

# Models & Tools for Acute Trusts

## **1. Financial Risk in Healthcare Provision**

This method allows a healthcare provider to evaluate its exposure to financial risk arising from the natural level of statistical variation in healthcare demand. It will allow an acute trust to minimize its exposure to risk by selecting the optimum mix of HRG, how to minimize risk using risk pools or to set trigger points to activate contingency plans.

## **2. Simulation to Test the Robustness of Business Cases**

This method attaches the likely range for all assumptions in a business case and allows all assumptions to simultaneously vary. The output of this simulation gives the likely probability that the so-called preferred option will succeed or fail and the probability for costs/benefits higher or lower than the preferred option.

## **3. Performance Evaluation**

The financial & operational performance of departments can be evaluated using specialist analysis which looks at economy of scale and Trust reference costs. HRG-based costs relative to national average can be re-interpreted in the light of six dimensions in which the national tariff has statistical and other deficiencies.

## **4. Due Diligence and Total Cost & Activity Forecast from a Mid-year Position**

This method uses pattern recognition to forecast year end out-turn (activity and cost) from a mid year position. Upper and lower control limits allow managers to take action where it is appropriate and allow the Board of Directors to exercise due diligence regarding financial break-even.

## **5. Predicting Flows to NHS and IS Sites in a Patient Choice Environment**

This geo-demographic model predicts likely flows to any site (new or established) in the face of competition from other (new or proposed) sites. It can be used an acute Trust to estimate the likely impact of a nearby IS TC, the flows to a new outpatient satellite clinic or the flows following the introduction of a minor injuries unit. The method can also calculate the optimum and feasible sites for a new facility.

## **6. Erlang for Beds**

This innovative tool gives exceedingly accurate values for the size of the specialty bed pools in an acute hospital. This is the only method available which allocates the correct occupancy level to bed pools of different sizes. Future reductions in length of stay or the movement of blocks of bed days to alternative settings are easily handled to give a revised bed pool size. The method has been extensively validated in over fifteen hospitals and has been used to set ring-fenced surgical bed pools.

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## **7. LDP and Capacity Calculations**

This method takes historical activity and converts this into a demand trend. Demand is projected into the future and the activity impact of waiting time changes incorporated to give future activity needed to achieve targets. Forecasts can be made at Specialty or HRG level. The method has been used by both Thames Valley and South Central SHA's to validate the annual LDP figures.

## **8. The Capacity Implications of an 18 Week Maximum Wait**

This method uses the statistics behind variation in demand to enable managers to explore the capacity implications of a 4 week outpatient wait, etc. Such short waiting times have an implied excess capacity (or increased flexibility) required to avoid any patient breaching the maximum wait. The implied excess capacity is much higher than most NHS managers realize and the necessary steps can be explored ahead of time rather than fire fighting after the event.

## **9. Reference Material & Benchmarking**

An extensive reference library of healthcare statistics can be used to estimate demand for aspects of healthcare such as diagnostic tests, use of community hospitals, hourly demand for A&E and to benchmark healthcare activities.

## **10. Ad-hoc Analysis**

If you have a problem but are unsure of the exact solution then ask if suitable analysis can be performed which will shed light on the possible range of solutions.

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# About Healthcare Analysis & Forecasting

Healthcare Analysis & Forecasting was established in 1995 with clients including Trusts, SHAs and PCTs, Prudential and Glaxo plc.

Dr Rod Jones has a Ph.D. in Chemical Engineering; is a qualified management accountant and has completed the Hewlett Packard course in Total Quality Management. His career prior outside the NHS covers 7 years in academia and 10 years in industry as a senior Process Engineer & Divisional Manager.

He has over 15 years experience in healthcare both within the NHS and as an independent consultant covering both Acute and Community involving Information, Contracting, Commissioning, Performance Management & Service Planning.

In 1995 a disease management study in gastrointestinal bleeding & ulcers won an international award within Glaxo plc. In 1996 he completed a review of bed requirements for the Royal Berkshire Hospital with the longer-term projections of bed requirements being validated in practice. The Trust eventually submitted a further business case in line with the original projections.

During 2001/02 he was involved in the Hospital Operational Intelligence Project (HOIP) investigating best practice in the use of operational intelligence to match capacity with demand. He was Statistical Advisor to the Thames Valley Strategic Health Authority from its inception, has provided support to the Met Office Health Forecasting Unit and provides advice to the South Central Strategic Health Authority.

His research has led to the development of many innovative and new methods for understanding the operational and financial challenges in healthcare. He is the author of hundreds of papers, articles & reports and is an invited speaker at national conferences.

