New South Wales Auditor-General's Report

Performance Audit

Managing operating theatre efficiency for elective surgery

NSW Health

audit office

OF NEW SOUTH WALES

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In accordance with section 38E of the *Public Finance and Audit Act 1983*, I present a report titled **Managing operating theatre efficiency for elective surgery: NSW Health.**

Peter Achterstraat.

Peter Achterstraat
Auditor-General
17 July 2013

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Executive summary

Background

Elective or planned surgery is defined as any form of surgery that a patient's doctor believes to be necessary and can be delayed by at least 24 hours. Examples are hip replacement, cataract extraction and breast surgery.

In 2011-12, approximately 210,000 patients had elective surgery in over 270 public hospital operating theatres in New South Wales. The cost of elective surgery within hospitals is estimated to be $1.3 billion each year or about 17 per cent of NSW Health's inpatient hospital services budget.

Across the NSW public hospital system, 45 per cent of all admissions to operating theatres are for elective surgery, 27 per cent for emergency procedures and 28 per cent for non-surgical procedures such as endoscopies. This balance in individual hospitals varies, as does the range and complexity of the surgical procedures undertaken.

These three types of procedures generally share the same operating theatre complex, management, staffing and scheduling issues. If the demand for emergency surgery and non-surgical procedures exceeds allocated resources, it can displace scheduled elective surgery.

The amounts and types of surgery performed at each hospital depend on the demand in the hospital's catchment area, the types of surgery its staff and facilities are credentialed to undertake, and the budget available. Waiting lists are maintained to ensure patients are treated in order of clinical urgency.

The management of waiting times for elective surgery within clinically recommended times has been a major focus of public and health management attention for the last ten years at least. This is set to continue for the next ten years as 'the reduction of waiting times for planned surgery' is a goal in the State plan NSW 2021.

There is also a new focus on the efficiency of surgical services and of operating theatres. This has been prompted by new activity based funding arrangements that will form the basis for hospital budgets in New South Wales from 2013-14. Hospital surgical budgets will be based on the 'efficient price' set by the State for each procedure. Hospitals whose costs are higher than this price will lose money when they undertake such procedures and will have an incentive to improve efficiency, or do less activity. Hospitals that operate efficiently will make a surplus and have an incentive to do more activities or invest surpluses in other areas of health need. This has major implications for the way surgical services and operating theatres are managed, and the information needed to support that management.

Technically complex surgery is made more complex by the need for specific surgeons, anaesthetists, theatre nurses, assistants and technicians to be in one place at the right time. Support is also frequently required from other hospital departments such as radiology or pathology. Some of these clinicians may have also been involved in preparing patients for operations and also in moving them in and out of theatres at the right time. Making sure this happens is a management challenge beyond clinical skills and roles. Practitioners must accept broader responsibilities and be willingly coordinated within the common goals and agreed standards of the operating theatre unit.

The responsibility for the efficient management of operating theatres rests with hospitals and their local health districts (LHDs). Operating theatre committees within hospitals, comprised of the key clinicians and managers, oversee the theatres' activities month-to-month. Statewide monitoring of LHD performance lies with the Ministry of Health. Assistance and guidance for improving clinical practices and management within operating theatre suites is with the Agency of Clinical Innovation and its Surgical Services Taskforce. NSW Health is the collective term for the overall framework.

The audit

The audit assessed how efficiently public hospital operating theatres are being managed to deliver elective surgery. The audit concentrated on efficiency because it is a key factor in meeting tightening national timeframes for elective surgery and ensuring that activity based funding budgets are achieved. Efficiency means the management of theatre time, costs, resources and staff to undertake as many procedures as possible within given levels of resources, or doing the same number of procedures using a lesser amount of resources.

The audit focused on elective surgery. The management of emergency surgery and non-surgical procedures were not included in the audit's scope except to the extent that they compete for operating theatre capacity and resources. Wider aspects of surgical patient care and performance were also excluded from specific examination, in particular length of stay, patient safety, patient outcomes and the quality of the patient experience. We recognise that all of these are important to the effectiveness of surgery and can place constraints on achieving efficiency.

Two primary criteria were applied to collect performance information and audit evidence:

- Are public hospitals meeting appropriate operating theatre efficiency targets?
- Do managers have the information they need to manage operating theatres efficiently?

Conclusion

There is room for operating theatres to be managed more efficiently and potential for more elective surgery at current funding and resourcing levels.

Over the last three financial years elective surgery numbers have grown by six per cent. Public hospitals are now treating patients from waiting lists substantially within national clinical timeframes. This is a significant achievement.

However, NSW Health is not meeting its three key elective surgery efficiency targets for theatre utilisation, cancellations on the day of surgery and first case starting on time. There is also wide variation against these efficiency targets between LHDs and hospitals of similar types across New South Wales.

There is scope for more elective surgery to be delivered with existing resources if operating theatres are managed more efficiently. The scale of the potential increase is difficult to determine with current information, but almost certainly amounts to many thousands more surgical procedures annually statewide.

The statewide elective surgery targets alone are insufficient to drive theatre efficiency at an LHD and hospital level. Those in charge of operating theatres need a wider range of efficiency indicators to drive performance.

Local management has access to some, but not all the information required to manage operating theatres efficiently. The major gaps relate to financial information, including the extent that physical operating theatre capacity is funded and used. Current budgets lack a full set of costs (of clinical staff time, prostheses and so on) and are not yet activity based. There is also a need to improve the reliability of the data captured in operating theatre information systems.

A further constraint is the lack of adequate management frameworks to deliver efficiency. The effectiveness of operating theatre committees is a key determinant here. Operating theatre committees vary in composition as do the roles played by key personnel and their accountability for efficient operating theatre performance.

With funding becoming firmly based on specified numbers of operations and targets to treat patients within national timeframes being set higher, incentives are increasing for operating theatre committees and hospital management to use and act upon the available information to increase efficiency. This focus must ensure that any future growth funding is used to achieve the targeted number of additional elective surgery patients.

Supporting findings

Public hospitals not meeting appropriate operating theatre efficiency targets

NSW Health reports three key high level efficiency indicators and targets for operating theatres, along with other measures, in a monthly dashboard report to monitor operating theatre performance statewide. These measures are appropriate for high level monitoring of operating theatre efficiency but are not as wide-ranging as those used in some other jurisdictions.

We found that none of the three key elective surgery efficiency targets were being met statewide for theatre utilisation, first case starting on time and cancellations. Performance against these targets varies significantly between LHDs and hospitals.

Operating theatre utilisation rates have averaged five per cent less than the target of 80 per cent over the last five years. A few hospitals and LHDs exceed the target, but most do not, suggesting there is scope for improvement. The target utilisation rates set in other states and overseas we examined were higher than for New South Wales. They range from 85 to 95 per cent.

There was continued poor performance against the first case starting on time indicator. Only around half of theatre sessions start on time against a target of 95 per cent with performance declining on this measure over the last eighteen months. Action being taken to address this issue appears to be having limited success.

More than 12,000 patients had their procedures cancelled on the day planned for reasons attributed to the hospital or the patient. This was more than twice the target cancellation rate of two per cent.

There is scope for more elective surgery to be delivered within existing resources. An incentive for this to occur is the national waiting list initiative requiring patients to be treated within clinically recommended timeframes. At December 2012, between 90 and 96 per cent of elective surgery patients must be treated within the timeframes. A new target of 100 per cent applies to the three clinical categories and timeframes from 2015. This is estimated to result in NSW Health undertaking 20,000 additional operations per year. The Audit Office estimates that this target can be reached if all hospitals were to meet the utilisation rate benchmark of 80 per cent by 2015.

We found that the three elective surgery operating theatre indicators used for statewide monitoring are also the predominant means by which managers at LHDs and hospitals monitor efficiency. They are not sufficient on their own to analyse and drive theatre efficiency locally. The new activity based funding arrangements will put a premium on hospitals knowing the relative efficiency of their surgical procedures, and the reasons why.

At present NSW Health does not isolate the cost of the operating theatre unit component. We used the full cost of selected elective surgical procedures as a surrogate indicator of operating theatre efficiency. The extent of the differences in the costs of the same procedures between LHDs and hospitals indicates further analysis is required if efficiencies in elective surgery are to be realised. Improved costing of surgical procedures and component costs, is expected during the transition to full activity based funding.

We found that elective surgery has not always increased relative to funding injections and theatre improvement initiatives over the last nine years. From 2003-04 to 2011-12, $325.5 million in growth funding was injected to reduce elective surgery waiting lists. This achieved an initial increase in admissions, but from 2006-07 admissions declined until 2009-10.

There is more physical capacity in hospitals than is currently being used for elective surgery. Greater understanding and justification of the utilisation of the physical capacity of operating theatres across the State, including differences between metropolitan and regional/rural areas, is required.

Theatre rooms are purpose built and expensively equipped for surgical procedures. Yet around a quarter of all cases in theatres (120,000) are non-surgical procedures such as endoscopies which would, if volumes are sufficient, be more efficiently performed in procedure rooms. We recognise that procedure rooms are not always appropriate when there are concerns about patient safety and in the case of smaller hospitals where procedure rooms cannot be cost justified.

Managers do not have all the information they need to manage operating theatre efficiency

We found that overall, there is limited use by local management of the information available in operating theatre systems to monitor efficiency. In hospitals we visited there was too much emphasis on monitoring the three key targets at the expense of other efficiency information and cost drivers, such as planned procedures versus actual procedures, theatre cost per minute/hour and turnover time between operations. Responses to a Ministry/Audit Office survey of operating theatre managers indicated that a wider suite of efficiency measures was needed to help them better assess and drive the efficiency of their theatre units. Complete and reliable data, and access to relevant reports, were critical constraints.

Currently, an almost universal gap in the information accessible to, and used by, operating theatre managers was details of the full cost of operating theatre activity and of the cost of the operating theatre unit as a portion of individual surgical procedures. Current operating theatre budgets typically do not include the costs of medical staff (surgeons and anaesthetists) or of all supplies costs (for example, prostheses), although some hospitals are clearly moving beyond these limitations as the costing analysis to support activity based funding improves.

The introduction of activity based funding and more complete information will not be enough to drive efficiency without stronger management arrangements at hospital level. We found that many operating theatre managers had limited management authority. Inconsistencies in the use and composition of theatre management committees contributed to a lack of clarity around roles and a lack of accountability for meeting targets. In hospitals visited, the composition of operating theatre committees varied from high levels of executive and clinician engagement to very limited participation. The information reported on operating theatre performance, and acted upon, varied similarly. This lack of adequate efficiency reporting makes it difficult to effectively hold key players such as nurses, surgeons and anaesthetists accountable for operating theatre efficiency and to drive change.

Recommendations

Strengthening operating theatre management

LHDs supported by the Ministry and the Agency for Clinical Innovation should, by 30 June 2014, develop operating theatre better practice management guides which cover:

- the role and composition of the operating theatre committee
- clearly defined operating theatre related roles and accountabilities of key positions such as the heads of surgery and anaesthetics, surgical department heads, directors of medical and nursing services, theatre managers, theatre nurse unit managers and business managers
- performance management arrangements, including regular efficiency reporting against accountabilities and targets for these key positions and clinical staff (staff specialists, visiting medical officers and nursing staff) to deliver efficiency, throughput and other measures of performance

- operating theatre management committee connections to their hospital and LHD executive to support effectiveness and to other committees in order to share knowledge and experiences (page 33).

Helping LHDs and hospitals to develop better efficiency measures

LHDs supported by the Ministry, the Agency for Clinical Innovation and the Surgical Services Taskforce should, by 30 June 2014, develop guidance on better practice theatre efficiency measures incorporating:

- a stocktake of currently available performance data and review of the capabilities of operating theatre and financial information systems
- a suite of efficiency indicators across aspects of costs, time, activity and resources which are readily accessible by managers
- education programs to build awareness of how efficiency indicators can be assessed and used to allow more meaningful efficiency monitoring and reporting
- benchmarking of selected efficiency measures across hospitals and LHDs (page 31).

Providing managers with efficiency information they can trust

NSW Health should, by 30 June 2014, implement improved controls over data collection to ensure consistency and reliability in the collection and reporting of operating theatre efficiency measures (page 31).

Ensuring elective surgery initiatives deliver results

As part of the implementation of activity based funding, the Ministry and the LHDs, should by 30 June 2014, ensure that performance frameworks used include mechanisms to:

- monitor the relationship between additional funding and additional activity to deliver targets at LHD and hospital levels, for example, increased elective surgery activity levels
- regularly evaluate the impact of theatre efficiency initiatives on the levels of elective surgery and other efficiency measures (page 26).

Understanding the extent to which the physical capacity of operating theatres is used

LHDs and their hospitals should, by 30 June 2014, improve their monitoring of the extent that the physical capacity of operating theatres is used and the constraints on greater use. Measures should allow comparison by theatre of actual hours used, booked hours and funded hours, and allow monitoring of the number of surgical procedures planned and undertaken (page 24).

Potential to free up theatre capacity for elective surgery

LHDs supported by the Ministry and the Agency for Clinical Innovation should, by 30 June 2014:

- regularly monitor the extent to which theatres are used for non-surgical procedures
- establish plans for minimising the use of operating theatres for non-surgical procedures, based on considerations such as patient safety, availability of staff and equipment, the co-location of services and benefit cost analysis (page 25).

Monitoring the cost of operating theatres

LHDs supported by the Ministry should, by 30 June 2014:

- improve the reliability of capturing cost information for surgical procedures, including the cost of operating theatre units as a key component
- complete an initial analysis of variations in the costs of procedures, both within and between hospitals and LHDs, to identify and address drivers of inefficiencies
- incorporate cost benchmarks and measures into the revised suite of efficiency indicators recommended above (page 29).

Response from NSW Health

NSW GOVERNMENT | Health

Trim No.: H13/65975

Mr Peter Achterstraat
Auditor-General
Audit Office of New South Wales
Level 15, 1 Margaret Street
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Dear Mr Achterstraat

Performance Audit – Managing Operating Theatre Efficiency for Elective Surgery

Thank you for providing the final version of your report entitled 'Performance Audit: Managing Operating Theatre Efficiency for Elective Surgery'.

Please find attached NSW Health's formal response for inclusion in the report as per your request.

As indicated in our response, the Ministry, ACI and LHDs welcome the findings and recommendations of this report as a positive contribution to the service quality and efficiency improvement efforts that are already under way across the NSW health system.

I would like to thank you and your team for a highly professional and constructive approach that was demonstrated throughout the audit process, resulting in a valuable and useful final report.

Yours sincerely

Ken Whelan
Acting Director General

04 JUL 2013

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NSW Health Response

NSW Health welcomes the Managing operating theatre efficiency for elective surgery report and accepts the recommendations of the NSW Audit Office.

The report identifies many of the key areas that the Ministry of Health, the Agency for Clinical Innovation (ACI) and the Local Health Districts (LHD) and Specialist Health Networks (SHN) are currently working on to continuously improve the efficiency and effectiveness of surgical services in NSW. It also identifies areas where more improvement effort should be invested.

NSW Health is committed to the provision of safe, patient-focussed surgical services that have strong clinical governance and provide value for money. In pursuing further improvements, we will be building on many excellent achievements highlighted in this report, including the achievement of some of the highest percentages of patients treated within clinically recommended timeframes anywhere in the country.

The definition and measurement of operating theatre efficiency is complex and involves the analysis of many elements in the surgical patient journey. The approach by the Ministry of Health, ACI and LHDs/SHNs is to improve processes not only within operating theatres but across all other related areas that impact on the operating theatre efficiency. These include the surgical booking office, preadmission services and the models of care that a hospital has adopted to admit and discharge patients for their episode of care.

A number of key strategies are already underway to address the recommendations raised in the report. These include:

Leadership from the NSW Surgical Services Taskforce

The NSW Surgical Services Taskforce (SST) was established in 2004. The Taskforce is comprised of expert clinicians and LHD managers and its objective is to improve the delivery of surgical services in NSW. The SST in conjunction with the ACI and the Ministry of Health has been instrumental to the initiation and delivery of a range of improvements in surgical services in NSW. Some of these improvements include ensuring that elective surgical patients are being treated within clinically recommended timeframes, developing models of care such as for Extended Day Only patients and Emergency Surgery patients.

