**Who Bears the Cost of NICE Public Health Recommendations?**

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**Abstract**

**Background**

In the UK, NICE issues guidance on public health initiatives. Failure to report which sectors of the economy are affected by their implementation precludes the appropriate accounting for the full opportunity costs, and has the potential to result in erroneous decision making and inefficient budgetary planning.

**Sources of data**

We reviewed all NICE public health guidances available at the time of research, categorising the sector on which the cost burden of the public health initiatives fall and the extent to which this burden was estimated.

**Areas of agreement**

The majority of guidances were determined to be associated with a cost burden on the NHS (n=48) and local authorities’ public health spend (n=47).

**Areas of controversy**

Explicit identification and quantification of cost burden by sector of the economy was reported for only eight guidances.

**Areas timely for developing research**

Future NICE guidance should report disaggregated costs across the sectors where they fall. Further research is needed to conceptualise the opportunity cost of financial burdens falling on non-health budgets before optimal decision making in public health is possible.

1. **Introduction**

The role of public health interventions in improving the health of the population, both now and into the future, is well supported, being engrained in both the 2014 NHS Five Year Forward View and the 2012 Health and Social Care Act. As a means of reducing current ill health and the prevalence of future disease through reduction in known risk factors, such initiatives have been argued to typically be highly cost-effective, addressing population health challenges in the Western world such as increased cancer incidence and rates of diabetes prior to the disease emerging.[1] Unlike medical technologies, public health interventions are highly likely to impact on the budgets and outcomes of interest of sectors beyond the health sector. Furthermore, many are delivered and funded outside of the health sector, for example with school based campaigns to increase awareness of skin cancer risks or the introduction of 20mph speed limits to reduce road traffic accidents. Accordingly, adopting a narrow health sector perspective for the economic evaluation of public health interventions may be insufficient.

It may be as a consequence of the relative abundance of economic evaluations of medical interventions compared to those of public health interventions, that appropriate methods for dealing with impacts across multiple sectors are less well known and less established. A recent review suggested that of 18,743 evaluations listed on the NHS Economic Evaluation Database 15.7% concerned public health initiatives, highlighting that many of these overlooked costs and outcomes outside of the healthcare setting or arbitrarily aggregated them.[2] Aggregation of non-healthcare costs (e.g. to local authorities) with those that fall on the NHS ignores the siloed nature of budgeting within the public sector. Furthermore, it fails to reflect the potential differences in the value of what is forgone to fund new investments or what may be lost by the removal of current services, i.e. the ‘opportunity costs’ of each separate budget on which costs fall.[3] Evaluations which overlook costs imposed on other sectors of the economy misestimates the true impact of a public health intervention.

In general, economic evaluations of medical interventions have utilised a cost-effectiveness threshold to represent the value of the opportunity costs, below which a new intervention can be considered a worthwhile investment. The cost-effectiveness threshold for the UK health sector, based on NHS budget was previously estimated by the Department of Health to be £25,000 per additional quality adjusted life year (QALY),[4] but more recently has been estimated at £13,000 per QALY (Claxton).[5] This gives the productivity of the health sector, and implies that reducing the NHS budget by £13,000 would result in the loss of one QALY. In the case of public health, many interventions involve resources from outside the health care sector, the opportunity costs faced by each sector should therefore be reflected in any consideration of cost-effectiveness. Empirical estimates for the value of outcomes forgone by reducing spend in other public sector budgets may not be available, and it is possible that the productivity of each in producing health may differ. Furthermore, each sector uses public funds to produce outcomes of value outside of health, and these should not be ignored.

In the UK, the National Institute for Health and Care Excellence (NICE) has been at the forefront of efforts to produce evidence on the cost-effectiveness of public health activities.[6] The NICE Public Health Advisory Committee (PHAC) makes recommendations, based on consideration of the evidence, as to which public health activities represent good value for public sector investment. This guidance is produced to inform a range of stakeholders, including the English NHS, local authorities and the Department of Health. A study by Owen et al.[1] showed that many public health interventions considered by NICE were deemed cost-effective. However, the study focussed on the reporting of estimates of cost-effectiveness which often incorporated cost borne by a number of stakeholders, and which were compared against health outcomes alone, failing to reflect the outcomes of interest to other stakeholders who faced some of the cost burden. Without making explicit the multi-sectoral impacts and potential differences in opportunity costs this could result in erroneous decisions.

This study has two aims: first, to review the previous NICE public health guidelines to evaluate to what extent NICE public health recommendations impose costs across multiple sectors and, if so, whether these cost were appropriately reported at a sector level, and second, to provide recommendations for the estimation and reporting of sector specific costs in future evaluations of public health initiatives.

