AUDITOR-GENERAL'S REPORT
PERFORMANCE AUDIT

Tackling Cancer with Radiotherapy

NSW Department of Health

The Legislative Assembly
Parliament House
SYDNEY NSW 2000

The Legislative Council
Parliament House
SYDNEY NSW 2000

In accordance with section 38E of the *Public Finance and Audit Act 1983*, I present a report titled **Tackling Cancer with Radiotherapy: NSW Department of Health.**

A T Whitfield
Deputy Auditor-General

Sydney
June 2009

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Contents

Foreword

Cancer is on the increase. The Cancer Institute NSW predicts that there will be over 30 per cent more cancer cases in the next ten years than there were in the last ten years. By 2016, there will be an estimated 45,000 cases of cancer each year, costing around $106 billion over the next ten years.

Radiotherapy is one of the main treatments for cancer, along with surgery and chemotherapy. It can be used to cure cancer and also to reduce pain.

While New South Wales has a number of well-established radiotherapy treatment centres, the high capital cost limits their availability in all hospitals. Some patients need to travel long distances and be away from their homes for up to seven weeks.

In this audit we look at whether patients have reasonable access to radiotherapy, services are located where they are needed and are adequately staffed, and that resources are properly utilised. We also examine whether radiotherapy services are likely to be adequate in the future.

The report recommends a number of ways to improve the efficiency and effectiveness of radiotherapy services in New South Wales.

It follows previous audit reports that have looked at critical areas of NSW Health including *Delivering Health Care out of Hospitals (2008)* and *Managing Infectious Disease Outbreaks (2006)*.

I believe this report will encourage better practice, at a time when the availability, efficiency and effectiveness of State resources are receiving increased attention.

Tony Whitfield
Deputy Auditor-General

June 2009

Executive summary

The focus of our audit

Our objective in this audit was to determine how well NSW Health manages the provision and delivery of radiotherapy services.

Cancer is a life-changing diagnosis that will affect one in two men and one in three women currently living in NSW during their lifetime, according to the Cancer Institute NSW. Large gains have been made in the treatment of and survival from many cancers. Cancer death rates have fallen by 16% in men and 10% in women over the past decade. However, because cancer risk increases with age, as the population grows and ages the number of cases of cancer is increasing.

The Cancer Institute NSW has estimated that:

- over the next 10 years, 412,000 people in NSW will be diagnosed with cancer and 145,000 may die of the disease
- the incidence of cancer in the 10 years from 2007–2016 is expected to be more than 30 per cent higher than that in the previous 10 years (1997–2006)
- cancer will cost the NSW economy around $106 billion and $320 billion over the next 10 and 30 years respectively.

The focus of this audit is on radiotherapy services. Along with surgery and chemotherapy, radiotherapy is one of the main treatments for cancer. Radiotherapy can be used to cure cancer and also to reduce pain. Radiotherapy services are costly to establish. Linear accelerators that deliver radiation treatment cost between $3.5 million and $5 million each. While most centres in NSW have 2 to 3 machines, there are larger centres with up to 5 machines.

While our focus is on radiotherapy services, it is important to remember this is provided in combination with other treatments, particularly surgery and chemotherapy.

During the course of the audit we were impressed by the dedication and efforts of medical, nursing and allied health staff in NSW radiotherapy treatment centres, and cancer services more broadly, in providing care and support for patients and families dealing with a diagnosis of cancer.

Audit opinion

Overall radiotherapy services are managed in a reasonably efficient and effective manner. Much is being done to further improve efficiency and effectiveness, and more can be done. The projected growth in demand for radiotherapy services will further challenge NSW Health and it needs to more clearly demonstrate how it will have the right facilities in the right place at the right time.

Are radiotherapy services provided efficiently and effectively?

We found that, overall, radiotherapy services are provided in a reasonably efficient manner. Most patients have reasonable access to radiotherapy services. NSW has as many linear accelerators per 1000 cancer patients as other comparable jurisdictions. Centres are for the most part adequately staffed, well equipped and well utilised.

We were unable to obtain similar assurance in relation to the effectiveness of the provision of radiotherapy treatment. We looked for, but did not find, clarity and agreement on what the results for patients should be from the use of radiotherapy.

We found that the foundation for many improvements in efficiency and effectiveness appears to be in place. This includes improving:

- accessibility of radiotherapy services such as by more timely referrals, reducing waiting times, and locating radiotherapy facilities in regional centres
- operational performance of radiotherapy treatment centres by waiting list management, patient booking systems and staff rostering.

Are radiotherapy services likely to be adequate in the future?

We expected that NSW Health would have a strategy or plan to help ensure that the provision and delivery of radiotherapy services are directed to areas of need and the highest priorities. We also expected its assessments to support value for money.

We found that NSW Health had undertaken significant planning in relation to the development of a draft *Radiotherapy Services Plan 2007-2011*, but not released it due to the need to resolve the significant funding required.

Although there has been no published plan, we found that implementation of state-wide planning has progressed. We also found assessments in the *Business Case for the Radiotherapy Services Plan 2007* to support value for money.

Key audit findings

Are radiotherapy services provided efficiently and effectively?

Framework

As radiotherapy is but one means of tackling cancer, and cancer treatment is one of many health services, we looked to see if there was an overall framework for providing radiotherapy services within that context.

We found that a number of policies and strategic planning documents provide the strategic framework for the delivery of health services in relation to cancer in NSW.

We found that radiotherapy services operate as part of broader cancer networks, and these networks often reflect long standing referral patterns and the existence of outreach services. We agree with the view of the *Cancer Care Model* that there would be benefit in formalising such arrangements between Area Health Services.

We also found that there are a range of measures to ensure the quality of radiotherapy operations. We looked to see if there was a quality accreditation program specifically focused on radiotherapy services. The Cancer Institute NSW reported that it has been examining the feasibility of such a process. In our view, it would provide an ongoing independent assurance of quality and do much to promote public confidence in the delivery of radiotherapy services.

Alternatives

As there are a number of alternatives to the use of radiotherapy, and as it is almost always used in conjunction with other treatments, we looked to see if the alternatives were considered and evaluated.

We found that NSW Health and the Cancer Institute NSW promote the use of multidisciplinary approaches to cancer care, increasingly through the use of multidisciplinary teams. In a multidisciplinary approach to care, the treatment options for patients are considered by a team, including medical specialists, nurses and allied health professionals from the various oncology sub-specialities with relevant expertise. In 2006, 69% of patients had their care considered by a multidisciplinary team.

Accessibility

We looked to see if patients had reasonable access to radiotherapy services.

We found that most patients have reasonable access to radiotherapy services, and that there are a number of measures to improve access – particularly for patients in regional and rural areas.

distance to treatment facilities

We found that NSW has as many linear accelerators per 1000 cancer patients as other comparable jurisdictions (with the singular exception of the USA). NSW is a large state and radiotherapy services have historically been provided through a concentrated service delivery model. More recently, a more distributed model has been developed. However, because this type of treatment cannot be delivered in all hospitals, patients still need to travel some distance and be away from their homes for up to seven weeks.

Although significant contributions are made by the public sector towards travel and accommodation, we found that not all costs are able to be fully covered by these programs.

We see scope for further analysis to identify those people who are not within reasonable distance of radiotherapy facilities – where additional service and support efforts may be needed. This could then be subject to more detailed consideration and assessment by Area Health Services of cancer outreach services or special transport measures.

waiting times

We found that problems including poor waiting time data quality, and a lack of consistency of approach to data definitions, have precluded systematic state-wide monitoring and analysis of patient waiting times.

A study by NSW Health undertaken during our audit indicated that the average number of days between 'ready for care' and the start of their radiotherapy treatment in 10 centres has been reduced from 18.5 days in 2004 to 14.2 days in 2008. Actual times vary between centres with the average waiting times ranging between 9.7 days to 18 days in 2008. In six centres waiting times were reduced. In four centres waiting times increased. The percentage of patients who were treated in 2008 within target times also showed an overall improvement; with 57% of priority one patients, 72% of priority two patients and 82% of priority three patients treated within the maximum acceptable times recommended by the Royal Australian and New Zealand College of Radiologists.

We looked for, but were unable to find, similar information on the time between referral and initial specialist consultation, as this is often outside the data capture of NSW Health. This time contributes to overall waiting times.

We see scope to further improve waiting time performance by: ensuring consistency of definitions for all centres to enable inter-centre comparison; ensuring all centres include priority codes for patients; ensuring roll-out of the Business Improvement 'tool kit' to all public centres; ensuring consistency in setting of ready for care dates; systematically monitoring and benchmarking the performance of radiotherapy centres state-wide; developing centralised booking systems; and ensuring that patients faced with extended waiting times have been offered access to alternative radiotherapy centres.

Location

We looked at how NSW Health ensures that facilities are located appropriately for effective service delivery.

We found strategic analysis at Department and Area Health Service level to identify and assess alternative locations and service delivery options state-wide.

We found these aspects addressed in the more detailed planning for services undertaken by Area Health Services, for example in relation to Orange and Lismore. We found that decisions concerning the location of facilities consider a number of factors including population distribution and size, workforce training and availability, and patient access. Other regional centres could be similarly considered. NSW Health needs to conduct further detailed analysis of options for radiotherapy services (including public or private sector provision) and sites in the geographic areas of need, including the Central Coast, Hunter New England and Illawarra Shoalhaven areas.

Productivity

We looked to see whether full and effective use was being made of the existing facilities. We found that while centres are well utilised during the week, there is potential for further improvement.

We found that it was possible to increase throughput within existing resources by waiting list management, patient booking systems and staff rostering.

We agree with the findings of a NSW Health improvement project that centres need to develop and benchmark a set of key performance measures. This will require a workload measure that facilitates comparison of centres with different case-mixes and different techniques.

We found that it may also be possible to extend the hours of operation at some centres. This presents the opportunity to test whether there is additional demand, without having to build new facilities.

Staffing

We looked at whether there are appropriate numbers of staff with the requisite skill levels. We found that generally there seemed to be enough staff, but that staffing levels varied considerably.

We found that there have been workforce shortages, both nationally and internationally, that in the past have resulted in reduced productivity of radiotherapy machines. NSW Health undertook a number of strategies to address the situation and in recent years NSW vacancy rates have declined. These efforts need to be sustained to ensure adequate staffing into the future.

We observed that centres appear to have quite different staffing levels when related to the throughput achieved. The reasons for such variations were not clear, but could be due to more complex treatments, more training commitments and more involvement in research. NSW Health needs a process to analyse this and establish the staffing required at each centre.

Effectiveness

We looked to see if the effectiveness of radiotherapy services had been assessed to establish the impact of centre facilities on patient outcomes.

We found there was no means of systematically reviewing the effectiveness of services provided at individual centres. We looked for, but did not find, clarity and agreement on what the results for patients should be from the use of radiotherapy.

NSW Health proposals for new radiotherapy services usually cite improvement in morbidity and mortality, and radiotherapy treatment rates as primary objectives. In particular, a treatment rate of at least 50% of all cancer patients has been a NSW target since 1995. Current radiotherapy treatment rates for NSW residents who received radiotherapy in NSW and interstate, in either the public or private sector, are considerably lower than this target. Treatment rates in other states and overseas appeared similar to those achieved in NSW.

NSW Health needs to look closely at the changing evidence basis for this target, particularly considering that treatments have changed over time and radiotherapy is provided in combination with other treatments.

We see a need for more realistic 5 year and 10 year treatment benchmarks for each Area Health Service as a basis for assessing performance and planning the expansion of facilities.

Are radiotherapy services likely to be adequate in the future?

Planning

The establishment of radiotherapy centres requires extensive planning. Over the next 10 to 12 years demand for cancer services is expected to increase significantly. We looked to see how well NSW Health was planning to provide the services that will be needed.

We found that NSW Health had undertaken significant planning in relation to the development of a draft *Radiotherapy Services Plan 2007-2011*, but not released it due to the need to resolve the significant funding required. In our view the Plan should be extended to a 10 year timeframe and released to provide overall direction - resourcing and the availability of funding being risks that need to be managed.

Although there has been no published plan, we found that state-wide planning has progressed. This has included consideration of the estimated number of new cancer cases, flow patterns and the impact of new and expanded services. This enables assessment of the impact of adjustments to flow patterns and the supply of radiotherapy services. This planning process has identified areas of geographic need including the Central Coast, Illawarra/Shoalhaven, Hunter/New England, and Sydney West/Sydney South West regions.

Value for money

We looked to see how well NSW Health had evaluated the economic or 'value for money' aspects of the projected replacement and expansion of radiotherapy services.

We found that the *Business Case for the Radiotherapy Services Plan 2007* evaluated replacement and expansion of radiotherapy services in NSW in terms of a limited number of options. We looked for, but did not find at a state-wide level, economic or value for money assessments of the economies of scale comparing facilities with 1, 2, 3 and 4 or more machines, or optimal replacement of existing machinery based on service need, age, state of repair, productivity, and life cycle costs.

Resources

We looked to see if future planning had clearly identified the resources needed.

We found that the *Business Case for the Radiotherapy Services Plan 2007* provided a broad estimate of the overall funding needed, identified the linear accelerators required and was supported by an economic analysis that includes assumptions in relation to staffing, equipment, and other related costs such as maintenance. We also found Area Health Services identifying radiotherapy resources they need. A key issue for Area Health Services is the operational funding required to operate these services.

Capacity/ affordability

We were particularly interested in seeing if the planned increase in radiotherapy services was likely to be affordable – for NSW Health as well as the patients.

We have found analysis of the affordability of options at the Project Definition Planning phase. We expected to see, but did not find, analysis of affordability at a state-wide level including:

- assessments of the likely adequacy of funding for development, operations, and maintenance of all radiotherapy treatment centres in the system
- efforts to identify, secure and leverage further funding sources as necessary to address any shortfalls.

Risks

We looked to see if future planning had identified and assessed the risks to service delivery – particularly the risks associated with limited public sector funding.

The *Business Case for the Radiotherapy Services Plan 2007* identified risks to the development program as including lack of funding, workforce availability, and program delays.

Our view is that NSW Health has more to do on the assessment and risk management of funding, workforce support (particularly at non-metropolitan locations), and private sector involvement.

Recommendations

Providing services more efficiently and effectively

We recommend that NSW Health:

1. establishes by December 2010 formal cancer networks that link radiotherapy centres in a way that clarifies, assures and specifies access to a complete range of cancer services for rural and regional residents (page 27)
2. continues to work with accreditation agencies to adopt by June 2010 agreed accreditation standards for radiation oncology services within their hospital accreditation processes (page 28)
3. systematically and consistently by June 2010 monitors, benchmarks and analyses the actual times taken between receipt of the referral to radiotherapy treatment centres and initial specialist consultation, and from 'ready for care' to treatment (page 41)
4. develops centralised booking systems by December 2009 for all radiotherapy treatment centres within a service network (page 41)
5. identifies by June 2010 those people who are not within a reasonable distance or do not have reasonable access to radiotherapy facilities, and analyses where additional service and support efforts may be needed (page 41)
6. conducts detailed analysis of options for radiotherapy services (including public or private sector provision) and sites in the geographic areas of need, including the Central Coast, Hunter New England and Illawarra Shoalhaven areas (page 46)

7. develops a workload measure by June 2010 that facilitates comparison of centres with different case-mixes and different techniques (page 50)
8. monitors and benchmarks by December 2009 operational performance measures for radiotherapy treatment centres including for quality, patient safety, waiting times, throughput, cost of treatment and outcomes (page 50)
9. assesses by June 2010 the value for money of working extended hours (including Saturday mornings), including the value to patients (page 50)
10. analyses by December 2010 the variations of current staff levels between radiotherapy centres and develops staffing profiles for each centre which reflect volume, case-mix and complexity (page 53)
11. establishes by June 2010 more realistic 5 year and 10 year treatment benchmarks for each Area Health Service as a basis for assessing performance and planning the expansion of facilities (page 60)
12. continues to monitor international evidence and assess the impact that radiotherapy services are having on patient outcomes as part of their overall cancer treatment, in order to clarify and agree what the patient outcomes and performance measures should be (page 60).

Ensuring radiotherapy services are adequate in the future

We recommend that NSW Health:

13. develops and publishes by June 2010 a 10 year strategic plan for radiotherapy services, noting that the progress of its implementation will be determined by resource and funding availability (page 67)
14. assesses by June 2010 economies of scale to assist in considering the most cost effective machine configuration and the impact on access to services (page 69)
15. develops by June 2010 a firm funding strategy to support the replacement of existing machinery based on service need, age, state of repair, productivity, and life cycle costs (page 69)
16. analyses by June 2010 the affordability of its strategic plan, particularly in relation to Commonwealth payments and the implications of private sector involvement (page 71).

Response from NSW Department of Health

Thank you for the opportunity to provide a response to the performance audit report Tackling Cancer with Radiotherapy.

The impact and subsequent challenges of a cancer diagnosis on individuals; their families; and, their carers is well is understood. While the focus for this review has been on radiotherapy services, the burden of cancer means that there needs to be continued efforts on many fronts; from prevention and screening, through treatment; and, to rehabilitation and palliation; as part of maintaining and improving the response to this disease. Ongoing improvement in people's experiences; recovery; and, survival from cancer will depend upon action across many parts of the NSW Health system.

As the report indicates, NSW has survival rates for cancer which are among the best in the world. NSW Health aims to continue to ensure that gains that have been made in the treatment of, and survival from, many cancers are sustained and survival rates continue to improve. The Cancer Institute, NSW will continue to lead NSW Health efforts in this regard.

Since 1995, NSW has invested over $150 million to expand the capacity of services to treat cancer through new and replacement linear accelerators. This has occurred through the expansion of services at Calvary Mater Hospital, Newcastle, and the establishment of the North Coast Cancer Institute at Coffs Harbour and Port Macquarie. Over $50 million additional funding has been committed to establish new services at Lismore and Orange, and provide for the replacement of three linear accelerators. In addition to the capital investment made, since 2003/04 funding of over $13 million has been allocated to operate the additional treatment machines at existing and new centres.

Our cancer services owe much to the dedicated staff who diagnose, treat, and support cancer patients. NSW Health has made major investments in a range of workforce initiatives to grow and support the necessary workforce for radiation oncology. Some of these initiatives include $2.2 million, each year, for a range of strategies for Radiation Oncology Medical Physicists; $0.8 million each year for Radiation Therapist tutor positions; and, support for approximately 50 positions each year for Professional Development Year positions for Radiation Therapists.

In an area such as cancer, it is recognised that more can always be done and the recommendations of the report identify a number of areas where the efficiency and effectiveness of our existing services can continue to be improved.

All of the recommendations are supported. However, I would note that the response to a number of the recommendations will be dependent on availability of resources and will also need careful consideration as to the broader implications of these recommendations. A schedule is attached which outlines the summary position from NSW Health in response to each of the recommendations.

