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England

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Physical inactivity: economic costs to NHS clinical commissioning groups

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Introduction

An analysis of the Global Burden of Diseases, Injuries and Risk Factors Study found physical inactivity and low physical activity to be among the ten most important risk factors in England.¹ It is estimated that physical inactivity contributes to almost one in ten premature deaths (based on life expectancy estimates for world regions) from coronary heart disease and one in six deaths from any cause.²

Health Survey for England data shows no overall change between 2008 and 2012 in the percentage of adults reaching recommended levels of physical activity (although the introduction of new recommendations in 2011³ mean that there is limited long-term trend data for individuals achieving physical activity targets). Some regional variation in physical activity levels are still apparent in the country with the highest percentages of men and women achieving the recommended levels of physical activity found in the South East and the lowest levels found in the North.⁴ Similarly, the highest levels of physical inactivity are found in the North West for men (26%) and women (31%). Inequalities in physical activity are also evident across characteristics within the Equality Act 2010, including disabled people being half as likely to be active as the general population.⁵

Inactivity or sedentary behaviour is associated with poor health at all ages. Sedentary behaviour is not simply a lack of physical activity, as people can achieve recommended levels of physical activity but spend large amounts of the remaining time sedentary. The association between inactivity and poor health has been found to be independent of the level of overall physical activity.^{6,7,8,9} Even among individuals who are active at the recommended levels, spending large amounts of time sedentary may increase risk of some adverse health outcomes.

In addition to understanding the health burden of physical inactivity, it is of great interest to consider the economic burden on society. Estimates provided here are a starting point in understanding the cost of physical inactivity in England as a result of treating adverse health outcomes. This analysis considers the impact of physical inactivity on only five disease areas, thus produces estimates that contribute a smaller proportion than the true total value of disease related physical inactivity. Other important health conditions were not included in this estimate (due to a lack of population attributable fractions). These include obesity, musculoskeletal health, mental health and functional health. We were also unable to take account of indirect costs and only consider those to the NHS in England allocated to Primary Care Trusts (PCTs) in 2012-13 and to clinical commissioning groups (CCGs) in 2013-14. It should be noted that CCGs do not cover as great a range of NHS spending as PCTs did, as they are not responsible for certain services commissioned directly by the NHS Commissioning

Board, health improvement services commissioned by local authorities and health protection and promotion services provided by Public Health England (PHE).¹⁰

These figures provide NHS CCGs and their partners with an indication of the cost and potential realisable savings of increasing physical activity within their population.

Methods

The cost data for this analysis was taken from the programme budgeting data released by NHS England in 2010-2014. The dataset provides national and health board level expenditure, allocated to disease subgroups.

Physical activity helps to prevent and manage over 20 chronic conditions.¹² This study looked at the five conditions for which population attributable fractions (PAFs) are available for physical inactivity, ischaemic heart disease, ischaemic stroke, breast cancer, colon/rectum cancer and diabetes mellitus. By applying PAFs for physical inactivity we can estimate costs from these diseases that can be attributed directly to physical inactivity (table 1).

Table 1. Disease categories for physical inactivity and relevant PAFs within the World Health Organisation's (WHO) 2002 report

WHO attributable disease	PAF for physical inactivity
Ischaemic heart disease	10.5
Cerebrovascular disease	12.0
Breast cancer	17.9
Colon/rectum cancer	18.7
Diabetes mellitus	13.0

PAFs quantify the contribution of a risk factor to a disease or a death. PAFs correspond to the proportional reduction in population disease or mortality that would occur if exposure to a risk factor were reduced to an alternative ideal exposure scenario (eg, no tobacco use or no overeating of animal fats in diets). Many diseases are caused by multiple risk factors, and individual risk factors may interact in their impact on overall risk of disease. As a result, PAFs for individual risk factors often overlap and add up to more than 100%. PAFs express the amount and relative contribution of a risk factor to overall disease levels. The PAFs used in this estimation were calculated using conservative assumptions to estimate how much disease could be averted in the UK if physical inactivity was eliminated, ie, if activity levels of all individuals reached recommended levels.¹¹ This was done for all diseases described above (ischaemic heart disease, breast cancer, diabetes and colon cancer) except for stroke for which

old PAFs, calculated at the EUR-A region in 2002, were used as UK level data was not available.

The formulae for calculation of a PAF is:

$$\text{PAF} = \frac{\sum_{i=1}^n P_i' RR_i - \sum_{i=1}^n P_i RR_i}{\sum_{i=1}^n P_i RR_i}$$

Pi = proportion of population at exposure level i, current exposure

P'i = proportion of population at exposure level i, counterfactual or ideal level of exposure

RR = the relative risk at exposure level i

n = the number of exposure levels

Calculations were performed in STATA 11 SE. Output was then reconverted into an Excel file.

