

SMOKING-RELATED DISEASE RISK, AREA DEPRIVATION AND HEALTH BEHAVIOURS

Barbara Eberth, Damilola Olajide and Anne Ludbrook
with Peter Craig from the Scottish Government Health & Social Care Directorates

Background

Smoking-related diseases are an important source of preventable ill health and mortality¹ and significantly contribute to health inequalities. In Scotland, the percentage of smoking attributable deaths between 2000 - 2004 was 15% for the least and 33% for the most deprived population quintile.² Hence, reducing smoking prevalence amongst deprived populations could have a disproportionately large effect on population health and an important impact on health inequalities. However, risk is elevated not only by current or past tobacco smoke exposure (both active and passive) but also by other health behavioural risk factors and deprivation.

Untangling the impact of area based deprivation or individual factors, such as education or occupation, and their impact on health, is complex. They impact health outcomes associated with smoking behaviour directly and indirectly in determining, promoting or perpetuating smoking behaviour; what the Marmot Review refers to as 'the causes of the causes'³. It is possible that, due to the social patterning of smoking behaviour⁴ and the multifactorial influences on health outcomes, as smoking rates decline other risk factors will take over in maintaining health inequalities, albeit at a lower absolute risk level. This possibility could be avoided by explicitly targeting smoking interventions based on other health risk factors, as well as deprivation.

This briefing paper reports on a study⁵ that used administratively linked health records and health survey data from a general population sample to investigate the separate contributions of health behaviours pertaining to alcohol, physical inactivity and weight to smoking-related disease risk measured by risk of hospital admission for smoking attributable diseases across (i) the socio-economic spectrum measured by area deprivation and (ii) smoking status. Additionally the contribution from previous smoking-related disease history is also assessed.

Methods

We use hospitalisation episodes data (Scottish Morbidity Records; SMR) that have been administratively linked to respondents in the Scottish Health Surveys (SHeS), waves 1995, 1998, and 2003. Permission to access the linked datasets was obtained from the Privacy Advisory Committee of the Information Services Division (ISD).

Smoking-related diseases are defined by ICD9 and ICD10 codes. Survey interview, hospital admission, and discharge dates were used to determine if a smoking-related disease event occurred pre or post-survey. Our primary variable of interest is the *first* smoking-related disease event post-survey to model disease risk. In analysis, a smoking-related disease event pre-survey (SRDpre) controls for smoking related disease history. **Smoking status** is categorised into never smokers, never smokers exposed to environmental tobacco smoke (ETS), current and ex-smokers. **Deprivation** is measured by the Scottish Index of Multiple Deprivation (SIMD) and categorised into five ordered quintiles. **Lifestyle behaviours** are self-reported weekly alcohol consumption, physical activity, and Body Mass Index. **Other control factors** are respondent demographic, household, socio-economic and health characteristics.

Statistical analysis was used to model smoking-related disease risk as a function of the above lifestyle behaviours, deprivation and other control factors. The model outputs were then used to predict, post model estimation, disease risk for each smoking status group by:

- Deprivation quintile with and without a pre-survey smoking-related disease event
- Deprivation quintile and a healthy lifestyle behaviour without a pre-survey smoking-related disease event
 - BMI of normal weight, alcohol consumption within recommended limits, and physical activity of moderate or vigorous intensity
- Deprivation quintile and unhealthy behaviours with a pre-survey smoking-related disease event
 - BMI corresponding to overweight or obesity, alcohol consumption above the recommended limit, no sports participation or participation at low vigour

Results

The sample consisted of N=20,315 individuals aged 16 and older, of which 24% experienced a smoking-related disease event post-survey. At the time of interview, 16% were never smokers, 23% were never smokers exposed to ETS, 37% were smokers and 24% ex-smokers. Smoking-related diseases not only occurred amongst smokers or ex-smokers but these groups have the highest prevalence. Just over 11% of the sample, but 18% of ex-smokers, had experienced a smoking-related disease event pre-survey.

Predicted disease risk increases for all smoking status groups with increasing deprivation. However, changes across the deprivation distribution are small for never smokers and never smokers exposed to ETS relative to smokers and ex-smokers. Least deprived smokers have a higher predicted risk relative to the most deprived ex-smokers or never smokers. The same pattern holds in the presence of a smoking-related disease event pre-survey which increases disease risk across the deprivation distribution and for all smoking status groups. However, it affects smokers the most, increasing disease risk for least deprived smokers by 16.84 and most deprived smokers by 17.94 percentage points.

