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Bamford, David and Chatziaslan, Elizabeth

Healthcare Capacity Measurement

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Author Information:

| | | |
|--------------|--|--|
| Names: | David Bamford *corresponding author | Elizabeth Chatziaslan |
| Affiliation: | Manchester Business School | Manchester Business School |
| Address: | Booth Street West Manchester M15 6PB | Booth Street West Manchester M15 6PB |
| Telephone: | 0161 306 8982 | |
| Email: | David.Bamford@mbs.ac.uk | E.Chatziaslan@manchester.ac.uk |

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Healthcare Capacity Measurement

Abstract:

This paper presents findings from an action research intervention in the outpatient department of a National Health Service (NHS) Hospital. It investigates the perceived and actual problems of performance measurement, specifically measuring capacity, at a United Kingdom (UK) hospital. An action research methodology was adopted: Relevant literature on capacity measurement and performance was reviewed; the motivation behind its usage explored. Systems requiring improvement were identified and the adoption and implementation of new working methods initiated and explored. In addition to considering capacity measurement and performance issues, the authors examined the effects this may have on the long-term potential of the organisation. The research identified gaps in the capacity and activity measures used and in the dissemination of performance information. To address these problems and meet the changing needs of the department a new performance measurement and reporting tool was implemented. Specific recommendations for the implementation of a new performance tool for healthcare organisations are made. The conclusions drawn add to previous commentaries, and develop interesting questions for future research.

Keywords: capacity measurement, healthcare, UK NHS

Introduction

This paper investigates capacity measurement in the outpatients department of a United Kingdom (UK) National Health Service (NHS) hospital. The background to this research is the interest within the NHS of the restricted nature of resources and the importance of the service for the 'customers' wellbeing (DoH, 2000). Accurate measurement of theoretical and available capacity is of vital importance for the management of a healthcare organisation.

The need for accurate and up-to-date performance information increases for NHS hospitals as Payment by Results and Patient Choice introduce dramatic changes in the way patients access Services and how services are commissioned (DOH, 2004). Under Payment by Results, hospitals will be paid according to their activity, receiving funding for every patient that they see based on nationally agreed tariffs (DOH, 2002). Therefore, the ability to know at any given time the past, current and predicted activity is directly linked with the financial well being of the hospital and the survival of the services it provides. At the same time, in order to attract patients and funding, Hospital Trusts need to demonstrate competence in meeting the objectives and targets set by their commissioners and the UK government. Hospital Trusts and departments have to prove: i) the clinical quality; ii) the cost effectiveness of the services they provide (Curtwright *et al*, 2000). Theoretically, departments or even whole hospitals that do not provide cost effective and quality services will have to close (Carvel, 2006).

This research examines the measurement of capacity and the systems used to measure and report activity at the outpatient clinics of an NHS Hospital in the North West of England. From the review of the literature three research questions were developed: Question 1 - How is capacity defined and measured at the hospital outpatient department?; Question 2 - What are the main issues with measuring and reporting operational performance?; Question 3 - How can the measurement and reporting of operational performance at the outpatient department be improved for the benefit of all stakeholders (patients, providers, payers)?

The Literature

Working from a management accounting point of view, Bayou (2001) traced the problems of capacity measurement in three main areas: i) confusion of capacity with capacity utilization; ii) an incomplete view of capacity that does not consider its two components of resource and ability; and iii) a disregard of the interaction between the capacity of a single organization and that of the whole industry. From an operations perspective Valiris *et al* (2005) distinguished four main reasons for problematic capacity measurement: i) the product or service mix; ii) the time period –sustainable output does not necessarily equal the outcome of the process during a short period of time; iii) the product or service specification, and iv) capacity leakages. The complexity of most operations is certainly a decisive factor. Research in healthcare has concentrated on the distinct characteristics of health operations that make capacity measurement challenging. Adan and Vissers (2002) noted the importance of the patient mix on capacity decisions as different patient categories have different characteristics in terms of resource requirements, necessary length of stay etc. Healthcare capacity is usually measured in terms of resources or inputs in order to deal with the variety of the patient/service mix. The capacity units favoured under these circumstances are beds and operating theatre time or slots (Santerre and

Adams, 2002; Kim *et al*, 2000; Moore, 2003; Renner and Palme, 1999). Gemmel and Van Dierdonck (1999) referred to other capacity service units such as nursing workload, however they too used bed capacity for the purposes of their study. Other studies measured capacity in appointment slots or number of patients that can be seen (Klassen and Rohleder, 2004). McDermott and Stock (2007), in their paper on hospital operations and length of stay performance, identified that there is significant evidence of a direct link between effective capacity management and performance, especially that there is a relationship between Average Length of Stay (ALOS) reduction and capacity.

