specifically on babies born in the Republic of Ireland or Northern Ireland.

In addition, smoking in pregnancy is associated with an increased risk of congenital malformations (Royal College of Physicians, 2010) as well as an increased risk of postnatal respiratory infection and sudden infant death syndrome (SIDS) (Mohsin et al, 2005). A five year population based case-control study in the Republic of Ireland which examined 203 SIDS cases and 622 control infants born between1994 and 1998 found that smoking in pregnancy was significant in the risk of SIDS (McGarvey, 2003)

2.1.3 Overview of impact of maternal smoking in pregnancy on child health

It is increasingly recognized that the legacy of smoking in pregnancy goes well beyond the neonatal period. In fact, smoking in pregnancy may have lifelong negative effects on children's lives, both in terms of children's health and their developmental potential (Ino, 2010; Oken et al 2008; Barker, 1992). A review of childhood outcomes in 5 year olds in Northern Ireland, based on the Millennium Cohort Study demonstrated that low birthweight (for which smoking in pregnancy is known to be a common factor) was highly predictive of worse educational, cognitive, behavioural and general health outcomes (Sullivan et al, 2010).

2.1.4 Overview of impact of exposure of pregnant women to second-hand smoke on child health

A recent meta-analysis of second-hand smoke and adverse foetal outcomes in non-smoking pregnant women estimated that pregnant women who are exposed to second-hand smoke are estimated to be 23% more likely to experience stillbirth and 13% more likely to give birth to a child with a congenital malformation (Leonardi-Bee et al, 2011) than women who do not smoke and are not exposed to any second hand smoke. The health consequences of involuntary exposure of pregnant women to tobacco smoke in terms of lower birth weight and sudden infant death are becoming increasingly acknowledged (US Department of Health and Human Services, 2006).

2.2 Approach and methodology

2.2.1 Introduction

A number of different data sources were used to present findings on smoking in pregnancy on the island of Ireland.

The National Perinatal Reporting System (NPRS) records data on all births in the Republic of Ireland including key neonatal outcomes, such as mortality, birthweight and breastfeeding. However, data on smoking is not recorded in this dataset. Therefore, estimates of smoking in pregnancy in the Republic of Ireland in this chapter were derived from analysis of two different data sources- the Growing Up in Ireland Longitudinal Study of Children and the Coombe Women and Infants University Hospital dataset. In Northern Ireland, findings are presented based on data from four sources – the UK Infant Feeding Survey, the Northern Ireland Child Health System, the Northern Ireland cohort of the Millennium Cohort Study and the DHSSPS Statistics on Smoking Cessation Services in Northern Ireland.

2.2.2 Data

2.2.2.1 Republic of Ireland

The Growing Up in Ireland Longitudinal Study of Children (GUI) is a nationally representative longitudinal study of children in Ireland which records information on many factors relevant to the wellbeing and development of children. A two age cohort longitudinal design was adopted with one cohort aged nine months, conducted in 2009 and the other aged nine years, conducted in 2008. Data were obtained from children's parents as primary caregivers, schools and in the case of the 9 year olds,

the children themselves. Data on the 9 year old cohort relates to children born between November 1997 and October 1998. Data on the 9 month old cohort relates to children born between December 2007 and June 2008.

Biological mothers of children sampled in the GUI were asked to report on their smoking status at the time of pregnancy with the study child. Data collated only relates to smoking status of the mother for pregnancies with children in the sample and may not be fully representative of all pregnancies in Ireland during that time, an issue further explored in section 2.2.3.

Data were also derived from the Coombe Women and Infants University Hospital dataset to examine maternal smoking status at the initial booking visit, i.e. the first visit to the maternity hospital in that pregnancy. Data on live singleton births occurring in the Coombe Women and Infants University Hospital between 2000 and 2008 were analysed. The Coombe Women and Infants University Hospital is a tertiary referral maternity hospital serving Dublin and its surrounding areas. A high proportion of all births in the Republic of Ireland are estimated to occur in this hospital, although data cannot be considered as nationally representative. Social class of mothers is recorded based on the CSO classification system. Findings from MPhil theses developed by TobaccoFree Research Institute staff relating to this data and to an evaluation of smoking cessation services in Republic of Ireland were included (Clarke, 2012; Keogan, 2012).

Further discussion of the potential limitations of the data used is presented in section 2.2.3.

2.2.2.2 Northern Ireland

In Northern Ireland, published data on smoking in pregnancy derived from three waves of the UK Infant Feeding Survey is presented (2000, 2005 and 2010). This survey has been carried out every 5 years since 1975 across the 4 regions of the UK. Survey samples were drawn from birth registration records and a postal questionnaire was utilised, with the option of submitting information online in 2010. Data were weighted to take account of any over-sampling by country and by deprivation.

The survey has the principal aim of recording information on the infant feeding practices of UK mothers. The survey also records information on whether mothers smoked before, during or after pregnancy. Specifically, mothers are asked whether they currently smoke, smoked in the last 2 years or ever smoked. This survey handles the data according to three groups:

(i) smoking before or during pregnancy – the percentage of women who smoked at all in the 2 years before they completed the survey which roughly covers the period of their pregnancy and the year before conception.

(ii) smoking throughout pregnancy – the percentage of women who smoked in the 2 years before they completed the survey and who were smoking at the time of the baby's birth. This includes women who may have given up smoking before or during pregnancy but who had restarted before the birth.

(iii) gave up smoking before or during pregnancy – the percentage of women who smoked in the 2 years before they completed the survey and who gave up during this period and had not restarted before the birth of the baby.

The 2001 National Statistics socioeconomic classification (NS-SEC) is used in the Infant Feeding Survey as the principal variable for assessment of socioeconomic status and inequalities.

Prevalence estimates for smoking in pregnancy in Northern Ireland were also derived from the Child Health System and from the Millennium Cohort Study. The Northern Ireland Child Health System is an information system operated by the Community Trusts in Northern Ireland. The system records data on all children and pregnant women registered with a GP in Northern Ireland.

Findings from the Northern Ireland sample of the Millennium Cohort Study, a longitudinal study of children across the UK, are also presented. This study relates to 18,552 children born in the 12 months from September 2000 in England and Wales and in the 12 months from December 2000 in Northern Ireland and Scotland.

Data on quitting behaviors among pregnant women were derived from both the UK Infant Feeding Survey and the Statistics on Smoking Cessation Services in Northern Ireland (DHSSPS, 2005/06 to 2010/11). Statistics on Smoking Cessation Services in Northern Ireland are published annually by the Department of Health, Social Services and Public Safety.

2.2.3 Strengths and limitations

Very different methodologies were used to develop estimates of smoking in pregnancy in the Republic of Ireland.

Data from GUI has the strength of being nationally representative and allows for accurate population level estimates. There is particular value offered by this data as it integrates data on smoking in pregnancy into a wider longitudinal study - thus the issue can be considered in the context of a wide range of other child and family variables over time. Principally the data can also support the development of prevalence estimates for smoking in pregnancy at two distinct time points around 10 years apart. However there are also limitations to using GUI data to develop prevalence estimates of smoking in pregnancy. As GUI data on smoking in pregnancy is based on retrospective self-reporting by mothers recall bias may be an issue. Another consideration is that GUI data relates to those pregnancies which resulted in babies being born to mothers in the period 1997 and 1998 and for which a 9 year old child is still alive. Therefore it does not include pregnancies which resulted in miscarriage, stillbirth or indeed death of an infant in early childhood.

Administrative data were available from the Coombe Women and Infants University Hospital. This data is routinely collected and can provide a more detailed picture of annual trends in smoking behaviours in pregnancy. However, the data cannot be considered to be nationally representative of all pregnancies in any given year and therefore caution must be used in terms of drawing inferences for population health. As the Coombe Women and Infants University Hospital catchment area is an area of urban disadvantage and as the hospital is a tertiary referral centre, this may mean that complex pregnancies may be overrepresented compared to the general population.

It is also recognised that smoking in pregnancy can be associated with stigma and may be under-reported by mothers, therefore reporting bias may be an issue for both survey based (GUI) and clinic based (Coombe Women and Infants University Hospital) contexts.

Data from the Infant Feeding Survey and Northern Ireland Child Health Systems were used to inform the consideration of smoking in pregnancy in Northern Ireland. Due to differing methodologies, findings from these two sources are not directly comparable. Data from the Infant Feeding Survey is particularly useful for comparisons across the UK but a comparison with any figures in the Republic of

Ireland is inappropriate. Data from the Child Health System provides annual nationally representative data appropriate for testing trends over time, however this was not possible with the Infant Feeding Survey data.

An additional layer of complexity is apparent when making North-South comparisons. Given the methodological differences between data sources in the North and South direct comparison between the findings for the two jurisdictions is not appropriate, nor is any all-island estimate of smoking in pregnancy proposed. Nonetheless, it is useful to examine patterns of prevalence in both jurisdictions and a joint discussion section concludes this chapter which comments upon the findings from both the Republic of Ireland and Northern Ireland data.

2.3 Results

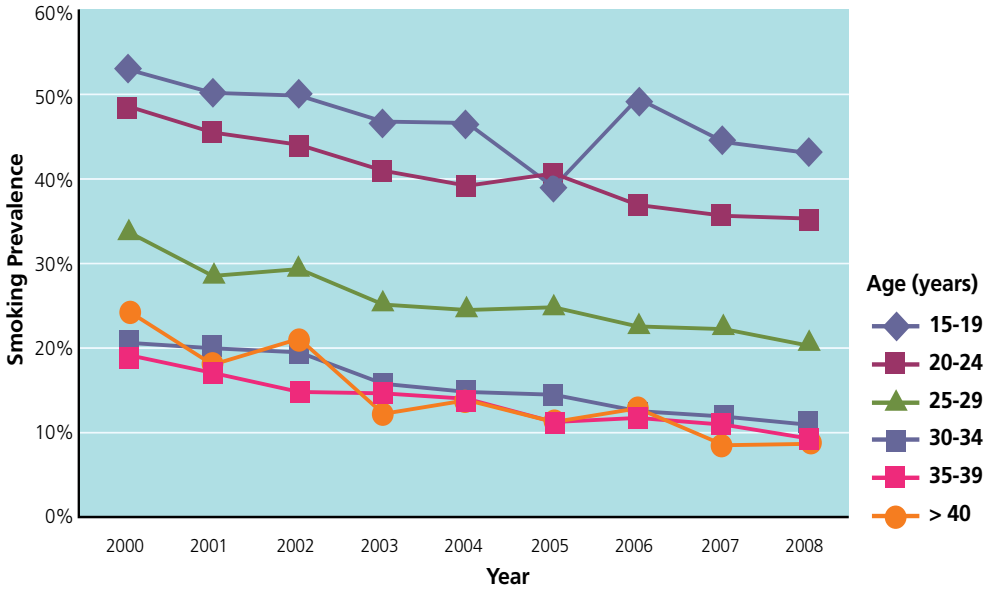
2.3.1 Findings: Republic of Ireland

2.3.1.1 Smoking in pregnancy in the Republic of Ireland

A substantial reduction in the percentage of mothers smoking in pregnancy was recorded between different samples of the GUI study. While 28.1% (n=2,255) of mothers of children born between November 1997 and October 1998 smoked in pregnancy, this rate declined to 18% for mothers of children born between December 2007 and June 2008 (McCrory and Layte, 2012), representing a 35.7% relative decrease in smoking rates for pregnant women in that decade.

The overall smoking rate derived from the Coombe Women and Infants University Hospital data was 17.1% in 2008. Similar to GUI data, smoking rates fell by around one third over a nine year period (Figure 2.1).

Figure 2.1 Prevalence of smoking among pregnant women in the Republic of Ireland by age (Coombe Women and Infants University Hospital 2000-2008)



Source (Clarke, 2012)

Overall smoking prevalence was lowest among older mothers in all years between 2000 and 2008 for expectant mothers presenting in the Coombe Women and Infants University Hospital. Furthermore, the decrease in smoking rates between 2000 and 2008 showed a distinct age effect with the largest decrease in smoking prevalence observed among older mothers. The smallest decline in smoking rates over the period was observed in teenage expectant mothers (aged 15 to 19 years) who continue to exhibit substantially higher prevalence rates of smoking in pregnancy compared to all other age groups. The smoking rate observed among teenage mothers in the Coombe also appears to be considerably higher than that observed among teenage girls more generally (Chapter 3) over the same period. A comparative analysis matching for other variables was not conducted here but may be useful to understanding the wider social contexts of teenage mothers and their smoking behaviours.

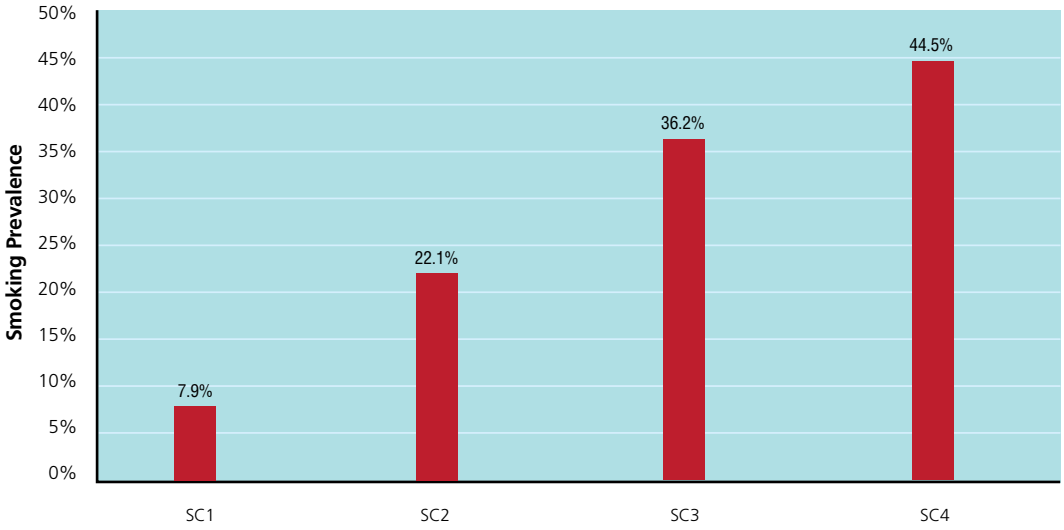
Analysis of the Growing Up in Ireland Longitudinal Survey shows that 11.3% (n=906) of mothers of 9 year olds reported that they smoked occasionally during their pregnancy and 16.8% (n=1,349) of mothers smoked daily during their pregnancy. This data relates to children born in 1997/1998. Of those mothers who smoked daily almost half 45.1% (n=609) smoked between 6 and 10 cigarettes per day while 36.6% (n=495) smoked between 11 and 25 per day and 3.7% (n=49) smoked in excess of 26 cigarettes on a daily basis.

2.3.1.2 Smoking in pregnancy and socio-economic status in the Republic of Ireland

The effect of socioeconomic status on prevalence of smoking in pregnancy was investigated in mothers of the 9 year old GUI sample. A steep and relatively uniform gradient in smoking in pregnancy was found according to education status in this group. Among mothers with none or primary level only education an estimated 61.3% smoked in pregnancy compared to 43.6% for those with only lower secondary level education. Prevalence of smoking in pregnancy was lowest for mothers with higher secondary education and above. Similarly, a gradient was observed among the same expectant mothers for smoking prevalence in pregnancy according to equivalised household annual income. Mothers in the lowest income quintile were more than twice as likely to smoke as those in the highest income quintile (43.5% v 15.2% respectively).

A steep and relatively uniform social gradient was observed for smoking in pregnancy, for each level of social class 1 to 4 (Figure 2.2) in the Coombe Women and Infants University Hospital data. 44.5% of mothers in social class 4 were smokers compared to 7.9% in social class 1. Mothers attending the Coombe Women and Infants University Hospital who were recorded as unemployed at time of booking obstetric care were also more likely to smoke in pregnancy than women in employment.

Figure 2.2 Prevalence of smoking among pregnant women in the Republic of Ireland by social class (Coombe Women and Infants University Hospital combined dataset 1999-2004)



2.3.1.3 Smoking in pregnancy and neonatal outcomes in the Republic of Ireland

In keeping with the findings from international literature, smoking in pregnancy was associated with low birthweight among babies born between 1997 and 1998 in an analysis of GUI data. Low birth weight was defined as babies weighing less than 2.5kg at birth. Of mothers who reported a low birthweight baby, 43.8% smoked compared to 27.2% who reported having a normal birthweight baby. The median and interquartile range for birthweight of babies born to mothers who smoked in pregnancy was 3.3 kg (2.99 kg - 3.7 kg) compared to 3.6 kg (3.2 kg – 3.9 kg) for non-smoking mothers. However, the observed difference did not reach conventional statistical significance levels.

An increased prevalence of smoking was observed among mothers of low birthweight and preterm babies compared to mothers of all babies in the Coombe Women and Infants University Hospital. This finding was consistent across all years during the period 2000-2008 (Figure 2.3). Prevalence of smoking declined among all mothers as well as among those mothers who had pre-term babies and those who had low birthweight babies over this time period. The smoking prevalence among all mothers giving birth in the Coombe hospital in 2008 was estimated at 17.1%. Smoking prevalence among pregnant mothers was further explored according to key neonatal outcomes.

There was a significant difference in smoking among mothers of normal birthweight (16.3%; (95% CI 11.0% - 23.5%) and low birthweight babies (32.3%; (95% CI 24.8% - 41.0%).

Smoking among mothers of full term and preterm babies differed but there was some overlap in 95% CI (full term babies - 16.7% (95% CI 11.0% to 23.5%); preterm babies 25.4% (95% CI 18.6% to 33.6%)). Smoking among mothers of babies who were weight appropriate for gestational age differed significantly at 15.3% (95% CI 10.2% - 22.4%), compared to 32.0% (95% CI 23.4% - 41.6%) among mothers of SGA babies.

Fig 2.3 Prevalence of smoking in pregnancy among mothers of low birthweight, preterm and small-for-gestational age babies in the Republic of Ireland (Coombe Women and Infants University Hospital, 2000-2008)

Source: (Kabir, 2013)

2.3.1.4 Smoking in pregnancy and child health outcomes in Republic of Ireland

Two multivariable logistic regression analyses were conducted on the Growing Up in Ireland data (9 year old cohort) to investigate associations between child health outcomes and in utero exposure to smoking based on maternal recall of smoking in pregnancy (Table 2.1). Child outcome measures were based on maternal reports of a doctor diagnosed chronic illness. Attention deficit hyperactivity disorder (ADHD) in the child by age 9 was also studied, as this was previously noted as being related to smoking in pregnancy in this dataset (McCrory and Layte, 2012). Each model was adjusted for the presence of a partner in the household, maternal age, maternal educational attainment, household occupational status, deprivation status and gender of the child. This model found no significant association between smoking in pregnancy and chronic illness at age 9, however a significant association was evident between maternal smoking in pregnancy and ADHD in the 9 year old child.

Table 2.1 Multivariate analysis of child health outcomes (Chronic illness and ADHD) in 9 year olds and smoking in pregnancy (Growing Up in Ireland, 9 yr olds in 2007/08)

Independent Factors and covariates	Odds ratio (OR) for 9- year old child	
	Chronic illness	ADHD
Smoking in pregnancy		
Yes	1.00 [0.86 – 1.18]; p=0.957	3.46 [2.23 – 5.38]; p<0.001
Reference category: no; OR: 1.00		
Partner in household		
No partner	1.39 [1.16 – 1.66]; p<0.001	1.27 [0.76 – 2.11]; p=0.359
Reference category: yes; OR: 1.00		
Maternal age		
OR per year	0.99 [0.97 – 1.00]; p=0.062	0.96 [0.92 – 1.00]; p=0.028
Highest maternal education attained		
No leaving certificate	1.43 [1.21 – 1.67]; p<0.001	1.35 [0.85 – 2.13]; p=0.202
Reference category: leaving certificate or equivalent and above; OR: 1.00		
Occupational household background		
No professional / managerial background	0.97 [0.82 – 1.13]; p=0.966	1.17 [0.66 – 2.08]; p=0.602
Reference category: professional / managerial background; OR: 1.00		
Basic deprivation index (0-11 points)		
OR per point	1.12 [1.06 – 1.19]; p<0.001	1.29 [1.15 – 1.46]; p<0.001
Gender study child		
male	1.43 [1.24 – 1.64]; p<0.001	2.74 [1.76 – 4.26]; p<0.001
Reference category: female; OR: 1.00		

2.3.2 Findings: Northern Ireland

2.3.2.1 Prevalence of smoking during pregnancy in Northern Ireland

In keeping with trends observed in the Republic of Ireland, a decrease was also observed in the prevalence of smoking during pregnancy in Northern Ireland in the last decade (Information Centre for Health and Social Care, 2011). 15% of expectant mothers in Northern Ireland smoked throughout their pregnancy in 2010 compared to 23% in 2000 representing a percentage decrease of 34.8% over that decade. Estimates produced by the Northern Ireland Health and Social Care Inequalities Monitoring System based on the Child Health System estimate that the proportion of mothers who smoked fell from 20% in 2005 to 17% in 2010, representing a 16% relative decrease in that 5 year period.

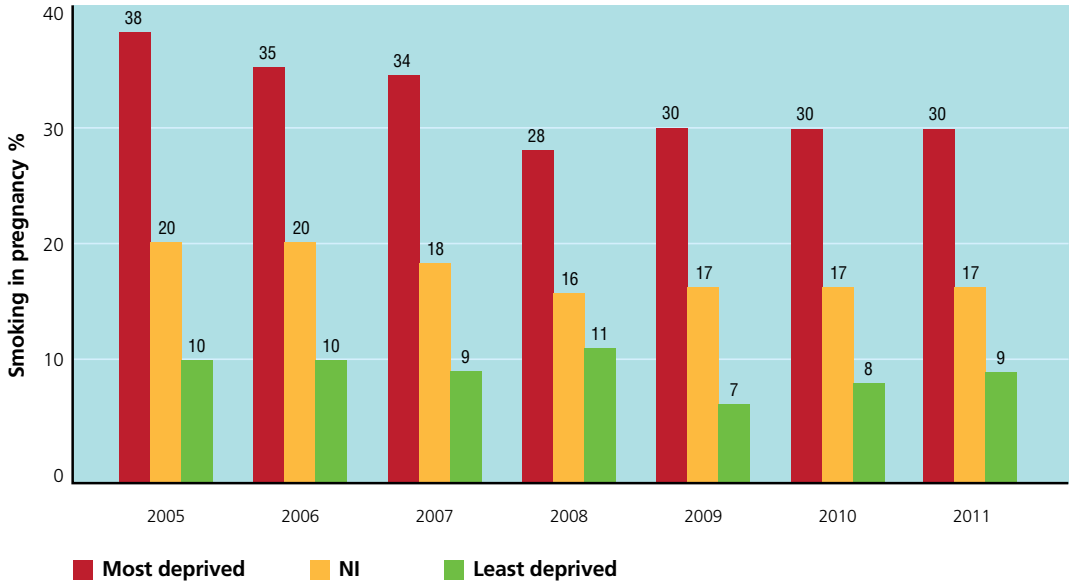
An analysis of the Millennium Cohort Study data relating to smoking in pregnancy in Northern Ireland between 2000 and 2001 found that smoking prevalence was in excess of those recorded in other UK jurisdictions (17.5% in Northern Ireland v 14.8% in all other UK jurisdictions). Estimates are lower than those derived from the Northern Ireland Infant Feeding Survey during the same period. The observed difference between the datasets in Northern Ireland may be reflecting differences between study questions and methodological approaches.

