

Access to Public Hospitals: Measuring Performance



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Auditor-General

Access to Public Hospitals: Measuring Performance

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The Hon. Robert Smith MLC
President
Legislative Council
Parliament House
Melbourne

The Hon. Jenny Lindell MP
Speaker
Legislative Assembly
Parliament House
Melbourne

Dear Presiding Officers

Under the provisions of section 16AB of the *Audit Act 1994*, I transmit my performance report on *Access to Public Hospitals: Measuring Performance*.

Yours faithfully



D D R PEARSON
Auditor-General

1 April 2009

Foreword

The magnitude of the investment in our hospital system demands a robust monitoring and accountability framework. Timely access to care is one of the keys to effective health outcomes, and in this regard, much energy and considerable resources are devoted to capturing and reporting data which informs the Department of Human Services' (DHS) judgment of hospital management, directs bonus funding to hospitals, and most importantly informs the community about how well our hospitals are performing.

Given that access indicators are a core part of the accountability framework under which hospitals operate, it is most concerning that the audit found fundamental flaws both with data accuracy and the rigour of data capture processes. Capturing data, especially in an emergency department, is not without its challenges and should never be allowed to interfere with a clinician's first responsibility to render effective care to patients. Nevertheless, the data collected must be reliable. Unfortunately, it is one of the findings of this audit that the reliability of access performance data by public hospitals cannot be assured.

This is unfair, both to those who diligently capture the data, and to the community who are entitled to credible information about this critically important part of their health system.

The audit has also found limitations to the appropriateness and relevance of some indicators. However, much more worrying were instances of admitted data manipulation to meet indicator targets. This is highly improper and other recent public admissions serve only to confirm and amplify the audit findings.

Focused and sustained action is clearly necessary to re-build trust and confidence in this important suite of performance information. This will require the attention of those responsible: DHS, together with hospital management, and all hospital staff who contribute to data collection. This task also includes re-examining the effectiveness of supervision, not just over the reporting of the data, but of the systems and processes that produce the data.

More positively, recent efforts by DHS to improve consistency of data collection, and to commence audits of data accuracy, are encouraging first steps. However, these efforts need to be sustained until a credible monitoring and accountability framework can be demonstrated.



D D R PEARSON
Auditor-General

1 April 2009

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1 Audit summary

1.1 Background

Timely access to hospital care is important. For patients requiring emergency care or elective surgery, the time taken to receive services can significantly affect clinical outcomes. Information about the timeliness of access to hospital care is necessary for understanding hospital performance and identifying areas for improvement.

The Department of Human Services (DHS) has been measuring aspects of hospital performance in providing timely access to care over the past decade. Access indicators form the major part of the department's hospital performance monitoring framework. Access indicators are critically important as they provide the main measure of assurance to the public that hospital services are accessible and provided in a timely manner. Hospital performance against the access indicators also determines:

- the level of monitoring DHS will apply to a hospital's management
- bonus funding to hospitals to reward performance
- areas for improvement.

In 2008–09 DHS used 12 indicators to measure access, seven indicators cover access to emergency services and the remaining five cover elective surgery access. Figure 1A lists these indicators.

Figure 1A
2008–09 Access indicators

Access indicators	Benchmark
Emergency access indicators	
Operating time on hospital bypass (%)	3%
Triage category 1 (resuscitation) patients seen immediately (%)	100%
Triage category 2 (emergency) patients seen within 10 minutes (%)	80%
Triage category 3 (urgent) patients seen within 30 minutes (%)	75%
Emergency patients transferred to an inpatient bed within eight hours (%)	80%
Non-admitted emergency patients with a length of stay of less than four hours (%)	80%
Patients with a length of stay in the emergency department greater than 24 hours (number)	0

Figure 1A
2008–09 Access indicators – continued

Access indicators	Benchmark
Elective surgery access indicators	
Category 1 elective surgery patients admitted within 30 days (%)	100%
Category 2 elective surgery patients waiting less than 90 days (%)	Individual hospital improvement targets determined
Category 3 elective surgery patients waiting less than 365 days (%)	Individual hospital improvement targets determined
Patients on the elective surgery waiting list (number)	Individual hospital targets determined
Hospital initiated postponements (HIPs) per 100 waiting list scheduled admissions (number)	8

Source: *Public Health Services 2008–09 Statement of Priorities and Performance Framework Business Rules*, DHS.

DHS sets out this performance monitoring framework, and its indicators, in annual Statements of Priorities (SOP). The SOPs outline government and hospital policy priorities and expected performance levels. DHS then monitors and assesses the performance of a hospital, and its management, against the framework. The DHS performance monitoring framework also includes 11 service and 5 financial indicators that are outside the scope of the audit.

Many of these indicators contribute to statewide performance measures set for DHS in the State Budget and in DHS’s *Victorian Public Hospitals and Mental Health Services: Policy and Funding Guidelines*. These measures report on performance at the health system level and are a tool to judge the state’s performance against the departmental objective of timely and accessible human (health) services.

The access indicators also provide individual hospitals, and in aggregated format the overall health system, performance information to the public. DHS’s annual report and the publication, *Your Hospitals* are the main sources of this information.

Because the access indicators are used to assess hospital performance, allocate funds, and report to government and the public on this core component of hospital care, they need to be fit for purpose.

Access indicators need to be:

- **relevant** - linked logically to the objective of timely and accessible health services, and within control of the hospitals being held accountable
- **appropriate** - providing sufficient information to identify achievement against the objective
- **fairly representative** - results reported should be accurate so that they are reliable sources of information for decision making.

The objective of this audit was to determine whether reported access indicators, used by DHS, are relevant, appropriate and fairly represent hospital performance.

The audit examined four hospitals, DHS and Ambulance Victoria to determine whether the indicators:

- reflect the government objective of ‘timely and accessible human (health) services’
- clearly demonstrate performance in providing timely access to hospital care through:
 - the use of appropriate targets and benchmarks
 - transparent public reporting
- are consistently captured
- reported accurately.

1.2 Key findings

1.2.1 Fair representation of access performance

It was not possible to assure that reported performance against the majority of the access indicators fairly represented actual performance.

Emergency access indicators

The hospitals inconsistently interpreted reporting rules, data capture methods were susceptible to error, and the accuracy of some data was impossible to check. This means incorrect data can go undetected. In one hospital, data manipulation had occurred. This hospital has now acted appropriately to better assure accurate reporting.

Poor security of emergency department data, no computer audit logs and failure to audit the Victorian Emergency Minimum Dataset (VEMD), the DHS database used for emergency access indicator reporting, has contributed to this situation. DHS’s implementation of an audit program for the VEMD will help to address this.

Elective access indicators

The accuracy of these indicators is uncertain because of:

- limitations in the ability to audit them
- variability in how urgency categories are assigned
- evidence of some inappropriate recording of patients as ‘not ready for care’.

At the hospital using the *HealthSMART* patient manager tool, staff had trouble in reporting accurate elective surgery waiting list data to DHS. They were unable to extract an accurate report from the *HealthSMART* waiting list module for submission to the Elective Surgery Information System (ESIS). This raises doubt about the ability to obtain accurate elective surgery data as the system rolls out across the state.

1.2.2 Relevance of the access indicator suite

The majority of the access indicators used are relevant as they relate to timeliness of access to hospital care and hospitals are properly accountable for their performance.

Two indicators, however, are not considered relevant. These are:

- the percentage of time spent on bypass
- the total numbers of patients on the elective surgery waiting list.

Bypass occurs when an emergency department is full and the hospital calls for a period where ambulance patients are diverted elsewhere. When one hospital commences bypass the remaining hospitals experience increased ambulance arrivals. The increase can cause subsequent hospitals to call for bypass, creating a bypass cycle.

Bypass for this reason does not reflect hospital performance, but a failure of bypass as a method to manage ambulance arrivals. Performance against the indicator is, therefore, not always within the control of individual hospitals.

Hospitals also have limited control over the number of patients on their elective surgery waiting list. While they can manage patient removals, new registrations on the list represent public demand for elective surgery. While a useful indicator of demand, the indicator is not considered a relevant measure of timely access to hospital care.

It is not productive to devote time and resources to collect and report data for irrelevant indicators.

The access indicators also omit some key patient groups and aspects of timely access to care. These are the timeliness:

- with which a hospital emergency department accepts patients who have arrived by ambulance
- of access to emergency department care for triage category 4 and 5 patients
- of access to specialist outpatient appointments.

Reflecting these aspects of timely access to care within the performance monitoring framework will improve its balance, better reflecting access along a patient's journey through the hospital system.

1.2.3 Appropriateness of access performance reporting

DHS pioneered many of the access indicators and, in 2005, reviewed them. However, it could not provide evidence-based rationales for the selection of indicator targets and benchmarks measuring:

- time spent on bypass
- time taken until admission or discharge from the emergency department
- time spent waiting for elective surgery by urgency category
- the rate of HIPs of surgery.

Without evidence for the particular timelines, targets and benchmarks included in these indicators, it is impossible to make an informed appraisal of whether access to hospital services is good or bad. Given that reporting against access indicators involves significant resources and that performance is judged on them, targets and benchmarks warrant evidence-based rationales.

Open and transparent reporting is core to a fair assessment of performance. *Your Hospitals* reports the timeliness of access to elective surgery for the period, and over time, openly and transparently. However, the method chosen for presenting performance over time for emergency access indicators does not provide the reader with a clear view of performance trends. Instead, to obtain this information the readers must undertake their own calculations. Such calculations show declining performance for waiting times, for triage categories 2, 3 and 4 patients, since 2003–04, which is not clearly shown in the report.

Your Hospitals is also limited in that it excludes HIP rates and the indicator measuring waits of more than 24 hours in the emergency department. These indicators report against experiences the public can readily understand and are useful in presenting a comprehensive picture of health system performance.

1.3 Audit conclusions

Access indicators assist in assessing achievement against DHS's stated objective of timely and accessible human (health) services. Systemic problems with the access indicators, however, limit their usefulness. It is not possible to assure the accuracy of actual results reported by hospitals, and while most of the indicators are relevant, the appropriateness of some of the benchmarks and targets used need further justification.

Inability to provide assurance about the fair representation of access indicator performance stems from the lack of effective quality control regimes at the hospitals, and at DHS. Similarly, limitations to the relevance and appropriateness of aspects of the access indicators reflect the need for further research to validate indicators and greater transparency about how indicators are chosen, developed and reviewed.

Effort towards data quality and validation of indicators is disproportionately low in comparison to the resources and effort put into collecting and reporting access indicators, and to the importance placed on their results. These conditions have opened the way for inappropriate practices such as data manipulation, which undermine the integrity of hospital performance monitoring.

If access indicators are to play a key role in measuring hospital performance, then this situation needs attention to assure a reliable governance and accountability framework for public hospitals in Victoria. We acknowledge that measuring performance in an environment as complex as a hospital is challenging. However, reports of hospital performance against indicators that are meaningful to both hospital staff and the public, and where their levels of accuracy are transparent, are not only achievable, but warranted. Work begun by DHS, such as implementation of an audit program for emergency access data, will assist in meeting this challenge.

1.4 Recommendations

Fair representation of access performance

The Department of Human Services needs to:

- review and clarify definitions and rules for reporting of access indicator data (**Recommendation 6.1**)
- routinely audit both the Victorian Emergency Minimum Dataset (VEMD) and the Elective Surgery Information System (ESIS) for compliance with reporting rules and data accuracy (**Recommendation 6.2**)
- facilitate implementation of information technology systems that support simple, real-time data capture within hospital emergency departments (**Recommendation 6.3**)
- review the reporting capability of the iPM waiting list module and facilitate improvements as required (**Recommendation 6.4**).

Hospitals need to:

- improve security controls on computer systems used for recording VEMD data and utilise audit log systems (**Recommendation 6.5**)
- internally monitor compliance with policy regarding reporting of access indicators and provide appropriate instruction and training to staff submitting data (**Recommendation 6.6**)
- conduct internal audits of accuracy of VEMD and ESIS data (**Recommendation 6.7**).

Relevance of the access indicator suite

The Department of Human Services needs to:

- improve the measurement of access to emergency care by ambulance by:
 - implementing a 'destination decision support system' to manage ambulance arrivals thereby eliminating the need for bypass
 - addressing the need to measure hospital performance in both their ability to be available to ambulance arrivals, as well as the timeliness with which they accept patients arrived by ambulance (**Recommendation 4.1**)
- include indicators and targets for emergency patients in triage categories four and five, reflecting the Australasian College of Emergency Medicine's (ACEM) policy and National Health and Hospital Reform Commission (NHHRC) recommendation (**Recommendation 4.2**)
- continue to monitor total numbers of patients on the elective surgery waiting list as a measure of demand, but remove this indicator from the performance monitoring framework (**Recommendation 4.3**)
- address the need to measure hospital performance in providing access to specialist outpatient appointments (**Recommendation 4.4**).

Appropriateness of access performance reporting

The Department of Human Services needs to:

- review the use of improvement targets for elective surgery indicators and set specific action plans and timelines for when poor performing hospitals should achieve improved performance (**Recommendation 5.1**)
 - conduct research and analysis to determine evidence-based targets and benchmarks for access indicators (**Recommendation 5.2**)
 - present emergency access performance over time as the percentage of patients seen, admitted or discharged within time (**Recommendation 5.3**)
 - include performance against access indicators measuring the number of patients with emergency department stays of more than 24 hours and rates of HIPs of surgery in *Your Hospitals* (**Recommendation 5.4**).
-

2 Audit Act 1994 section 16 – submissions and comments

2.1 Introduction

In accordance with section 16(3) of the *Audit Act 1994* a copy of this report, or relevant extracts from the report, was provided to the Department of Human Services (DHS), Ambulance Victoria and the four audited hospitals with a request for comments or submissions.