Development of Guidelines/Toolkits to promote best practice

The Ministry and the ACI have developed a number of guidelines and information booklets that provide LHD staff with information on models of care. These include High Volume Short Stay Surgical Units, Emergency Surgery, Pre Procedure Preparation and Waiting List Management, Surgical Service Self Assessment Checklist.

The ACI and Ministry of Health are in the planning phase for the development of best practice guidelines for operating theatre management and governance - one of the key recommendations of this Audit Report.

Hospital Visit Program

In early 2013, the Ministry's Surgery Team embarked on a program of planned visits to NSW hospitals that provide surgical services. The aim of this program is to provide practical advice and coaching for LHD staff to deliver best practice in processes that impact on surgical services, including utilisation of operating theatres.

Clinical Redesign Program

The ACI continues to conduct a Surgery Redesign Training Program (a one week dedicated training program) that provides LHD staff with the practical skills to implement changes in their workplace. The attendees come with a specific surgery project that is worked through during the week. Projects cover any aspect of the surgical patient journey including Operating Theatre efficiency.

Sharing of lessons and practice innovations between LHDs

NSW Health has a number of different resources to assist in the sharing of best practice. These include a regular surgery managers' teleconference, a bimonthly newsletter Surgery News, resources on the 'Australian Research Centre for Healthcare Innovations' (ARCHI) website and specific workshops that promote efficiency.

Access to Performance Information

NSW Health has made significant advances in its information management capacity and capability in recent years. This includes state-wide implementation of a range of clinical information systems, electronic medical records and operating theatre management systems. These operational, clinical systems offer a wealth of data that can be analysed and reported to clinicians and managers to guide their quality and efficiency improvement efforts. Recent developments of the state-wide Enterprise Data Warehouse, which includes daily feeds from hospitals' operating theatre management system, will enable a range of performance reports to be developed and delivered to local decision-makers. This will include an extended set of indicators as recommended in this Audit Report.

Improvements in Costing Information

NSW Health is entering the second year of its implementation of the new Activity Based Funding (ABF) model, the aim of which is to transparently link the volume of health services provided to patients with the funding that health providers (LHDs and SHNs) receive for these services. This includes surgical services and, within that, operating theatres as one of the key inputs into the surgical activity. Progressive implementation of ABF has already resulted in improved quality of activity and costing data collected by hospitals and LHDs/SHNs. It is expected that these improvements will continue in future years, enabling a more in-depth understanding of service outputs and outcomes as well as specific cost components of each service stream. The report's recommendations are very much aligned with the general direction of NSW Health's funding reform and ABF as its key tool.

The Managing operating theatre efficiency for elective surgery report confirms the direction that the NSW health system is already taking and reaffirms our commitment to achieving positive improvement to operating theatre efficiency while ensuring that patient safety is paramount.

Introduction

Challenging times ahead for NSW Health to increase elective surgery efficiency

There are increasing pressures on the NSW public health system's operating theatres to perform more efficiently.

By 2015, NSW Health is to increase the proportion of patients on waiting lists who receive their elective surgery within clinically prescribed times to 100 per cent from between 90 to 94 per cent. This is estimated to be 20,000 (or nine per cent) more patients per year.

There is growing pressure on NSW Health to ensure that patients in the non-urgent category are treated on time as many are coming closer to the limit of 365 days.

National funding is increasingly focused on the numbers and costs of elective surgery procedures undertaken within hospitals. The expectation is that efficiencies will result in many more operations being performed for similar levels of funding. This could result in some hospitals performing less elective surgery unless efficiency can be improved.

1.1 The role of an operating theatre

There are over 270 operating theatres in 99 public hospitals across New South Wales. Most are used to undertake elective (planned) and emergency (unplanned) surgery, and may also be used to undertake simple non-surgical procedures. They are usually located in a suite of theatres and supporting rooms for preparation and waiting, recovery and discharge, and administration. The size of the suite will depend on the location and type of hospital. They will be larger and contain more complex equipment in tertiary teaching hospitals, compared to small rural hospitals with a single theatre.

Forty five per cent of attendances at operating theatres are for elective surgery

Forty five per cent of total theatre attendances are for elective surgery, 27 per cent for emergency procedures and 28 per cent for non-surgical procedures such as endoscopies. The audit takes into account emergency and non-surgical admissions and procedures to the extent that they compete for operating theatre capacity and resources.

Emergency surgery operates under a different model of care with separate lists and allocation of clinicians, the use of specifically assigned theatres with significant amounts of surgery undertaken outside usual working hours. As emergency surgery shares the same operating theatre complex, there are shared management and coordination issues, and some of the audit's recommendations have application to emergency surgery. If emergency surgery demand exceeds allocated resources it can displace scheduled elective surgery.

Non-surgical procedures are also carried out in operating theatres

Who is responsible for the efficient use of operating theatres?

Hospitals and their local health districts (LHDs) are responsible for the efficient management of operating theatres. The fifteen geographical-based LHDs and two specialist health networks (Sydney Children's Hospitals Network and St Vincent's Health Network) have boards and chief executives to take on the devolved responsibility and accountability for delivering health services largely via their hospitals. Each chair and chief executive has signed a service agreement with the Director General of the Ministry of Health to meet service obligations and performance requirements, including some relating to surgical activity, waiting lists and hence operating theatres. The Board and Chief Executive of the LHD have corresponding formal agreements with hospital general managers to deliver the services. Within hospitals, those responsible include operating theatre committees, operating theatre unit managers, directors of medical services and heads of surgery and anaesthetics.

The Ministry of Health (previously the NSW Department of Health) and its Director General are responsible for supporting the roles of the Minister for Health, including statewide planning and monitoring the performance of LHDs and hospitals. The Ministry holds monthly meetings with each LHD executive team to review performance against targets/benchmarks and strategies to achieve them.

The Agency for Clinical Innovation and its Surgical Services Taskforce play an important role

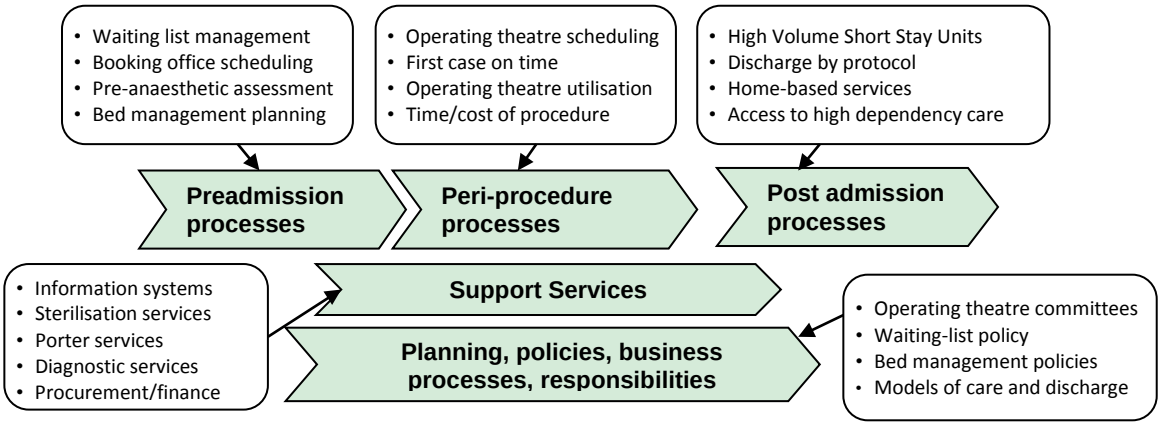
The Agency for Clinical Innovation and its Surgical Services Taskforce play an important role providing assistance, education and guidance to clinicians to develop improved methods of care and management. Other pillar agencies include the Clinical Excellence Commission that assists with quality and safety of care, and the Bureau of Health Information that provides independent reports on the performance of the NSW public health system.

NSW Health is the umbrella term for public health organisations across the state.

The elective surgery journey

To provide elective surgery a long list of activities and people must be co-ordinated within hospitals. These include patients, waiting lists, surgeons, anaesthetists, nurses, radiologists, porters and administrators. For this to occur, the responsible professionals must have capable systems, credible information and effective management structures. The diagram below indicates the level of co-ordination required for a successful elective surgery journey.

Exhibit 1: Coordinating an elective surgery journey within hospitals



Source: *Applying Clinical process redesign methods to planned arrivals in NSW hospitals*, Medical Journal of Australia, MJA 2008; (6 Suppl): S23-S26 with Audit Office additions.

Appendix 1 contains a long list of factors prepared by the Ministry that could impact the efficiency of operating theatres.

Hospital information systems collect quality, safety and performance data relating to the patient's journey. Data is collected to support such efficiency measures as utilisation of booked theatre time, case durations, case turn-around times, late starts, early finishes, long stays in recovery, theatre cancellations, use of prostheses and activity by surgeons and anaesthetists.

1.2 Waiting times for elective surgery

National targets for treating patients off the waiting list must be met

National targets for elective surgery

An agreement between the Commonwealth, State and Territory governments in August 2011 resulted in the National Elective Surgery Target or NEST. Its aim is to ensure that elective surgical patients are treated within clinically recommended timeframes. There are three related categories: Category 1 patients are to be treated within 30 days, category 2 patients within 90 days and category 3 patients within 365 days. The decision to place a patient on the waiting list and within a category is made by the treating clinician based on NSW Health guidelines. As indicated in Exhibit 2, the targets are gradually being increased to 100 per cent by 30 December 2015. For the financial year 2010-11, approximately 80 per cent of patients were in category 3, 17 per cent in category 2 and three per cent in category 1.

To reach the target of treating 100 per cent of waiting list patients within clinically recommended times, the Audit Office estimates that this equals 20,000 (or nine per cent) more patients per year.

Exhibit 2: National elective surgery targets 2012 to 2015

	Category 1 %	Category 2 %	Category 3 %
By December 2012	96	90	92
By December 2013	100	93	95
By December 2014	100	97	97
By December 2015	100	100	100

Source: Ministry of Health.

The importance of managing elective surgery waiting times is recognised in the State Plan NSW 2021: A Plan to Make NSW Number One (September 2011). Goal 12 in the plan is to provide world-class clinical services with timely access and effective infrastructure and a target/goal to reduce hospital waiting times for planned surgery.

Performance against national targets

National targets being met but waiting times for category 3 under pressure

The proportion of NSW Health patients treated within the clinically recommended timeframes met national targets for categories 2 and 3 at December 2012 and just fell short of the target for category 1 patients (ending the year one percent below the target of 96 per cent). During the period from June 2008 to December 2012, category 1 improved from 93 to 95 per cent and category 2 from 79 to 91 per cent, with category 3 falling from 95 to 92 per cent. Latest NSW Bureau of Health Information figures for the January to March 2013 quarter indicate that the categories were 99, 94 and 94 per cent respectively.

Over the period from June 2008 to December 2012, the length of time patients are waiting for elective surgery has been fairly static for categories 1 and 2 with median times of 11 and 48 days respectively at June 2012. Category 3 waiting time has increased over the period by 72 days (128 days to 200 days) and is on average longer than other States. Latest NSW Bureau of Health Information figures for the January to March 2013 quarter indicate that the median waiting time for category 3 increased to an average of 230 days.

For the calendar year 2012, the median waiting time for category 3 elective surgery patients in New South Wales was 200 days, almost 100 days longer than reported for Victoria (median of 105 days) and Queensland (median of 109 days). However, it should be noted that there are some differences in the data collection and reporting methodologies across jurisdictions.

As noted above, over the next three years NSW Health is to increase the proportion of patients on waiting lists who receive their elective surgery within prescribed times to 100 per cent. This will require increased efficiency in the elective surgery journey and possibly limiting more surgery through applying ‘appropriateness’ tests.

Appropriateness of surgical procedures

Criteria are being developed to test the appropriate-ness of some elective surgery

There is discussion at an international level about under what circumstances some elective surgery procedures should take place. It is occurring because of the significant increase in some types of elective surgery and the related costs. Examples of such procedures in orthopaedic surgery are hip and knee replacements. Examples in ear/nose/throat surgery include tonsillectomies and insertion of grommets. Cosmetic surgery and circumcision already must meet an identified clinical need to improve the physical health of the patient.

The development of evidence based appropriateness criteria for elective procedures will help prioritise patients and can provide an opportunity for reducing procedures and costs. Studies in the United States applying appropriateness criteria have revealed that many elective procedures are overused.

A model of care is currently being trialled for the assessment of hip and knee surgery in seven LHDs across New South Wales. The model is to support 'rational clinical management and equitable clinical decision-making for better delivery of healthcare, as well as improved health service planning and resource allocation'.

1.3 Elective surgery and operating theatre initiatives

There have been significant initiatives and growth funding in an attempt to increase elective surgery

Current elective surgery and operating theatre initiatives in NSW Health can be traced back to at least 2003-04. A significant development at the time was the formation of the Surgical Services Taskforce to support strategies and targets to better manage waiting times.

Strategies then were based around similar elective surgery waiting list categories as are in place today and were included in NSW Health's Clinical Services Redesign Program.

Specific initiatives related to the Clinical Services Redesign Program targeting elective surgery and operating theatres were:

- the development of a surgery dashboard with indicators for utilisation, cancellation rates and numbers of operations (2006)
- Predictable Surgery Program developed by the Surgical Services Taskforce and built around principles to have the right patient, having the right operation, undertaken by the right staff in the right place (2005)
- introduction of extended day only (EDO) wards for surgical services to enable patients requiring a longer stay after some day procedures to still present as a short stay patient by receiving overnight care (2005)
- release of the Pre-Procedure Preparation Toolkit to ensure best practice in pre-procedure preparation (2007)
- development of the Emergency Surgery Guidelines – a framework for the delivery of emergency surgery in New South Wales (2009)
- design and implementation of Surginet, a statewide operating theatre information system (2007)
- the enhancement of education and training programs for nursing managers (2011)
- support for high volume short stay practices (arising from the Surgical Future Plans sponsored by the Surgical Services Taskforce (2012).

These initiatives were supported through budget funding for increased surgical procedures. From 2003-04 to 2011-12, $325.5 million in additional growth funding was provided for elective surgery enhancement. This was in addition to capital investment in refurbished and new operating theatre complexes.

1.4 Move to funding based on activity

Activity based funding is creating incentive for operating theatres to perform more efficiently

Activity based funding is part of recent national agreements and is being introduced to provide more direct funding of public hospital services. Activity based funding allocations are based on the activities or procedures undertaken multiplied by an efficient price calculated on the actual cost of service delivery in a range of hospitals across Australia. The funded surgical procedures are classified using the Australian-Refined Diagnosis Related Groups (AR-DRG).

Activity based funding will put pressure on hospitals to deliver surgical services at or below the 'funded' efficient price, or to reduce provision of such services. The aim is to encourage more efficient hospitals, and thus provide more elective surgery overall for the same price.

For management in individual hospitals and LHDs this requires much greater attention to, and information on, the costs of providing specific services, and the components of those costs. For surgical services, this includes all stages of the patient's journey.

Activity based funding is being implemented and is currently in a transitionary stage with a combination of funding based on service activity and bulk allocations for small facilities. NSW Health is making steady progress in implementing activity based funding.

1.5 The audit

In this environment the management of surgical services and operating theatres require comprehensive information about how they are performing, a range of targets focusing on time, costs and surgical procedures, and effective management structures to enforce the strategic directions.

The audit assessed how efficiently public hospital operating theatres are being managed to deliver elective surgery.

The audit focused on efficiency and the management of theatre time, costs and staff to undertake as many elective procedures as possible using the existing levels of resources, or doing a set amount of procedures with a minimum amount of resources. We also acknowledge that other matters such as patient safety, clinical outcomes and equity must be balanced to achieve quality patient care, although these were not a primary focus of the audit. Such factors are important to the effectiveness of surgery and can place constraints on achieving efficiency.

The audit's approach to assessing operating theatre performance had four elements:

- assessing data used at the State, LHD and hospital levels to manage operating theatre efficiency
- conducting a survey of operating theatre managers across the State (in conjunction with the Ministry)
- visiting hospitals as case studies
- discussions with stakeholders, both within and outside the public health system.