2.3.2.2 Inequalities and smoking in pregnancy in Northern Ireland

A clear socioeconomic gradient was evident in smoking prevalence among expectant mothers in Northern Ireland. The Infant Feeding Survey 2010 found that Northern Ireland mothers in the lowest socioeconomic groups (i.e. routine and manual workers/never worked) had the highest smoking rates compared to all other socioeconomic groups (HSCIMS, 2012).

Figure 2.4 show that the proportion of mothers who smoked from the most deprived areas fell by 21% between 2005 and 2011 which compares to a 16% decline in the region generally. Despite this positive trend, stark inequalities remain with women in the most deprived areas roughly three times more likely to smoke in pregnancy than those in the least deprived in 2011 (HSCIMS, 2012).

Figure 2.4 Prevalence of smoking during pregnancy in Northern Ireland by level of local area deprivation (NI Child Health System 2005-2011)



Source: NI Health & Social Care Inequalities Monitoring System, Fourth update bulletin 2012; Project Support Analysis Branch, PSAB, IAD

2.3.2.3 Smoking cessation in expectant mothers in Northern Ireland

The UK Infant Feeding Survey found that of those mothers in the UK who smoked before or during their pregnancy, just over half (54%) gave up at some point before the birth. Comparisons of data between UK regions over the same period showed that mothers in England were most likely to quit smoking before or during pregnancy (55%) whereas those in Northern Ireland were least likely to quit (47%) (Information Centre for Health and Social Care, 2011).

The numbers of expectant mothers attending specialist smoking cessation services in Northern Ireland increased substantially between 2005 and 2011 (from 116 to 1005 respectively) with the largest increase observed between 2009/10 and 2010/11 (DHSSPS Statistics on Smoking Cessation). In 2010/11 pregnant women represented around 3% of all attendances at specialist smoking cessation services in Northern Ireland. A participant is considered to have successfully quit at 4 weeks if they self-report that

they have not smoked at all since 2 weeks after their quit date. Although the success of quit attempts (measured at 4 week follow up) fluctuated over the 6 years observed, around half of expectant mothers attending smoking cessation services in Northern Ireland had successfully quit at 4 weeks. Data relates only to attendance at particular specialist services and it cannot therefore be considered to be indicative of quitting among all pregnant women in the region.

Table 2.2 Outcomes of specialist smoking cessation services for pregnant women in Northern Ireland (DHSSPS 2005/06 – 2010/11).

	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
Number of pregnant women attending smoking cessation service	116	185	308	285	325	1005
Quit at 4 week follow up	51%	45%	56%	68%	53%	52%
Not quit at 4 week follow up	44%	46%	39%	29%	32%	38%
Lost to follow-up	5%	8%	5%	4%	15%	10%

2.4 Key Findings: Smoking in pregnancy

1. Smoking in pregnancy has declined on the island of Ireland. Across a number of data sources, smoking rates during pregnancy fell by around a third over a 9 to 10 year period. A 35.7% reduction was observed in GUI data 1997/98-2007/8 (Republic of Ireland). A 34.8% reduction was observed in Infant Feeding Survey data 2000-2010 (Northern Ireland).

2. Levels of smoking in pregnancy remain high. It is estimated that around 17-18% (GUI data – births in 2007/2008) (Coombe Women and Infants University Hospital data 2008) of expectant mothers smoked in the Republic of Ireland. Survey estimates from Northern Ireland suggest that 15% of expectant mothers in Northern Ireland smoked throughout their pregnancy in 2010, whereas figures from the Child Health System estimate the prevalence of smoking in pregnancy at 17%.

3. Smoking in pregnancy is strongly socially patterned across the island with age and socioeconomic factors including employment, social class and deprivation status acting as key determinants of smoking prevalence. Socioeconomic inequalities in smoking during pregnancy have persisted against a background of overall declines in prevalence of smoking during pregnancy. Expectant mothers in the 'never worked' socioeconomic groups had the highest smoking rates (41%) compared to all other groupings in Northern Ireland.

4. In Northern Ireland the proportion of mothers that smoked from the most deprived areas fell by a fifth (21%) between 2005 and 2011 compared to a 16% decline in the region generally. This is indicative of a small but significant narrowing of inequalities. However, despite such improvements, the proportion of women that smoked during pregnancy in the most deprived areas remained more than three times greater than that in the least deprived areas in 2011.

5. Mothers in Northern Ireland were least likely to give up smoking during pregnancy (47%) compared to all other jurisdictions in the UK. However, a significant increase in pregnant mothers engaging with specialist smoking cessation services in Northern Ireland was observed.

6. Among babies born 1997/1998, smoking prevalence was higher among mothers of low birthweight babies compared to those who did not have a low birthweight baby (43.8% v 27.2%) in the Republic of Ireland. The median birthweight of babies born to expectant mothers who smoked was 3.3kg compared to 3.6kg among non-smoking mothers. Smoking in pregnancy was significant in patterns of low birthweight, SGA and prematurity in maternity hospital data.

7. In the Republic of Ireland, a multivariate analysis of the Growing Up in Ireland data showed smoking in pregnancy was associated with the subsequent development of adverse outcomes in 9 year old children including ADHD. Causality is not assumed.

2.5 Discussion

2.5.1 Prevalence of smoking in pregnancy

These analyses suggest that between 15% and 18% of all babies born on the island of Ireland in recent years are likely to have been born to a mother who smoked at some stage in pregnancy. A conservative estimate of the number of affected babies on the island of Ireland in 2010 is proposed - that at least 14,000-15,000 babies were exposed to smoking in utero in that single year. (Estimate based on a smoking rate of 15% and an estimated 99,039 total births on the island in 2010). An analysis of smoking behaviours among 1,011 first time pregnant mothers on their booking visit in a Dublin maternity hospital reported that 27.9% were still smoking. Women who smoked in pregnancy were also more likely to engage in other risk behaviours including drug use (Donnelly et al, 2008).

A consistent decline in smoking in pregnancy was observed across all analyses. However, the prevalence of smoking in pregnancy in Ireland remains unacceptably high.

It is also likely that smoking prevalence and smoking intensity in pregnancy across the island is under-reported. Social stigma around smoking in pregnancy may be of significance in the interpretation of both prevalence and quit rates (Mohsin, 2005). Self-reporting and social desirability bias may mean that under-reporting is a factor; the extent of under-reporting may however be small. Schneider et al (2008) considered estimated under-reporting of smoking prevalence rates to be between 3 to 5 percentage points.

The large reduction in smoking rates in pregnancy recorded between GUI cohorts is impressive in the context of smaller reductions seen among women of child-bearing age, for example in the SLÁN surveys. This has been considered to represent an increased sensitivity among women to move away from smoking in pregnancy over the past decade (McCrory and Layte, 2012).

2.5.2 Determinants of smoking in pregnancy and inequalities

Young maternal age as well as lower socioeconomic status and educational level were consistently associated with smoking in pregnancy, in keeping with the international literature (Schneider et al (2008; 2010) and other Irish studies (Tarrant et al, 2011).

The age gradient observed in the maternity hospital dataset was particularly striking - over the period studied around half of mothers in the 15 to 24 year old age bracket smoked in pregnancy. Declines in

smoking in the youngest pregnant mothers were less impressive than those observed in older mothers. Improvements observed in smoking prevalence among expectant mothers overall are less impressive for younger mothers, although the population health significance of this pattern may be mitigated by a tendency towards fewer pregnancies among younger women including teenagers (ESRI, 2012; HSCIMS, 2012). In fact it could be argued that the trend of increasing maternal age over the last decade may be acting as a significant driver of the observed declines in smoking in pregnancy in both jurisdictions. The changing ethnicity of mothers giving birth in Ireland may also be a factor.

Socioeconomic status is consistent as a strong determinant of smoking in pregnancy. Improvements in smoking rates in pregnancy in Northern Ireland appear to have been well distributed across different social groups. The picture of narrowing inequalities in smoking rates in Northern Ireland based on data from the Northern Ireland Child Health System is particularly welcome. However, the extent of the differences remaining indicate that there is plenty more work to be done on narrowing inequalities further.

This analysis did not extend to a consideration of whether inequalities in smoking in pregnancy were narrowed in the Republic of Ireland. The capacity to develop a meaningful analysis of this issue is limited by the lack of annual nationally representative data on smoking in pregnancy.

2.5.3 Smoking cessation in pregnancy

Supporting women to quit smoking as part of planning a pregnancy and as early as possible in pregnancy is critical to reducing harm to the foetus and baby and a core consideration within policy targets on reducing smoking prevalence in pregnancy.

While data on quitting behaviours in pregnancy is incomplete in both jurisdictions, data is particularly lacking in the Republic of Ireland necessitating a reliance on non-representative observational studies. A recent study of 470 pregnant women conducted in the Republic of Ireland suggests that there is considerable scope for improvements with regard to supporting smoking cessation in pregnancy. This study aimed to establish the care received in relation to smoking whilst attending routine public antenatal appointments. None of the women were offered specific assistance to help them stop smoking or had a follow-up appointment arranged specifically related to smoking. 167 women in the study (35.6%) reported that they were exposed to second-hand smoke in their own homes (Cully, 2010).

Tarrant et al (2011) undertook a prospective observational study (2004-2006) of 491 pregnant women, and 450 postpartum women attending the Coombe Women and Infants University Hospital in Dublin. During pregnancy, one-fifth of the sample (20.9% (n= 94 women)) smoked and 13.6% (n=61 women) discontinued smoking, while the majority of ongoing smokers decreased their number of cigarettes smoked per day. The authors concluded that interventions and smoking cessation programmes to target high-risk groups are a worthwhile public health investment for Ireland – with younger women and women in lower socioeconomic groups as a key target group. A study on smoking cessation among 118 pregnant women in the Republic of Ireland reported a disappointing quit rate of only 16.5% at both 4 weeks and at 3 months. This compares with 35.2% at 4 weeks and 20.3% at 3 months of the non-pregnant female population in the study (Keogan, 2013). Such rates would compare poorly to those observed in the Northern Ireland data although the data used differs in many respects and may be an artefact of differing methodologies.

Success in smoking cessation is associated with the social environment and cessation is a complex undertaking which requires specific skills (Mohsin et al, 2005). Schneider et al (2008) hypothesise that younger women on a lower income may find it more difficult to cease smoking. The social and economic context for younger women, single women, women of lower socioeconomic status and multiparous women seem to be associated with less success in smoking cessation. Alongside these reasons, Schneider et al (2010) conclude that there are three principal inhibiting factors for smoking cessation during pregnancy: living with a smoking partner, the extent of addiction, and multiparity.

A study of 1000 pregnant women attending the Rotunda Hospital in Dublin assessed the effect of motivational interviewing on smoking outcomes. Motivational interviewing delivered at several time points and up to 9 months postpartum was not successful in altering quit rates. However, a small effect was observed with regard to prevention of relapse (Hayes, 2013).

Guidance on effective practice in supporting women to quit smoking while they are pregnant or shortly after birth have been produced (National Institute for Health and Clinical Excellence, 2010). However, it is not clear to what degree practice in either the Republic of Ireland or Northern Ireland is compliant with these guidelines or to what degree smoking cessation for pregnant women is integrated with performance indicators for maternity or primary care services.

2.5.4 Smoking in pregnancy and child health outcomes

It is not possible to provide a comprehensive analysis of the overall impact of smoking in pregnancy on child health on the island of Ireland. In the context of an increasing focus on promoting optimal child development and equitable child outcomes in the early years within policies in both jurisdictions, it could be argued that such an analysis is now warranted.

In the first instance, it is noted that the findings here relate principally to live-born children. The impact of smoking on miscarriage and stillbirth, perinatal mortality and congenital anomaly was not addressed and has not yet been estimated in the Republic of Ireland/Northern Ireland context. Furthermore, the impact of smoking on fertility issues and its' role in the absence of 'longed for' children has not been considered.

Previous studies found that smoking is a critical factor in the observed patterns of low birthweight in both jurisdictions (McAvoy et al, 2006; HSCIMS, 2012; Pattenden, 2009). Findings in this study confirm the associations between smoking in pregnancy and pre-term birth as well as low birthweight. Findings from the Lifeways Study, a prospective cohort study of 1109 pregnant women in the Republic of Ireland found that markers of social deprivation including rented and crowded home, smoking, alcohol consumption and intake of saturated fatty acids displayed educational differences and were predictive of preterm delivery. Material factors (rented and crowded home) and behavioural factors (smoking and alcohol consumption) reduced the hazard ratio (HR) of preterm delivery for low educated women by 42% (HR = 1.66, 95% CI: 0.76-3.63) (Niedhammer at al, 2011). In Northern Ireland, an analysis of the geographic distribution of low birthweight for babies born between 1992 and 2002 found that controlling for smoking levels reduced variation between electoral wards (Pattenden, 2009).

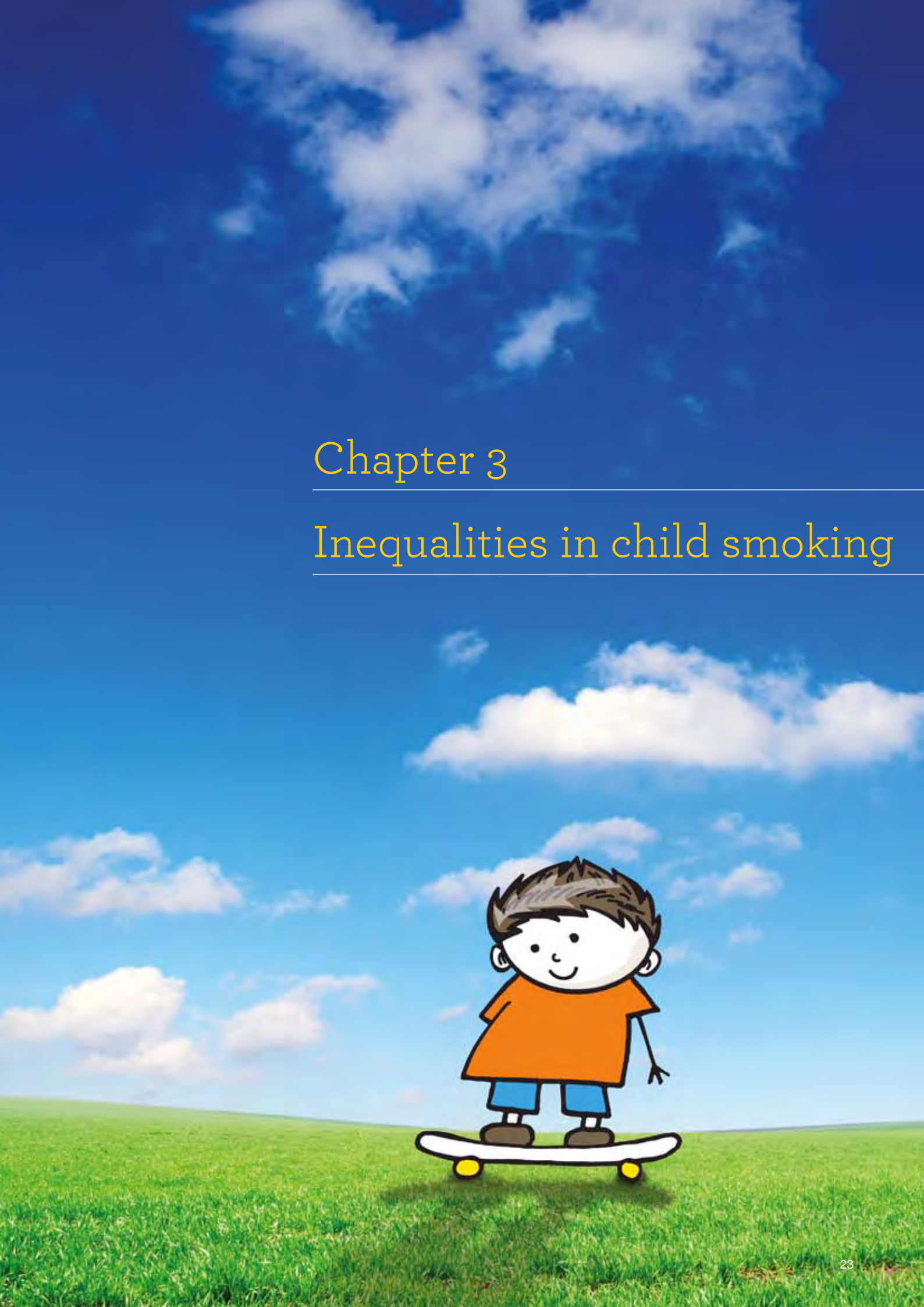
The family and socio-economic contexts of childrens lives are complex and change over time. The associations between smoking in pregnancy and longer-term child outcomes should be interpreted with caution as many other factors may be at play in the aetiology of these outcomes. However, the

association between smoking in pregnancy and ADHD has been noted elsewhere. Analysis of the UK Millennium Cohort Study including a Northern Ireland sample found that smoking in pregnancy was a significant predictor of a child's Strengths and Difficulties Questionnaire (SDQ) score (total behavioural difficulty score) at age 5 (Sullivan et al, 2010). An analysis of GUI data by McCrory and Layte (2012) found that the risk of ADHD increased with increasing smoking intensity in pregnancy, suggestive of a 'dose-response' type relationship. Also, smoking in households has been shown to be significantly associated with childhood neurobehavioral disorders (Kabir et al, 2011). Markussen Linnet et al (2003) undertook a review of 24 studies evaluating the association between smoking during pregnancy and ADHD in childhood. The majority of studies indicated an association but not all found a statistically significant association, and parental experience of ADHD may be a confounder while diagnostic assessment of ADHD was lacking. Similarly, there may also be additional pathways linking smoking in pregnancy to the subsequent risk of childhood asthma that need to be more clearly established (Jaakkola et al, 2006).

Overall these findings highlight the importance of recording and analysing data on smoking in pregnancy to better understand its contribution to critical population health outcomes relating to foetal and child mortality as well as in the context of neonatal health and longer term child health outcomes. Appropriate and standardised recording of smoking in pregnancy on all health information systems relating to births, birth outcomes and congenital anomaly is critical. Furthermore, the development of longitudinal studies on children in Ireland and Northern Ireland provides a unique opportunity to further investigate and understand smoking in pregnancy and its role in the generation of health inequalities across the life course.

Chapter 3

Inequalities in child smoking



3.1 Context and rationale

3.1.1 Introduction

The vast majority of smokers start smoking in childhood. Preventing children from trying cigarettes and preventing 'tryers' from progressing to regular smoking is the 'holy grail' of tobacco control - success in this goal will bring the greatest population health gain. Tobacco control policies on the island of Ireland have reduced the ease with which children can access tobacco through a variety of means including price, minimum pack size and legislation requiring age identification at point of sale and restricting tobacco vending machines. Reducing the appeal of smoking for young people is also a key concern. In June 2013, the Irish government approved the drafting of legislation to introduce standardised packaging of tobacco products in the Republic of Ireland with this in mind.

At European level, a revision of the 2001 European Tobacco Products Directive is underway. The revisions relate to the marketing and labelling of tobacco products and ingredients and are highly relevant to youth smoking. Analysis of tobacco industry documentation and trends in youth smoking clearly show the vulnerability of young people to marketing techniques relating to tobacco flavours (eg menthol), packaging and branding (Moodie et al, 2003; Carpenter et al, 2005). The revision of the directive was a critical opportunity to reduce the appeal of tobacco to young people and provide young people with appropriate warning of the risks associated with starting and continuing to smoke. More widely, the revision of the Directive can provide an opportunity for countries to progress their commitments under the Framework Convention on Tobacco Control (FCTC).

Understanding the smoking behaviours and attitudes of children and the external factors dictating the availability of tobacco and attractiveness of smoking are critical to informing effective tobacco control policies and programmes.

This chapter begins with an introductory overview of the impact of child smoking on child wellbeing outcomes. The implications of child smoking patterns on adult health outcomes are touched upon.

Following an outline of data and methodology issues, findings on smoking among children in the Republic of Ireland and Northern Ireland are presented and discussed.

3.1.2 Overview of impact of child smoking on child wellbeing and adult health

Children who take up smoking tend to do so during adolescence, a period of significant physical growth as well as social, emotional and sexual development. Smoking among adolescents has both short-term and long-term health effects. Short-term effects include increased respiratory symptoms such as shortness of breath and phlegm and reduced physical fitness. Smoking children are at an increased risk for impaired lung growth and the development of asthma and other chronic respiratory disease (Centres for Disease Control and Prevention, 2004).

Asthma is the most prevalent chronic disease among children on the island of Ireland with significant implications for children's school attendance, quality of life and social development. 46% of all chronic illness reported among 9 years old in the Republic of Ireland was respiratory in nature, far outweighing any other condition (Dept of Children and Youth Affairs, 2011). Children and teenagers who smoke

are more likely to develop asthma and smoking exacerbates symptoms among those children with pre-existing asthma. Smoking among adolescents increases the incidence, persistence and recurrence of wheeze symptoms (US Dept of Health and Human Services, 2012). It has been estimated that adolescents who smoke regularly are four times more likely to develop asthma over the following 8 years (Gilliland, 2006). In addition, smoking is now thought to hinder the effectiveness of certain asthma treatments (US Dept of Health & Human Services, 2012).

Smoking in childhood is associated with an enduring, commonly a lifetime, smoking habit and therefore greater tobacco-related harm across the life course. The younger a person is when they start smoking the more addicted they tend to be and the less likely to quit (Wray, 2012). Analysis of repeated cross-sectional surveys in Britain has shown that clear relationships exist between early initiation of smoking and lung cancer mortality across birth cohorts (Funatogawa, 2012). Early initiation of smoking among adolescent girls is associated with decreased bone mass placing women at greater risk of osteoporosis in later life and associated risks of fracture, pain and impaired mobility as well as the risks associated with cardiovascular, respiratory disease and cancers (Dorn, 2013).

3.2 Approach and methodology

3.2.1 Introduction

Data on the smoking behaviours and attitudes of children are routinely collected through a number of surveys on the island.

Findings on smoking in childhood in the Republic of Ireland data are presented based on three data sources - the Health Behaviour in School-aged Children survey (HBSC), the European School Survey Project of Alcohol and Drugs (ESPAD) and the International Study of Asthma and Allergies in Childhood (ISAAC). In addition, trends in preferred tobacco brands by young smokers were assessed using the Office of Tobacco Control / MRBI survey.

Findings on smoking in childhood in Northern Ireland are presented based on two data sources - the Young Persons Behaviour and Attitudes Survey (YPBAS) and the DHSSPS Statistics on Smoking Cessation Services.

Further details on the methodology underpinning these data sources are presented in Appendix 1.