The comments and submissions provided are not subject to audit nor the evidentiary standards required to reach an audit conclusion. Responsibility for the accuracy, fairness and balance of those comments rests solely with the agency head.

2.2 Submissions and comments received

RESPONSE by the Secretary, Department of Human Services

General

The measurement, monitoring and reporting of public hospital performance is a critical component of the DHS's governance and performance management frameworks. It ensures that organisations are accountable and that they perform efficiently and effectively.

Defining and measuring performance, in an environment as complex as a hospital, is challenging. The Department has a data quality plan to continually improve data. DHS agrees that there can be improvement to data collection systems and practices and intends to take further action to strengthen governance, definition guidelines and administrative and computer processes. Whilst further action is required DHS is satisfied that reported performance against key access indicators reasonably reflects actual performance.

The audit found that sometimes data was not entered in a timely way. While agreeing that this would be ideal, DHS understands that in an emergency department the critical clinical care needs of patients will sometimes mean that data entry is delayed.

RESPONSE by the Secretary, Department of Human Services – continued

Emergency department data

The audit also found that reporting rules were not consistently applied in regard to when treatment commences. DHS guidelines refer to 'time to treatment' as the difference between the patient's triage time, and the time that the patient was first treated by a clinician. There has been some variation in interpretation of 'time to treatment' between health services which centres around whether a patient's treatment starts when a doctor or nurse starts assessment, or when they commence a specific intervention, such as administering pharmaceuticals. DHS is working with health services to more tightly define time to treatment for the range of emergency department procedures.

The audit identified issues with transfer times to ward in one health service. An investigation of specific medical records is required to explain the audit's statistical finding. The health service is reviewing this finding and taking action to strengthen data management practices.

In summary DHS believes that more can be done to improve data consistency and accuracy in the emergency department but the very nature of critical emergency department care means sometimes data practices will not be ideal. DHS has a comprehensive data quality plan and a formal data audit is underway. The audit acknowledges that measuring performance in an environment as complex as a hospital is challenging, and while the audit could not formally assure data, DHS believes the issues identified do not materially impact on the published emergency key performance indicators.

Elective surgery data

The audit identified issues with elective surgery data at one health service after the implementation of the new HealthSMART patient and client management system. The audit found that this health service was unable to extract accurate elective surgery data and this may be a systemic problem with HealthSMART.

Issues with elective surgery data reporting at one health service do not indicate a systemic issue with the implementation of the new HealthSMART patient and client management system. The HealthSMART system is working successfully at four other sites and will be rolled out to others later this year. The Department is engaged with the Health Service involved to resolve the issue.

The audit highlighted concerns about variability in assigning patients to elective surgery categories. This allocation is undertaken by clinicians based on guidelines and clinical judgement. While DHS will continue to work with clinicians to ensure greater consistency of assignment there will always be an element of clinical judgement and differences between clinicians are to be expected.

RESPONSE by the Secretary, Department of Human Services – continued

Elective surgery data – continued

The audit has identified classification issues in regard to patients shown as not ready for care. Audit cites two examples where patients were in their view inappropriately classified. The first is where patients have requested a deferral of their procedure for personal reasons and the second is where there has not been contact with a patient for a period of time and the health service has contacted the patient to determine whether they want to proceed with surgery. DHS will further review health service compliance with classification guidelines.

DHS believes that the issues identified need to be addressed but do not materially impact on the published elective surgery key performance indicators.

Relevance and appropriateness of access indicators

The audit has examined the relevance of key performance indicators and the appropriateness of targets.

While generally supporting the indicator set, the report raises issues with some indicators and targets.

There is currently national work to develop an agreed set of key performance indicators. The audit recommendations will be considered as part of this process. Once national indicators are finalised, current reporting arrangements will be re-examined.

Recommendations

Recommendation 4.1 - improve the measurement of access to emergency care by ambulance by:

- implementing a 'destination decision support system' to manage ambulance arrivals thereby eliminating the need for bypass
- addressing the need to measure hospital performance in both their ability to be available to ambulance arrivals, as well as the timeliness with which they accept patients arrived by ambulance. .

There is currently national work to develop an agreed set of key performance indicators. This recommendation will be considered as part of this process.

Recommendation 4.2 - include indicators and targets for emergency patients in triage categories 4 and 5 reflecting the Australian College of Emergency Medicine's (ACEM) policy and National Health and Hospital Reform Commission (NHHRC) recommendation.

There is currently national work to develop an agreed set of key performance indicators. This recommendation will be considered as part of this process.

RESPONSE by the Secretary, Department of Human Services – continued

Recommendation 4.3 - continue to monitor total numbers of patients on the elective surgery waiting list as a measure of demand, but remove this indicator from the performance monitoring framework.

Not accepted.

The performance monitoring framework is a critical component of the health system governance framework, and includes a wide range of indicators that contribute to health system financial and service delivery performance. This includes the elective surgery waiting list indicator, which reflects the net impact of patient demand and system capacity, and supports the monitoring of other access performance indicators which measure time to treatment.

Recommendation 4.4 - address the need to measure hospital performance in providing access to specialist outpatient appointments.

There is currently national work to develop an agreed set of key performance indicators. This recommendation will be considered as part of this process.

Recommendation 5.1 - review the use of improvement targets for elective surgery indicators and set specific action plans and timelines for when poor performing hospitals should achieve improved performance.

Accepted.

As part of the performance monitoring framework the department regularly monitors health service performance. Health services that do not meet appropriate benchmarks or targets are subject to increased performance monitoring including independent review and a requirement for specific plans.

The process examines performance and the factors that may have led to a variation from the expected outcome. Specific and measurable targets for improvement are set as appropriate. This is a collaborative process, between DHS and individual health services. This may include agreeing an action plan such as an access improvement plan to address the causes of under-performance.

DHS will continue to review the appropriateness of improvement targets.

Recommendation 5.2 - conduct research and analysis to develop evidence based targets and benchmarks for access indicators.

Accepted.

DHS adopts nationally agreed indicators, benchmarks and targets where these exist. Where they do not exist, DHS uses indicators, targets and benchmarks to drive performance.

RESPONSE by the Secretary, Department of Human Services – continued

DHS will continue to strengthen the evidence base to inform decisions about the appropriate balance of resources, clinical risk and patient wellbeing when determining access indicators and targets. DHS does involve appropriately qualified clinicians in the establishment of measures and benchmarks. However, in the absence of definitive research anywhere in the world, challenging targets have been set and performance reported publicly for indicators that Victoria has implemented to improve patient access.

Recommendation 5.3 - present emergency access performance over time as the percentage of patients seen, admitted or discharged within time.

There is currently national work to develop an agreed set of key performance indicators. This recommendation will be considered as part of this process.

Recommendation 5.4 - include in Your Hospitals performance against access indicators measuring numbers of patients with emergency department stays of more than 24 hours, and rates of hospital initiated postponements of surgery.

There is currently national work to develop an agreed set of key performance indicators. This recommendation will be considered as part of this process.

Recommendation 6.1 - Review and clarify definitions and rules for reporting of access indicator data.

Accepted.

DHS continually reviews and clarifies definitions and rules for reporting of all data to emergency department and elective surgery datasets.

This is informed by formal reference groups comprising clinicians and health information managers.

Guidance is issued to health services to enhance the clarity of rules and definitions, a help desk supports hospitals in the interpretation and clarification of definitions and reporting rules, and a website is available to hospital staff containing comprehensive documentation.

Recommendation 6.2 - Routinely audit both the Victorian Emergency Minimum Dataset (VEMD) and the Elective Surgery Information System (ESIS) for compliance with reporting rules and data accuracy.

Accepted.

Data reported to DHS by health services is subject to rigorous input edit processes, requiring adherence to strict editing tolerances, correction and re-submission. Edits and tolerances are periodically reviewed to ensure their application adds value to the data.

By the end of 2009 all health services reporting emergency department data will have been subjected to a formal audit. This follows a pilot Victorian Emergency Minimum Dataset audit that was conducted in 2006–07 in four health services.

RESPONSE by the Secretary, Department of Human Services – continued

The department will undertake a formal audit of elective surgery data following the completion of the emergency department audit.

Recommendation 6.3 - Facilitate implementation of information technology systems that support simple, real-time data capture within hospital emergency departments.

Accepted.

Appropriate information technology systems for emergency departments will be considered as part of the new whole of health ICT strategy.

Recommendation 6.4 - Review the reporting capability of the iPM waiting list module and facilitate improvements as required.

Accepted.

Whilst DHS will review iPM reporting capability, the HealthSMART system is working successfully at four other sites. The Department is engaged with the Health Service identified by the audit to resolve the difficulties identified.

Recommendations 6.5–6.7: Hospitals need to:

Recommendation 6.5 - Improve security controls on computer systems used for recording VEMD data and utilise audit log systems.

Recommendation 6.6 - Internally monitor compliance with policy regarding reporting of access indicators and provide appropriate instruction and training to staff submitting data.

Recommendation 6.7 - Conduct internal audits of accuracy of VEMD and ESIS data.

Accepted.

DHS considers that these recommendations constitute good data management practice.

AUDITED HOSPITALS

RESPONSE by a Chief Executive Officer

In relation to the recommendations included in the Access to public hospitals: measuring performance report, I can confirm that our health service has systems in place, in response to your preliminary findings of November 2008.

We formally responded on 12 December 2008, with the actions contained in that response being consistent with recommendations 6.5, 6.6 and 6.7 made to the hospital in the report. We are continuing to monitor progress against these recommendations.

I would like it noted, that the hospital gained no financial advantage from the discrepancy of data that is given prominence in the report. Urgent action was taken to address the issue when it was discovered.

RESPONSE by a Chief Executive Officer

I refer to your report and offer the following comments:

- *Our health service in principal supports most of the recommendations however; significant investment in resources would be required to implement the recommendations.*
- *Recommendation 6.5 – we are currently implementing a new Emergency Patient Management System which will improve security controls and utilise audit log systems. This computer system implementation is not part of the HealthSMART strategy and has been funded internally.*
- *Recommendation 6.7 – we currently undertake internal audits to ensure accuracy of VEMD and ESIS data. In particular, we recognise the short comings of the ESIS data extraction process and have written an edit checker. It should be noted that this functionality will be lost with the HealthSMART waiting list module scheduled for implementation in November 2009. This current edit checker ensures that accurate data is sent to DHS. As such I fully support recommendation 6.4 – review the reporting capability of the iPM waiting list module and facilitate improvements as required.*

There is also mention of hospitals inappropriate recording of 'not ready for care' status and examples given (Figure 6F). The policy suggests that the patient's treating surgeon or the referring physician or the general practitioner be consulted for contact details. Our health service complies with this process. According to the policy the patient should then be removed from the waiting list. Our health service however has gone a step further for the patient and rather than removing the patient has made them not ready for care whilst a letter is sent to the last known mailing address. As such I do not consider this to be a breach with the policy.

3 Background

3.1 Background

3.1.1 Measuring access to hospital care

Access, like safety and quality, is a fundamental aspect of health service provision. Access refers to how easily the public can obtain health services. This includes how equitable the distribution of health services are across the community and the time it takes to receive health care. This report focuses specifically on the performance of public hospitals in providing timely access to care.

Timely access to care is important. For patients requiring emergency care, as well as those waiting for elective surgery, the time taken to receive services can significantly affect clinical outcomes. Measuring the timeliness of access to hospital care is key to understanding health system and individual hospital performance, and serves a number of purposes, including:

- demonstrating agreed timeliness of care standards are met
- identifying areas where access may not be timely and driving targeted improvement.

Performance indicators are used to measure the timeliness of access to hospital care. Good indicators assist understanding of system performance, allow comparison over time and between systems, and can drive improvement. Poor indicators, for example where the indicator does not actually measure what it claims to, will fail to provide meaningful information. Good indicators should be:

- relevant—linked to an objective in a logical and consistent way
- appropriate—give sufficient information to demonstrate the extent to which the objective is met
- fairly representative:
 - capable of measurement
 - represent consistently what they purport to indicate
 - accurate.

3.1.2 Access objectives and indicators

The Australian Government, through the *Australian Healthcare Agreement (AHA)*, requires the Victorian Government to provide hospital services based on clinical need within a clinically appropriate period.

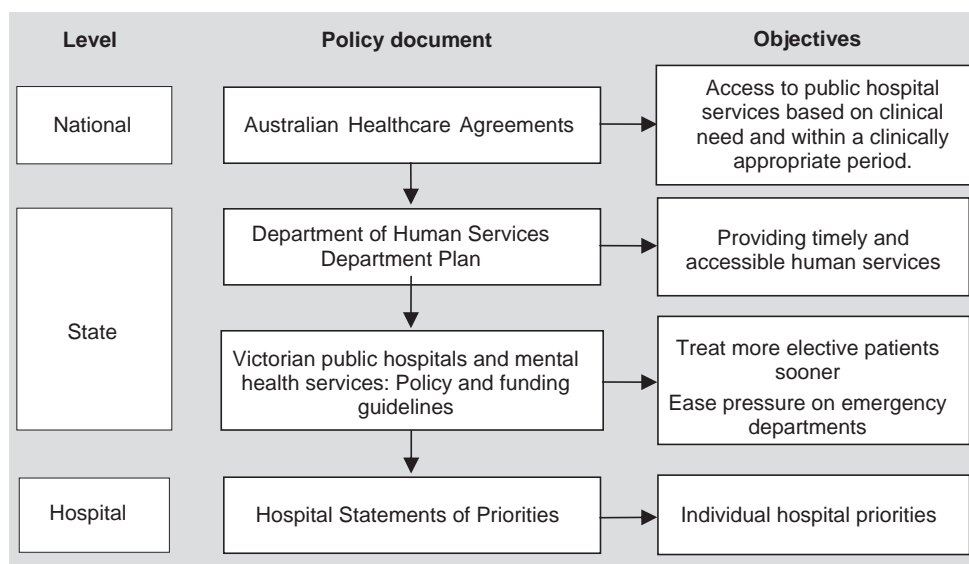
At the state level, the Department of Human Services' (DHS) *Departmental Plan 2008–09* sets the objectives, intended outcomes and priorities for the year. Providing 'timely and accessible human (health) services' is a key objective, linked to the following outcomes:

- reduced time to treatment in health services
- meeting elective surgery demand pressures.