So, capacity measurement provides the basis for the planning and control activities of the operation, providing information on available levels of activity over a set time period. How well the operation uses this capacity to achieve its targets is a concern of performance measurement. Radnor and McGuire (2004) in their research on two case studies (one within the UK health sector, the other a large UK government department) are very clear in distinguishing between measuring the performance of an organisation and acting on the results of the measurement in order to manage performance. Neely and Bourne (2000), in their review of performance management, argued that the problems with performance measurement progressively changed from measuring the wrong things to measuring too many things and creating an information overload. For Radnor and McGuire (2004) this information abundance is the main reason behind the failure of performance measurement in the public sector, as people tend to ignore its outputs. Literature on performance measurement and management mainly focuses on the content of performance measurement and its position in relation to strategy (Kennerley and Neely, 2002; Ghalayini *et al*, 1997; Kaplan and Norton, 1992; Lynch and Cross, 1991). Increasingly the question of how performance measurement systems impact on performance is starting to be investigated (Bourne *et al*, 2005).

In the public sector, performance measurement and management is a subject attracting a lot of research interest. In reality performance measurement and reporting has been widely used in the public sector for the purpose of accountability and to show that improvement has been achieved through public sector reforms (McAdam *et al*, 2005). However, the focus is moving away from simply collecting and reporting on performance indicators and towards holistic performance systems that can offer strategic control and drive improvement (Radnor and McGuire, 2004).

The literature on performance measurement and management systems presents several frameworks that can provide the basis for the development of a performance measurement model (Kennerley and Neely, 2002; Ghalayini *et al*, 1997; Kaplan and Norton, 1996, 1992; Lynch and Cross, 1991; Dixon *et al*, 1990). Kennerley and Neely's review of the literature (2003) showed evidence that organisations implementing 'integrated balanced performance management systems' outperform others that do not. Gurd and Gao (2008), in their review of strategic performance measurement systems within healthcare, found diverse forms of the BSC with varying measures being used.

The Balanced Scorecard (Kaplan and Norton, 2001; 1996; 1992), the SMART (Strategic Measurement Analysis and Reporting Technique) system and its embodiment, the performance pyramid (Lynch and Cross, 1991) and the Integrated Dynamic Performance Measurement System (Ghalayini *et al*, 1997) connect operational performance with the strategic goals of the organisation. They focus on aligning operational performance with strategy. The performance prism puts the stakeholders, rather than strategy at the heart of performance measurement and delivery (Kennerley and Neely, 2002). All four systems provide multidimensional perspectives

of performance, link performance across several organisational levels and integrate financial and non-financial measures (Kennerley and Neely, 2002; Ghalayini *et al.*, 1997; Kaplan and Norton, 1996, 1992; Lynch and Cross, 1991). They are, with the exception of the IDPMS, strategic in their focus. The Balanced Scorecard provides an overall view of performance, while the Performance Pyramid does not provide the necessary guidance to the development of performance indicators (Ghalayini *et al.*, 1997). From the frameworks discussed only the IDPMS concentrates specifically on measures and indicators of operational performance. Determining service capacity and productivity is therefore multidimensional, and even utilisation and efficiency reporting can be biased and problematic. Expressing these with a simple ratio of outputs/inputs can not only produce confusing measurements, but also provide the basis for counter-productive management that leads to deterioration of total service performance.

Research Methodology

Research Focus

This research examines the measurement of capacity and the systems used to measure and report activity at the outpatient clinics of a District General Hospital in the North West of England. As such it deals with the measurement and reporting of operational performance and particularly with measures used to express how well the department uses its capacity. Performance at the outpatient department depends on several factors including quality of care and quality of services provided to patients. This research focuses on a critical area of performance; the ability of the department to utilise its capacity effectively in order to meet demand for its services.

From the review of the literature three research questions were developed: Question 1 - How is service defined and measured at the hospital outpatient department?; Question 2 - What are the main issues with measuring and reporting operational performance at the outpatient department?; Question 3 - How can the measurement and reporting of operational performance at the outpatient department be improved for the benefit of all stakeholders (patients, providers, payers)?