3.2.2 Data and variables

3.2.2.1 Republic of Ireland

The HBSC is a cross-national research study conducted in collaboration with the WHO Regional Office for Europe and runs on a four year cycle. The study is a school-based survey with information collected from students through self-completion questionnaires. Findings from published data from the 2002, 2006 and 2010 HBSC surveys are presented. The Irish sample consisted of 8,424, 10,334 and 16,060 school-children in each respective cycle. Data included in this report was drawn from the main HBSC survey reports, international HBSC reports and relevant short reports produced by the National University of Ireland Galway, the Irish HBSC co-ordinating centre.

For the purpose of the HBSC survey, a child was considered as anyone less than 19 years of age, although data is reported on different age subsets in various HBSC reports. Children were asked if they had ever smoked tobacco with a dichotomous response of yes or no. They were also asked how often they smoke tobacco at present, with the response options: every day, at least once a week but not every day, less than once a week, I do not smoke. In the 2006 survey, children were also asked how frequently they had smoked cigarettes during the last 30 days, with the response options: not at all, less than 1 cigarette per week, less than 1 cigarette per day, 1-5 cigarettes per day, 6-10 cigarettes per day, 11-20 cigarettes per day, more than 20 cigarettes per day. Children were also asked at what age did you first smoke a cigarette (more than a puff)? – never, 11 years or younger, 12 years old, 13 years old, 14 years old, 15 years old, 16 years or older.

Patterns of smoking according to social class (based on parental occupation) are presented. In addition, the Family Affluence Scale (FAS) was used to explore aspects of inequalities in adolescent health behaviours as there are limitations in assessing socioeconomic status based on children's report on their parent's occupational status (Currie et al, 2008). The HBSC FAS is based on a set of four questions

- How many computers does your family own?
- Does your family own a car, van or truck?
- Do you have your own bedroom?
- During the past 12 months how many times did you travel away on holiday with your family? (in Ireland or abroad).

Children were classified according to the summed score of the FAS items, with the overall score being recorded to give values of low (0-2 score), middle (3-5 score) and high family affluence (6-9 score).

Data from the Republic of Ireland sample of the ISAAC survey for the years 1995 to 2007 were analysed to examine the relationship, between childhood smoking and patterns of childhood asthma. Data from the ISAAC study are based upon children aged 13-14 years.

Three main asthma variables were analysed:

- *ever asthma* defined as children self-reporting to have ever had asthma.
- *current asthma* defined as children self-reporting wheezing/whistling in the chest over the past 12 months.
- *severe asthma* classified as current wheeze with either more than 4 attacks of wheeze or more than 1 night of sleep disturbance caused by wheeze or 1 or more episodes of wheeze affecting speech in the last 12 months.

Some findings on preferred tobacco brands based on an analysis of the Office of Tobacco Control/ MRBI surveys are included.

Published findings from the ESPAD study are also included in this chapter. ESPAD is a collaborative study of substance use among 15- 16 year olds in forty European countries. Information on these surveys is included in Appendix 1.

3.2.2.2 Northern Ireland

The Young Persons Behaviour and Attitudes Survey (YPBAS) is a study of the health behaviours of 11-16 year old school-children in Northern Ireland. The survey facilitates consideration of child smoking

in the context of other data on wider aspects of children's lives and has included a number of detailed questions on active smoking and SHS exposure among children. YPBAS data is appropriate for the development of nationally representative prevalence estimates and estimation of 4 yearly trends.

Data from the 2003, 2007 and 2010 YPBAS surveys is presented. Smoking status is defined as follows:

- ever smoked defined as having ever smoked a whole cigarette (not just a puff of one)
- current smoker defined as someone who still smokes tobacco (even occasionally)
- regular smoker defined as someone who smokes tobacco at least once a week.

Findings are also presented based on the age of first trying a cigarette, transition to regular smoking and perceptions of smoking.

The principle socioeconomic variable used in the analysis of school-children in Northern Ireland was whether or not the child received free school meals (FSM). Northern Ireland school-children are eligible for free school meals if their family can demonstrate that they are in receipt of certain social protection benefits or allowances associated with low income. These principally relate to families on Income Support, Child Tax Credit of Working Tax Credit (equivalent to an annual taxable income less than £16,190). Children with special educational needs, children registered as asylum seekers and children boarding in special schools are also eligible.

3.2.3 Strengths and limitations

The HBSC survey is a well-established World Health Organization cross-sectional research study on the health behaviours of school-children. The HBSC international survey is now operating in 43 countries and facilitates consideration of child smoking in the context of other data on wider aspects of children's lives. HBSC data is appropriate for the development of nationally representative prevalence estimates, estimation of 4-yearly trends as well as international comparisons. However, data on wider aspects of child smoking including young people's perceptions of smoking and quitting behaviours is not routinely recorded in HBSC, unlike the Northern Ireland Young Persons Behaviour and Attitudes Survey.

The ISAAC study is a well-established international collaborative study of 13 to 14 year olds designed to enhance understanding of asthma and wheeze as well as other allergic conditions. ISAAC data is appropriate for the development of nationally representative prevalence estimates as well as international comparisons. However, findings relate only to 13 and 14 year olds and cannot be directly applied to other age groups. Unfortunately there was no suitable socioeconomic variable in the ISAAC study to facilitate analysis of socioeconomic patterns and explore inequalities.

Appropriate and meaningful estimation of the socioeconomic status of children is a challenge common to surveys with child respondents. Caution is therefore required in the interpretation of findings. There are limitations to children's ability to accurately provide detail on occupational status, income or level of education of their parent(s). The use of the Family Affluence Scale in the HBSC study is an example of progress towards the development of a meaningful indicator. In the YPBAS, receipt of free school meals is used as a dichotomous indicator of socioeconomic status which prohibits consideration of any social gradient, and simply allows for grouping of children into two broad groups - advantaged and disadvantaged. As family income is only one of the qualifying criteria for receipt of free school meals, its suitability as a proxy measure of the socioeconomic status of the family is questionable.

3.3 Results

3.3.1 Findings: Republic of Ireland

3.3.1.1 Smoking prevalence and intensity

According to the HBSC study, 11.9% of children (age 10-17) were current smokers in 2010. Overall, 27% of children reported that they had ever smoked tobacco. In this study, current smokers were considered as children who reported smoking 'every day', 'at least once a week but not every day' or 'less than once a week'.

Successive waves of the HBSC study reveal a consistent decline in child smoking (Gavin et al, 2013). Declines are evident in terms of the proportion of children who reported 'ever smoking' and currently smoking. 36% of children reported that they had ever smoked tobacco in 2006 compared to 27% in 2010, representing a 25% reduction in children who had ever smoked in that period. The percentage of children age 10 to 17 who reported never smoking increased from 50.8% in 1998 to 73.5% in 2010 (Department of Children and Youth Affairs, 2013).

In terms of current smoking 21.2% of children reported that they currently smoke in 1998, 15.3% of children reported that they were current smokers in 2006 compared to 11.9% in 2010. This represented a 20% reduction in the rate of current smoking among children between 2006 and 2010. Similarly the percentage of 10-17 year olds smoking cigarettes every week declined from 13.3% in 2002 to 7.9% in 2010.

The prevalence of current smoking among girls in 2006 exceeded that of boys (NicGabhainn, 2008), but the 2010 survey now indicates no statistical difference in smoking rates by gender, at least in the overall 10-17 year old group (Kelly, 2012). However, within the 15-17 year old subcategory, smoking among girls exceeds that of boys. The highest percentage of current smoking was among girls aged 15-17 across all four waves of the HBSC survey (Gavin et al, 2013).

In 2010, around 12.5% of young people aged 15-17 who smoked reporting trying their first cigarette at or before age 11 and around half reported that they tried their first cigarette at or before age 13. A statistically significant decrease has been observed between 2002 and 2010 in the percentage of 15 to 17 year old 'ever smokers' who reported having their first cigarette at age 13 or younger; from 60.6% in 2002 to 48.9% in 2010 (Gavin et al, 2013).

3.3.1.2 Child smoking and socioeconomic factors

Social class

A social class gradient in child smoking is evident in the 2010 HBSC data. There are statistically significant differences across social class groups in both 'current smoking' status and having 'ever smoked'. In 2010, the prevalence of current smoking among 15 to 17 year old girls in social class 1-2 was 19% in 2010 compared to 23% among girls in social class 3-4 and 25% among girls in social class 5-6 (Kelly, 2012).

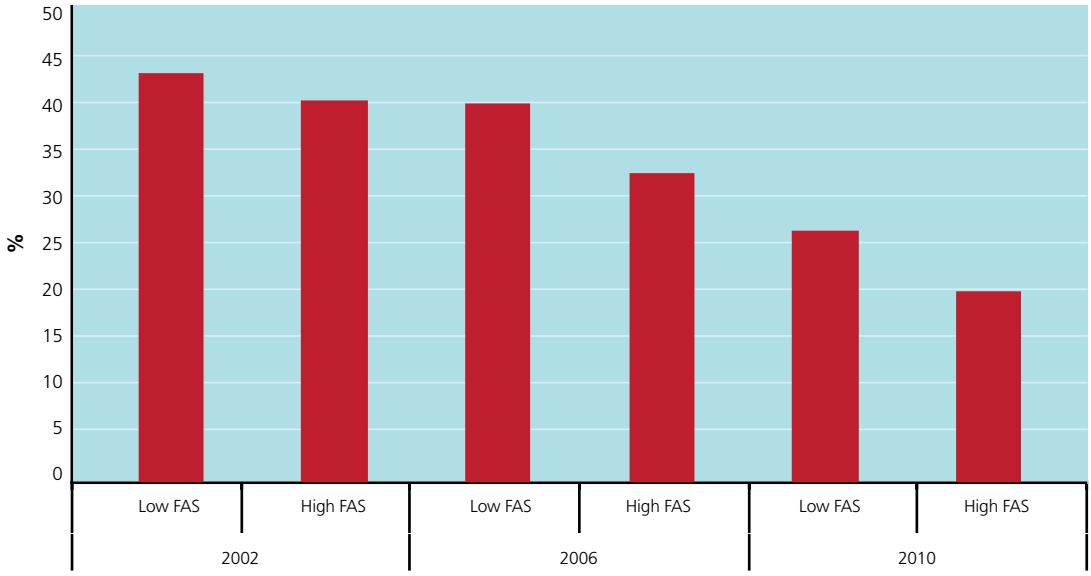
Declines in current smoking among all school-children are evident for all social class groups. This would suggest that gains in terms of reduced smoking initiation were shared reasonably well across children from different social class backgrounds.

Among school-children in social class 1-2, 6.3% reported that they smoked 6 or more cigarettes during the last 30 days compared to 10% in social class 5-6. In an analysis of smoking by social class, age and gender, the group with the highest smoking rate was 15-17 year old girls in social class 5-6. The finding of high smoking rates among teenage girls living from disadvantaged backgrounds is resonant of findings for smoking among pregnant teenagers observed in Section 2.3.1.1.

Family affluence

Figure 3.1 presents findings from an analysis of ever smoking and current smoking according to family affluence. This data was provided as a short report to inform this report by National University of Ireland Galway (Gajewski and NicGabhainn, 2013). The family affluence scale measure is detailed in section 3.2.2.1.

Figure 3.1 Proportion of school-children (aged 10-18) in the Republic of Ireland who reported that they had ever smoked by family affluence (HBSC 2002,2006, 2010)

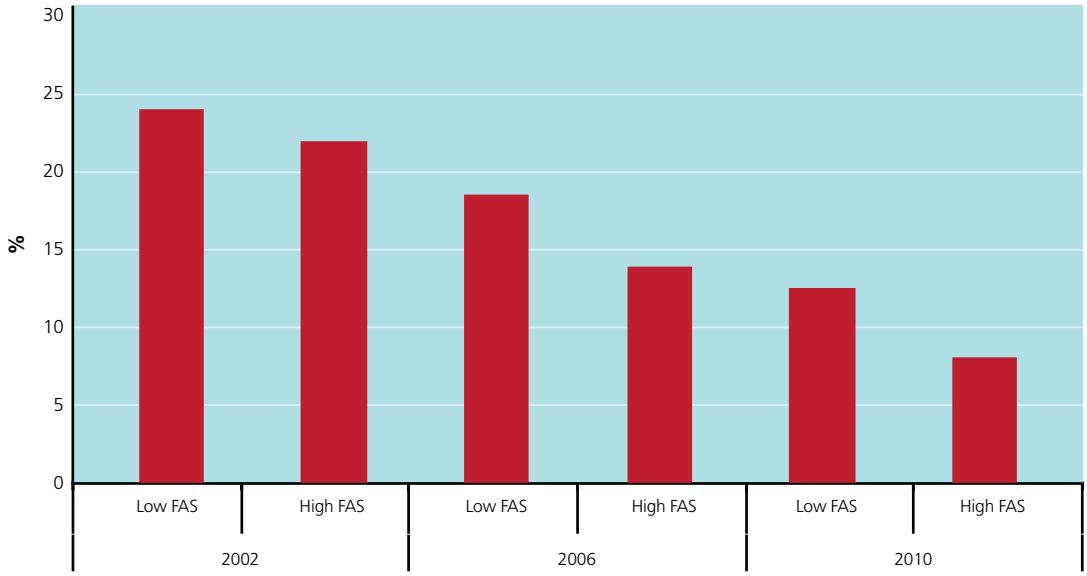


FAS = family affluence scale

Source: (Gajewski and NicGabhainn, 2013)

Figure 3.2 presents the proportion of school-children who reported that they tried their first cigarette under the age of 13 according to family affluence. This shows that children with low family affluence were more likely to have tried their first cigarette at a younger age in all study years. A recent analysis of trends in HBSC survey data in Ireland noted that a higher percentage of young people smoking at age 13 were from social classes 5-6 than from social class 1-2 (Gavin et al, 2013). Figure 3.2 also reveals steady declines in the proportion of children who tried when 'very young' among both high and low affluence children.

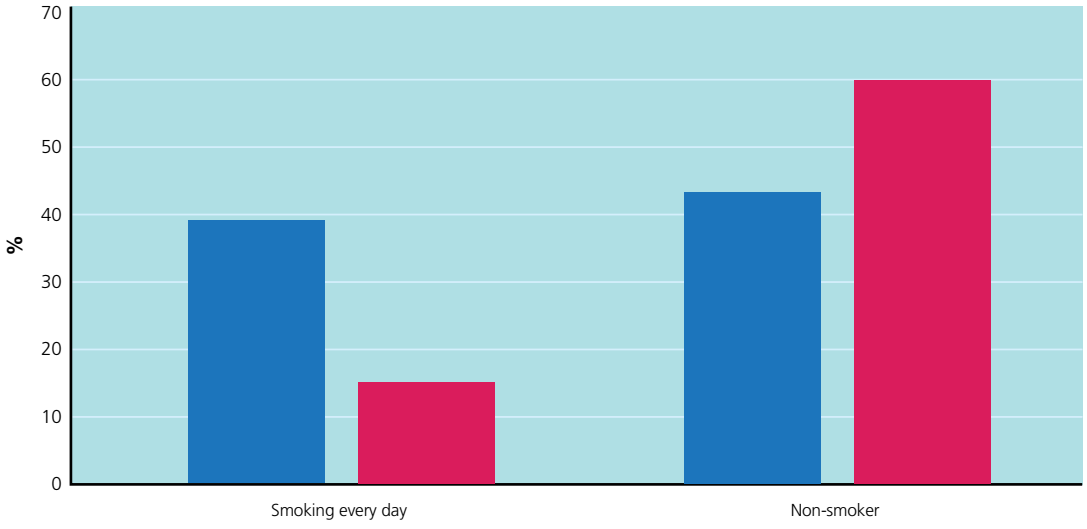
Figure 3.2 Proportion of all school-children (age 10-18) in the Republic of Ireland who reported that they tried their first cigarette before the age of 13 by family affluence (HBSC 2002, 2006, 2010)



Source: (Gajewski and NicGabhainn, 2013)

The significance of the age at which children try their first cigarette in terms of children's current smoking behaviours was explored. Among 15 year olds who reported that they smoked their first cigarette at age 13 or younger, 58% were current smokers and 38.3% currently smoked every day. Among 15 year olds who reported that they smoked their first cigarette at age 15 or younger, 41% were current smokers and 15% smoked every day. This suggests that children who smoke their first cigarette at a very young age (age 13 or younger) may be more vulnerable to progressing to established and indeed daily smoking thereafter.

Figure 3.3 Current smoking behaviours of 15 year olds in the Republic of Ireland by when they smoked their first cigarette (early/ very early smoking initiation) (HBSC 2010)



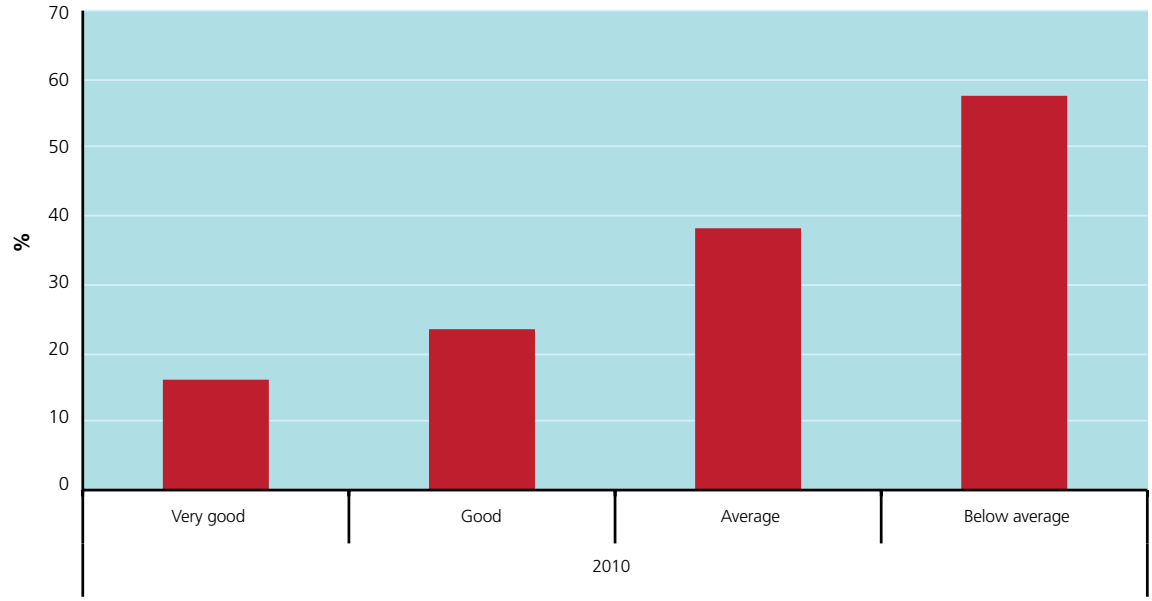
Source: (Gajewski and NicGabhainn, 2013)

very early initiation defined as 15 year olds reporting that they smoked their first cigarette at age 13 or younger

early initiation defined as 15 year olds reporting that they smoked their first cigarette at age 15 or younger

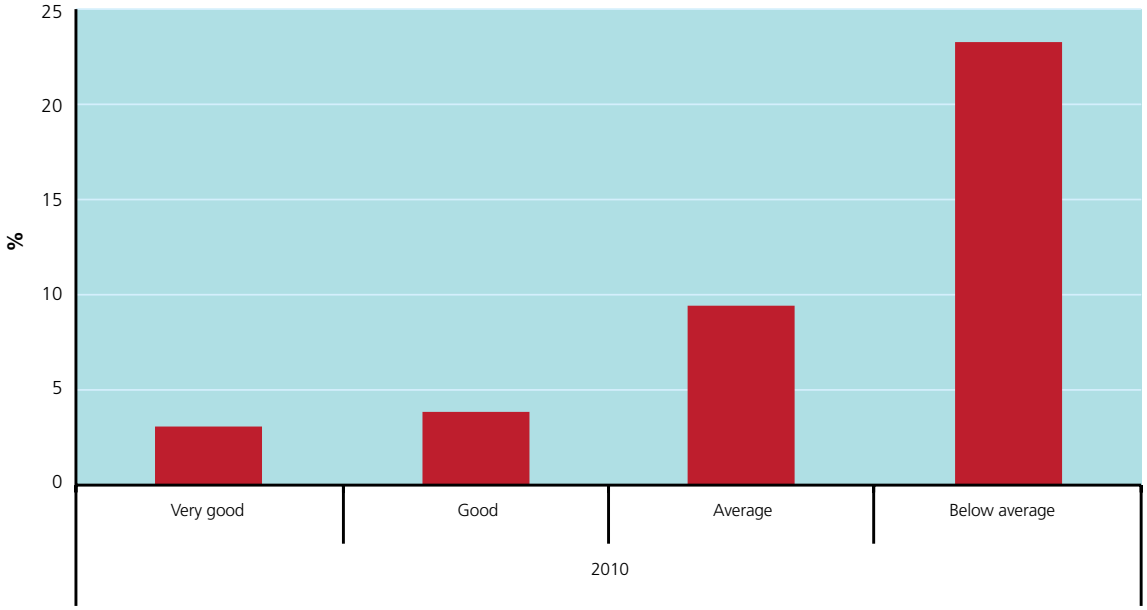
The relationship between smoking and lower levels of educational achievement is well established in all representative surveys of adults on the island of Ireland (Brugha et al, 2009; DHSSPS, 2012). The relationship between children's perception of their level of academic achievement and their smoking behaviours was explored with a view to considering educational gradients in smoking in childhood. Figure 3.4 presents data on children's report of whether they had ever smoked according to their report of their level of academic achievement. Similarly, Figure 3.5 presents data on children's report of whether they smoke every day according to their level of academic achievement. Academic achievement was measured according to children's responses to being asked ' in your opinion, what does your class teacher think about your school performance compared to your classmates?', with response options - very good, good, average and below average.

Figure 3.4 Proportion of school-children (aged 10-18) who reported ever smoking by their perceived level of academic achievement (HBSC 2010)



Source: (Gajewski and NicGabhainn, 2013)

Figure 3.5 Proportion of school-children (age 10-18) who reported smoking every day by their perceived level of academic achievement (HBSC 2010)



Source: (Gajewski and NicGabhainn, 2013)

The findings suggest that a steep gradient in smoking behaviours exists according to levels of academic achievement among secondary school-age children. School-children age 10-18 years who (rightly or wrongly) rate their academic achievement as below average may be particularly vulnerable to taking up smoking and progressing thereafter to smoking every day.

Furthermore, children with below average academic achievement were more likely to report trying their first cigarette at or below the age of 13 years. 29.7% of school-children who perceived themselves as having below average academic achievement reported that they had tried a cigarette before the age of 13 years in 2010. A large difference was observed between the 'average' and 'below average' academic achievement groups. The proportion of 'below average' children reporting trying a cigarette under the age of 13 years was double that of the 'average' grouping (14.6%).

In terms of trends, rates of ever smoking and current smoking have declined in all groups including the 'below average' academic group, as shown in Table 3.1 below.

Table 3.1 Smoking patterns among 10-18 year old children in the Republic of Ireland who perceive their academic achievement as below average (HBSC 2002, 2006, 2010)

	2002	2006	2010
Ever smoked	71.6%	73.1%	57.6%
Smoke daily	32.9%	27.7%	23.3%

Data from the ISAAC surveys also shows a steady decline in the overall prevalence of smoking in children aged 13-14 years in the Republic of Ireland. Smoking prevalence among 13-14 year olds halved in the twelve years between 1995 and 2007 from 19.9% to 10.6%.