1. **Methods**
   1. Overview

In order to evaluate the extent to which current NICE public health guidelines report the sector specific cost impact of recommended public health interventions a full review of guidelines published at the date of review was conducted. Data were extracted on the sectors which would be expected to bear the cost of adherence to the NICE public health initiatives, as well as any attempts in the guideline evaluation to estimate the scale of the total and sector specific costs.

* 1. Review

This review considered all 65 NICE public health guidelines published between the start of NICE’s publication of public health guidelines (March 2006) and the date of review (July 2016). The guidelines were accessed via the NICE website in the period of 1st July – 20th September 2016. At the time of review four guidelines had been withdrawn after being replaced by new guidelines.[7-10] One guideline was found not to present any intervention recommendations.[11] This gave a full set of 60 guidelines that were included in the review.

The review sought to identify where the costs of interventions recommended within the NICE public health guidelines fell and categorise the burden by sector. Where multiple recommendations were issued in a single guideline the accumulated cost burden of all of the recommendations was used to reflect the total impact of the guideline. Categories were determined based on the costs reported during the guideline discussion of implementation or in the associated economic evaluation.

Costs were categorised into the following five sectors led by definitions used in some of the guidelines:

1. Costs falling on the health sector (NHS) (e.g. costs of providing health care services and interventions delivered);
2. Costs falling within the remit of the public health budget of local authority (‘LA PH’ hereafter) (e.g. costs of NHS Health Check);
3. Costs falling on the non-public health budget of local authority (‘LA non-PH’ hereafter) (e.g. costs of transport services and education services provided by local authority);
4. Costs falling on the wider public sector (e.g. costs of transport and education services which are provided by central government such as Department of Transport);
5. Costs falling outside public sector. This category is defined as costs incurred by private sector which may include out-of-pocket payment by individuals or costs falling on employers.

Consideration was given to the inclusion of a sixth category to include the Third Sector, however, the review found no consistent consideration of it as an independent sector in the NICE guidelines.

The review was conducted independently by two researchers, with any disagreements resolved through discussion. One of the reviewers concurrently conducted a full review of the guidance documents to determine whether sufficient information was available within the economic evaluations to present an estimate of total cost of the recommendations and the costs disaggregated by sector.

1. **Results**

The results of the review are shown in Table 1. An overview of the overlap across sectors is presented in the Venn diagram in Figure 1 in which local authority non-public health spend is combined with wider public spend into 'other public sector' to encompass all public health spend not directly targeted at public health expenditure and for visual clarity.

NHS spend represented the largest frequency of burden (n=48), followed by local authority public health spend (47), local authority non-public health spend (32), wider public spend (23) and private sector spend (14). As would be expected the majority of recommendations impacted both the NHS spend and local authority public health spend (n=38), with only seven of the 60 considered to result in a cost burden falling on neither of these sectors. The most frequent combination of cost burden categories across the five sector categorisation (shown in Table 1) was found to be burden across NHS and local authority public health spend (n=11). In the four sector categorisation (shown in Figure 1), the most frequent combination was that of all public sector categories (NHS, local authority public health and other public sector spend, n=19). Only four guidelines were restricted to NHS spend alone.

Figure : Venn diagram of sector burdens **[here]**

Table : Cost burden of NICE public health guidance **[here]**

The in depth review of the guidance documents found that 51 of the 60 produced a quantitative estimate of the cost of the public health recommendations made. Of these, 43 failed to report the cost of the interventions disaggregated by the sectors that would bear the cost, consisting of three distinct groups:

* those which considered a total cost burden that aggregated costs across multiple sectors **with** a clear statement of the sectors included (n=16);
* those which considered a total cost burden that aggregated costs across multiple sectors but **without** a clear statement of the sectors (n=13);
* those which considered a total cost burden to the NHS alone, despite acknowledging a cost burden on wider sectors (n=14), and;

The remaining eight guidelines contained some attempt to report the cost of the intervention disaggregated by the sector which would bear the cost (PH13, PH29, PH31, PH43, PH48, PH50, NG16, and NG48).

Three of the nine guidelines that failed to provide a quantitative estimate of the cost of recommended interventions qualitatively reported a number of possible resource use implications or presented specific non-NHS sector unit costs without associated estimates of quantity (PH24, PH28, and NG6). These included the production of a table in NG6 of expected direction of cost burden on a number of sectors (NHS, Local Authority, Government, and Householder).

1. **Discussion**
   1. Key Findings

This study reviewed all of the published NICE public health guidelines and examined the recommendations made to identify where the costs of public health interventions fall. The main findings of the review were that public health interventions generate multi-sectoral costs but that the majority of NICE guidelines do not report costs by sector, and that there appears to be no consistency as to the approach taken to evaluate multi-sectoral burdens.