Key findings

2. Are public hospitals meeting appropriate operating theatre efficiency targets?

Finding: NSW Health is not meeting its own elective surgery efficiency targets and there is a wide variance in LHD and hospital theatre efficiency. This suggests that there is significant room for more elective operations to be conducted without the need for more resources. Given the changing health funding environment which ties funding to meeting national targets for conducting surgery within set time frames, it's now critical for health to make the best use of available theatre resources.

2.1 Are the efficiency benchmarks/targets appropriate?

It is difficult to compare the performance of hospital operating theatres and monitor their efficiency using the statewide KPIs alone. They are a 'one size fits all' approach and at an aggregated level don't differentiate between hospitals undertaking different caseloads.

NSW Health uses a high level 'dashboard' report containing 26 benchmarks/targets to monitor the performance of surgery in LHD across the State. An example is provided in Appendix 2.

The dashboard contains three targets of operating theatre efficiency: utilisation rate, first case on time theatre starts and cancellations on the day of surgery. The dashboard contains two other targets that contribute to efficiency of operating theatres and throughput of patients: extended day only performance on specific procedures and day of surgery admissions.

Utilisation rate is an indicator of the efficiency of access and throughput of patients treated in dedicated elective theatre sessions. It measures the time from the patient entering to leaving the operating theatre divided by the booked theatre time. The target is for an 80 per cent utilisation. Included in the indicator are unplanned emergency surgery cases that sometimes take the place of scheduled elective cases.

First case on time aims to promote efficiency by measuring differences between the actual time the first patient enters the theatre and the scheduled start time for the session. The target is for 95 per cent of first cases being on time.

Cancellations on the day of surgery are caused by hospital and patient related issues. The target is for less than two per cent of those scheduled being cancelled on the day of surgery.

Routine sessions for procedures in operating theatres in large to medium-sized hospitals are normally in eight hour or two four hours sessions per week day (approximately 230 days a year) typically starting at 8 am. Variations can occur in busy hospitals where additional shifts are added going into the evening, and at small regional hospitals where elective surgery in theatres may only occur on infrequent days over a year. Clinicians are allocated to the sessions via an operating theatre scheduled.

High level targets alone are not sufficient for measuring operating theatre efficiency

The key targets are intended for high level use at the Ministry and the Surgical Services Taskforce level, and alone are insufficient for measuring and managing operating theatre efficiency at the hospital and LHD levels.

At an LHD level, the use of high level targets as indicators makes it very difficult to compare the efficiency of one hospital against another.

In hospitals visited, theatre managers told us there was too much emphasis on the key targets and that a wider suite of indicators was needed to help them to monitor and drive theatre efficiency. This was also the key message coming out of the Ministry/Audit Office

survey as discussed in the next chapter, where the majority of theatre managers wanted more information about how efficiently their theatres were performing.

In some other jurisdictions, high level targets and indicators 'cascaded' down into a more detailed set of measures for frontline managers of operating theatres to keep a closer watch on efficiency. Adopting these detailed measures across all hospitals (of similar type/caseload) allows managers in each hospital to compare themselves with others and better understand causes and management solutions for less than efficient performance.

Other jurisdictions offer better regimes for managing operating theatre efficiency

Better practice operating theatre efficiency regimes

The Audit Office looked at how other jurisdictions are measuring theatre efficiency.

An example of an efficiency regime is Ontario's Surgical Efficiency Targets Program in Canada. It has five performance categories and eighteen KPIs that hospitals report on and include four core targets for high level comparison. The approach supports accountability and process improvements through consistent measuring against consistent KPIs and allowing the benchmarking of comparable hospitals. Hospitals report on such efficiency indicators as start-time accuracy, case time effectiveness and utilisation as indicated in the exhibit below. Much emphasis is placed on consistent and accurate data collection against these measures.

Exhibit 3: Ontario's Surgical Efficiency Targets Program - indicators and descriptions

Category	Description	Indicators	Targets
Start Time Accuracy	• Measure whether or not surgical cases are starting on time, as scheduled. Measuring start times. • Helps to ensure that operating room time and resources are not wasted due to delays	• % First Case On-Time or Early • % Subsequent Case On-Time or Early	85%
Case Time Effectiveness	• Detailed information about how effectively time in the operating room is being used • Objective is to equate the amount of time spent in the operating room with the amount of time that was scheduled for a particular surgery	• Average Patient In to Patient Out Minutes • Average Patient in to Anaesthesia Ready Minutes • Average Turnover Minutes • % Scheduling Accuracy	
Utilisation	• How well operating room resources are both planned and utilised • Utilisation management is a balancing act between minimising waste and enabling flexibility to accommodate emergency cases	• % Utilisation 7am-3pm • % Same Day Add-on Weekdays • % Unplanned Closures • % Same Day Cancelled or Postponed	90 to 100%
Quality and Safety	• Ensure appropriate patient preparedness for surgery and that the surgical team is taking steps to maximise patient safety • Include conducting the mandatory requirement to conduct the Surgical Safety Checklist prior to surgeries	• % Patients Screened Prior to Surgery • % Surgical Checklist Compliance • Unplanned return to surgery <24 hrs	100% 100%
Scheduling	• Measure the proportion of surgeries that are booked as elective versus emergency surgery, providing insight into hospital booking processes and helping to ensure that cases are being scheduled appropriately	• % Priority 1 Cases • % Priority 1A Access within 0-2 hrs • % Priority 1B Access within 2-8 hrs • % Priority 1C Access within 8-48 hrs • % Priority 1D Access within 2-7 days	

Source: Surgical Efficiency Targets Program, Ontario, Canada.

A further example of better practice is provided by the United Kingdom's 'The Productive Operating Theatre' or TPOT initiative within the National Health Service. It provides a comprehensive set of measures within four domains – safety, team, value and patient. The measures to monitor and drive efficiency are aimed at different levels of management oversight ranging from front line theatre teams and management, to finance and service directors, and to the hospital executive. An extract of TPOT's measures is included in Appendix 3.

In Australia, we found better practice in the Victorian Department of Health where a guide for measuring surgery performance was produced as part of its clinical services redesign program. It provides a suite of measures aligned to priorities translated to a hospital level, including benchmarks for the average cost of an operating minute (see Appendix 4).

Theatre efficiency information and measures at a hospital and LHD level are further discussed in Section 3 of this report.

2.2 Performance against the targets

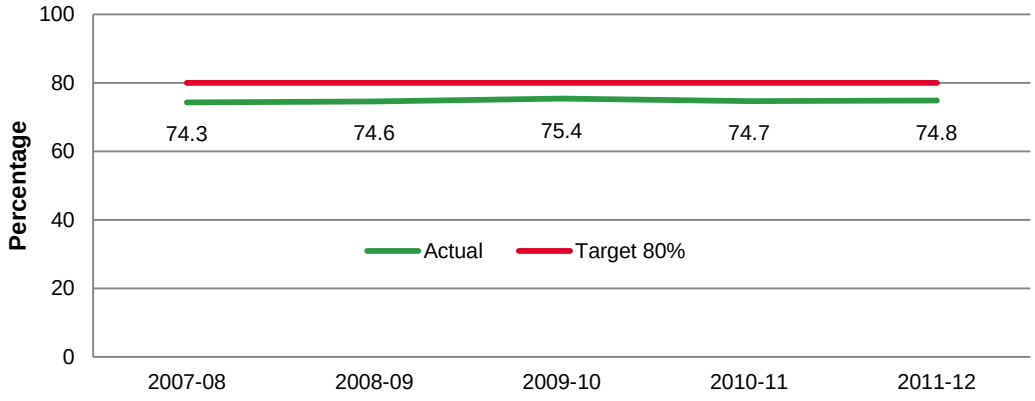
There is under-performance against operating theatre efficiency targets

NSW Health operating theatre efficiency targets are not being met for utilisation of booked time, commencing the first case on time and cancellations on the day of surgery. Performance against these targets varies significantly between hospitals.

Percentage utilisation

The target for operating theatre utilisation of 80 per cent is not being met overall. It has averaged around five per cent less than the target over the last five years. We estimate that by increasing utilisation by the five per cent would equate to over 20,000 additional patients being treated each year. The New South Wales benchmark is lower than that suggested in research and used in other jurisdictions we examined. Research in Victoria by Monash Medical Centre and Peninsula Health suggest a utilisation target rate of 85 to 90 per cent. Queensland has a target theatre utilisation rate of 85 per cent while Ontario, Canada has a 90 per cent minimum utilisation target.

Exhibit 4: Percentage theatre utilisation rate against target for New South Wales 2007-08 to 2011-12

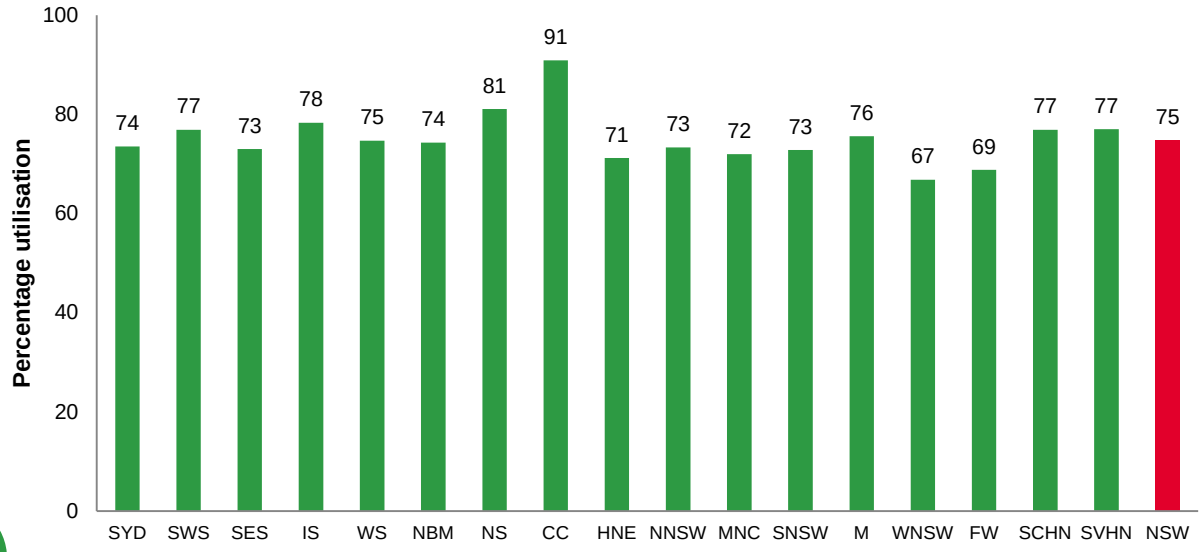


Source: NSW Ministry of Health.

There is significant variation in utilisation rate performance between LHDs. Two LHDs exceed the target (and one reaches the 90 per cent benchmark used in Ontario, Canada). The rest fall below the target, reaching as low as 67 per cent utilisation as shown in Exhibit 5.

Utilisation of booked operating theatre varies across LHDs and hospitals

Exhibit 5: Percentage theatre utilisation rate by LHD for 2011–12



Key for LHDs:

SYD = Sydney; SWS=South Western Sydney; SES = South East Sydney; IS = Illawarra Shoalhaven; WS = Western Sydney; NBM = Nepean Blue Mountains; NS = Northern Sydney; CC = Central Coast; HNE = Hunter New England; NNSW = Northern NSW; MNC = Mid North Coast; SNSW = Southern NSW; M = Murrumbidgee; WNSW = Western NSW; FW = Far West; SCHN = Sydney Children Hospitals Network; SVHN = St Vincent's Health Network; NSW = Average for all LHDs.

Source: NSW Ministry of Health.

The degree of variance in utilisation rates is even higher at a hospital level, as seen in Exhibit 6 that compares hospitals in like peer groups.

Exhibit 6: Variation in percentage theatre utilisation rate by hospital peer group (July to December 2012)

	Peer Group A		Peer Group B		Peer Group C		Peer Group D	
Lowest utilisation rates	Prince of Wales	71%	Hornsby	67%	Maclean	46%	Gloucester	61%
	St Vincent's	74%	Tamworth	68%	Queanbeyan	61%	Scott Memorial, Scone	69%
	Nepean	75%	Manning	69%	Inverell	61%	Wauchope	73%
Highest utilisation rates	Royal Prince Alfred	84%	Shoalhaven	80%	Moruya	84%	Cootamundra	87%
	Royal North Shore	86%	Fairfield	90%	Cooma	86%	Narrandera	87%
	Gosford	88%	Wyong	92%	Young	91%	Temora	100%

Key:

Peer Group A = principal referral hospitals (very large hospitals providing a broad range of services, including specialised units at a state or national level); Peer Group B = major hospitals (large metropolitan and non-metropolitan hospitals); Peer Group C = district group hospitals treating less than 10,000 patients per annum (ranging from medium size metropolitan hospitals to smaller rural hospitals); Peer Group D = community facilities offering some surgical services.

Source: NSW Ministry of Health.

Despite some inconsistencies and accuracy issues with this indicator, the scale of variation between LHDs and hospitals on these indicators suggests there is room for improvement.

Continued poor performance against commencing first case on time target

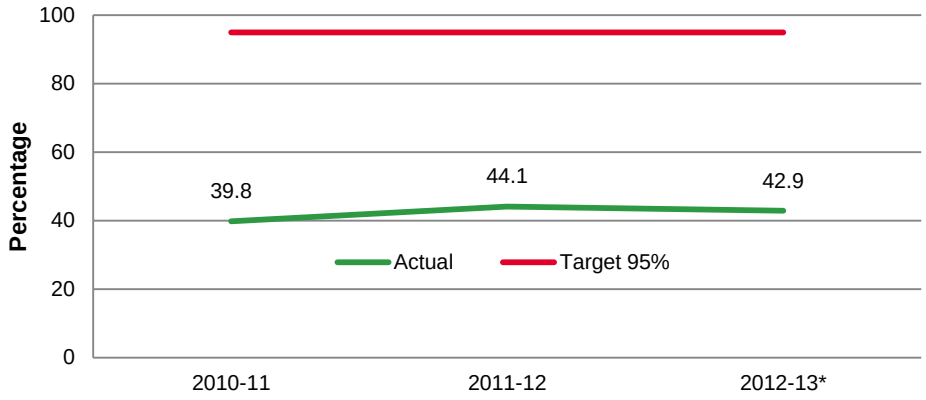
First case on time

The first case on time target requires 95 per cent of elective surgery sessions to start at the scheduled start time.

Overall performance against the first case on time indicator has been well below the benchmark set by NSW Health. It is at or around half the 95 per cent target, over the past three years. Even if New South Wales used the lower benchmark of 85 per cent used in some other jurisdictions, its performance would still fall well below it.

In recent years the Ministry has conducted a survey and funded projects at the hospital level in an attempt to address this issue and identify better practice examples for others. So far they appear to have had limited success in terms of overall results on this measure.

Exhibit 7: Percentage of first cases on time for New South Wales from 2010-11 to 2012-13

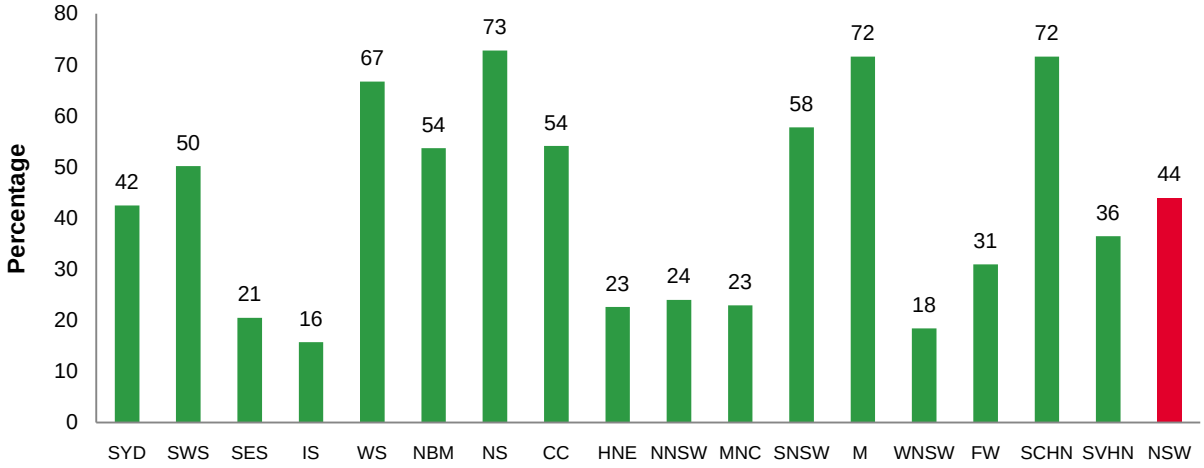


Source: NSW Ministry of Health.