To measure achievement against DHS objectives, statewide performance measures are included within *Budget Paper 3* and DHS's *Victorian Public Hospitals and Mental Health Services: Policy and Funding Guidelines*. These measures report on performance at the health system level and provide a tool to judge DHS, and subsequently government performance.

To measure performance at the individual hospital level, DHS uses a performance monitoring framework that includes 12 access indicators, 11 service indicators and 5 financial indicators. Metropolitan and major regional public hospitals report against these indicators, and many of these indicators contribute to reporting against the statewide performance measures. This performance monitoring framework is set out in annual *Statements of Priorities* (SOP). The SOP outline government and hospital policy priorities and expected performance levels. Figure 3A shows this hierarchy of policies and objectives.

Figure 3A
Health service policy objectives



Source: Victorian Auditor-General's Office.

In the 2008–09 *Statements of Priorities*, the 12 indicators measuring access consist of seven indicators measuring access to emergency services and five measuring access to elective surgery. For each access indicator a benchmark is set, describing the expected level of performance. Figure 3B shows statewide performance measures, hospital access indicators, and their respective benchmarks.

Figure 3B
2008–09 Access indicators

Aspect of access	Hospital access indicators	Statewide indicators	Hospital benchmarks	Statewide benchmarks
Access to emergency care by ambulance	Operating time on hospital bypass (%)			3%
Access to care in the emergency department	Triage category 1 (resuscitation) patients seen immediately (%)			100%
	Triage category 2 (emergency) patients seen within 10 minutes (%)			80%
	Triage category 3 (urgent) patients seen within 30 minutes (%)			75%
Access to admission or discharge from the emergency department	Emergency patients transferred to an inpatient bed within eight hours (%)			80%
	Non-admitted emergency patients with a length of stay of less than four hours (%)			80%
Access to elective surgery	Patients with a length of stay in the emergency department greater than 24 hours (number)	Not included	0	Not included
	Category 1 elective surgery patients admitted within 30 days (%)		Individual hospital improvement targets determined	100%
	Category 2 elective surgery patients waiting less than 90 days (%)	Category 2 elective surgery patients admitted within 90 days (%)		80%
	Category 3 elective surgery patients waiting less than 365 days (%)	Category 3 elective surgery patients admitted within 365 days (%)		90%
	Patients on the elective surgery waiting list (number)	Not included	Individual hospital targets determined	Not included
	Hospital initiated postponements (HIPs) per 100 waiting list scheduled admissions (number)	Not included	8	Not included

Source: Victorian Auditor-General's Office compiled from DHS's 2008–09 Victorian Public Health Services Performance and Accountability Framework Business Rules and Public Health Services 2008–09 Statement of Priorities and Performance Framework Business Rules.

3.1.3 Data for reporting access indicators

Hospitals and DHS both have responsibilities for the quality of data collected for access indicator reporting. Hospitals are responsible for collecting accurate data within local computer systems and submitting this information to DHS. DHS is responsible for the reporting rules, submission systems and databases that store data used for access indicator reporting. The two databases used in access indicator reporting are:

- the Victorian Emergency Minimum Dataset (VEMD), used to collect data on emergency department presentations
- the Elective Surgery Information System (ESIS), used to collect elective surgery waiting list information.

3.1.4 Assessing and rewarding performance

Both statewide and individual hospital performance is assessed using access indicators.

DHS assesses hospital performance against the access indicators quarterly using the performance monitoring framework. Relative performance against the indicator benchmark determines the score achieved. Figure 3C shows an example of this. The higher the score achieved, the better the performance.

Figure 3C
Example of performance monitoring framework scoring

Indicator	Threshold	Points attributed
Emergency patients transferred to an inpatient bed within eight hours (5)	80% or more	3
	75–79%	2
	65–74%	1
	0–64%	0

Source: Public Health Services. *The 2008–09 Statement of Priorities and Performance Framework Business Rules* DHS.

Performance against access indicators contributes 50 per cent to an overall score. Performance against 16 other indicators measuring financial, quality and service provision performance, determines the other 50 per cent. The overall score determines the monitoring level that DHS will apply to the hospital. There are three levels of monitoring:

- Standard monitoring (70–100 points), which is the least intrusive level of monitoring with quarterly meetings held between DHS and the hospital to discuss performance
- Performance watch (50–69 points), where the scope of monitoring is increased and DHS hold performance meetings with the hospital once or twice a month
- Intensive monitoring (0–49 points), where the scope and frequency of monitoring is intensified and hospitals provide detailed information to DHS, such as an access improvement plan.

A bonus funding framework is also applied to performance against the access indicators. In 2008–09, the pool includes \$20.53 million allocated to metropolitan hospitals, and \$5.18 million for rural hospitals. This is a modest amount when compared with the acute health system allocation of more than \$7 billion in the 2008–09 budget.

Bonus funding points are awarded to the extent each access indicator benchmark has been reached. A dollar value is calculated for each bonus point and hospitals receive bonus funds according to the total number of points achieved for the quarter. The bonus funding framework provides an incentive to meet the performance benchmarks for access and reward improvement.

3.1.5 Public reporting of access indicators

Another key function of the access indicator suite is to inform the public about hospital performance. As users of public hospital services, the public is interested in, and entitled to, information about the ability of hospitals to provide access to emergency and elective surgery services.

Twice a year, DHS publicly report performance against a range of access indicators in *Your Hospitals*. The publication provides information on the provision of emergency, elective and other health services.

Specifications of Your Hospitals Reported Data accompanies *Your Hospitals*, providing detail on indicator definitions and calculation methods.

DHS also provides performance information through the *Your Hospitals* website <[http: www.health.vic.gov.au/yourhospitals/](http://www.health.vic.gov.au/yourhospitals/)>.

3.2 Audit approach and purpose

3.2.1 Audit objective and criteria

The audit objective was to determine whether reported access indicators are relevant, appropriate and fairly represent hospital performance. To achieve this objective the audit examined whether access indicators:

- reflect the government objective of ‘timely and accessible health services’
- clearly demonstrate performance in providing timely access to hospital care through the use of appropriate targets and benchmarks and transparent public reporting
- are consistently captured, and
- reported accurately.

3.2.2 Audit scope

The audit examined those indicators identified as access indicators within the DHS 2008–09 *Statements of Priorities* and the public reporting of performance against these indicators. As such, areas examined are timeliness of access to:

- emergency care by ambulance
- care in the emergency department
- admission or discharge from the emergency department
- elective surgery.

Agencies included in conduct of the audit were:

- The Department of Human Services:
 - Funding, health and information policy branch
 - Access and metropolitan performance branch
- a metropolitan tertiary hospital
- a metropolitan specialist hospital
- a metropolitan secondary hospital
- a large regional hospital
- Ambulance Victoria

The audit was performed in accordance with Australian standards applicable to performance audits, and included tests and procedures sufficient to enable audit conclusions to be reached. The total cost was \$335 000. This cost includes staff time, overheads and printing. Further information on the method of medical record audit is detailed in Appendices B and C of this report.

4 Relevance of access indicators

At a glance

To assess relevance, we examined whether the access indicators:

- have a logical relationship to the objective of timely access to health services
- are within the control of the hospitals whose performance is assessed by them
- produce inappropriate outcomes.

Overall, the access indicators assist in assessing achievement against the objective. However, the indicator set could provide a more complete and balanced view of performance in providing timely access to hospital services.

Indicators measuring the percentage of time spent on bypass, and the number of patients on the elective surgery waiting list, are not considered relevant. Important aspects of hospital care are also not measured by the current access indicators. Areas excluded include the timeliness:

- with which an emergency department accepts patients arrived by ambulance
- of access to emergency department care for triage category four and five patients
- of access to a specialist outpatient appointment.

To address these findings we recommend that the Department of Human Services:

- improve the measurement of access to emergency care by ambulance by:
 - implementing a 'destination decision support system' to manage ambulance arrivals thereby eliminating the need for bypass
 - addressing the need to measure hospital performance in both their ability to be available to ambulance arrivals, as well as the timeliness with which they accept patients arrived by ambulance (**Recommendation 4.1**)
- include indicators and targets for emergency patients in triage categories four and five to reflect Australasian College of Emergency Medicine (ACEM) policy and National Health and Hospitals Reform Commission (NHHRC) recommendation (**Recommendation 4.2**)
- continue to monitor total numbers of patients on the elective surgery waiting list as a measure of demand, but remove this indicator from the performance monitoring framework (**Recommendation 4.3**)
- address the need to measure hospital performance in providing access to specialist outpatient appointments (**Recommendation 4.4**).

4.1 Introduction

The purpose of the access indicators is to measure performance against the government objective of 'timely and accessible health services'. To achieve this purpose the indicators used must be relevant to this objective.

Indicators are relevant when:

- they have a logical relationship to their objectives, e.g., that they do measure the timeliness of access to health services
- the agency whose performance is assessed against the indicators is properly accountable for its achievement, i.e., performance against the indicator is within the control of the hospital
- the indicators do not produce inappropriate outcomes, e.g., they do not create perverse incentives.

4.2 Emergency access indicators

We examined the emergency access indicators for these features of relevance in relation to indicators measuring access to:

- emergency care by ambulance
- care within the emergency department
- admission or discharge from the emergency department.

4.2.1 Access to emergency care by ambulance

Ambulances are a vital element in the health system's ability to provide emergency care, often transporting the sickest patients to emergency departments. The ability of patients, transported by ambulance, to access the most appropriate hospital quickly can be a matter of life or death.

Delays in access can occur when a hospital is on bypass. An episode of bypass is a period of no more than two hours, where the ambulance service diverts patients who are not time-critical away from a hospital. A hospital calls for bypass when its emergency department is full and arrival of more patients could compromise patient safety. Only non-specialist, metropolitan hospitals may use bypass.

The indicator used to measure the time hospitals spend on bypass is 'the percentage of total operating time a hospital is on bypass'.

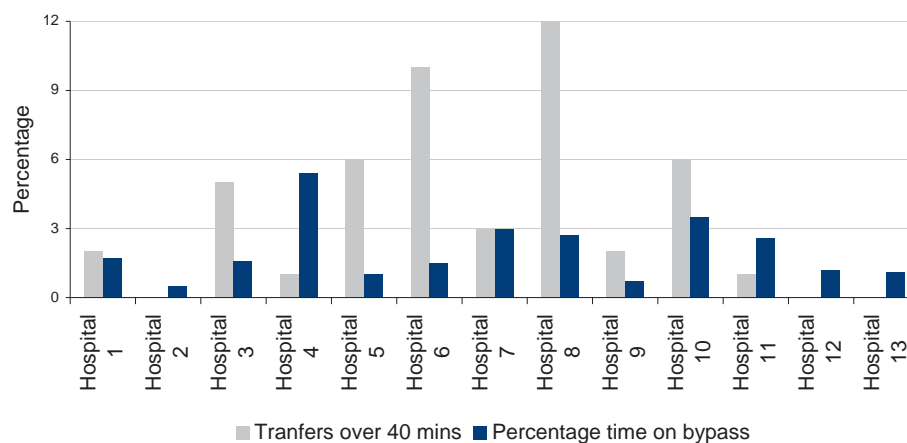
Relationship to the objective

Ambulance diversions caused by hospital bypass, increase transport time for a patient. Measuring the percentage of time on bypass identifies how frequently hospitals cause such delays, therefore, the indicator provides a proxy measure in relation to the objective of timely and accessible health services. However, the bypass indicator does not capture the time a hospital emergency department may take to accept a patient once they have arrived by ambulance. This means the indicator does not fully represent hospital performance in providing timely access to care for patients who have arrived by ambulance.

Good performance against the bypass indicator implies that ambulance patients are receiving timely access to care. However, the limitations of the indicator mean that this is not always the case.

Figure 4A suggests this, showing that good performance against the bypass indicator does not necessarily mean good transfer times from the ambulance to the emergency department. Hospitals 3, 5, 6, and 8 have good performance against the bypass indicator target of 3 per cent, but high percentages for cases that the ambulance service have recorded as taking more than 40 minutes from arrival to completion of transfer of care.

Figure 4A
Bypass performance against percentage of ambulance transfers over 40 minutes, January–June 2008



Note: Data of 'transfers over 40 minutes' was collected for operational purposes by Ambulance Victoria. It includes time taken by paramedics to complete transfer paperwork, as well as hospital time to accept patients, and so is not a direct measure of hospital performance.

Source: Ambulance Victoria and DHS's *Your Hospitals July 2007 to June 2008*.

Delays shown in Figure 4A can negatively affect patient outcomes and prevent ambulances from attending their next call. Currently, hospital performance in this component of access is not measured. This means the timeliness with which hospitals accept ambulance patients is unknown.

Hospital accountability for performance

Hospitals use bypass to manage demand on emergency departments. However, bypass itself can lead to increased pressure on emergency department capacity. When a hospital uses bypass, one less hospital is available for the delivery of patients by ambulances. The increased ambulance arrivals to the remaining hospitals may cause another to commence bypass and this process can continue. Time hospitals spend on bypass due to this ‘knock on’ effect reflects a failure of bypass to manage ambulance arrivals effectively, rather than hospital performance. Individual hospitals, therefore, cannot entirely control their performance against this indicator.