Research context

This NHS Hospital provides healthcare to an area of approximately 100 square miles with a population of 309,295. This research focused on the outpatient clinics across four specialties: i) adult medicine; ii) gastroenterology; iii) cardiology and; iv) elderly care. Among them they see approximately 25,000 patients per year. Twelve senior physicians (medical consultants) run the clinics, assisted by their clinical teams. The size and structure of these teams varies greatly according to the available staff and the preferences of each physician; in total approximately 100 NHS staff are directly involved.

Research method

An action research methodology was adopted. Moore (1986) states that to be properly regarded as action research, a project must contain a continuous thread of objective evaluation and a mechanism whereby the results of the evaluation and the lessons learned during the project can be fed back into the process so that it becomes something which is dynamic and constantly modified in the light of experience. Its distinguishing feature is that it integrates something of real, practical worth into an organisation. This has to be the case, otherwise the research would never have been sanctioned - firms do not have resources to spare and would not waste their own

time and resources on a non value adding project. One weakness of the adopted research methodology is its very public nature; if the project did not produce tangible real-time results, those supporting it may lose interest and bias any future initiatives. Another limitation is the single case approach, however Remenyi *et al* (1998) argues this can be enough to add to the body of knowledge. Small scale intervention, informal interviews, participant observation and company documentation were all used.

Gaining access to an organisation for this type of research can be the result of good luck, strategic planning and hard work (Bryman, 1988). For this research it was a combination of all three elements. One of the authors joined the organisation for a two and half year period in a service research and improvement role; the core investigation was based upon an examination of capacity management issues in outpatients. The brief was to investigate the data collection within operations, assess the capacity of the outpatients department then recommend and implement a more accurate measurement, reporting and control tool. The academic partner was closely involved and provided professional guidance throughout. Two and a half years on-site in a participant observation capacity, coupled with subsequent follow-up allowed for: extensive direct access and intervention; reviews of internal documentation; the application of semi-structured, open-ended interviewing to elicit information based upon categories defined from the literature review; follow-up conversations with many interviewees. This research involved twenty eight core participants: four senior managers, twelve senior clinicians, four middle managers, two IT analysts; six administrators; multiple teams and user groups. The interviewees were selected using a combination of judgement, snowball and quota techniques (Remenyi *et al*, 1998). For the analysis of the primary and secondary research information manual thematic coding of the data sets was carried out (Fereday and Muir-Cochrane, 2006).

Findings and Discussion

To provide a clear structure for presentation of the findings and discussion this section has been arranged around the research questions.

How is capacity defined and measured at the hospital outpatient department? (Question 1)

The outpatient department measures capacity in appointment slots, as previously identified by Klassen and Rohleder (2004). The number of patients seen in every clinic session and the duration of each appointment are set historically by a combination of good clinical practice, guidelines from the appropriate Royal Colleges and specific requirements of each leading clinician, and are recorded in the clinic schedule, called the template. It emerged that there was no clear indication of actual capacity and a number of problems with the measures used and the assumptions made about working hours and normal operating conditions became apparent; this mirrors the findings of Bayou (2001) who identified confusion of capacity with capacity utilization and none consideration of the two components of resource and ability. Table I outlines some of the first findings; the 'Initial assumptions by Staff' column shows the basis of the staff capacity measurement. The 'Research Findings' column shows the agreed indicators after discussion with both management and clinicians. Following communication of the findings what the department considered as actual capacity changed dramatically; several clinicians stated it became "*much more realistic*".

TAKE IN TABLE I

Table II shows the difference between capacity, as it was calculated with the old measures (Column B), with the new measures (Column D), and the effect on capacity utilisation (Columns C and E).

TAKE IN TABLE II

The changes in capacity measures had a significant effect on the perceived capacity utilisation across the thirteen clinics under investigation (Table II, Columns C and E). After the re-adjustment of the clinic capacity (Column D), it was revealed that the real problem facing the clinics was the over utilisation of existing resources and that the so-called unused capacity presented in previous reports was a result of faulty measurement (c.f. Valiris *et al*, 2005; Bayou, 2001)

From the literature on capacity planning/management and performance drivers in healthcare the authors recognised two core challenges:

- **Conflicting stakeholder priorities in relation to the use of capacity.** Simons *et al* (2004), Lovejoy and Lin (2002), Kim *et al* (2000), Gemmel and Van Dierdonck (1999) argued that different decision makers or stakeholder groups within a hospital can have different priorities in relation to scheduling.
- **Interaction of capacity decisions with each other.** As the capacity of several resources has to be matched for a patient or a patient group to be treated effectively, affecting one can have an effect on another. Focusing on the optimisation of the capacity use of a single resource (traditionally beds) can lead to lower utilisation for the whole system (Gemmel and Van Dierdonck, 1999). Zigan *et al* (2008) concluded that existing performance measurement systems need to be adjusted to incorporate the most significant. Kollberg *et al* (2007) promoted eight measures (demand for care; booking; first visit; diagnosis; decision to treat; treatment start; control following up; case closed), concluding that local departments have different requisites to plan and predict their demands.

