

Activity and Financial Modelling of Acute & Specialist Hospitals

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Activity Modelling

The models used by HCAF are in four parts

1. **Forecast of activity** uses a mix of demography and experience to extrapolate a range of future scenarios. HCAF is a UK leading source of expertise in the area of emergency admissions (and associated bed demand) and has recently published a series of three articles in BJHCM which questions many of the accepted assumptions behind forecasting future emergency admissions. Forecasts of demand by local providers can be triangulated against the HCAF forecasts.
2. **Patient flows** under alternative points of delivery are modelled using a geo-demographic tool based on distance to the nearest service point for population groups of around 1,500 head. Flows for all population groups are then aggregated for each individual scenario. This model has been extensively validated and its most recent use has been to support the successful application by Healthierwood & Wexham Park Hospitals NHS Foundation Trust to become a recognised regional centre for Haematological cancers and an evaluation of options surrounding a PCT-led proposed new outpatient centre (similar to a polyclinic).
3. **Real demand** is modelled using a predictive equation based on age profile, proportion of full-time students (elective demand only) and Index of Multiple Deprivation (IMD). This allows demand to be modelled for very small population groups such as a Lower Super Output Area (LSOA), i.e. around 1,500 head of population. Extensive experience shows that attempts to model demand using Trust-based data only serves to highlight perceived intervention rate issues which are artefacts of Trust counting and coding rather than to do with real intervention issues. Hence the forecast of patient flows will initially use modelled 'real demand'. This allows multiple options to be quickly evaluated. Once these scenarios have been evaluated the model is then calibrated using local activity data. This will avoid the delays usually encountered waiting for local data.
4. **Hospital beds** are modelled using the 'E-plus for Beds' methodology which is the only bed modelling tool capable of attaching the correct level of average occupancy to bed pools of different size. This tool is especially relevant to small specialist bed pools, to maternity bed pools and to the movement of bed days into alternative settings.

The patient flows model applicable to this project will remain with the project sponsor. The 'E-plus for Beds' model remains the exclusive property of HCAF.

Financial Modelling

Each successive version of HRG's, the MFF and the capitation formula all generate a change in financial flows. Recent research by HCAF published in BJHCM has shown that there are serious flaws in financial modelling based on the current V4 HRG's, the MFF and the

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capitation formula. Any financial modelling will therefore seek to highlight potential alternative scenarios in financial flows which could arise from the future (necessary) modifications to these components of the financial landscape.

It should be especially noted that the research by HCAF has pointed out specific deficiencies in HRG V4 relating to Orthopaedic interventions which will skew the financial modelling of this specialty in particular. This is of relevance to the Trauma aspects of the project.

It is assumed that Trusts will do their own financial modelling and that the PCTs finance department(s) will collaborate on financial modelling in collaboration with HCAF. HCAF will subject the final financial model to sensitivity testing using specialist software.

HCAF have conducted unique economy of scale studies on the costs incurred by English healthcare providers. This knowledge will be used to guide decisions regarding the likely costs at any proposed new points of delivery.

Prior Experience & Existing Models

Dr Jones has over 15 years experience with a wide range of capacity related projects. See information on 'Models and Tools for PCTs', 'Models and Tools for Acute Trusts' and a list of recent projects available on www.hcaf.biz (refer to 'For PCTs' and 'Contact HCAF') pages on the website.

For details of existing models refer to the documents listed on the 'Forecasting Demand' page of the www.hcaf.biz website.

Information Required for Successful Completion

The following information will be needed within days of commencement to enable the initial investigation of patient flows.

1. Proposed sites for polyclinics (postcode) and list of proposed services to be provided at these sites. Typical age specific activity rates for these activities in 5 year age bands.
2. Any demographic forecasts available to the PCTs with additional refinement over and above that offered by ONS forecasts.
3. Documents already listed in the specification.
4. Details of proposed polyclinics in bordering PCTs to ensure that mutual competition does not occur to a significant degree.
5. An exact specification of which specialties/diagnoses/procedures/HRG/tests/etc are to be modelled in the different scenarios, i.e. outpatient vs. inpatient, etc.

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6. A list of all provider sites (Acute, community, independent sector) both relating to the delivery of inpatient, outpatient and diagnostic services relevant to the project including sites in the surrounding ring of PCTs.
7. Details of travel costs (after discussion with PCTs and Ambulances service)

Subsequent to the initial geo-demographic analysis specific data will be requested to calibrate the model for the final configuration. This will be activity data at Lower Super Output Area (LSOA) level. Note that LSOA is a standard feature of SUS data. This data need only relate to a limited geographic area as it is merely to refine the model to match local conditions.

Limitations of the Analysis

All analysis will be conducted under the assumption of free choice where service quality and waiting times are not materially different. These assumptions apply to a free market where all providers of service can react to developments by other providers in order to protect market share – which in the long run therefore remains fairly static.

The PCT is responsible for ensuring that HCAF are informed about any suspected data anomalies arising from the way in which particular Trusts count and code activity.

HCAF will express forecast future activity in the form of upper and lower limits with an explanation of the assumptions behind these limits.

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