Creating inappropriate outcomes

By measuring the time hospitals spend on bypass and not measuring the time hospital emergency departments take to accept patients who have arrived by ambulance, the potential for an inappropriate outcome is created. Hospitals may, to meet the 3 per cent target, avoid calling for bypass despite need, resulting in ambulances waiting at the door. Anecdotally this is reported to occur.

Improving the measurement of access by ambulance

Ambulance Victoria and the hospitals audited that are allowed to use bypass acknowledged the problems with bypass and its indicator. This was also reflected in the findings of a 2008 DHS-commissioned study, *Managing Ambulance Arrivals at the Emergency Department*. To overcome these limitations, DHS is considering the following recommendations from the study:

- management of ambulance arrivals through an information technology and decision support system using real-time information of emergency department capacity and ambulance arrivals, eliminating the need for bypass
- the development of an access indicator measuring time between ambulance arrival and completion of the transfer of patient care to the emergency department.

Implementation of these recommendations would allow the development of an indicator, or indicators, that provide a complete picture of hospital performance in providing access to ambulance delivered patients.

4.2.2 Access to care in the emergency department

The Australasian College of Emergency Medicine’s (ACEM) Australasian Triage Scale guides the DHS indicators measuring access to care in the emergency department:

- the percentage of triage category 1 (resuscitation) patients seen immediately (within 60 seconds)
- the percentage of triage category 2 (emergency) patients seen within 10 minutes
- the percentage of triage category 3 (urgent) patients seen within 30 minutes
- the percentage of triage category 4 (semi-urgent) patients seen within one hour
- the percentage of triage category 5 (non-urgent) patients seen within two hours.

ACEM acknowledges that delays to assessment and treatment beyond the time limits given in the triage scale can affect patient outcomes. The time it takes to be seen in an emergency department is therefore an essential measure of access to care.

Relationship to the objective

Measuring the time taken for a patient to receive care in a hospital emergency department directly relates to the objective of timely access to health services. However, within the access indicator suite, only indicators and benchmarks for category 1 to 3 patients are included. Public reports include the statewide percentage of category 4 and 5 patients treated within desired time frames, but these indicators are not included in the *Statement of Priorities* and do not determine levels of performance monitoring or bonus funding.

While category 4 and 5 patients are less urgent, and some may be appropriate for diversion to primary care services, those patients who choose to wait for emergency department care should receive an appropriate standard of service. In 2007–08, patients in categories 4 and 5 made up more than half of all emergency department presentations. The current indicators included in the access indicator suite, therefore, do not represent the timeliness of access for the majority of patients limiting relevance to the objective.

In 2008, the National Health and Hospital Reform Commission (NHHRC) acknowledged the relevance of indicators for category 4 and 5 patients by including indicators and targets for these patients in performance benchmarks developed to inform the framework of future Australian Healthcare Agreements. Specific indicators and targets for these categories would also provide hospitals with incentives to provide timely care to these patients. Including indicators for category 4 and 5 patients within the Victorian access indicator suite would present a complete picture of access to emergency departments.

Hospital accountability for performance

A hospital's efficiency in discharging and admitting patients from the emergency department determines performance against the indicators measuring timeliness of access to emergency department care. When delays are experienced in admitting patients to inpatient beds, or in discharging patients, the emergency department may become 'blocked'. This can prolong the time to care for patients in the emergency department waiting room.

Hospitals can control the timeliness of access for patients awaiting emergency department care, for example, through admission planning, inpatient bed management systems, and emergency department models of care. Hospitals are therefore properly accountable for performance against the indicators measuring the percentage of patients seen in the given waiting times.

4.2.3 Access to admission or discharge from the emergency department

Emergency department patients experience variable lengths of stay. Patients not requiring admission remain in the emergency department until their assessment, any investigations, and management is completed. For patients requiring admission they may wait in the emergency department until an inpatient bed becomes available.

These indicators measure the timeliness of patient admission or discharge from the emergency department:

- the percentage of emergency patients transferred to an inpatient bed within eight hours
- the number of patients with a length of stay in the emergency department greater than 24 hours
- the percentage of non-admitted emergency patients with a length of stay of less than four hours.

Relevance to the objective

The role of emergency departments is to manage acutely unwell patients for short periods only. Physical conditions such as trolleys, lighting and limited privacy, are not appropriate for prolonged lengths of stay. For patients requiring an inpatient bed, extended time in the emergency department is associated with increased risk of poorer clinical outcomes. Measuring the time spent in emergency departments waiting for an inpatient bed, or for completion of care and discharge, is therefore relevant to the objective of timely access to health services.

Hospital accountability for performance

For patients requiring admission, 'access block' commonly causes prolonged stays in emergency departments. Access block prevents timely patient transfer from the emergency department because of lack of an available inpatient bed. Hospitals can control access block through careful monitoring and management of patient admissions, bed usage, discharges and overall patient flow. As such, hospitals are properly accountable for performance against the indicators measuring the percentage of patients admitted within eight hours, and the number of patients staying in the emergency department for longer than 24 hours.

For patients discharged from the emergency department, the efficiency of emergency department processes and services providing investigations, such as radiology and pathology, determines their length of stay. Hospitals can control performance of the indicator measuring the percentage of non-admitted patients discharged in less than four hours, for example, through models of care and management processes.

4.3 Elective access indicators

Elective surgery patients require treatment within a reasonable time frame to alleviate their condition, prevent further deterioration and maintain or improve quality of life. The indicators used to measure access to elective surgery are:

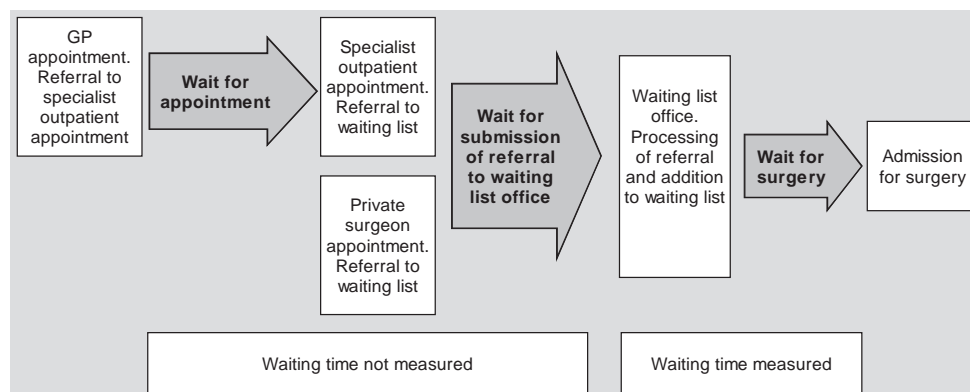
- the percentage of category 1 (urgent) patients admitted within 30 days
- the percentage of category 2 (semi-urgent) patients waiting less than 90 days
- the percentage of category 3 (non-urgent) patients waiting less than 365 days
- the number of patients on the elective surgery waiting list
- the number of hospital initiated postponements (HIPs) of surgery per 100 waiting list scheduled admissions.

Relationship to the objective

Measuring the percentage of patients treated within, or waiting less than, the recommended time is meaningful as it acknowledges the deterioration or discomfort patients may experience if waiting an unreasonable time for surgery. As such, these indicators relate to the objective of timely access to health services.

However, patients wait longer for elective surgery than the time frames reflected in the elective access indicators. In accordance with national reporting rules, waiting time is measured from the date the patient is registered on the waiting list. This excludes time spent waiting for a specialist outpatient appointment, the source of the surgery referral, and the time the surgeon may take to forward on the referral. Figure 4B demonstrates this. Reported performance of access does not represent the actual waiting experience of many patients.

Figure 4B
Patient waiting experience for elective surgery



Source: Victorian Auditor-General's Office.

Specialist outpatient clinics represent a significant proportion of public hospital service provision. For patients requiring elective surgery, access to these clinics is an important step in accessing surgery. While DHS monitors the number of patients treated in specialist outpatient clinics, measures of access to these clinics are not included in the hospital *Statement of Priorities*. Timeliness of access to specialist outpatient services is therefore unknown meaning that current indicators provide only a partial measure against the objective.

Patients should also not experience unreasonable inconvenience due to cancellations of surgery. Measuring the rate of HIPs of surgery indicates how often patients experience such inconvenience. Therefore, this indicator does relate to the objective of timely access to health services.

In contrast, the total numbers of patients listed as waiting for elective surgery do not measure access. In their report *Elective Surgery in Australia*, the Australian Institute of Health and Welfare (AIHW) note the movement away from using waiting lists to judge access to elective surgery because the 'length of waiting lists was not necessarily related to how long people waited for their elective surgery'. Rather, waiting list numbers reflect public demand for services. Management staff at the audited hospitals frequently expressed this issue and DHS acknowledged that waiting list numbers are not a statewide performance measure for this reason.

It is important to monitor and report on waiting list numbers as a measure of demand; however, the total numbers of waiting patients do not provide information about the objective of timely access to health services.

Hospital accountability for performance

The ability of a hospital to plan admissions, manage theatre resources and monitor waiting patients determines its ability to provide elective surgery to patients within prescribed time frames. Hospitals are therefore properly accountable for their performance against the indicators that measure waiting time to surgery.

Hospitals can also minimise HIPs by balancing demand for elective and emergency services and planning elective admissions in response. Hospitals are therefore also properly accountable for their HIPs rates.

However, while hospital's can control the number of patients removed from their waiting list, they cannot prevent new patients registering for surgery. For this reason, hospitals are not entirely accountable for performance against the indicator measuring the total number of patients waiting for surgery.

Creating inappropriate outcomes

The indicator measuring the total number of patients on the waiting list also creates potential for an inappropriate outcome. Where waiting list numbers are measured and access to specialist outpatient appointments is not, hospitals may be encouraged to limit access to outpatient clinics to reduce the number of new patients registered on the waiting list and meet the set target. Measuring access to specialist outpatient appointments would likely identify this and may mitigate the likelihood of its occurrence.

4.4 Conclusion

The majority of the access indicators used are relevant - they relate to the objective of timely access to health services and hospitals are properly accountable for performance against the indicator.

Two indicators, however, are not considered relevant. Those indicators are:

- percentage of time spent on bypass - as hospitals are not solely accountable for performance
- total numbers of patients on the elective surgery waiting list - as this is a measure of demand, not access.

Devoting time and resources to the collection and reporting of data on indicators that are not relevant is not productive.

The access indicators also miss out some key patient groups and aspects of 'timely access to health services'. These are the timeliness:

- with which a hospital emergency department accepts patients arrived by ambulance
- of access to emergency department care for triage category 4 and 5 patients
- of access to a specialist outpatient appointment.

Measuring hospital performance in these aspects of 'timely access to health services' will result in a more balanced performance monitoring framework that better reflects access along a patient's journey through the hospital system and assists in limiting the potential for inappropriate outcomes.

Recommendations

The Department of Human Services needs to:

4.1 improve the measurement of access to emergency care by ambulance by:

- implementing a 'destination decision support system' to manage ambulance arrivals thereby eliminating the need for bypass
- addressing the need to measure hospital performance in both their ability to be available to ambulance arrivals, as well as the timeliness with which they accept patients arrived by ambulance

- 4.2 include indicators and targets for emergency patients in triage categories four and five, reflecting the Australasian College of Emergency Medicine's (ACEM) policy and National Health and Hospital Reform Commission (NHHRC) recommendation
 - 4.3 continue to monitor total numbers of patients on the elective surgery waiting list as a measure of demand, but remove this indicator from the performance monitoring framework
 - 4.4 address the need to measure hospital performance in providing access to specialist outpatient appointments.
-

5 Appropriateness of access indicators and public reports

At a glance

To truly represent what good performance is, and to provide motivation for improvement, access indicator targets and benchmarks should be realistic and based on reliable evidence. However, we identified limitations in the choice and application of access indicator targets and benchmarks:

- evidence could not be provided to support targets and benchmarks for many indicators
- individual hospital targets, set for the percentage of category 2 and 3 elective surgery patients waiting less than 90 or 365 days respectively, are not achieving equity of access across hospitals.

It is also important that the timeliness of access to public hospital services is reported appropriately, with sufficient transparency and information for readers to make an informed assessment of performance.

While the Department of Human Services' (DHS) publication *Your Hospitals* clearly presents performance for the reporting period, transparency of reporting for some indicators is limited, impacting on overall accountability. Information is not always clearly represented, increasing the likelihood of data being misconstrued, while some key access information is not included.

We therefore recommend that DHS:

- review the use of improvement targets for elective surgery indicators and set specific action plans and timelines for when poor performing hospitals should achieve improved performance (**Recommendation 5.1**)
- conduct research and analysis to develop evidence-based targets and benchmarks for access indicators (**Recommendation 5.2**)
- present emergency access performance over time as the percentage of patients seen, admitted or discharged within time (**Recommendation 5.3**)
- include in *Your Hospitals* performance against access indicators measuring numbers of patients with emergency department stays of more than 24 hours and rates of hospital initiated postponements of surgery (**Recommendation 5.4**).

5.1 Introduction

Indicators describe how a system is performing - whether there is improvement or decline, and if standards are met. This is achieved by showing whether a target or benchmark is met and sharing this information with those with an interest in the system's performance, the government, health services, and the public.

To describe performance in a meaningful way, targets and benchmarks included within indicators should be appropriate. They should set realistic goals so there is motivation for improvement, and be evidence-based, showing that the target or benchmark represents reasonable expectations.

Public reporting of performance against indicators, their targets, and benchmarks allows users to understand the health care system and to assess levels of achievement. Accurate assessment relies on comprehensive, transparent and timely presentation of information.