Service quality should, and does, remain a major focus of all service provision, and accreditation is an important part of this overall process; accreditation is also part of the national agenda. Recommendation 2 will be raised through the Australian Health Ministers Council process.

Some recommendations, such as recommendations 10, 14 and 16 will require additional resources, as external expertise in health economics, will need to be sourced to undertake more detailed analyses. Progress on these recommendations will therefore be dependent on the availability of these resources, balanced against service provision.

Recommendation 12 will require continued assessment of cancer outcomes, within overall cancer treatment, in line with international best practice, and close monitoring of the role of radiotherapy, both now and into the future.

The role of the Commonwealth in radiotherapy is significant and NSW will continue to work closely with the Commonwealth; other jurisdictions; and, the private sector, in the planning and provision of radiotherapy services. The important contributions and achievements of the Radiation Oncology Reform Implementation Committee, and its associated Quality, Workforce and Planning Working Groups, will continue to provide a venue to respond to some recommendations regarding service provision.

NSW is fortunate in having access to comprehensive data and information regarding the provision of radiotherapy services. The availability of this information makes the results of reviews such as this audit review and service planning, more generally, of significant standard. This is the result of the contribution by public and private sector providers, both in NSW and interstate, over many years; the participation of these service providers is appreciated.

The commitment and cooperation of the clinicians responsible for delivering radiotherapy on a day to day basis, and for cancer services more broadly, is acknowledged and greatly appreciated.

I would also like to take this opportunity to thank the many clinicians and stakeholders who were consulted and provided assistance in the development of this report. I also wish to acknowledge the Audit Team for the collaborative manner in which this Performance Audit was conducted.

(signed)

Professor Debora Picone AM
Director-General

Dated: 1 June 2009

Audit Office Report Recommendations	NSW Health Response
Providing services more efficiently and effectively	
1. establishes by December 2010 formal cancer networks that link radiotherapy centres in a way that clarifies, assures and specifies access to a complete range of cancer services for rural and regional residents	Supported. This will be considered as part of the overall arrangements for new centres to be networked with larger, more established centres, where required. In developing these networks the overall service needs of residents will be considered.
2. continues to work with accreditation agencies to adopt by June 2010 agreed accreditation standards for radiation oncology services within their hospital accreditation processes	Supported with qualification. A separate accreditation process for radiotherapy, aside from other cancer services, is not supported. The accreditation of radiotherapy services needs to be incorporated into existing accreditation processes.
3. systematically and consistently by June 2010 monitors, benchmarks and analyses the actual times taken between receipt of the referral to radiotherapy treatment centres and initial specialist consultation, and from 'ready for care' to treatment	Supported with qualification. The Department is supportive of monitoring the time between confirmation of the patient's "Ready for Care" date, and commencement of treatment. This information is anticipated to be available from the roll-out of the Business Improvement Toolkit. To date, the intent of developing the system and reports has been to assist clinicians in discussing with the patient possible alternate treatment locations in relation to likely time to treatment.
4. develops centralised booking systems by December 2009 for all radiotherapy treatment centres within a service network	Supported. This will require action by Area Health Services but should be facilitated by the Business Improvement Toolkit.
5. identifies by June 2010 those people who are not within a reasonable distance or do not have reasonable access to radiotherapy facilities, and analyses where additional service and support efforts may be needed	Supported. Information already available in the Source of Referral information in the Radiotherapy Management Information System Report. More detailed assessment is also undertaken as part of the detailed services' and facility planning for specific geographic areas.
6. conducts detailed analysis of options for radiotherapy services (including public or private sector provision) and sites in the geographic areas of need, including the Central Coast, Hunter New England and Illawarra Shoalhaven areas	Supported with qualification. This detailed analysis is undertaken as part of the service and facility planning process. The timing of these analyses is determined by the annual budget cycle. These processes can have significant associated Consultant costs and need to be programmed accordingly.
7. develops a workload measure by June 2010 that facilitates comparison of centres with different case-mixes and different techniques	Supported. A Basic Treatment Equivalent model has been used previously with variable uptake by individual ROTCs.
8. monitors and benchmarks by December 2009 operational performance measures for radiotherapy treatment centres including for quality, patient safety, waiting times, throughput, cost of treatment and outcomes	Supported with qualification. Implementation will be dependent on resources to undertake the review. Not all of this information is currently readily available and will require additional resources to develop systems to capture this information.

9. assesses by June 2010 the value for money of working extended hours, (including Saturday mornings), including the value to patients	Supported.
10. analyses by December 2010 the variations of current staff levels between radiotherapy centres and develops staffing profiles for each centre which reflect volume, case-mix and complexity	Supported with qualification. Implementation will be dependent on resources to undertake review.
11. establishes by June 2010 more realistic 5 year and 10 year treatment benchmarks for each Area Health Service as a basis for assessing performance and planning the expansion of facilities	Supported. Implementation will be facilitated through the AHMAC Radiation Oncology Reform Implementation Committee.
12. continues to monitor international evidence and assess the impact that radiotherapy services are having on patient outcomes as part of their overall cancer treatment, in order to clarify and agree what the patient outcomes and performance measures should be.	Supported. Implementation will be facilitated through the AHMAC Radiation Oncology Reform Implementation Committee.
Ensuring radiotherapy services are adequate in the future	
13. develops and publishes by June 2010 a 10 year strategic plan for radiotherapy services, noting that the progress of its implementation will be determined by resource and funding availability	Supported.
14. assesses by June 2010 economies of scale to assist in considering the most cost effective machine configuration and the impact on access to services	Supported with qualification. Implementation will be dependent on resources to undertake review.
15. develops by June 2010 a firm funding strategy to support the replacement of existing machinery based on service need, age, state of repair, productivity, and life cycle costs	Supported.
16. analyses by June 2010 the affordability of its strategic plan, particularly in relation to Commonwealth payments and the implications of private sector involvement.	Supported with qualification. Implementation will be dependent on resources to undertake review.

1 Treating cancer with radiotherapy

1.1 The role of radiotherapy in cancer treatment

Cancer is a life-changing diagnosis that will affect one in two men and one in three women currently living in NSW during their lifetime, according to the Cancer Institute NSW. Because cancer risk increases with age, as the population grows and ages the number of cases of cancer is increasing. Cancer is the largest cause of premature death in our community.

In recent years, large gains have been made in the treatment of and survival from many cancers. Cancer death rates have fallen by 16% in men and 10% in women over the past decade. Increasing numbers of cancers, coupled with increased survival, places an additional burden on our health system necessitating careful resource planning to respond to this demand.

Survival rates previously published by the Cancer Institute NSW suggest that cancer patient survival in NSW are among the best in Australia and internationally; similar to the USA and Canada, but superior to the UK and many western European countries. The rate of decline is steeper for younger people, suggesting that some lifestyle risk messages are having a greater impact in that group.

The five most common cancers in NSW (accounting for 62% of new cancers) are:

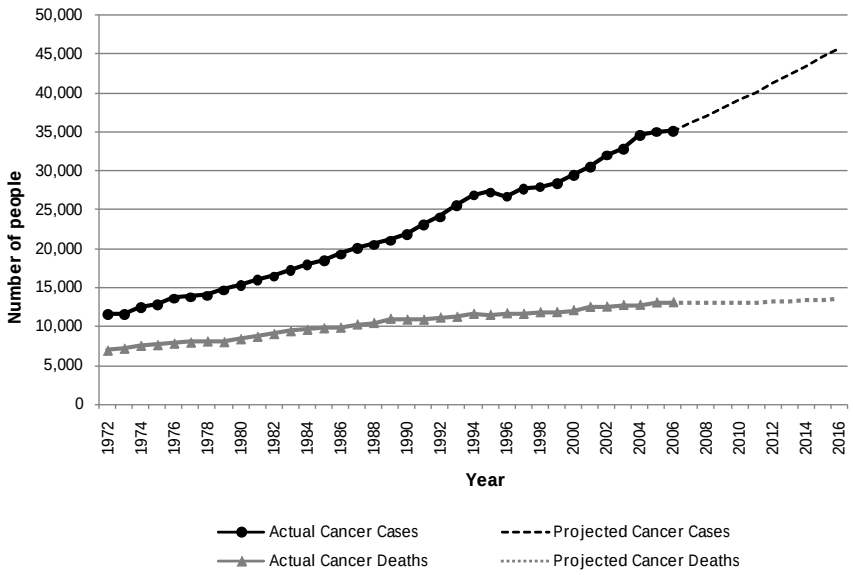
1. prostate cancer (18%)
2. bowel cancer (13%)
3. breast cancer (12%)
4. melanoma (10%)
5. lung cancer (9%).

Source: Cancer Institute NSW, *2006 Cancer in New South Wales: Incidence and Mortality Report*, 2008

Cancer numbers will increase

The number of people with cancer continues to grow as a result of population growth and ageing, as shown by the graph below. This represents a significant demand for services to diagnose, treat and manage patients with cancer. It also represents an increasing need to ensure that appropriate cancer prevention programs are put in place.

Cancer: deaths and new cases
NSW 1972 to 2016



Source: NSW Central Cancer Registry data, December 2008, Cancer Institute NSW.

Cost of cancer

The Cancer Institute NSW has estimated that:

- over the next 10 years, 412,000 people in NSW will be diagnosed with cancer and 145,000 may die of the disease
- the incidence of cancer in the 10 years from 2007–2016 is expected to be more than 30 per cent higher than that in the previous 10 years (1997–2006)
- cancer will cost the NSW economy around $106 billion and $320 billion over the next 10 and 30 years respectively.

Source: Cancer Institute NSW, *Lives at Risk from Cancer in New South Wales 2007–2036: A health economics study of cancer in New South Wales*, December 2008.

Radiotherapy is the focus of this audit

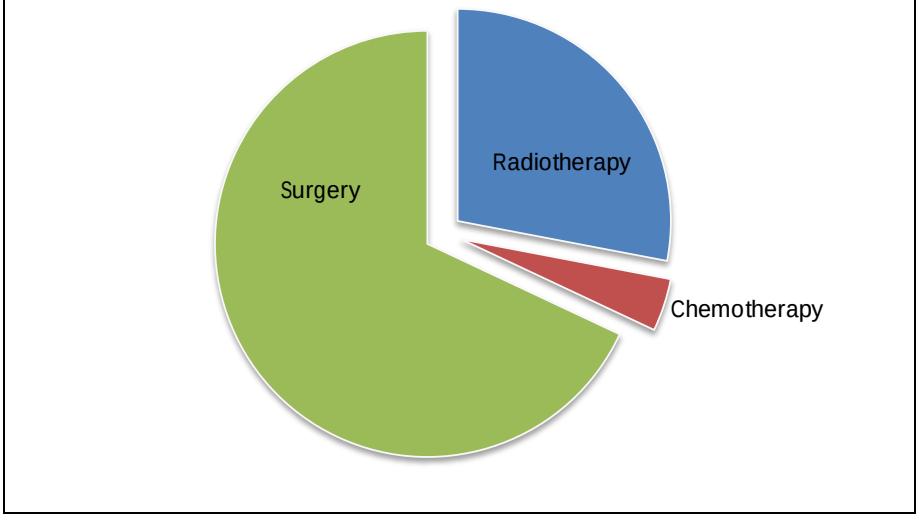
The focus of this audit is on radiotherapy services. Along with surgery and chemotherapy, radiotherapy is one of the main treatments for cancer. The choice of therapy depends on the location and grade of the tumour and the stage of the disease, as well as the medical condition of the patient. Radiotherapy can be used to cure cancer and also to reduce pain and improve symptom control in palliative care.

While our focus is on radiotherapy services, it is important to consider this treatment within the broader context of cancer control – from prevention and screening to treatment and rehabilitation and palliation. Ongoing improvement in people's experience, recovery and survival from cancer will depend upon effort across many parts of the NSW Health system.

This audit has been facilitated by the availability of comprehensive information on radiotherapy services available in NSW. We recognise this significant commitment over many years by public and private services to provide information which assists NSW Health in planning for these services.

Radiotherapy is an effective treatment for cancers, depending on the type and stage. As the following graph shows, it is a major contributor to the cure of cancer. It is also used to relieve pain and other symptoms caused by cancer.

Relative contributions of different treatments to the cure of cancer



Source: The Royal Australian and New Zealand College of Radiologists, *Clinician's Guide to Radiation Oncology, the Faculty of Radiation Oncology,* Sydney 2002.

Radiotherapy uses ionising radiation to kill cancer cells and shrink tumours. It can be administered externally via external beam radiotherapy (EBRT) or internally via brachytherapy. The effects of radiotherapy are localised and mainly confined to the region being treated. Radiotherapy injures or destroys cells in the area being treated by damaging their genetic material, making it impossible for these cells to continue to grow and divide. The goal of radiotherapy is to damage as many cancer cells as possible, while limiting harm to nearby healthy tissues.

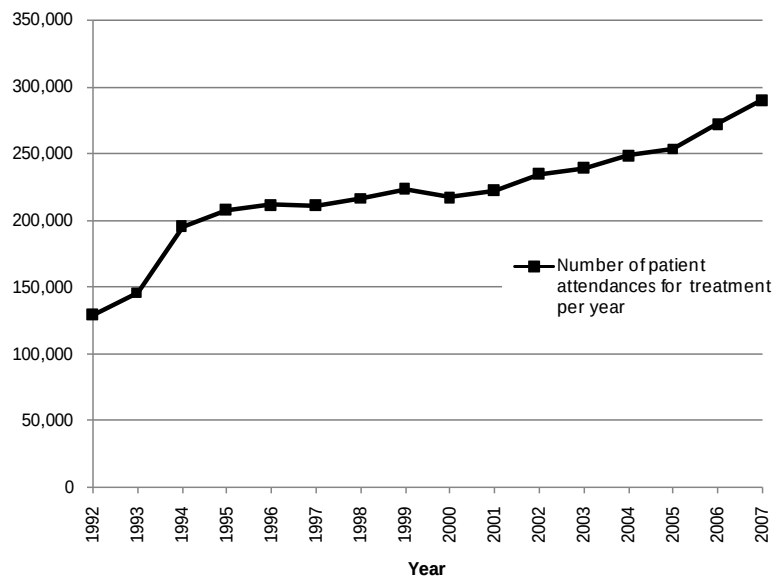
For this reason, it is given in many small doses over three to six weeks, allowing healthy tissue to recover between doses.

Radiotherapy may be used to treat almost every type of solid tumour, as well as leukaemia and lymphoma. It can also be used to treat non-cancerous conditions such as hypertrophic bone disease, benign brain tumours and neoplasms, as well as metastatic and complex, non-melanomatous skin cancers. However, the role of radiotherapy for individual cancers and stage will vary, with it playing a significant role for some cancers and a lesser role for others.

Growth in radiotherapy treatment

Since 1992, the number of attendances for radiotherapy treatment in NSW's public and private hospitals has more than doubled, as shown by the following graph.

Growth in radiotherapy treatment services NSW 1992 to 2007



Source: NSW Health, *2007 Radiotherapy Management Information System Report*, September 2008.

1.2 Radiotherapy services available to the patient

Cancer treatment centres

Radiotherapy services are one part of treatment services for people with cancer. They are mainly provided at cancer treatment centres, attached to major hospitals. These centres usually provide a range of services including surgical oncology, medical oncology, radiation oncology, haematology, and psycho-oncology. The services are supported by pathology, imaging and related services such as intensive care, operating theatres and allied health services.

Radiotherapy is recognised as one of the more technically complex clinical services. There are also important safety issues that must be considered due to the radiation used for treatment.

Specialist equipment

Radiotherapy is, for the most part, delivered using a linear accelerator. Linear accelerators have to be housed in specially designed and constructed buildings, often called a bunker. Before a person can commence treatment, they need to have their treatment 'planned' to ensure that the radiation dose is delivered precisely. Therefore, as well as the linear accelerator, there is essential related equipment such a computed axial tomography (CT) simulators, planning computers and physics equipment to ensure that the treatment is accurate. An objective of radiotherapy treatment is to provide an accurate dose of radiation to the cancer, while sparing healthy tissue. Many technological advances are aimed at achieving this greater accuracy.

These linear accelerators cost between $3.5 million and $5 million each. While most centres in NSW have 2 to 3 machines, there are larger centres with up to 5 machines.

Other important treatment equipment includes brachytherapy machines that implant small radioactive 'seeds' in a tumour, and orthovoltage machines that use X rays to treat skin cancers. There is also a range of diagnostic equipment, which includes CT scanners, magnetic resonance imaging (MRI) and positron emission tomography (PET) scanners.

One of the linear accelerators at the Westmead Cancer Care Centre

Specialist staff

The specialist staff that provide radiotherapy services include radiation oncologists who are doctors that specialise in the treatment of cancer using radiation; radiation therapists who plan and administer the treatment; and radiation oncology medical physicists who provide technical support, calibration and quality assurance activities to ensure the safe and accurate delivery of the radiation dose to patients and a radiation safe environment.

Services provided

Radiotherapy services in NSW are provided by both the public and private sectors. Radiotherapy is provided at comprehensive cancer centres; with more complex services, such as stereotactic radio-surgery or treatment of children, provided at a limited number of sites.

In places where radiotherapy services are not available, 'out-reach' clinics may be provided offering consultations with visiting cancer specialists, including radiation oncologists.

Some centres can provide accommodation and transport. This can be particularly important for radiotherapy patients who are dislocated from their home, and who require several weeks of treatment.

1.3 Responsibilities within NSW Health for providing radiotherapy services

Within NSW Health

The NSW public health system is usually referred to as NSW Health. NSW Health includes the Department of Health, Area Health Services, and the Cancer Institute NSW.

NSW Health aims to ensure that services are of high quality, appropriate, safe, available when and where needed, and coordinated to meet each individual's needs.

The Department of Health:

- supports the NSW Minister for Health in promoting, protecting, developing, maintaining and improving the health and wellbeing of the people of NSW
- plans the provision of comprehensive, balanced and co-ordinated health services throughout NSW
- monitors the performance of the NSW public health system.

Area Health Services are responsible for the operational management of public health services, as required under the *Health Services Act 1997*.

Additionally, the Cancer Institute NSW provides a source of expertise on cancer and provides expert advice to patients, the public, health care professionals and the Government.

State-wide coordination

Services considered on a state-wide basis are usually high cost or highly specialised services that are provided in limited locations, but accessed by residents across NSW or across a group of Area Health Services. Quality and safety factors are important to ensure an adequate throughput of patients and availability of appropriately qualified staff.

Consideration is also given to cost efficiencies and the need to ensure specialised services are not duplicated across too many facilities, whilst ensuring there are no undue impediments to access by residents. Workforce expertise and supply are also considerations for these services.

Based on these factors, and because of the need to interface effectively with the Commonwealth Government, planning for radiotherapy services development is coordinated on a state-wide basis by the Department of Health.