The participating doctors felt justified by the findings, believing that they did reflect what actually happens in their clinics. As one noted: “*the problem with management is that they have always assumed that registrars [middle grade doctors] see the same number of patients as consultants during a clinic, where in fact they only see about half*”. Middle managers on the other hand, as a result of these findings, changed their focus from the annual utilization of capacity to dealing with the variation of available capacity throughout the year and concentrated on how resources can be planned to meet demand in the short-term.

The measurement of capacity had a significant impact on the perception of operational performance and therefore on the management of the clinics (c.f. McDermott and Stock, 2007). Decisions previously based on the assumption that the outpatient department does not use its capacity had to be reviewed to mirror the new findings of over-utilisation. Despite this over-utilisation however, significant sources of waste, such as hospital initiated appointment

cancellations, were still found in the system and should be included in the performance measures.

What are the main issues with measuring and reporting operational performance at the outpatient department? (Question 2)

The research also investigated how the department measures its performance, with regards to meeting the demand for services. Key activity measures for the outpatient clinics were: Number of New Patients seen; Number of New Patients who Did Not Attend their Appointment; Number of Follow-up Patients seen; Number of Follow-up Patients who Did Not Attend their Appointment; Ratio of New Patients Seen to Follow-up Patients seen. Additionally, data on appointment cancellations initiated by the hospital (hospital cancellations as opposed to patient cancellations) was collected by the management of the department, but was not reported to the clinicians or associated with the management of capacity. The purpose was to assess performance of individual clinics and progress made on the improvement projects taking place within the outpatient department. These reports, in the form of graphs, Statistical Process Control charts and tables, were reported to relevant steering groups and the senior management. Research observation, participation and review of multiple documents, identified a number of problems with the process of measuring and reporting the clinic activity:

- The utilisation of available capacity (efficiency), activity and performance information, although measured on a regular basis was not reported to outpatient clinical teams in any structured way (c.f. Radnor and McGuire, 2004).
- Several sets of measures that closely affect the operational performance of the department and its ability to meet its targets were not measured, considered or monitored (c.f. Neely and Bourne, 2000).
- The operational performance of individual clinics was not connected with the overall/strategic performance targets for the department, and in particular the outpatient waiting time targets (c.f. Kennerley and Neely, 2002).
- Performance measurement was reactive and historical (only reported on past performance). The potential to use performance measurement to assess the ability to meet future targets was not realised (c.f. Bourne *et al*, 2005).
- The performance of each specialty within the outpatient department against the targets was measured, but not drilled-down to the level of the individual clinics. As a result, the performance of individual clinics and their connection with the capacity of the department was not monitored. Transparency and accountability were compromised (c.f. Radnor and McGuire, 2004).
- Planning and forecasting the desired future performance was time consuming and required manual analysis of large data sets. It took a week to match future demand over the next thirteen weeks with available capacity. By the time the report was produced the information was often outdated and new measurements had to take place (c.f. Gurd and Gao, 2008).

Moreover, participant observation identified that measurement took place for the sake of measurement, without actual reporting of the findings to stakeholders, particularly the clinicians. There was no connection with the strategic performance management of the hospital or provision for action to be taken on the measurement findings.

Additional Measures of Operational Performance

Research and analysis of the way clinics operated revealed other measures of operational performance that should be taken into consideration. Patient non-attendance, known as Did Not Attend (DNAs), was the only cause of 'waste' measured within the department. Non-attendance is a source of inefficiencies and costs, wasting valuable resources and delaying the treatment of patients, but it is not the only or most significant source of waste. DNAs in the clinics was calculated at 11 per cent, just below the UK average of 12 per cent (DOH, 2003) but still significantly high. The DNA rate meant that one appointment out of nine was missed. Unfortunately one appointment in four was cancelled by the hospital, a rate significantly higher than the DNAs. This data had always been collected by the department but not associated with the management of performance.