In Victoria, DHS publishes performance against access indicators and their targets and benchmarks, in the *Your Hospitals* report. *Your Hospitals* contains text-based analysis of statistical data accompanied by charts and case studies. Individual reports for the state's 29 major hospitals are included as an appendix to the report.

In assessing whether access indicators are appropriate, we considered:

- how targets and benchmarks are set for the access indicators
- the presentation of performance against the indicators in *Your Hospitals*.

5.2 Appropriateness of targets and benchmarks

Each of the access indicators includes a target and/or a benchmark. It is important in setting targets and benchmarks that they are challenging yet achievable. Unrealistic targets or benchmarks make an indicator meaningless to those trying to achieve it. Figure 5A outlines how the targets and benchmarks included within the access indicators were determined.

Figure 5A
Basis of access indicator targets and benchmarks

Access indicator	Method for target/benchmark setting
Emergency access indicators	
Operating time on hospital bypass (%)	Benchmark of 3% set by DHS
Triage category 1 emergency patients seen immediately (%)	Time limit and benchmark of 100% based on the Australasian Triage Scale
Triage category 2 emergency patients seen within 10 minutes (%)	Time limit and benchmark of 80% based on the Australasian Triage Scale
Triage category 3 emergency patients seen within 30 minutes (%)	Time limit and benchmark of 75% based on the Australasian Triage Scale
Non-admitted emergency patients with a length of stay of less than four hours (%)	Limit of four hours adopted by DHS from the National Health Service, United Kingdom. Benchmark of 80% determined by DHS
Emergency patients transferred to an inpatient bed within eight hours (%)	Limit of eight hours and benchmark of 80% determined by DHS
Patients with a length of stay in the emergency department greater than 24 hours (number)	Limit of 24 hours and benchmark of 0 determined by DHS
Elective access indicators	
Category 1 patients admitted within 30 days (%)	Limit of 30 days determined by DHS and adopted nationally, benchmark of 100% set by DHS
Category 2 patients waiting less than 90 days (%)	Limit of 90 days determined by DHS and adopted nationally, hospital improvement targets set by DHS
Category 3 patients waiting less than 365 days (%)	Limit of 365 days and hospital improvement targets set by DHS
Patients on the waiting list (number)	Individual hospital targets determined by DHS
Hospital initiated postponements (HIP) per 100 waiting list scheduled admissions (number)	Benchmark of eight set by DHS

Source: Victorian Auditor-General's Office.

For indicators measuring time to emergency department care, the target time frames and benchmarks are consistent with national reporting frameworks and based on work by the Australasian College of Emergency Medicine (ACEM). The ACEM triage policy states that the indicators are appropriate for the period 1998–2002 and must be kept 'under regular review'. The policy was last reviewed in 2006 and the indicators upheld. Among the hospitals audited the targets and benchmarks for these emergency access indicators were considered by management and clinical staff interviewed to be relevant and clinically appropriate.

Urgency categories and associated time limits used in the indicators measuring waiting time for elective surgery were developed by DHS in 1991 through an expert advisory committee and then adopted for national use by the National Health Data Committee in 1997. Management staff at the audited hospitals questioned the appropriateness of these indicators in regard to the significant variation in urgency of patients within categories and the complexity created as the indicators effectively require management of three separate waiting lists.

For indicators measuring time spent on bypass, time to admission or discharge from the emergency department, and rate of HIPs, both management and clinical staff interviewed at the four audited hospitals were unaware of how the targets and benchmarks were determined. A commonly held view was that targets and benchmarks for these indicators were arbitrarily decided.

Excluding the indicators developed and reviewed by the ACEM, DHS were unable to provide evidence, e.g., data analysis or research, to support the appropriateness of applying the other indicator targets and benchmarks to Victorian public hospitals. While DHS undertook a consultative review of the access indicator suite in 2005, it was unable to provide any documentation of the discussion or findings of the review to the audit. Without evidence-based rationales for targets and benchmarks included in indicators they appear arbitrary and say little about performance. It is unclear, for example, if 80 per cent of emergency patients admitted within eight hours really does represent good performance. It is therefore only possible to assess good performance in a relative sense, not in absolute terms.

For indicators measuring access for category 2 and 3 elective surgery patients, DHS set individual improvement targets for hospitals. The intent of these individual targets is to:

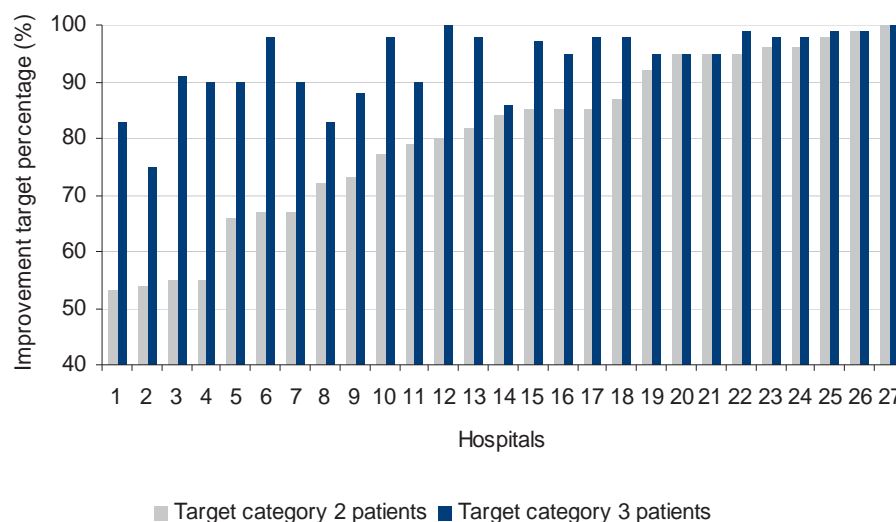
- maintain hospital motivation for improvement by setting achievable goals
- bring all hospitals to a high level of performance over time.

DHS base these targets on a hospital's:

- historical activity levels and performance
- available funding
- forecast activity
- factors such as improvements in surgery facilities.

Figure 5B illustrates the various targets set for each hospital reporting against these indicators in 2008–09.

Figure 5B
Hospital improvement targets 2008–09



Source: Victorian Auditor-General's Office, based on DHS's 2008–09 hospital *Statements of Priorities*.

Figure 5B shows the extent to which hospital targets vary, from 53 to 100 per cent of category 2 patients treated within time and 75 to 100 per cent of category 3 patients. This is in contrast to the indicator measuring HIP rates and all emergency access indicators, where the same performance standard is expected of all hospitals. While there is merit in setting individual, achievable targets, from a patient perspective it may seem that poorer access performance is acceptable at one hospital in comparison to another.

If individual targets are to be set they need to drive improvement. Sixteen of the 26 hospitals reporting the percentage of category 2 patients admitted within 90 days did not meet the 80 per cent statewide benchmark in the January to June 2008 period. Fourteen of these hospitals showed poorer performance in 2008 than in 2004. Figure 5C illustrates this, showing performance for the five hospitals with the worst access for category 2 patients in the state. All these hospitals show poorer performance now than in 2004.

Figure 5C
Percentage of category 2 patients admitted within 90 days

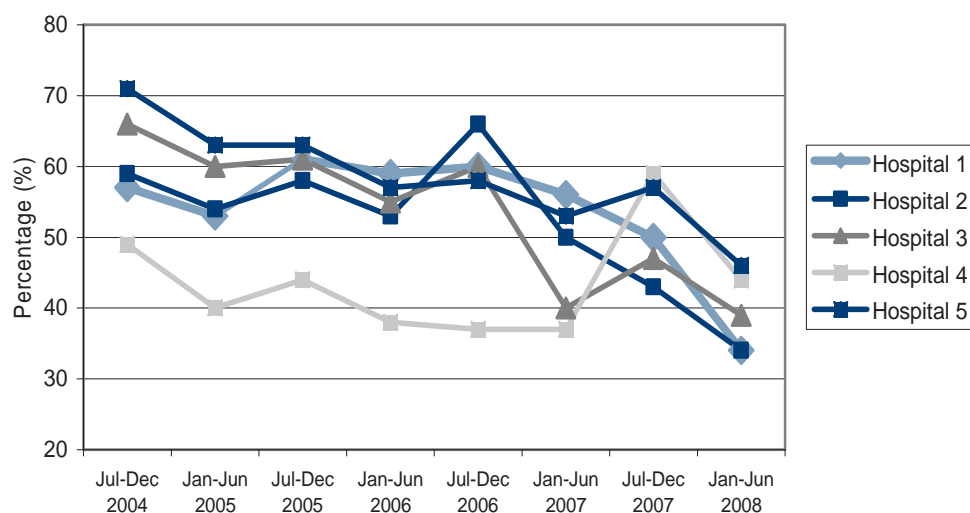


Figure 5C shows performance at the five Victorian hospitals with the worst access for category 2 patients in January to June 2008. These are not necessarily the audited hospitals.

Source: Victorian Auditor-General's Office, compiled from DHS's *Your Hospitals* reports.

DHS advise that they case manage hospitals with poor performance, and where possible address issues, such as the need for more surgery facilities, through capital works. However, the improvement targets set are not accompanied by clear timelines or directions for how and when better performance will be achieved. This is essential to achieving equitable elective surgery access for patients regardless of the hospital they are referred to.

5.3 Presentation of public reports

Open and transparent reporting is core to assessing health system performance. It is important, therefore, to present information in a way that is easy for readers to comprehend, and is unlikely to be misinterpreted.

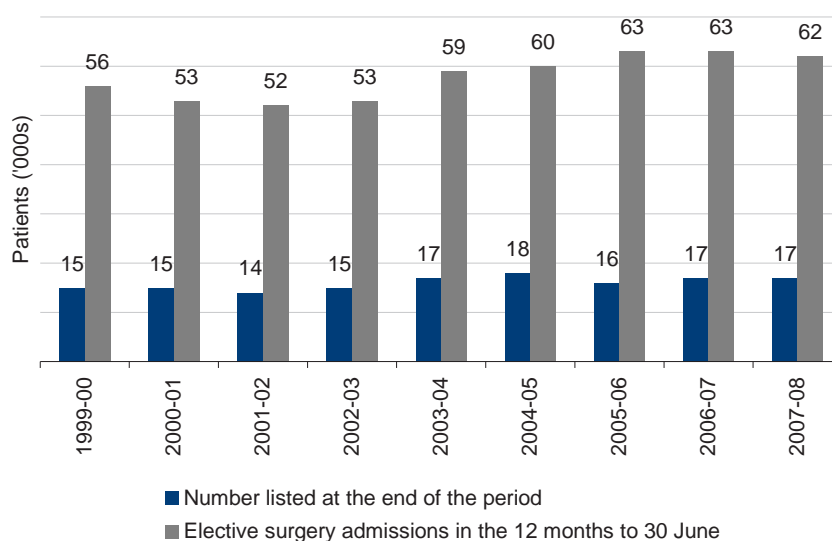
The DHS annual report, as well as state budget papers report performance against the statewide performance measures, showing actual and targeted annual performance. The key document for information about Victorian public hospital performance for patients, carers and health professionals is *Your Hospitals*.

5.3.1 Reporting elective surgery performance

Your Hospitals contains comprehensive information about access to elective surgery for the reporting period.

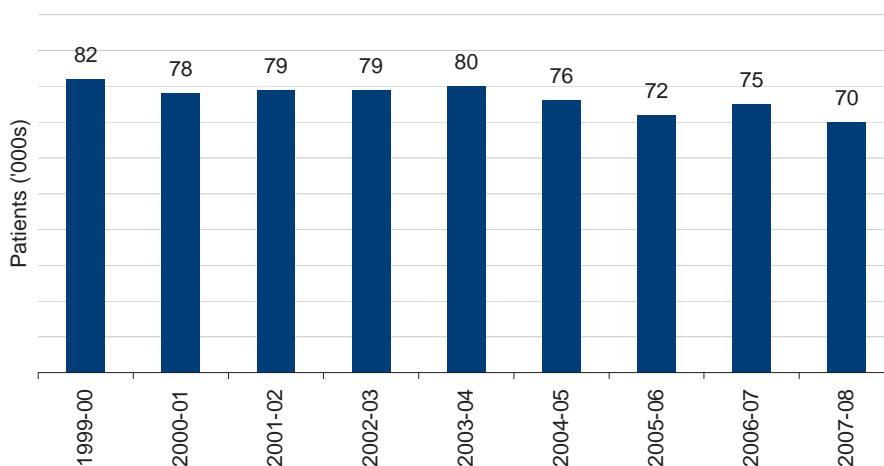
The report contains data on the number of patients on the waiting list at the end of each year, and the percentage of patients who were admitted within the scheduled time, from 1999–00 to 2007–08. By presenting the data in a series of bar graphs, readers are able to track performance over time and form a view of whether access to elective surgery is improving. This is illustrated in Figures 5D and 5E.

Figure 5D
Statewide access to elective surgery – semi-urgent patients



Source: Victorian Auditor-General's Office, from DHS's *Your Hospitals* 2007–08.

Figure 5E
Statewide percentage of semi-urgent patients treated within 90 days



Source: Victorian Auditor-General's Office, from DHS's *Your Hospitals* 2007–08.

The report also clearly shows, by a tick or cross icon, whether performance for the period met the targets set within that year's state budget papers for percentage patients treated in time.

Information on the rate of HIPs of surgery is, however, excluded from the report. DHS do not report this indicator as it is not included in state-level performance measures set out in *Budget Paper 3*. However, *Your Hospitals* provides much information not referred to within *Budget Paper 3* and the HIP rate indicator provides real insight to readers of hospital efficiency and effectiveness in providing access to surgery. The indicator's exclusion also reduces accountability for performance against this indicator and as such Audit considers that it should be included in future *Your Hospitals* reports.

