

Introduction & Objectives

There is no consensus on which methods to use to estimate an opportunity cost threshold for the efficient allocation of resources. Researchers have attempted to estimate an evidence-based threshold value, but only a few approaches have been considered and any estimate is currently used by policy makers. This study aims at exploring three assumptions normally applied in the threshold estimation:

- (1) Approaches assume that there is always a displacement involving a loss of health, however, empirical studies suggest that one of the first responses of local health care purchasers is to squeeze greater efficiency out of providers (Karlsberg Schaffer et al., 2015; Karlsberg Schaffer et al., 2016).
- (2) To be sure about the appropriate threshold it is necessary to know which health services purchasers are giving up to introduce a new treatment; current estimates bypass this lack of information by averaging the effects of changes in expenditure by clinical area.
- (3) Recent methodologies consider a single health outcome: mortality; however, health outcomes of many clinical areas may not be well reflected by mortality.

Data & Methods

- **Data Envelopment Analysis (DEA)** allows to consider efficiency to measure opportunity cost and to include several outcomes in addition to mortality.
 - Basic DEA model assumes that health locations (English Primary Health Trusts - PCTs) have the same degree of control over how expenditure can be used to create health outputs, which is not valid when performance is influenced by variables beyond the control of PCT managers.
 - The feasibility of applying the **three-stage procedure proposed by Fried et al. (2002)** was tested. This allows adjustment of inputs to environmental effects.
 - Six separate DEA analyses with health outcomes and inputs (expenditures) related to six different PBC (Program Budgeting Categories) were estimated.
- **Health Outcomes** data are from the NHS Digital Indicator Portal (<https://beta.digital.nhs.uk/>), which includes mortality statistics from the Office of National statistics, outcome data from the Clinical Commissioning Groups (CCG) Outcomes Indicator Set and the Quality Outcomes Framework.
- **Inputs:** Per-capita expenditure per PCT and PBC adjusted by the differences in health care demand across PCT using the Need Index and differences in price level using the Market Factor Index. Years 2010-2013 with data from Programme Budgeting Benchmarking Tool.
- PBC expenditure data are available for the 151 PCTs. Health outcomes data are not reported at PCT level. A similar **mapping** to the one used by the National Audit Office (NAO, 2015) was constructed.

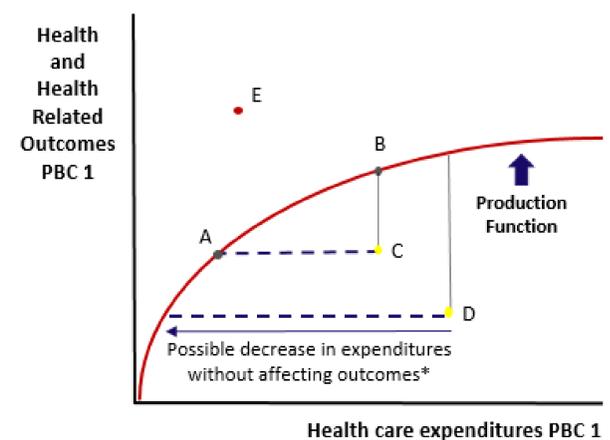


Figure 1. DEA and the estimation of the opportunity cost

- *A and B*: Efficient production within a PCT. At all points on the line, it is not possible to spend less without reducing health outcomes.
- *C and D*: Inefficient production. It would be possible, by reorganising production, to achieve the same outcomes with lower expenditure
- *E*: Production level that is impossible to reach with the current level of technology and inputs.
- * For C and D the opportunity cost of funding a new health technology, in terms of health outcomes, could be zero if they improve efficiency.

Results & Key Findings

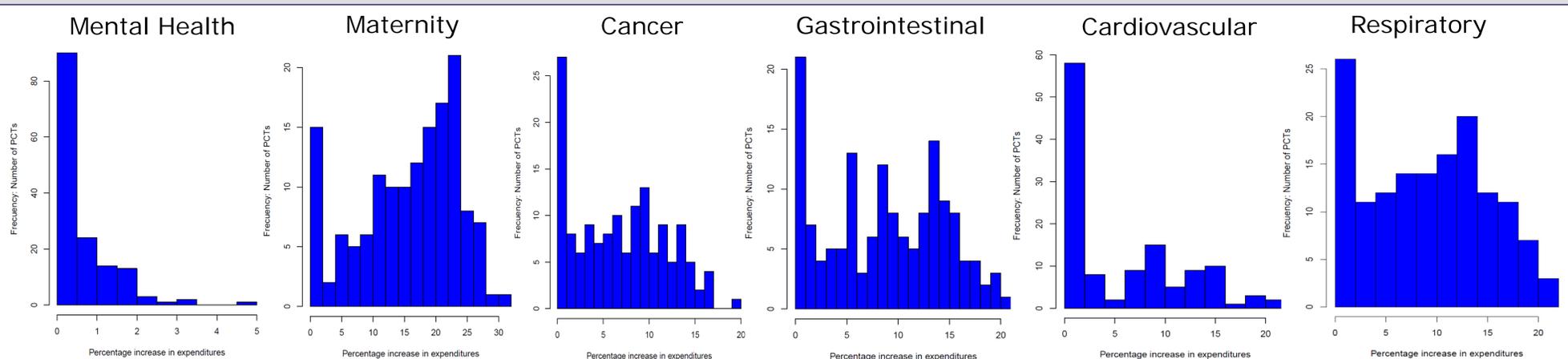


Figure 2. Percentage of the total expenditures represented by the increase in expenditure per year that could be possible without affecting health outcomes (See Figure 1)

- There are differences in efficiency between PCTs in different clinical areas.
- At the extreme, there are a small number of PCTs that could decrease their expenditures by 30% without affecting outcomes.
- Heterogeneity across PCTs and PBCs with respect to how efficient providers convert health resources.
- Providers level of efficiency differs between PBCs (Figure 2)
 - High level: Mental Health, Cardiovascular and Cancer
 - Middle level: Respiratory disease
 - Low level: Gastrointestinal and Maternity

Summary & Conclusions

- **Differences in efficiency:**
 - Between-PCTs:* Inefficient PCTs can introduce new health technologies with lower opportunity costs than efficient PCTs.
 - Within-PCTs:* It is not generally the case that PCTs are “efficient” or “inefficient” in all PBCs. This is likely to influence the mix of services PCTs choose to invest or disinvest in at the margin when they confront a new technology.
- Results indicate that PCTs are seeking to achieve a range of outcomes, which suggests that PCTs have different objective functions, which we cannot observe. It is crucial to select the appropriate set of health outcomes, such that they reflect health system priorities, otherwise, we would be estimating a threshold that does not reflect likely displacement.
- Estimation of the threshold should allow for observation of the actual level of inefficiencies as well as an ability to consider the previous capacity of health locations to respond to changes in expenditures.

- References:**
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