Contrary to patient DNAs not all hospital cancellations translated into unused capacity, yet the waste generated for the department was significant. To determine this figure the process of cancelling and rebooking patients in the outpatient clinics was mapped (see Figure 1).

TAKE IN FIGURE 1

It was estimated from available data that during one year: £40,000 was spent writing cancellation letters to patients; 170,000 hours wasted cancelling and re-scheduling patients. These figures demonstrated the need for formal measurement and monitoring of the cancellations. Having identified the gaps in performance management and reporting at the outpatient department the potential for developing a new operational reporting tool was realised.

The realisation of the impact that hospital cancellations have on the performance of the outpatient department, introduced not only a new operational measure, but a new dimension into performance measurement. As clinic cancellations began to be measured, monitored, and reported a greater degree of transparency and accountability was introduced.

The findings regarding the problems with performance measurement at the hospital are consistent with the literature. Bititci *et al* (2002) reviewing three research projects (Bourne and Neely, 2000; Hudson *et al*, 1999; Bititci and Carrie, 1998) summarise the main reasons for the failure of performance measurement systems; their time consuming and static nature and the lack of integrated IT infrastructure. This research identified the greatest problems with operational performance measurement at the department as: i) the time consuming manual analysis of computer generated performance information, ii) the lack of structured reporting system, and iii) the inability to connect the performance at different levels. Moreover, the outpatient department of the hospital lacks a performance measurement system. It rather tries to adapt the already existing performance reports to fit its needs.

It became obvious that the Outpatient department required a performance measurement system that would fit its needs for measuring, reporting and communicating performance to its stakeholders. To fit the changing needs of management and clinicians, the system would have to be accurate, dynamic and integrated with the existing IT systems of the hospital.

How can the measurement and reporting of operational performance at the outpatient department be improved for the benefit of all stakeholders (patients, providers, payers)?
(Question 3)

The study of the outpatient department revealed gaps in capacity measurement and capacity and activity reporting. The development of a new ‘Activity Measurement Framework’ (AMF) to address these gaps was proposed to the hospital by the authors and the following issues were subsequently identified by potential users and designers:

- Identification of metrics
- Establishment of data sources; availability of required data; ease of collection for each metrics
- Identification and/or development of targets for the metrics
- Establishment of an agreed structure for the reporting tool
- Agreement for the responsibility of data collection, maintenance and updates
- Assessment of required IT capabilities and potential of making the tool web-enabled and dynamic

The Development Process: a series of interviews and meetings with stakeholders explored the requirement of an operational reporting tool. Participants provided views and preferences on a range of capacity and performance management issues from content (required metrics or indicators) to structure and reporting needs (how often and in what way performance would be communicated). As this initial development stage progressed a series of pilot frameworks were developed and evaluated. The resulting framework, the AMF, was put into use and presented to all participants during their regular departmental meetings. Feedback from these was used to review the framework.

In parallel with this process the IT department was involved in integrating the AMF with existing IT systems, to make it dynamic, automated, web-enabled and provide up-to-date information with minimum human input.

The Content: Senior management was interested in metrics that could be tied-in with organisational capacity, performance measurement and the strategic targets. There was also interest in cost information. Middle management expressed particular interest in using the framework for short-term capacity planning. Clinicians wanted regular reports on performance metrics the hospital used for annual assessments (e.g. the ratio of new to follow-up patients in clinics) (c.f. Simons *et al*, 2004; Lovejoy and Lin, 2002; Kim *et al*, 2000). Balancing stakeholders’ needs with information that was available and could be collected and analysed within acceptable timeframes led to twelve initial metrics (see Table III). Participants across all levels expressed concern about timely and regular reporting.

TAKE IN TABLE III

In parallel, the authors worked on the development of explicit targets for each of the indicators, in conjunction with middle management. The identification and development of these targets was the most challenging part of the AMF development. Even after the capacity exercise and several re-adjustments of theoretical and available capacity, the aggregate (annual) capacity

estimations were not successfully translated into monthly or weekly estimations of available capacity and expected activity. Available capacity was not evenly distributed throughout the year. The absence of a single doctor from a clinic lead to large variations of available resources and the expected activity. The patient mix presented another problem: doctors in the same specialty often treated special patient sub-categories, this created different demand and capacity characteristics (Johnston and Clark, 2005; Betts *et al*, 2000; Armistead and Clark, 1994). At this stage the problem was partially overcome by the use of ‘indicators’ rather than ‘targets’; estimations only of what activity was expected (see Table IV).