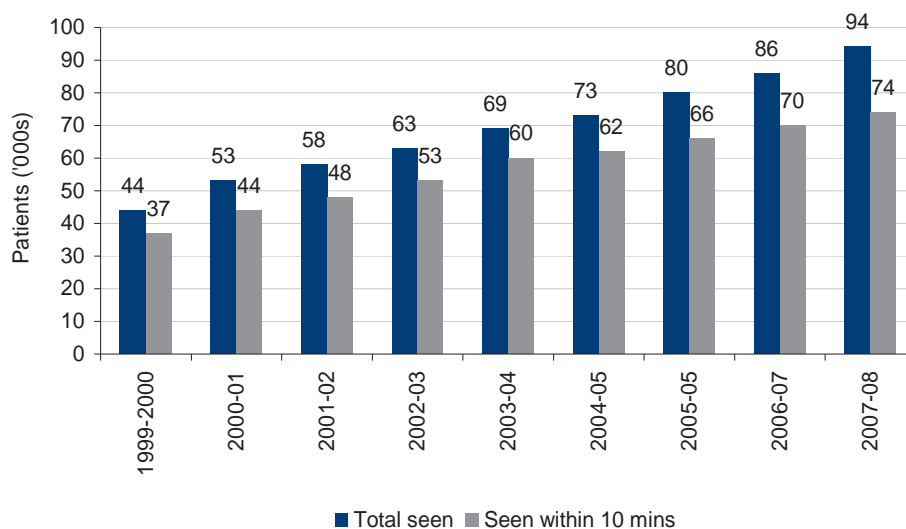
5.3.2 Reporting performance in emergency care

For each emergency access indicator, a tick or cross icon indicates whether the performance target was achieved for the period, and the performance level that was achieved is clearly stated. Performance against the emergency access indicators over time is, however, presented differently to the elective surgery indicators.

DHS's chosen method for presenting emergency access indicator performance over time is chosen to provide information on the increasing demand for emergency services and to show performance within this context. This format though, does not provide clear information on whether hospital performance is coping with this increased demand.

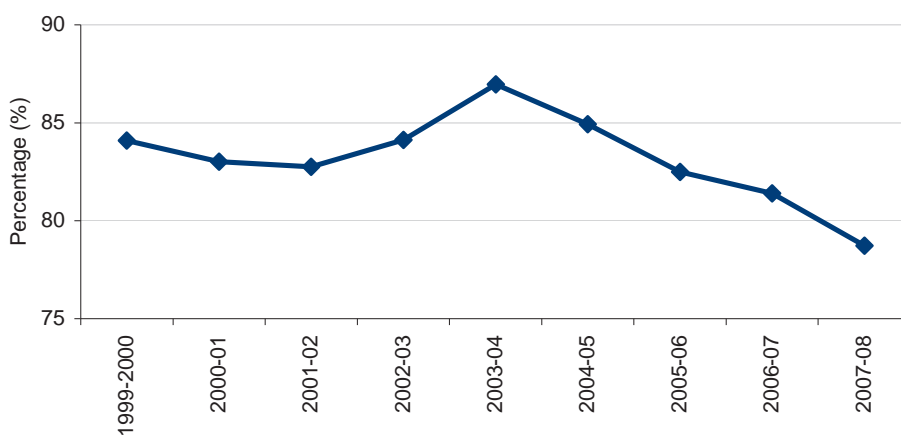
Although DHS measures performance against the emergency access indicators as a percentage, this information is shown in *Your Hospitals* as the total number of patients treated and the number treated within the specified timeframes. The result is a bar graph that shows an upward trend, reflecting the growing demand for services. Presenting the information in this way, as shown in Figure 5F, is inconsistent with the elective surgery data in the report, which is shown as the performance percentage over time. It is also potentially misleading as the upward trend creates an impression of improvement. Figure 5G illustrates that when the 'time to be seen' indicator for triage category 2 patients is calculated as a percentage, performance has declined since 2003–04.

Figure 5F
Statewide triage category 2 patients treated in emergency departments,
as reported in *Your Hospitals*



Source: Victorian Auditor-General's Office, from DHS's *Your Hospitals* 2007–08.

Figure 5G
Statewide performance against triage category 2,
calculated as a percentage

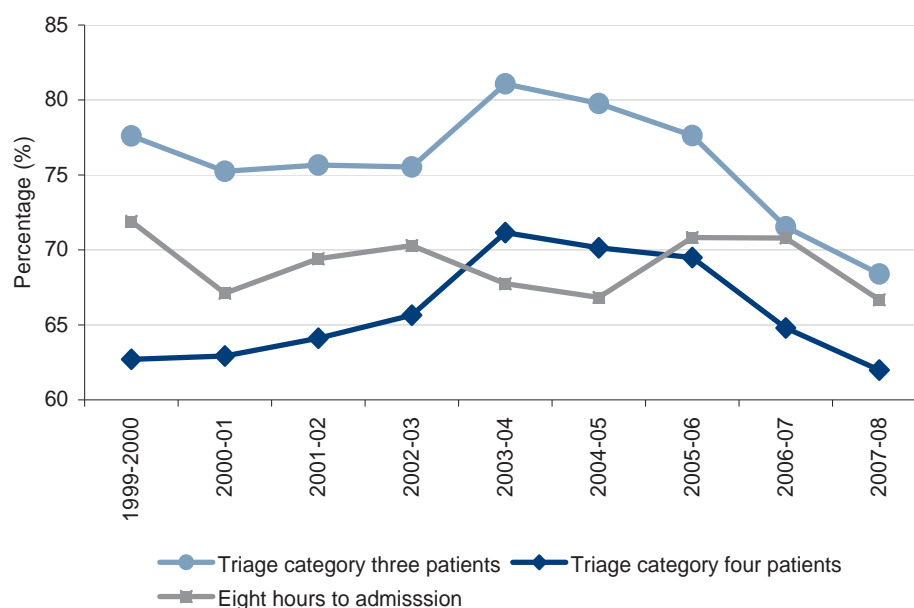


Source: Victorian Auditor-General's Office, from DHS's *Your Hospitals* 2007–08.

Figure 5H also shows a declining trend when performance against triage categories 3 and 4 are calculated as a percentage. Also, the percentage of patients admitted within eight hours shows that the 80 per cent target has not been achieved in the nine year

period. This information is only available to readers by undertaking a series of manual calculations. The narrative contained within the report does not describe these trends and instead refers to the increase in total numbers of patients treated within time compared to the previous year.

Figure 5H
Statewide emergency access performance when
calculated as a percentage



Source: Victorian Auditor-General's Office, from DHS's *Your Hospitals* 2007–08.

Your Hospitals also does not provide a report of performance against the indicator measuring the number of patients who remain in the emergency department for more than 24 hours. Again, this indicator is excluded as it is not included among state-level performance measures in *Budget Paper 3*. However, inclusion of this indicator would provide insight into how well patients flow through the hospital and is an important measure of access to an inpatient bed.

5.4 Conclusion

The lack of evidence for the targets and benchmarks included in the majority of indicators mean that it is not possible to make an informed appraisal of whether access to hospital services is good or bad depending on indicator performance. If hospitals and DHS are to contribute resources for reporting against access indicators, and judgements made about performance based on the indicators, then targets and benchmarks should be based on rationales that are supported by evidence.

Targets and benchmarks should also encourage equitable access to care. At present, individual hospital improvement targets, set for the percentages of category 2 and 3 elective surgery patients waiting less than the desired time, are not achieving improvement in access at the hospitals where it is needed most.

In publicly reporting performance against the access indicators, *Your Hospitals* provides key information on the state of the Victorian health care system. Open and transparent reporting is fundamental to making a fair assessment of performance and accountability. This is achieved through clear accounts of performance for the period, and of performance over time against elective surgery indicators. However, the method chosen for presenting performance over time against the emergency access indicators does not provide the reader with a readily accessible view of performance trends.

Providing clear, consistent information of performance over time is needed to identify trends. To obtain this information the reader of this public document is required to undertake their own calculations. While information on service demand is useful to the reader, clear information on whether hospitals are coping with this demand is also needed to assess health system performance. Declines in performance against waiting times, for categories 2, 3 and 4 patients since 2003–04, is not clearly presented in the report.

The exclusion of access indicators measuring waits of more than 24 hours in the emergency department, and HIP rates, also limit the usefulness of the report. While these indicators are not included in *Budget Paper 3*, they report against experiences the public can readily understand and are, therefore, useful in presenting a comprehensive picture of hospital performance.

Recommendations

The Department of Human Services needs to:

- 5.1 review the use of improvement targets for elective surgery indicators and set specific action plans and timelines for when poor performing hospitals should achieve improved performance
- 5.2 conduct research and analysis to determine evidence-based targets and benchmarks for access indicators
- 5.3 present emergency access performance over time as the percentage of patients seen, admitted or discharged within time
- 5.4 include performance against access indicators measuring the number of patients with emergency department stays of more than 24 hours, and rates of HIPs of surgery in *Your Hospitals*.

6 Fair representation of access performance

At a glance

To draw a meaningful conclusion about access performance, information needs to be fairly represented. Access indicators should therefore be capable of measurement, represent consistently what they purport to indicate and be accurately reported.

Many of the access indicators do not satisfy the test of fair representation. Consequently, the ability to compare and assess hospital performance is limited. In particular:

- five access indicators were not auditable so accuracy could not be confirmed
- hospitals interpreted reporting rules differently, resulting in inconsistent reporting
- there were numerous inaccuracies in reported emergency access data
- manipulation of data was identified at one hospital.

As a result, we recommend the Department of Human Services:

- review and clarify definitions and rules for reporting of access indicator data **(Recommendation 6.1)**
- routinely audit both the VEMD and ESIS databases for compliance with reporting rules and data accuracy **(Recommendation 6.2)**
- facilitate implementation of information technology systems that support simple, real-time data capture within hospital emergency departments **(Recommendation 6.3)**
- review the reporting capability of the iPM waiting list module and facilitate improvements as required **(Recommendation 6.4)**.

We also recommend that hospitals:

- improve security controls on computer systems used for recording VEMD data and utilise audit log systems **(Recommendation 6.5)**
- internally monitor compliance with policy regarding reporting of access indicators and provide appropriate instruction and training to staff submitting data **(Recommendation 6.6)**
- conduct internal audits of accuracy of VEMD and ESIS data **(Recommendation 6.7)**.

6.1 Introduction

Reports of performance against access indicators should fairly represent actual performance. To achieve this the supporting data must be captured consistently and accurately. Where these conditions are not met, the fair representation of performance is not achieved.

To ascertain whether reported performance against each access indicator is fairly represented we examined, at the four audited hospitals for the period January–June 2007, whether:

- data required for reporting was consistently captured
- reported data was accurate.

This period was selected because at one of the audited hospitals emergency data, for the period July–December 2007, had been corrupted by a computer system error, and at another hospital, elective surgery data for this period was unavailable due to implementation of *HealthSMART*. January–June 2008 data was not practicable for audit as such recent files may have still been in use.

This part presents our findings at the four hospitals in reference to:

- emergency access indicators
- elective access indicators.

6.2 Emergency access indicators

Data capture and consistency

Data captured in emergency department settings is recorded inconsistently because of:

- varying interpretations of reporting rules
- data capture processes that are inconsistent and susceptible to error.

The exception among the emergency access indicators is data used for reporting against the bypass indicator. Data collection for this indicator follows a consistent process across hospitals and is independently recorded by Ambulance Victoria.

Data required for reporting the indicators measuring the percentage of triage category 1, 2 and 3 patients seen within time was inconsistently recorded across the four audited hospitals. This was due to different interpretations of the reporting rules at each site.


The DHS rules for reporting the indicators are:

- time to be seen is referred to as ‘time to treatment’ and is the difference between the patient’s arrival time and the time the patient is first seen by a nurse, doctor or mental health practitioner (whichever is first)

- treatment is defined as medical and/or surgical care provided to a patient with a view to stabilisation, diagnosis and alleviation of their condition, e.g., commencement of investigations, provision of medication.
- waiting time can be measured up to the time that the treating nurse first saw the patient; this includes the taking of baseline observations after triage, e.g., recording of temperature, heart rate, blood pressure.

Figure 6A illustrates that due to variable interpretations of these rules, each hospital is 'stopping the clock' at a different stage. This means reported performance is not comparable between hospitals. Hospitals taking the earliest opportunity to 'stop the clock' may be seen to have better performance than those waiting longer, regardless of the actual time that ongoing assessment and care is provided to patients.

Figure 6A
Variation in recording 'time to be seen'

Method of recording 'time to be seen'	Waiting time recorded
Waiting time stops when a nurse takes clinical observations, whether this occurs at the start of ongoing assessment and care, whether the patient may wait further for treatment, or whether the patient is being triaged and may then return to the waiting room.	Shortest
Waiting time stops when a nurse commences taking clinical observations and assessment for the purposes of generating a diagnosis and providing care.	
Waiting time stops when either the doctor sees the patient, or a nurse performs a specific intervention such as administering drugs or applying a wound dressing.	
Waiting time stops when the doctor first sees the patient regardless of when a nurse may have provided assessment and treatment.	

Source: Victorian Auditor General's Office.

This variation stems from lack of clear definition of the conditions that determine the start of 'treatment'. For example:

- the actions that constitute care with a view to 'stabilisation, diagnosis and alleviation of a condition' are not specified, therefore hospitals have individually determined this
- confusion about when 'first time seen' should be recorded occurs where a nurse may take 'baseline observations' only and the patient may then wait further for diagnosis and alleviation of their condition.