As radiotherapy services are but one form of cancer treatment, they need to be planned and managed in conjunction with other cancer related services and associated clinical support services.

This more detailed planning and the operation of these services are managed as part of the usual responsibilities of an Area Health Service.

2 Are radiotherapy services provided efficiently and effectively?

At a glance

The key question we wanted to answer was:

Are radiotherapy services provided efficiently and effectively?

Our assessment:

We found that, overall, radiotherapy services are provided in a reasonably efficient manner. Most patients have reasonable access to radiotherapy services. Centres are for the most part adequately staffed, well equipped and well utilised.

We were unable to obtain similar assurance in relation to the effectiveness of the provision of radiotherapy treatment. We looked for, but did not find, clarity and agreement on what the results for patients should be from the use of radiotherapy.

Current radiotherapy treatment rates for NSW residents are around 35% and fall well short of NSW Health's 50% target. NSW Health needs to look closely at the changing evidence basis for this target, particularly considering that treatments have changed over time and radiotherapy is provided in combination with other treatments.

We found that the foundation for many improvements in efficiency and effectiveness appears to be in place. This includes improving:

- accessibility of radiotherapy services such as by more timely referrals, reducing waiting times, and locating radiotherapy facilities in regional centres
- operational performance of radiotherapy treatment centres by waiting list management, patient booking systems and staff rostering.

In this chapter we make a number of recommendations to further improve efficiency and effectiveness.

2.1 Is there a framework for providing radiotherapy services?

As radiotherapy is but one means of tackling cancer, and cancer treatment is one of many health services, we looked to see if there was an overall framework for providing radiotherapy services within that context.

Our assessment

We found that a number of policies and strategic planning documents provide the strategic framework for the delivery of health services in relation to cancer in NSW.

We found that radiotherapy services operate as part of broader cancer networks, and these networks often reflect long standing referral patterns and the existence of outreach services. We agree with the view of the *Cancer Care Model* that there would be benefit in formalising such arrangements between Area Health Services.

We also found that there are a range of measures to ensure the quality of radiotherapy operations. We looked to see if there was a quality accreditation program specifically focused on radiotherapy services. The Cancer Institute NSW reported that it has been examining the feasibility of such a process. In our view, it would provide an ongoing independent assurance of quality and do much to promote public confidence in the delivery of radiotherapy services.

Strategic framework

A number of policies and strategic planning documents provide the strategic framework for the delivery of health services in relation to cancer in NSW. These include:

- *The State Plan: A New Direction for NSW* that aims to improve access to quality healthcare
- *The State Health Plan Towards 2010* that points to the growth and ageing of the population as a major factor in driving up health costs and placing increasing demands on health services
- The *NSW Rural Health Plan 2002* established a key policy direction of providing a greater range of services closer to where rural people live
- *The Future Directions for Health in NSW — Towards 2025* that also identifies persistent health inequalities with rural residents having a shorter average life expectancy than people living in urban areas
- *Optimising Cancer Management - A Cancer Care Model for NSW 1999*: This provided an organisational model for the delivery of cancer care services in NSW, which comprised population health services, cancer units and comprehensive cancer centres linked by formal networks and strategic alliances
- *A Clinical Service Framework for Optimising Cancer Care in NSW 2003* gave organisational form to the *Cancer Care Model* and set performance standards for cancer service delivery
- The *NSW Cancer Plans 2004-2006* and *2007-2010* that focus on preventing cancer, detecting cancer early, improving cancer services and professional education, accelerating improvement through research, and relevant data and information.

In NSW radiotherapy services have been established as part of comprehensive cancer care service delivery and so service planning and development is informed by these policies and frameworks.

Radiotherapy has been subject to many reviews and inquiries at state and national levels. The most recent national inquiry was *A Vision for Radiotherapy – Report of the Radiation Oncology Inquiry 2002* (Baume Report). Since the publication of that report, the states and territories and the Commonwealth have been working collaboratively to facilitate a national approach to services planning, workforce and quality issues.

In 2003, all health departments worked together under the auspices of the Australian Health Ministers' Advisory Council to develop a *Radiation Oncology Service Development Framework* with a number of principles, including that:

- radiation oncology is to be part of a comprehensive and multidisciplinary approach to cancer care that supports optimal cancer management for all. This provides an organisational framework to ensure that the needs of cancer patients and their carers are met through networking of cancer and support services
- sites for radiation oncology services need to have a sufficient level of clinical support services, such as diagnostic imaging, nuclear medicine, pathology, intensive care unit and pharmacy services to support the delivery of quality services
- expansion of services will be based on achieving a balance of increasing geographical access, workforce supply and critical mass, sub-specialisation treatment access, and increasing treatment rates
- formalisation of cancer service networking, through the formation of strategic alliances and partnerships, at an inter- and intra-state level should be undertaken.

Source: Radiation Oncology Jurisdictional Implementation Group, Final Report, 2003.

Service delivery framework

Currently there are 13 public sector comprehensive cancer centres which provide radiotherapy services. Their locations are shown in section 2.4.

The framework documents emphasise the importance of service networks in assisting Area Health Services to provide access to a range of primary and secondary services, supported by referral to a comprehensive cancer centre for more clinically or technologically complex care where required.

We found that radiotherapy services operate as part of broader cancer networks, and these networks often reflect long standing referral patterns and the existence of outreach services. The *Cancer Care Model* considered, and we agree, there would be benefit in formalising such arrangements between Area Health Services.

For example, the Greater West Area Health Service is developing plans for the new cancer treatment centre in Orange based on a network service delivery model. The plan includes provision of specialist-networked support with services in Sydney, as the principal tertiary referral centre in the network.

We found that, for the most part, formalised networking arrangements have been limited to those within the Area Health Service concerned. Following funding from Cancer Australia and the Cancer Institute NSW, a project known as CanNET is being progressed which aims to link the Hunter/New England Area Health Service, the North Sydney/Central Coast Area Heath Service and the North Coast Area Health Service in a formalised networking arrangement.

Recommendation

We recommend that NSW Health establishes by December 2010 formal cancer networks that link centres in a way that clarifies, assures and specifies access to a complete range of cancer services for rural and regional residents.

Quality framework

A major finding of the national inquiry, *A Vision for Radiotherapy – Report of the Radiation Oncology Inquiry 2002, w*as that there were no national standards to be met and no associated quality assurance program specifically for radiation oncology practices.

We found that there are a range of measures to ensure the quality of radiotherapy operations:

- the Commonwealth has reported that a national review of quality standards is nearing completion. It is expected that these standards would include a provision for practices to maintain an incident monitoring system and a national dosimetry program
- a business case is currently under development by the Commonwealth in partnership with the jurisdictions, for the development of a national radiotherapy dosimetric survey service to provide regular independent calibration of linear accelerators
- the Australian Radiation Protection and Nuclear Safety Agency develops and publishes Safety Guides and Codes of Practice to assist in the safe use of radiation for medical purposes, including radiotherapy
- there are statutory requirements under the NSW *Radiation Control Act 1990* and its associated regulations to protect people and the environment
- NSW Health has an incident monitoring system that requires mandatory compliance by each centre with the NSW Health Incident Management Policy
- NSW Health Policy Directives regarding quality issues such as PD2007_079 Correct Patient, Correct Procedure and Correct Site and PD2008_53 Radiotherapy Facilities – Prescription and Treatment Sheets
- the Cancer Institute NSW has a Standard Cancer Treatment protocols program (CI-SCaT) that enables cancer clinicians and general practitioners to access complete treatment protocols, their supporting evidence and dose calculation. Currently, the CI-SCaT site lists over 350 protocols for medical oncology and haematology, and is being expanded with protocols that include radiotherapy.

We looked for, but did not find, any quality accreditation program specifically focused on radiation oncology services. At present the Australian Council on Healthcare Standards (ACHS) accredits hospitals in which the radiotherapy services have been established. ACHS uses a set of generic standards for NSW hospitals, known as the *Evaluation and Quality Program (EQUIP)*.

Accreditation can provide an independent assurance of quality and promote public confidence in the delivery of radiotherapy services. It can also be used to promote a more uniform approach and the development of best practice clinical protocols.

The ACHS accredited sites as at March 2009 included: Calvary Mater Newcastle, Campbelltown, Liverpool, Prince of Wales, Royal North Shore, Royal Prince Alfred, St Vincent's Public, and Wollongong Hospitals. Nepean and Westmead Hospitals are part of Sydney West Area Health Service Integrated Clusters which are noted as new members.

ACHS has developed clinical indicators for radiation oncology, covering the consultation process, treatment process and outcome process. The ACHS Clinical Indicator Program, which derives from the ACHS accreditation process, provides comparative information on the processes and outcomes of health care. The ACHS Clinical Indicator program is voluntary. The information is reported to the participating hospital, and the results are assessed and published on a national basis.

The accreditation process can provide an independent assurance of quality and promote continuous improvement and public confidence in the delivery of radiotherapy services.

The Cancer Institute NSW reported that it has been examining the feasibility of an accreditation process for cancer services. We were advised that it plans to publish its work on accreditation standards and work with accreditation agencies to adopt them. Its current focus is to develop and implement indicators and standards and monitor these standards as a quality exercise leading to a new accreditation approach.

Recommendation We recommend that NSW Health continues to work with accreditation agencies to adopt by June 2010 agreed accreditation standards for radiation oncology services within their hospital accreditation processes.

2.2 Have the alternative treatments to radiotherapy been considered and evaluated?

As there are a number of alternatives to the use of radiotherapy, and as it is almost always used in conjunction with other treatments, we looked to see if the alternatives were considered and evaluated.

Our assessment

We found that NSW Health and the Cancer Institute NSW promote the use of multidisciplinary approaches to cancer care, increasingly through the use of multidisciplinary teams. In a multidisciplinary approach to care, the treatment options for patients are considered by a team, including medical specialists, nurses and allied health professionals from the various oncology sub-specialities with relevant expertise. In 2006, 69% of patients had their care considered by a multidisciplinary team.

Alternatives

Radiotherapy is used extensively in the treatment of many cancers. Treatment is provided on an intensive basis for an extended period of time (on average about 19 attendances for a course of treatment of at least four weeks). People may opt to have alternative treatments rather than incur the disruption that radiotherapy treatment may require.

Alternatives to the use of radiotherapy include surgery, chemotherapy, pain relieving drugs, hormone therapy, cryotherapy or high intensity focussed ultrasound. As indicated previously, radiotherapy is generally provided in combination with other treatments.

The usefulness, appropriateness and side effects of various treatment options vary with the cancer type and stage of development. Additional factors that may be considered include the range of services available, costs, availability of transport and accommodation.

Multidisciplinary approach

NSW Health and the Cancer Institute NSW promote the use of multidisciplinary approaches to cancer care. In a multidisciplinary approach to care, the treatment options for patients are considered by a team, including medical specialists, nurses and allied health professionals from the various oncology sub-specialities with relevant expertise. This provides a level of assurance that the use of radiotherapy has been considered within a broader cancer care context, and that other alternatives have also been considered and evaluated.

The Cancer Institute NSW has been surveying the use of multi-disciplinary teams in NSW. In 2006, 69% of patients had their care considered by a multidisciplinary team.

Additionally, the NSW Health report *A Clinical Service Framework for Optimising Cancer Care in NSW, 2003* said that each cancer patient should have a care coordinator whose responsibilities would include guiding the patient to information and services, participating in multidisciplinary team meetings, and coordinating the implementation of the patient care plan including provision of information and referral to appropriate support services.

The Cancer Institute NSW has funded Cancer Nurse Coordinators for some cancer treatment centres. We have seen evidence of this for some cancer types, particularly breast cancer, at some centres.

2.3 Are radiotherapy services readily accessible to patients?

We looked to see if patients had reasonable access to radiotherapy services.

Our assessment

We found that most patients have reasonable access to radiotherapy services, and that there are a number of measures to improve access – particularly for patients in regional and rural areas.

distance to treatment facilities

We found that NSW has as many linear accelerators per 1000 cancer patients as other comparable jurisdictions (with the singular exception of the USA). NSW is a large state and radiotherapy services have historically been provided through a concentrated service delivery model. More recently, a more distributed model has been developed. However, because this type of treatment cannot be delivered in all hospitals, patients still need to travel some distance and be away from their homes for up to seven weeks.

Although significant contributions are made by the public sector towards travel and accommodation, we found that not all costs are able to be fully covered by these programs.

We see scope for further analysis to identify those people who are not within reasonable distance of radiotherapy facilities – where additional service and support efforts may be needed. This could then be subject to more detailed consideration and assessment by Area Health Services of cancer outreach services or special transport measures.

waiting times

We found that problems including poor waiting time data quality, and a lack of consistency of approach to data definitions, have precluded systematic state-wide monitoring and analysis of patient waiting times.

A study by NSW Health undertaken during our audit indicated that the average number of days between 'ready for care' and the start of their radiotherapy treatment in 10 centres has been reduced from 18.5 days in 2004 to 14.2 days in 2008. Actual times vary between centres with the average waiting times ranging between 9.7 days to 18 days in 2008. In six centres waiting times were reduced. In four centres waiting times increased. The percentage of patients who were treated in 2008 within target times also showed an overall improvement; with 57% of priority one patients, 72% of priority two patients and 82% of priority three patients treated within the maximum acceptable times recommended by the Royal Australian and New Zealand College of Radiologists.

We see scope to further improve waiting time performance by: ensuring consistency of definitions for all centres to enable inter-centre comparison; ensuring all centres include priority codes for patients; ensuring roll-out of the Business Improvement 'tool kit' to all public centres; ensuring consistency in setting of ready for care dates; systematically monitoring and benchmarking the performance of radiotherapy centres state-wide; developing centralised booking systems; and ensuring that patients faced with extended waiting times have been offered access to alternative radiotherapy centres.

Factors affecting access

The level of access is affected by:

- knowledge of services available
- referral to a radiotherapy specialist
- waiting time for treatment at a radiotherapy centre
- distance to treatment centre
- opening hours
- availability of accommodation and travel assistance
- affordability and the costs involved.

What patients need access to

Individuals need timely access to a full range of cancer services including prevention, screening, diagnosis, treatment, rehabilitation, supportive care and palliative care.

Radiotherapy services require a significant investment in specialist radiotherapy and diagnostic equipment and the availability of specialist staff.

The following table indicates that NSW has as many linear accelerators per 1000 cancer patients as other comparable jurisdictions (with the singular exception of the USA):

Country or State	Linear accelerators	Linear accelerators per 1000 cancer patients
NSW	43	1.1
Victoria	33	1.2
Queensland	22	1.0
Canada	165	1.0
UK	215	0.9
USA	3,120	2.2

Source: Cancer Institute NSW, advice provided 20 October 2008.

NSW is a large state and radiotherapy services have historically been provided through a concentrated service delivery model. More recently, a more distributed model has been developed. However, patients still need to travel some distance and be away from their homes for up to seven weeks.

The NSW Health report *A Clinical Service Framework for Optimising Cancer Care in NSW,* 2003 states that all Area Health Services should ensure that:

- time between general practitioner referral and initial specialist consultation is less than 2 weeks
- for radiotherapy, maximum acceptable time between decision to treat and commencing treatment is 3 weeks
- they develop priority categories so that cases requiring more urgent attention than the maximum acceptable intervals defined above are appropriately identified and managed
- where services do not comply with the waiting times indicated above, protocols are in place to ensure patients can gain access to services that meet standards.

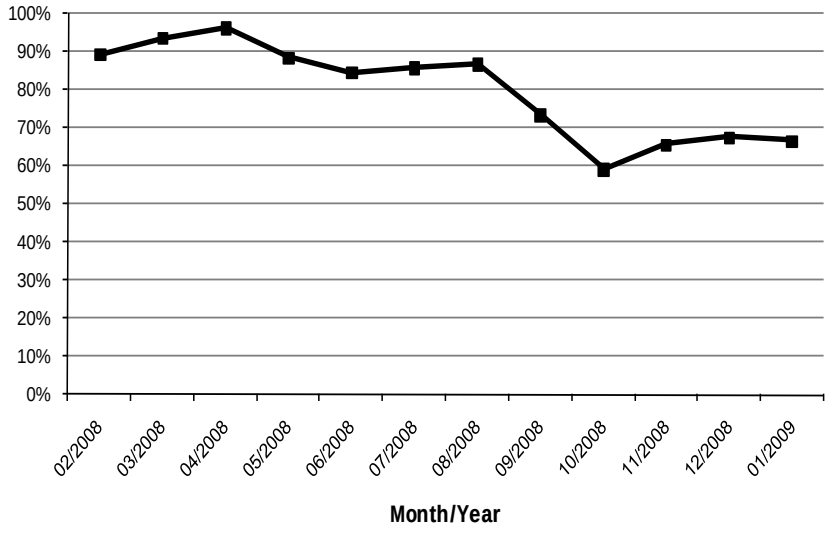
Knowledge of services available

Information on services is available from a number of sources, including the NSW Cancer Council and Area Health Services. The Cancer Institute NSW is developing an Online Cancer Services Directory. It is expected to detail what services are provided and their location, key personnel and contact details. The Cancer Institute NSW anticipates that it will be established for public and professional use in three Area Health Services by June 2009. Following implementation in these Areas, the Cancer Institute NSW intends to develop a program for the remaining Area Health Services.

Referral to a radiotherapy specialist

The times taken from initial consultation with a general practitioner to referral and initial specialist consultation can add significantly to the overall waiting time experienced by the patient. As an example, Liverpool and Macarthur Cancer Therapy Centres monitor the time from referral to initial specialist consultation, as indicated in the graph below.

Liverpool and Macarthur Cancer Therapy Centres
% of patients seen within two weeks from time of referral to initial specialist consultation



Source: NSW Health, Sydney South West Area Health Service.

Note: Time of referral is taken as time of consultation request.

The time between referral and initial specialist consultation is intended to be less than 2 weeks.

We found that while some centres monitor the times taken between referral and initial specialist consultation, the Department of Health does not systematically monitor, benchmark and analyse such times for this or, as we are advised, for any clinical specialty. This is often outside the data capture of NSW Health.

Cancer outreach services that offer consultations for local residents with cancer specialists, including radiation oncologists, are available in many regional centres. We found that some regional centres could receive weekly outreach services, while others of equivalent size would receive services fortnightly or less often. There seemed to be no consistent approach to the level of service provided. These services should be based on an assessment of local population need and clinical and geographic factors such as distance to specialist services, availability of clinical support services, and the population base to allow effective use of specialist teams.

We found that clear referral path ways are being developed to promote more timely referrals. Cancer Australia has developed the Cancer Service Networks National Demonstration Program, (CanNET) to better link regional and metropolitan cancer services. For example, it is envisaged that cancer patients living in regional and rural areas will soon be able to go online and choose the nearest, most appropriate specialist and support service.