TAKE IN TABLE IV

The Structure: When structure was discussed during the development stage the stakeholder requirements focused on two points: i) tabular as well as graphic representation; ii) ability to view reports for different organisational levels. Several structures were reviewed by the participants. The resulting system drilled performance down through three levels: from departmental to specialty to individual clinicians (see Figure 2).

TAKE IN FIGURE 2

The Implementation: For speed of impact the framework was initially populated and distributed ‘manually’ rather than by the hospital’s IT system. The calendar month was selected as a reporting period, although future provision was made to automate any reporting period. The framework provides a ‘snapshot’ of performance; the department was able to assess established indicators on a monthly basis and to monitor progress from the beginning of the financial year. Furthermore, additional perspectives of performance, such as financial and quality of patient services were straightforward to build-in and the framework was flexible enough to provide for future measurement needs.

The background on performance measurement systems provided in the literature (Kaplan and Norton, 1996; 2001; Ghalayini *et al*, 1997; Kennerley and Neely, 2002) provided inspiration and acted as guiding lines for the development of a performance reporting tool for the outpatient department. In terms of structure the Activity Measurement Framework borrowed from the Balanced Scorecard, although the ensuing system could not be characterised balanced. The Integrated Dynamic Performance Measurement System (Ghalayini *et al*, 1997) appeared equally appealing to the managers involved in the research, as it establishes clear links between the performance measures at the top of the organisation and at the operational level (Ghalayini *et al*, 1997).

Due to the nature of healthcare services both managers and clinicians are involved with the long-term and daily running of the outpatient clinics and good communication between the two groups is essential (Chatziaslan and Bamford, 2005). The web-based, accurate performance

measurement system appeared to increase the confidence of clinicians in performance information, improve transparency and form the basis for common understanding and improved relationships between the two groups (c.f. Kollberg *et al*, 2007). Follow-up research would be required to explore this area more fully over an appropriate time period.

However, issues still existed regards the AMF: senior management regarded the tool as something “*to help control clinicians*”; the framework only provided a narrow view of one aspect of operational capacity and performance, expressed with the use of a simple number or ratio; the metrics did not incorporate perceptions of quality, nor take into account the differences in patient mix and practice among different clinicians (Dey *et al*, 2006). It was therefore vital to transparently communicate to all stakeholders that this new framework was a means of collating and communicating performance and capacity information rather than a performance management tool.

Conclusions

The methodology applied for collection of the research data was wholly appropriate and consistent with the perceived outcomes required. It generated ample data which facilitated discussion and the drawing of specific conclusions. This research has also provided a foundation for future work, especially with regard to the capacity and performance measurement and management of healthcare operations. The main contribution of this research is that it has added to the body of knowledge on healthcare capacity measurement, specifically through an exploration of the implementation of the AMF.

Starting with the measurement of capacity at the outpatient medical clinics of the hospital and moving on to assess the gaps in the measurement and reporting of performance, this research identified the need of the outpatient department for a performance measurement system. A simple to use, accurate system that could provide information in the requested format with a minimum of manual input.

Using ideas from the literature and specifically from the Balanced Scorecard and the Integrated Dynamic Performance Measurement System, a new framework was conceived and implemented. Although providing a rather one-dimensional view of operational activity, the potential for development is significant as the hospital moves towards the development of a (strategic) Balanced Scorecard. The AMF provides the basis for connecting strategic performance with operational baselines. For the future the hospital is focusing on: i) further development of metrics, especially financial performance information; ii) integration with the organisational performance measurement systems; iii) assessment of its effect on capacity and performance measurement and management.

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| | Initial Assumptions by Staff | Research Findings |
|---|--|---|
| Working hours/ year (for clinicians) | 40 weeks | 36 weeks |
| No of Doctors in the clinics | Steady throughout the planning period | Depends on the clinic, it can vary throughout the year |
| Demand | Increases | Steady decline |
| Capacity leakage | Patient Non Attendance is the biggest problem | Hospital Cancellations are the biggest problem |
| Capacity (in appointment slots) | 5,398 | 3,341 |

Table I – Initial resource capacity assumptions

| Specialty | A Throughput 2005-2006 | B Capacity (for 40 wks) | C Utilisation % | D Capacity (for 36 wks) | E Utilisation % |
|--------------------|---|--|--|--|--|
| Adult Medicine (M) | 1,743 | 2,471 | 71 | 1,451 | 120 |
| Gastroenterology | 794 | 840 | 95 | 613 | 130 |
| Cardiology | 1,091 | 1,487 | 73 | 1,025 | 106 |
| Adult Medicine (E) | 197 | 600 | 33 | 252 | 78 |

