ASH Ready Reckoner 2021

Methodology

1- Health Care

1.1- Ambulatory care:

1.1.1- Differential age-group, sex and smoking status stratified rates of primary care events (resource groups: GP consultations, nurse consultations, outpatient visits and GP prescriptions) were derived from the custom analysis undertaken for the NICE ROI tool, itself based on data from the 2006 General Household Survey

1.1.2- Using the data from 2.1.1., the smoking-attributable excess healthcare events (for each resource type and age-group/sex cohort) could be calculated by subtracting the rates for smokers and ex-smokers respectively from the rates for never smokers

1.1.3- 35+ population of local smoking prevalence was derived from Public Health England (OHID) Annual Population Survey (APS) custom analysis including rate and count of current, ex and never smokers.

1.1.4- Outputs from 1.1.2. and 1.1.3. were combined to produce a total number of events for each of the four resource groups

1.1.5- The Personal Social Services Research Unit (PSSRU) Unit Costs of Health and Social Care was used to derive the average cost per event for each of the resource groups (adjusted for inflation)

1.1.6- Outputs from 1.1.4. and 1.1.5. were combined to produce gross estimates of the cost of excess events due to smoking in each resource group.

1.1.7- Outputs from 1.1.6. summed to generate the final, gross figure.

England value: £1.50bn

1.2. Inpatient care:

1.2.1- The total 35yr+ population is derived from PHE/OHID custom analysis using APS data, including rate and count of current, ex and never smokers.

1.2.2- The cost per capita (35+) of smoking-attributable hospital admissions is derived from the LTCP

1.2.3- Outputs from 1.2.1. and 1.2.2. are combined to produce a gross estimate

1.2.4- Local cost per admission is derived from the division of England national cost by the number of hospital admissions (England) using 2019/20 Hospital admission data from LTCP.

1.2.5- Local cost is then calculation by multiplying 1.2.4 Local cost per admission by the number of hospital admissions per area.

England value: £906.17m

2- Costs of Social Care

2.1- Domiciliary Social Care:

2.1-1. The total cost across England of Domiciliary social care for treating people with smoking-attributable conditions is derived from the ASH-commissioned report by Landman Economics, “Cost of smoking to social care”

2.1-2. The total 35yr+ population is derived from APS data, supplied by PHE/OHID is used to derive estimates of the national and local counts of smokers aged 50yrs and above.
2.1-3. Outputs from 2.1.1. and 2.1.2. are used to estimate the average cost of Domiciliary social care in England per smoker aged 50+ +
2.1-4. The output from 2.1.3. is then reaggregated to the local level by using the data from 2.1.2. to provide a total local cost

England value: £625m

2.2- Residential Social Care:
2.2-1. The same procedure is followed as described in 2.1

England value: £565m

3- Productivity costs

In previous years productivity costs only included the costs of smoking-related sickness and absenteeism, smoking breaks and the cost of premature death. This year these costs have been updated to include more comprehensive estimates of the costs of under-employment linked to smoking, not just economic inactivity. In addition, previous analyses of the impact of economic inactivity only included smokers who had applied for incapacity benefit while this analysis includes all unemployed and economically inactive smokers. Up to date information on smoking breaks is not available so this has been removed from the calculations. The estimate of productivity costs comprises three components:

(1) Lost productivity due to smoking-related early deaths (valued at the income lost to those dying prematurely).
(2) Reduced employment levels for smokers compared to non-smokers.
(3) Reduced earnings for smokers compared to non-smokers.

The methodology for each of these components is explained in detail below. Note that for components (2) and (3). Full results from the employment and earnings regressions used are available in (2020) *The impact of smoking history on employment prospects, earnings and productivity: an analysis using UK panel data*.

3.1 Lost productivity due to smoking-related early deaths valued at the income lost to those dying prematurely

The steps used to produce this estimate are as follows:

3.1.1- DHSC's Local Tobacco Control Profiles data are used to produce the England-wide smoking-attributable mortality rate per 100,000 population, age 35 years and over.
3.1.2- The mortality rate from step (i) is applied to estimates from PHE/OHID of the number of smokers aged 35+ to give a gross figure for the estimated number of smoking-attributable deaths in England.
3.1.3- The distribution of all deaths in England is calculated across age and sex based on data from the National Life Tables published by ONS.
3.1.4- The gross number of smoking-attributable deaths (step ii) disaggregated by sex and age (35-89 years) according to the distribution calculated in step (iii)

3.1.5- Employment rates (%) for England, stratified by sex and age group, are calculated from ONS Labour Market Statistics.