The demonstration project in NSW was established by the Cancer Institute NSW, and is jointly funded by the Commonwealth and the Cancer Institute NSW. It covers cancer services provided in the geographical regions incorporating Hunter New England, Northern Sydney Central Coast and North Coast Area Health Services, and includes services provided in the public, private and non-government sectors. It is expected to be completed by the end of June 2009. Following this, we understand that the project will be evaluated at a state and national level in relation to its potential implementation across other Area Health Services.

Waiting time for treatment at radiotherapy centre

Each cancer treatment centre has a system to monitor waiting times and a method of prioritising and categorising urgency. For example, urgent patients are seen within shorter timeframes.

The results are sent by Area Health Services to the Department of Health's Health Information Exchange. However, there have been problems with the data including:

- inconsistent manual processes at the centres for capturing the data and entering it into the Radiotherapy Management Information System (RMIS)
- inconsistent approaches to the definition and capture of 'ready for care' date
- absence of quality assurance processes on the data.

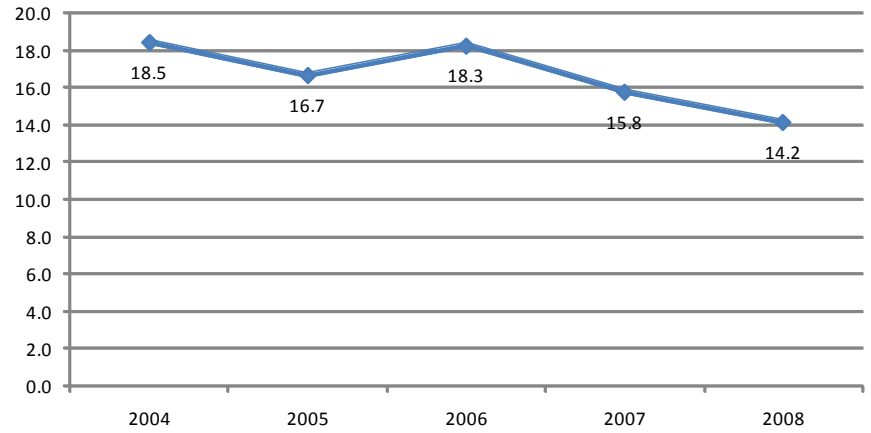
We found that problems including poor waiting time data quality, and a lack of consistency of approach to data definitions, have precluded systematic state-wide monitoring and analysis of patient waiting times.

NSW Health and the Cancer Institute NSW have worked on a range of initiatives to improve waiting time information for use by radiotherapy services to assist patient management. NSW Health advised that the new business improvement tools should in future result in the availability of more reliable and accurate data.

During our audit, NSW Health engaged a consultant to undertake a specific analysis of information extracted directly from the linear accelerators' record and verify systems for the period 2004 to 2008. The study *ROTC Wait Times, Draft Final Report,* was completed in April 2009. Accepting that issues with the overall quality of data remain, the study gives some indication that overall radiotherapy waiting times have improved.

The following graph indicates that the average number of days between ready for care and the start of their radiotherapy treatment in the 11 centres has been reduced by 23%, from 18.5 days in 2004, to 14.2 days in 2008. Over the same period, total courses delivered have increased by an estimated 13.6%, from 10,240 in 2004 to 11,635 in 2008.

Average public sector radiotherapy treatment waiting times 2004-2008



Source: NSW Health.
Note: The North Coast Cancer Institute, which commenced operation in mid 2007, was excluded from the study, and data for St Vincent's Public Hospital was only available for the last quarter of 2008.

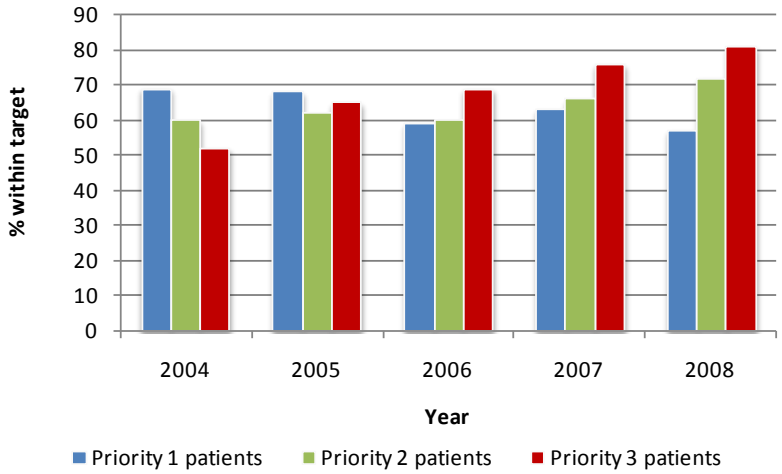
The study looked at waiting times in terms of patient priority, generally described as:

- 'priority one' patients, where the patient may have an acute, life-threatening condition or be in severe pain that cannot be controlled by analgesics
- 'priority two' patients, which include selected paediatric patients and patients with rapidly growing tumours, imminent obstructions, or conditions of similar priority
- 'priority three' patients, other patients not classified as priority one or two.

The study analysed the percentage of patients treated within the 'maximum acceptable times' issued by the Royal Australian and New Zealand College of Radiologists. The study found that the percentage of:

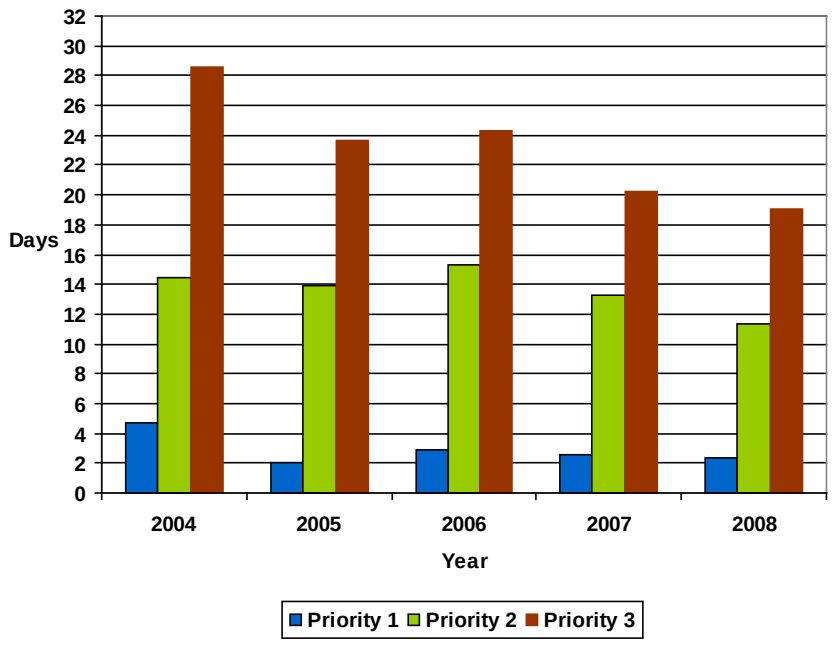
- priority one patients who were treated on their ready for care date, or the next day, has reduced from 69% in 2004, to 57% in 2008. However, the average time waited by these patients has been reduced by 49%, from 4.7 days in 2004, to 2.4 days in 2008
- priority two patients who were treated no more than 14 days after their ready for care date has increased from 60% in 2004, to 72% in 2008. Over the same period, the average time waited by these patients has been reduced by 22%, from 14.5 days in 2004, to 11.3 days in 2008
- priority three patients who were treated no more than 28 days after their ready for care date has increased from 52% in 2004, to 82% in 2008. Over the same period, the average time waited by these patients has been reduced by 33%, from 28.6 days in 2004, to 19.1 days in 2008.

Percentage of public sector radiotherapy treatment waiting times within targets by priority patient type, 2004 to 2008



Source: NSW Health.
Note: As per note in following graph.

Average public sector radiotherapy treatment waiting times split by priority patient type, 2004 to 2008



Source: NSW Health
Note: The North Coast Cancer Institute, which commenced operation in mid 2007, was excluded from the study, and data for St Vincent's Public Hospital was only available for the last quarter of 2008.

The study found that times vary between centres with the average waiting time ranging between 9.7 days to 18 days in 2008. In six centres waiting times have been reduced and in four centres waiting times have increased. NSW Health advised us that these changes may be related to factors such as:

- installation of new and/or replacement of linear accelerators at the centre
- changes in the volume of referrals to the centre
- adoption of new working methods, technologies or hours of operation.

The quality of waiting time record keeping has improved. In 2004, 40% of estimated total courses were coded with a ready for care date and treatment priority code in 2004. In 2008, 83% of estimated total courses were coded.

We see scope to further improve waiting time performance by: ensuring consistency of definitions for all centres to enable inter-centre comparison; ensuring all centres include priority codes for patients; ensuring roll-out of the Business Improvement 'tool kit' to all public centres; ensuring consistency in setting of ready for care dates; systematically monitoring and benchmarking the performance of radiotherapy centres state-wide; developing centralised booking systems; and ensuring that patients faced with extended waiting times have been offered access to alternative radiotherapy centres.

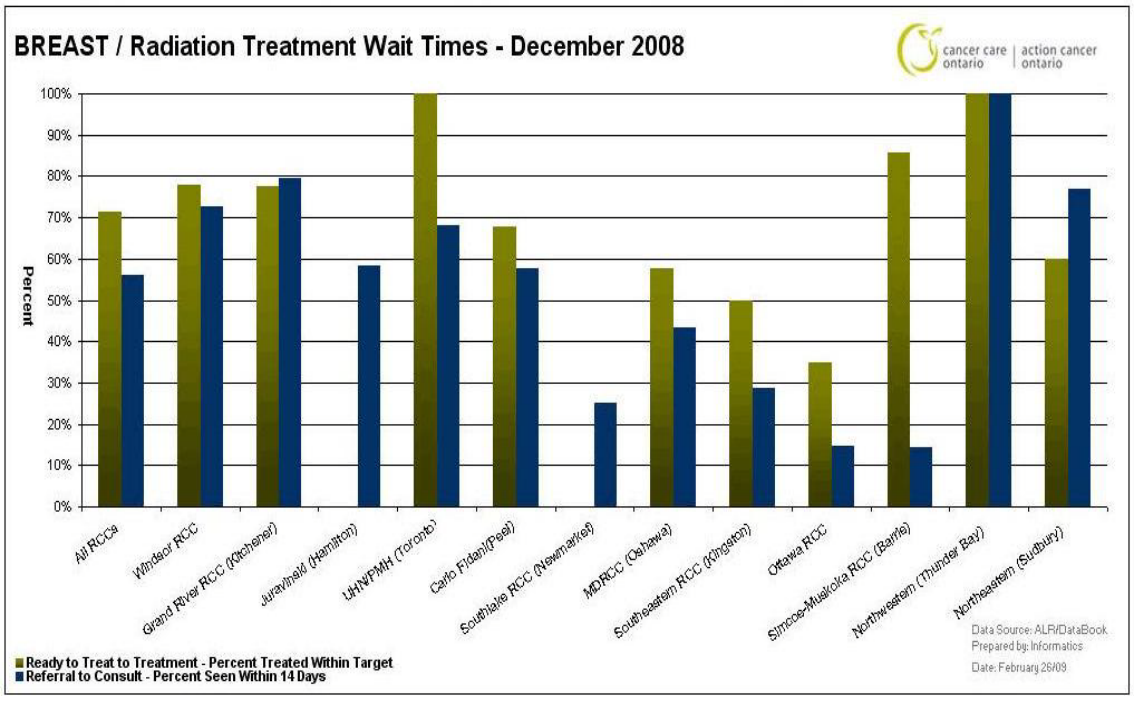
Countries such as Canada and the UK systematically report waiting times for a range of cancer services including surgery, chemotherapy and radiotherapy. NSW systematically reports only the surgical waiting times.

For example, we observed that Cancer Care Ontario reports on radiation treatment waiting times at each of the regional cancer centre hospitals that offer radiation services and for each type of cancer. Waiting times are publicly reported monthly. It reports the proportion of patients who are being seen or receiving radiation treatment within the recommended timeframe or target. Waiting times are reported for two intervals:

- referral to consult: The time between a referral to a specialist to the time that specialist consults with the patient
- ready to treat to treatment: The time from when the specialist is confident the patient is ready to begin treatment to the time the patient receives treatment.

This information is used to help manage waiting lists. Also, as it explains on its web site:

> We provide this radiation treatment wait time information to help you and your physician decide whether it is appropriate for you to be referred to a treatment facility outside your area or Local Health Integration Network (LHIN). If it is appropriate, your physician will contact the treatment centre to determine whether you can be accommodated there and to make the necessary arrangements. You are responsible for all travel and accommodation expenses incurred as a result.
>
> Source: Cancer Care Ontario website, accessed 28 February 2009.



Waiting times for breast cancer treatment by regional cancer centre
Cancer Care Ontario website

In 2006-2007 the Cancer Institute NSW sponsored a project aimed at identifying opportunities for improvements in business practices at NSW radiotherapy treatment centres. As a result of the *Business Improvement Project*, the elapsed time from consultation to treatment was reported to have been reduced in most participating centres to an average of 10 days, from an average of 20 days over the period of their participation during the project.

To assist in sustaining these gains, a second phase of the *Business Improvement Project* has commenced developing a 'tool kit' for each centre to use. This project will develop web-based business monitoring and improvement tools for each public radiotherapy treatment centre in NSW. The Cancer Institute NSW has advised us that the tools will allow monitoring of key performance indicators, capacity estimation, radiation therapist rostering, treatment booking support, and radiation oncology scheduling and it expects this work to be complete by 30 June 2009.

The *Business Improvement Project* also found that referrals for some centres are not well matched to treatment capacity, with the result that some centres have waiting lists while others have excess capacity. We found for example that a centre might advise a breast patient to travel to another centre, if the treatment could not be offered within 6 to 8 weeks of surgery. Similar examples apply to other tumours, depending on an assessment of the consequences of the delay. The new information tools could be used by radiotherapy centres to complement and enhance current referral mechanisms, to offer patients an opportunity to be seen at another centre.

The NSW Health report *A Clinical Service Framework for Optimising Cancer Care 2003* also recommended centralising booking systems for all departments. We found that there is no centralised booking service for radiotherapy treatment centres within a service network.

Opening hours

Typically, the public radiotherapy centres open from 8 am to 5 pm, Monday to Friday, with treatment being provided at weekends and public holidays for emergency cases only. Centres will work extended hours for limited periods to reduce lengthy waiting times.

The private radiotherapy centres in NSW operate similar hours, usually starting a little earlier in the day. When waiting lists may lengthen, such as when one machine is unavailable, the centres will operate for extended hours – for example from 8 am to 8 pm.

Certain types of patients, such as those undergoing long term treatment, parents of children undergoing treatment and those with 'simple' treatments who wish to remain at work, may prefer to be treated outside normal working hours. But we have found no assessment of patient preferences in relation to this. Most radiotherapy centres do not operate outside normal working hours, other than for short periods to deal with extended waiting lists.

Distance to treatment facilities

Rural and regional patients and their carers, in particular, face significant transport and accommodation costs and loss of social support when they have to leave their community for specialist treatment.

The NSW Radiotherapy Management Information System (RMIS) provides information on the number of residents of geographic areas of NSW and where treatment has been provided. This includes all public and private NSW and interstate centres. This provides an indication of geographic areas where additional services may be required. Detailed analysis of travel times and distance is then undertaken in the various planning studies that determine the most appropriate site and service configuration to deliver the service.

Inevitably, some people will not live within a reasonable distance of radiotherapy facilities, and additional service efforts may be needed. There is scope for further analysis to identify those people who are not within reasonable distance of radiotherapy facilities – where additional service and support efforts may be needed. This could then be subject to more detailed consideration and assessment by Area Health Services of cancer outreach services or special transport measures.

Availability of accommodation and travel assistance

The NSW Health report, *A Cancer Care Model for NSW 1999* said that as a means of ensuring access, it is essential that cancer units and comprehensive cancer centres undertake to ensure that patients needing to relocate for care have access to appropriate transport and accommodation facilities.

Such accommodation is normally provided at a low cost to the patient – typically $35 to $40 per night. It usually depends on community fund-raising and support, although NSW Health may contribute a building they no longer require or land (usually adjacent to a hospital). For example, the NSW Cancer Council and Rotary have assisted in funding several hostels for patients undergoing treatment.

The Jean Colvin Hospital in the Sydney suburb of Darling Point is a 35 bed private hospital which specialises in providing accommodation and support for cancer patients undergoing cancer treatment in Sydney. It is operated by CanAssist which receives its funding from charity. Patients are assessed on admission by a social worker who assesses their financial situation and how much they are able to pay for accommodation and transport to treatment hospitals.

The services at both Port Macquarie and Coffs Harbour Hospitals have on-site accommodation for patients and carers. We found plans being developed for accommodation at the planned Orange facility, and discussions about accommodation at the planned Lismore facility are understood to be underway.

Some hospitals such as St Vincent's public hospital provide transport, while others such as Royal Prince Alfred Hospital do not. Where Area Health Services provide transport, it is for limited travel within their Area.

There are other community services to assist rural cancer patients. For example *Country Care Link*, operated by the nuns of the St Vincent's Public Hospital, arranges transport and a volunteer driver for rural patients.

The *Transport for Health – Isolated Patients Travel and Accommodation Assistance Scheme* (IPTAAS) recognises that people in isolated and rural communities experience particular difficulties in their ability to access specialist medical treatment. IPTAAS aims to reduce the impact of this disadvantage on the health of individuals and communities. It provides assistance with the cost of travel and accommodation where the patient needs to travel more than 100km (each way) to access specialist care. The Cancer Institute NSW provides an additional $500,000 per annum to the IPTAAS program to enable cancer patients living 100 to 200 kilometres from a treatment centre to be supported for travel. This has brought the travel support for cancer patients in line with other states.

The Cancer Council NSW has undertaken two reviews of patient accommodation, one funded by the Cancer Institute NSW and one initiated jointly with the Cancer Institute NSW through a joint Patient Support Committee. The latest report in 2008 identified 40 hospital-allied accommodation facilities with 828 rooms and 1736 beds providing accommodation to patients from NSW attending treatment for cancer at 29 treatment centres. The majority of facilities only accept patients who live more than 100kms away. The average room occupancy rate for hospital-allied facilities Monday to Friday was 79%. The report concluded, however, that there are fewer facilities than needed, particularly in Newcastle and Central Sydney.

Affordability and the costs involved

The cost of services is a key consideration for patient access. Treatment services are provided by the public sector to all patients at no additional cost to the patient.