Table II - Throughput, capacity and utilisation

| | Content | Structure |
|------------------------------|--|--|
| Senior Management | Capacity utilisation - strategic performance targets | One-stop report |
| | Financial data (cost per clinic) | Fit with the potential organisational scorecard |
| | Fit with clinician's annual assessment | SPC charts |
| | Activity targets | |
| Middle Management | Comparison of performance against targets | Detailed and summary information |
| | Facilitate forward capacity planning as well as report on past performance | Diagrammatic representation of performance |
| | Increase transparency and accountability for the individual clinical teams | Three levels: Whole department – directorates – individual consultants (clinics) |
| | Connection with NHS targets | |

| | | |
|-------------------|--------------------------------------|---|
| Clinicians | Assess the activity in their clinics | Own performance and performance of colleagues |
| | Connection with their assessment | Anonymous |
| | New : Follow-up ratios | Diagrammatic representation of performance |
| | Use of clinic capacity | |

Table III – 12 Desirable Characteristics of a Performance Reporting Tool

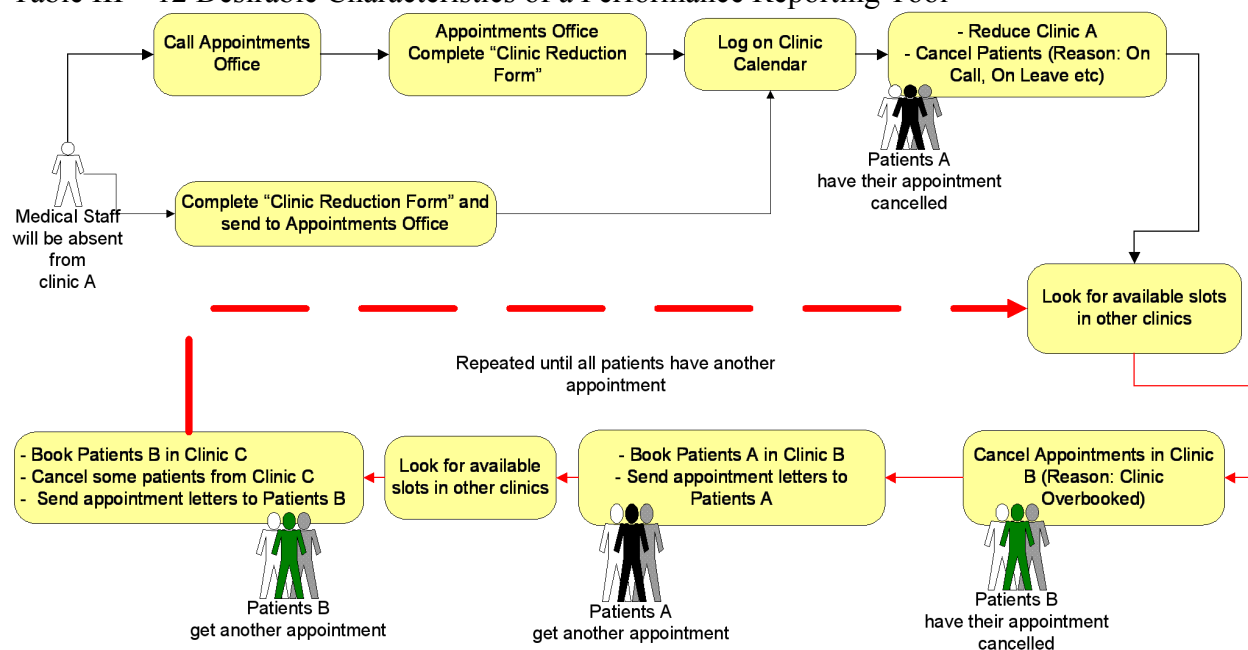


Figure 1: Hospital Initiated Appointment Cancellation Process

| Activity and Internal Capacity | | | | |
|----------------------------------|-----------|-------------|----------|------------|
| Metric | Indicator | Performance | Previous | Cumulative |
| New appointments available | | | | |
| New Patients seen | | | | |
| New DNAs | | | | |
| New DNA% | | | | |
| New Appointment Slot utilisation | | | | |
| Follow-Up appointments available | | | | |
| Follow-Up Patients seen | | | | |
| Follow-Up DNAs | | | | |
| Follow-Up DNA% | | | | |
| Follow-Up slot utilisation | | | | |
| Hospital Cancellations | | | | |

| | | | | |
|--------------------------------------|--|--|--|--|
| Ratio of New: Follow-up Appointments | | | | |
| Appointments in WLI Clinics | | | | |

