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Short Communication

Comparison of methods for estimating the subnational cost of alcohol misuse

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Assessments of the economic burden of alcohol misuse are of use to policy makers, but methods to make accurate estimations at subnational levels remain underdeveloped. A health economic study compared the results of simple and more complex methods for estimating the economic cost of alcohol misuse in the population of North Somerset, England during the 2000/2001 financial year. The findings showed that calculation of the population-attributable fraction of national cost estimates, adjusted for local population age structure and crime rates, may provide an adequate assessment for local policy advocacy. However, target setting and evaluation will require more detailed cost analysis to ensure accuracy.

Health economic 'cost-of-illness' (COI) studies estimating the overall magnitude of the burden placed on society by the misuse of alcohol are popular with policy makers because they provide a readily intelligible assessment of the economic cost of such behaviour. These calculations commonly include not only those costs arising from illness or health care, but also those of police and criminal justice expenditure and lost economic activity.[1] Accurate cost estimates provide justification for resources spent on prevention or harm reduction, provide a baseline measurement for future cost-benefit and target assessment, and can highlight information gaps and further research needs. However, as COI studies do not consider the benefits of alcohol consumption, they cannot be used to gauge the efficiency of expenditure or interventions in this arena.[2]

In England, it has been estimated that the cost of alcohol misuse has spiralled from £0.4–0.7 (€0.6–1.0) billion in 1977 to £18.5–20 (€27.2–29.4) billion in 2001.[2–5] Although there has been some investigation of the costs in specific sections of the national economy,[6] London is the only subnational region to have had a published study conducted.[7]

The most recent national English COI study was conducted on behalf of the Cabinet Office, and applied World Health Organization international guidelines for the conduct of COI studies of substance misuse to data from the 2000/2001 financial year.[2] This analysis preceded the first national alcohol misuse reduction strategy and was influential in creating a political climate conducive to public health action on this topic.[8] However, there are no established methods for gauging the economic cost and relative priority of alcohol misuse for subnational populations. Such estimates could be of considerable use in planning and implementing small-area alcohol misuse reduction strategies through local strategic partnerships;

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non-statutory, multi-agency bodies that bring together public, private, community and voluntary sectors within the bounds of a single local government area.

Several key organizational stakeholders in the North Somerset local strategic partnership wished to prioritize the reduction of alcohol misuse in the local area. These included the local primary care trust (the principal body responsible for organizing local health services and delivering public health targets), the drug action team, the constabulary, the ambulance service and local government. The present study was undertaken as part of the development of the first alcohol misuse reduction strategy for North Somerset.

One option for estimating the local burden of alcohol misuse could be to simply apply a population-based calculation to available national cost estimates. However, considerable inaccuracy may occur with such an approach if local population structure, behavioural characteristics or service provision differ significantly from the national average. North Somerset, for example, has a relatively older and more affluent population profile than the English average, but contains approximately 11% of all the alcohol and drug rehabilitation facilities in the country.

The present study aimed to compare the results of a simple population-based calculation with a more complex method for estimating the economic cost of alcohol misuse in North Somerset during 2000/2001. Both methods were derived from the most recent national study.[2] By so doing, the practicability and validity of contrasting

Table 1 Assumptions, sources of data and valuations for healthcare costs used in the detailed costing method.

Resource area	Data source/s	Valuation data source	Assumptions of estimate	
			Lower	Higher
Hospital inpatient episodes	Hospital episode statistics	Hospital episode statistics	Diseases directly caused by alcohol misuse[2]	Diseases directly and indirectly caused by alcohol misuse[2]
Hospital outpatient visits	General Household Survey[11]	Health and social care unit costs[14]	Excess attendances attributable to heavy drinkers[13]	All attendances attributable to heavy drinkers[13]
Accident and emergency consultations	Hospital activity statistics and Cabinet Office[2]	Health and social care unit costs[12]	n/a	n/a
Ambulance services	Avon Ambulance Service statistics and Cabinet Office[2]	Health and social care unit costs[12]	n/a	n/a
Practice nurse consultations	General Household Survey[11] and Birmingham Untreated Heavy Drinkers Project[13]	n/a	Lower cost valuation[18]	Health and social care unit cost valuation[12]
General practitioner consultations	General Household Survey[11] and Birmingham Untreated Heavy Drinkers Project[13]	Health and social care unit costs[12]	Lower estimate of attributable fraction for alcohol-related consultations[12]	Upper estimate of attributable fraction for alcohol-related consultations[12]
Other primary care service usage	General Household Survey[11] and Birmingham Untreated Heavy Drinkers Project[13]	Health and social care unit costs[14]	n/a	n/a
Specialist treatment services	Alcohol Concern[14]	n/a	Valuation based on per capita expenditure	Valuation based on per treatment centre expenditure
Dependency prescribed drugs	Prescription cost analysis	Prescription cost analysis	n/a	n/a

n/a, not applicable.

approaches to estimating the economic burden of alcohol misuse in one subnational context was assessed.