3.3.1.3 Smoking and asthma in Children

Trends in asthma prevalence among smoking and non-smoking children were explored over the waves of the ISAAC study. Three main asthma variables were studied – 'ever asthma', 'current asthma' and 'severe asthma'. An overview of these variables is provided in section 3.2.2.1 and an overview of the survey methodology is presented in Appendix 1.

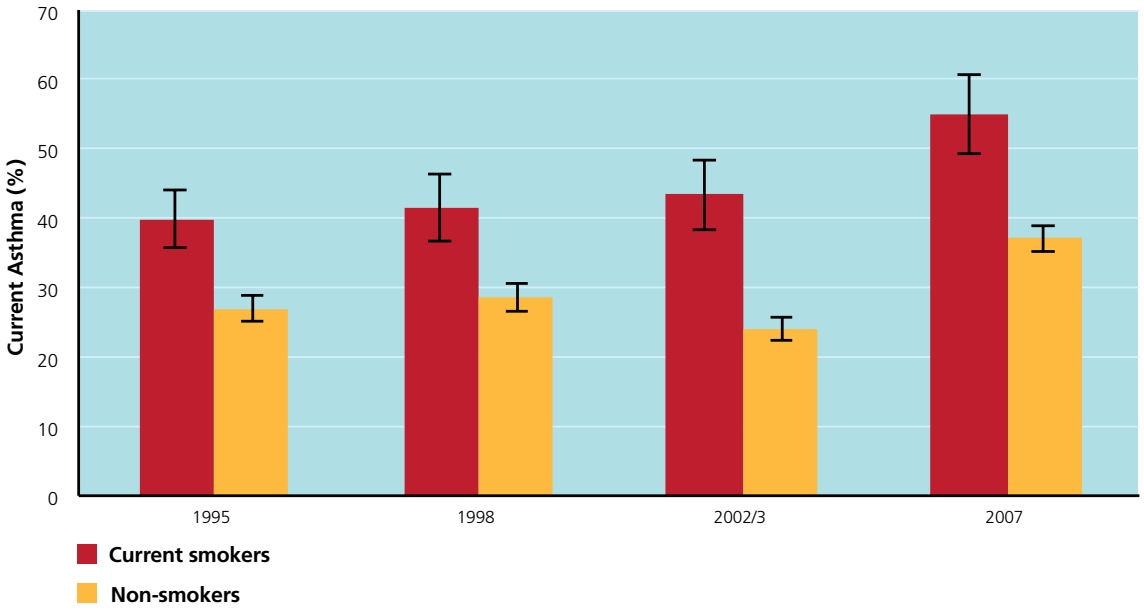
Figures 3.6 present trends in 'current asthma' among smoking and non-smoking 13-14 year olds in the Republic of Ireland between 1995 and 2007.

Prevalence of 'ever asthma' and 'current asthma' increased among both non-smoking and smoking children over the study period. The rate of increase of 'ever asthma' was significantly greater among child smokers than among non-smoking children (β = 2.8% for current smokers (p=0.002) compared to β = 1.4% for non-smokers (p=0.0001)).

The prevalence of 'current asthma' was significantly higher among smoking compared to non-smoking children in all study years. A multivariable analysis found that the adjusted odds ratio for 'current asthma' was 1.90 (95% CI: 1.70- 2.13) for smokers compared to non-smokers suggesting that 13-14 year old children with asthma are almost twice as likely to be smokers compared to those without asthma[2].

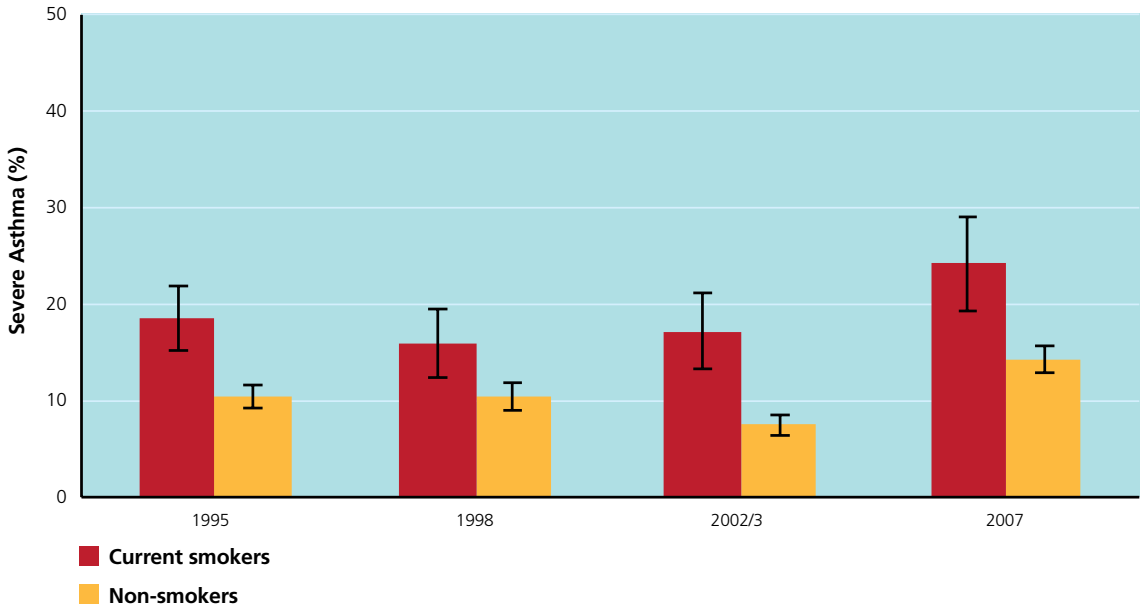
'Severe asthma' was consistently more prevalent among children who were current smokers than among non-smoking children in each of the study years (Figure 3.7).

Figure 3.6 Prevalence of current asthma among smoking and non-smoking children aged 13-14 years in the Republic of Ireland (ISAAC study 1995-2007).



2 Odds ratios were adjusted according to gender, year and SHS exposure

Figure 3.7 Prevalence of severe asthma among smoking and non-smoking children aged 13-14 years in the Republic of Ireland (ISAAC study 1995-2007).



3.3.1.4 Trends in preferred tobacco brands among young people

An analysis of OTC/MRBI data on preferred tobacco brands was undertaken to explore any notable changes in the popularity of brands over time among young people. Detail on the methodology used in these surveys is provided in Appendix 1.

The main finding was that RYO tobacco has gained popularity among smokers in all age groups in recent years. A notable increase in popularity occurred after 2006 among young smokers in the 15-18 year old grouping. The percentage of young smokers reporting that RYO tobacco was the brand of cigarette most often smoked by them more than doubled between 2007 and 2009. 10% of 15-18 year olds reported that RYO was their tobacco of choice in 2009.

3.3.2 Findings: Northern Ireland

3.3.2.1 Smoking prevalence, intensity and age at initiation

According to the YPBAS survey, 8% of children (age 11-16) in Northern Ireland were current smokers and 7% were regular smokers in 2010. Overall, 19.2% of 11- 16 year olds reported that they had ever smoked tobacco (at least one cigarette not just a puff of someone else's) in 2010 compared to a higher rate of 24.5% reported in 2007, reflecting a reduction of 21% in the intervening period.

In keeping with the findings in the Republic of Ireland, many children reported trying their first cigarette at a very young age. The median age for trying their first cigarette among Northern Ireland school-children (age 11-16) was 12 in 2003, 2007 and 2010.

A pattern of low intensity smoking was evident among 11 to 16 year old school-children in Northern Ireland in terms of both frequency and number of cigarettes smoked. Of children who indicated that

they had ever smoked tobacco (at least one whole cigarette, not just a puff of someone else's) 44% were currently smoking. Among those children who indicated they had ever smoked tobacco, 56% no longer smoked, 25.2% smoked every day, 9.5% smoked at least once a week but not every day and 9.4% smoked less than once a week (Central Survey Unit, 2011).

Among children who reported smoking every week, around two thirds smoked between 1 and 10 cigarettes a week. Less than 1% of regular child smokers were heavy smokers (taking smoking more than 140 cigarettes a week as equivalent to more than 20 a day).

41.4% of regular child smokers smoked less than one pack of cigarettes (20 cigs) a week in 2007 and 72.4% of regular child smokers smoked less than one pack of cigarettes a week in 2010. As well as reductions in the prevalence of smoking among school-children, positive trends are indicated in terms of children smoking fewer cigarettes in a week.

3.3.2.2 Access and attitudes to cigarettes

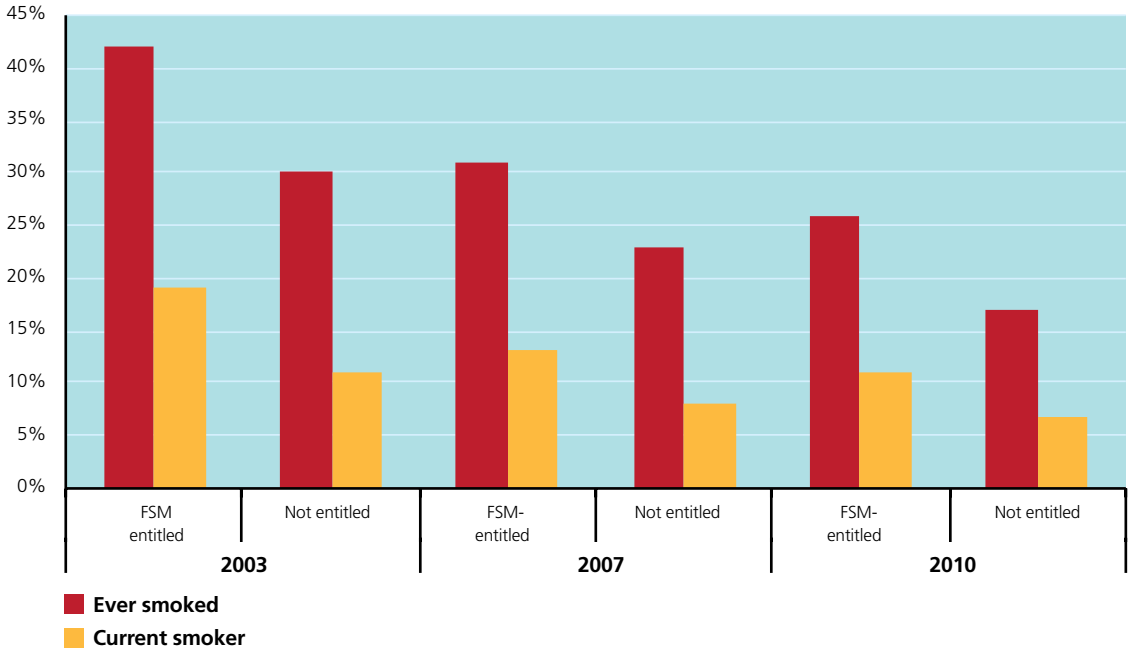
The newsagent/tobacconist/sweet shop (51.1%) was reported as the most common source of cigarettes among Northern Ireland schoolchildren aged 11-16 followed by 'friends giving them to me' (42%). Garage shops, other shops and buying them from friends/relatives were other cited sources. 35.8% of school-children felt that cigarettes help them calm down and 26.0% felt that smoking can put you in a better mood. Over one third felt that smokers are less boring than people who don't smoke or that smokers tend to be more 'hard' than people who don't smoke. Lower proportions of young people felt that smoking was related to feeling more confident, making friends easily or having a girlfriend/ boyfriend.

3.3.2.3 Inequalities in smoking

The 2010 YPBAS survey reported substantially higher prevalence across all smoking behaviours for those in receipt of free school meals compared to all others including for ever smoking (26% v 18% respectively), current smoking (11% v 8% respectively) and for regular smoking (10% v 6% respectively). Secondary data analyses based on the 2007 YPBAS data found that pupils entitled to free school meals reported a higher lifetime prevalence of smoking (31%) compared to those not entitled (23%) (DHSSPS, 2009).

The median age at which school-children smoked was related to receipt of free school meals. In 2010, the median age of children trying their first cigarette when they were in receipt of free school meals was 12, among children not in receipt the median age was 13 years.

Figure 3.8 Prevalence of ever smoking and current smoking among Northern Ireland school children aged 11-16 by receipt of Free School Meals (YPBAS 2003, 2007, 2010).



3.3.2.4 Quit attempts and quitting among child smokers

Among school-children surveyed in the 2010 Young Persons Behaviour and Attitudes Survey who smoked at least once a week, 70.7% reported that they would like to give up smoking altogether (Central Survey Unit 2011). Over 90% of school-children in the 2000 and 2003 surveys acknowledged that stopping smoking was difficult. In the 2010 survey, school-children reported that they were most likely to try the following for help in giving up smoking: a nicotine replacement product (22.8%), some other thing (15.2%), approaching family/friends for help (10.2%) and asking another adult/school (8.4%).

The DHSSPS Statistics on Smoking Cessation Services estimate that 527 children aged 11 to 16 years attended specialist smoking cessation services in 2010/2011. 1.5 % of all such service users in 2010/2011 were children aged 11- 16 years. 2% of those setting a quit date with the service were under 18 years of age. The number of 11 to 16 year olds attending the service more than doubled over the period 2005/06 – 2010/11.

32% of 11 – 16 year olds succeeded in quitting at 4 weeks, compared to 52% of all service users. In general success at quitting at 4 weeks increased with age from 33% for children (under 18s) to 59% among those over 60 years of age.

Table 3.2. Outcomes of specialist smoking cessation services for children age 11- 16 years in Northern Ireland (DHSSPS 2005/2006-2010/2011)

	Numbers or percentages of attendants reporting each outcome for each study year					
	2005/2006	2006/2007	2007/2008	2008/2009	2009/2010	2010/2011
Total number of all attendants setting a quit date	8,702	13,795	21,476	21,272	23,383	34,386
Total number of children setting a quit date	214	174	271	332	320	527
Outcome at 4 weeks after setting a date (% quit based on self-report)						
Number of children who successfully quit at 4 week follow up	54	63	86	107	113	170
Proportion of children who successfully quit at 4 week follow up	25%	36%	32%	32%	35%	32%

3.5 Key Findings: child smoking

1. In the Republic of Ireland in 2010, 11.9% of children aged 10-17 were current smokers. In Northern Ireland, 8% of children aged 11 – 16 were current smokers – the exclusion of 17 year olds from the Northern Ireland survey data means that child smoking estimates are not comparable.

2. Smoking among school children has declined across the island of Ireland. In the Republic of Ireland, the proportion of children aged 10-17 reporting that they had ever smoked fell from 36% to 27% between 2006 and 2010. In Northern Ireland, the proportion of 11-16 year olds reporting that they had ever smoked decreased from 24% to 19% between 2007 and 2010.

3. In general a pattern of low intensity smoking was evident among school-children in terms of both frequency of smoking and the number of cigarettes smoked. A positive trend was suggested in terms of declines in the number of cigarettes smoked by child smokers over time. 41.4% of regular child smokers in Northern Ireland smoked less than one pack of cigarettes (20 cigs) a week in 2007 whereas 72.4% of regular child smokers smoked less than one pack of cigarettes a week in 2010.

4. Children are trying their first cigarette at a very young age but there are some signs of improvement. Between 2002 and 2010 there was a significant decline in the proportion of young people in the Republic of Ireland who reported having their first cigarette aged 13 or younger. In Northern Ireland the median age of trying a first cigarette among 11-16 year olds was 12 years and this has not changed between 2003 and 2010.

5. Social disadvantage was associated with children trying smoking at a younger age. This association was evident in respect of children from low affluence families in the Republic of Ireland and in respect of children in receipt of free school meals in Northern Ireland.

6. Smoking in childhood was strongly associated with a range of socioeconomic factors. Social class was significantly associated with smoking behaviours among Republic of Ireland school-children. Financial disadvantage in families (as measured by the Family Affluence Scale in Ireland and the receipt of free school meals in Northern Ireland) was significantly associated with childhood smoking.

7. Lower academic achievement was associated with child smoking. In the Republic of Ireland, school children who perceived they had below average academic achievement were more likely to report smoking and trying smoking at a younger age.

8. Smoking in childhood was significantly associated with a range of asthma outcomes. The prevalence of 'current asthma' in the Republic of Ireland has increased among both smoking and non-smoking children. The proportion of children reporting that they had wheezing/whistling in the chest over the past 12 months was consistently higher among 13 to 14 year olds who smoke than those who do not smoke - 55% of child smokers reported this experience in 2007, compared to 37% of non-smoking children. The overall prevalence of severe asthma was consistently higher among child smokers than non-smoking children in 2007 (24.2% v's 14.3%).

9. Most child smokers on the island of Ireland want to quit. Among Northern Ireland school-children aged 11 to 16 who reported smoking at least once a week, 70.7% stated that they would like to give up smoking altogether. The number of 11 to 16 year olds attending specialist smoking cessation services in Northern Ireland more than doubled over the period 2005/06 – 2010/11. In the 2007 Republic of Ireland ESPAD sample, the majority of 15-16 year old smokers in the Republic of Ireland had attempted to quit (70.4%).

10. Children who smoke appear to have less success in quitting than adults. 32% of 11 – 16 year olds attending specialist smoking cessation services in Northern Ireland succeeded in quitting at 4 weeks, compared to 52% of all service users.

3.6 Discussion

3.6.1 Trends in child smoking and inequalities

Smoking among children is declining on the island of Ireland. European comparisons available through the ESPAD study show that compared to 1995, the countries with the largest decrease in children reporting that they smoked during the past 30 days (20 or more percentage points from the start) are Iceland, Ireland and Norway (Hibell et al, 2012). The observed declines in smoking in middle childhood and adolescence on the island of Ireland are likely to yield significant returns to population health in the long-term. However, there is no room for complacency and significant challenges remain. Recent evidence in the US has suggested that after years of steady progress, declines in the use of tobacco by youth and young adults have slowed for cigarette smoking and stalled for smokeless tobacco use (US Dept of Health and Services, 2012). In European countries where more adolescents smoke, adolescents are more likely to report that cigarettes are easily attainable (Hibell et al, 2012). Sustained efforts to reduce the accessibility as well as the appeal of smoking to young people have demonstrated success and must therefore represent an ongoing priority in tobacco control in both jurisdictions. The analyses present findings for children aged 10 to 18 in the Republic of Ireland and aged 11 to 16 in Northern Ireland. Data on 'adult' smoking behaviours should also be routinely analysed to assess trends in uptake in later adolescence and the early 20's to ensure 'late uptake' does not undermine these patterns.

The age at which children try their first cigarette matters. It matters in terms of laying the foundation for established adolescent smoking and thereafter a potentially lifetime habit. It may also be relevant to laying the foundations for inequalities in youth and adult smoking behaviours. The findings in the Republic of Ireland and Northern Ireland are consistent with European studies showing associations between early smoking initiation (age 13 or younger) and regular tobacco use (Hibell et al, 2012). A 2003/04 study in the Republic of Ireland estimated that 62% of lower income smokers took up smoking by the age of 15, compared to 34% of higher income smokers. This study also observed that the average spend on tobacco among higher socioeconomic group children was a third that of lower socioeconomic children. Cigarettes and tobacco products were one of the highest expenditure items for low income children (Office of Tobacco Control, 2006). The opportunity cost of this expenditure on tobacco for young people is a concern on many levels as the tobacco industry and their retailers are the sole beneficiaries of such expenditure.

There are still unacceptably high numbers of children on the island of Ireland who are trying their first cigarette at a very young age and progressing to smoking in early and later adolescence. The legacy of this pattern across the life-course of children on the island has not been comprehensively estimated. The causal relationship between active smoking and outcomes such as reduced lung function and impaired lung growth in childhood and adolescence, asthma and early abdominal aortic atherosclerosis has been recently highlighted (US Dept of Health and Services, 2012).

There would appear to be some distinct priorities for both research and policy emerging from the analysis

- Reducing the overall proportion of children who ever try a cigarette
- Increasing the median age at which children are trying their first cigarette
- Reducing the proportion of 'tryers' who progress to established smoking
- Keeping an eye to potential late uptake in later teenage years.

Data from the Growing Up in Ireland Longitudinal Study of Children was not used in this analysis - the second wave of the research on 9 year olds currently relates to 13-14 year olds. In the longer term, this data will be particularly important in understanding smoking initiation and quitting trajectories for adolescents and young adults. Considering child smoking in the light of longitudinal data collected within the wider context of economic recession and with the capacity to explore aspects of child poverty and deprivation would seem particularly pertinent. In particular the factors relating to the priorities listed above should be explored with this data and used to inform policy targets and priorities.

3.6.2 The tobacco industry and youth smoking – pricing, branding and Roll Your Own

The young age at which children are trying their first cigarette is particularly important in terms of recent policy development on regulation of tobacco industry activity including marketing to young people through tobacco pack branding and other means. Given their developmental age, children are uniquely susceptible not just in terms of social and environmental influences but also to the sophisticated marketing techniques employed by the tobacco industry.

The evidence is clear that plain packaging of tobacco can reduce the appeal of cigarettes and smoking, enhance the salience of health warnings on packs and address the use of packaging elements that mislead smokers about product harm (Moodie et al, 2013). Price is also a critical policy lever in reducing youth smoking (Currie, 2012).

Low cost cigarettes take many forms. The availability of low cost tobacco is a concern in terms of the role it plays in making smoking accessible and affordable to young people generally and those from disadvantaged backgrounds. An assessment of tobacco pricing strategies adopted by the tobacco industry concluded that the industry is increasingly targeting low income markets including young people and women. Tobacco companies can minimize the impact of any given tax structure by providing cheaper alternatives for poorer smokers who are the most price-sensitive. Analysis of the British market suggests a multifaceted strategy was adopted to keep prices low on the ultra-low segment of the market. Between 2006 and 2009, the price of cigarettes in the ultra low segment of the market increased by less than 1% with real prices decreasing for some brands, while mid-priced and economy brands increased by 5-6% (Currie et al, 2012).

International data is suggestive of a shift to lower cost tobacco in recent years, including a small but significant increase in the use of 'roll your own' (RYO) cigarettes in recent years. The increasing popularity of RYO tobacco in Ireland is mirrored in many other countries (Young et al, 2006; Connolly et al, 2008; Raisamo, 2011). The findings presented here suggest a need for further research on the use of RYO cigarettes on the island of Ireland and in other European countries. In Northern Ireland, around 14% of all smokers reported smoking RYO tobacco in 2008/09 (Continuous Household Survey 2008/09). A European comparative analysis found that the proportion of smokers smoking RYO cigarettes was highest in England (32%), France (17%) and Finland (14%) (Currie et al, 2012).

In the U.S. a number of new trends in tobacco consumption among young people have emerged. While U.S. cigarette consumption declined 33% from 2000 to 2011, use of other kinds of tobacco grew by 123%, as smokers sought lower-cost alternatives to cigarettes. This phenomenon was also characterised by a new pattern - concurrent use of multiple tobacco products among youth including RYO tobacco, cigars and smokeless tobacco (US Dept of Health and Human Services, 2012).