Treatment services provided by the private sector usually require an additional payment by the patient. We were advised that such payments can be significant, particularly for more complex treatments. However, final out-of-pocket expenses can be considerably reduced by the *Extended Medicare Safety Net*. This is designed to assist families and individuals with high out-of-pocket costs for out-of-hospital services covered by Medicare. Holders of Pensioner cards, Health Care cards, or Commonwealth Seniors card have a threshold of $529.30. All other Medicare card holders have a threshold of $1058.70. Once the relevant threshold has been met, Medicare will pay 80% of any future out of pocket costs (that is the difference between what the doctor charges and the Medicare Benefit) for out of hospital Medicare services provided in the remainder of the calendar year.

Although significant contributions are made by the NSW public sector towards travel and accommodation, not all costs are able to be fully covered by these programs. Travel, accommodation, meals and loss of earnings can result in substantial out of pocket costs to patients and carers.

In 2007 the Federal Senate conducted an inquiry into accommodation and travel assistance schemes: *Highway to health: better access for rural, regional and remote patients*. It identified a number of issues common to all states including: *problems with the application process, eligibility requirements including distance thresholds, patient support provisions and subsidy levels*.

Its recommendations included that: *as a matter of urgency, the Australian Health Ministers' Advisory Council establish a taskforce comprised of government, consumer and practitioner representatives to develop a set of national standards for patient assisted travel schemes that ensure equity of access to medical services for people living in rural, regional and remote Australia*. The Federal Government had not responded to the recommendations at the time of our audit.

The overall impact of costs on decisions for treatment needs to be considered in the planning of services. While availability of accommodation is documented in the Radiotherapy Management Information System, further analysis and assessment of the adequacy and affordability of accommodation and transport facilities is needed.

The Cancer Institute NSW is currently developing an *Out of Pocket* expenses survey of 1,250 NSW residents who have been diagnosed with cancer. The survey should provide information on travel and accommodation costs, as well as other factors such as changes in employment, difficulties in paying mortgage or rent.

Recommendation

We recommend that NSW Health:

- systematically and consistently by June 2010 monitors, benchmarks and analyses the actual times taken between receipt of the referral to radiotherapy treatment centres and initial specialist consultation, and from 'ready for care' to treatment
- develops centralised booking systems by December 2009 for all radiotherapy treatment centres within a service network
- identifies by June 2010 those people who are not within a reasonable distance or do not have reasonable access to radiotherapy facilities, and analyses where additional service and support efforts may be needed.

2.4 Are facilities located appropriately for effective service delivery?

We looked at how NSW Health ensures that facilities are located appropriately for effective service delivery.

Our assessment

We found strategic analysis at Department and Area Health Service level to identify and assess alternative locations and service delivery options state-wide.

We found these aspects addressed in the more detailed planning for services undertaken by Area Health Services, for example in relation to Orange and Lismore. We found that decisions concerning the location of facilities consider a number of factors including population distribution and size, workforce training and availability, and patient access. Other regional centres could be similarly considered. NSW Health needs to conduct further detailed analysis of options for radiotherapy services (including public or private sector provision) and sites in the geographic areas of need, including the Central Coast, Hunter/New England and Illawarra/Shoalhaven areas.

Location of facilities

To date most radiotherapy facilities have been developed at major hospitals in the metropolitan area.

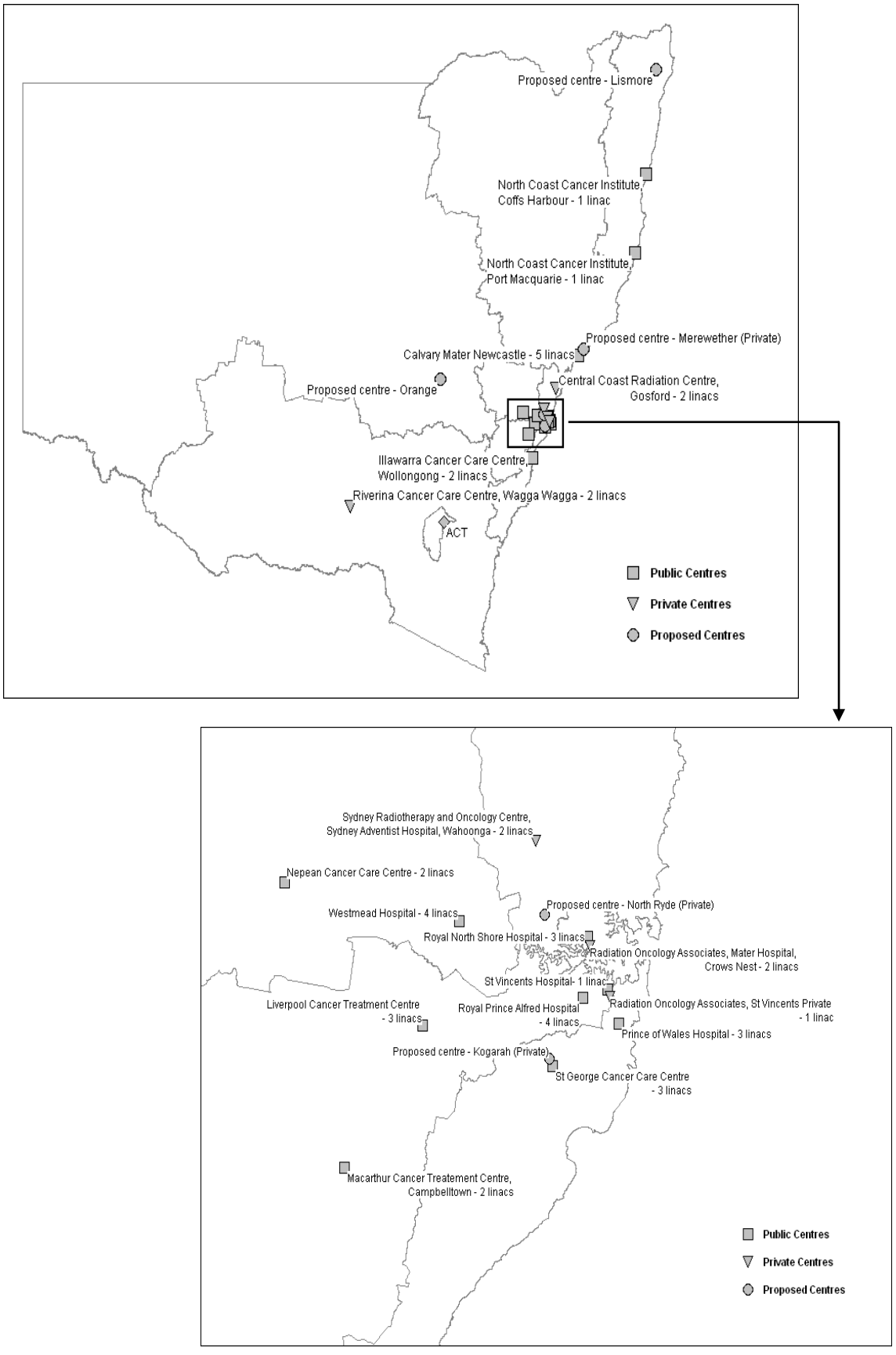
Radiotherapy services are currently provided by NSW Health at:

- Liverpool Hospital
- Campbelltown Hospital
- Westmead Hospital
- Nepean Hospital
- Royal North Shore Hospital
- Royal Prince Alfred Hospital
- St Vincent's Hospital
- St George Hospital
- Prince of Wales Hospital
- Calvary Mater Newcastle Hospital
- Wollongong Hospital
- Coffs Harbour Hospital
- Port Macquarie Hospital.

New facilities are being developed at Orange and Lismore.

Radiotherapy services are provided by private providers at:

- Calvary Hospital, Wagga Wagga
- Central Coast Radiation Oncology Centre, Gosford
- Sydney Adventist Hospital, Wahroonga
- Mater Misericordiae Hospital, Crows Nest
- St Vincent's Private Hospital, Darlinghurst.



Source: NSW Health

Additionally, NSW residents who live closer to state borders, often access radiotherapy services in the ACT, Victoria, South Australia and Queensland.

The major growth areas in NSW in terms of projected cancer cases are currently:

- North Coast (being addressed with the establishment of new facilities at Coffs Harbour, Port Macquarie and Lismore)
- Hunter/New England (there has been recent expansion of Calvary Mater Newcastle and a private centre has recently received approval from the Commonwealth for Health Program Grants)
- South Western and Western Sydney (expansion at Liverpool is part of the current major redevelopment at Liverpool Hospital)
- Illawarra/Shoalhaven.

Factors affecting choice

Choice of a centre depends on many factors including the referring clinician's preferences, patient preference, the availability of family and carer support, the centre's proximity, and whether it is public or private.

For example in 2006 in:

- Northern Sydney and Central Coast Area Health Service, with one public radiotherapy treatment centre and three private centres, the majority (63%) of patients were treated by private centres
- Sydney South West Area Health Service, with three public radiotherapy treatment centres, almost all (95%) patients were treated by public centres
- Greater Western Area Health Service, with no radiotherapy treatment centres, all patients were treated in other Areas.

In Area Health Services with radiotherapy facilities, some patients may still travel across the Area boundaries to obtain their treatment due to geographic proximity or to access more specialised treatment, such as for children.

Regional, and rural patients in particular, need to travel to the centres for treatment. This can be costly in terms of time, money and amenity. It can involve separation from family, loss of work, and the need to find accommodation (mostly motels or specialised accommodation) during the weeks of radiotherapy treatment.

Coffs Harbour Health Campus – North Coast Cancer Institute

Services close to where people live

The *NSW Rural Health Plan 2002* established a key policy direction of providing a greater range of services closer to where rural people live. This is a particular issue for radiotherapy services where treatment is provided on an intensive basis for an extended period of time. As a result, people may opt not to have radiotherapy treatment rather than incur the disruption that it may require.

Example from *NSW Rural Health Plan 2002* showing how it should improve access

Radiotherapy services in rural NSW will improve access for people like Bob, a 60 year old timber mill worker from Walcha who has prostate cancer and requires radiotherapy treatment over an extended period. Instead of having to travel to either Newcastle or Sydney for daily treatment over a 6-8 week period, Bob will be able to stay closer to family and have the support of friends during his treatment.

Furthermore, Bob will have access to quality services provided from a comprehensive cancer care centre providing a range of cancer and support services. This centre will also be networked to a larger more established cancer care centre in a metropolitan Area Health Service.

However, a national Radiation Oncology Inquiry, commissioned by the Federal Minister for Health and Ageing in 2002 identified a number of reasons why the benefits of providing nearer services for radiotherapy could be limited:

- evidence from NSW suggests that both rural and urban areas experience large variation in uptake, and some rural areas are comparatively well served
- some patients will always need to travel, because super-specialised services such as brachytherapy will continue to be viable only in larger centres
- even if services are relatively close, radiotherapy is still inherently inconvenient. Patients will still need to commit time and money, and some will choose not to.

Source: *A Vision for Radiotherapy*, Report of the Radiation Oncology Inquiry, 2002.

Example of local level planning

In 2007 the Greater Western Area Health Service evaluated options for a new radiotherapy service. Service options assessed included both public and private sector providers. Locations considered included the four major centres within the central west - being Bathurst, Orange, Dubbo and Broken Hill. The decision to locate the facility at Orange was based principally on the considerable clinical infrastructure support currently available, or to be developed, at Orange. Travel distance analysis demonstrated its greater accessibility to the majority of residents in the Greater Western Area Health Service and concerns that Dubbo, the next alternative, would not be sufficiently able to support the service, or able to attract and retain specialist staff. Networking with the planning service at Dubbo was identified as important.

Consideration of other locations

We have found strategic analysis at an Area Health Service level to identify and assess alternative locations and service delivery options state-wide. Decisions concerning the location of facilities consider a number of factors including population distribution and size, workforce training and availability, and patient access. Further analysis at the sub-Area planning may be undertaken as part of a range of planning processes. For example, Tweed Heads was considered as part of the planning processes for Lismore and the NSW Queensland Joint Planning Study. The central west catchment was examined in planning for the decision to establish in Orange. The draft *Tamworth Health Services Plan 2008-2012* provides information in relation to planning for future services at Tamworth. Other regional centres could be similarly considered.

Recommendation

We recommend that NSW Health conducts detailed analysis of options for radiotherapy services (including public or private sector provision) and sites in the geographic areas of need, including the Central Coast, Hunter/New England and Illawarra/Shoalhaven areas.

2.5 Are existing facilities productive and fully utilised in service delivery?

In this section we examine measures such as the weekly throughput of a facility and how many hours a week it operates in treating patients. We looked to see whether full and effective use was being made of the existing facilities.

Our assessment

We found that while centres are well utilised during the week, there is potential for further improvement.

We found that it was possible to increase throughput within existing resources by waiting list management, patient booking systems and staff rostering.

We agree with the findings of a NSW Health improvement project that centres need to develop and benchmark a set of key performance measures. This will require a workload measure that facilitates comparison of centres with different case-mixes and different techniques.

We found that it may also be possible to extend the hours of operation at some centres. This presents the opportunity to test whether there is additional demand, without having to build new facilities.

Planning parameters

In radiotherapy treatment, the Department of Health plans on the basis of a 52.3% treatment rate for new cases and a 25% retreatment rate. It further plans on a linear accelerator achieving:

- 19 attendances per course
- 4.1 attendances per hour
- 8 operating hours per day
- 240 working days per annum.

Throughput benchmark

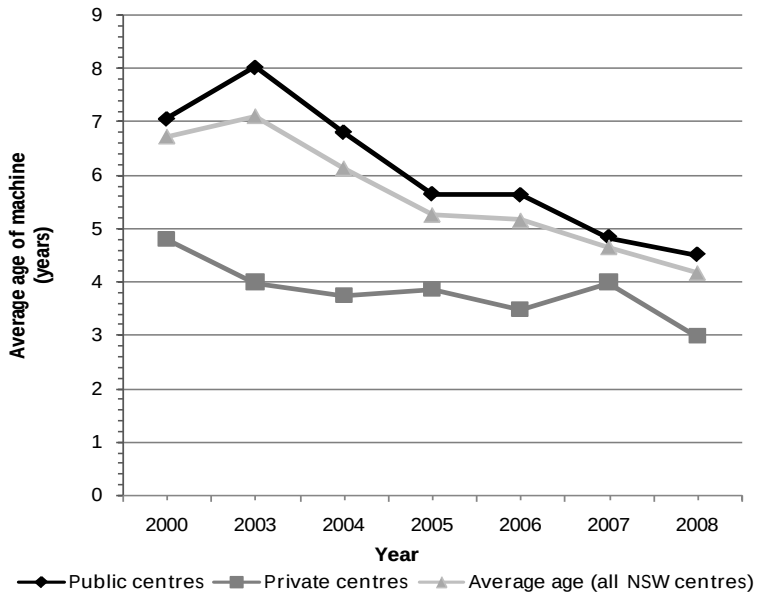
This recommended throughput results in an expected 414 total courses per machine per annum being achieved.

NSW Health reported that the 31 public machines and nine private machines operated at 94.5% of the benchmark in 2006. The public centres operated at 93.8% and private centres at 97% at the benchmark. In 2005, the average for all machines was 89%.

The results are not adjusted, for comparison purposes, to take into account factors such as:

- the case-mix of particular centres. For example, children and some particular cancers such as prostate may require longer treatment times. On average 19 attendances are needed in a 'course'. For prostate cancer, a course may involve 38 attendances
- the techniques in use. Some centres have intensity modulated radiotherapy, stereotactic radiotherapy, and paediatrics that are more complex and take more time
- the reliability of the equipment in use. This is affected by the age of the equipment. There has been a steady decline in the age of linear accelerators in public and private centres in NSW. The average age of linear accelerators in the public sector peaked in 2003 at 8.0 years. An expansion and replacement program has resulted in the average age of machines at the end of 2008 at 4.5 years. Commonwealth funding is available for linear accelerators up to 10 years old. At the end of 2007 there were 5 machines aged over 10 years, that is less than 2% of all the treatment machines in the public and private sectors. Of these 3 have been, or are, being replaced.

Average age of linear accelerators in NSW 2000 – 2008



Source: NSW Health

A 2004 review, conducted for NSW Health by the Collaboration for Cancer Outcomes Research Evaluation, *An assessment of linear accelerator throughput in NSW in 2003*, found that when compared to 1996:

- the average number of patients treated per hour had increased by 11%
- the average operational time per day for a linear accelerator had decreased by almost one hour (8% decrease).

This was attributed in part to new technologies that have reduced treatment times despite an increase in complexity.

The *Business Improvement Project* found that prior to the project only two centres were exceeding the planning benchmark of 414 courses per linear accelerator per year. By the end of their respective projects, the participating centres averaged 411 courses per linear accelerator per year, an increase of 16% within existing resources. Four others were constrained by shortage of referrals. This was assisted by a number of new tools, including:

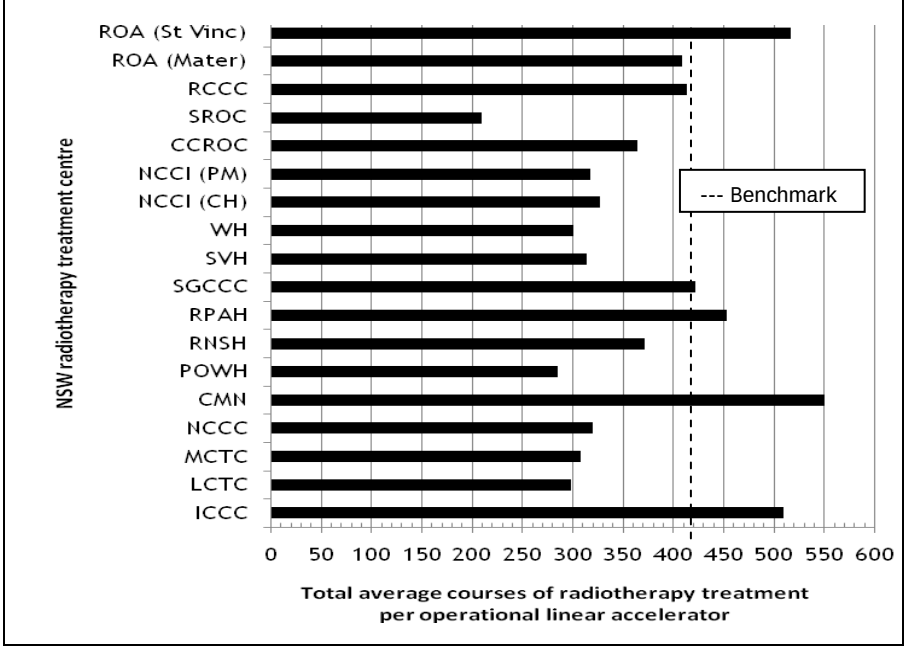
- waiting list management
- patient booking
- electronic booking forms
- radiation therapist rostering
- radiation oncologist rostering.

In 2007, four public and one private radiotherapy treatment centre exceeded the planning parameter of 414 courses per linear accelerator when measured as average courses of radiotherapy treatment per 'operational' linear accelerator (ie. taking into account machine downtime), as shown in the following graph.