3.1.6- The estimates from Steps (iv) and (v) are combined to produce an estimate of smoking-attributable deaths across the UK as a whole in the different age/sex categories, for people in employment only.

3.1.7- For each age/sex category, the number of years of potential productivity remaining is calculated based on analysis of employment rates for smokers and non-smokers by age group using micro-data from the Understanding Society panel survey (the technical specification is known as a hazard model). This data analysis is used to produce an estimate of average remaining years in employment for non-smokers in employment by age.

3.1.8- Outputs from steps (vi) and (vii) are combined to produce an actuarial table of years of potential productivity lost to smoking-attributable early deaths for each age/sex category.

3.1.9- The distribution of earnings from employment and self-employment in the UK (combined) is derived from Family Resources Survey micro-data and broken down for each age/sex category using summary quantile points of the distribution (within-decile means).

3.1.10- The output from step (viii) is combined with the output from step (ix) to produce a gross estimate of lost labour income due to early deaths from smoking stratified by sex and age group.

3.1.11- A discounting table is produced using the years of remaining potential productivity from step (vii) and the assigned discounting factor (3.5%) to calculate an age-, year- and sex-stratified discounting value.

3.1.12- The total 35yr+ population is derived from PHE/OHID custom analysis using APS data, including rate and count of current, ex and never smokers. Using 35+ smoking population (column G Early Death Breakdown) has been used to create % proportion of all 35+smokers (column L) and that the figures shown are simply derived from the national value (£1.62bn) multiplied by the factorisation in column L.

England value: £1.44Bn

3.2 Reduced employment levels for smokers compared to non-smokers

3.2.1- Data from the Understanding Society (USoc) panel survey (Waves 2 through 8) are used to estimate an employment regression for adults aged between 20 and 69 years old in Wave 8 (inclusive) with the following specification:
Regression type: Logistic
Dependent variable: Employment status at USoc Wave 8 (in work / not in work)

3.2.2- Regressor variables:

- Smoking status in USoc Wave 7 (smoker/ non-smoker)
- Smoking status in USoc Wave 2 (smoker/non-smoker)
- Smoking at any point before Wave 2 (smoked before Wave 2 / never smoked)

3.2.3- Control variables:

- Age group (25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69)
- Gender (male, female)

- Ethnicity (White, Black, Indian, Pakistani, Bangladeshi, Other, Mixed)
- Disabled (yes/no)
- Age of youngest child in family (if any): under 1, 2-4, 5-10, 11-16 (interacted with gender of adult)
- Currently pregnant (yes/no)
- Carer for other adult in household (yes/no)
- Highest educational qualification (degree, other HE, A Level, GCSE or equivalent, other, no qualifications)
- Region of residence (9 English regions, Scotland, Wales, Northern Ireland)
- Housing tenure (owner-occupier, private tenant, local authority/housing association tenant)

3.2.4- The results from this regression are used to estimate the employment penalty for current smokers and ex-smokers compared to people who have never smoked. The estimated employment penalty is grossed up to the England population total (for adults aged 20-69) to give a total employment impact of smoking in England.

3.2.5- The employment impact from step (ii) is multiplied by average earnings per employed person in the UK to give a total estimate of the productivity losses arising from reduced employment for current and ex-smokers compared to never-smokers.

England value: £5.69Bn

3.3 Reduced wages for smokers compared to non-smokers

3.3.1- Data from the Understanding Society (USoc) panel survey (Waves 2 through 8) are used to estimate an earnings regression for adults in work (both employees and self-employed) aged between 20 and 69 years old in Wave 8 (inclusive) with the following specification:

Regression type: Ordinary Least Squares

Dependent variable: Log earnings in Understanding Society Wave 8 (adults in work but with zero or negative earnings are omitted from the regression)
Regressor variables: as for employment regression in Section 1.2 above
Control variables: as for employment regression in Section 1.2 above, plus:

- Labour market history: Not working at two or more waves of USoc 5, 6 and 7) (yes/no)

3.3.2- The results from this regression are used to estimate the earnings penalty (in percentage terms) for current smokers and ex-smokers compared to people who have never smoked.

3.3.3- The estimated earnings penalty is grossed up to the population total of smokers in England (for adults aged 20-69) to give a total estimate of the productivity losses arising from reduced earnings for current and ex-smokers who are in work compared to compared to never-smokers who are in work.