It has been suggested that this trend may be partially driven by the affordability of RYO cigarettes compared to manufactured cigarettes. Far from being the preserve of older men, the appeal of RYO cigarettes is now evident in the profile of the current generation of young men and women making 'roll-ups' their cigarette of choice. In this regard the separate increase in the cost of RYO tobacco introduced in the Republic of Ireland Budget 2013 may be timely. Cigarette marketing has two goals - to develop brand identity and to entrench ideas and feelings related to the product (Grant-Braham et al, 2011). Young people with low self esteem, lacking confidence, in a position of social disadvantage, surrounded by smokers and having ease of access to tobacco, are more likely to smoke. RYO tobacco fulfils the needs of young smokers in particular with the low cost fulfilling the rational needs, while the rolling process itself is used to display knowledge and a relaxed, unhurried pace (Devlin et al, 2003).

There are a number of implications from the increased popularity of RYO cigarettes at population level and most notably among young people. Of primary concern, is the role that the increase in RYO tobacco has in the generation of heavily addicted smokers from lower income or disadvantaged backgrounds and the consequences in terms of health inequalities. Analysis of data from four countries (UK, USA, Canada, and New Zealand) shows that although a heterogeneous population of smokers, the factors associated with RYO use are consistent: lower annual income, being male, younger age, higher levels of nicotine addiction, strong belief that RYO is less harmful compared to other forms of tobacco, and more positive perceptions of tobacco use (Young et al, 2006). In addition, RYO smokers are disproportionately represented in at risk groups in terms of alcohol misuse and mental health issues (Young et al, 2010).

Misperceptions are evident with regard to the risks from smoking RYO cigarettes. They are perceived as somehow less harmful, more 'natural' with the addition of fewer chemicals in the tobacco used (Devlin et al, 2003; McDaniel et al, 2007; Young et al, 2010; Wray et al, 2012). Among a New Zealand representative sample of adult smokers, just over 20% cited using RYO cigarettes as they reduced risks to health (Young et al, 2010). Level of education may play a role in the adoption of this belief. However, RYO cigarettes are not uniformly made - therefore RYO smokers may be inhaling more tar, carbon monoxide and nicotine, the latter of which renders them more addictive (Darrall et al, 1998; Devlin et al, 2003).

The increase in popularity of RYO cigarettes among young people also has implications for tobacco control policies regulating the marketing of tobacco products. For example, while RYO tobacco falls under the same legislation in respect of package health warnings, branding and point of sale display/advertising restrictions, this is not necessarily the case for the paraphernalia associated with RYO tobacco such as rolling papers, tins and branded leather pouches. Tobacco companies can sell kits to convert hand-rolling tobacco into cigarettes, at a price which may be lower than that of the equivalent manufactured cigarette. 'Brandstanding' can take place on tobacco tins, pouches, rolling machines and through advertising rolling papers and filters (Grant-Braham et al, 2011; Casado, 2007). The paraphernalia attached to RYO tobacco can be attractive to young people and RYO provides the tobacco industry an opportunity to promote their product through associated goods – with or without direct branding. Circumvention of marketing restrictions has been a feature of the tobacco industry in recent years and if the popularity of RYO tobacco is capitalised on, this could create significant health problems for 'unknowing' consumers (Hendlin et al, 2010).

3.6.3 Raising awareness of children who are vulnerable to taking up smoking

Many Northern Ireland children consider smokers to be less boring and tougher and a great many children attribute significant stress-relief qualities to smoking. The mental health of young people has become a particular concern on the island of Ireland in the context of high levels of youth unemployment and the inter-relationship with suicide and self-harm (Dooley and Fitzgerald, 2012; Health Service Executive National Office for Suicide Prevention, 2013). In this context the interface between aspects of teenagers' responses to stress-relief, coping strategies, their mental health and their ideas about the role of tobacco warrants further consideration. New and innovative approaches are required that encompass aspects of childrens self-esteem, resilience and life skills.

The striking association between smoking and lower academic achievement is consistent with the international literature. The group of US adolescents most likely to begin to use tobacco and progress to regular use are those with lower academic achievement (US Dept of Health & Services, 2012). This finding may have implications for the design and delivery of school-based health promotion programmes as well as the focussing of quitting services in settings relevant to children requiring literacy and education support and to early school leavers. The gradients in smoking by academic achievements are more striking than those observed for social class and family affluence. This suggests that it may be particularly useful for targeting at risk children and for monitoring inequalities.

Children who are growing up in families living in disadvantage are at an increased risk of taking up smoking. Lone-parent families, working poor families and families with no adults in employment would be especially vulnerable to experiencing child poverty and deprivation (Central Statistics Office, 2012).

UK studies indicate an association between lone parenthood and high smoking rates. The British Lone Parent Cohort study estimated that 60% of lone parents smoke. In addition to high levels of poverty, higher levels of stress and lower self-esteem have been found to explain some of the difference in smoking behaviours of lone parents (Dorset and Marsh, 1998). Furthermore, it has been suggested that while parenthood is protective of smoking for married women this is not the case for single women (Jun, 2007). Creating policies and services that support parents to make healthier choices is an important context for tackling health inequalities and halting intergenerational cycles of smoking. Policy changes must also address social determinants of health including income and education. The effectiveness and appropriateness of health education and promotion approaches for prevention and cessation in these social contexts remain poorly understood. Premature tobacco-related ill health and mortality can have devastating effects on the wellbeing of families and the ability of parents to provide for their children on many levels. This is particularly important for families where the full burden of child-rearing and care may rely on one rather than two parents.

3.6.4 Smoking in childhood and asthma

The increasing prevalence of asthma in the Republic of Ireland is concerning but would be in keeping with a general trend in Europe and across the developed world. A number of genetic and environmental factors are implicated in this pattern. The exact contribution of active smoking and SHS exposure to the national burden of childhood asthma on the island of Ireland has not been quantified.

Smoking was associated with a range of adverse outcomes relating to asthma, the most common chronic disease affecting children on the island. Many factors underpinning increases in asthma remain poorly understood and therefore difficult to address. Reducing smoking among children and among susceptible children must therefore represent an increasingly tangible policy goal in child and respiratory health policy. A number of studies indicate that having asthma may not be a deterrent to children taking up smoking (Tyc, 2008; Siroux, 2000). The degree to which smoking can be prevented among children with asthma (or indeed among children with a predisposition to asthma) could form a distinct marker of the success of tobacco control policies and programmes.

Asthma among school-children in the ISAAC study appears to be increasing. Conversely, a decline in asthma was observed in the 2010 Northern Ireland Young Persons Behaviour and Attitudes Survey (YPBAS) - this found that 13.9% of school-children reported that they had asthma in the previous 12 months compared to 15.7% in the 2007 survey and 18.5% in the 2003 survey. These differences may be attributable to differences in the way that asthma is defined, based on symptoms (ISAAC) or having received a clinical diagnosis (YPBAS).

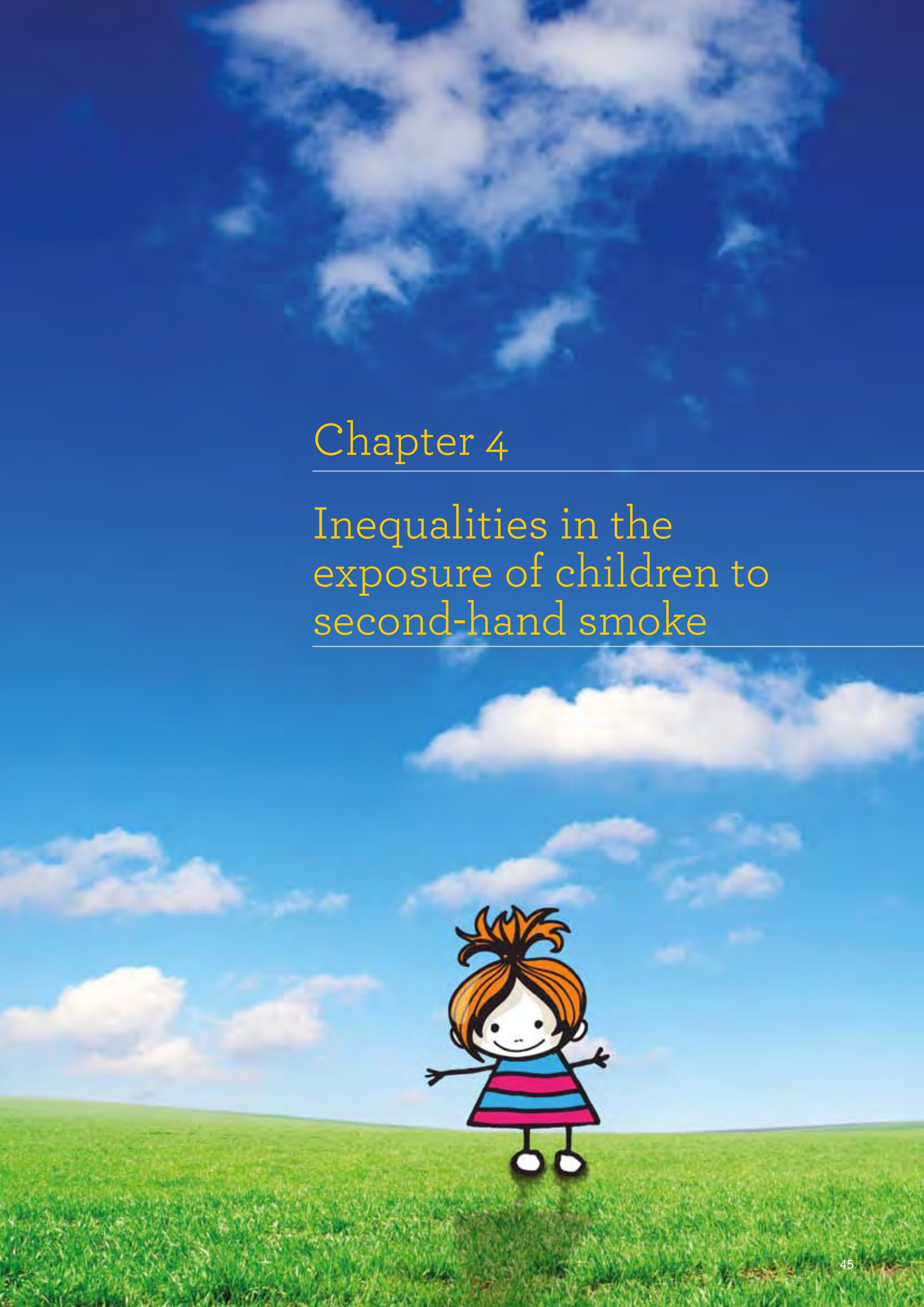
3.6.5 Quitting among child smokers

A study of smoking among young people in the Republic of Ireland in the early 2000's observed that 'the journey from experimentation to frustration remains short' (Office of Tobacco Control, 2006). The evidence presented here reinforces this learning – the vast majority of child smokers want to quit and many had already tried to quit despite having only smoked for a short period of their lives. Analysis of the 2007 ESPAD study found that the majority of 15-16 year old smokers in the Republic of Ireland had attempted to quit (70.4%).

In general smoking among children was of low intensity in terms of both frequency of smoking and number of cigarettes, possibly dictated by prohibiting factors such as cost or 'secret smoking' out of sight of parents or teachers. The pattern of smoking in young people is indicative of a low level of nicotine addiction. However, 43.6% of Northern Ireland child smokers felt that they would be most likely to try nicotine replacement therapy to try to give up smoking (Central Survey Unit, 2011). This would indicate that while there is much to gain by supporting young people to quit as early as possible in their lives, there is much to learn in terms of how to succeed in this goal. In Northern Ireland, the number of children engaging with specialist smoking cessation is increasing. Despite their lower level of nicotine addiction, children were less likely to succeed at quitting at 4 weeks than adults and very likely to consider nicotine replacement as a suitable aid to quitting. This might suggest that other social, psychological or environmental factors may be posing particular barriers to children quitting. A recently updated Cochrane review on smoking cessation for young people found that models incorporating trans -theoretical models of change approaches and psychosocial interventions including motivational interviewing may offer the best chance of success. Evidence was not supportive of nicotine replacement therapy for this group and evidence on the merits of online smoking cessation support approaches for young people was unclear (Stanton, 2013). This evidence shows a demand for ongoing development in understanding what works in smoking cessation generally for young people. It also emphasises the need for development of comparable service-based data on smoking cessation among young people in the Republic of Ireland.

Chapter 4

Inequalities in the exposure of children to second-hand smoke



4.1 Context and rationale

4.1.1 Introduction

Second-hand smoke (SHS) is harmful for everyone and has been classified as a Group 1 carcinogen. This chapter considers evidence on the exposure of children to SHS on the island of Ireland. This consideration occurs in the wider context of evidence presented in previous chapters on exposure of children in the womb and through active smoking in adolescence. A life course accumulation of risk associated with tobacco-related harm is evident and the concentration of such risk among children growing up in disadvantaged circumstances is a particular concern. For example, there is now evidence that children exposed to tobacco smoke in utero through either active or passive maternal smoking appear to be more affected by subsequent SHS exposure with more pronounced respiratory symptoms, higher respiratory infection rates and decreased pulmonary function (Öberg, 2010).

In 2004, the Republic of Ireland was the first country in the world to introduce comprehensive legislation restricting smoking in the workplace. A similar ban was introduced in Northern Ireland in April 2007. This intervention has been associated with significant declines in adult mortality from heart disease, stroke and chronic respiratory illnesses (Stallings-Smith et al, 2013). The ban was also successful in achieving its primary objective of reducing harmful SHS exposure in workplace settings (Goodman et al, 2007). Other research has highlighted possible associations between the introduction of the ban and declines in small for gestational age (SGA) and pre-term births (Kabir et el 2009; Kabir et al 2013).

However, particular challenges remain in the context of children's exposure to SHS as the majority of this exposure happens in the setting of the home or car. The Protection of Children's Health from Tobacco Smoke Bill prohibiting smoking in cars with children is progressing through the Oireachtas in the Republic of Ireland. A consultation on regulation of smoking in cars in Northern Ireland is expected in the near future.

In the context of these policy developments, this chapter begins with an introductory overview of evidence on the impact of SHS exposure on child health and wellbeing.

Following an outline of data and methodology issues, findings on SHS exposure among children in the Republic of Ireland and Northern Ireland are presented.

4.1.2 Overview of impact of SHS on child health

Children are particularly vulnerable to harms associated with SHS. They are more commonly exposed to SHS than adults and are less able to prevent their own exposure. Children are particularly susceptible to health effects, in part because they inhale more toxins per pound of body weight than adults (Öberg, 2010). There is now an extensive literature on the health impacts of SHS exposure for babies and children and this demonstrates that both the dose and duration of exposure are important (Öberg, 2010). Babies exposed to SHS are at a greater risk of sudden infant death syndrome (SIDS) and children who regularly breathe SHS are more likely to experience asthma, ear infections and respiratory tract infections (Royal College of Physicians, 2010; SCOTH, 2004; US Surgeon General, 2006). A recent systematic review concluded that SHS exposure caused 22,600 new cases of wheeze and asthma in the UK each year. Attributable fractions for SHS exposure and respiratory outcomes in children have been estimated - SHS exposure was responsible for 8% of wheezing in children aged under 3 years, 4% of

asthma in 3 to 4 year olds and 10% of asthma in children age 5 and over (Royal College of Physicians, 2010). In addition, children exposed to SHS have an increased likelihood of starting to smoke (US Dept of Health and Human Services, 2012).

4.2 Approach and methodology

4.2.1 Introduction

Findings on SHS exposure among children on the island of Ireland are presented based on analyses of a range of relevant population-based surveys.

In the Republic of Ireland, findings on children's exposure to SHS are based on analyses of three surveys

- Survey of Lifestyle, Attitudes and Nutrition (SLÁN)
- Growing Up in Ireland (GUI)– the National Longitudinal Study of Children 9 year old and 9 month old cohorts
- International Study of Asthma and Allergies in Childhood (ISAAC) 1995-2007

In Northern Ireland, findings on children's exposure to SHS are based on three sources

- Health Survey Northern Ireland 2010/11
- Young Persons Behaviour and Attitudes Survey 2010
- The Northern Ireland Childhood Exposure to Tobacco Smoke Study (CHETS).

In addition, findings from the one-year review and the three-year reviews of smoke-free legislation in Northern Ireland are featured (DHSSPS, 2009; DHSSPS, 2013).

Further detail on these surveys is presented in Appendix 1.

Findings relate to data from two respondent groups

- adult reports of whether they considered children to be exposed and rules in the home regarding smoking (SLÁN, Health Survey Northern Ireland, GUI)
- school-children's assessment of their own exposure (ISAAC, YPBAS).

In addition, some data on Northern Ireland hospital inpatient activity for various SHS-related childhood illnesses has been included.

4.2.2 Data and variables

4.2.2.1 Republic of Ireland

Data presented from SLÁN 2007 relates to whether adult respondents (aged 18 and older) reported that smoking was allowed inside the home. A separate analysis examined this variable among those adults in households where children were resident.

Data presented from GUI relates to whether the primary caregiver reported that smoking occurred in the same room as their 9 year old child. Data relates to 9 year olds born between 1997 and 1998.

Data from the ISAAC study is based on the report of 13-14 year old children regarding their exposure to SHS across three waves of the study conducted between 1995 and 2007. The analysis aimed principally to assess the relationship between SHS exposure and a number of asthma outcomes. In the ISAAC study, SHS exposure was estimated based on the response of 13-14 year olds to the question 'does anyone you live with smoke cigarettes regularly at home?' with responses yes/no.

Further details on these surveys is available in Appendix 1

4.2.2.2 Northern Ireland

Data presented from Health Survey Northern Ireland 2010 relates to whether adult respondents (aged 16 and older) reported that smoking occurs inside the home.

Data from the Young Persons Behaviour and Attitudes Surveys relates to 11- 16 year olds response to 'do the adults smoke inside your home?' with response yes/no.

Published findings from the Northern Ireland Childhood Exposure to Tobacco Smoke (CHETS) study are also presented here (Health Promotion Agency, 2009). This study was carried out before and after introduction of the ban on smoking in the workplace and public places in April 2007. In addition, findings from the one-year review and the three-year reviews of smoke-free legislation in Northern Ireland are featured (DHSSPS, 2009; DHSSPS, 2013).

Further detail on these surveys is presented in Appendix 1.

4.2.3 Strengths and limitations of the data

Both the SLÁN survey and Health Survey Northern Ireland are nationally representative surveys of adults but there are notable differences in the methodologies used that negate against comparability of the findings. A variable on SHS exposure was included in the 2007 wave of the SLÁN survey, but not in the 2002 and 1998 waves. This limits interpretation of trends in SHS exposure over that period and prohibits a consideration of pre- and post-ban patterns.

While SLÁN data relates to adults age 18 and over, Health Survey Northern Ireland relates to adults aged 16 and over. There are also small but potentially important differences in the questions used in these surveys which further limit the comparability of findings. It is particularly beneficial that the Department of Health, Social Services and Public Safety routinely publishes reports reviewing the impacts of the smoking ban over time that considers both child and adult exposures and wider smoking trends (DHSSPS, 2009; DHSSPS, 2013).

Growing Up in Ireland data is useful for developing estimates of SHS exposure among 9 year olds and among 9 month olds and data is nationally representative. GUI data permits analyses in the context of children's social and economic circumstances as well as in the context of child health and development.

Unlike the Young Persons Behaviour and Attitudes Survey, no question on exposure to SHS was included in the Health Behaviour in School-aged Children Survey. Analysis of inequalities in SHS

exposure through the YPBAS is limited to a simple dichotomous variable – receipt of free school meals. Details on this variable and a discussion on its limitations are provided in sections 3.2.2.2 and 3.2.2.3.

The results from the ISAAC survey are informative in terms of understanding asthma and wheeze in the 13-14 year old age bracket but findings cannot be directly applied to a consideration of asthma across infancy, early childhood or indeed into adolescence. Unfortunately there was no suitable socioeconomic variable in the ISAAC study to facilitate later analysis of socioeconomic patterns and explore inequalities.

4.3 Results

4.3.1 Findings: Republic of Ireland

4.3.1.1 Inequalities in SHS exposure

Children in disadvantaged circumstances are at an increased risk of exposure to SHS first and foremost because their parents are more likely to be smokers. Analysis of GUI data finds that in the Republic of Ireland in 2007, 32% of primary caregivers of 9 year olds were current smokers; 25.4% smoked daily and 6.6% smoked occasionally. Likelihood of smoking among primary care givers is patterned by socioeconomic background. A smoking prevalence of 55.7% was observed among primary caregivers of 9 year olds whose highest level of education was none or primary education only, compared to 19% for primary caregivers who had attained a university degree. A similar pattern was observed among primary caregivers according to their equivalised household annual income with 46.2% of those in the lowest income quintile smoking compared to 19.7% in the highest income quintile.

Findings from SLÁN 2007 found that 24.6% of adults living in households with children allowed smoking in some places in the home and 13.4% allowed smoking anywhere in the home. 22% of primary caregivers of 9 year olds responding to the GUI study indicated that smoking occurred in the same room of the home as their child. Socioeconomic status was related to exposure to SHS in the home. Over twice as many 9-year old children living in families whose equivalised household annual income is in the lowest quintile were exposed to second-hand smoke in the home compared to children in families in the highest quintiles (32.7% v 14.0%).

Estimates derived from the Republic of Ireland sample of the ISAAC study based on responses from 13 to 14 year old children indicate a somewhat higher level of exposure than that suggested from adult respondents in the GUI study. 45% of 13- 14 year olds reported that they were exposed to SHS in 2007. However, there was a decline in the proportion of children reporting exposure to second hand smoke from 47.7% in 1995 to 45% in 2007 although the decline did not reach conventional statistical significance levels.

Table 4.1 Prevalence of exposure to second hand smoke among 13 – 14 year old children in the Republic of Ireland (ISAAC study 1995- 2007)

Study Year	Second-hand smoke exposure	
	Prevalence (%)	OR (95% CI)
1995	47.7	Reference
1998	49.5	1.07 (0.96 - 1.20)
2002/03	45.7	0.92 (0.83 - 1.03)
2007	45.0	0.90 (0.81 - 1.0)

Smoking in cars is a further potential setting for SHS exposure for children. A nationally representative follow up study using the ISAAC questionnaire in the Republic of Ireland (n=2,809), found that 14.8% of Irish children aged 13-14 years were exposed to smoking in cars in 2007 (Kabir, 2009).

4.3.1.2 Smoking status among mothers and child health outcomes at 9 months and 9 years

A bivariate analyses of the Growing Up in Ireland 9 month old cohort was conducted to examine associations between the mothers current smoking status and various health outcomes. Current maternal smoking was associated with an increased likelihood of their infant attending a health professional in the first 9 months of life with respiratory symptoms including snuffles, chest infection or wheeze (Table 4.2). Similar associations were observed in respect of ear infection.

Table 4.2 Smoking behaviour of mothers and health outcomes of their 9 month old infants (Growing Up in Ireland – 9 month old infants in 2007).