Areas of particular expertise include:

- Optimising operational performance via simulation and understanding variation in demand, i.e. waiting time targets in A&E, outpatients, etc
- Financial risk in healthcare contracts and provision, i.e. contingency budgets, risk pools, etc
- Capacity planning and capacity implications of very low waiting times
- Financial pressures due to PbR, i.e. practical impact of data definitions, coding, etc and which HRG are most susceptible to these issues
- Statistical tests to see if an acute Trust has changes the way it counts events with PbR implications

Over the years Rod has developed a wealth of experience in the area of healthcare information sources and has over 20 MB of reference material from age banded intervention rates relating to all types of healthcare through to demographic information relating to healthcare forecasting.

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## **Recent Projects (last two years)**

- A review of maternity beds and costs at two acute hospitals
- A review of specialty bed pools at a Foundation Trust hospital
- A capacity planning tool for a Foundation Trust hospital
- A review of hospital reference costs and resulting LDP challenge for a group of three PCTs
- Analytical support to the Marie Curie end of life DCP care project
- Financial risk in healthcare purchasing – series of three papers in BJHCM
- A review of hospital counting & coding for a consortium of eight PCTs
- Supporting analysis for a community hospitals review
- Financial & operational analysis for early achievement of 18 weeks in NHS South Central
- A review of admission rates for a PCT using OPCS procedure codes
- Detailed small area analysis of admissions sensitive to primary care intervention for a PCT
- Analysis of financial pressures at Isle of Wight Healthcare due to conflicting assumptions within the national tariff and the capitation formula
- Support for Specialist Commissioning at a SHA
- Modelling of activity required for next years contract for two PCTs
- Specialty-specific costs in the NHS HRG tariff and implications to perceived efficiency.

## **Prior Projects**

- A review of alternative sites for a new hospital using small area geo-demographic modelling. Some 35 alternative configurations including acute and satellite sites were evaluated.
- Forecast shortfall in admissions at two Independent Sector Treatment Centres based on travel time and competition with other sites.
- A review investigating methods the extent of abuse of the definition of ‘day case’ across English providers for a SHA.
- Detailed support to the LDP process at South Central SHA
- Detailed support to the LDP process at Thames Valley SHA
- Advise on the limitations of various DH capacity & demand models to enable the SHA to give a measured response.
- A review of outpatient to inpatient conversion rates for GP practices across Thames Valley.
- A review of admission rates across Thames Valley SHA using small area geo-demographic methods.
- Analysis of demand and capacity at Orthopaedic departments supporting the TV SHA review of Orthopaedics.
- Statistical support to the TV SHA review of Paediatric deaths at the ORH
- Analytical support to the TV SHA community matrons project
- Analytical support to a review of healthcare services in Hertfordshire
- Capacity planning support to acute trusts (multiple sites)
- Review of bed requirements (multiple sites)

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## **Publications**

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- Jones, R and Curtis, E (1995) The potential for local healthcare gains in the area of gastrointestinal bleeds & ulcers. A Glaxo plc disease management study.
- Jones, R (1996) Estimation of annual activity and the use of activity multipliers. Health Informatics 2, 71-77.
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- Jones, R (1996) How many patients next year? Healthcare Analysis & Forecasting, Reading, UK. A book on forecasting & planning in healthcare.
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- Jones, R (2001) Quick, quick, slow. HSJ: 111 (5778), 20-24 – predicting waiting times
- Jones, R (2001) Don't take it lying down. HSJ: 111 (5752), 28-31 – the Erlang equation and bed occupancy
- Jones, R (2001) New approaches to bed utilisation – making queuing theory practical. Presented at 'New Techniques for health & Social Care'. Harrogate Management Centre Conference 27<sup>th</sup> Sep, 2001.
- Jones R (2004) Financial risk in healthcare provision and contracts. Proc. 2004 Crystal Ball User Conf. [www.crystalball.com/cbuc/2004/papers/CBUC04-Jones.pdf](http://www.crystalball.com/cbuc/2004/papers/CBUC04-Jones.pdf)
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- Jones, R (2008) Financial risk in health purchasing: Risk pools. British Journal of Healthcare Management. 14(6), 240-245.
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- Jones, R (2008) Limitations of the HRG tariff: excess bed days. British Journal of Healthcare Management. 14 (in press). .... start of a six paper series investigating the multiple deficiencies in the tariff.
- Jones, R (2008) Very small area demographic factors influencing admission to hospital. British Journal of Healthcare Management. (Submitted for publication)
- Jones, R (2008) Very small area demographic factors influencing outpatient attendances. British Journal of Healthcare Management. (Submitted for publication)