Some variation could be expected due to differences in the complexity of treatment and techniques offered. For example, the treatment of children takes longer and requires anaesthesia. Radiotherapy centres do not currently apply workload measures that facilitate comparison of centres with different case-mixes and different techniques.

[Note: Refer to the Appendix 2 for the definition of each acronym used in the graph].

Total average courses of radiotherapy treatment per operational linear accelerator in 2007



Source: NSW Health, *2007 Radiotherapy Management Information System Report*, September 2008.

Potential to improve throughput

All the participating centres calculated potential throughput capacities for each linear accelerator. Across all 10 participating sites these aggregated theoretical capacities showed that potentially they could achieve a further 39% increase in courses per year compared to the planning figure. This presents the opportunity to test whether there is additional demand, without having to build new facilities.

The *Business Improvement Project* identified the need for an external stimulus for the centres to maintain the new management process. Existing incentives to improve productivity are limited to some increase in income for the radiotherapy treatment centre and some increased remuneration or recognition for the oncologists. It suggested that a standard set of key performance indicators be reported centrally to the Cancer Institute NSW and/or NSW Health each month. We found no evidence that this had been done. Individual centres have devised their own performance indicators using factors such as waiting times, unused machine capacity, weekly incident reports, patient surveys and financial data. But there is no state-wide standardisation, comparison of results or benchmarking.

Utilisation

We found that the utilisation of radiotherapy centres varied considerably, but for the most part operations were limited to 8 hours a day, 5 days a week. Centres would operate for extended hours, until 8pm or even to 11pm at times, if one of the machines was unserviceable or if a machine was being replaced.

There may be potential to work a second shift, and even to treat patients on weekends. This additional capacity could be used to 'test the demand' for such capacity. Such 'after hours' access might even improve accessibility for patients, who otherwise have to leave work to attend treatment during business hours.

We did find examples of some centres working extended hours on a routine basis. For example, in 2008 the normal hours of operation at the Westmead and Nepean Cancer Care Centres were increased to eleven hours per day Mondays to Fridays. Also, for example, we found that the Peter MacCallum Cancer Centre in Melbourne operates from 8am to 6:15pm Monday to Friday, and Saturday mornings, as standard procedure.

In relation to this, the national Radiation Oncology Inquiry in 2002 recommended:

- recruitment of staff and increased flexibility in work practices, to allow expanded hours of operation for existing equipment, should be undertaken before commissioning additional linear accelerators
- once existing hours of operation have been extended to the point where a new linear accelerator is justified, additional equipment should be commissioned in areas of demonstrated need
- in the short-term, State and Territory governments should facilitate flexible operating hours for radiotherapy centres. Options should be examined for up to 12 hours operation daily before the end of 2004, and implemented where staff numbers are adequate.

Source: *A Vision for Radiotherapy*, Report of the Radiation Oncology Inquiry, 2002.

We found that NSW Health had not in recent years explored the potential for better value for money by use of an extended working hours model of service delivery. Such a move might well be welcomed by patients, many of whom need to remain working or care for children during the weeks of radiotherapy treatment.

From a financial perspective, there may be reduced capital costs per patient. But this needs to be weighed against the impact on the workforce and increased operating costs per patient, including nature of the roster arrangements, wage and salary agreements, retention and recruitment, and on the extent of the ancillary services required.

Benchmarking more generally

NSW Health has developed an annual *Radiotherapy Management Information System Report* (RMIS) that collects data on equipment, staffing, treatment and the source of referrals from each public and private radiotherapy treatment centre. This information is used to support the planning of services. One of the advantages of the new web-based business improvement tools, is that information currently collected for the RMIS on an annual basis will become more accessible and readily used to support the operations management of the radiotherapy treatment centres.

The *Business Improvement Project* identified the need for benchmarking and an external stimulus for the centres to maintain the new management process. It suggested that a standard set of key performance indicators be reported centrally to the Cancer Institute NSW and/or NSW Health each month.

In addition to the internal benefits which the centres experience from the use of the data described above, there are a number of mechanisms which could provide an external stimulus for the centres to maintain the new management process. In particular:

- the standard set of KPIs can be reported centrally to the Cancer Institute NSW and/or NSW Health each month. This would have the further benefit of providing at least a subset of radiotherapy management information system data in a considerably more timely basis than is currently possible
- the centres can introduce a regular rolling patient experience survey and include a patient "non executive" participant in their management process as described above; again to provide an external stimulus to sustain the process.

Source: NSW Health, *Radiation Oncology Business Improvement Project Final Report – Waves One, Two and Three, 2007.*

Recommendation

We recommend that NSW Health:

- develops a workload measure by June 2010 that facilitates comparison of centres with different case-mixes and different techniques
- monitors and benchmarks by December 2009 operational performance measures including quality, patient safety, waiting times, throughput, cost of treatment and outcomes
- assesses by June 2010 the value for money of working extended hours (including Saturday mornings), including the value to patients.

2.6 Are there appropriate numbers of staff with the requisite skill levels?

Staffing costs are the major operating cost component in the delivery of radiotherapy services. On the other hand, we understood that, in the past, the delivery of services had been constrained by workforce shortages. We looked to see how well NSW Health had addressed these issues.

Our assessment

We found that generally there seemed to be enough staff, but that staffing levels varied considerably.

We found that there have been workforce shortages, both nationally and internationally, that in the past have resulted in reduced productivity of radiotherapy machines. NSW Health undertook a number of strategies to address the situation and in recent years NSW vacancy rates have declined. These efforts need to be sustained to ensure adequate staffing into the future.

We observed that centres appear to have quite different staffing levels when related to the throughput achieved. The reasons for such variations were not clear, but could be due to more complex treatments, more training commitments and more involvement in research. NSW Health needs a process to analyse this and establish the staffing required at each centre.

The workforce

The workforces involved in the provision of radiotherapy services include radiation therapists, radiation oncologists, radiation oncology medical physicists and allied health staff.

Source: The Cancer Council NSW, *Understanding Radiotherapy: a guide for people with cancer, their families and friends,* 2007

Workforce shortages

There have been workforce shortages, both nationally and internationally, that in the past have resulted in reduced productivity of radiotherapy machines. This was particularly evident and reported by the national Radiation Oncology Inquiry in 2002.

NSW Health had commenced a number of strategies prior to this time to address the situation. For example, for radiation therapists, these involved:

- additional university places
- support for professional year training
- an improved salary package and career structure
- supporting trained radiation therapists to re-enter the workforce
- overseas recruitment programs
- tutor positions
- promotion of a career in radiation therapy.

Radiation therapists

The NSW vacancy rate for radiation therapists has been declining for some time. Since January 2006 the vacancy rate has remained under 5%. As at 1 July 2008, the NSW vacancy rate for radiation therapists was 3.11% in the public sector. This compares to vacancy rates of 26% in October 2001.

Radiation oncologists

There have also been efforts to improve recruitment and retention of radiation oncologists. NSW Health has funded a number of advanced trainees in Radiation Oncology positions since 2002. The funding of these positions has aimed to improve the recruitment and retention of the specialists; to provide opportunities for increased rotation and exposure to practice in a rural setting; and to improve career opportunities for trainees wishing to practice in a rural setting. These positions have now been permanently established in the Area Health Services. NSW Health advised us that the vacancy rate for radiation oncologists was 4%.

Medical physicists

For radiation oncology medical physicists these strategies have included being the first Australian jurisdiction to implement the *Training, Education and Accreditation Program* to ensure an adequately skilled and expert workforce. The number of accredited radiation oncology medical physicists (and those non-accredited with greater than three years of clinical experience) represent 91.5% of the total filled positions as at 1 January 2009. Measures also included providing funding to establish super numerary trainee for medical physicists, establishing a clinical placement coordinator, funding a university chair at in medical physics, funding for scholarships and continuing professional development, and overseas recruitment programs. We were advised that the vacancy rate for radiation oncology medical physicists had reached 20.5% in April 2008, but had been reduced to 11.9% by October 2008.

Workforce planning

Despite improvements in overall aggregate figures, some centres continue to experience difficulties in staffing. This may not be related to recruiting difficulties, but may be due to financial constraints as identified in section 2.7.

We noted that the Commonwealth and States have initiated a *Radiation Oncology Workforce Planning Project* to:

- provide a clear statement of the current profile of the radiation oncology workforce
- examine the factors that might influence its future profile and provide a model with which to project staff numbers and skill requirements
- examine current strategies, including overseas recruitment and programs to recruit to rural and regional areas and recommend ways of improving them.

The work is expected to commence in the near future and be completed over a period of four months.

Staffing benchmarks

We observed that centres appear to have quite different staffing levels when related to the throughput achieved. For example, in 2007 the number of courses of treatment achieved per radiation therapist ranged from around 40 to 80 courses of treatment. The reasons for such variations were not clear, but could be due to more complex treatments, more training commitments and more involvement in research.

NSW Health advised us:

- guidance on a generic staffing profile was issued to Areas in 2004. This was based on benchmarking between centres, professional recommendations and international guidelines for radiation oncology services
- it was emphasised to Area Health Services that the staffing profiles should remain flexible and reflect the case-mix and technology of each centre, and that staffing configurations are considered as a guide only
- the clinical staffing profile for a two machine service was provided by way of example, to assist the Area Health Service in the more detailed operational planning of local radiation oncology services
- staffing profiles for 1-5 machine departments have been developed and are reviewed regularly. These were also independently reviewed in 2007. When detailed services and facility planning is being undertaken these are provided to assist in local planning.

Staffing profiles are used to plan new centres and plan the expansion of existing centres. However, we have not found the staffing profiles used by the Department of Health as benchmarks for comparing and assessing operational performance of present radiotherapy treatment centre staff levels.

We have noted considerable variation between the staffing levels in the public and private sectors, and between individual public radiotherapy centres. Differing views have been expressed regarding the explanation for these variations. A workload measure which reflected differing case-mix and techniques would assist in undertaking more meaningful comparison of staffing requirements.

Recommendation

We recommend that by December 2010 NSW Health analyses the variations of current staff levels between radiotherapy centres and assist Area Health Services refine staffing for each centre which reflect volume, case-mix and complexity.

2.7 Are there constraints on service delivery arising from other parts of the health system?

Radiotherapy centres impact on the finances of Area Health Services. We focused on how much was known about this aspect.

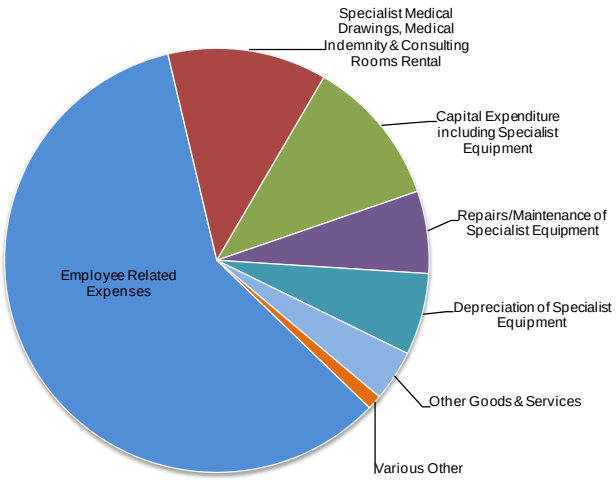
Our assessment

We found that the limitations in finances can have an impact on a radiotherapy centres ability to deliver services. We have not found NSW Health comparing the financial performance of radiotherapy centres with each other, including identification and scrutiny of unit costs - such as the cost per patient of each treatment.

Impact of Area Health Service finances

Radiotherapy centres have an obvious impact on the finances of Area Health Services, as shown by the following example.

Westmead and Nepean Cancer Care Centres
Overview of the expenditure 2007-2008



Total expenditure = $ 19.9 million

Source: NSW Health, Sydney West Area Health Service.

Radiotherapy services are predominantly funded by the Commonwealth and the NSW Health Department. Revenue is obtained from the Commonwealth through billing of patients according to the MBS item charge which is held in a trust fund for radiation oncologists. The distribution of the revenue within the trust fund to the radiotherapy centre varies, depending upon the arrangements made with the Area Health Service and the radiation oncologist.

This revenue is complemented by the Commonwealth Health Program Grant (HPG) funds in relation to the designated approved radiotherapy equipment.

The Department of Health's budgetary allocation is primarily for employee related expense, repairs and maintenance of specialist equipment and other ancillary goods and services.

In the case of the Westmead and Nepean Cancer Care Centres, the funding between the Commonwealth and the NSW Health Department was almost equal in amount in 2007-2008.

The limitations in finances can have an impact on a radiotherapy centres ability to deliver services.

We have not found NSW Health comparing the financial performance of radiotherapy centres with each other, including identification and scrutiny of unit costs - such as the cost per patient of each treatment. In our view, this needs to be included with the operational performance monitoring recommended in section 2.5.

2.8 Are radiotherapy services delivered in an effective manner?

We looked to see if the effectiveness of radiotherapy services had been assessed to establish the impact of centre facilities on patient outcomes.

Our assessment

We found there was no means of systematically reviewing the effectiveness of services provided at individual centres. We looked for, but did not find, clarity and agreement on what the results for patients should be from the use of radiotherapy.

NSW Health proposals for new radiotherapy services usually cite improvement in morbidity and mortality, and radiotherapy treatment rates as primary objectives. In particular, a treatment rate of at least 50% of all cancer patients has been a NSW target since 1995. Current radiotherapy treatment rates for NSW residents who received radiotherapy in NSW and interstate, in either the public or private sector, are considerably lower than this target. Treatment rates in other states and overseas appeared similar to those achieved in NSW.

NSW Health needs to look closely at the changing evidence basis for this target, particularly considering that treatments have changed over time and radiotherapy is provided in combination with other treatments.

We see a need for more realistic 5 year and 10 year treatment benchmarks for each Area Health Service as a basis for assessing performance and planning the expansion of facilities.

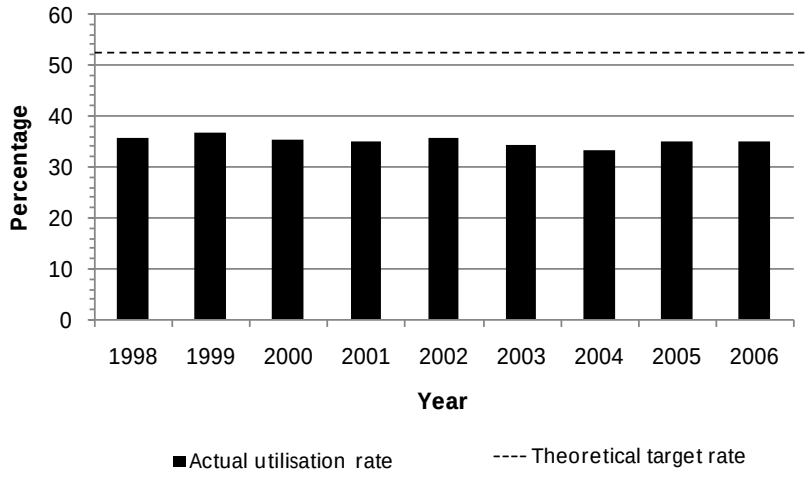
Patient outcomes

We have not found a means of systematically reviewing the services provided at individual centres. We have not seen clarity and agreement on what the patient outcome objectives and measures should be. Broadly these are likely to be to cure cancer (and mortality figures could tell us how successful we have been), to get rid of pain (where patient surveys and admission information would help), and to minimise the toxicity of the treatment.

Radiotherapy treatment rates

NSW Health proposals for new radiotherapy services usually cite improvement in morbidity and mortality, and radiotherapy treatment rates as primary objectives. We found that radiotherapy utilisation rates vary substantially throughout Australia. Based on the best available evidence at the time (*Radiotherapy in Cancer Care: Estimating the Optimal Utilisation From a Review of Evidence Based Clinical Guidelines*, Collaboration for Cancer Outcomes Research Evaluation (CCORE) Report, October 2003), the proportion of cancer patients that could benefit from radiotherapy has been estimated as 52.3% of new cancer patients, and 25% of those requiring repeat treatments. This is a 'weighted average' of the results obtained from an analysis by each of the many cancer tumours. A treatment rate of at least 50% has been a NSW target since 1995. Current radiotherapy treatment rates for NSW residents who received radiotherapy in NSW and interstate, in either public or private sector, are considerably lower than this target, as shown below.

Percentage of NSW cancer patients utilising radiotherapy 1998 to 2006



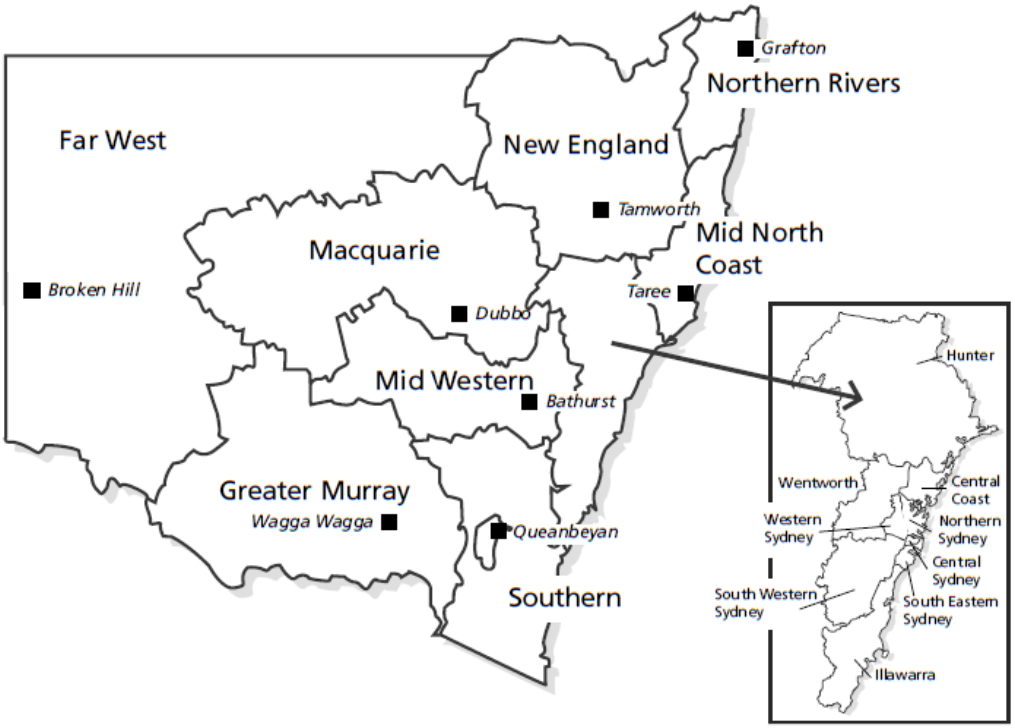
Source: NSW Health, 1998-2007 Radiotherapy Management Information System Reports, and NSW Central Cancer Registry data, December 2008, Cancer Institute NSW.

