Cost of smoking to the NHS in Wales

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Key Findings

- Smoking cost NHS Wales an estimated £386 million in 2007/08; equivalent to £129 per head and 7% of total healthcare expenditure in Wales.

- Secondary care accounts for 67% of the total cost and primary care 33%. £235.6 million is spent on hospital admissions and £21.5 million on outpatient attendances, while £43.1 million is spent on GP consultations, £6.2 million on practice nurse consultations and £79.3 million on prescriptions.

- Smoking accounts overall for an estimated 22% of adult hospital admission costs, 6% of outpatient costs, 13% of GP consultation costs, 12% of practice nurse consultation costs and 14% of prescription costs.

1. Introduction

Policies and initiatives designed to reduce the prevalence of smoking in Wales over a number of years have been largely successful[1] and relatively efficient.[2] However, smoking prevalence in Wales, at 24%,[3] remains higher than the prevalence in England, where it is estimated that 21% of the population are smokers.[4] Further, it is estimated that smoking is still responsible for one in five deaths in Wales each year in Wales.[5] Smoking imposes a huge economic burden on society, with estimates suggesting that up to 15% of total healthcare costs can be attributed to the treatment of diseases resulting from smoking in developed countries.[6] Smokers tend to have a lower self reported health status than non-smokers,[7] while smoking has also been recognised as the main reason for the gap in life expectancy between rich and poor.[8]

The legacy of relatively high rates of smoking in Wales continue to be evidenced in relation to the number of people with chronic health conditions, which consume a significant proportion of limited health care resources. This report therefore aims to estimate the extent to which smoking related diseases impact on health expenditure in Wales. The approach employed mirrors the estimation of the costs of smoking in England,[9] undertaken to assess progress in the 10-year period following publication of the report 'Smoking Kills'.[10]

[1] Dolman R Gibbon R, Roberts C. Smoking in Wales: current facts. Wales Centre for Health, November 2007
[2] Phillips CJ, Prowle M. Economics of a reduction in smoking: case study from Heartbeat Wales. Journal of Epidemiology and Community Health, 1993; 47: 215-223.
[3] Welsh Assembly Government. Welsh Health Survey, 2007.
[4] http://www.dh.gov.uk/en/Publichealth/Healthimprovement/Tobacco/index.htm
[5] Dolman R et al. Op Cit
[6] Parrot S, Godfrey C. Economics of smoking cessation. BMJ 2004; 328; 947-949
[7] Parrot S, Godfrey C. Op Cit
[8] Dolman R et al. Op Cit
[9] Callum C. Cost of smoking to the NHS in England 2006.
[10] Department of Health. Smoking Kills: a White Paper on Tobacco (Cm 4177). London: Stationery Office; 1998.

2. Design and methods

The costs associated with smoking in Wales are assessed from the perspective of NHS Wales and therefore include resource utilisation related to hospital admissions, outpatient visits, GP and practice nurse consultations and prescriptions. The estimates relate only to the direct costs of treating smokers for diseases caused by their smoking, and do not include the effects of second-hand smoke. The estimates do not include the impact of smoking related diseases on working days lost by smokers or the carer burden of looking after relatives with debilitating and disabling smoking related conditions.

As stated above, this report mirrors that undertaken for NHS England and further details of the methodologies employed are clearly portrayed in that report[11] and its technical appendix.[12]

The utilisation of current and ex-smokers' health service use is compared with that of never-smokers and the difference between them is attributed to smoking. The relative risks and smoking prevalence for current and ex-smokers together produce an estimate of the proportion attributable to smoking estimated from the following formula:

$$\textit{Attributable proportion} = [p_{cur}(r_{cur}-1)+p_{ex}(r_{ex}-1)]/[1+ p_{cur}(r_{cur}-1)+p_{ex}(r_{ex}-1)]$$

where

p_{cur} = proportion who are current smokers
r_{cur} = relative risk for current compared with never smokers
p_{ex} = proportion who are ex-smokers
r_{ex} = relative risk for ex compared with never smokers

The proportion is then applied to the total number of hospital in-patient admissions, outpatient attendances and primary care consultations to yield an estimate of the numbers

[11] Callum C. Op Cit
[12] Callum C. Technical Appendix to Cost of smoking to the NHS in England 2006.

attributable to smoking in Wales. The cost to NHS Wales is obtained by multiplying the attributable number by estimates of unit cost relating to Wales. Smoking-related diseases and estimates of relative risk were the same as the English report, while hospital admission estimates were derived from Patient Episode Database (PEDW) day-case admissions and bed-days data. Unit costs were provided by the Programme Management Unit, NHS Wales. Primary care utilisation rates were generated from data produced for the Welsh Health Survey 2007[13] and unit costs were taken from published sources – with a slight difference between those used in the English report,[14,15] in relation to cost of outpatient attendances.