Conditioning on healthy and unhealthy behaviours reveals that healthy behaviours generally reduce smoking-related disease risk across the deprivation distribution for all smoking status groups. Interestingly, predicted disease risk for the most deprived with healthy behaviours is lower than for the least deprived without healthy behaviours for all smoking status groups. Predicted disease risk reductions vary by smoking status group with smokers predicted to experience the smallest relative changes in disease risk conditional on a healthy lifestyle across all deprivation groups. This ranges from a drop of 30% for the least to a drop of 28% for the most deprived deprivation quintile while healthy never smokers exposed to ETS are predicted to experience the highest decline in disease risk across all deprivation quintiles ranging from 34% for the least to 32% for the most deprived quintile.

Unhealthy behaviours are found to increase disease risk above that derived from deprivation and a previous smoking-related disease occurrence for all smoking status groups with smokers being most at risk. This suggests that unhealthy behaviours considerably impact disease risk beyond that derived from a previous smoking-related disease event. Given the multi-factorial causes of smoking-related diseases, our results show that predicted risks are uniformly higher with unhealthy lifestyles and a pre-survey smoking-related disease incidence and greatest for smokers. The change in risk for the least deprived smokers is 3.29 percentage points and similar for most deprived smokers.

Acknowledgements

Receipt of financial support from the MRC National Preventive Research Initiative Phase 2 grant G0701874 is gratefully acknowledged. See <http://www.npri.org.uk>.

Discussion

Targeting policy effort purely on reducing smoking prevalence will help in reducing smoking-related disease risk and the socio-economic inequalities in disease risk. However, it will not eliminate these completely. Other contributing risk factors need to be taken into account to reflect the multifaceted influences on and inequalities in disease risk. Results in this study provide some evidence indicating that, as expected, not only smoking behaviour but also pre-existing disease and other health behaviours are major factors in predicting the risk of a smoking-related disease incidence. Whilst area deprivation is confirmed an important determinant of disease risk across smoking status groups, smoking status makes a bigger difference to disease than does the deprivation quintile.

Healthy and unhealthy behaviours impact considerably on the 'pure' deprivation risk, especially for smokers and ex-smokers. Thus it appears that the main effect of deprivation is realized through the differential adoption of smoking behaviour. However, predicted disease risk has been shown highest in the most deprived regardless of smoking status. Experiencing a smoking related disease event pre-survey elevates the risk of a subsequent event and other health behaviours also play an important role in determining predicted risk. A healthy lifestyle has been found to affect predicted risk more than area deprivation. For unhealthy smokers, the predicted risk reduction from adopting a healthy lifestyle is greater than the gain from quitting smoking. Unhealthy never smokers face similar predicted risks to 'healthy' smokers.

Conclusions

Previous findings for inequalities in mortality also hold for morbidity; differences in smoking-related behaviours across deprivation categories are an important driver of inequalities in risk of adverse outcomes, with predicted smoking-related disease risks disproportionately concentrated amongst individuals from most deprived areas and highest for the most deprived smokers. The results suggest that the impact of smoking interventions in reducing risk across the deprivation distribution can be increased by targeting those with pre-existing smoking-related disease events and with other unhealthy lifestyle behaviours. This suggests that interventions which successfully address both smoking and other unhealthy lifestyle behaviours, or promote other healthy lifestyle behaviours, will have the most impact.

Reference

- 1 World Health Organisation. *WHO Report on the Global Tobacco Epidemic. Warning about the Dangers of Tobacco*. Geneva: World Health Organisation, 2011.
- 2 Taulbut M and Gordon D. *Tobacco Smoking in Scotland: An Epidemiology Briefing*. Edinburgh: NHS Health Scotland, 2008.
- 3 Marmot M. *Fair Society, Healthy Lives. Strategic Review of Health Inequalities in England Post 2010*. London: The Marmot Review, 2010.
- 4 Hiscock R, Bauld L, Amos A et al. Socioeconomic status and smoking: a review. *Annals of the New York Academy of Sciences* 2011; 1248: 107-23. DOI:10.1111/j.1749-6632.2011.060202.x
- 5 Eberth B, Olajide D, Craig P and Ludbrook A. (-2013). Smoking-related disease risk, area deprivation and health behaviours. *Journal of Public Health* [ONLINE] DOI: 10.1093/pubmed/fdt031. Epub ahead of print.

CONTACT US

HEALTH ECONOMICS RESEARCH UNIT

Institute of Applied Health Sciences, Polwarth Building, Foresterhill, Aberdeen AB25 2ZD

Tel: +44 (0)1224 437197/437196 Fax: +44 (0)1224 437195 Email: heru@abdn.ac.uk www.abdn.ac.uk/heru