This review identified that the majority of the costs associated with guideline recommendations fall on the health sector and Local Authority Public Health costs, but that they frequently fell on other sectors as well. This highlights that NICE public health recommendations have cost implications for multiple sectors.

Despite the majority of recommendations having cost implications for different budgets (and therefore decision makers), only eight of the accompanying economic evaluations attempted to report the full set of total costs according to the appropriate sectors in which they fall. Outside of the health sector there were no attempts to reflect sector specific opportunity costs of adherence to the NICE recommendations.

* 1. Strengths and Limitations

The primary strength of this study is that it is the first to explicitly consider where the costs of adherence to historic NICE public health recommendations fall. In doing so it provides a potential categorisation against which the structuring of public health cost burdens could be considered in order to more accurately reflect independent budget constraints and sector specific opportunity costs. However, there are potentially many different ways to categorise the siloed budgets that are impacted by public health activities, with the five implemented here representing arguably the most aggregated form.

Reviewers’ judgement played an important role in cases where distinction between whether services were provided at NHS, local authority, or central government level was not clear, especially due to the changing budget responsibility implications of the 2012 Health and Social Care Act. Another limitation is the possibility of overlooking information presented in the appendices and other documents such as NICE committee board discussion, where there may be additional information or issues which have been resolved in the committee meeting. Similarly, other evaluations of public health interventions exist outside of the NICE framework, and as such are not covered by this research.

Due to a lack of clarity in the guidelines and understanding of the service provision in the Third Sector it was excluded from the categorization of budgetary areas. Undoubtedly, NICE guidelines, if implemented, will have budgetary implications for the Third Sector, as it may directly provide the interventions recommendations or currently provide services in an area of public health which may be replaced by national investments.

This paper has focused on the cost burden of public health guidelines, however, clearly the consideration of opportunity cost across multiple sectors requires acknowledgement of the different outcomes of interest. The clarification, definition, and estimation of the comparative value of cross sector outcomes represents the most significant challenge to the construction of efficient cross sector decision making.

* 1. What This Study Adds

This study found that there has been a consistent failure in NICE public health guidelines to reflect the issue of sector specific budget constraints and opportunity costs in the estimation of the cost burden of public health recommendations.

* 1. Implications for the future economic evaluation of public health interventions

Failing to provide sufficient detail to inform the full set of stakeholders who bear the costs of adherence to recommendations could result in lower than optimal uptake of public health guidance due to the challenges associated with financial planning for those stakeholders.

In addition, a failure to reflect the siloed nature of public budgets risks an inaccurate interpretation of the cost-effectiveness results reported, and as such the potential failure to recommend the most cost-effective policy option across the entire set of sectors. Furthermore, if cost-savings associated with a sector other than that which bears the cost of the intervention are considered in the analysis, without the fair reflection of the different budgets involved or redistribution of funding, there is the potential that interventions are invested in that are not cost-effective to the respective sector.

While the lack of a common objective or any estimates of the comparative value of the outcomes across the different sectors renders the definition of a public health cost-effectiveness threshold unlikely, we conclude that it is still possible to improve the consistency, robustness and transparency in the conduct of public health evaluations. Our recommendations would be for NICE to implement in their reference case for public health evaluations (and any NICE evaluation which has costs of outcomes falling on non-NHS sectors) the required reporting of costs across the sectors where they fall, to a minimum level of granularity as presented in the five sector structure in this article, and ideally to a level of budgetary independence (e.g. NHS, Local Authority, Department for Education).

In addition, those undertaking economic evaluation of public health interventions could seek to utilize an adapted CHEERS checklist, incorporating elements of sector specific costs and outcomes to the existing items 11 (outcomes) and 13 (costs). For example, a new item 11c ‘Identification and quantification of all relevant outcomes according to the appropriate categorization of where the outcomes fall’ and 13c ‘Identification and quantification of resource items and costs of intervention according to the appropriate categorization of where the costs fall’ could be introduced and implemented for all new public health guidelines.

1. **Conclusions**

The costs of many public health interventions, including those recommended in NICE public health guidelines, are borne by multiple sectors. However, identification and quantification of all costs have not been conducted by most of the economic evaluations and fail to be explicated in the NICE reference case. This shortfall risks not only a lack of clarity for stakeholders about the scale of the cost of adherence they face; but the potential for inefficient recommendations. Aggregating total costs where they fall across multiple siloed budgets results in cost-effectiveness estimates that do not accurately reflect opportunity costs, unless assumed to be the same for all sectors. In the case that opportunity costs differ between sectors, a simple summation of all costs fails to reflect the true investment decision faced by sector specific decision makers.

By identifying and reporting all relevant costs associated with public health interventions, NICE would create the conditions for an open and consistent discussion between different stakeholders and budget holders, and improve the ease with which new public health guidelines can be implemented.

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