Results

Using the most recent PAFs and 2013-14 data collected by CCGs, physical inactivity was found to cost the NHS £455m for that year. This equates to £817,274 per 100,000 individuals or £8.17 per person. This is much lower than calculated using 2012-13 data collected by PCTs when using the same PAFs, in which the overall cost was found to be £620m, equating to £11.72 per person. This 2012-13 estimate is lower again than the 2010-11 estimates, using the most up-to-date PAFs, with £701m spent in total, £13.50 per person. Estimates calculated using the 2010-11 data and 2002 PAFs suggest a cost of £944m or £18.17 per person.

Table 2. Total costs and costs per person of physical inactivity, by year, England

Year of data	PAFs	Collecting unit	Total costs £ million	Costs per person £
2013-14	2012	CCG	455	8.17
2012-13	2012	PCT	620	11.72
2010-11	2012	PCT	701	13.50
2010-11	2002	PCT	944	18.17

Discussion

Using the most recent cost data collected at the CCG level physical inactivity costs the NHS in England more than £450m a year. Although this is much lower than calculated for recent years the major reduction comes from the different way that spending has been applied to CCGs. CCGs were set up by the Health and Social Care Act 2012 to organise the delivery of NHS services in England, replacing PCTs. Although around 80% of planned NHS funding in England was allocated through PCTs, less is available to CCGs, with some PCT responsibilities moving to other organisations such as PHE and local authorities. The NHS will be publishing direct commissioning costs in the future and although these will bridge some of the spending gap it will still not cover completely the spending that had been available to PCTs.

Secondly, updated PAFs available to be used here are lower than in previous estimates for some disease groups. The methods used to develop previous estimates were based on PAFs calculated by WHO in 2002.^{12,13} These PAFs are based on broad WHO regions (specifically the EUR-A region of developed European countries with very low child and adult mortality) and as such they may not accurately represent the picture in England. PAFs must take account of the underlying prevalence of a risk factor within a population (since, for example, in a population with zero smokers, none of the ischaemic heart disease could be attributable to smoking), and the use of WHO regional PAFs will therefore affect the accuracy of these estimates. In this report, estimates were calculated using new UK specific PAFs for all conditions except stroke, for which no update was available. Although these PAFs are higher than previously used ones for breast and colon cancer, they are lower for coronary heart disease and diabetes, resulting in lower costs estimates overall. It should also be noted that PAFs are only available for certain diseases and therefore not all diseases related to PiA can be included, in particular costs of conditions such as dementia, whose burden in the UK is growing rapidly, have not been possible.

The figures also suggest that the cost of PiA in England vary hugely across the country, ranging from a high of £13.73 per person to £4.40. There are undoubtable differences across the country in the burden of physical inactivity, as we find regional differences in both physical activity levels and the burden of those diseases related to physical inactivity. However, a limitation of the study is that we are unable to account for different age, gender, ethnic and social class structures which define different areas in England and the impact upon physical activity. In addition the regional expenditure will be affected by the local cost of health services provision. This is taken into account when calculating allocated budgets, along with population, the level of healthcare need and health inequality. The amount of money each region receives is based on the interaction of these factors, along with others, calculated through a complex funding formula. In general the North of England tends to have higher allocations than it would

under a simple population-based formula, and the South (excluding London) a lower allocation. The reason for this is that health needs, as measured by the formula, tend to be greater in the North.

Similarly it should also be noted that reducing costs of physical inactivity may be as a result of the treatment of the diseases associated with it, rather than improvements in physical activity across the country. Programme budgeting data shows a decrease in the cost of coronary heart disease and stroke to the NHS in England in the last few years. Although this may be partly as a result of decreasing incidence, it will also be due to cheaper treatment options with preventive drugs coming out of patent and the use of cheaper surgical interventions increasing, such as percutaneous coronary interventions (PCIs), in the place of more costly procedures such coronary artery bypass grafts (CAGBs).

Conclusion

Insufficient physical activity is among the ten most important risk factors for the health burden in England. This study helps elucidate the economic cost – and therefore potential for saving – for each NHS CCG in England.

A comparison over time appears to suggest that the costs have decreased in recent years. This is likely to be an artefact related to the changes in NHS allocation (ie, CCGs receive significantly less of the NHS budget than PCTs did) and changes in the WHO methodology for calculating PAFs that is likely to underestimate the picture in England. There is also likely to be an impact in improvements and efficiencies in treatment rather than any improvement in physical activity.

The NHS Five Year Forward View underlined the critical importance of a focus on prevention to address the preventable health burden and associated costs that place the sustainability of the NHS at risk. This study illustrates the significant potential that addressing physical inactivity can make and helps underpin the case for a robust approach to increase physical activity through clinical pathways.

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