Health education and promotion spending in England: a note on the potential utility of the Health Service Indicators dataset

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Abstract

Health promotion and education (HPE) needs to be evaluated on a national scale. This note draws attention to the existence, possible uses and pitfalls of a little known dataset which provides information on English district health authorities' HPE expenditure for the first time. Despite its problems, cautious uses of this data has the potential to significantly increase the knowledge and understanding of local level HPE in England.

Introduction

Health promotion and education (HPE) needs to be evaluated on a national scale. Despite increasing numbers of micro-level evaluations, very little is known about HPE as a whole in England. Even basic information such as the size and distribution of expenditure across the country, which is crucial if the contribution of HPE is to be properly evaluated, is not widely known. The purpose of this note is to draw attention to an under-used and valuable national level dataset and to discuss some of its possible applications and its problems.

The Health Service Indicators (HSI) dataset: some possible applications

The HSI is an annual dataset collated by the Department of Health and contains a wealth of information—mainly on hospital treatments, mortality and other outcomes. It is designed to be a management tool for health authorities and health purchasers to assist them in 'benchmarking' their performance relative to similar units throughout the country. However, the dataset is also available to non-NHS researchers and contains some intriguing information for HPE researchers. The most high profile provider of HPE in England is the Health Education Authority with an annual budget of roughly £30m for national media campaigns, local support and evaluations. HPE funded at a local level, primarily through health authorities, has a much lower profile. However, the HSI dataset contains the variable 'health promotion and education spending per 1000 district population' which, if used creatively and cautiously, could shed much needed light on locally funded HPE activities in a national context. Examples of how this data could be used are set out in the rest of this section.

Application 1: information on total health authority spending on HPE in England

Even something as simple as an estimate of total health authority spending on HPE in England provides useful information not previously available. In 1993/94, 126 health authorities submitted HPE expenditure figures, covering over 85% of the population. Across these districts mean HPE expenditure was £1797 per 1000 residents (95% CI: 1533–2062)—a total recorded spend of £73.5m. Grossing up to the whole of England implies a total spend of £84.7m (95% CI: £74.4–100.0m) by district health authorities on HPE in 1993/94.

This total is almost three times that of the
Fig. 1. HPE spending by English DHAs by region 1993/94.

Health Education Authority and illustrates the importance—despite the low profile—of local level HPE.

Application 2: information on the distribution of local spending on HPE in England

It may be of more interest to researchers, policy makers and HPE professionals alike to look at how this total is distributed. A cursory inspection of Figure 1 shows that it varies dramatically across the 14 old English health regions. In Wessex every 1000 residents received just £752 for health promotion in 1993/94 as opposed to £3257 in the neighbouring South West region—over four times as much. This is a statistically significant difference at the 95% level. However, these are the only significant differences between regions despite the seemingly large contrast in spending in Figure 1. Breaking the data down further, to district level, gives more insight into why this is so.

Figure 2 shows a histogram of spending by the 126 districts for which we have information. The data is fairly skewed, with high variance, the bulk of authorities spending up to £3000 per 1000 residents, but with a number spending appreciably above this figure. It is not surprising that the tests reported above are insignificant—there is simply too much variation in the data.

Application 3: is the distribution of local spending on HPE in England equitable?

The question which immediately springs to mind is to ask whether this distribution is equitable—can such significant variation be justified? Although a full investigation is beyond the scope of this note an indication can be gleaned from a method borrowed from the economics literature on inequality. The Lorenz curve shows the degree of dispersion between any two variables. In economics it
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Fig. 3. A Lorenz curve of local HPE spending versus population in England 1993/94.

has traditionally been used to illustrate the amount of inequality in income distribution in a population or the distribution of sales by firms in an industry (an indication of the extent of monopoly). Figure 3 is a Lorenz curve showing the distribution of HPE spending in England by population. The x-axis shows the cumulative population in our 126 districts, ranked by district in ascending order. The y-axis is the corresponding cumulative proportion of total expenditure in the same districts.