England value: £6.04Bn

3.4 Interpreting these productivity costs compared to previous versions of the ASH Ready Reckoner

3.4.1- The previous version of the ASH ready reckoner estimated a total productivity cost to smoking of £8.9bn, comprising the following elements:

- £3.0bn due to early deaths caused by smoking;
- £1.3bn due to smoking-related sickness leading to economic inactivity;
- £1.3bn due to absenteeism from work as a result of smoking-related illnesses;
- £3.3bn due to smoking breaks at work.

3.4.2- Of these elements, the estimate from the new ready reckoner of £1.44bn due to early deaths caused by smoking is a directly comparable update of the £3.0bn from the previous ready reckoner (the reduction from £3bn to £1.44bn is mainly due to a combination of reduced smoking prevalence in the England adult population and reductions in the proportion of deaths attributable to smoking in recent PHE/OHID estimates. The other three elements included in the old ready reckoner sum to around £6bn in total, compared with around £11.7bn for the employment and earnings productivity costs in the new ready reckoner. The increase in these elements of the costs in the new ready reckoner arises mainly because the old ready reckoner was a much less comprehensive measure of productivity costs than the new ready reckoner. The elements of productivity costs that are included in the new estimates, but excluded from the old estimates, could include the following:

- Lower motivation to find work for smokers compared to non-smokers, resulting in lower employment rates.
- Longer term disability (rather than sickness) due to smoking, leading to lower employment rates for smokers compared to non-smokers.
- Lower productivity in work for smokers compared to non-smokers due to smoking being associated with lower propensity to undertake post-compulsory education.

3.4.3- This list is not exhaustive and there may be other causal pathways between smoking, employment and earnings not considered here that are important. To uncover more information about these pathways, further research is essential.

4- Cost of Smoking-related Fires

4.1- Fatalities:

4.1-1. DCLG Fire statistics for the 3 previous annual periods (2018/19,2019/20,2021/21) are used to estimate the annual number of smoking-related fires, deaths and injuries across England, defined as those incidents caused by fires ignited by smokers' materials or cigarette lighters

4.1-2. DCLG data on incidents of all causes attended by local fire and rescue services used to derive aggregate counts of mortality and casualties for the same periods used in 4.1.1. at the F&RS geographical level

4.1-3. The outputs from 4.1.1. are used to estimate the proportion of all England fire casualties occurring in each F&RS area in each of the 3 years

4.1-4. The outputs from 4.1.1. and 4.1.3. are then combined to produce a synthetic estimate of the F&RS-level count of smoking-related deaths across each of the 3 target years

4.1-5. For each F&RS area, the 3 outputs of 4.1.4. are averaged to produce a mean number of annual smoking-related deaths
4.1-6. The total adult smoking population figures for all Local Authority areas are derived from LTCP prevalence data and ONS population estimates; these counts are then aggregated to the F&RS level (which have contiguous borders with LAs)
4.1-7. The outputs from 4.1.6. allow for the relative proportion of F&RS smokers to be calculated for each LA
4.1-8. The outputs of 4.1.5. and 4.1.7. are combined to produce LA-level estimates of the number of smoking-related house fire deaths
4.1-9. Table 22 of the DCLG report "The economic cost of fire" is used to derive the regional cost-per-fire of smoking-attributable fatalities and injuries (most recent data is from 2008)
4.1-10. The total regional costs of casualties as a consequence of fire are also derived from the 2008 DCLG data (Table 9)
4.1-11. The DCLG Fire Stats for 2008 are used to produce regional counts of all fires and fire related deaths and injuries
4.1-12. The outputs of 4.1.9., 4.1.10. and 4.1.11. are combined to produce an adjusted estimate of the regional cost per fatality
4.1-13. The outputs of 4.1.8. and 4.1.12. are combined to produce the total cost of smoking related fire fatalities at the local level

England value: £115.85m

4.2- Injuries:

4.2-1. The same procedure is followed as in 4.1., except the data for smoking-related fire injuries (non-fatal casualties) are used instead

England value: £54.18m

4.3- Property damage:

4.3-1. The number of smoking-related housefires for the selected location is derived from the same procedure outlined in steps 4.1.1. to 4.1.8.
4.3-2. The count of regional fires is derived from 4.1.11.
4.3-3. The total regional cost of fire-related property damage is drawn from Table 9 of the DCLG report "The economic cost of fire"
4.3-4. The output of 4.3.3. is divided by the output of 4.3.2. to produce a regional cost of property damage per house fire
4.3-5. The output of 4.3.4. is then combined with the count from 4.3.1. to produce a total local cost of property damage due to smoking-related fires