	Prevalence of condition (infant was seen by a health professional in the past 9 months)	Crude odds ratio for mother smoking	P-value
Highly significant association with mother smoking			
Snuffles/common cold	46.9% [95% CI 46.0-47.9%]	1.22 (1.12 – 1.33)	p<0.001
Chest infections	32.1% [95% CI 31.3-33.0%]	1.34 (1.23 – 1.47)	p<0.001
Ear infection	17.3% [95% CI 16.6-18.0%]	1.29 (1.44 – 1.11)	p<0.001
Wheezing or asthma	8.9% [95% CI 8.4-9.5%]	1.43 (1.24 – 1.65)	p<0.001
Significant association with mother smoking			
Sleeping problems	3.0% [95% CI 2.7-3.3%]	1.37 (1.08 – 1.73)	p=0.010
No significant association with mother smoking			
Meningitis	0.4% [95% CI 0.3-0.5%]	1.4 (0.74 – 2.66)	p=0.296
† Analyses based on mothers who reported smoking at the time their infant was 9 months of age.			

Multivariate logistic regression analyses examined the associations between child health outcomes at 9 years and current smoking status among mothers (Table 4.3). The analyses conducted adjusted for the presence of a partner in the household, maternal age, maternal educational attainment, household occupational status, deprivation status and gender of the child. Child outcome measures were based on maternal reporting of a doctor diagnosed chronic illness or behavioural disorder in the child at age 9. There was no significant effect detected for current maternal smoking and the likelihood of a chronic illness in 9 year old children, however a significant association was found between current maternal smoking and ADHD in 9 year olds.

Table 4.3 Current smoking behaviour of mothers and health outcomes of their 9 year old children (Growing Up in Ireland – 9 year olds in 2007/08).

Independent factors and covariates	Odds ratio (OR) for 9- year old child having Chronic illness	 ADHD
Current maternal smoking		
yes	1.10 [0.95 – 1.28]; p=0.224	2.70 [1.76 – 4.15]; p<0.001
Reference category: no; OR: 1.00		
Partner in household		
No partner	1.37 [1.14 – 1.63]; p=0.001	1.27 [0.76 – 2.12]; p=0.358
Reference category: yes; OR: 1.00		
Maternal age		
OR per year	0.99 [0.98 – 1.00]; p=0.063	0.96 [0.92 – 1.00]; p=0.037
Highest maternal education attained		
No leaving certificate	1.42 [1.22 – 1.66]; p<0.001	1.60 [1.02 – 2.51]; p=0.039
Reference category: leaving certificate or equivalent and above; OR: 1.00		
Occupational household background		
No professional / managerial background	0.93 [0.79 – 1.09]; p=0.377	1.11 [0.62 – 1.98]; p=0.724
Reference category: professional / managerial background; OR: 1.00		
Basic deprivation index (0-11 points)		
OR per point	1.12 [1.06 – 1.19]; p<0.001	1.30 [1.15 – 1.46]; p<0.001
Gender study child		
male	1.40 [1.22 – 1.61]; p<0.001	2.78 [1.79 – 4.32]; p<0.001
Reference category: female; OR: 1.00		

4.3.1.3 SHS exposure and asthma in 13-14 year olds

The prevalence of 'current asthma' and severe asthma were examined in the ISAAC data - both were found to be consistently higher among children exposed to SHS in each of the consecutive waves of the study (Figure 4.1 and 4.2). A significant increase in the prevalence of 'current asthma' was observed in both groups in the intervening years i.e. the SHS exposed and non-exposed children (p<0.001 for both groups).

Figure 4.1 Prevalence of current asthma among second hand smoke exposed and non-exposed 13 to 14 year old children in the Republic of Ireland (ISAAC study 1995-2007)

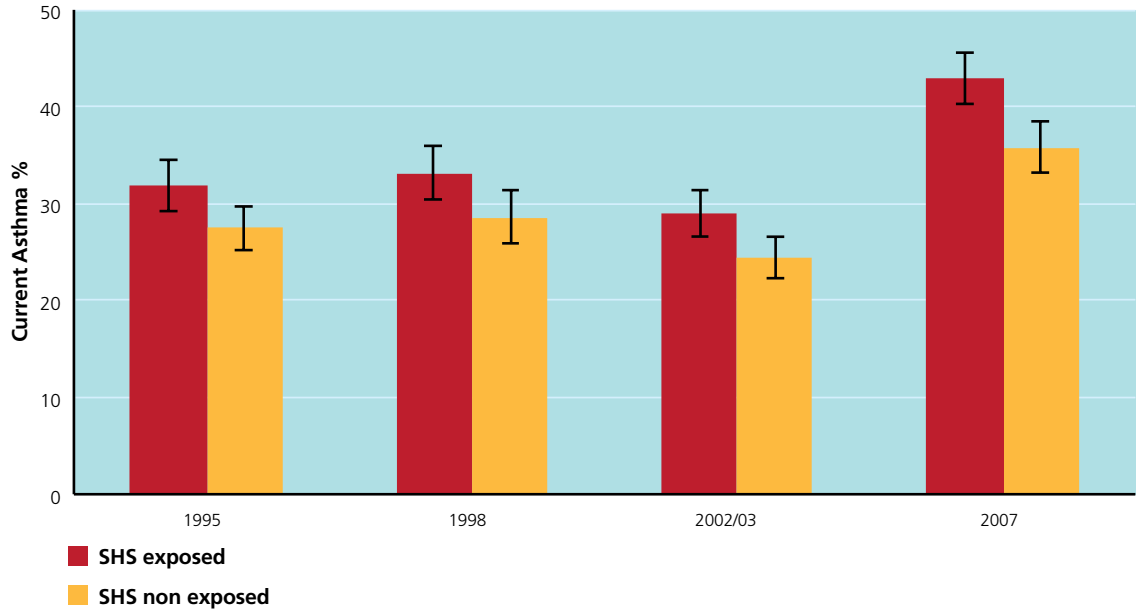
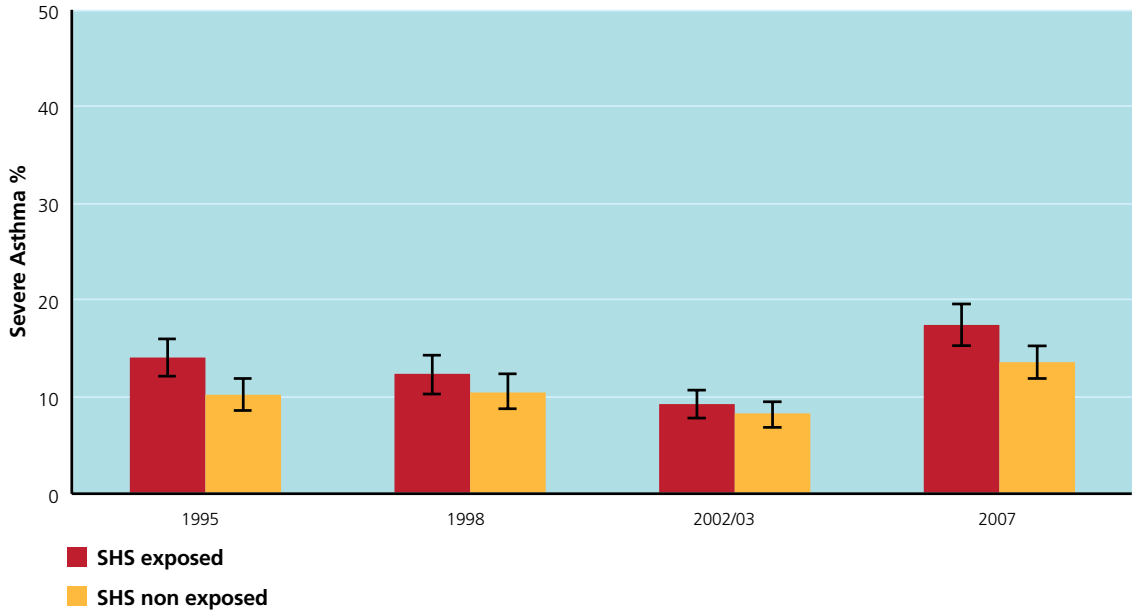


Figure 4.2 Prevalence of severe asthma among second hand smoke exposed and non-exposed 13 – 14 year old children in the Republic of Ireland (ISAAC study 1995-2007)



4.3.2 Findings: Northern Ireland

4.3.2.1 Inequalities in SHS exposure

In the general population, 72% of all respondents (aged 16 and older) to the 2010 Health Survey Northern Ireland, reported that smoking is not allowed anywhere in their home. This compares to 61% in 2007/08 (DHSSPS, 2013). 81% of those living in households with children reported that smoking is not allowed at all inside their home, 15% reported allowing smoking in certain places in their home or on special occasions, whilst 4% reported that smoking was allowed anywhere in the home.

67% of all respondents to the 2010/11 Health Survey Northern Ireland reported that smoking is never allowed in their family car or cars. A larger proportion (85%) of respondents living in households with children who had a family car indicated that smoking is never allowed in the family car while 10% reported allowing smoking sometimes or in some cars and 5% reported no restrictions on smoking in family cars (DHSSPS, 2011). This would suggest that child exposure to SHS in a car is a feature of just over one in seven families with children in Northern Ireland.

The findings suggest that rules on smoking in the home have been enhanced in Northern Ireland in recent years. It would also suggest that at least some adults take into account whether children are in the family when making rules for smoking at home or in the car.

In parallel with the findings from the Republic of Ireland data, there was a significant difference between child and adult reports of exposure to SHS in the home. Estimates from the YPBAS survey based on 11-16 year old respondents indicate a higher level of home exposure than that indicated by adult respondents (16+) in Health Survey Northern Ireland. The 2010 wave of YPBAS indicates that 41.8% of school-children aged 11 – 16 years lived in households where an adult smoker was resident. Almost half (49.8%) of children reported that adults smoked inside their home. Just over one quarter of school-children (26%) reported that visitors were allowed to smoke inside their home, 59.1% reported that visitors were not allowed smoke and 14.9% were unsure of the rules in this regard.

The proportion of 11- 16 year old children living in homes with adult smokers declined by 10 percentage points between 2003 and 2010 (from 51.8% to 41.8%) (Table 4.4). The proportion of children living in homes where adults smoked inside their home declined by 29 percentage points over the same period.

Table 4.4 Smoking behaviours inside the homes of 11-16 year old school-children in Northern Ireland (YPBAS 2003, 2007, 2010).

Survey question	2000	2003	2007	2010
Do any adults in your household smoke?		51.8%	42.8%	41.8%
Do the adults smoke inside your home?		78.6%	57.3%	49.8%
Do you think that other people's smoking can harm the health of non-smokers?	95.6%	97%		
† Percentages represent the valid percentage of school-children who answered yes to the questions				
‡ Data are not available for blank cells				

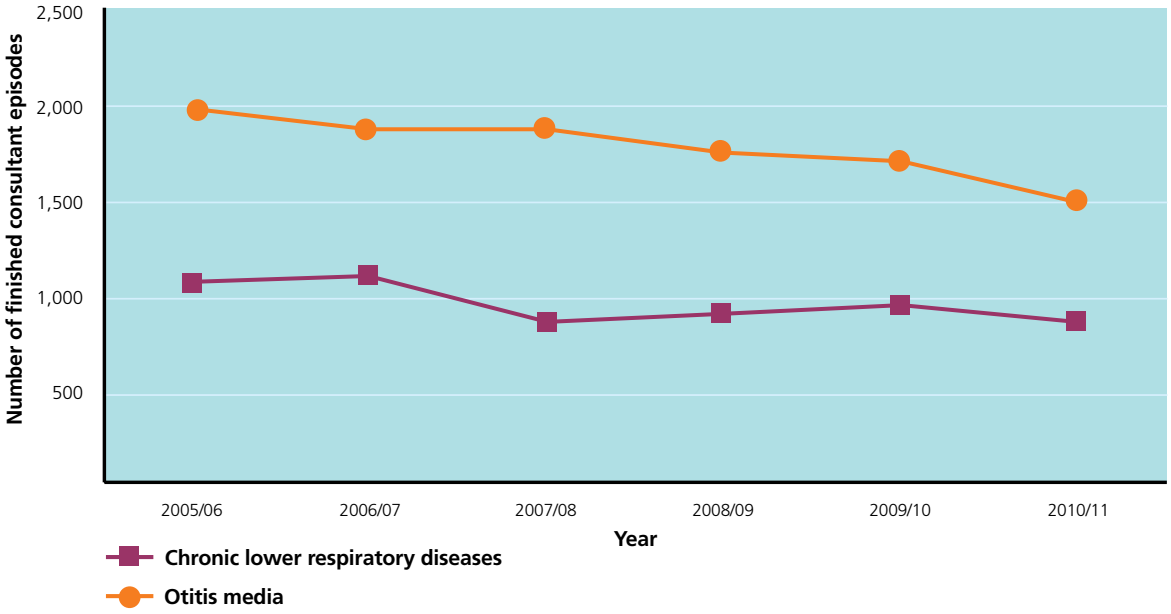
Findings from The Childhood Exposure to Tobacco Smoke Study (CHETS) carried out pre and post introduction of the workplace smoking legislation in Northern Ireland are resonant of findings from the YPBAS survey. Just under half of children (47%) reported that smoking was not allowed at all in the home in the pre-ban survey with no difference in home rules immediately post-ban. 18% of children reported that they were in a location where someone was smoking 'about every day'. Parents and relatives who smoked were a more significant contributor to exposure to SHS than friends. Children who lived with a mother figure who smoked had a higher exposure to SHS than those children who live with a father figure who was the only smoker in the home or had non-smoking parents (Health Promotion Agency for Northern Ireland, 2009).

Smoking status among parents differed according to occupational status. Children from professional/ managerial households were least likely to report living with a parent who smoked (29% pre- and post-legislation) compared to those from partly skilled/unskilled households (52% pre- v 54% post-legislation) and those children in a household without current employment (70% pre- v 56% post-legislation). In addition to living in households where a higher proportion of parents smoked, children from less advantaged family backgrounds were also more likely to experience more frequent exposure to SHS both pre- and post- the introduction of smoke-free legislation compared to more advantaged families. However it is also notable that the proportion of children in homes where neither parent was employed who were exposed to smoking 'about every day' also reduced substantially after the smoking ban - 40% of children in such households were exposed to frequent smoking pre-legislation and this declined to 26% post-legislation. Children with parents who smoke and children from less advantaged family backgrounds were more likely to hold an accepting view on adults smoking in front of them (Health Promotion Agency for Northern Ireland, 2009).

4.3.3.2 SHS exposure and child health outcomes

Data was not available to examine the same child health outcomes in both jurisdictions. However, it was noted that 10% of hospital admissions for asthma in children aged 5-14 years in England in 2005/06 are considered to be attributable to SHS exposure (Royal College of Physicians, 2010). In keeping with published studies exploring possible effects of the smoking ban on child hospitalisations in Scotland and the UK (Mackay et al, 2010), a preliminary scoping of data from Northern Ireland was undertaken (Mackay et al, 2010). Hospital inpatient activity data among children aged 18 years and under were analysed for the period 2005/06 to 2010/11 in respect of chronic lower respiratory disease and otitis media. Chronic respiratory disease relates to ICD codes J40-47 (the majority of which relates to asthma in this case) and otitis media relates to codes H65-66. These disease outcomes were selected based on World Health Organization guidance on assessing the burden of disease associated with SHS (Öberg, 2010). Inpatient activity is measured according to the number of finished consultant episodes. A dip in the hospital admissions from chronic lower respiratory disease between 2006/07 and 2007/08 is evident followed by a plateau at a lower level (Figures 4.3).

Figure 4.3 Hospital inpatient activity for various potential SHS-related illnesses among children aged 0-18 years in Northern Ireland (2005-2011)



The findings presented here from the Young Persons Behaviour and Attitudes Survey and the findings from CHETS would support the hypothesis that reduced exposure to SHS over this timeframe may have played a role in this reduction. Findings on the introduction of smoke-free legislation and hospitalizations for childhood asthma in Scotland provide some support for the preliminary findings presented here. There was an observed mean reduction in asthma hospital admission rates among children aged less than 15 of 18.2% per year relative to the rate in 2006 pre-legislation (Mackay et al, 2010). While rigorous examination of this hypothesis was beyond the scope of this study, further research assessing the mid to long term outcomes of the ban may provide important insights into the dividend for child health and health services.

4.4 Key Findings: children's exposure to second-hand smoke

1. Exposure of children to SHS in the home is common. In the Republic of Ireland, 22% of primary caregivers of 9 year olds reported that smoking occurs in the same room as their child. Smoking in the home was allowed in 19% of Northern Ireland family homes containing children in 2010.

2. Exposure of children to SHS in the car occurs less frequently. Among adults (age 16+) who live with children in Northern Ireland, 15% of those who had a family car allowed smoking in the family car. In the Republic of Ireland, 14.8% of children aged 13-14 years reported exposure to smoking in cars in 2007.

3. Adult and child reports of children's exposure to SHS differ considerably. Children's reported level of exposure tends to exceed that of adults in both jurisdictions. 45% of 13 to 14 year old children in the Republic of Ireland reported exposure to second hand smoke at home in 2007. Similarly, nearly

half (49.8%) of 11 to 16 year old school-children in the Young Persons Behaviour and Attitudes Survey conducted in Northern Ireland in 2010 reported that adults smoked inside their home.

4. The proportion of children living with non-smoking adults and in homes where adults do not smoke inside the house is increasing. In Northern Ireland, the proportion of 11-16 year old children living in households with adult smokers fell from 51.8% in 2003 to 41.8% in 2010.

5. The ban on smoking in workplaces and indoor public places was not associated with any increase in SHS exposure among children in the home in either jurisdiction. The proportion of 11 to 16 year old children in Northern Ireland reporting that adults smoke in the home environment declined from 78.6% in 2003 to 57.3% in 2007 to 49.8% in 2010. 72% of all respondents to the 2010/11 Health Survey Northern Ireland reported that smoking is not allowed anywhere in the home, compared to 61% in 2007/08.

6. Disadvantaged children are more likely to live in households with smoking adults and are at greater risk of exposure to SHS. Nine year old children in the Republic of Ireland living in the lowest income quintile families were twice as likely to be exposed to SHS in the home as children in the highest income quintile families. Nearly one in three 9 year old children in the lowest income quintile were exposed to SHS in the home, according to their primary caregiver.

7. Infants living with a smoking mother are at an increased risk of illness in the first 9 months of life. Among infants in the Republic of Ireland, having a mother who smoked was associated with an increased risk of consulting health services for respiratory illnesses and ear infections in the first 9 months of life.

8. SHS exposure among children with asthma was common. SHS exposure was associated with a higher risk of reporting 'current asthma'. The prevalence of 'current asthma' among children exposed to SHS was consistently and significantly higher than the prevalence of current asthma among non-exposed children in all four waves of the ISAAC study (1995 – 2007). In 2007, 42.9% of SHS exposed children reported wheezing/whistling in their chest over the past 12 months compared to 35.7% of non-exposed children.

9. SHS exposure was associated with severe asthma. The prevalence of severe asthma among children exposed to second-hand smoke was consistently higher than the prevalence of severe asthma among non-exposed children in all four waves of the ISAAC study (1995- 2007). 17.4% of exposed children reported severe asthma compared to 13.6% of non-exposed in 2007.

4.5 Discussion

4.5.1 Level of exposure of children to SHS and trends

A 2010 report highlighted the importance of quantifying the extent of harm caused directly to the health of children by exposure to SHS (Royal College of Physicians, 2010). As a result of differences in the methodologies used in studies of SHS North and South it is inappropriate to directly compare patterns in both jurisdictions.

The estimates derived from the 9 year old cohort of Growing Up in Ireland for exposure of children to SHS at home are broadly similar to those in Canada, where 7% of children under the age of 12 were

regularly exposed to SHS (Health Canada, 2007). The findings from analysis of primary caregivers of 9 year olds in the Republic of Ireland are also similar to findings from UK studies – 77% of smokers reported that they would not smoke at all in a room with children and a further 14% stated they would limit their smoking in the presence of children (ONS, 2009).

Reports on exposure to SHS in the home differed according to respondent i.e. between the adult surveys and the surveys of school-children, and this phenomenon was apparent in both jurisdictions. In general, school-children seemed to report that adults smoked inside their home or that they were exposed in the home at levels considerably in excess of the levels that might be expected based on report from surveys of adults. This phenomenon was directly observed in a secondary analysis of the 2004/05 Canadian Youth Smoking Survey which found statistically significant disagreement between youth and parent responses regarding parental smoking, household rules around smoking and smoking in the home and vehicles. This analysis also observed that youth indicated more smoking in the home than parents indicated (Nowatzki, 2010). Reports of discordant reporting have also emerged in the US where one study found that in 19% of families reporting differed between adults and children in terms of what were the rules on smoking in the home; the authors of this study recommending that in order to better understand home/car bans multiple reporters may be required (Ding, 2011).

In the UK, significant declines in childrens exposure to SHS have been observed. The proportion of children living in a smoke-free home in England rose from 21% in 1996 to 37% in 2007 (Royal College of Physicians, 2010). Furthermore, declines in childrens exposure to SHS in England were evident associated with the introduction of smoke-free legislation (Bauld, 2011). In the Republic of Ireland there was no evidence of increase in SHS exposure at home after the workplace smoking ban of 2004 (Kabir, 2010). This is in keeping with findings in Scotland, the first of the UK jurisdictions to introduce similar smoke-free legislation (Akhtar, 2009) and indeed with the findings from Northern Ireland (Health Promotion Agency, 2009; DHSSPS, 2012). A recent study of smoking bans across Europe concluded that there has been no increase in exposure to SHS in the home as a result of workplace smoking bans (Mons, 2012). The CHETS findings in Northern Ireland demonstrate definitive decreases in children's exposures to SHS in a range of public places following the introduction of smoke-free legislation (Health Promotion Agency, 2009). At best current data can tell us whether exposure occurs and in what setting. However evidence on duration and frequency of exposure is underdeveloped.

A protocol for a systematic review and meta-analysis on the impact of smoke-free legislation on fetal, infant and child health has been recently published (Been, 2013) and this will prove informative to further work in the area.

4.5.2 Inequalities in children's exposure to SHS

In keeping with findings from the UK, children in households where parents have lower levels of education and lower socioeconomic status are more likely to be exposed to SHS in the home. A recent review conducted in the UK found that cotinine levels were 3.1 times higher in children living in households headed by manual workers than in households headed by professional or managerial workers and 2.7 times higher in those living in households whose head of household was unemployed than employed. It is intuitive that children from disadvantaged backgrounds are more likely to be exposed to second hand smoke in the home because they are more likely to be living with at least one adult smoker. However, lower socioeconomic status was found to have a persistent independent and significant effect in a multivariate model. This found that children from a poorer background have higher exposure to second-hand smoke in the home even after allowing for any differences in the likelihood that their parents or carers smoke, or that someone smokes regularly in their home (Royal College of

Physicians, 2010). In other words, disadvantaged children are put at risk by dual factors – that their parent is more likely to be a smoker and also that their parents are more likely to allow SHS in the home.

Analysis of a repeat cross-sectional survey of 10,867 children in primary schools in Scotland, Wales and Northern Ireland concluded that SHS exposure was highest and private smoking restrictions were least frequently reported among lower SES children. Socioeconomic inequality in the likelihood of samples containing detectable cotinine increased after the introduction of the ban. Among children from the poorest families, 96.9% of post-legislation samples contained detectable cotinine compared with 38.2% among the most affluent (Moore, 2012). Other analyses have found that smokers with lower levels of education were more likely to allow smoking in cars carrying children than smokers with higher levels of education (Hitchman, 2012).