* Note: Data only available from July 2012 to December 2012.

There is significant variation in performance between LHDs ranging from 16 to 73 per cent as shown in Exhibit 8.

Exhibit 8: Percentage of first cases on time by LHD for 2011-12



Key for LHDs:

SYD = Sydney; SWS=South Western Sydney; SES = South East Sydney; IS = Illawarra Shoalhaven; WS = Western Sydney; NBM = Nepean Blue Mountains; NS = Northern Sydney; CC = Central Coast; HNE = Hunter New England; NNSW = Northern NSW; MNC = Mid North Coast; SNSW = Southern NSW; M = Murrumbidgee; WNSW = Western NSW; FW = Far West; SCHN = Sydney Children Hospitals Network; SVHN = St Vincent's Health Network; NSW = Average for all LHDs.

Source: NSW Ministry of Health.

The degree of variance in first case rates is even higher at a hospital level, as seen in Exhibit 9 that compares hospitals in like peer groups.

Exhibit 9: Variation in first case on time percentages by hospital by peer group (July to December 2012)

	Peer Group A		Peer Group B		Peer Group C		Peer Group D	
Lowest first case on time rates	Wollongong	18%	Sutherland	8%	Ballina	2%	Wauchope	23%
	Gosford	19%	Shoalhaven	8%	Kurri Kurri	4%	Gloucester	55%
	John Hunter	22%	Manning	9%	Bellinger River	7%	Corowa	56%
Highest first case on time rates	Bankstown	84%	Auburn	68%	Muswellbrook	85%	Springwood	92%
	Royal North Shore	86%	Campbelltown	73%	Young	93%	Temora	100%
	Liverpool	89%	Fairfield	96%	Ryde	97%	Leeton	100%

Key:

Peer Group A = principal referral hospitals (very large hospitals providing a broad range of services, including specialised units at a state or national level); Peer Group B = major hospitals (large metropolitan and non-metropolitan hospitals); Peer Group C = district group hospitals treating less than 10,000 patients per annum (ranging from medium size metropolitan hospitals to smaller rural hospitals); Peer Group D = community facilities offering some surgical services.

Source: NSW Ministry of Health.

Starting on time can increase the capacity to undertake more operations

Although we recognise inconsistencies and accuracy issues with the indicator, the level of variation between LHDs and hospitals on these indicators suggests there is room for improvement.

In the recent Ministry/Audit Office survey the most frequent response to 'What could you do to improve operating theatre efficiency?' was improve first case on time. The survey revealed time wasting practices in many hospitals where both anaesthetists and surgeons start at the same time and surgeons frequently arrive late. Other prominent issues raised in relation to efficiency were scheduling, rostering and staff shortages. These survey results were supported by observations made in visits to hospitals.

A study in one former area health service (approximately the size of two current metropolitan LHDs) concluded that if late starts in all its facilities were decreased by 10 per cent there would be sufficient operating theatre capacity to halve the area's waiting lists without increased resources.

Cancellations on planned day of surgery

Over 12,000 operations are being cancelled on the day of surgery annually

Cancellations on the day of surgery can result in theatre downtime unless other cases on the lists can be scheduled at very short notice, which can be challenging.

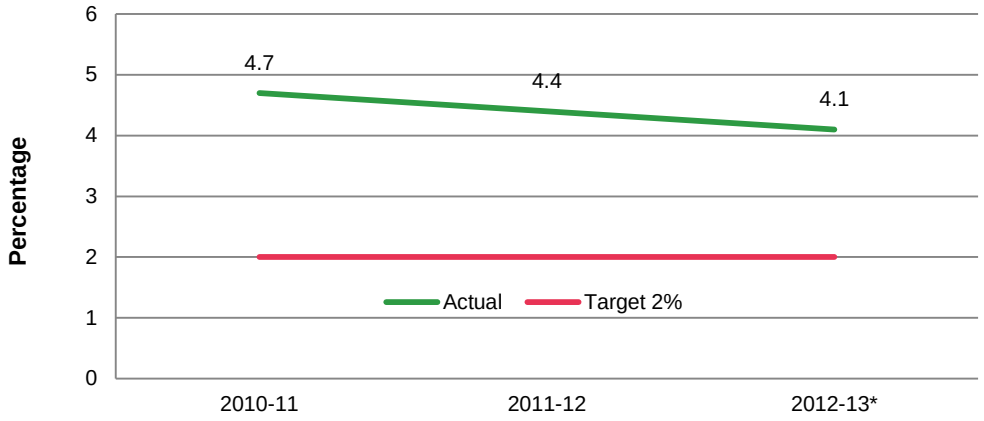
Cancellation rates on the day of surgery remain at about double the target of two per cent. This means that more than 12,000 patients had their procedure cancelled on the actual day they were booked to receive it. Around half of the cancellations are due to patient related reasons where they are presenting as unsuitable for surgery. However, approximately 6,000 patients per year are not having their operation on the planned day due to hospital related issues. Examples of these reasons are provided in Exhibit 10.

Exhibit 10: Examples of reasons for cancellations on day of surgery

Cancellation due to hospital reasons	Cancellation due to patient reasons
Beds not available for overnight stay	Patient attended but ill with flu or rash
Emergency case taking priority	Patient had not fasted
Visiting medical officer (surgeon) not available	Patient not taken all bowel preparation
List overrun (unable to complete all scheduled operations)	Patient unable to attend or does not want operation

Source: Audit Office of NSW – hospital visits.

Exhibit 11: Percentage of patients cancelled on planned day of surgery in New South from 2010-11 to 2012-13



Source: NSW Ministry of Health.

* Note: Data only available from July 2012 to December 2012.

Cancellations rates for elective surgery vary between LHDs and hospitals

There is significant variation in performance between LHDs ranging between 1.8 to 6 per cent as shown in the exhibit below.

Exhibit 12: Percentage of patients cancelled on planned day by LHD for 2011-12

Key for LHDs:

SYD = Sydney; SWS=South Western Sydney; SES = South East Sydney; IS = Illawarra Shoalhaven; WS = Western Sydney; NBM = Nepean Blue Mountains; NS = Northern Sydney; CC = Central Coast; HNE = Hunter New England; NNSW = Northern NSW; MNC = Mid North Coast; SNSW = Southern NSW; M = Murrumbidgee; WNSW = Western NSW; FW = Far West; SCHN = Sydney Children Hospitals Network; SVHN = St Vincent's Health Network; NSW = Average for all LHDs.

Source: NSW Ministry of Health.

The degree of variance in cancellation rates is even higher at a hospital level, as seen in Exhibit 13 that compares hospitals in like peer groups.

Exhibit 13: Variation in percentage cancellation rates by hospital by peer group (July to December 2012)

	Peer Group A		Peer Group B		Peer Group C		Peer Group D	
Lowest rates	Concord	2.9%	Fairfield	1.9%	Young	0.3%	Gloucester	0.5%
	Royal Prince Alfred	3.1%	Hornsby	2.0%	Cooma	0.4%	Wauchope	0.6%
	Bankstown	3.4%	Sutherland	2.3%	Moruya	0.4%	Pambula	1.0%
Highest rates	Liverpool	7.7%	Shoalhaven	9.0%	Armidale	6.2%	Scott Memorial, Scone	1.8%
	John Hunter	8.1%	Port Macquarie	11.3%	Kempsey	7.3%	Springwood	2.3%
	Westmead	8.7%	Dubbo	12.9%	Tumut	11.0%	Glen Innes	4.8%

Key:

Peer Group A = principal referral hospitals (very large hospitals providing a broad range of services, including specialised units at a state or national level); Peer Group B = major hospitals (large metropolitan and non-metropolitan hospitals); Peer Group C = district group hospitals treating less than 10,000 patients per annum (ranging from medium size metropolitan hospitals to smaller rural hospitals); Peer Group D = community facilities offering some surgical services.

Source: NSW Ministry of Health.

The level of variation between LHDs and hospitals on these indicators suggests there is room for improvement.

Numbers of day only admissions on target but variations between hospitals indicates improvements possible

Other operating theatre related targets

Included on the surgery dashboard (Appendix 2) are two admission related targets that influence the efficiency of elective surgery. These are for targeted procedures where the patient is to be admitted and discharged either on an extended day only basis (within 28 hours, inclusive of an oversight stay) or on a day only basis.

The range of surgery includes hand/elbow/knee/foot, and eye and ear/nose/mouth/throat procedures. Effective scheduling of these longer recovery day procedures helps optimise bed occupancy, operating theatre efficiency and admits patients closer to the time of procedure. Statewide performance against the target of 80 per cent was 81 per cent for 2011-12.

However, there is a degree of variation in the extended day and day only rates at a hospital level, as seen in Exhibit 14 below that compares hospitals in like peer groups.

Exhibit 14: Variation in targeted extended day or day only percentage rates by hospital peer group (July- December 2012)

	Peer Group A		Peer Group B		Peer Group C		Peer Group D	
Lowest rates	Royal North Shore	65%	Hornsby	73%	Bega	78%	Narrandera	33%
	St Vincent's	71%	Port Macquarie	77%	Mount Druitt	80%	Glen Innes	66%
	St George	71%	The Tweed	79%	Moruya	81%	Temora	75%
Highest rates	Bankstown	80%	Shoalhaven	89%	Kempsey	99%	Pambula	100%
	Gosford	80%	Dubbo	89%	Batemans Bay	99%	Wauchope	100%
	Wollongong	81%	Wyong	92%	Kurri Kurri	100%	Springwood	100%

Key:

Peer Group A = principal referral hospitals (very large hospitals providing a broad range of services, including specialised units at a state or national level); Peer Group B = major hospitals (large metropolitan and non-metropolitan hospitals); Peer Group C = district group hospitals treating less than 10,000 patients per annum (ranging from medium size metropolitan hospitals to smaller rural hospitals); Peer Group D = community facilities offering some surgical services.

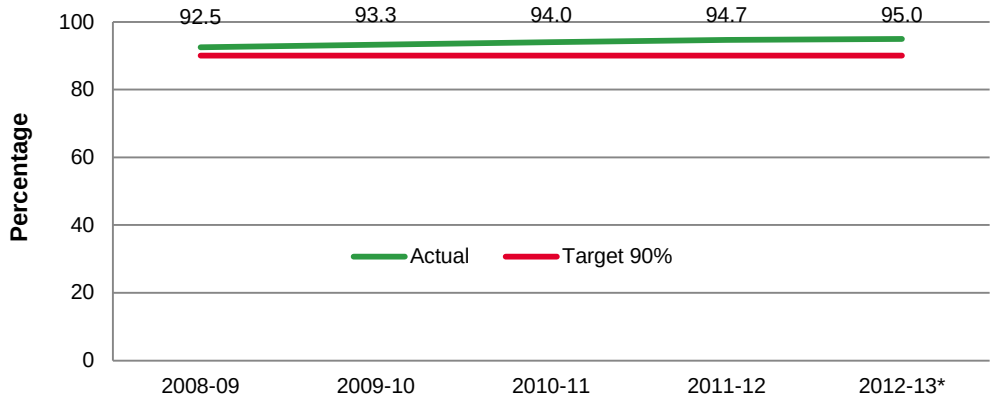
Source: NSW Ministry of Health.

The level of variation in the extended day and day only rates between LHDs and hospitals indicates there is room for improvement.

Day of surgery admissions benchmark measures the number of patients who are admitted on the day of surgery with the intention of an overnight stay. An efficiency gained is that fewer patients are being admitted the day before surgery.

The target of 90 per cent is being achieved as shown in Exhibit 15 below. This indicates that the success of the changed practice of admitting more patients on the day of surgery, rather than the night before, for operations that will generally require overnight stays post operation.

Exhibit 15: Percentage day of surgery admissions New South Wales for 2008-09 to 2012-13



Source: NSW Ministry of Health.

* Note: Data only available from July 2012 to December 2012.

2.3 To what extent is the physical capacity of operating theatres being utilised?

The Audit Office estimates that there is spare physical capacity in operating theatres across NSW Health. However, due to a lack of collected information, we were unable to determine accurately the extent of the unused physical capacity in hospitals where it exists. There was also a shortage of information at a State level about the use of operating theatres for non-surgical procedures and the extent that these could be done in procedure rooms, potentially freeing up operating theatres to do more elective surgery. These two factors have a significant impact on how the physical capacity of theatres is utilised.

Overall use of operating theatre capacity

The Ministry undertakes a stocktake of operating theatres across the State every three years. The last available stocktake during 2009 reported 276 operating theatres. However, the Ministry's stocktake did not record the extent that operating theatres are used.

Need to better understand the extent that physical capacity of operating theatres is being used

The use and allocation of assets and services is assessed and determined at an LHD level. This includes determing the roles of hospitals and their operating theatres and the allocation of different types of surgery between hospitals. This is generally included in LHD clinical service plans developed over five years. Supporting this is some analysis of the number and location of hospital operating theatres, projected demand and resources required.

Statewide there is more physical capacity in hospitals than is currently being used for elective surgery. There are a number of factors contributing to this: hospitals may have more theatres than are funded to run; some theatres are built for future capacity; some theatres are used on a needs basis for emergency surgery; and many rural operating theatres get infrequent use. There can be significant differences with the utilisation of the physical capacity of operating theatres in metropolitan areas compared to regional/rural areas. Greater understanding of utilisation and justification of the relative physical capacity is required.

We also noted that a 2005 study in the former Sydney West Area Health Service revealed that the amount of elective surgery performed was only a fraction of available capacity based on the numbers of theatres and the funding provided to run them. The study found that at best 23 per cent of funded physical operating theatre capacity was used for elective surgery during weekdays.

At a hospital level theatre managers can observe on a 'day-to-day' basis the extent to which theatres are being used. However, there is little information flowing up the hospital, LHD and Ministry hierarchy to enable monitoring theatre room usage. In one private sector hospital we visited, theatre usage was monitored by comparing actual operating minutes against the expected minutes, which was based on the number of funded theatres and the total minutes those theatres were expected to operate. The hospital also compared the number of booked operating minutes against the expected number of minutes funded. The current theatre utilisation indicator discussed above does not give this level of information. For example, the highest operating theatre utilisation rate in 2012 was recorded in December when the number of admissions and theatre usage is historically low due to the holiday break.

Recommendation

LHDs and their hospitals should, by 30 June 2014, improve their monitoring of the extent that the physical capacity of operating theatres is used and the constraints on greater use. Measures should allow comparison by theatre of actual hours used, booked hours and funded hours, and allow monitoring of the number of surgical procedures planned and undertaken.

Non-surgical procedures

Routine non-surgical procedures such as colonoscopies are undertaken in many hospital operating theatres as well as in dedicated procedure rooms. Health's stocktake of 2009 identified 54 procedures rooms. Undertaking non-surgical procedures in expensively equipped operating theatres routinely is not efficient especially where waiting times for

Fewer non-surgical procedures in theatres would create additional capacity

elective surgery are increasing. Feedback from surgeons and operating theatre nursing unit managers was that fewer non-surgical procedures undertaken in operating theatres would create additional capacity to do more elective surgery. There were an estimated 120,000 non-surgical procedures undertaken in operating theatres in 2011-12.

There are exceptions for the use of operating theatres in place of procedures rooms. Circumstances include where:

- hospitals do not have a procedure room and do not have any free space to convert into a procedure room suitable for endoscopy
- the procedure room is not close enough to the recovery unit for patient safety purposes
- the operating theatre utilisation is low and mainly taken up by endoscopic procedures with few surgical procedures and therefore not justifying the capital investment to create a separate procedure room.

Recommendations

LHDs supported by the Ministry and the Agency for Clinical Innovation should, by 30 June 2014:

- regularly monitor the extent to which theatres are used for non-surgical procedures
- establish plans for minimising the use of operating theatres for non-surgical procedures, based on considerations such as patient safety, availability of staff and equipment, the co-location of services and benefit cost analysis.