In 2001, census statistics showed that the 188,564 North Somerset residents accounted for 0.321% of the total English population of 58,789,194. In the simple method, the population-attributable fraction of both lower and upper estimates of national costs was calculated for all costing areas of the Cabinet Office study.[2]

In the second method, the Cabinet Office study was replicated by applying local data to each individual costing area in the national study. Private costs, such as those arising from personal health insurance, were not considered, as the private costs of an individual's behaviour are irrelevant to public policy.[9] All direct and indirect external economic costs were included for: primary and secondary health care; law enforcement and the criminal justice system; and the workplace and the wider economy.

All data were gathered from publicly available statistics and sources specified in Tables 1 and 2. The 2000/2001 financial year was used in the calculation of all costs as this best fit the availability of data from all sources and the adopted methodology.[2] All estimates were adjusted for value at 2000/2001 prices. Published population-attributable fractions were used to calculate the relative proportion of the burden of mortality, morbidity and criminal acts attributable to alcohol misuse in the North Somerset population.[2] Following conventional sensitivity analysis, lower and upper cost estimates were calculated where contrasting assumptions were possible.[10]

The simple population-based calculation method took a competent analyst working with publicly available data on a standard computer software

Table 2 Assumptions, sources of data and valuations for costs of crime, workplace and the wider economy used in the detailed costing method.

Resource area	Data source	Valuation data source	Assumptions of estimate	
Crime				
Anticipation of crime	Home Office statistics and NEW-ADAM arrestee survey[2]	[15]	n/a	n/a
Resulting from crime	Home Office and NEW-ADAM arrestee survey[2]	[15]	Excluding human costs	Including human costs
In response to crime	Home Office statistics, Avon Constabulary statistics and NEW-ADAM arrestee survey[2]	[15,16]	n/a	n/a
Drink driving	Home Office statistics	[11]	Excluding human costs	Including human costs
Workplace and wider economy				
Employee absenteeism	Psychiatric Morbidity Survey, Labour Force Survey[11] and Confederation of British Industry[17]	Annual Survey of Hours and Earnings[11]	Lower estimate of employment rate for heavy drinkers[18]	Upper estimate of employment rate for heavy drinkers[18]
Unemployment	General Household Survey[11] and Cabinet Office[2]	Annual Survey of Hours and Earnings[11]	Male heavy drinkers only	All heavy drinkers
Premature mortality	Mortality Statistics, Labour Force Survey[11,18]	Annual Survey of Hours and Earnings[11]	Human capital approach. Years of life lost from disease related directly to alcohol[2]	Human capital approach. Years of life lost from disease related directly and indirectly to alcohol[2]

n/a, not applicable.

package approximately two hours to complete. The detailed costing method took a competent social researcher working with publicly available data on a standard computer software package approximately two working months to complete.

The detailed costing method found that there were 23 premature deaths directly attributable to alcohol misuse in North Somerset during 2001, with an associated premature loss of 220 life-years.

Table 3 shows that in the case of the lower estimate of total costs, the population-based calculation method overvalued the total cost of alcohol misuse in North Somerset by 82% in comparison with the more detailed costing method. With respect to specific cost areas, crime accounted for the greatest part of this overestimate by far, followed by health care, particularly inpatient episodes partly attributable to alcohol misuse, and finally the workplace and wider economy.

Table 4 shows that the corresponding higher estimates were more concordant, with the population-based calculation method being only 35% higher than that arising from the detailed costing methods. Again, the largest proportion of this overestimate was accounted for by crime, followed by the workplace and wider economy, and finally health care, particularly inpatient episodes.

The results of the population-based calculation were 182% of the lower estimate and 135% of the higher estimate generated by the detailed costing method. These differences in cost estimates may have been due to a range of factors. Firstly, the larger discrepancy between the lower estimates of costs may be due to more conservative methodological assumptions made in the full COI study

Table 3 Lower cost estimates for alcohol misuse in North Somerset, 2000/1.