The patterns observed would indicate that interventions should focus not just on reducing smoking among adults in poor households but also on modifying behaviour of low income smokers in terms of exposing their children to SHS. A further consideration is that the effect of smoking bans in cars would be evaluated in terms of its effect in reducing overall SHS exposure as well as inequalities in that exposure among the most vulnerable children.

4.5.3 SHS exposure, inequalities and child health outcomes

Findings in this report are similar to the international literature in finding significant associations between mothers smoking in the post natal period (in this case the first 9 months were studied) and the child's risk of respiratory illnesses and middle ear infection. A review conducted by the Royal College of Physicians in the UK estimated a pooled odds ratio for maternal smoking and wheeze in children in the first two years of life at 1.2 (95% CI 1.15 to 2.58). The analysis also suggests that maternal smoking had consistently the strongest effect on wheeze at all ages, when compared to smoking in pregnancy or smoking by other members of the household (Royal College of Physicians, 2010). It has been estimated that smoking by the mother increases the risk of lower respiratory infection in children by about 60%, most of this effect due to bronchiolitis which is about 2.5 times more likely in children whose mothers smoke (Royal College of Physicians, 2010). An analysis of the prevalence of smoking among parents of pre-school children admitted to a Cork hospital with respiratory illness noted that smoking among such parents was significantly higher than the general population. The analysis included objective and subjective measures of smoking intensity and the authors emphasised the importance of appropriate assessment and responses to smoking behaviours in this clinical setting (Shea, 2010).

Estimates of the burden of disease caused by SHS in UK children have been recently published. This found a progressive increase in relative incidence for lower respiratory tract infections, wheeze, asthma and meningitis with increasing socioeconomic deprivation, but not for middle ear disease. Population attributable fractions for SHS exposure and the incidence of the following disease outcomes in 5-16 year olds were estimated - lower respiratory infection (11%); middle ear infections (7%); meningitis (22%) and asthma (10%). Furthermore, over 8000 hospital admissions in children aged 0 to 14 years in England from 2005/6 were in specified diseases attributable to SHS exposure (Royal College of Physicians, 2010).

SHS exposure has been estimated to double the risk of bacterial meningitis (Royal College of Physicians, 2010) but no such association was observed in this reports analysis of the Growing Up in Ireland data but very different methodologies underpin the analyses on meningitis including different age groups of children.

Chapter 5

Discussion and recommendations

"Children are the living messages we send to a time we will not see"

Neil Postman. The Disappearance of Childhood.

5.1 Discussion

This report has presented evidence relating to key windows of tobacco exposure for children on the island of Ireland – smoking in pregnancy, active smoking by children and the exposure of children to second-hand smoke.

Tobacco remains a common feature of childhood. A great many children continue to experience tobacco exposures at a variety of times and in a variety of ways as they grow and develop. However, many trends are encouraging – the proportion of women smoking in pregnancy and the proportion of children currently smoking both showed convincing declines over time. Furthermore, despite the protestations of the tobacco industry that the introduction of the smoking ban would result in increases in the exposure of children to SHS in the home, the evidence here definitively shows that this was not the case. On the contrary, evidence from Northern Ireland was strongly suggestive of declines in SHS exposure for children over time and is suggestive of a slow but definite culture change around the acceptability of exposing children to SHS in other environments. Much work remains in addressing SHS exposure in the home environment.

These findings demonstrate the return from the introduction of the broad-ranging tobacco control measures introduced over the last decade on this island. Measures such as the workplace smoking ban, regulation of vending machines and pack sizes, increases in price and removal of point of sale displays of tobacco appear to be succeeding in denormalising smoking and reducing the appeal and accessibility of tobacco – this is clearly reflected in declining smoking rates in young people. Overall smoking rates in adults in Northern Ireland have declined from 33% in 1983 to 24% in 2010/11, with no evidence of a reduction in smoking rates in the period 2007-08 to 2011-12. As nationally representative data on smoking prevalence in adults in the Republic of Ireland was last collected in 2007, more recent trends in adult smoking are unclear. In both jurisdictions, declines in smoking in adults are less convincing than those observed in children which emphasises the importance of investment in comprehensive tobacco control as well as in smoking cessation.

The evidence on tobacco-related harms in childhood presented in this report does not represent the full spectrum of this burden on the island of Ireland. This burden has never been comprehensively assessed but there were many useful examples of such assessments conducted in the UK and US which include estimates of the health service burden (Royal College of Physicians, 2010). However, the analyses conducted confirm an unhealthy relationship between smoking and early indicators of harm to child growth and development including low birthweight. Further analyses on the role of tobacco in other aspects of early years mortality, morbidity, disability and development is warranted. Ideally, such approaches should encompass a holistic view of child health and development that captures not just measures of disease or disability but also the impacts on child and family life. Significant associations were also observed in terms of communicable disease outcomes (ear and respiratory tract infections) in infancy and non-communicable disease outcomes in middle childhood (asthma, behavioural outcomes). As well as being directly relevant to child health, such outcomes are highly relevant to wider aspects of child wellbeing including the risk of physical and sensory disability and suboptimal child development in the cognitive, physical, language and social and emotional domains. Child health is a critical factor in the social inclusion and optimal development of children. The observed associations between tobacco

exposures and behavioural problems as well as those observed in respect of common childhood asthma outcomes are particularly concerning.

Tobacco-free childhoods are particularly elusive for children born into disadvantaged families. Inequalities in exposure of children in utero were perhaps the most striking in this regard. Such children are at an increased risk of multiple exposures starting in the womb and later compounded by smoking adults in their home and local community and a normalisation of smoking by their peers and siblings. The findings suggest a toxic relationship between smoking and aspects of family and child poverty, educational underachievement and social exclusion. This suggests that the toll of tobacco extends well beyond the issue of health and this demonstrates the importance of placing a premium on child health outcomes and tobacco control within all aspects of policy and services for pregnant women, families and children. Extending the reach of appropriate tobacco control and smoking cessation supports into a range of family support, education, social protection and maternity policies may be beneficial in this regard.

The World Health Organization has termed the tobacco industry 'a vector of social inequity'. The industry employs many measures to facilitate smoking among young and low income smokers through a blend of branding, pricing and promotions aimed at both the 'ultra-low' market segment and young people (Currie et al, 2012). Tobacco companies 'win by volume' by keeping the young and the poor in the market. An analysis of UK tobacco firms selling ultra-low price cigarettes found that the price gap between premium and ultra-low price brands is increasing because the industry differentially shifts tax increases between brand segments (Gilmore, 2013). The industry can attract child smokers by circumventing regulations governing the accessibility of tobacco and utilising an ever-expanding range of distribution channels used by young people. For example the tobacco industry communicates key market themes relating to self-image, independence and femininity/ masculinity through both tobacco packaging and stealth marketing linked to online subscriptions and social media. In this regard, supporting the introduction of standardised packaging in both jurisdictions of the island of Ireland would be particularly timely to reduce the appeal of smoking and support the positive trends in child smoking observed in this report. Wider aspects of the proposed revision of the European Tobacco Products Directive are also of critical concern for example in terms of regulating the sale and supply of electronic cigarettes and protecting children from inappropriate marketing of nicotine-containing products which are only suitable in the context of tobacco harm reduction.

While child health must be valued in its own right, indicators of tobacco exposures in childhood can also reveal important signals about future trends in tobacco-related harm and health inequalities across the life-course. The combined effects of rising childhood overweight/obesity and child smoking would be a particular concern and warrants further analysis. As life expectancy continues to rise, healthy ageing will increasingly depend on the ability of health systems to effectively prevent as well as manage tobacco-related chronic disease and disability, and prevention will need to be effective at an earlier stage in the life-cycle.

Ongoing investment in a suite of appropriate surveys and clinical data collection systems is needed to support the development of evidence-informed policies that have the best chance of protecting health into the future. Data from longitudinal studies of children are particularly important to reaching a deeper understanding of the long-term impacts of childhood exposures to tobacco as well as the factors which predispose some children to taking up smoking. As evidence develops, appropriate assessment of the long-term impacts of exposures in childhood should become increasingly well defined within tobacco control policies on the island. Such information is critical to ensure tobacco control policy becomes ever more effective in protecting children's health through appropriate policies, legislation, services and public awareness campaigns.

5.2 Recommendations

Child-centred tobacco control policy

- The Republic of Ireland and Northern Ireland should fully implement their commitments under the WHO Framework Convention on Tobacco Control
- Tobacco-free childhoods should be a priority within the development, review and implementation of tobacco control policies on the island
- Agree a set of tobacco and childhood indicators and report on progress towards tobacco-free childhoods based upon the three windows of exposure recognised by the WHO.

Enhance understanding of the impact of tobacco control measures on children

- Develop a comprehensive estimate of the child illness burden associated with tobacco exposures based on Irish, UK and international research and including the health service burden
- Review the impact of smoke-free legislation on children's health on the island of Ireland.

Enhanced health information and research

- The National Perinatal Reporting System should include data on smoking to facilitate the development of ongoing surveillance of smoking patterns and the relationship to key neonatal outcomes on a national basis
- Develop a research programme to further explore the full range of child health outcomes associated with various exposures using longitudinal data North and South through a multi-disciplinary approach.

Supporting smoking cessation that protects disadvantaged children

- Integrate and evaluate smoking cessation supports linking them to child and family services located in disadvantaged communities.

Reduce the appeal of tobacco to young people

- Introduce standardised packaging of tobacco on the island of Ireland and evaluate the effects on children's smoking behaviours and perceptions
- Regulate e-cigarettes in a way that prohibits them being marketed in a way that appeals to young people. Monitor young people's use of e-cigarettes through national health surveys of children
- Monitor, report and address tobacco industry activities in terms of their interface with young people through social media and other distribution channels on the island of Ireland
- Complete the passage of The Protection of Children's Health from the Tobacco Smoke Bill in the Oireachtas and support the development of similar legislation in Northern Ireland.

Enhanced attention on smoking cessation for pregnant women

- A comprehensive review of smoking cessation services and structures for pregnant women should be undertaken to include an assessment of the agreement between current practice and best practice standards
- Prioritise smoking cessation in pregnancy within maternity and early years policies and service development
- Resource the evaluation of new evidence-informed models of smoking cessation for pregnant women based on successful models.

References

Akhtar, PC. Haw, SJ. Currie, DB. Zachary, R. Currie, CE. (2009). 'Smoking restrictions in the home and secondhand smoke exposure among primary schoolchildren before and after introduction of the Scottish smoke-free legislation'. *Journal of Tobacco Control* 18:509-15.

Barker, DJP. Martyn, CN. (1992). 'The maternal and fetal origins of cardiovascular disease'. *Journal of Epidemiology and Community Health* 46:8-11.

Bauld, L. (2011). Impact of smokefree legislation: evidence review. University of Bath. [https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/216319/dh_124959.pdf Accessed 30 October 2013].

Been, JV. Nurmatov, U. Van Schayck, CP. Sheikh, A. (2013). 'The impact of smoke-free legislation on fetal, infant and child health: a systematic review and meta-analysis protocol'. *British Medical Journal Open* 3(2) doi: 10.1136/bmjopen-2012-002261.

Bradley, RH. Corwyn RF. (2002). 'Socioeconomic Status and Child Development'. *Annual Review of Psychology* 53:371-99.

Brugha, R. Tully, N. Dicker, P. Shelley, E. Ward, M. McGee, H. (2009). *SLÀN 2007: Survey of Lifestyle, Attitudes and Nutrition in Ireland. Smoking patterns in Ireland: Implications for policy and services.* Dublin: Department of Health and Children.

Carpenter, CM. Wayne, GF. Pauly, JL. Koh, HK. Connolly, GN. (2005). 'New cigarette brands with flavors that appeal to youth: tobacco marketing strategies'. *Health Affairs* 24(6):1601-10.

Casado, L. (2007). 'Brazil: tin cigarette cases as a marketing strategy'. *Tobacco Control* 16:5.

Central Survey Unit Northern Ireland Statistics and Research Agency. (2011). *Young Persons' Behaviour & Attitudes Survey 2010 - Technical Report.* [See http://www.csu.nisra.gov.uk/survey.asp14.htm]

Centers for Disease Control and Prevention US. Department of Health and Human Services. (2004). *The Health Consequences of Smoking: A Report of the Surgeon General.* Atlanta, GA: US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health.

Centers for Disease Control and Prevention US. Department of Health and Human Services. (2012). 'Consumption of Cigarettes and Combustible Tobacco — United States, 2000–2011'. *Morbidity and Mortality Weekly Report.* 6:565-9. [See http://www.cdc.gov/mmwr/]

Central Statistics Office. (2012) *Survey of Income and Living Conditions 2010*. Dublin: Stationery Office.

Clarke, V. (2012) *Smoking Prevalence in Mothers, Low Brithweight and Preterm Births in the Coombe Hospital before and after the introduction of the 2004 National Smoking Ban.* Dublin: Institute of Technology.

Connolly, GN. Alpert, HR. (2008). 'Trends in the use of Cigarettes and Other Tobacco Products 2000-2007'. *Journal of the American Medical Association* 299:2629-30.

Cully, G. (2010). 'Are pregnant women receiving support for smoking dependence when attending routine antenatal appointments?' *Irish Medical Journal* 103(8):239-41.

Currie , C. Molcho, M. Boyce, W. Holstein, B. Torsheim, T. Richter, M. (2008). 'Researching health inequalities in adolescents: the development of the Health Behaviour in School-Aged Children (HBSC) family affluence scale'. *Social Science and Medicine* 66(6):1429-36.

Currie, L. Townsend, J. Roux, ML. Godfrey, S. Gallus, S. Gilmore, AB. Levy, D. Nguyen, L. Rosenqvist, G. Clancy, L. (2012). *Policy Recommendations for Tobacco Taxation in the European Union Integrated Research Findings from the PPACTE project*. Dublin: The PPACTE Consortium. [http://www.academia.edu/1257661/Policy_Recommendations_for_Tobacco_Taxation_in_the_European_Union_Integrated_research_findings_from_the_PPACTE_project Accessed 30 October 2013].

Darrall, K.G. Figgins, J.A. (1998). 'Roll-Your-Own smoke yields: theoretical and practical aspects'. *Tobacco Control* 7:168-75.

Department of Children and Youth Affairs. (2012). *State of the Nation's Children: Ireland.* Dublin.

Department of Health. (2013). *Healthy Ireland – A Framework for Improved Health and Wellbeing 2013-2025.* Dublin: Department of Health.

Department of Health. (2013). *Tobacco Free Ireland - Report of the Tobacco Policy Review Group.* Dublin: Department of Health.

DHSSPS. (2003). *A Five Year Tobacco Action Plan 2003-2008*. [http://www.dhsspsni.gov.uk/tobaccoplan.pdf Accessed 30 October 2013].

DHSSPS. (2009). *Secondary Analysis of the 2007 Young Persons' Behaviour and Attitudes Survey (Drugs, Solvents, Alcohol and Smoking)* [http://www.dhsspsni.gov.uk/secondary_analysis_of_2007_ypbas.pdf Accessed 30 October 2013].

DHSSPS. (2009). *Smoke-free legislation in Northern Ireland – A One Year Review.* [http://www.dhsspsni.gov.uk/smoke-free.pdf Accessed 30 October 2013]

DHSSPS. (2011). *Health Survey Northern Ireland: First Results from the 2010/11 Survey.* Belfast Department of Health, Social Services and Public Safety.

DHSSPS. (2012). *Ten-Year Tobacco Control Strategy for Northern Ireland.* Belfast Department of Health, Social Services and Public Safety.

DHSSPS. (2012). *Fit and Well – Changing Lives 2012 – 2022. A Ten Year Public Health Strategic Framework for Northern Ireland – A Consultation Document.* [http://www.dhsspsni.gov.uk/fit-and-well-consultation-document.pdf Accessed 30 October 2013].

DHSSPS. (2013). *Smoke-free legislation in Northern Ireland – A Three Year Review.* [http://www.dhsspsni.gov.uk/pdf_version_-_smokefree_legislation_-_a_three_year_review_-__june_2013.pdf Accessed 30 October 2013].

Devlin, E. Eadie, D. Angus, K. (2003). *Rolling Tobacco* Prepared for NHS Health Scotland. University of Strathclyde: The Centre for Tobacco Control Research.

Ding, D. Wahlgren, DR. Liles, S. Matt, GE. McKenzie, O. Jones, JA. Hovell, MF. (2011). *Second hand smoke exposure in cars and respiratory health effects in children.* Dublin Tobacco Free Research Institute, Respiratory Medicine, Asthma Society of Ireland and Dublin Institute of Technology.

Donnelly, JC. Cooley, SM. Walsh, TA. Sarkar, R. Durnea, U. Geary, MP. (2008). 'Illegal drug use, smoking and alcohol consumption in a low-risk Irish primigravid population'. *Journal of Perinatal Medicine* 36:70-2.

Dooley, B. Fitzgerald, A. (2012). *My World Survey: National Study of Youth Mental Health in Ireland.* Dublin: Headstrong: The National Centre for Youth Mental Health; UCD School of Psychology, Dublin.

Dorn, LD. Beal, SJ. Kalwarf, H J. Pabst, S. Noll, JG. Susman, EJ. (2013). 'Longitudinal impact of substance use and depressive symptoms on bone accrual among girls aged 11-19 years'. *Journal of Adolescence Health* 52:393-9. [http://www.west-info.eu/files/Study76.pdf Accessed 30 October 2013].

Dorset, R. Marsh, J. (1998). *The Health Trap: Poverty, Smoking and Lone Parenthood.* London. Policy Studies Institute.

ESRI. (2012). *Perinatal Statistics Report 2010.* Economic and Social Research Institute Survey and Statistical Report Series. Dublin.

Funatogawa, I. Funatogawa, Y. Yano, E. (2012). 'Impacts of early smoking initiation: long-term trends of lung cancer mortality and smoking initiation from repeated cross-sectional surveys in Great Britain'. *British Medical Journal Open 2*. e001676 doi:10.1136/bmjopen-2012-001676 [http://bmjopen.bmj.com/content/2/5/e001676.full Accessed 30 October 2013].

Gajewski, J. NicGabhainn, S. (2013) *Short Report - HBSC Ireland: Socio-economic variations in tobacco smoking among school-aged children in Ireland: 2002, 2006 and 2010*. Centre for Health Promotion Studies, National University of Ireland Galway. [http://www.nuigalway.ie/hbsc/documents/2013_sr__jg__hbsc_ireland_ses_and_smoking.pdf Accessed 30 October 2013].

Gavin, A. Molcho, M. Kelly, C. NicGabhainn, S.(2013). *The HBSC Ireland Trends Report 1998–2010: Child Health Behaviours, Outcomes and Contexts.* [http://www.dohc.ie/publications/HBSCtrends2013.html Accessed 30 October 2013].

Gilliland, F. Islam, T. Berhane, K. Gauderman, W. McConnell, R. Avol, E. Peters, J. (2006) Regular smoking and asthma incidence in adolescents. *American Journal of Respiratory and Critical Care Medicine* 174(10):1094-1100.'

Gilmore, AB. Tavakoly, B. Taylor, G. Reed, H. (2013). 'Understanding tobacco industry pricing strategy and whether it undermines tobacco tax policy: the example of the UK cigarette market'. *Addiction* 108(7):1371-26.

Goodman, P. Agnew, M. McCaffrey, M. Paul, G. Clancy, L. (2007). 'Effects of the Irish smoking ban on respiratory health of bar workers and air quality in Dublin pubs'. *American Journal of Respiratory and Critical Care Medicine* 175:840-850.

Grant-Braham, B. Britton, J. (2011). 'Motor racing, tobacco company sponsorship, barcodes and alibi marketing'. *Tobacco Control* [available on line: http://tobaccocontrol.bmj.com/content/early/2011/08/04/tc.2011.043448.short?rss=1 accessed 23 April 2012]

Hauser, RM. (1994). 'Measuring Socioeconomic Status of Child Development'. *Child Development.* 65(6):1541-5.

Hayes, CB. Collins, C. O'Carroll, H. Wyse, E. Gunning, M. Geary, M. Kelleher, C. (2013). 'Effectiveness of motivational interviewing in influencing smoking cessation in pregnant and postpartum disadvantaged women'. *Nicotine & Tobacco Research* 15:969-77.

Health Canada (2007). *Canadian Tobacco Use Monitoring Survey, Summary of Annual Results for 2006.* [See http://www.hc-sc.gc.ca/hc-ps/tobac-tabac/research-recherche/stat/index-eng.php].

Health Promotion Agency for Northern Ireland. (2009). *Childhood Exposure to Tobacco Smoke Study.* Belfast: Health Promotion Agency for Northern Ireland.

Hendlin, Y. Anderson, S.J. Glantz, S.A. (2010). ' 'Acceptable rebellion': marketing hipster aesthetics to sell Camel cigarettes in the US'. *Tobacco Control* 19:213-22.

Hibell, B. Guttormsson, U. Ahlstrom, S. Balakireva, O. Bjarnason, T, Kokkevi, A. Kraus, L. (2012). *The 2011 ESPAD Report – Substance use among students in 36 European countries.* [http://www.idt.pt/PT/Investigacao/Documents/Relatorio/The_2011_ESPAD_Report_FULL.pdf Accessed 30 October 2013].

Hitchman, SC. Guignard, R. Nagelhout, GE. Mons, U. Beck, F. Van Den Putte, B. Crone, M. DeVries, H. Hyland, A. Fong, GT. (2012). 'Predictors of car smoking rules among smokers in France, Germany and the Netherlands'. *European Journal of Public Health* 22:17-22.

HM Government. (2011). *Opening doors, breaking barriers – A Strategy for Social Mobility* [https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/61964/opening-doors-breaking-barriers.pdf Accessed 30 October 2013].

HSCIMS (2012). Rodgers, H. Stewart, B. Keys, L. *Northern Ireland Health & Social Care Inequalities Monitoring System: Fourth Update Bulletin 2012.* Belfast Department of Health, Social Services and Public Safety.

Information Centre for Health and Social Care. (2011). *Infant feeding Survey 2010: Early Results.* York: University of York. [See http://www.hscic.gov.uk/catalogue/PUB00648].

Ino, T. (2010) 'Maternal smoking during pregnancy and offspring obesity: meta-analysis'. *Pediatrics International* 52:94-9.

Jaakkola, MS. Piipari, R. Jaakkola, N. Jaakkola, JJ. (2003) Environmental tobacco smoke and adult onset asthma: a population based incident case-control study. American Journal of Public Health. 93(12):2055-2066.

Jun HJ, Acevedo-Garcia D. 2007.The effect of single motherhood on smoking by socioeconomic status and race/ethnicity. Soc Sci Med. Aug;65(4):653-66. Epub 2007 May 9.

Kabir, Z. Clarke, V. Conroy, R. McNamee, E. Daly, S. Clancy, L. (2009). 'Low birthweight and preterm birth rates 1 year before and after the Irish workplace smoking ban'. *BJOG: An International Journal of Obstetrics and Gynaecology* 116(13):1782-7.