2.4 Has increased funding resulted in increased activity?

Variable impact of funding enhancements and initiatives on activity levels

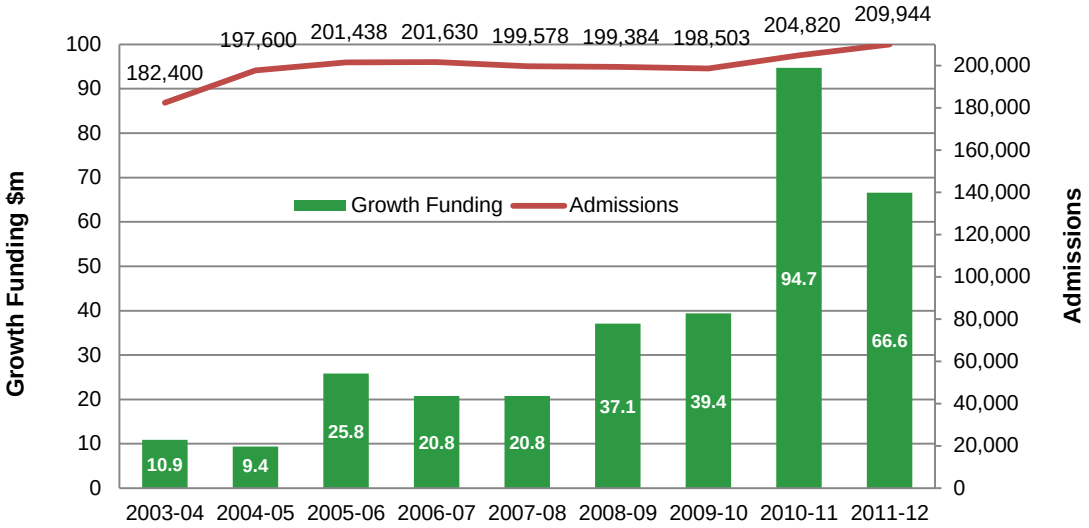
We found that elective surgery has not always increased relative to funding injections and waiting list initiatives over the last nine years. From 2003-04, $325.5 million in growth funding was injected to increase elective surgery. In addition, there were initiatives to improve patient flow through surgery, especially through the Clinical Services Redesign Program.

Volume of elective surgery not always responsive to significant enhancement funding

As indicated in Exhibit 16 below, there has been mixed success over the past nine years with additional funding to increase the amount of elective surgery. The establishment of the Surgical Services Taskforce in 2004, combined with initiatives arising from the Clinical Services Redesign Program and enhancement funding for more elective surgery led to initial increases in activity levels. However, growth in activity levels did not continue and activity levels fell from 2006-07 to 2009-10 even though funding enhancements for elective surgery continued throughout this period.

Activity levels started to grow again in 2010-11 and 2011-12. The significance of recent increases is hard to determine because activity levels are not weighted or classified according to complexity and cost. Admissions could range from short simple surgery such as ingrown toenails to or more complex cases such as cardiac surgery. NSW Health's early adoption of NEST type targets that officially came into effect in January 2012 combined with substantial recent injections of growth funding may explain some of the increases in elective surgery. We also observed during one hospital visit that additional funding for more high volume short stay procedures was not being spent as required because of difficulties filling nursing staff vacancies.

Exhibit 16: Impact of increased surgery funding on admissions from waiting lists from 2003–04 to 2011–12



Source: AIWH reports and Ministry of Health.

The application of enhancement funding of $325.5 million (from 2003-04 to 2011-12) and related patient flow initiatives has achieved an extra 27,544 admissions per annum at a cost of $11,800 for each additional operation. This would seem inefficient when compared to the current average cost per surgical episode of $6,400.

Recommendations

As part of the implementation of activity based funding, the Ministry and the LHDs, should by 30 June 2014, ensure that performance frameworks used include mechanisms to:

- monitor the relationship between additional funding and additional activity to deliver targets at LHD and hospital levels, for example, increased elective surgery activity levels
- regularly evaluate the impact of theatre efficiency initiatives on the levels of elective surgery and other efficiency measures.

2.5 Cost of operating theatres

There is a lack of information about the costs of operating theatres

Measuring efficiency of operating theatres requires information on costs as well as procedures and throughput. NSW Health collects cost information relating to a surgical episode: the patient's journey from admission to hospital, surgery to recovery in hospital. At present it does not isolate the cost of the operating theatre unit alone.

The Ministry estimates the cost of elective surgery episodes in NSW public hospitals to be $1.3 billion in 2011-12, about 17 per cent of inpatient hospital services expenditure overall. Based on NSW Health data, the relative cost of activity in the operating theatre alone is estimated to be in excess of 53 per cent of the total patient episode cost, the equivalent of over $685 million per year in NSW. Excluded from this estimate are the costs of surgeons and anaesthetists, depreciation and on-costs.

More detailed cost-breakdowns are expected to come from improvements in costing systems required to manage under activity based funding. In the meantime, we have used the cost estimates of surgical episodes as a surrogate indicator of the efficiency of operating theatres in this report.

The move to activity based funding has required hospitals to report patient and procedure level costs to the Ministry for inclusion in the 'state price' and the 'national efficient price' for individual procedures. These prices will form the basis for funding activity in future. The initial costing analysis by the Ministry provides a starting point for examining the costs of different procedures, and how they vary between hospitals.

The Ministry has pointed out the difficulties in estimating costs accurately for individual procedures and components of a surgical patient's journey, and therefore the importance of careful interpretation of any cost variations reported. We accept this.

There can be considerable and legitimate variations in the services required by individual patients, even for similar procedures. Teaching hospitals have different resource levels and staffing costs than others. Larger hospitals (and larger operating theatre suites) can generate greater economies of scale and specialisation, for example with separate procedure rooms. Specialist hospitals, for children for example, have different treatment, length of stay and therefore cost profiles. Recording practices and cost allocation processes may also vary.

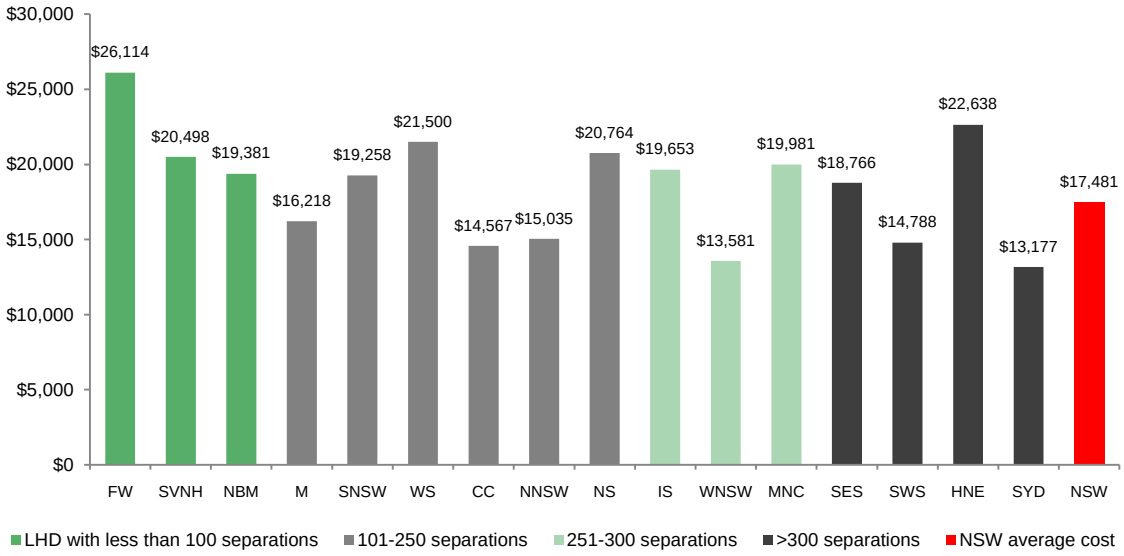
Variation in costs of similar surgery suggests potential for efficiency and more activity

These factors are likely to explain many of the differences in the costs of surgical episodes between LHDs and hospitals. However, without more detail on the reasons for 'legitimate' cost differences, it is difficult for the Ministry to reflect them in budgets and funding; and for hospitals to isolate and address remaining inefficiencies. The scale of the differences now in reported costs emphasises the importance of doing so.

For the purposes of our analysis, the following exhibits show variations in costs for groupings of common surgical procedures. Each grouped procedure includes operations of varying complexity, for example, knee replacement with or without complications and/or comorbidities.

Our first example, Exhibit 17, compares the cost of knee replacements across LHDs and shows significant variation with the highest Far West being almost double that of the lowest Western NSW. In general, higher volume LHDs tend to have lower average costs. But episodes in Murrumbidgee (130 episodes) and Central Coast (225 episodes) often cost less than higher volume LHDs such as South East Sydney (308 episodes) and Hunter New England (593 episodes).

Exhibit 17: Knee replacement* average cost by LHD for 2011-12



* **Note:** Total arthroplasty of knee, unilateral AR-DRG 49518-00

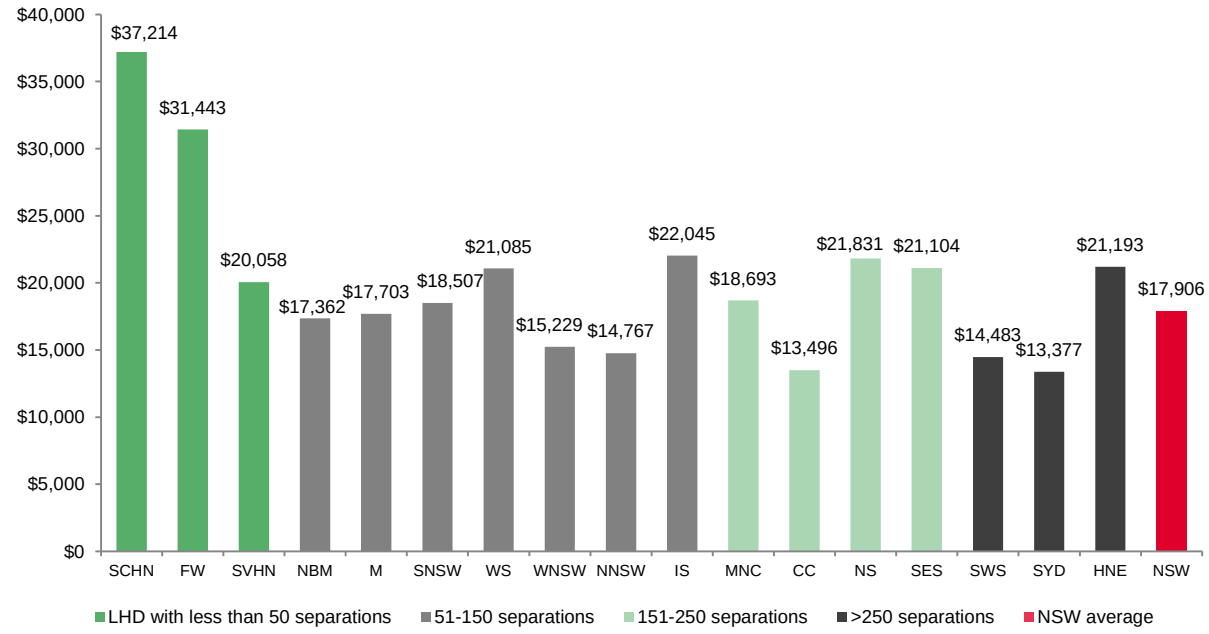
Key for LHDs:

SYD = Sydney; SWS=South Western Sydney; SES = South East Sydney; IS = Illawarra Shoalhaven; WS = Western Sydney; NBM = Nepean Blue Mountains; NS = Northern Sydney; CC = Central Coast; HNE = Hunter New England; NNSW = Northern NSW; MNC = Mid North Coast; SNSW = Southern NSW; M = Murrumbidgee; WNSW = Western NSW; FW = Far West; SCHN = Sydney Children Hospitals Network; SVHN = St Vincent's Health Network; NSW = Average for all LHDs.

Source: NSW Health Activity Based Funding Task Force data.

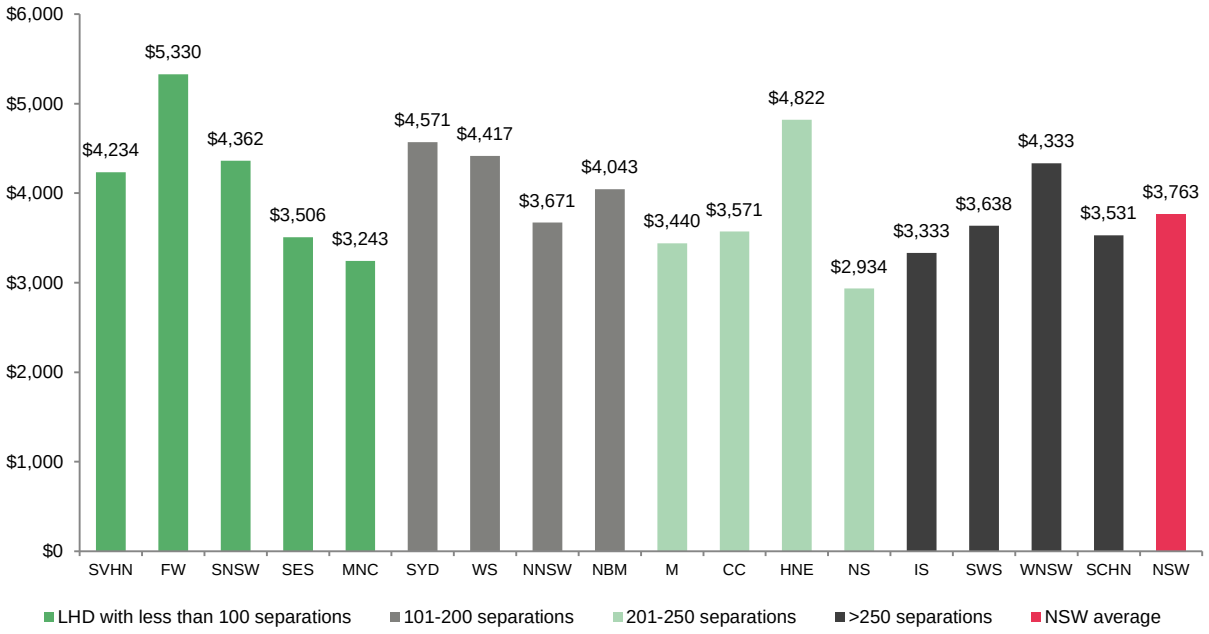
Exhibits 18 and 19 below for hip replacement and tonsillectomy average cost show a similar picture of significant cost variance between LHDs.