Note: In 2004, there was no data provided by the Queensland private provider for NSW residents treated at the private practice. This accounts for the 'apparent' reduction in the utilisation rate for that year.

The radiotherapy treatment rates in NSW also vary considerably as shown for each former Area Health Service in the table below.

Radiotherapy utilisation by former Area Health Service 2006			
Former Area Health Service	**New cancer cases**	**Numbers treated**	**Treatment rate**
Central Coast	2,036	664	32.61%
Central Sydney	2,308	806	34.92%
Far West	232	125	53.88%
Greater Murray	1,512	679	44.91%
Hunter	3,197	1,089	34.06%
Illawarra	2,092	798	38.15%
Macquarie	595	182	30.59%
Mid North Coast	2,037	540	26.51%
Mid Western	920	270	29.35%
New England	1,033	231	22.36%
Northern Rivers	1,984	697	35.13%
Northern Sydney	4,279	1,604	37.49%
South Eastern Sydney	4,225	1,607	38.04%
South Western Sydney	3,244	1,256	38.72%
Southern	1,128	355	31.47%
Wentworth	1,283	224	17.46%
Western Sydney	3,054	1,255	41.09%
Total	**35,159**	**12,382**	**35.22%**

Source: NSW Health, *2006 Radiotherapy Management Information System Report*, July 2007, and NSW Central Cancer Registry data, September 2008 extraction, February 2009, Cancer Institute NSW.



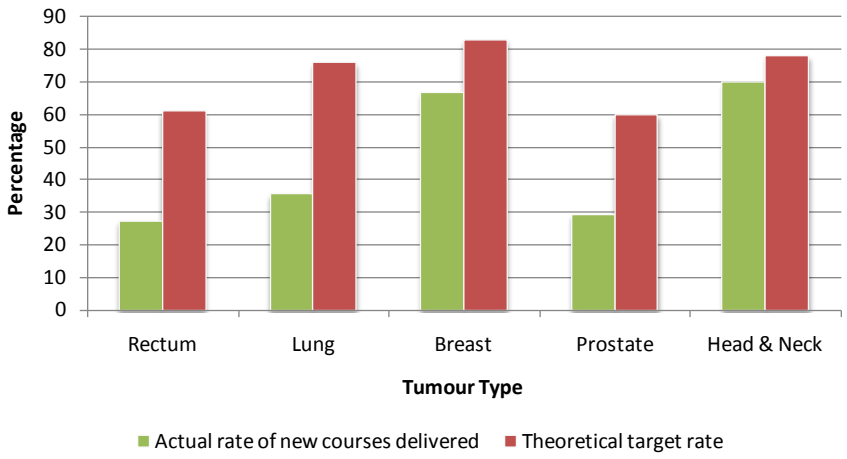
Source: NSW Health, *Annual Report 1997/98 NSW Department of Health*, December 1998.

The target reflects a clinical perspective, and we could not find evidence that it had been achieved elsewhere. Treatment rates in other states and overseas appeared similar to those achieved in NSW.

In practice, there are a number of factors that influence radiotherapy treatment rates. These factors include the rate at which clinicians refer cancer patients for radiotherapy treatment, the impact of screening programs, alternative but equivalent treatments, patients' treatment preferences, access to radiotherapy services and the capacity of services.

The following table shows considerable differences for several of the most common cancers in actual treatment rates, as compared to those estimated in the report that developed the overall target of 52.3%.

Actual NSW radiotherapy treatment rates in 2006 versus those that comprise the 52.3%



Source: NSW Health, *2006 Radiotherapy Management Information System Report,* July 2007, Cancer Institute NSW, *Cancer in NSW: Incidence and Mortality Report 2006,* November 2008, and *Radiotherapy in Cancer Care: Estimating the Optimal Utilisation From a Review of Evidence Based Clinical Guidelines*, CCORE Report, October 2003.

One might expect that improved access to radiotherapy services would result in higher rates of treatment. However, some metropolitan areas have lower treatment rates, despite ready access and modest waiting times. Some rural areas have high treatment rates, despite patients having to travel considerable distances for treatment.

What is not clear is the extent to which treatment rates are influenced by factors such as access to a clinic staffed by a referring radiation oncologist, programs to increase referrer and patient awareness of the benefits of radiotherapy, more or better accommodation near the central facilities or wider access to out of hours facilities. Also, there is the question of patient preference.

There are even different medical views. The Cancer Institute NSW has advised us of the importance of good clinical trial evidence to support the view that radiotherapy produces better outcomes than other cancer treatment. Only with such evidence, can it be argued a patient will be disadvantaged if they did not receive radiotherapy.

For example, localised prostate cancer can be treated with either surgery or radiotherapy, both producing the same survival outcome. However, in this example, radiotherapy may be preferred due to its lesser side-effects.

We have not found a more realistic treatment benchmark for assessing performance and planning the expansion of facilities. We have been advised that that figure could be 45% to 50%. To estimate the real unmet demand one might look at each tumour stream individually, see how clear is the evidence, see where the patients live, identify the gaps in NSW and what needs to be done about it, and then establish realistic 5 year goals.

The Cancer Institute NSW's work in establishing clinical cancer registries could help by improving the collection and reporting of data on access by geographical area and the use of radiotherapy for each type of cancer.

Recommendation

We recommend that NSW Health:

- establishes by June 2010 more realistic 5 year and 10 year treatment benchmarks for each Area Health Service as a basis for assessing performance and planning the expansion of facilities
- continues to monitor international evidence and assess the impact that radiotherapy services are having on patient outcomes as part of their overall cancer treatment, in order to clarify and agree what the patient outcomes and performance measures should be.

3 Are radiotherapy services likely to be adequate in the future?

At a glance

The key question we wanted to answer was:

Are radiotherapy services likely to be adequate in the future?

Our assessment:

We expected that NSW Health would have a strategy or plan to help ensure that the provision and delivery of radiotherapy services are directed to areas of need and the highest priorities. We also expected its assessments to support value for money.

We found that NSW Health had undertaken significant planning in relation to the development of a draft *Radiotherapy Services Plan 2007-2011*, but not released it due to the need to resolve the significant funding required. In our view the Plan should be extended to a 10 year timeframe, and released to provide overall direction - resourcing and the availability of funding being risks that need to be managed (as discussed in section 3.5).

Although there has been no published plan, we found that implementation of state-wide planning has progressed. This has included consideration of the estimated number of new cancer cases, flow patterns and the impact of new and expanded services. This enables assessment of the impact of adjustments to flow patterns and the supply of radiotherapy services. This planning process has identified areas of geographic need including the Central Coast, Illawarra/Shoalhaven, Hunter/New England, and Sydney West/Sydney South West regions.

We also found assessments in the *Business Case for the Radiotherapy Services Plan 2007* to support value for money.

We believe that NSW Health should issue a 10 year strategic plan for radiotherapy services, noting that the progress of its implementation will be determined by resource and funding availability. In this chapter we also recommend more value for money assessment, and analysis of affordability and funding.

3.1 Are there objectives, a strategy, plan and timetable for the future provision of radiotherapy services?

The establishment of radiotherapy centres requires extensive planning. Over the next 10 to 12 years demand for cancer services is expected to increase significantly. We looked to see how well NSW Health was planning to provide the services that will be needed.

Our assessment

We found that NSW Health had undertaken significant planning in relation to the development of a draft *Radiotherapy Services Plan 2007-2011*, but not released it due to the need to resolve the significant funding required. In our view the Plan should be extended to a 10 year timeframe, and released to provide overall direction - resourcing and the availability of funding being risks that need to be managed.

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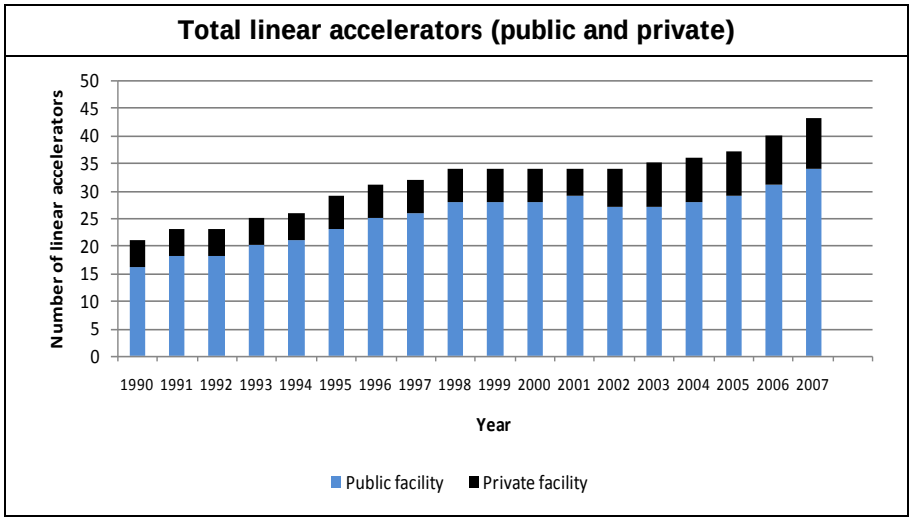
Long lead times

The acquisition of new equipment and new facilities requires long lead times and an associated increase in the clinical workforce. Radiotherapy also requires many close links to other health and supportive services.

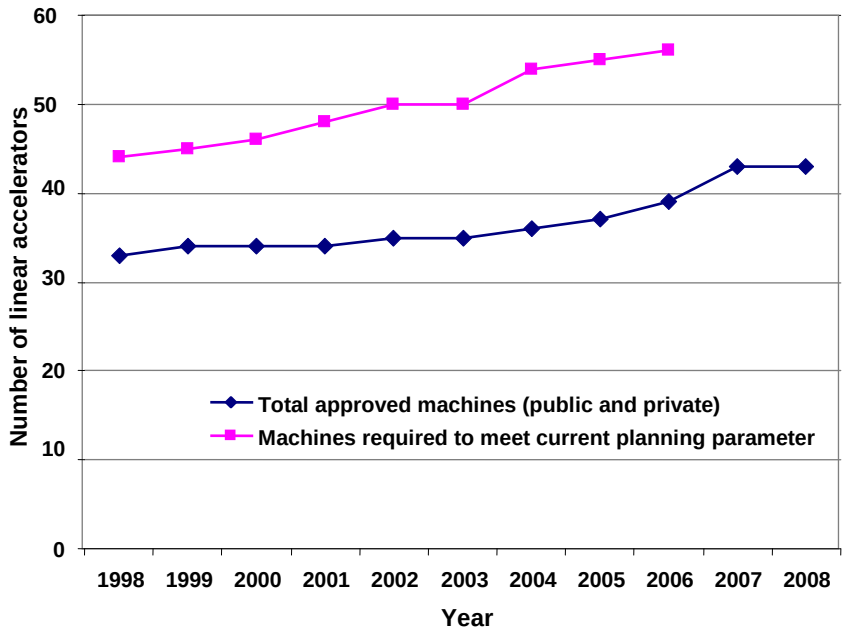
The following graph shows the number of NSW linear accelerators since 1990.



Source: NSW Health, 2001 to 2007 Radiotherapy Management Information System Reports, Radiotherapy Strategic Plans (1991; 1995-2000; to 2006).

There appears to be a widening gap between the number of linear accelerators and the projected demand based on 52.3% of new cancer cases, and 25% retreatment rate – as shown by the figure below.

Total approved linear accelerators (public and private) against estimated capacity to meet current planning parameters



Source: NSW Health

Note: NSW Health cannot provide the 2007 and 2008 data for 'machines required to meet current planning parameter' as it requires cancer incidence information which has a 2 year lag in availability.

State-wide plans

Since 1991, NSW Health has developed five year state-wide plans for provision of radiotherapy equipment, the most recent being for 2001 to 2006 – but not issued until June 2003.

The implementation of the last five year Plan to 2006 was completed with the commissioning of the fourth linear accelerator at Royal Prince Alfred Hospital in 2007.

Service expansions included:

- installation of a second machine at the Macarthur Cancer Treatment Centre
- two additional machines at Calvary Mater Newcastle Hospital
- two machines on the Mid North Coast – Coffs Harbour and Port Macquarie services established
- up to two machines at Royal Prince Alfred Hospital.

Detailed planning was also proposed, and subsequently progressed, for the central west and northern rivers areas of NSW. This has resulted in establishment of services at Orange and Lismore.

State-wide planning has been undertaken with consultation with Area Health Services and the *Radiotherapy Joint Advisory Committee* occurring in late 2006 and early 2007.

This has included consideration of the estimated number of new cancer cases, flow patterns and the impact of new and expanded services.

Scenario modelling has also been undertaken. This enables assessment of the impact of adjustments to flow patterns and the supply of radiotherapy services.

This planning process has identified areas of geographic need including the Central Coast, Illawarra/Shoalhaven, Hunter/New England, and Sydney West/Sydney South West regions.

While a 'plan' has not been published, Area Health Services also use the cancer incidence information from the Cancer Institute NSW and agreed planning parameters in local services planning.

Expansions can also be progressed as part of broader major hospital redevelopments, such as Liverpool, which will have two additional bunkers constructed as part of the current major redevelopment project which will provide capacity to 2016.

The Australian Government also seeks advice from the jurisdictions on applications from the private sector for Health Program Grant (HPG) funding. This enables consideration of where the establishment of private sector services would complement public sector services. NSW Health have indicated to us that the current approved private sector expansion includes: the Hunter (2 linear accelerators), North Ryde (2 linear accelerators), and St George (2 linear accelerators) areas. These machines are then taken into account in the supply planning for radiotherapy services.

While the state-wide *Radiotherapy Services Plan 2007-2011* has not been published, it has been subject to drafting and consultation (although that has been limited in view of its unpublished nature). A supporting business case was developed in 2007. This stated that the main objectives of the *Radiotherapy Services Plan* are to:

- improve patients' access to radiotherapy, leading to improved outcomes for cancer patients
- respond to increasing demand for radiotherapy treatment
- ensure timely replacement of existing machines.

The *Business Case for the Radiotherapy Services Plan 2007* projected a requirement by 2011 for:

- 16 new linear accelerators with at least 2 provided by the private sector, and including one linear accelerator at Orange, Lismore and Liverpool
- 9 linear accelerators to replace units that will be life-expired
- 2 new treatment centres - at Orange and Lismore.

It also identifies a potential requirement for new and expanded services as:

- an Illawarra/Shoalhaven service (equivalent to two machines across that region)
- the Hunter and New England areas (equivalent to two to three machines)
- the Central Coast (equivalent to two machines).

The target requirement was based on an increasing number of cancer patients and achieving capacity for 52.3% of new cancer cases to be treated with radiotherapy, with approximately 25% of cases requiring re-treatment. Expanding capacity in the private sector was also taken into account as part of achieving the supply needed to meet the projected demand.

We found that the release of the *Radiotherapy Services Plan 2007-2011* and its associated *Business Case* have not been progressed due to the need to resolve the funding required. In our view the Plan should be extended to a 10 year timeframe, and released to provide overall direction - resourcing and the availability of funding being risks that need to be managed (as discussed in section 3.5). We noted that Queensland recently released the *Queensland Statewide Cancer Treatment Services Plan 2008-17* which included an overall framework for the development of radiotherapy services - subject to funding.

Queensland Statewide Cancer Treatment Services Plan 2008-17

The plan outlines an overall framework for the development of radiotherapy services. For example:

- linear accelerators are planned on the basis of 1.6 machines per 1000 new cancers per year, across both public and private sector services
- service development should incorporate the principle of spare bunker capacity (minimum of one spare at each site) to facilitate replacement of equipment without disruption to services
- stand-alone single machine unit (SMU) facilities are not supported as a general rule, but if considered necessary then the SMU must be located sufficiently close to an existing service for back up and support. This principle will not necessarily apply where a designated service development involves staged introduction of linear accelerators
- tomotherapy will be provided at RBWH and image guided radiotherapy at PAH within two years
- each Area should have one centre with brachytherapy capacity within five years
- there will be only one public collaborative stereotactic radiation therapy service, which will be co-located with neurosurgery at RBWH.

Source: Queensland Government, *Queensland Statewide Cancer Treatment Services Plan 2008-17*, January 2008.

Area Health Service planning

We have found that Area Health Services have developed Area services delivery plans and also specific clinical service plans.

For example, the *Hunter/New England Area Cancer Services Plan 2006 – 2010* (2006) identifies key challenges for cancer service development to include:

- delivering comprehensive cancer control across multiple sites, disciplines and geographic distances
- moving the focus from discipline or institution based care to patient focused care
- poor integration between and across services resulting in poor coordination of treatment
- timely access to diagnostic and treatment services
- workforce and succession planning issues to ensure there are adequate resources available to meet increased demand
- lack of outcome measures to determine effective treatments and processes for the management of patients.

We have found comprehensive plans being developed in support of the proposed new cancer treatment centres at Orange and Lismore, which had featured in *Labor's Plan for Cancer* (2003/04 to 2006/07).

We have also seen a copy of a submission to NSW Health proposing establishment of a Comprehensive Cancer Centre in Sydney, to be co-located with the Royal Prince Alfred Hospital. The new Centre would cost in excess of $200 million and would include the existing capacity of five linear accelerators. We found that the Commonwealth Department of Health and Ageing has budgeted $50 million from 2008-09 to 2010-11 to assist with this project.

Recommendation

We recommend that NSW Health develops and publishes by June 2010 a 10 year strategic plan for radiotherapy services, noting that the progress of its implementation will be determined by resource and funding availability.

3.2 Have there been economic or value for money assessments made in relation to the provision of radiotherapy services?

We looked to see how well NSW Health had evaluated the economic or 'value for money' aspects of the projected replacement and expansion of radiotherapy services.

Our assessment

We found that the *Business Case for the Radiotherapy Services Plan 2007* evaluated replacement and expansion of radiotherapy services in NSW in terms of a limited number of options. We looked for, but did not find at a state-wide level, economic or value for money assessments of the economies of scale comparing facilities with 1, 2, 3 and 4 or more machines, or optimal replacement of existing machinery based on service need, age, state of repair, productivity, and life cycle costs.

Major cost components

The major cost components of radiotherapy are the cost of buildings and facilities, equipment, medical and non-medical staff, materials and overhead.

Options considered

The *Business Case for the Radiotherapy Services Plan 2007* evaluated replacement and expansion of radiotherapy services in NSW. Options considered were:

- *Base Case* replacements with current utilisation — existing linear accelerators in NSW are replaced, no new machines are provided and treatment rates remain at current levels
- *Option 1* replacements with benchmark workload throughput — existing linear accelerators in NSW are replaced, no new machines are provided, and each linear accelerator treats 414 patients each year (subject to capacity constraints)
- *Option 2* the proposed radiotherapy services program — the capacity to provide radiotherapy (new and replacement machines) is provided at NSW locations indicated by the services planning process and at benchmark treatment rates
- *Option 3* relying on new private sector services — provides the same number of new machines as in *Option 2*, but they are assumed to be provided by the private sector.