DHS had recognised this issue before the audit and has begun work to clarify the reporting rule definitions with the aim to improve consistency of reporting.

In addition to issues of interpretation, processes for recording the time a patient is first seen in the emergency department, or the time they leave, are also variable and susceptible to error. Methods for recording these times, used to generate reports of performance against a number of indicators, include:

- generating the time when the patient is accepted or departed by a clinician in the emergency department computer system, often entering the time of data entry and not the time the patient was actually seen or departed
- clinical staff writing down times and clerical staff later entering the data
- verbal communication of times to clerical staff
- estimates made by clerical staff when clinical staff fail to document this information.

As this information recorded in the Victorian Emergency Minimum Dataset (VEMD) is often not captured in real time, deferral of data entry and reliance on verbal communication increases the chance of error. As a result, reported waiting times to be seen, and times to admission or discharge for some patients are likely to be inaccurate.

This demonstrates the difficulties in capturing emergency department data in the absence of systems that allow easy, real-time data recording. In addition, none of the audited hospitals had documented instructions for relevant staff about how to correctly record data. Requiring clinicians, whose immediate priority is patient care, rather than data entry, to complete forms or leave the patient to find a computer, is unlikely to produce accurate data. As a result, the risk that emergency access indicator data is wrongly reported is further accentuated.

One of the audited hospitals is attempting to address this by implementing bedside computers and patient wristbands that can be scanned into the computer system. This will improve data quality, as information can be recorded by clinicians easily and in real time.

Data accuracy

As part of the audit, data recorded for access indicators was checked for accuracy by comparing available source documentation with information held in DHS databases.

For emergency access indicators, data used for reporting performance was:

- accurate for the indicator measuring the percentage of time spent on bypass
- unable to be verified for accuracy for the indicators measuring:
 - the time to be seen for triage category 1, 2 and 3 patients
 - the percentage of non-admitted patients discharged from the emergency department in less than four hours
- inaccurate for indicators measuring time to admission from the emergency department due to:
 - inconsistent data capture processes already discussed
 - errors in recording departure destination
 - deliberate changes to data at one of the audited hospitals.

Reported performance for the two audited hospitals permitted to use bypass was accurate. Bypass data captured independently by Ambulance Victoria, the audited hospitals, and performance published in *Your Hospitals* were consistent.

For the indicators where accuracy could not be verified this was due to lack of documentation, such as the medical record, to compare against data recorded for these indicators in the VEMD. Patient arrival time, the time the patient is first seen by a nurse or doctor, and the discharge time of non-admitted patients, is recorded directly in the emergency department's computer system. Data within the VEMD is extracted from these systems meaning they cannot be used as a source for comparison. While this system of data recording minimises administration, it limits the ability of hospitals to undertake internal quality assurance checks and audit of the data.

For the indicators measuring the percentage of patients admitted to an inpatient bed within eight hours, and the number of patients staying in the emergency department more than 24 hours, accuracy of reported performance is dependant on correct recording of:

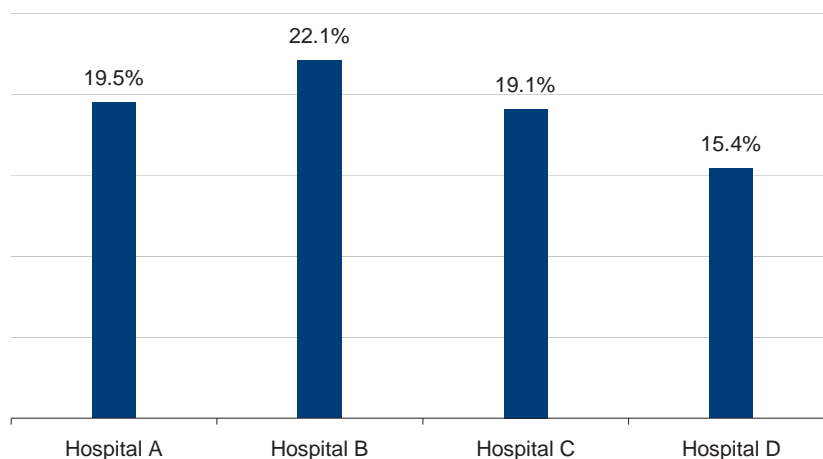
- patient departure time
- the patient destination
- whether the patient is actually admitted to an inpatient bed.

Departure time

For patients admitted from the emergency department, the patient departure time recorded in the VEMD was compared with information in the patient's medical record. The error rates for patients with a reported emergency department length of stay close to an indicator target were then compared with error rates for other patients, to identify statistically significant anomalies between these groups of patients. A more detailed explanation of the audit method and results of this analysis are in Appendix B.

Across the four audited hospitals, the percentage of inaccurate records, where the VEMD recorded departure time was either earlier or later than the time indicated by the medical record, ranged between 15.4 per cent and 22.1 per cent, as shown in Figure 6B. This is a substantial proportion of the sample.

Figure 6B
Percentage of records with inaccurate departure time



Source: Victorian Auditor-General's Office.

For three of the four hospitals these errors were caused by poor data capture processes. This inference was based on the fact that error rates detected were consistent for all patient groups, regardless of their reported length of stay.

At one hospital, however, patients with a reported length of stay just under eight hours had a significantly higher number of errors where patients had remained in the emergency department longer than eight hours, but were not reported as such within the VEMD. Applying this finding to the total number of admissions from the emergency department for the period, it is likely that performance against the indicator measuring the percentage of admissions within eight hours for this hospital, for the period, was overstated by 5 per cent. A 5 per cent inaccuracy can alter the amount of bonus funding paid to a hospital; however, in this example this did not occur.

Further investigation, carried out by the hospital in response to this finding, uncovered the following:

- where patient length of stay in the emergency department exceeded eight hours by a few minutes, associate nurse unit managers retrospectively altered data, at the request of a nursing coordinator, to meet the eight-hour indicator,
- errors also occurred where ward clerks 'admitted' emergency patients to an inpatient bed within the patient administration system, two to three hours before transfer, to hold the bed for that patient. In some cases this 'pre-transfer' time was incorrectly recorded as time the patient left the emergency department.

Neither of these points account for the findings of our medical record audit, as differences between reported and actual departure times were more substantial than a few minutes, and incorrect use of the pre-transfer time would not selectively affect one particular group of patients.

Our conclusion is that data manipulation did occur at this hospital, based not only on the hospital's admission of retrospective changes of data by a few minutes in order to meet the indicator, but also on the results of the medical record audit.

The errors and recording practices were facilitated by poor security controls of data and lack of an audit log within this hospital's emergency department computer system. Poor data security and lack of audit logs was common among the audited hospitals and this finding was also previously made in our report *Managing Emergency Demand in Public Hospitals* (Report No. 71. 2004) and the follow-up to that report (Report No.17. 2007).

Our finding of deliberate changes to data echoes findings of data manipulation in other jurisdictions. In our example, and others, data changes were intended to improve reported performance. It is important, therefore, that performance against access indicators is used and understood as a way to drive continual improvement of the hospital system, and not associated with the success or failure of individuals.

In response to this finding, immediate actions have been employed by the hospital to address these issues, including:

- staff instruction and development of documented guidelines on data reporting for emergency and administrative staff
- internal audit of data submitted to the VEMD.

Departure destination

Under Commonwealth admission guidelines, some patients treated within the emergency department qualify for admission due to the nature of medical treatment provided to them. These include:

- patients receiving extended medical treatment for more than four hours, e.g., observations for head injury
- patients receiving some minor procedures, such as intravenous therapy.

These patients are recorded by hospitals as 'admitted' within DHS's Victorian Admitted Episode Dataset (VAED) but receive their care entirely within the emergency department and are discharged from this setting.

In the VEMD these patients should be recorded as 'discharged home'. At three of the audited hospitals, however, these patients were recorded in the VEMD as having transferred to a ward or short stay unit, though this did not occur, to reflect their admitted status in this database.

This action has the effect of artificially improving performance against the indicator measuring discharges in less than four hours and altering performance against the indicator measuring admissions within eight hours. This is explained in Figure 6C. At one hospital more than a quarter of the sample showed this error, which means that the reported performance for this hospital against these two indicators is materially inaccurate.

Figure 6C
Inaccurate recording of departure destination

Access indicator	What happens	Effect
Emergency patients admitted to an inpatient bed within eight hours (%)	This depends on the length of stay of the patient and how the departure time is recorded, e.g., whether the time of the decision to 'admit' is recorded as the departure time, or the time the patient left for home.	If the majority of patients incorrectly recorded stayed less than eight hours, then these patients will artificially improve performance against the indicator. If the majority stayed more than eight hours they will artificially decrease performance.
Non-admitted emergency patients discharged in less than four hours (%)	These patients are commonly 'admitted' because they receive extended medical treatment over at least four hours (a)	These patients who stay longer than four hours in the emergency department are excluded from reporting against this indicator, artificially improving reported performance

Note: (a) refers to Commonwealth admission criteria outlined in the *DHS Hospital Admission Policy 2003–04*.

Source: Victorian Auditor General's Office.

DHS has since advised all hospitals of the correct VEMD coding of these patients to address this error.

Compliance of short-stay units

A short-stay unit is a commonly used model of care providing dedicated inpatient beds for patients requiring no more than a 24 hour admission. These units are often physically located alongside the emergency department. DHS requires that short-stay units:

- are furnished with hospital beds rather than trolleys
- are physically separate from the emergency department
- operate under a specified model of care with admission and discharge criteria.

As a short-stay unit should provide equivalent care and facilities to an inpatient ward, measurement of time spent in the emergency department ends when a patient is transferred to a short-stay unit bed. For this reason, it is important that short-stay units meet inpatient ward standards. At the four audited hospitals the short-stay units were examined to see whether these conditions were met and that patients admitted here were transferred to an 'inpatient bed'.

Short-stay units at three of the four hospitals were furnished with emergency department trolleys rather than hospital beds. This means these patients were recorded in the VEMD as transferred to an inpatient bed when they actually continued their care on hospital trolleys. At two hospitals, available space was cited as the cause. All three of these hospitals currently have capital works under way which will rectify this situation; however, completion of these works is not imminent. As current practice in short-stay unit facilities appears to contradict access indicator wording, which refers to transfer to an 'inpatient bed', greater clarity of both short-stay unit facility requirements and indicator reporting rules seem necessary.

All hospitals employed short-stay unit admission and discharge criteria and used care pathways to facilitate the short-stay model of care. One hospital, however, did not have specific documentation for their short-stay unit to assist clinical staff in documenting care and discharge planning. Instead, documentation for short-stay unit patients continued on emergency department forms. This meant the hospital could not provide evidence of the time of transfer from the emergency department, that the transfer to the short-stay unit did occur, or that care pathways were followed.

These findings demonstrate the consequences of lack of:

- routine quality assurance and audit of data submitted to the VEMD, both internally by hospitals and externally by DHS
- appropriate security controls and audit logs for computer systems, especially where there is no paper-based source to verify recorded data.

Without effective quality control regimes, at both hospitals and DHS, the risk of inaccurate data being reported and subsequent misleading representation of access performance is real. To date, DHS has not undertaken an audit of the VEMD. However, before this audit, DHS started work to develop and implement an audit program that will begin in 2009.

6.3 Elective access indicators

Data capture and consistency

Data capture

One of the audited hospitals had implemented the new *HealthSMART* patient administration system, i.Patient Manager (iPM), and was experiencing difficulties in submitting accurate data to the Elective Surgery Information System (ESIS). The problem concerned the ability to generate accurate reporting from iPM to ESIS. These issues are described in Figure 6D.

Figure 6D
HealthSMART iPM and ESIS reporting

At the time of audit, the hospital was experiencing significant difficulties using and reporting elective surgery information from the recently implemented *HealthSMART* iPM tool. Examples of the issues are:

- Differences in terminology used between the iPM waiting list module and DHS's ESIS manual have created confusion for staff.
- The ESIS data extract, from iPM, identifies errors which require edit. Many of these edits can only be corrected by *HealthSMART* services, which are external to the hospital and take considerable time .
- Those edits that can be performed by the hospital are complex and time consuming.
- When edits are made within the waiting list module the corrections are not always automatically re-submitted to ESIS, for example, edits made in one part of the waiting list module do not automatically correct related data in another part of the module, so errors remain.
- The ability to generate a data extract from iPM to ESIS is unreliable, causing delays in data submission.
- The suite of performance reports available in the iPM waiting list module does not produce data to accommodate DHS reporting requirements, meaning the hospital must create their own reports and data validation methods.

Source: Victorian Auditor-General's Office.

Staff at this hospital expressed serious concern regarding the accuracy of data submitted to DHS from the iPM waiting list module. Due to lack of access to accurate waiting list information, the hospital was collecting manual data to track their performance.

Given the issues experienced at this hospital in ability to validate and correct data errors, and submit accurate data, DHS's ability to accurately measure and monitor performance against the elective access indicators as the iPM system is rolled out across the state is in doubt.

Consistency of data

Consistency of data used for reporting elective surgery access is limited due to:

- variable interpretations of urgency categories assigned to patients
- inappropriate recording of patients as 'not ready for care'.

The Australian Institute of Health and Welfare (AIHW) states in its 2008 report, *Elective Surgery in Australia*, that measures based on urgency categories are not meaningful due to variance in category assignment. This was also found by a 2003 Victorian study, which identified variation in categorisation between surgeons and surgical specialities. Management and clinical staff at the four hospitals audited also noted this problem. Variation in urgency category reflects individual surgeon preference resulting in, for example, two patients with the same condition and apparent urgency being assigned different categories and experiencing different waiting periods. Lack of consistent application of urgency categories means patients may not access surgery in order of priority. Also, where surgeons list patients as more urgent than necessary, hospitals will have an artificially higher proportion of patients to treat in shorter times. This limits a hospital's ability to perform to targets.