Exhibit 18: Hip replacement* average cost by LHD for 2011-12



*** Note:** Total arthroplasty of hip, unilateral AR-DRG 49318-00

Exhibit: 19: Tonsillectomy* average cost by LHD for 2011-12



*** Note:** Tonsillectomy with adenoidectomy, AR-DRG 417789-01

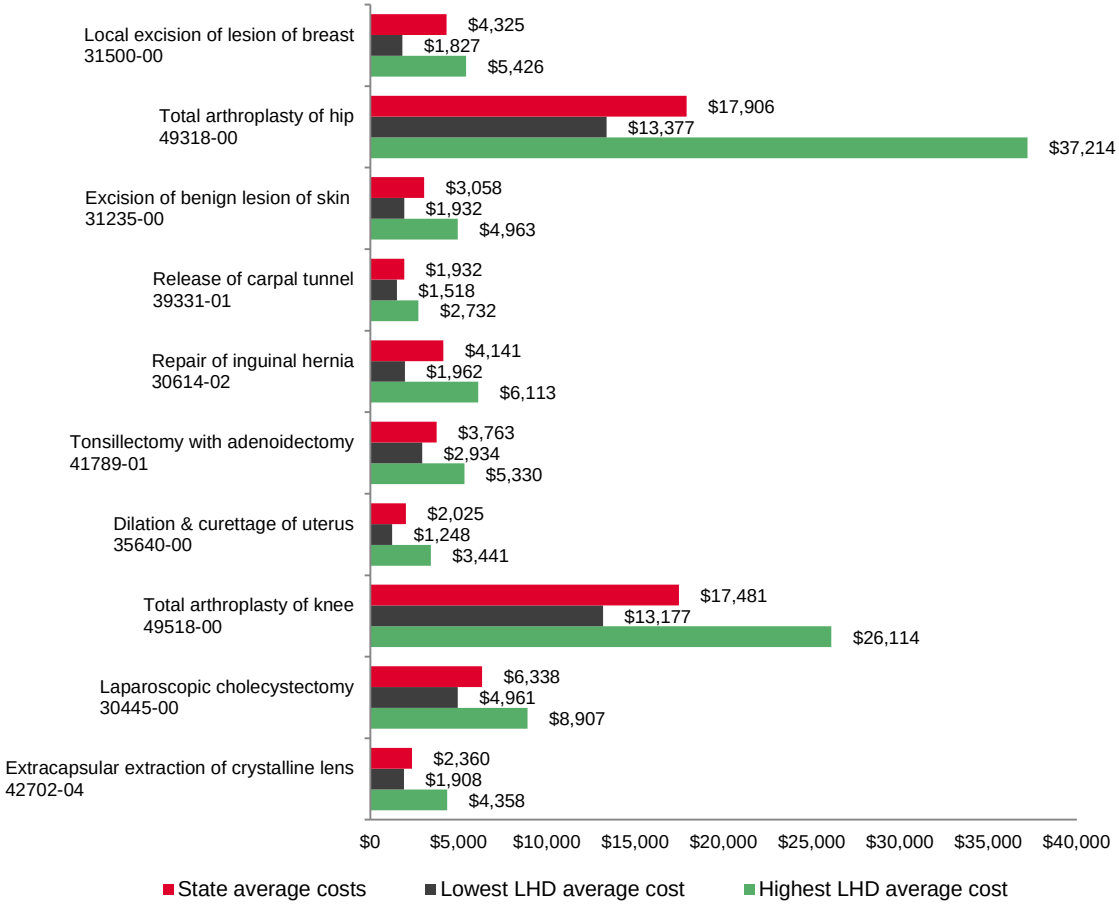
Key for LHDs (exhibits 18 and 19):

SYD = Sydney; SWS=South Western Sydney; SES = South East Sydney; IS = Illawarra Shoalhaven; WS = Western Sydney; NBM = Nepean Blue Mountains; NS = Northern Sydney; CC = Central Coast; HNE = Hunter New England; NNSW = Northern NSW; MNC = Mid North Coast; SNSW = Southern NSW; M = Murrumbidgee; WNSW = Western NSW; FW = Far West; SCHN = Sydney Children Hospitals Network; SVHN = St Vincent's Health Network; NSW = Average for all LHDs.

Source: NSW Health Activity Based Funding Task Force data.

Exhibit 20 below showing the cost variance for the top ten surgical episodes by volume for 2011-12 (28 per cent of all episodes) provides a wider picture of the scale of cost variation. For most procedures the highest LHD average cost was at least double that of the lowest cost LHD.

Exhibit 20: Cost variance of top ten surgical episodes by volume for 2011-12



Source: Audit Office analysis of Activity Based Funding Task Force data.

The scale of the reported cost variations emphasises the importance of:

- improving the completeness, accuracy and consistency of the cost estimating processes at LHDs to reduce the uncertainty over the significance of these variations
- improving the understanding of what causes the variations that remain, to inform decisions about the management of surgical activity in the new funding environment. This should include information on the marginal cost of additional activity, as well as average costs
- including cost information in the reporting to management of operating theatre activity, given it forms a substantial component of the total cost of surgical episodes.

Recommendations

LHDs supported by the Ministry should, by 30 June 2014:

- improve the reliability of capturing cost information for surgical procedures, including the cost of operating theatre units as a key component
- complete an initial analysis of variations in the costs of procedures, both within and between hospitals and LHDs, to identify and address drivers of inefficiencies
- incorporate cost benchmarks and measures into the revised suite of efficiency indicators recommended above.

3. Do managers have the information they need to manage operating theatre efficiency?

Finding: Operating theatre managers have some but not all the information needed to manage operating theatres efficiently. Activity based funding will reward those hospitals and surgical practices who understand which activities they undertake efficiently, and why. Those hospitals with inefficient theatres will not be able to sustain current levels of surgery with future activity based funding levels unless they can identify inefficient practices and address them.

To meet these challenges, the management of surgical services at hospitals needs better information on the drivers of costs, time and resources by procedure than they have. They also need the management structures and practices to address inefficiencies identified with this information. Both need further development.

3.1 Accessing and using the right information to manage efficiently

We found that overall, there is limited use by local hospital management of the information available in operating theatre systems to assess the efficiency of the range of activities in operating theatre units. This was revealed in responses to the Ministry/Audit Office survey and hospital visits within NSW Health by the audit team.

Limited use of information to assess efficiency of operating theatres, including costs

The survey revealed that the measures most used by management at operating theatre and hospital level were the three dashboard targets of utilisation, first case on time and cancellations. These were used by over 90 per cent of respondents. Monitoring the reasons for late starts (87 per cent) and cancellations (94 per cent) was also common.

There was less use of other time and activity information currently collected by operating theatre systems. Examples of information available but little used include the following:

- Only around half of the managers surveyed use measures to compare scheduled versus actual number of operations. This was despite surveyed managers suggesting scheduling as one of the key areas that could be improved to improve theatre efficiency.
- Only around half had measures to monitor turnaround/changeover time between operations (time to clean and prepare room) which can have significant impacts on theatre utilisation.

An almost universal gap in the information accessible to, and used by, operating theatre managers was details of the full cost of operating theatre unit activity and the cost of individual surgical procedures. Such information will be critical as surgery becomes increasingly reliant on activity based funding for its budget. Current operating theatre budgets typically do not include the costs of clinical staff (such as surgeons and anaesthetists) or of all costs of supplies (such as prostheses).

The Ministry/Audit Office survey revealed that:

- 65 per cent of respondents had limited financial information
- 32 per cent of respondents said operating theatre budgets were not based on planned activity levels
- only eight per cent of respondents monitored the cost of operations and a fifth monitored surgery completed at overtime rates.

See Appendix 5 for more details of the survey results.

It is important to note that the majority of managers that did not have such information thought such measures would assist them. In one hospital visited the Head of Surgery has already called for costing of theatre cases as they are completed.

While we found a good level of informal networking at professional levels, there was limited formal exchange between hospitals and LHDs on management practices. The limitations of the commonly used key efficiency indicators for frontline purposes limit comparison of hospitals efficiency.

It is worth noting that earlier attempts to deliver improvements in surgery productivity have not realised their full potential under the then hospital management arrangements. For example, NSW Health's Clinical Services Redesign Program (2005-08) included looking at improving theatre flow and throughput. A project within the program suggested that a ten per cent increase in surgical procedures could still be achieved within current resources. However, it did not result in a sufficient suite of theatre efficiency indicators to help managers monitor and sustain claimed program improvements in surgery productivity.

The Audit Office has compiled a listing of efficiency indicators that could be used at executive and hospital levels. They cover aspects of time, activity, resources and cost, and place them in the key stages of a patient's journey through an operating theatre unit. These have been drawn from currently used dashboard measures, discussions with practitioners, the survey of operating theatre managers and practices in other jurisdictions. The example outlining measures against the stages of a patient's journey is included in Appendix 6.

Audit Office has compiled a listing of efficiency indicators based on a patient's journey

Recommendations

In order to improve the use of operating theatre efficiency information and indicators, LHDs supported by the Ministry, the Agency for Clinical Innovation and the Surgical Services Taskforce should, by 30 June 2014, develop guidance on better practice theatre efficiency measures incorporating:

- a stocktake of currently available performance data and review of the capabilities of operating theatre and financial information systems
- the development of a suite of efficiency indicators across aspects of costs, time, activity and resources which are readily accessible by managers
- education programs to build awareness of how efficiency indicators can be assessed and used to allow more meaningful efficiency monitoring and reporting
- benchmarking of selected efficiency measures across hospitals and LHDs.

3.2 Recording and accuracy of efficiency measures

In a recent survey focusing on first case on time, conducted by the Ministry, 35 per cent of hospitals were not recording and reporting performance using the correct definition of first case on time (patient wheeled into operating room). In our field visits, most operating theatre managers raised broader concerns about the accuracy of the KPIs reported in the dashboard and therefore the relative performance of hospitals and LHDs across the State.

Concerns over the accuracy of operating theatre efficiency data

The preparations for activity based funding have raised wider concerns about the accuracy of coding and costing for surgical procedures across the state. These are now receiving substantial attention in all LHDs to support a more refined first set of 'live' budgets based on activity based funding, due for adoption in 2013-14. This process is likely to confirm some variations in costs per surgical procedure across hospitals, including some above the efficient price/budget. If such procedures are to continue at these hospitals, the drivers of high cost deserve further understanding to determine if they are less efficient operating theatre practices, or poor data recording.

Recommendation

In order to better support management decision-making in improving theatre costs and efficiency, NSW Health should, by 30 June 2014, implement improved controls over data collection to ensure consistency and reliability in the collection and reporting of operating theatre efficiency measures.

3.3 Operating theatre management

Current management structures for operating theatres vary across hospitals and do not always provide an appropriate framework to manage efficiency. The new incentives under activity based funding and new national waiting time targets will reward those hospitals with efficient, effective and agile management.

The overall day-to-day management of operating theatres is usually the responsibility of the operating theatre manager. But other management roles also play an important part in the day-to-day running of theatres. These include heads of surgery, heads of anaesthetics, surgical department heads (for example, head of orthopaedics) and directors of medical and nursing services.

Operating theatre committees membership and leadership varies

These key theatre positions along with other key staff such as the hospital general manager, theatre nurse unit manager, business managers and finance managers may form operating theatre committees who have overall responsibility for overseeing theatre performance. Achieving high levels of efficiency, quality and performance in theatre units across all specialties requires the effective integration of many processes and people. This is the key purpose of the operating theatre committee.

As outlined below we found considerable variability in the management of different hospitals.

Most hospitals (84 per cent) have an operating theatre committee, with representatives from the functions involved and acknowledge that it can help ensure that constraints and bottlenecks to efficient and effective operations are addressed promptly. All the larger hospitals we visited had a committee, but some of them work better than others.

In hospitals visited we found inconsistencies in the composition and attendance, the scope and decision making powers of theatre management committees, and lack of clarity around roles and responsibilities that can reduce their authority and impact.

We found that the more effective committees were those which have senior representatives from all key functions, including senior executives of the hospital and which are provided with comprehensive performance information to monitor and improve practices. This includes budget/finance information.

The effectiveness of the committees tends to be reflected in the effectiveness of the day-to-day management of operating theatre units in the hospitals we visited. Only 53 per cent of operating theatre managers surveyed believe that they have sufficient authority or influence over the day-to-day management of operating theatres. The other 47 per cent indicate that the managers have limited authority over surgeons and anaesthetists. This could indicate a poorly performing operating theatre committee or a lack of leadership and accountability for efficient operating theatre performance, by the head of surgery, anaesthetists or the theatre manager.

More effective operating theatre committees are those where medical officers are more involved

Our visits to hospitals revealed that where visiting medical officers (VMOs) and staff specialists were more involved in operating theatre management and focused on performance indicators, the more efficiently the operating theatres were managed. At one hospital the head of surgery, a visiting medical officer, had a desk in close proximity to the theatre manager (generally a higher graded nursing unit manager) and they were able to manage issues as they arose on a daily basis. In other hospitals visited the theatre managers were less able to exercise day-to-day control as heads of surgery were less 'hands on' and felt that they had little influence over surgeons and anaesthetists. Clinicians are generally led by evidence when improving their clinical practices. However, despite the significant impact VMOs and staff specialist have on theatre efficiency, the hospitals visited did not monitor their productivity or set efficiency related KPIs in their performance agreements and contracts. Only five per cent had measures to monitor surgeon and anaesthetist productivity.

In another hospital visited some surgeons and anaesthetist were concerned about the lack of strong leadership, claiming that whilst theatres had a “flat” non-hierarchical management structure where everybody works as a team, no one was being held to account for efficient theatre performance. One surgeon expressed the view that in the past there was stronger leadership and disciplined matrons kept a “closer eye” on how theatres were running day-to-day. Ministry staff working to improve surgical services told us they have often received similar feedback from surgeons and anaesthetist during their hospital visits.

The varying approaches and participation in the management of surgical activity, operating theatres and their efficiencies does not suggest that all hospitals will be in a position to respond promptly to growing needs to improve efficiency.

More recently, the persistent high rate of not starting operating sessions on time is symptomatic of limited operating theatre management responses to well known efficiency shortcomings. Surveys of operating theatre managers have repeatedly cited this as the foremost contributor to poor efficiency. In one hospital visited, surgeons and anaesthetists continued to blame each other for late starts, and the issue remains unresolved.

Recommendations

In order to ensure more effective management of operating theatre efficiency, LHDs supported by the Ministry and Agency for Clinical Innovation should, by 30 June 2014, develop operating theatre better practice management guides which cover:

- the role and composition of the operating theatre committee
- clearly defined operating theatre related roles and accountabilities of key positions such as the heads of surgery and anaesthetics, surgical department heads, directors of medical and nursing services, theatre managers, theatre nurse unit managers and business managers
- performance management arrangements, including regular efficiency reporting against accountabilities and targets for these key positions and clinical staff (staff specialists, visiting medical officers and nursing staff) to deliver efficiency, throughput and other measures of performance
- operating theatre management committee connections to their hospital and LHD executive to support effectiveness and to other committees in order to share knowledge and experiences.

Appendices

Appendix 1: Factors that may impact operating theatre efficiency

Stage
Admission
Communication between the booking office and theatres – processes and procedures
Pre admission assessment of all patients by clinical screener
Cancellation on the day of surgery
Patient reasons
System reasons
Peri-operative
Patient arrival times on the day of surgery
Staff start times in relation to session start times
Session start times in relation to
actual scheduled times
staggered session times
First case on time starts
Operating theatre utilisation
Number of operating rooms
Number of PARU (recovery) beds
Turnaround time between operations
Average case times per surgeon/specialty
Access to data and reports from theatre information system (Surginet & IPM)
Staffing skill mix and FTE
Nurses (theatre & PARU)
Surgeons (VMO and staff specialists)
Anaesthetists
Registrars
Ancillary staff (clerical, operations assistants, staff to assist with processing instruments and managing sterile stock, porters
Complexity of cases
Availability of stock control staff
Mix of elective and emergency cases
Volume of non-surgical cases performed in operating theatre suite (ECT, endoscopy, PICC lines)
Extent emergency surgery model implemented
Hours of operation
Mon-Fri
Weekends and public holidays
After-hours staffed or on-call
Storage capacity in operating theatre suite
Post-operative
Access to beds
ICU/HDU beds
Overnight beds
Impact of medical patients
EDO model implemented
Other factors
Effectiveness of operating theatre committee
Surgeon and anaesthetist payment arrangements
Fee for service or sessional rate for VMOs
Availability of technology that improves efficiency
System for notification of surgeon and anaesthetist leave
Systems for ordering and managing loan equipment
Systems for ensuring spread of annual leave and ADOs
Access to radiographers
Access to central sterilising services

Source: NSW Ministry of Health.