If HPE expenditure were distributed evenly across England—in relation to population—a plot of these series against each other would result in the 45% line marked on the graph. As Figure 3 clearly shows this is not the case. The Lorenz curve lies below the 45% line—indicating substantial inequality in the distribution of HPE expenditure in relation to population. For example, in 1993/94 half the population received somewhat less than 20% of total expenditure, the other half receiving the remaining 80%.

Application 4: is the distribution of HPE spending in England related to—‘need’?

Of course this may not be cause for concern if the half of the population which is receiving the 80% is more ‘in need’ than the other half. More complex models of the need for HPE should be constructed.

In particular, much thought should be given to the needs variables that HPE are supposed to be related too. Obvious candidates include measures of health knowledge, attitudes and beliefs, deprivation, empowerment, decision-making skills, and the like in a district. More useful Lorenz curves could then be constructed for ‘need-weighted’ population size against spending.

Application 5: identifying over and under-spenders on the basis of ‘need’

Such need-weighted data could then be useful for policy makers in prioritizing which districts may need to ‘pull their socks up’ in terms of HPE spending. Figure 4 illustrates this by graphing the ‘optimal’ spending level against actual expenditure for 1993/94. In this case the optimal spending level for each authority is simply the total HPE spend re-allocated according to raw population size, for simplicity. If authorities were spending as they should—assuming population size is a good guide—then they would all be located along the line of equality. All those that lie above the line are spending less than they ‘should’, whilst all those below are spending more. With a better measure of need-weighted population such a simple analysis may be able to identify authorities where,
in the judgement of policy makers, subsequent action could be taken.

**Further research**

Of course the above suggestions are only very preliminary. More complex modelling procedures and more suitable data are called for. If we are really interested in distributional issues then time-series analysis also needs to be undertaken. Longitudinal data exists in the HSIs but it is fragmented and difficult to reconcile across years. Annual figures on HPE spending are available back to the late 1980s although they are absent from the current 1996 edition (data for 1994/95). Simultaneous equations models do seem an obvious way forward. The problem with single equation models—where HPE spending is estimated through time and across districts as a function of need and other variables—is that they fail to take into account that HPE spending should also influence levels of need over time. Neglecting this feedback can lead to mis-specified statistical models and misleading conclusions. For example, at a point in time an authority may be “above the line” in a needs-based Figure 4, not because it is not spending enough now but because it was particularly successful in reducing need in the past. Simultaneous equations systems are potentially good ways to disentangle this sort of complexity. Multi-level analysis would also be a useful step to pick up any higher level effects present.

In short this dataset offers significant potential for researchers interested in evaluating HPE in England at a national level. However, inevitably there are problems and researchers potentially interested in this data need to be aware of them.

**Problems with the dataset**

On a practical level the HSIs are extremely user-unfriendly and it takes time just to get to grips with the structure of the datasets which change from year to year—collating data is an onerous task. This is compounded by the tendency for authorities to record no entry in the HSIs in some years only to reappear at a later date. Finally, recent boundary changes have caused a break in the dataset which makes district level analysis more difficult.

However, there is a more serious problem. Those who looked carefully at Figure 4 will have noticed a number of observations straddling the vertical. These are authorities with very low recorded expenditures. A Box–Whisker plot (not shown) of the data also indicates high spending outliers for five of the 126 districts. Various procedures can be instituted to reduce the impact of outliers.
Although any such procedure is in the final analysis arbitrary it is hoped that correcting for outliers provides more reliable bounds for aggregate estimates of the true HPE spending levels of districts and regions. The outliers problem raises a more fundamental question: just what does the phrase 'health education and promotion expenditure' mean? The HSIs are simply a collation of data on self-completed forms which are distributed to districts and other health units. The accuracy of the data therefore relies on the common interpretation of HPE across districts. How much leeway there is in the interpretations is difficult to judge. For example, some identified high spenders may be including nationally funded initiatives through the Health Education Authority. Similarly low spenders may have little identifiable HPE infrastructure which makes tracking down expenditure more difficult.