The Business Case ruled out *Option 1* and *Option 3* on the basis of:

- continuing inequities in access in rural and regional NSW
- greater numbers of cancer patients who would benefit from radiotherapy being left untreated
- private sector being unlikely to provide services within the timeframe proposed in the Radiotherapy Services Plan
- higher out-of-pocket expenses for patients using private services, which would decrease the likelihood that benchmark treatment rates are achieved.

We have not found economic or value for money assessments at a state-wide level of:

- economies of scale comparing facilities with 1, 2, 3 and 4 or more machines
- optimal replacement of existing machinery based on service need, age, state of repair, productivity, and life cycle costs.

For example, NSW is likely to have lower total costs with a small number of large centres, each treating many patients, since scale economies can be realised. However, the potential cost savings realised through large-scale centres need to be balanced against the potential cost and access disadvantages, due to increased transport and accommodation costs for patients and potentially impact on the effectiveness of radiotherapy services.

We have seen examples of where radiotherapy centres have developed their own capital equipment replacement plans as part of their Area Health Service's capital program.

The Business Case was developed on the assumption of a 10 year machine life being an average life span for such equipment and considering technological advances. In addition, the Commonwealth funding provided through the Health Program Grant, and available to contribute to replacement of equipment, has been adjusted to cease after 10 years. The individual Business Cases required by NSW Treasury document the criteria which support the circumstances under which a machine is to be replaced (including service need, age, state of repair, productivity, and life cycle costs). A firm funding strategy to support the replacement of existing machinery is required. The Health Program Grant funds would be expected to be a major contributor to this.

Recommendation

We recommend that NSW Health:

- assesses by June 2010 economies of scale to assist in considering the most cost effective machine configuration and the impact on access to services
- develops by June 2010 a firm funding strategy to support the replacement of existing machinery based on service need, age, state of repair, productivity, and life cycle costs.

3.3 Have the resources been identified that will be needed to achieve the objectives?

We looked to see if future planning had clearly identified the resources needed.

Our assessment

We found that the *Business Case for the Radiotherapy Services Plan 2007* provided a broad estimate of the overall funding needed, identified the linear accelerators required and was supported by an economic analysis that includes assumptions in relation to staffing, equipment, and other related costs such as maintenance. We also found Area Health Services identifying radiotherapy resources they need. A key issue for Area Health Services is the operational funding required to operate these services.

Planning documents

The *Business Case for the Radiotherapy Services Plan 2007* provided a broad estimate of the overall funding needed, identified the linear accelerators required and was supported by an economic analysis that includes assumptions in relation to staffing, equipment, and other related costs such as maintenance.

The Business Case proposed that detailed planning for the individual components be progressed, which enables assessment of possible delivery options, including site, configuration and provision by either the public or private sector.

As an example, the detailed plans in support of the proposed new cancer treatment centres at Orange and Lismore identify the resources needed at those centres. These are informed by Area Health Service planning, but are tested and subject to economic analyses as required as part of facility planning.

We have found Area Health Services identifying radiotherapy resources they need.

A key issue for Area Health Services is the operational funding required to operate these services.

3.4 Has the Department evaluated the current and future capacity of area health services and private providers to deliver radiotherapy services?

We were particularly interested in seeing if the planned increase in radiotherapy services was likely to be affordable – for NSW Health as well as the patients. In relation to this, we were interested to understand whether NSW Health had evaluated the potential contribution of the private sector.

Our assessment

We have found analysis of the affordability of options at the Project Definition Planning phase. We expected to see, but did not find, analysis of affordability at a state-wide level including:

- assessments of the likely adequacy of funding for development, operations, and maintenance of all radiotherapy treatment centres in the system
- efforts to identify, secure and leverage further funding sources as necessary to address any shortfalls.

We have found NSW Health takes into account capacity in the private sector in its planning.

Area Health Service capacity

The *Radiotherapy Management Information System Report* provides the Department and the Area Health Services with details on equipment, treatment, staffing, and source of referrals.

The *Business Case for the Radiotherapy Services Plan 2007* calculates the aggregate capacity needed, based on projected cancer cases and planning parameters. Capacity in the private sector is taken into account as part of achieving the supply estimated to meet the projected demand.

Affordability

An economically desirable outcome may still not be affordable. For example, there are Commonwealth payments to consider, and there are significantly different financial implications involved between public and private facilities.

While communities may proceed with fund raising, given the significant capital establishment costs, and operating costs, these form only a small component of the investment required to operate these services.

We have found analysis of the affordability of options in a financial sense at the Project Definition Planning phase. The Business Case addresses affordability in the context of the value of an improved quality of life for cancer patients. But at a state-wide level we have not found an analysis of the affordability of options in a financial sense. We have not found:

- assessments of the likely adequacy of funding for development, operations, and maintenance of all radiotherapy treatment centres in the system
- efforts to identify, secure and leverage further funding sources as necessary to address any shortfalls.

Private sector delivery

NSW Health have indicated to us that private sector proposals have been approved to establish new services at the Macquarie University Hospital at North Ryde, Lingard Hospital in Newcastle, and also in the Kogarah area. Another proposal in the Kogarah area remains under consideration by the Commonwealth.

We have seen some collaboration between the public and private sectors, as evidenced by the provision of data from the private sector for the *Radiotherapy Management Information System Report*.

In general, demand for private facilities is influenced by the socio-economic and demographic characteristics of the surrounding area including age profile, levels of income, rates of unemployment and levels of private health insurance cover. As part of the detailed planning undertaken for specific geographic areas, NSW Health is required to undertake economic evaluation of the potential delivery options. This includes consideration of provision by the public or private sectors.

The Commonwealth consults with NSW Health when private sector radiotherapy proponents apply for Health Program Grants. As these grants enable Commonwealth reimbursement for the capital cost of expensive radiotherapy equipment, a grant is considered to be a necessary pre-requisite. The federal Department of Health and Ageing forwards proposals to the relevant jurisdictions for advice as to the private sector's alignment with state-wide planning. In the case of NSW, in the absence of a published current state-wide plan, NSW Health undertakes its assessment based on the *Radiation Oncology Service Development Framework*, geographic need and workforce for the services proposed. While the decision to provide the grants is one for the Commonwealth, the grant application and approval process effectively controls the establishment of radiotherapy services in NSW.

Recommendation

We recommend that NSW Health analyses by June 2010 the affordability of its strategic plan, particularly in relation to Commonwealth payments and the implications of private sector involvement.

3.5 Has there been an identification and assessment of risks to service delivery?

We looked to see if future planning had identified and assessed the risks to service delivery – particularly the risks associated with limited public sector funding.

Our assessment

The *Business Case for the Radiotherapy Services Plan 2007* identified risks to the development program as including lack of funding, workforce availability, and program delays.

Our view is that NSW Health has more to do on the assessment and risk management of funding, workforce support (particularly at non-metropolitan locations), and private sector involvement.

The business case

The Business Case identified risks to the development program as including:

- lack of funding
- availability of a suitably trained and experienced workforce when and where required
- program delays.

It proposed counter measures including:

- emphasising the importance of the radiotherapy program
- outlining the current inequitable distribution of — and hence access to — radiotherapy services, particularly in rural and regional areas
- continuing to monitor performance including analysis of those services achieving benchmark throughput
- developing education and information programs targeting referring clinicians about the techniques and benefits of radiotherapy treatment.

It did not assess these risks in any detail, or develop specific risk mitigation strategies. For example, it did not indicate:

- prioritisation within the program
- alternative approaches to funding
- workforce planning measures to deal with the risks.

Our view is that NSW Health has more to do on the assessment and risk management of:

- funding availability
- workforce availability at specific locations nominated and the means of assuring adequate workforce support, particularly at non-metropolitan locations
- private sector involvement at specific locations, including actual services, fees, and level of services provided.

Appendices

Appendix 1 About the audit

Audit Objective

Our objective in this audit is to determine how well NSW Health manages the provision and delivery of radiotherapy services.

Lines of inquiry

In reaching an opinion against the overall objective, we examined three lines of inquiry:

- What radiotherapy services are available?
- Are radiotherapy services provided efficiently and effectively?
- Are radiotherapy services likely to be adequate in the future?

Audit criteria

The audit criteria, against which NSW Health's performance was assessed, addressed these questions in detail. The criteria are standards based on our research of current thinking and guidance on better practice. They were discussed and, where possible, agreed with NSW Health.

For line of inquiry 1, which outlines the topic, the audit criteria were:

- explain the role of radiotherapy in cancer treatment
- outline services available to the patient
- outline who provides radiotherapy services and where they are provided
- explain NSW Health's role in managing those responsible for providing services.

For line of inquiry 2, the audit criteria were:

- a framework for the planning and provision of radiotherapy service
- evaluation and consideration of alternatives to the use of radiotherapy
- services readily accessible to patients
- facilities appropriately located for effective service delivery
- existing facilities productive and fully utilised in service delivery
- appropriate numbers of staff with the requisite skill levels
- no constraints on service delivery arising from other parts of the health system
- services delivered in an effective manner

For line of inquiry 3, the audit criteria were:

- objectives, a strategy, plan and timetable for the future provision of radiotherapy services
- resources identified that will be needed to achieve the objectives
- economic or value for money assessments made in relation to the provision of radiotherapy services
- evaluated the current and future capacity of area health services and private providers to deliver radiotherapy services
- identification and assessment of risks to service delivery.

Audit scope

Our audit looked at the provision and delivery of radiotherapy services by NSW Health, including the Department of Health, Area Health Services and the Cancer Institute NSW. It also included consideration of the role of the private sector, particularly in terms of its impact on the need for public sector facilities.

The audit did not:

- duplicate reviews already conducted in relation to this topic
- question the merits of Government policy objectives
- question matters of clinical practice.

Audit approach

We acquired subject matter expertise through:

- interviews and examination of relevant documents including guidelines, reports, studies, strategies and reviews relating to radiotherapy services
- discussions with relevant staff of NSW Health
- visits to radiotherapy treatment centres in metropolitan, regional and rural areas considered reasonably representative of current practice and circumstances
- discussions with representatives of key stakeholders
- comparisons where appropriate with other states and countries
- government and best practice guidelines relevant to the above.

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 Australian Audit Standards AUS 806 and 808 on performance auditing, and to reflect current thinking on performance auditing practices. We produce our audits under a quality management system certified to International Standard ISO 9001. Our processes have also been designed to comply with the auditing requirements specified in the *Public Finance and Audit Act 1983*.

Acknowledgement

We gratefully acknowledge the co-operation and assistance provided by NSW Health. In particular, we wish to thank our liaison officers and staff who participated in interviews, assisted with document review or provided other material relevant to the audit.

We were also assisted by discussions with a number of external bodies including the NSW Cancer Council, Cancer Voices, Royal Australian and New Zealand College of Radiologists, Australian College of Physical Scientists and Engineers in Medicine, Health Services Union, Commonwealth Department of Health and Ageing, Victorian Department of Human Services, and the three private operators of radiotherapy services in NSW.

Audit team

Our team leader for this performance audit was Chris Yates, who was assisted by Jasmina Munari. Sean Crumlin provided direction and quality assurance.

Audit cost

Including staff costs, printing costs and overheads the estimated cost of the audit is $279,000.

Appendix 2 Acronyms

Public radiotherapy treatment centres

CMN	Calvary Mater Newcastle
ICCC	Illawarra Cancer Care Centre
LCTC	Liverpool Cancer Therapy Centre
MCTC	Macarthur Cancer Therapy Centre
NCCC	Nepean Cancer Care Centre
NCCI (CH)	North Coast Cancer Institute (Coffs Harbour)
NCCI (PM)	North Coast Cancer Institute (Port Macquarie)
POWH	Prince of Wales Hospital
RNSH	Royal North Shore Hospital
RPAH	Royal Prince Alfred Hospital
SGCCC	St George Cancer Care Centre
SVH	St Vincent's Hospital
WH	Westmead Hospital

Private radiotherapy treatment centres

CCROC	Central Coast Radiation Oncology Centre
SROC	Sydney Radiotherapy and Oncology Centre (at the Sydney Adventist Hospital)
RCCC	Riverina Cancer Care Centre
ROA (Mater)	Radiation Oncology Associates P/L (The Mater Hospital)
ROA (St Vinc)	Radiation Oncology Associates P/L (St Vincent's Private Hospital)

Performance Audits by the Audit Office of New South Wales

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.

Performance audits may review a government program, all or part of a government agency or consider particular issues which affect the whole public sector.

Where appropriate, performance audits make recommendations for improvements.

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Why do we conduct performance audits?

Performance audits provide independent assurance to Parliament and the public that government funds are being spent efficiently and effectively, and in accordance with the law.

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 assist the accountability process by holding managers to account for agency performance.

What are the phases in performance auditing?

Performance audits have three key phases: planning, fieldwork and report writing.

During the planning phase, the audit team will develop audit criteria and define the audit field work.

At the completion of field work we will meet with agency management to discuss all significant matters arising out of the audit. Following this, we will prepare a draft performance audit report.

We meet with agency management to check that facts presented in the report are accurate and that recommendations are practical and appropriate. Following this, a formal draft report is provided to the CEO for comment. The relevant Minister is also provided with a copy of the final report. The final report, which is tabled in Parliament, includes any comment made by the CEO on the conclusion and the recommendations of the audit.

Depending on the scope, performance audits can take several months to complete.

Copies of our performance audit reports can be obtained from our website or by contacting our Office.

How do we measure an agency's performance?

During the planning phase, the team develops the audit criteria. These are standards of performance against which the agency or program is assessed. Criteria may be based on best practice, government targets, benchmarks, or published guidelines.

Do we check to see if recommendations have been implemented?

Every few years we conduct a follow-up audit. These follow-up audits look at the extent to which action has been taken to address issues or recommendations agreed to in an earlier performance audit.

The Public Accounts Committee (PAC) may also conduct reviews or hold inquiries into matters raised in performance audit reports. Agencies are also requested to report actions taken against each recommendation in their annual report.

Who audits the auditors?

Our performance audits are subject to internal and external quality reviews against relevant Australian and international standards. This includes ongoing independent certification of our ISO 9001 quality management system.

The PAC is also responsible for overseeing the activities of the Audit Office and conducts a review of our operations every three years.

Who pays for performance audits?

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

Further information

Further information can be obtained from our website www.audit.nsw.gov.au or by contacting us on 9275 7277.

Performance Audit Reports

No	Agency or Issues Examined	Title of Performance Audit Report or Publication	Date Tabled in Parliament or Published
188	NSW Department of Health	*Tackling Cancer with Radiotherapy*	June 2009
187	Roads and Traffic Authority of NSW	*Improving Road Safety – Heavy Vehicles*	13 May 2009
186	Grants	*Grants Administration*	6 May 2009
185	Forests NSW	*Sustaining Native Forest Operations*	29 April 2009
184	NSW Police Force	*Managing Injured Police*	10 December 2008
183	Department of Education and Training	*Improving Literacy and Numeracy in NSW Public Schools*	22 October 2008
182	Department of Health	*Delivering Health Care out of Hospitals*	24 September 2008
181	Department of Environment and Climate Change	*Recycling and Reuse of Waste in the NSW Public Sector*	11 June 2008
180	Follow-up of 2003 Performance Audit	*Protecting Our Rivers*	21 May 2008
179	NSW Office of Liquor, Gaming and Racing; NSW Police Force	*Working with Hotels and Clubs to reduce alcohol-related crime*	23 April 2008
178	Greyhound and Harness Racing Regulatory Authority	*Managing the Amalgamation of the Greyhound and Harness Racing Regulatory Authority*	3 April 2008
177	Office of the Director of Public Prosecutions	*Efficiency of the Office of the Director of Public Prosecutions*	26 March 2008
176*	Better Practice Guide	*Implementing Successful Amalgamations*	5 March 2008
175	Department of Commerce Department of Primary Industries	*Managing Departmental Amalgamations*	5 March 2008
174	Department of Education and Training	*Ageing workforce – Teachers*	13 February 2008
173	NSW Police Force	*Police Rostering*	5 December 2007
172	Department of Primary Industries	*Improving Efficiency of Irrigation Water Use on Farms*	21 November 2007
171	Department of Premier and Cabinet Department of Commerce	*Government Advertising*	29 August 2007
170	RailCorp	*Signal Failures on the Metropolitan Rail Network*	15 August 2007
169	NSW Police Force	*Dealing with Household Burglaries*	27 June 2007
168	Ministry of Transport	*Connecting with Public Transport*	6 June 2007
167	Follow-up of 2001 Performance Audit: Ambulance Service of New South Wales	*Readiness to Respond*	6 June 2007

No	Agency or Issues Examined	Title of Performance Audit Report or Publication	Date Tabled in Parliament or Published
166	Follow-up of Performance Audit Department of Education and Training	*Using Computers in Schools for Teaching and Learning*	9 May 2007
165	Homelessness	*Responding to Homelessness*	2 May 2007
164	Department of Juvenile Justice NSW Police Force	*Addressing the Needs of Young Offenders*	28 March 2007
163	Legal Aid Commission of NSW	*Distributing Legal Aid in New South Wales*	13 December 2006
162	NSW Health	*Attracting, Retaining and Managing Nurses in Hospitals*	12 December 2006
161	Follow-up of 2003 Performance Audit	*The Police Assistance Line*	6 December 2006
160	NSW Health	*Helping Older People Access a Residential Aged Care Facility*	5 December 2006
159	NSW Health	*Major Infectious Disease Outbreaks: Readiness to Respond*	22 November 2006
158	Department of Education and Training	*Educating Primary School Students with Disabilities*	6 September 2006
157	Roads and Traffic Authority	*Condition of State Roads*	16 August 2006
156*	Fraud Control	*Fraud Control Improvement Kit: Meeting Your Fraud Control Obligations*	20 July 2006
155	Follow-up of 2002 Performance Audit	*Regulating the Clearing of Native Vegetation*	19 July 2006
154	Follow-up of 2002 Performance Audit	*Managing Sick Leave in NSW Police and the Department of Corrective Services*	June 2006
153	Performance Information	*Agency Use of Performance Information to Manage Services*	21 June 2006
152	Roads and Traffic Authority	*The Cross City Tunnel Project*	31 May 2006
151	Department of Corrective Services	*Prisoner Rehabilitation*	24 May 2006
150	Follow-up of 2000 Performance Audit	*Fare Evasion on Public Transport*	26 April 2006
149	Agency Collaboration	*Agencies Working Together to Improve Services*	22 March 2006

* Better Practice Guides

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.

If you have any problems accessing these reports, or are seeking older reports, please contact our Office Services Manager on (02) 9275 7116.