SURGERY DASHBOARD - June 2012

			METROPOLITAN NSW LOCAL HEALTH DISTRICTS										REGIONAL NSW LOCAL HEALTH DISTRICTS							
		Target	SCHN**	SVHN	SYD	SWS	SES**	IS	WS	NBM	NS	CC	HNE	NNSW	MNC	SNSW	M	WNSW	FW	NSW
Waiting List	OverDue Cat 1 (> 30days)	0	0	2	0	11	4	4	0	0	3	0	0	0	0	0	0	0	0	24
	OverDue Cat 2 (> 90days)	0	0	9	0	24	27	2	14	0	17	0	2	0	0	3	0	5	0	103
	OverDue Cat 3 (> 365days)*	0	0	23	2	7	57	0	18	0	47	4	0	0	0	2	0	17	0	177
	Cat 1 - % of patients treated in 30days (Cal YTD)	96%	99	96	98	90	92	95	96	96	95	95	93	91	82	93	96	97	97	94
	Cat 2 - % of patients treated in 90days (Cal YTD)	90%	91	87	98	88	90	88	90	80	93	86	91	86	82	94	92	88	88	90
	Cat 3 - % of patients treated in 365days (Cal YTD)	92%	95	85	98	91	92	94	95	75	96	89	93	92	86	90	89	90	100	92
	Surgical NRFC patients as % of surgical list	<10%	13.3	13.0	24.0	13.7	9.0	12.3	14.1	8.4	9.2	11.8	12.2	19.0	15.2	7.7	8.4	10.4	21.1	12.9
	Deferred Surgical NRFC patients as % of surgical list	<5%	10.3	5.0	10.6	6.5	4.4	2.9	5.2	4.1	4.4	3.0	4.5	7.6	7.6	4.2	3.7	3.4	8.2	5.4
Operating Theatre	% Theatre Utilisation	80%	74	76	81	76	72	81	77	73	82	88	70	74	75	73	72	70	71	76
	% 1st case on time theatre starts	95%	59	33	36	85	19	14	74	55	79	49	23	23	20	48	43	21	25	43
	Theatre Attendances (YTD)		14,183	7,982	41,535	40,991	48,913	19,810	37,850	16,705	30,451	22,242	60,408	24,928	19,835	11,783	14,179	19,293	2,126	433,214
	Surgical Separations (YTD May 12) #		10,584	5,946	27,667	28,546	27,942	13,257	22,113	10,020	20,159	11,755	34,892	14,107	10,652	5,527	7,646	11,493	1,119	263,425
	Surgical Separations (Var from YTD May 11)		54	251	880	1,962	798	114	1,227	279	684	574	1,690	744	196	136	411	494	94	10,588
	% Cancellations on Day of Surgery	<2%	4.9	4.6	2.5	4.8	6.5	4.1	5.4	4.7	3.6	5.3	5.6	2.6	7.6	0.9	4.0	7.2	3.1	4.8
Emergency Theatre Access	<15 minutes ; Immediate Life Threatening	100%	n/a	0	33	57	88	100	89	100	57	88	94	60	n/a	100	100	40	n/a	77
	<1 hour ; Life Threatening	100%	75	63	86	77	91	96	81	97	84	83	90	85	100	94	91	86	100	87
	<4 hours ; Organ/limb Threatening	85%	95	77	88	81	96	100	85	91	94	94	93	89	100	93	94	84	100	91
	<8 hours ; Non critical, emergent	85%	75	64	86	65	90	100	78	93	84	91	90	85	92	100	96	71	100	83
	<24 hours ; Non critical, Non emergent, urgent	85%	100	85	94	75	91	100	76	89	92	98	85	86	89	97	94	84	100	88
	<72 hours ; semi urgent, not stable for discharge	95%	100	89	96	89	91	100	85	95	98	100	89	75	97	96	90	95	100	92
Admission	%DOSA	90%	90	94	97	97	93	97	94	94	93	95	95	97	95	97	95	96	97	95
	% Target Surgery performed as EDO or DO (28hrs) (April 12)	80%	71	43	65	64	62	72	58	60	57	71	70	73	77	78	69	70	71	66

 # Surgical Separations are measured from coded DRG records and exclude Ceasarean procedures. Results include an estimate of surgery from 12,204 uncoded records (0.9%) of all records for YTD May 2012 (as at 20 July 2012), with particularly high rates of uncoded records at specific facilities in NNSW. Surgical cases June be under enumerated as a result of this and are indicative only.

* Excludes patients who choose to wait.
** Operating Theatre and Emergency Theatre Access measures for SCHN are for Children's Hospital at Westmead only (Sydney's Children Hospital results are included in SESLHN as a composite result with Prince of Wales data submission)
n/p = Data not provided for current month n/a = Not available

Metropolitan NSW Local Health Districts:
SCHN - Sydney Children's Hospitals Network SVHN - St Vincent's Health Network SYD - Sydney LHN SWS - South Western Sydney LHN SES - South Eastern Sydney LHN
IS - Illawarra Shoalhaven LHN WS - Western Sydney LHN NBM - Nepean Blue Mountains LHN NS - Northern Sydney LHN CC - Central Coast LHN

Regional NSW Local Health Districts:
HNE - Hunter New England LHN NNSW - Northern NSW LHN MNC - Mid North Coast LHN SNSW - Southern NSW LHN
M - Murrumbidgee LHN WNSW - Western NSW LHN FW - Far West LHN

Appendix 3: The Productive Operating Theatre (TPOT) example measures

"The following is an extract of operating theatre performance measures sourced from the Productive Operating Theatre Program, Associate National Health Service Institute for Innovation and Improvement, United Kingdom."

"The table below shows the measures that were developed and used by the test sites during the testing of The Productive Operating Theatre. The measures are order according to the domain they relate to, they also show which module they were used in. They provide you with examples and ideas of measure that you could collect; you could use some of the measures below or completely develop your own set. Although we do not dictate which measures you should collect, we do suggest that within your set of measures you include at least one Executive level measure and one other measure for each of the four domains of quality."

Domain	Measure	Impacts on the overall aim of …	Reported as … Operational Definition	Who for	Who collects	Frequency	Trend
Safety	Adverse surgical events	Avoiding complications	No/100 ops	Executive	Surgeon/ governance	Periodic	Downwards
	Readmissions	Avoiding complications	No ops	Theatre management	Infection control	Monthly	Downwards
	Staff accidents	Avoiding complications	No per week	Theatre management	Governance	Monthly	Downwards
	Unplanned returns to theatre	Avoiding complications	No ops	Theatre management	Directorate		Downwards
Team	Vacancies	Consistency/ confidence	no	Theatre management	Theatre manager	Weekly	Downwards
	Personal Development Reviews	Good competency levels	%	Theatre management	Line manager	Monthly	Up and Steady
	No staff per list	Consistency/ confidence	No	Theatre team	Theatre manager	Daily	Up and Steady
	Staff turnover	Consistency/ confidence	%	Theatre team	Theatre manager	Monthly	Downwards
	Sickness/absence	Consistency/ confidence	No of days/week	Theatre team	Theatre manager	Monthly	Downwards
	Mandatory training and appraisals	Good competency levels	% compliance	Theatre team	Theatre manager		Up then steady
Value	% value added time	Delivering plan to budget		Executive		Periodic	Up then steady
	Session utilisation	Delivering plan to budget	% funded sessions run	Executive			
	Lost income	Delivering plan to budget	Loss of revenue	Executive	Theatre manager	Periodic	Down then steady
	Correct kit	Running the list as planned	% operations	Theatre team	Team leader	Monthly	Up then steady
	Usable kit	Running the list as planned	% operations	Theatre team	Team leader	Monthly	Up then steady
	Are sustainability audits up to date	Delivering plan to budget	% up to date	Theatre team	Team leader	Monthly	Up then steady
	Patients lost from list	Running the list as planned		Theatre team	Theatre manager	Periodic	Down then steady
	Contact time/list utilisation	Running the list to time	% time available in session used	Theatre management	Team leader	Daily	Up then steady
	Late starts/early finishes/late finishes	Running the list to time	Mins late/early/reasons	Theatre team	Theatre co-ordinator	Daily	Down then steady
	Validation of lists	Avoiding mistakes	% lists validated by 2 or 3 staff groups	Theatre team	Team leader	Monthly	Up then steady
	Turnaround time	Minimising delay between cases	Minutes	Theatre team	Theatre co-ordinator	Daily	Down then steady
	Performance against budget	Providing service within budget	Variance against Budget	Finance/ theatre management/ service directors	Finance	Monthly	Steady

Domain	Measure	Impacts on the overall aim of …	Reported as … Operational Definition	Who for	Who collects	Frequency	Trend
Value	Theatre Cost per hour	Providing service within budget	Cost per hour	Exec / service dirs/ finance/ theatre mgt	Finance	3 Monthly	Steady
	HRG Income per procedure per session	Providing service within budget	Income per procedure	Executive / Service directors/ finance/theatre management	Finance	Monthly	Increasing
	Agency	Providing service within budget	Hours per week/% wte	Executive management/ Service Directors finance/theatre	Finance	Monthly	Steady - decreasing
	Stock take	Providing service within budget	Stock take for Operating Theatre £	Finance/supply /theatre management	Supply	2 per year - virtual if a closed store	Down and then steady
	Weekly consumable spend	Providing service within budget	£ spent per week	Finance/supply /theatre management	Supply	Weekly	Decrease variation then steady
	Items on Shelf > than 30 days	Providing service within budget	% Items held greater than 30 days	Finance/supply /theatre management	Supply	Monthly	Decrease in items on shelf > than 30 days then steady
	Prostheses spend	Providing service within budget	Prostheses spend per month	Executive/ service managers/ theatre mgrs	Orthopaedic nursing staff/ procurement	Monthly	Within budget
	Prostheses cost per episode	Providing service within budget	Prostheses cost per individual episode	Finance/supply /theatre management	Orthopaedic nursing staff	Daily	Steady
	Prostheses usage per surgeon	Providing service within budget	Prostheses spend per episode allocated to surgeons	Finance/supply /theatre management	Orthopaedic nursing staff/ procurement	Daily	Steady
	Funded Session Hours	Providing service within budget	No of funded sessions available per week	Theatre management	Theatre management	Weekly	Steady
	Unused Sessions Hours	Providing service within budget	No of funded sessions used per week	Theatre management	Theatre management	Weekly	Steady
	Contact Session hours per working date	Providing service within budget	Session hours used per working day	Executive/ theatre management	Theatre management	Monthly	Up then steady
	After hours surgery	Providing service within budget	After hours surgery used per month	Executive/ theatre management	Theatre management	Monthly	Steady and then down
	Time taken to reschedule an operation	Making procedures consistent	Minutes	Managers/ theatre managers	Theatre management	Periodic	Down then steady
	No of interruptions	Making procedures consistent	No of interruptions	Theatre team	Team leader	Weekly	Down then steady
Patient	Time – admission to anaesthetic	Avoiding unnecessary delay	Weekly or 100 pts	Theatre team	Theatre analyst	Monthly	Down then steady
	Time starved	Avoiding unnecessary delay	Weekly or 100 pts	Theatre management	Theatre analyst	Monthly	Down then steady
	Cancellations on the day	Avoid unnecessary discomfort	% Pts	Theatre management	Theatre co-ordinator	Daily	
	Recovery delay	Avoiding unnecessary delay	Weekly or 100 pts	Theatre team	Recovery co-ordinator	Weekly	Down then steady

Appendix 4: Victoria Health – Measuring elective surgery performance

	Demand and capacity measures	KPI aligned to statement of priorities (SOP)	Process measures	Check measures
Purpose	To define demand, capacity, and activity, and assist in writing a problem statement	A direct measure of the goal that you are trying to achieve or problem that you are trying to address	To capture, validate and track the impact of improvement initiatives on process performance	To demonstrate the improvement did not have unintended effects elsewhere in the patient journey or the hospital system
Examples	**Demand: all patients referred to surgical service** • Number of referrals • Number of additions to list • Number and % of patients requiring ICU • Number and % of patients for preadmission by category • Number of patients not appropriate to add to the waiting list **Capacity: resource available to provide a service to the patient, and includes staff.** • Number of theatres • Number of recovery beds • Number of 23-hour beds • Surgeon staff hours, by category, by session • Anaesthetic staff hours by category, by session • Nursing staff hours by category, by hour of day and day of week • Staffing profile (for example number of trainee staff) • Imaging/diagnostic availability by hours • Theatre overruns hours per list, unit, day, and month • Percentage of allocated theatre list time utilised • Percentage of available theatre time utilised • Patients removed from wait list • Percentage of patients cleared form the waiting list	• Number of patients registered to wait list • Patient treated and waiting within time: • Cat 1 (30 days) • Cat 2 (90 days) • Cat 3 (365 days) • Percentage of patients treated within urgency category guidelines • Percentage of patients per 100 scheduled admissions experiencing hospital-initiated postponements by reason for cancellation • Percentage of patients waiting within urgency category	**Process time:** • Surgical start time (e.g. incision time) • Anaesthetic start time • Time from referral to waiting list • Time from waiting list to treatment • Percentage of consent forms complete before day of surgery • Percentage on-time list starts • Registration within three days of referral • Time it takes to confirm a list • Number of patients cancelled on day of surgery admission • Theatre list early finishes • Theatre list overruns • Number of times recovery closes **Process quality:** • Number of patients that fail day surgery • Average % of admitted patients treated out of turn • Number and rate of patient-initiated postponements • Surgical turnaround time • Operation time allocated vs. operation time required • Rate of adherence to time-out • Imaging/pathology turnaround time • Percentage of theatre list with day of surgery admission (DOSA) patients vs. day surgery patients • Percentage of patients waiting who are not ready for care • Number of times a list order is changed • Number of patients waiting greater than 365 days • Number of interruptions • Time taken to reschedule cancelled patients • Time out	**Key measures:** • Unplanned return to theatre rates • Wound infection rates • Rate of adherence to patient pathways • Readmission to hospital • Mortality • Adverse events • Wrong side surgery **Patient satisfaction:** • Targeted surveys • Net promoter scores (recommending the service to others) • Qualitative patient feedback **Staff satisfaction:** • Targeted surveys • Turnover • Sick leave **Other measures:** • Agency use • OH&S incidents **Cost measures:** • Theatre cost per hour based on contact hours (range $40$45 per minute) in hours and out of hours • Performance against budget • Lost income per contact hours (Contact hours is the number of session hours used per working day. One contact hour = one WIES) • Consumables and consignment stock • Stock take • Prosthetic expenditure • Radiology expenditure • Overtime expenditure

Appendix 5: Extract from the Ministry of Health/Audit Office survey of operating theatre managers

Question: Please indicate the performance measures used to regularly assess your operating theatres efficient performance.

Answer	Yes	No – I don't need this information to assess efficiency	No- but this information would assist in assessing efficiency	Not Sure
Measuring the use of theatre time				
Theatre utilisation (actual surgery hours as a proportion of booked surgery hours)	35 (94%)	1 (3%)	1 (3%)	0 (0%)
1st case on time	36 (94%)	1 (3%)	1 (3%)	0 (0%)
Reasons for late start	33 (87%)	1 (3%)	4 (10%)	0 (0%)
Case durations (actual)	27 (73%)	3 (8%)	6 (16%)	1 (3%)
Average time taken for all operations/ procedures	22 (59%)	7 (19%)	8 (22%)	0 (0%)
Average time taken to complete operations/procedures by type	22 (60%)	6 (16%)	9 (24%)	0 (0%)
Turnaround/changeover time between cases	20 (54%)	5 (14%)	12 (32%)	0 (0%)
Anaesthetic time	22 (59%)	4 (11%)	10 (27%)	1 (23%)
Planned/scheduled number of procedures versus actual number of procedures	20 (54%)	9 (24%)	8 (2%)	0 (0%)
Vacant (unfilled) sessions per month	24 (65%)	8 (21%)	4 (11%)	1 (2%)
Number and proportion of procedures carried out in theatres classified as non-surgical	15 (40%)	10 (27%)	11 (30%)	1 (3%)
Measuring delays				
Cancellations on the day of surgery	37 (100%)	0 (0%)	0 (0%)	0 (0%)
Reasons for cancellations	35 (95%)	2 (5%)	0 (0%)	0 (0%)
List underruns	20 (54%)	5 (14%)	12 (32%)	0 (0%)
List overruns	26 (70%)	3 (8%)	8 (22%)	0 (0%)
Reasons for list underruns and overruns	24 (65%)	2 (5%)	11 (30%)	0 (0%)
Delays in other areas of the hospital which impact on theatre performance (equipment, patient tests, supplies)	23 (62%)	4 (11%)	10 (27%)	0 (0%)
Reasons for other delays	22 (59%)	4 (11%)	11 (30%)	0 (0%)
Measuring theatre related costs				
Average cost of all operations/procedures	3 (8%)	3 (8%)	29 (78%)	2 (6%)
Average cost of all operations by type	3 (8%)	2 (5%)	31 (84%)	1 (3%)
Elective surgery completed on overtime rates	8 (21%)	6 (16%)	23 (60%)	1 (3%)
Measuring theatre team efficiency				
Number of operating theatre staff per operation	14 (38%)	12 (32%)	7 (22%)	3 (8%)
Number of operating theatre staff per operation by type	9 (24%)	9 (24%)	16 (44%)	3 (8%)
Operating theatre staff costs per operation	1 (3%)	7 (19%)	26 (70%)	3 (8%)
Theatre staff cost per operation by type	1 (3%)	7 (19%)	26 (70%)	3 (8%)
Operating theatre medical staff (staff and VMO) productivity by surgeons and anaesthetists time and costs of individual surgeons/anaesthetists	2 (5%)	4 (11%)	27 (73%)	4 (11%)
Unfilled staff vacancies	16 (43%)	5 (14%)	14 (38%)	2 (5%)
Measuring performance against targets				
Comparison of actual operating hours against target operating hours	21 (57%)	3 (8%)	11 (30%)	2 (5%)
Comparison of actual number of procedures by type against target set by the LHD &/or hospital.	22 (60%)	2 (5%)	12 (32%)	1 (3%)