Kabir, Z. Manning, PJ. Holohan, J. Keogan, S. Goodman, PG. Clancy, L. (2009) 'Second-hand smoke exposure in cars and respiratory health effects in children'. *European Respiratory Journal* Sep 34(3):629-33.

Kabir, Z. Connolly, GN. Alpert, HR. (2011). 'Secondhand Smoke Exposure and Neurobehavioral disorders among children in the United States'. *Journal of the American Academy of Pediatrics* 80:548-52.

Kabir, Z. Daly, S. Clarke, V. Keogan, S. Clancy, L. (2013). 'Smoking ban and small-for-gestational age births in Ireland'. *PLoS One* 8(3):e57441.

Kabir, Z. Manning, PJ. Holohan, J. Goodman, PG. Clancy, L. (2010). 'Active smoking and second-hand-smoke exposure at home among Irish children, 1995-2007'. *Archives of Disease in Childhood* 95(1):42-5.

Kabir, Z. Manning, PJ. Holohan, J. Goodman, PG. Clancy, L. (2011). 'Prevalence of Symptoms of Severe Asthma and Allergies in Irish School Children: An ISAAC Protocol Study, 1995-2007'. *International Journal of Environmental Research and Public Health* 8:3192-3201.

Keogan S. (2012). Evaluation of smoking cessation services in Ireland 2012. http//arrowdit.ie/scienmas/78/ accessed 30 Oct 2013

Kelly, C. Gavin, A. Molcho, M. NicGabhainn, S. (2012). *The Irish Health Behaviour in School-aged Children (HBSC) Study 2010*. Dublin. Galway: Health Promotion Research Centre, National University of Ireland, Galway and Department of Health.

Kelly, C. Walker, L. Brennan, G. Molcho, M. NicGabhainn, S. (2008). *Health Behaviour in School-aged Children (HBSC) Ireland Study 2006: Socio-demographic patterns in the health behaviours, risk behaviours, health outcomes and social contexts of young people's lives.* Dublin: Department of Health and Children, Office of the Minister for Children and Youth Affairs, Health Promotion Research Centre and HBSC Ireland.

Leonardi-Bee, J. Britton, J. Venn, A. (2011). 'Secondhand smoke and adverse fetal outcomes in non-smoking pregnant women: a meta-analysis'. *Pediatrics* 127:734-41.

Leonardi-Bee, J. Smyth, A. Britton, J. Coleman, T. (2008). 'Environmental tobacco smoke and fetal health: systematic review and meta-analysis'. *Arch Dis Child Fetal Neonatal Ed.* 93:F351-361.

MacKay, D. Haw, S. Ayres, JG. Fischbacher, C. Pell, JP. (2010). 'Smoke-free legislation and hospitalizations for childhood asthma'. *New England Journal of Medicine* 16;363(12):1139-45.

Markussen Linnet, K. Dalsgaard, S. Obel, C. Wisborg, K. Henriksen, TB. Rodriguez, A. et al. (2003). 'Maternal lifestyle factors in pregnancy risk of attention deficit hyperactivity disorder and associated behaviors: review of the current evidence'. *American Journal of Psychiatry* 160:1028-40.

Marmot, M. Allen, J. Goldblatt, P. Boyce, T. McNeish, D. Grady, M. Geddes, I. (2010). *Fair society, healthy lives: the Marmot Review: strategic review of health inequalities in England post-2010.* London. [http://www.instituteofhealthequity.org/projects/fair-society-healthy-lives-the-marmot-review Accessed 30 October 2013].

McAvoy, H. Sturley, J. Burke, S. Balanda, K. (2006). *Unequal at birth – inequalities in the occurrence of low birthweight babies in Ireland.* Institute of Public Health in Ireland. [http://www.publichealth.ie/files/file/Unequal_at_Birth.pdf Accessed 30 October 2013].

McCrory, C. Layte, R. (2012). *Maternal smoking during pregnancy and child well-being: a burning issue*. ESRI Research Bulletin, 4. [See http://www.esri.ie/].

McCrory, C. Layte, R. (2012). 'Prenatal Exposure to Maternal Smoking and Childhood Behavioural Problems: A Quasi-experimental Approach'. *Journal of Abnormal Child Psychology* 40(8):1277-1288.

McDaniel, PA. Malone, RE. (2007). ' "I always thought they were all pure tobacco": American smokers' perceptions of "natural" cigarettes and tobacco industry advertising strategies'. *Tobacco Control* 16:e7.

McGarvey, C. McDonnell, M. Chong, A. O'Regan, M. Matthews, T. (2003). 'Factors relating to the infant's last sleep environment in sudden infant death syndrome in the Republic of Ireland'. *Archives of Disease in Childhood* 88:1058-64.

Moodie C, Angus K, Stead M and Bauld L (2013). Plain Tobacco Packaging Research: An Update. Stirling, Scotland: Centre for Tobacco Control Research, Institute for Social Marketing, University of Stirling.

Mohsin, M. Bauman, AE. (2005). 'Socio-demographic factors associated with smoking and smoking cessation among 426,344 pregnant women in New South Wales, Australia'. *BMC Public Health* 5:138 doi:10.1186/1471-2458-5-138.

Mons, U. Nagelhout, GE. Allwright, S. Guignard, R. Van Den Putte, B. Willemsen, MC. Fong, GT. Brenner, H. Potschke-Langer, M. Breitling, LP. (2012). 'Impact of national smoke-free legislation on home smoking bans: findings from the International Tobacco Control Policy Evaluation Project Europe Surveys'. *Tobacco Control* doi:10.1136/tobaccocontrol-2011-050131.

Moore, GF. Currie, D. Gilmore, G. Holliday, JC. Moore, L. (2012). 'Socioeconomic inequalities in childhood exposure to secondhand smoke before and after smoke-free legislation in three UK countries'. *Oxford Journal of Public Health* 34:599-608.

National Institute for Health and Clinical Excellence. (2010). *Quitting smoking in pregnancy and following childbirth.* Public Health Guidance. London.

National Office for Suicide Prevention. (2012). *Annual Report* 2012. Health Service Executive, Dublin.

NicGabhainn, S. (2008). *Short Report to HBSC Ireland: frequency of smoking behaviour in middle childhood and adolescence.* HBSC Ireland, Health Promotion Research Centre, National University of Ireland, Galway.

Niedhammer, I. Murrin, C. O'Mahony, D. Daly, S. Morrison, JJ. Kelleher, CC. (2011). 'Explanations for social inequalities in preterm delivery in the perspective Lifeways cohort in the Republic of Ireland' *European Journal of Public Health* 22, 533-8.

Nowatzki, J. Schultz, AS. Griffith, EJ. (2010). 'Discrepancies between youth and parent perceptions of their household environment relevant to smoking: a secondary analysis of the 2004/05 Canadian Youth Smoking Survey'. *Chronic Diseases Canada* 30(3):78-83.

Öberg, M. Jaakkola, MS. Pruss-Ustun, A. Schweizer, C. Woodward, A. (2010). *Second-hand Smoke - Assessing the burden of disease at national and local levels. Environmental Burden of Disease Series, No. 18.* Geneva: World Health Organization. [http://www.who.int/quantifying_ehimpacts/publications/ebd18/en/ Accessed 30 October 2013].

Oken, E. Levitan, EB. Gillman, MW. (2008). '*Maternal smoking during pregnancy and child overweight: systematic review and meta-analysis'*. International Journal of Obesity 32:201-10.

ONS; Office for National Statistics UK; Lader, D. (2006) Smoking-related Behaviour and Attitudes – a report on research using the National Statistics Omnibus Survey produced on behalf of the Information centre for health and social care. Omnibus Survey Report No. 31.

Padley, M. Hirsch, D. (2013). *End Child Poverty - Child Poverty Map of the UK.* End Child Poverty. [See http://www.endchildpoverty.org.uk/why-end-child-poverty/poverty-in-your-area].

Pattenden, S. Casson, K. Cook, S. Dolk, H. (2009). 'Geographical variation in infant mortality, stillbirth and low birth weight in Northern Ireland, 1992-2002'. *Journal of Epidemiology & Community Health* 65:1159-65.

Raisamo, SU. (2011). 'Trends in roll-your-own tobacco use among adolescents in Finland' *Preventive Medicine* 53:431-2.

Royal College of Physicians. (2010). *Passive smoking and children. (2010) A report by the Tobacco Advisory Group of the Royal College of Physicians.* London: Royal College of Physicians. [http://www.rcplondon.ac.uk/sites/default/files/documents/passive-smoking-and-children.pdf Accessed 30 October 2013].

Scheffels, J. (2008). 'A difference that makes a difference: young adult smokers' accounts of cigarette brands and package design'. *Tobacco Control* 17:118-22.

Schneider, S. Schütz, J. (2008). 'Who smokes during pregnancy? A systematic literature review of population-based surveys conducted in developed countries between 1997 and 2006'. *The European Journal of Contraception and Reproductive Health Care,* 13:138-147.

Scientific committee on Tobacco and Health. (2004). *Secondhand smoke: review of evidence since 1998. Update of evidence on health effects of secondhand smoke.* London: Department of Health.

Shea, J. Carolan, E. Ni Chroinin, M. (2010). 'Examining the prevalence of parental smoking in children <5 yr admitted with respiratory illness'. *Irish Medical Journal* 103(5):157.

Siroux V, Pin I, Oryszczyn MP, Le Moual N, Kauffmann F (2000). Relationships of active smoking to asthma and asthma severity in the EGEA study. Epidemiological study on the Genetics and Environment of Asthma. Eur Respir J. Mar;15(3):470-7.

Stanton, A., Grimshaw, G. (2013). Tobacco cessation interventions for young people. Cochrane Database of Systematic Reviews 2013, Issue 8. Art. No.: CD003289 - See more at: http://www.thementalelf.net/mental-health-conditions/substance-misuse/new-cochrane-review-examines-the-effectiveness-of-smoking-cessation-strategies-in-young-people/#sthash.RG3coaGd.dpuf

Sullivan, A. Cara, O. Joshi, H. Ketende, S. Obolenskaya, P. (2010). *The consequences of childhood disadvantage in Northern Ireland at age 5.* [http://www.ofmdfmni.gov.uk/the_consequences_of_childhood_disadvantage_in_northern_ireland.pdf Accessed 30 October 2013].

Tappin DM, MacAskill S, Bauld L, Eadie D, Shipton D and Galbraith L.(2010) Smoking prevalence and smoking cessation services for pregnant women in Scotland. Subst Abuse Treat Prev Policy. 2010 Jan 21;5:1. doi: 10.1186/1747-597X-5-1.

Tyc VL. (2008) .Introduction to the special issue: tobacco control strategies for medically at-risk youth. J Pediatr Psychol. Mar;33(2):113-8. doi: 10.1093/jpepsy/jsm134. Epub 2008 Jan 11.

Tarrant RC, Younger KM, Sheridan-Pereua M, Kearney, J M. (2011). 'Maternal health behaviours during pregnancy in an Irish obstetric population and their associations with socio-demographic and infant characteristics'. *European Journal of Clinical Nutrition* 65:470-9.

U.S. Department of Health and Human Services. (2012). *Preventing Tobacco Use among Youth and Young Adults: A Report of the Surgeon General.* Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention, Health Promotion and Office on Smoking and Health.

US Department of Health and Human Services. (2006). *The Health Consequences of Involuntary Exposure to Tobacco Smoke: A report of the Surgeon General*. Atlanta, GA: US Department of Health and Human Services.

World Health Organization. (2008). *Closing the gap in a generation: Health equity through action on the social determinants of health.* Geneva. [http://whqlibdoc.who.int/publications/2008/9789241563703_eng.pdf Accessed 30 October 2013].

World Health Organization. (2011). *Second-Hand Smoke Tobacco Smoke and Children - Children's Health and the Environment* WHO Training Package for the Health Sector World Health Organization. [http://www.who.int/ceh/capacity/tobacco1.pdf Accessed 30 October 2013].

World Health Organization – Regional Office for Europe. (2012). *Promoting Health and reducing health inequities by addressing social determinants of Health.* Denmark. [http://www.euro.who.int/__data/assets/pdf_file/0016/141226/Brochure_promoting_health.pdf Accessed 30 October 2013].

Wray, RJ. Jupka, K. Berman, S. Zellin, S. Vijaykumar, S. (2012). 'Young Adults' Perceptions about Established and Emerging Tobacco Products: Results From Eight Focus Groups'. *Nicotine & Tobacco Research* 14(2):184-90.

Young, D. Borland, R. Hammond, D. Cummings, KM. Devlin, E. Yong, H-H, O'Connor, R.J. (2006). 'Prevalence and attributes of roll-your-own smokers in the International Tobacco Control (ITC) Four Country Survey'. *Tobacco Control* 15(3):76-82.

Young, D. Wilson, N. Borland, R. Edwards, R. Weerasekera, D. (2010). 'Prevalence, Correlates of, and Reasons for Using Roll-Your-Own Tobacco in a High RYO Use Country: Findings from the ITC New Zealand Survey'. *Nicotine & Tobacco Research* 12(11):1089-98.

Appendices

Appendix 1

Overview of Republic of Ireland and Northern Ireland survey data used in this report (including data that was analysed and data where published findings were utilised)

Republic of Ireland							
Survey title	**Coverage**	**Years**	**Sample size**	**Description**	**Sampling Frame**	**Survey method**	**Analysis conducted for report**
Survey of Lifestyles, Attitudes and Nutrition (SLÁN)	Adults aged 18 and over in private households	1998 2002 2007	6,539 5,992 10,364	Repeat cross-sectional survey. Nationally representative data on the general health, health behaviours and health service use of adults.	Multi-staged sample drawn by electoral division	Self-completed postal questionnaire Face-to-face interview	✔
Health Behaviour in School-aged Children Survey (HBSC)	School -children - age 9 to 17 years	1998 2002 2006 2010	8,497 8,424 10,344	School based survey. HBSC uses cluster survey techniques to select 1,500 young people at each of three ages - 11, 13, and 15.	Cluster sample of students in a given classroom drawn from Department of Education and Science school lists.	Self-completed questionnaires administered in the classroom.	Short report prepared by NUI Galway
International Survey of Asthma and Allergies in Childhood (ISAAC)	School-children aged 13 to 14 years	1995 1998 2002/03 2007	2,671 2,273 2,894 2,809	Ongoing series of national surveys carried out in Irish schools, following an international protocol, on the prevalence of asthma and wheeze among young people in the Republic of Ireland.	Basic sampling frame of 624 post-primary schools Multi-stage stratified random sampling technique to require at least 3000 pupils per wave	A self-administered questionnaire, completed under supervision in the classroom.	✔
Coombe Women and Infants University Hospital Dataset	Pregnant women and their babies attending the Coombe Maternity Hospital Dublin	2000-2009	78,766 singleton live births	Data obtained from the Coombe Maternity Hospital in Dublin.	All singleton live births.	Administrative data	✔

Republic of Ireland							
Survey title	**Coverage**	**Years**	**Sample size**	**Description**	**Sampling Frame**	**Survey method**	**Analysis conducted for report**
Growing Up in Ireland – the national longitudinal study of children – 9 year old cohort	9 year old children, their primary caregivers and teachers	2008	8,568	Growing Up in Ireland is the national longitudinal study of children. This Study examines the factors that contribute to or undermine the well-being of children in contemporary Irish families. A two age cohort longitudinal design was adopted with one cohort aged nine months and the other aged 9 years, with a view to improving and understanding of children's development across a range of domains.	A representative sample of 910 schools participated in the study – from the national total of 3,200 primary schools. The sample of children and their families was then randomly generated from within those schools.	Interviews were carried out using a mixture of CAPI and PAPI (Paper and Pencil Personal Interview). Core questionnaire administered to primary caregiver.	✔
Growing Up in Ireland – the national longitudinal study of children – infant cohort	Parents of 9 month old babies and the babies	2009	11,134		Systematic random sample of 5000 addresses drawn from the LPSA. Fieldwork for the 2005/06 survey was spread over a one year period from February 2005 to March 2006. Fieldwork for the 2001 and 1997 surveys was spread over a 6 month period from January to July	CAPI (Computer Assisted Personal Interviewing) and CASI (Computer Assisted Self Interviewing)	✔
Office of Tobacco Control/MRBI survey	Adults age 15 and over in Ireland	2002 to 2009	1000 adults aged 15 and over in Ireland each month since July 2002 weighted by gender, age, social class and region.		1000 adults aged 15 and over in Ireland each month since July 2002.	Monthly quota survey on Ipsos MRBI's telephone omnipoll. Weighted by gender, age, social class and region.	✔

Republic of Ireland							
Survey title	**Coverage**	**Years**	**Sample size**	**Description**	**Sampling Frame**	**Survey method**	**Analysis conducted for report**
European School Survey Project on Alcohol and Other Drugs (ESPAD)	Regular students (aged 16 in the calendar year of the survey) and present in the classroom on the day of the survey. Includes students enrolled in regular, vocational, general or academic studies.	2011	100,000+ students from 36 countries / regions	The main purpose of ESPAD is to collect comparable data on substance use among 15–16-year-old European students in order to monitor trends within as well as between countries.	The sampling procedure produces a sample that is nationally representative of the ESPAD target population. Data from each participating country should be based on responses from at least 1,200 males and 1,200 females. To obtain a net sample of 2,400 students, it is necessary to draw a gross sample large enough to accommodate attrition in relation to absent students, schools not willing to participate and classes unable to take part on the day chosen for the survey.	Data are collected by group-administered questionnaires. Students completed questionnaires anonymously, with teachers or research assistants functioning as survey leaders.	Published data used

Northern Ireland							
Survey title	**Coverage**	**Years**	**Sample size**	**Description**	**Sampling Frame**	**Survey method**	**Analysis conducted for report**
Northern Ireland Health and Social Wellbeing Survey	Representative sample of adults aged 16 and over in private households.	2001 2005/6	5,205 4,245	The surveys focus on a range of different health issues including cardiovascular disease, mental health and ill-health, physical activity, smoking and drinking.	Systematic random sample of 5,000 addresses drawn from the Land and Property Services Agency´s property database. The LPSA addresses were sorted by district council and ward, so the sample was effectively stratified geographically.	CAPI	Published data used
Young Persons Behaviour and Attitudes Survey	School-children aged 11 to 16 years.	2000 2003 2007 2010	62 schools 6297 pupils 74 schools 7223 pupils 70 schools and 6902 pupils 77 schools and 7616 pupils	School-based survey covering topics, relevant to the lives of young people and smoking variables relating to smoking behaviours and attitudes and smoking rules in the home.	A random sample of post-primary schools representative of students attending post-primary schools in NI.	Selected pupils are assembled in class-sized groups and CSU interviewers administer each pupil with a self-completion paper questionnaire.	✔
Health Survey Northern Ireland	Adults aged 16+	2010/ 2011 2011/ 2012	4,085 4,390	Health Survey Northern Ireland is a new DHSSPS survey that will run annually. The survey covers a range of health topics that are important to the lives of people in Northern Ireland today.	A random sample of 5,650 addresses across Northern Ireland was selected for interview. Measurements of height and weight were sought from individuals aged 2 and over in participating households.	CAPI and where appropriate, Computer Assisted Self Interviewing (CASI) from those aged 16 and over in private households in Northern Ireland.	Published data used

Northern Ireland							
Survey title	**Coverage**	**Years**	**Sample size**	**Description**	**Sampling Frame**	**Survey method**	**Analysis conducted for report**
Infant Feeding Survey	The sample was drawn from birth registration records and covered births occurring between August and October 2010.	2000 2005 2010	1,788 1,800	The main aim of the survey is to provide estimates of the incidence, prevalence and duration of breastfeeding and other feeding practices adopted by mothers from the birth of their baby up to around ten months. The survey also collects information about the smoking and drinking behaviour of mothers before, during and after pregnancy.	In Northern Ireland all births in the sample period were included (for which details were available at the time of sampling).	The initial questionnaire reached the mother when the baby was approximately six weeks old. Up to three reminders were sent out where necessary. An on-line version of the questionnaire was also available.	Published data used
Childhood Exposure to Tobacco Smoke Study (CHETS)	Year seven children before and after the introduction of the smoke-free legislation in Northern Ireland.	2007/8	Pre-legislation n=2176 Post-legislation n=2148	To assess Year seven children's exposure to second-hand smoke before and after the introduction of the smoke-free legislation to prevent smoking in enclosed public places and workplaces in Northern Ireland.	The sampling frame comprised all primary schools in Northern Ireland (excluding special schools). The sample was stratified by school management type, Education and Library Board area, urban/rural area, proportion of free school meal entitlement, and school size.	A repeat cross-sectional survey consisting of two parts: 1. confidential self-completion questionnaire; 2. collection of saliva samples for cotinine assessment.	Published data used
DHSSPS Smoking Cessation Data	Smokers who registered with a smoking cessation service provider.	2005/6 2006/7 2007/8 2008/9 2009/10 2010/11 2010/12	8,702 13,795 21,476 21,272 23,383 34,386 39,204	DHSSPS developed monitoring arrangements whereby providers of smoking cessation services (e.g. GP, pharmacist, nurse) report information via a web-based recording system.	All smokers who registered with a smoking cessation service provider are included in the sample.	Providers of smoking cessation services (e.g. GP, pharmacist, nurse) report information via a web-based recording system.	✔

Northern Ireland							
Survey title	**Coverage**	**Years**	**Sample size**	**Description**	**Sampling Frame**	**Survey method**	**Analysis conducted for report**
Hospital Inpatient Activity data	Each record relates to an individual consultant episode therefore episode data is not equivalent to admission based data.	2004/05 2005 to 2010/11	In excess of half a million each year.	The Hospital Inpatient System (HIS) provides information on admitted patient care delivered by Health and Social Care Hospitals in Northern Ireland.	Each record relates to an individual consultant episode therefore episode data is not equivalent to admission based data.	Patient-level administrative data source.	✔
Millennium Cohort Study Northern Ireland	63 sample wards in Northern Ireland (including groupings of smaller wards)	Since 1 December 2000 in Northern Ireland.	Achieved responses (provisional totals, all productive contacts): 1,955 children 1,923 families interviewed 376 single mothers 1,326 fathers (male partners of main respondent in two parent families)	A multi-disciplinary research project following the lives of circa 19,000 children born in the UK (2000-2001). The project intends to track the children through their early years and into adulthood.	The sample population for the study was drawn from all live births in the UK over 12 months from 1 September 2000 in England and Wales and 1 December 2000 in Scotland and Northern Ireland. Sample was selected from a random sample of electoral wards disproportionately stratified for adequate representation of all 4 UK countries, deprived areas and areas with high concentrations of Black and Asian families.	Computer aided personal interview.	Published data used
Northern Ireland Child Health System	A patient-centred community-based operational system.	Data from 2005-2011 are presented	All children registered with a GP in Northern Ireland	Data based on returns from the four legacy health boards in Northern Ireland	Data is supplemented with information from Registrar Generals Birth Registrations and NIMATS – Northern Ireland Maternity System	Patient-level administrative data source	Published data from the Northern Ireland Health and Social Care Inequalities Monitoring System Fourth Update Bulletin 2012 was used which was based on the NI Child Health System (HSCIMS, 2012)

ISBN 978-0-9570083-3-5

Published November 2013

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