England value: £104.06m

4.4- Response costs:

4.4-1. The total annual cost of responding to fires on a regional level is drawn from Table 10 of the DCLG "economic cost of fire" report
4.4-2. This is divided by the output of 4.3.2. to produce a regional response cost per fire
4.4-3. The output of 4.4.3. is then applied to the output of 4.3.1 to produce a total cost of property damage from smoking-related housefires in the selected location

England value: £8.70m

5- Tobacco expenditure

5.1- The estimate of total consumer expenditure on tobacco for 2018-19 is taken from Howard Reed, (2021) The economic impact of a smokefree United Kingdom: technical report. The figure is made up of an estimate for legally purchased tobacco and an estimate for illicitly purchased tobacco, which are summed together.

5.2- Legally purchased tobacco. HMRC provides data on total tobacco receipts by tax year (HMRC, 2020) which has been used to derive total consumer spending on tobacco for the tax year 2018-19 by using statistics on the average price of cigarettes and hand-rolling tobacco. Total legal consumer tobacco expenditure for 2018-19 is estimated at around £14.3 billion.

5.3- Illicit tobacco. The estimate for the value of illicit tobacco purchased in 2018/19 is based on two sources: (i) Estimates for the volume of illicit cigarettes and hand-rolling tobacco (HRT) are from HMRC's Measuring Tax Gaps publication (HMRC, 2020). (ii) Estimates for the average price paid for illicit cigarettes and HRT are taken from surveys by NEMS [explain who NEMS are] of the price paid per pack of 20 cigarettes in Greater Manchester and West Yorkshire. These are the only surveys which asked about the unit price of illicit tobacco.

5.4- Overall estimate of spending on illicit tobacco is approximately £1.3 billion. Summing expenditure on illicit tobacco and legally purchased tobacco gives a total UK consumer tobacco expenditure figure for 2018-19 of approximately £15.6 billion.

5.5- HMRC Tax Receipts Split by England, Wales, Scotland and Northern Ireland states that England represents 76.6% of UK Tobacco Duties. England Tobacco Spend= Total UK tobacco spend *76.6% (15.605bn *76.6%= 11,954bn).

5.6- Using APS 2019 Smoking Prevalence from LTCP it shows for England there is 6,144,703 smokers. To calculate an estimated, spend per smoker= Total England Tobacco spend/number of smokers in England (11,954bn /6,144,703= £1945.42).

5.7- Local tobacco spend was then derived by applying local spend per smoker to number of smokers in each respective area in England.

England value: £11.95Bn

6- Smoking related Litter

5.1- Using data from Table 4. Average daily cigarette consumption. Average daily cigarette consumption for all persons for 2019 is 9.1 cigarettes per day. Using APS 2019 Smoking Prevalence from LTCP it shows for England there is 6,144,703 smokers.

5.2- Number of cigarettes smoked per day= Number of smokers* average daily consumption (6,144,703*9.1= 55,916,797 M)

5.3- Using Table 5. Type of cigarette smoked roughly 57% are packeted, 43% hand rolled. Number of cigarettes smoked per day * % handrolled or packeted. (Packeted= 31,872,574, Handrolled= 24,044,223)

5.4- Using rate of filter use in HRT (0.655) from Shabab, West & Mc Neill (2008), calculate number of Hand rolled cigarettes with filters- (24,044,023*0.655=15,748,966)

5.5- Calculate number of filtered cigarettes smoked per day= Packeted cigarettes + Filtered hand rolled- (31,872,574+15,748,966= 47,621,540)

5.6- Calculate number of filtered cigarettes discarded per day= Number of filtered cigarettes smoked per day * Rate of Cigarette littering (Policy Exchange, 2009)- (47,621,540*0.42=20,001,047)

5.7- Calculate total mass of number of filtered cigarettes (tonnes of waste per day) = Number of filtered cigarettes smoked per day * Rate of Cigarette littering (Policy Exchange, 2009)- (47,621,540*0.171=8,143,283)

5.8- Calculate total mass of number of discarded filtered cigarettes (tonnes of waste per day) = Number of filtered cigarettes discarded per day * Rate of Cigarette littering (Policy Exchange, 2009)- (20,001,047*0.171=3,420,179)

5.9- Multiply daily rates * 365 to get annual figures using same method.

England value: Number of cigarettes smoked per day= 55,916,797

Tonnes of waste per day=8,143,283,

Tonnes of discarded waste per day=3,420,179