Appendix 6: An elective surgery patient's journey and related efficiency measures

Stage	Actions	Current NSW Health-statewide indicators	Other examples of LHD and hospital level efficiency indicators (sourced from Ontario Canada, United Kingdom and Victoria – see other appendices)
Decision for surgery	Request for admission generated from specialist and forwarded to hospital for registration on waiting list		• Time from request for admission to registration on the waiting list • Time from listing date to admissions for treatment
Scheduling	Patient scheduled to theatre according to clinical priority time frame and available theatre sessions	• % treated on time • overdue patients • % not ready for surgery	• Session allocations reviewed periodically • Operation time allocated for each case vs actual time • Funded number of operating minutes per week/month compared to: – booked or planned number of operating minutes – actual number of operating minutes • Session utilisation: % of funded sessions run • Planned/scheduled number of procedures versus actual number of procedures performed • Vacant (unfilled) sessions per month
Pre procedure preparation	Patient is prepared for surgery via a pre assessment process		• Cancellations on day of surgery due to inadequate preparation of patient
Admission	Day of surgery admission and proposed admission type (e.g. day only, extended day only or full)	• % day of surgery admissions • % extended day only	• Time from admission to operating theatre • Percentage of consent forms complete before day of surgery • Number of patients cancelled on day of surgery admission
Immediate pre-operative	Immediate pre-operative assessment and preparation for operating theatre		• % of patients not ready for surgery • Number and rate of patient-initiated postponements • % of patients through a pre-procedure process as per NSW Health pre-procedure toolkit • Average time spent by patient in Pre admission clinic – General PAC (anaesthetist and nurse) – Multidisciplinary PAC • Number of patients who 'did not attend' on the day of surgery
Intra operative – **(continued over)**	Patient undergoes surgery	• % cancellations on day of surgery • first case on time start • theatre utilisation • theatre attendances • surgical separations	• Capacity: – Percentage of theatres in use – Number of funded sessions/operating hours – Number and proportion of procedures carried out in theatres classified as non-surgical – Surgeon/Anaesthetic/Nursing staff hours, by category, by session by hour of day and day of week – Staffing profile (eg numbers and skill levels) – Imaging/diagnostic availability by hours • Process time: – Late starts, early finishes, late finishes measured in hours per list, unit, day, and month and reason – Turnaround between finish of one operation and start of next – Imaging/pathology turnaround time – Anaesthetic start time – Anaesthetic time – Surgical start time (e.g. incision time)

Stage	Actions	Current NSW Health-statewide indicators	Other examples of LHD and hospital level efficiency indicators (sourced from Ontario Canada, United Kingdom and Victoria – see other appendices)
Intra operative - **(continued)**	Patient undergoes surgery		• Percentage on-time list starts – Case durations (actual) – Average time taken for all operations/procedures – Average time taken to complete operations/procedures by type • Cost measures: – Theatre cost per hour based on contact hours (in hours and out of hours) – Performance against budget – Lost income per contact hours (Contact hours is the number of session hours used per working day. One contact hour = one WIES) – Consumables and consignment stock – Stocktakes – Prosthetic expenditure – Radiology expenditure – Overtime expenditure • Clinician and Staff Productivity – Number of operating theatre staff per operation – Number of operating theatre staff per operation by type – Operating theatre staff costs per operation – Operating theatre staff cost per operation by type – Operating theatre medical staff (staff and VMO) productivity by surgeons and anaesthetists (operating theatre time and costs of individual surgeons and anaesthetists and session utilisation by surgeon/anaesthetist) – Unfilled staff vacancies • Unintended effects – Unplanned readmission to operating theatre – Mortality – Adverse events – Wrong side surgery – Number of interruptions and reasons
Post-operative	Patient managed and cared for post-surgery		• Number of recovery beds • Number of Short stay beds • Number of times recovery is unable to accept patients due to no bed space • Unplanned return to theatre rates • Wound infection rates • Recovery delay hours (patients who have delayed/extended stay in recovery)
Pathway of care	Pathway of care determined by procedure and admission type		• Variances from protocols of care • Length of stay for Diagnostic Related Groups
Discharge	Patient discharged from hospital to usual place of residence with or without out of hospital services		

Source: Ministry of Health and Audit Office

Appendix 7: About the audit

Objective

The audit assessed how efficiently public hospital operating theatres are being managed to deliver elective surgery.

Audit criteria

These criteria address key issues about the activity's performance and provide information and evidence to support a conclusion against the audit's objective.

1. Public hospitals are meeting appropriate operating theatre efficiency benchmarks
2. Managers have the information they need to manage operating theatre performance.

When developing the audit's criteria we accessed a range of sources to ensure that the criteria were suitable standards against which to collect and assess performance information on operating theatres.

Broadly the model underlying the criteria for the management of operating theatres is:

- There should be clear and well founded performance measures – both at a health system and local levels.
- Management systems and practices should support the effective and efficient day-to-day management of activities and assessment of performance.
- Performance meets appropriate KPIs.
- Continuous improvement is supported at a local and State level.

Examples of potential under-performance against criteria identified at the planning stage were:

- Management information systems and practices not supporting adequate performance analysis.
- Performance being measured but not used to achieve improvements.
- Variable performance of operating theatres across hospitals.
- Late cancellations or arrivals (patients and staff) causing scheduling/flow problems.
- Management structures not supporting a focus on improving operating theatre practices.

The materiality of under-performance, or performance gaps, raised in audit findings were assessed individually and collectively when forming the audit's conclusion and the extent that it might be qualified.

Scope

The audit assessed how effectively operating theatres perform against targets set at Ministry, LHD and hospital level. It assessed systems, performance information and guidance that support the efficient management of operating theatres, including support through the Agency for Clinical Innovation.

Economy was considered to the extent that key inputs such as hospital staff and VMOs impact on efficient activities. The audit considered compliance with laws and rules to the extent that Ministry and LHD directives are implemented.

The audit visited four LHDs and hospitals to examine performance information and hold discussions with those responsible for operating theatre efficiency. The hospitals and LHDs visited were Wollongong Hospital in Illawarra Shoalhaven LHD, Auburn Hospital in Western Sydney LHD, Concord Hospital in Sydney LHD and Orange Hospital in Western NSW LHD.

The audit did not include:

- emergency surgery and non-surgical procedures
- clinical outcomes of individual operating theatre procedures
- patient safety, clinical practices and models of care

- theatre design and technology, and equipment
- location and distribution of operating theatres
- management of waiting lists.

However there can be comment on these issues where they affect findings or provide context.

Audit approach

The audit team developed its understanding of the subject matter and collect audit evidence through:

Interviews with:

- managers, management committees and staff (including VMOs) responsible for operating theatre performance at the Ministry, Agency for Clinical Innovation, LHDs and hospitals level
- data collection and monitoring staff within Ministry, Agency for Clinical Innovation, LHDs and hospitals
- conducting a survey of operating theatre managers across the State in conjunction with the Ministry of Health
- staff in other jurisdictions and the private hospital sector.

Examination of:

- targets set at statewide/LHD/hospital levels
- public hospitals performance against operating theatre efficiency targets
- surveys of operating theatres and practices
- analysis of operating theatre physical capacity
- comparison with practices in private hospitals and, other jurisdictions
- data collected in hospital information systems.
- LHD and hospital management reports, including minutes of committees
- guides and policy issued at Ministry, LHD and hospital levels
- service agreements between Ministry and LHDs on activity levels and funding
- research into better practice operating theatre performance management information
- other sources identified through discussions with Ministry, Agency for Clinical Innovation and LHDs.

Audit selection

We use a strategic approach to selecting performance audits which balances our performance audit program to reflect issues of interest to parliament and the community. Details of our approach to selecting topics and our forward program are available on our website.

Audit methodology

Our performance audit methodology is designed to satisfy the Australian assurance engagement standard on performance auditing (ASAE 3500), and to reflect current thinking on performance auditing practices. Our processes have also been designed to comply with the auditing requirements specified in the *Public Finance and Audit Act 1983*.

Acknowledgements

We gratefully acknowledge the cooperation and assistance provided within NSW Health.

Audit team

This audit was carried out by Chris Bowdler and Gordon Eastwood. Sean Crumlin provided direction and quality assurance.

Audit cost

Including staff costs, printing costs and overheads, the estimated cost of the audit is $364,000.

Performance Auditing

What are performance audits?

Performance audits determine whether an agency is carrying out its activities effectively, and doing so economically and efficiently and in compliance with all relevant laws.

The activities examined by a performance audit may include a government program, all or part of a government agency or consider particular issues which affect the whole public sector. They cannot question the merits of government policy objectives.

The Auditor-General's mandate to undertake performance audits is set out in the *Public Finance and Audit Act 1983*.

Why do we conduct performance audits?

Performance audits provide independent assurance to parliament and the public.

Through their recommendations, performance audits seek to improve the efficiency and effectiveness of government agencies so that the community receives value for money from government services.

Performance audits also focus on assisting accountability processes by holding managers to account for agency performance.

Performance audits are selected at the discretion of the Auditor-General who seeks input from parliamentarians, the public, agencies and Audit Office research.

What happens during the phases of a performance audit?

Performance audits have three key phases: planning, fieldwork and report writing. They can take up to nine months to complete, depending on the audit's scope.

During the planning phase the audit team develops an understanding of agency activities and defines the objective and scope of the audit.

The planning phase also identifies the audit criteria. These are standards of performance against which the agency or program activities are assessed. Criteria may be based on best practice, government targets, benchmarks or published guidelines.

At the completion of fieldwork the audit team meets with agency management to discuss all significant matters arising out of the audit. Following this, a draft performance audit report is prepared.

The audit team then meets with agency management to check that facts presented in the draft report are accurate and that recommendations are practical and appropriate.

A final report is then provided to the CEO for comment. The relevant minister and the Treasurer are also provided with a copy of the final report. The report tabled in Parliament includes a response from the CEO on the report's conclusion and recommendations. In multiple agency performance audits there may be responses from more than one agency or from a nominated coordinating agency.

Do we check to see if recommendations have been implemented?

Following the tabling of the report in parliament, agencies are requested to advise the Audit Office on action taken, or proposed, against each of the report's recommendations. It is usual for agency audit committees to monitor progress with the implementation of recommendations.

In addition, it is the practice of Parliament's Public Accounts Committee (PAC) to conduct reviews or hold inquiries into matters raised in performance audit reports. The reviews and inquiries are usually held 12 months after the report is tabled. These reports are available on the parliamentary website.

Who audits the auditors?

Our performance audits are subject to internal and external quality reviews against relevant Australian and international standards.

Internal quality control review of each audit ensures compliance with Australian assurance standards. Periodic review by other Audit Offices tests our activities against best practice.

The PAC is also responsible for overseeing the performance of the Audit Office and conducts a review of our operations every four years. The review's report is tabled in parliament and available on its website.

Who pays for performance audits?

No fee is charged for performance audits. Our performance audit services are funded by the NSW Parliament.

Further information and copies of reports

For further information, including copies of performance audit reports and a list of audits currently in-progress, please see our website www.audit.nsw.gov.au or contact us on 9275 7100.

Performance audit reports

No	Agency or Issues Examined	Title of performance Audit Report or Publication	Date Tabled in Parliament or Published
232	NSW Health	*Managing operating theatre efficiency for elective surgery*	17 July 2013
231	Ministry of Health NSW Treasury NSW Office of Environment and Heritage	*Building energy use in NSW public hospitals*	4 June 2013
230	Office of Environment and Heritage - National Parks and Wildlife Service	*Management of historic heritage in national parks and reserves*	29 May 2013
229	Department of Trade and Investment, Regional Infrastructure and Services – Office of Liquor, Gaming and Racing Independent Liquor and Gaming Authority	*Management of the ClubGRANTS scheme*	2 May 2013
228	Department of Planning and Infrastructure Environment Protection Authority Transport for NSW WorkCover Authority	*Managing gifts and benefits*	27 March 2013
227	NSW Police Force	*Managing drug exhibits and other high profile goods*	28 February 2013
226	Department of Education and Communities	*Impact of the raised school leaving age*	1 November 2012
225	Department of Premier and Cabinet Division of Local Government	*Monitoring Local Government*	26 September 2012
224	Department of Education and Communities	*Improving the literacy of Aboriginal students in NSW public schools*	8 August 2012
223	Rail Corporation NSW Roads and Maritime Services	*Managing overtime*	20 June 2012
222	Department of Education and Communities	*Physical activity in government primary schools*	13 June 2012
221	Community Relations Commission For a multicultural NSW Department of Premier and Cabinet	*Settling humanitarian entrants in NSW* *services to permanent residents who come to NSW through the humanitarian migration stream*	23 May 2012
220	Department of Finance and Services NSW Ministry of Health NSW Police Force	*Managing IT Services Contracts*	1 February 2012
219	NSW Health	*Visiting Medical Officers and Staff Specialists*	14 December 2011
218	Department of Family and Community Services Department of Attorney General and Justice Ministry of Health NSW Police Force	*Responding to Domestic and Family Violence*	8 November 2011
217	Roads and Traffic Authority	*Improving Road Safety: Young Drivers*	19 October 2011
216	Department of Premier and Cabinet Department of Finance and Services	*Prequalification Scheme: Performance and Management Services*	25 September 2011
215	Roads and Traffic Authority	*Improving Road Safety: Speed Cameras*	27 July 2011

No	Agency or Issues Examined	Title of performance Audit Report or Publication	Date Tabled in Parliament or Published
214	Barangaroo Delivery Authority Department of Transport NSW Treasury	*Government Expenditure and Transport Planning in relation to implementing Barangaroo*	15 June 2011
213	Aboriginal Affairs NSW Department of Premier and Cabinet	*Two Ways Together - NSW Aboriginal Affairs Plan*	18 May 2011
212	Office of Environment and Heritage WorkCover NSW	*Transport of Dangerous Goods*	10 May 2011
211	NSW Police Force NSW Health	*The Effectiveness of Cautioning for Minor Cannabis Offences*	7 April 2011
210	NSW Health	*Mental Health Workforce*	16 December 2010
209	Department of Premier and Cabinet	*Sick leave*	8 December 2010
208	Department of Industry and Investment	*Coal Mining Royalties*	30 November 2010
207	Whole of Government electronic information security	*Electronic Information Security*	20 October 2010
206	NSW Health NSW Ambulance Service	*Helicopter Emergency Medical Service Contract*	22 September 2010
205	Department of Environment, Climate Change and Water	*Protecting the Environment: Pollution Incidents*	15 September 2010
204	Corrective Services NSW	*Home Detention*	8 September 2010
203	Australian Museum	*Knowing the Collections*	1 September 2010
202	Industry & Investment NSW Homebush Motor Racing Authority Events NSW	*Government Investment in V8 Supercar Races at Sydney Olympic Park*	23 June 2010
201	Department of Premier and Cabinet	*Severance Payments to Special Temporary Employees*	16 June 2010
200	Department of Human Services - Ageing, Disability and Home Care	*Access to Overnight Centre-Based Disability Respite*	5 May 2010
199	Department of Premier and Cabinet NSW Treasury WorkCover NSW	*Injury Management in the NSW Public Sector*	31 March 2010
198	NSW Transport and Infrastructure	*Improving the performance of Metropolitan Bus Services*	10 March 2010

Performance audits on our website

A list of performance audits tabled or published since March 1997, as well as those currently in progress, can be found on our website www.audit.nsw.gov.au.

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