Table IV: Activity Measurement Framework Metrics

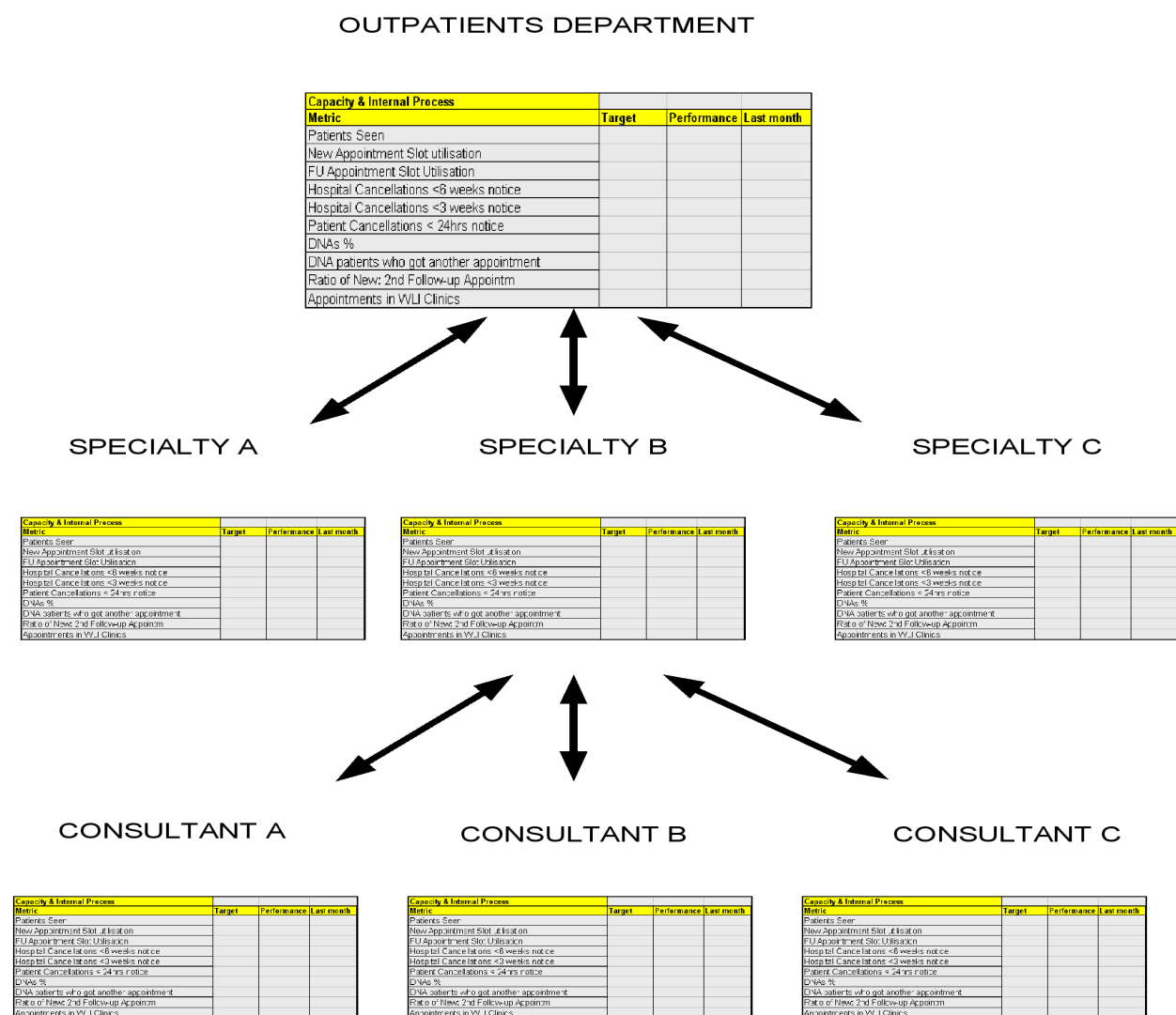


Figure 2: Activity Measurement Framework Structure