[13] Welsh Assembly Government. Welsh Health Survey 2007.
[14] NHS Trusts Financial Returns 2007-08
[15] Curtis L, Netten A: Unit Costs of Health and Social Care 2008. PSSRU Personal Social Services Research Unit, University of Kent at Canterbury; 2008

3. Results

The Welsh Health Survey 2007 is the latest edition for which data relating to smoking prevalence and resource utilisation is available. The prevalence rate for smoking among men was 25%, with 31% being ex-smokers; while for women the prevalence rate was 23% and with 27% being ex-smokers.

3.1 Total Costs

Smoking cost the NHS in Wales £385,703,869 in 2007, more than £7 million spent each week treating diseases caused by smoking, and amounting to £129 per person in Wales and 7% of total healthcare expenditure. Two-thirds of the cost is incurred by secondary care and one-third by primary care; which differs from the English estimates, due to higher prevalence of smokers in Wales and the differentials in prevalence associated with respiratory diseases and circulatory disease.

3.2 Hospital Admissions

The impact of smoking on hospitalisations in Wales amounted to over £235 million in 2006/07, which represent 22% of total expenditure on in-patients. It is known that smoking is a major causal factor in relation to cancer, circulatory disease and respiratory disease. These diseases account for 96% of the expenditure incurred on patients admitted to hospital as a result of their smoking, with respiratory disease accounting for 41%; circulatory disease accounting for 41% and cancer accounting for 14%

3.3 Outpatient costs

The same problems as recorded in the English report apply to Welsh data. Outpatient attendances in Wales for 2007-08 were derived from WAG statistics.[16] Outpatient attendances that can be attributed to smoking represented just under 6% of total cost and assuming that the average cost per attendance was £123 this amounts to £21,508,082.

[16] Welsh Assembly Government Health Statistics.
http://www.statswales.wales.gov.uk/TableViewer/tableView.aspx?ReportId=1039

3.4 Primary care costs

The English report highlighted the significance of smoking-related conditions on primary care. It was not possible however to determine the underlying reason for the consultation with primary care practitioners and therefore aggregated data had to be used.

3.4.1 Consultations with GPs and Practice Nurses

It is known that 17% of the population aged 16+ contacted their GP in the past two weeks and 9% consulted with a practice nurse. GP visits due to smoking cost NHS Wales an estimated £43,093,442, which represents over 13% of all costs in the age-group 16 years and over. Practice nurse visits due to smoking cost NHS Wales an estimated £ 6,179,339, which represents over 12% of all costs in the age-group 16 years and over.

3.4.2 Prescriptions

Smoking is estimated to have accounted for over 14% of prescriptions issued by GPs in Wales in 2007-08, which amounts to £79,346,241.

4. Comments on Allender et al paper

The method used by Allender et al[17] for calculating the health burden due to smoking and the direct cost of smoking to the NHS involved five steps. They were:

- Step 1: Diseases where smoking is a risk factor (as defined by WHO) were identified from the World Health Report for 2002.
- Step 2: Data on years of life lost (YLL), years of healthy life lost to disability (YLD) and disability adjusted life years (DALYs) for the year 2002 were taken from WHO Global Burden of Disease Project for WHO Euro-A Region. Data on mortality for the year 2005 was obtained directly from Office for National Statistics for England and Wales, and the General Register Offices for Scotland and Northern Ireland.
- Step 3: In 1996, the National Health Executive published a study which ascribed 1992–3 NHS costs to different diseases as defined by the International Classification of Disease (ICD 9). NHS total costs were defined in this document as the sum of NHS inpatient and outpatient costs, NHS primary care expenditure, NHS pharmaceutical expenditure and NHS net community care services expenditure. The proportion of total NHS expenditure by disease code in 1992–3 was applied to the total cost of the NHS in 2005–6 for all four countries in the UK to provide an estimate of the total NHS costs for diseases that were identified as being related to smoking. The diseases related to smoking were considered to be those ascribed within the Global Burden of Disease Project including mouth and oral cancer, trachea/bronchus and lung cancer, chronic obstructive pulmonary disease and cardiovascular disease.
- Step 4: Estimates of the burden of disease in the PAFs were calculated by the Global Burden of Disease Project. The PAFs for smoking, by sex and condition and relevant to the UK, were extracted from the World Health Report 2002. The smoking PAFs were calculated using a base theoretical population in which all individuals had no tobacco use.
- Step 5: The burden (in terms of economic cost, mortality and morbidity) of smoking was calculated by applying the PAFs for diseases related to smoking to 2005–6

[17] Allender S, Balakrishnan R, Scarborough P et al. The burden of smoking related ill-health in the UK. Tobacco Control, 2009: 0:1–7. doi:10.1136/tc.2008.026294

disease specific data. Cost data for each of the four countries in the UK were derived using the method described in step 3. Mortality data four each of the four countries in the UK were taken from routinely collected sources.

The differences between the approach employed in this study with that of Allender et al, basically revolve around Steps 1, 3 and 4. The choice of diseases which are affected – fatally and non-fatally – by smoking were derived from those used in the estimation of 1995 UK mortality[18] and Wald and Hackshaw's review,[19] with potentially fatal smoking attributable diseases updated in light of the US Surgeon General's (USSG) review of evidence contained in the 2004 Report on the Health Consequences of Tobacco.[20]

The third step in the process employed by Allender et al[21] assumed that the relative proportions of the respective diseases in terms of overall cost burden that existed in 1992-93 were relevant for 2005-06. This is a significant assumption that warrants closer scrutiny and investigation, as there are many reasons why this would not hold true. The authors recognise this limitation and highlight the differential in their estimates of the cost of treating conditions relative to the figures produced by the Department of Health National Programme Budget Project. In 2005–6 the NPBP reported problems of circulation as costing £6.1 billion, obstructive airway disease £534 million and infectious diseases at £1.2 billion, whereas the Allender et al estimates were £9.7 billion for cardiovascular disease, £1.7 billion for COPD and £834 million for infectious disease in England.[22]

The second major factor in terms of methods relate to the derivation of the attribution factor, where Allender et al used the WHO (2002) population attributable fractions for smoking-related conditions and the latest (2005) mortality data for the UK. In this study, relative risks are for hospital admissions were mainly based on the Cancer Prevention Study II (CPS II),[23]

[18] Callum, C. (1998) The UK smoking epidemic: deaths in 1995. London: Health Education Authority.
[19] Wald, NJ, Hackshaw, AK. Cigarette smoking: an epidemiological overview. British Medical Bulletin:Tobacco and health. Doll,R, Crofton,J (eds.), Volume 52, Number 1, 1996
[20] US Department of Health and Human Services. The Health Consequences of Smoking: a Report of the Surgeon General. Washington, US Department of Health and Human Services, 2004
[21] Allender et al. 2009. Op Cit
[22] Allender et al. 2009. Op Cit
[23] Stellman SD, Garfinkel L. Smoking habits and tar levels in a new American Cancer Society prospective study of 1.2 million men and women. Journal of the National Cancer Institute, 76: 1057-1063, 1986.

a prospective study conducted by the American Cancer Society starting in 1982 of more than 1.2 million people across the United States, while for outpatient and primary care costs negative binomial regression based relative risk estimates were derived for adults aged 16 years and over from individual-reported service use in the 2006 General Household Survey (GHS).[24]

The differences in methodology are likely to explain the differences in the estimate produced in the English report,[25] and on which this study in Wales is mirrored, and that of Allender et al.[26]

[24] Office for National Statistics. Social and Vital Statistics Division, General Household Survey, 2006 [computer file]. 2nd Edition. Colchester, Essex: UK Data Archive [distributor], July 2008. SN: 5804.
[25] Callum Op Cit
[26] Allender et al 2009. Op Cit