Cost	Cost to North Somerset (£)		Cost difference between methods	
	Population-based calculation A	Detailed costing B	Absolute cost (£) (A−B)	Percentage (A−B)/A × 100 (%)
Inpatient episodes directly attributable to alcohol misuse	405,227	139,659	265,568	290
Inpatient episodes partly attributable to alcohol misuse	1,104,796	304,600	800,196	363
Hospital outpatient visits	715,186	866,486	−151,300	83
Accident and emergency visits	979,692	909,446	70,246	108
Ambulance services	658,050	387,327	270,723	170
Practice nurse consultations	61,418	74,414	−12,996	83
General practitioner consultations	89,245	108,126	−18,881	83
Other primary care service usage	113,276	148,370	−35,094	76
Specialist treatment services	308,658	294,988	13,670	105
Dependency prescribed drugs	5136	2698	2438	190
Total health care	4,440,684	3,236,114	1,204,570	137
Costs in anticipation of crime	4,797,686	840,000	3,957,686	571
Property/victim and lost output	11,206,007	2,321,456	8,884,551	483
Costs in response to crime	5,618,527	1,013,371	4,605,156	554
Drink driving	1,685,899	4,206,042	−2,520,143	40
Total crime	23,308,119	8,380,869	14,927,250	278
Lost output due to employee absenteeism	3,895,759	3,339,610	556,149	117
Lost output due to unemployment	5,540,632	5,636,014	−95,382	98
Lost output due to premature mortality	7,236,373	3,845,590	3,390,783	188
Total workplace and wider economy	16,672,764	12,821,214	3,851,550	130
Total costs	44,416,430	24,438,197	19,978,233	182

because of data limitations compared with the national study.[2] Secondly, the greater concordance in estimates of the upper limit of costs may be explained by the inclusion of the intangible costs of crime, which represented the largest part of the difference between upper and lower cost estimates in the full COI study. Thirdly, North Somerset is a largely affluent and elderly population relative to the national average, and such population differences are not taken into account by the simple population-based calculations. In particular, a relatively low crime rate in North Somerset may partially account for the overestimation of associated costs in the population-based calculation.

The results of the detailed costing element of the study were fed back to representatives of the local strategic partnership to refine cost estimates for the development of priorities in the North Somerset alcohol misuse reduction strategy. Two major limitations were identified that show the usefulness of local data in assessing the burden of alcohol misuse in small areas.

Firstly, although local-level data were used following the national study's costing areas, organizational stakeholders felt that such data were not necessarily representative of the true local situation. Available data on alcohol-related crime, for example, were felt to seriously underestimate unreported, low-level activity such as routine verbal cautions that took up valuable local policing resources. Secondly, although data on alcohol rehabilitation were adjusted to take account of the high number of local treatment beds, it was felt that this still underestimated the true costs as measured by unmet service demand caused by ex-patients remaining in the area following relatively short periods of treatment.

In conclusion, the findings of this study showed that differences in population and service provision may lead to considerable under- or overestimation of the costs of alcohol misuse when the population-attributable fraction of national cost figures are calculated. Nevertheless, such an estimate may be usable if the purpose is to provide a quickly calculable crude estimate of the economic burden

Table 4 Higher cost estimates for alcohol misuse in North Somerset, 2000/1.

Cost	Cost to North Somerset (£)		Cost difference between methods	
	Population-based calculation A	Detailed costing B	Absolute cost (£) A−B	Percentage (A−B)/A × 100 (%)
Inpatient episodes directly attributable to alcohol misuse	405,227	139,659	265,568	290
Inpatient episodes partly attributable to alcohol misuse	1,283,437	304,600	978,837	421
Hospital outpatient visits	1,430,373	1,732,889	−302,516	83
Accident and emergency visits	979,692	909,446	70,246	108
Ambulance services	658,050	387,327	270,723	170
Practice nurse consultations	61,976	75,090	−13,114	83
General practitioner consultations	156,179	189,234	−33,055	83
Other primary care service usage	113,276	148,370	−35,094	76
Specialist treatment services	308,658	856,667	−548,009	36
Dependency prescribed drugs	5136	2698	2438	190
Total health care	5,402,004	4,745,980	656,024	114
Costs in anticipation of crime	4,797,686	840,000	3,957,686	571
Property/victim and lost output	11,206,007	2,321,456	8,884,551	483
Human costs for victims of crime	15,018,291	2,713,011	12,305,280	554
Costs in response to crime	5,618,527	1,013,371	4,605,156	554
Drink driving	1,685,899	20,442,992	−18,757,093	8
Total crime	38,326,410	27,330,830	10,995,580	140
Lost output due to employee absenteeism	5,732,764	4,508,923	1,223,841	127
Lost output due to unemployment	6,913,445	6,579,569	333,876	105
Lost output due to premature mortality	7,966,611	4,457,561	3,509,050	179
Total workplace and wider economy	20,612,820	15,546,053	5,066,767	133
Total costs	64,336,096	47,622,863	16,713,233	135

of alcohol misuse to a local community; for example, when initially advocating a local alcohol misuse reduction strategy with local policy makers. If this is the case, the findings of this study suggest that adjusting costs for the age profile of the local population and particularly for local crime rates may improve the accuracy of the estimate. More detailed study of local costs can give a better assessment of the true burden of alcohol misuse as local circumstances can be taken into account more inclusively. When accurate measurement of the economic costs of alcohol misuse is needed, for example when setting targets or evaluating the effectiveness of interventions, detailed study of cost areas is warranted.

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None declared.

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