An inspection of forms TFR2 and HFR22 reveals at least what HPE is supposed to cover. It is worthwhile quoting the HFR22 entry for HPE in full (TFR2 contains the same information albeit in slightly different wording):

This will include expenditure incurred on health education and promotion departments together with the proportion of time spent by clinical medical officers, health visitors and professions supplementary to medicine on specific health education work, such as lectures to school children and other groups. It will also include expenditure incurred on the promotion, through education and advice, of the take-up of services by minority ethnic groups. Work undertaken in relation to specific education matters (which may be undertaken by a variety of health professionals often based in hospitals) will only be included...where it is part of a specific campaign organized on behalf of the health authority.

The main category is therefore the net expenditure of HPE departments supplemented by the activities of others when it can be traced and measured. It also includes attempts to increase the access to health services of minority ethnic groups. Whilst this is desirable, it is an open question whether this is health education or promotion in itself. The definition seems to explicitly exclude national initiatives, such as those funded by the HEA, since only those specific campaigns organized by the health authority alone are included. However, this definition could also exclude important informal work which does not have specific policy backing. It also excludes surveillance activities, such as well-women clinics, which are allocated to 'other community programmes' and general professional advice from health professionals to clients, which has its own code. The activities of GPs, including health protection measures such as immunization and lifestyle advice, are not included since they are under the remit of FHSAs rather than health authorities.

Having said all this at least the Department of Health has provided reasonable guidance on what should be included as HPE and what should not be included. There is obvious room for interpretation but this seems inevitable with any ex post attempt to record the allocation of resources.

**Conclusion**

This brief note has brought to light the existence of a unique dataset on local HPE expenditure in England. Although its problems—like most datasets—need to be kept in mind, this author at least thinks it has substantial research potential. This is especially true if researchers take the time and effort to consistently collate it over time and to further investigate outliers in the data.

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**Notes**

1. For those interested write to: Finance and Performance Division A, Performance Analysis (Comparative
Information and Analysis), NHS Executive, Quarry House, Quarry Hill, Leeds LS2 7UE, UK.

2. With the further exception of the South-West and South West Thames regions.

3. Another way of expressing this is that the greater the area between the Lorenz curve and the 45% line, the greater the degree of inequality. This is the definition of the Gini coefficient. Its value can lie between 0 (the 45% line when there is no inequality) and 1 (total inequality). In this case the Gini coefficient is 0.438.

4. The author is currently in the process of investigating this further using avoidable mortality as a proxy for need.

5. Early datasets also have some other potentially useful variables including details of health promotion clinics and the number of health promotion officers by district.

6. I am grateful to an anonymous referee for this point.

7. A Box-Whisker plot is a summary plot of a variable based on the median, quartiles and extreme values. The plot did not pick up the low spenders because the overall distribution is weighted towards the lower end (see Figure 2).

8. In other work the author has taken three alternative approaches to dealing with outliers. (1) Exclude the cases which are identified as extreme outliers from a Box-Whisker plot from subsequent analysis. (2) Consider that cases falling below the 5% percentile (less than £35 per 1000 residents) and above the 95% percentile (more than £5078 per 1000 residents) are outliers, and exclude them from subsequent analysis. (3) Assume an arbitrary minimum limit for HPE spending in any district (£50 000). Any implied spending figure per 1000 residents that falls below this figure is excluded from the analysis as unreliable.

9. In terms of regional rankings the impact of cleaning the data for outliers made little difference (not shown).

10. The author is grateful to an anonymous referee for raising this possibility.

11. The author is grateful to Paul Gilbert and Russell Cavis of the NHS Executive for supplying copies of the source forms.

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