Fathoming the PCT funding formula with Excel graphics

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Research Report 254, entitled “A PCT funding formula for England based on faith may be wasting billions”, employed a sequential graphical technique that offers some insight into the influence of the socio-economic factors that make up the target (weighted capitation) funding formula. This was to help PCT managers and other interested parties to understand why what the formula offers them differs so much from what other PCTs get.

There are three amounts of money involved in the current arguments about those PCT deficits that the Department of Health chooses to attribute to poor management:

(i) the *actual allocation* — strongly influenced by the target formula but not yet reached (upwards or downwards) by many PCTs
(ii) the *target formula* itself
(iii) the *deserved amount* — what the PCT ought to have been given by some formula based on direct measurement of health needs rather than on socio-economic proxies responsive to current political pressures.

No-one yet knows much about what “deserved” should be for any PCT. When “actual” significantly exceeds “deserved”, the PCT is likely to be in surplus and therefore praised for good financial management, with additional praise if target exceeds actual. But when “deserved” exceeds “actual”, the PCT is likely to be in deficit and the PCT chief executive may lose his job, with additional censure if actual exceeds target!

To get the graph for any particular PCT, you will need to know its proper name. The Excel file “PCTnamefinder.xls” will help you find it. With it, enter the Excel file “PCTgrapher.xls” and follow the simple instructions.

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1Research Report No. 267, Department of Statistical Science, University College London. Date: April 2006
There was not enough room on the graph for the full names of the 19 factors whose abbreviations appear on the x-axis of the graph. Here they are:

1. Age-profile
2. Low-education score
3. Proportion of low birthweight babies
4. Standardised mortality ratio under 75 years
5. Proportion of over 75s living alone
6. Standardised birth ratio
7. Low-income score
8. Nervous system morbidity index
9. Circulatory morbidity index
10. Musculo-skeletal morbidity index
11. Comparative mortality under 65 years
12. Proportion of over 60s claiming income support
13. Poor-housing score
14. Psycho-social morbidity index
15. Market forces factor (MFF)
16. Emergency ambulance cost adjustment (EACA)
17. HIV/AIDS
18. Prescribing
19. (Under TARGET) General medical services cash limited

The Department of Health’s weighted capitation formula (www.doh.gov.uk/allocations/capitation.htm) delivers an influential statistic for each Primary Care Trust in England — its ‘Unified Weighted Population’. This is a hypothetical population that the Department uses as a target to guide most of the PCT’s allocation.

The formula is not based on any direct measurement of the different health needs of PCTs, but on a weighted combination of socio-economic factors that are seen as convenient proxies for health needs. Some factor names, such as ‘nervous system morbidity index’ (‘nerv. MI’ for short) suggest direct
measurement, but are themselves statistically-derived combinations of other socio-economic variables.

Research Report 254 uses the term ‘Unified Target Population’ as another name for the Department of Health’s unified weighted population. It defines a PCT’s ‘Target Index’ as the ratio of that weighted population to the actual population of the PCT. The Target Index is therefore a *per capita* index that can be used to compare the target funding of different PCTs.

The Target Index is plotted in the Excel graphs as the rightmost point over the label TARGET. The whole plot shows how a PCT’s Target Index is built up as each of the PCT’s 19 socio-economic factor values is incorporated into the current formula. The build-up starts from the case of no factors (i.e. equal *per capita* funding). It ends with the TARGET value when the final 19th factor (GMSCL) has been incorporated.

At each stage, the Index is a partial Index that has been constructed to be the value that the Target Index would have had if, in the corresponding stage of the Department of Health’s calculation of the unified weighted population, calculators had downed tools and substituted national values for those factors that had not yet been built into the formula (instead of the PCT’s own values). At each stage, the saltus (the up or down change) in the partial Index is informative about the influence that the factor just incorporated has, on top of the cumulative influence of the already incorporated factors.

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This graphical tool has been developed for Excel (1997 or later versions) with the kind assistance of Joan Davis, Chairman of The Community Voice, and Dr Andrew Frost, a Research Associate in Statistics at Imperial College. Community Voice does not wish to take a view about the scientific validity of the Index graphs but it supports their wider availability, while having doubts about the validity of the Department of Health formula itself.