In 2001, the problem of inconsistent urgency categorisation resulted in the AIHW removing indicators based on urgency categorisation from their reporting. This was because true comparison could not be made between jurisdictions based on the indicators. While the AIHW acknowledges that the indicators may be useful for managing waiting list demand at a hospital level, it is possible that variations in urgency category assignment may impair comparability of Victorian hospitals. A 1998 review of Victorian elective surgery waiting lists, commissioned by the Minister for Health, recommended the development of clinical guidelines for urgency categorisation, with enhanced detail to improve consistency of category allocation. To date, this recommendation has not been implemented.

Another possible cause of inconsistent recording of urgency category was detailed in the 2008 New South Wales Special Commission of Inquiry report, *Acute care services in NSW public hospitals*. This inquiry found evidence of administrative staff reassigning urgency categories determined by surgeons, in order to meet waiting times. This is because national waiting time reporting rules allow the number of days spent waiting to restart at zero when a patient's urgency is increased. Evidence of this practice was not found at the audited hospitals. At these sites urgency category reassignment was only permitted at the direction of the patient's surgeon and on the basis of clinical need. DHS also reports that in 2007–08, only 3 per cent of elective surgery patients experienced a change to their urgency category.

Reported waiting time is also affected by the amount of days a patient is recorded as 'not ready for care'. Patients are listed as 'not ready for care' if they become medically unfit for surgery or are unavailable for personal reasons, e.g., due to an overseas holiday. Any days spent 'not ready for care' are removed from the total waiting time calculated for that patient.

Three of the audited hospitals were at times inappropriately recording patients as 'not ready for care'. Figure 6E shows examples of this.

Figure 6E

Examples of inappropriate recording of 'not ready for care' status

Example 1:

At two hospitals patients were made 'not ready for care' if they were unable to attend for surgery on a particular day for personal reasons. This is in contrast to DHS's policy, which requires hospitals to exercise discretion in determining 'not ready for care' status and distinguish between a patient who is reasonably negotiating a surgery date and one who is unavailable for prolonged periods.

Waiting list management staff expressed that their decision about a patient's 'not ready for care' status in these situations is influenced by the time the patient has spent waiting against the target, with those about to exceed the target more likely to be made 'not ready for care'.

Example 2:

At one hospital, waiting patients who could not be contacted by phone, and had met the criteria for removal from the waiting list, were sent letters to confirm if they still wished to receive surgery. On sending the letter the hospital listed these patients as 'not ready for care'.

The intention was to delay removing patients from the waiting list entirely. However there is no provision in DHS policy to make patients 'not ready for care' except for clinical reasons or on advice from the patient.

The practice was inconsistent with the other audited hospitals.

Source: Victoria Auditor-General's Office.

The practice described in Example 1 effectively reduces reported waiting time, and waiting list numbers. Example 2 highlights inconsistency in the use of 'not ready for care' status and thresholds for removal of patients from the waiting list.

Data accuracy

For elective surgery access indicators data used for reporting performance was:

- not audited for the indicator measuring total waiting list numbers, as it is not considered a relevant measure of access
- unverifiable in measuring accuracy of HIP rates as causes of postponements are generally only documented within the hospital's computer system from which ESIS data is directly derived. This meant that a secondary source was not available from which to compare ESIS data and reported HIP rates
- of variable accuracy for the indicator measuring the percentage of category 2 patients waiting less than 90 days for treatment; however, this did not affect reported performance.

Accuracy of the percentage of category 1 patients admitted within 30 days, and category 3 patients waiting less than 365 days, was not audited. This was to limit inconvenience to hospitals associated with retrieving large numbers of patient files and because the process for data reporting for all three categories is the same.

DHS requires hospitals to register patients on the elective surgery waiting list within three days of receiving their referral. Patients should then be removed from the list on the day they are admitted for surgery. To verify the accuracy of reported waiting times for patients who received elective surgery, dates documented in patient medical records were compared with registration and removal dates in ESIS. A detailed description of the audit method is in Appendix C.

At two hospitals, only a small number of referrals for surgery showed the date of hospital receipt. In such cases, where delays could be seen between the referral date and waiting list registration, it was not possible to distinguish if the delay was due to late submission of the referral by the surgeon, or caused by delayed registration by the hospital. This demonstrates the importance of hospitals documenting the date they receive a referral.

At two hospitals the majority of referrals did show the date they were received. Inaccurate records, those registered more than three days after receipt, or those where the removal date did not match the admission date, occurred in 6.8 per cent of the sample at one hospital, and 24.7 per cent at the other. These errors arose because of delayed registration of patients on the waiting list. Clerical staff noted that data entry can be delayed, for example, at times of staff absence. These errors, however, had no effect on the overall reported performance of the hospitals against the indicator.

6.4 Conclusion

The majority of emergency access indicators do not fairly represent performance at the four audited hospitals. This is because of inconsistent interpretation of reporting rules and the use of data capture methods susceptible to error. Significant errors were also found at one hospital that uncovered data manipulation. Poor security of emergency department data, lack of computer audit logs and lack of quality assurance and audit of the VEMD database has contributed to these problems.

This is serious, and raises questions about a key aspect of the governance and accountability framework overseeing health system performance. Hospitals and DHS should put in place systems, processes and culture that support accurate performance reporting. Recent work by DHS to develop an audit program for the VEMD is a positive step.

Limitations to the elective access indicators, variability in how urgency categories are assigned, and evidence of some inappropriate recording of patients as 'not ready for care' mean that the level of accuracy for elective access indicators is questionable.

In addition, at the audited hospital where the *HealthSMART* patient manager tool had been implemented, staff were experiencing significant difficulties in reporting accurate elective surgery waiting list data to DHS. This is due to difficulties extracting an accurate report from the *HealthSMART* waiting list module for submission to ESIS and puts in doubt the ability to obtain accurate statewide elective surgery data as the system is rolled out.

Due to current inconsistencies and errors, the extent to which the majority of access indicators fairly represent performance at these hospitals is questionable. There is no reason to suggest that the findings of this audit of four hospitals are not representative of problems with data capture across hospitals. The current level of effort and control directed towards accurate data capture does not match the importance placed on the role of the access indicators. These circumstances preclude the provision of reasonable assurance that data on performance published in *Your Hospitals* is reliable.

Recommendations

That the Department of Human Services should:

- 6.1 review and clarify definitions and rules for reporting of access indicator data
- 6.2 routinely audit both the VEMD and ESIS databases for compliance with reporting rules and data accuracy
- 6.3 facilitate implementation of information technology systems that support simple, real-time data capture within hospital emergency departments
- 6.4 review the reporting capability of the iPM waiting list module and facilitate improvements as required.

That hospitals should:

- 6.5 improve security controls on computer systems used for recording VEMD data and utilise audit log systems
 - 6.6 internally monitor compliance with policy regarding reporting of access indicators and provide appropriate instruction and training to staff submitting data
 - 6.7 conduct internal audits of accuracy of VEMD and ESIS data.
-

Appendix A.

Access indicators: definitions and calculation rules

Indicator	Definition and calculation method	Data source
Percentage of time emergency departments went on hospital bypass.	Percentage of time a hospital defers Ambulance Victoria when the emergency department is full. This is calculated as percentage of time on hospital bypass = $\frac{\text{actual time on bypass}}{\text{actual time in the period}}$	VEMD
Triage category 1 patients treated in emergency departments.	(a) Total number of resuscitation (triage category 1) patients treated in emergency departments (ED). This excludes those who <i>left at their own risk without treatment</i> , and <i>left after clinical advice regarding treatment options</i> . (b) Number of resuscitation (triage category 1) patients as defined above (a) who were seen immediately (less than or equal to 1 minute) that is, where their time to treatment was less than or equal to 1 minute. Time to treatment equals a - b , where: a is arrival date and time and b is the date and time the patient is first seen by a nurse, doctor or mental health practitioner (whichever was first).	VEMD
Triage category 2 patients treated in emergency departments.	(a) Total number of emergency (triage category 2) patients treated in EDs. This excludes those who left at their own risk without treatment, and left after clinical advice regarding treatment options. (b) Number of emergency (triage category 2) patients as defined above (a) who were seen within 10 minutes, that is, where their time to treatment was less than or equal to 10 minutes. Time to treatment equals a - b , where: a is arrival date and time and b is the date and time the patient is first seen by a nurse, doctor or mental health practitioner (whichever was first).	VEMD

Indicator	Definition and calculation method	Data source
Triage category 3 patients treated in emergency departments.	<p>(a) Total number of urgent (triage category 3) patients treated in EDs. This excludes those who <i>left at their own risk without treatment, and left after clinical advice regarding treatment options.</i></p> <p>(b) Number of urgent (triage category 3) patients as defined above (a) who were seen within 30 minutes, that is, where their time to treatment was less than or equal to 30 minutes.</p> <p>Time to treatment equals a–b, where:</p> <p>a is arrival date and time and</p> <p>b is the date and time the patient is first seen by a nurse, doctor or mental health practitioner (whichever was first).</p>	VEMD
Number of patients transferred from emergency departments to hospital beds within 8 hours.	<p>ED patients transferred to an inpatient bed. This means ED patients whose departure status indicates they were <i>admitted to a ward, short stay observation unit, emergency medical unit, medical assessment and planning unit, intensive care bed, mental health bed, or coronary care unit.</i></p> <p>(b) ED patients transferred to an inpatient bed within 8 hours, where the interval between the patient's arrival (date and time) and their departure (date and time) from the ED to the inpatient bed is less than or equal to 8 hours.</p>	VEMD
Number of non-admitted emergency department patients whose stay is less than 4 hours.	<p>(a) ED patients not admitted to an inpatient bed. This means ED patients whose departure status indicates they departed to the following; <i>home, left after advice re treatment options, correctional/custodial facility, mental health residential facility and aged care residency.</i></p> <p>(b) ED patients not admitted to an inpatient bed whose length of stay was less than 4 hours, where the interval between the patient's arrival (date and time) and their departure (date and time) from the ED to the inpatient bed is less than or equal to 4 hours.</p>	VEMD
Number of patients with a length of stay in the emergency department of greater than 24 hours	The total number of patients with a length of stay in the emergency department greater than 24 hours calculated as the numbers of patients with an emergency department length of stay of greater than 24 hours (1 440 minutes), regardless of departure status code.	VEMD
Percentage of urgent patients treated within 30 days	<p>(a) Number of urgent (category 1) patients admitted for elective surgery during the reporting period whose total waiting time is less than or equal to 30 days. Total waiting time is the difference between the date that the patient was listed for the procedure to the date they were admitted to hospital for the awaited procedure.</p> <p>as a percentage of:</p> <p>(b) Total number of urgent (category 1) patients admitted for elective surgery during the reporting period.</p>	ESIS

Indicator	Definition and calculation method	Data source
Percentage of category 2 elective surgery patients waiting less than 90 days	The number of category 2 patients waiting 90 days or less as a percentage of all category 2 patients on the elective surgery waiting list at the end of the quarter.	ESIS
Percentage of category 3 elective surgery patients waiting less than 365 days	The number of patients waiting 365 days or less as a percentage of all category 3 patients on the elective surgery waiting list at the end of the quarter.	ESIS
Number of patients on the elective surgery waiting list	The number of patients waiting for elective surgery as at the end of the quarter.	ESIS
Number of hospital initiated postponements (HIPs) per 100 scheduled admissions (from the elective surgery waiting list)	<p>A hospital initiated postponement (HIP) occurs when:</p> <ul style="list-style-type: none"> • an episode's scheduled admission date (SAD) is exceeded; and • the reason the SAD changed is deemed to be a postponement initiated by the hospital, it's staff or a surgeon. <p>Performance is calculated using the formula:</p> $\frac{\text{Number of HIPs within the quarter}}{\text{Number of procedures scheduled to occur in the quarter}}$	ESIS

Source: Victorian Auditor-General's Office compiled from DHS's Public Health Services; The 2008-09 Statement of Priorities and Performance Framework, Business Rules and Specification of Your Hospitals Report Data, July 2007 to June 2008.

Appendix B.

Audit of reported emergency department departure times

Methods

Statistical methods employed were recommended by the University of Melbourne Statistical Consulting Centre. Calculations of confidence intervals and power were conducted by the centre.

For each audited hospital the following data fields were sourced from DHS's Victorian Emergency Minimum Dataset (VEMD) for all patients admitted from the emergency department between 1 January and 30 June 2007:

- patient identification number
- date of birth
- arrival and departure dates and times
- length of stay in the emergency department
- departure status and destination.

This period of time was selected because emergency department data for the period 1 July to 31 December 2007 at one hospital had been corrupted due to a computer system error. For each hospital the total population of patients admitted from the emergency department for this period was divided according to emergency department length of stay:

- 6 hours to 7 hours 59 minutes
- 20 hours to 23 hours 59 minutes
- all others.

Population totals for each of the four hospitals are shown in Figure B1.

Figure B1
Population totals

	Hospital A	Hospital B	Hospital C	Hospital D
6–8 hours	786	1 291	1 673	1 628
20–24 hours	96	7	397	137
All other times	1 902	5 821	7 602	5 901
Total	2 784	7 119	9 672	7 666

Source: Victorian Auditor-General's Office.

We determined that the sample estimate of the percentage of medical records showing inaccurate VEMD data should have a 95 per cent confidence interval width no greater than ± 5 per cent.

Stratified random sampling was employed to allow comparison of accuracy of reported information between those patients with a length of stay near to 8 or 24 hours, and those not. We expected to find systematic causes of data errors represented in the stratum of patients whose length of stay was not near to an indicator target. Specific cause of data error would present as a comparatively higher percentage of errors in either the 'near to 8 hours' or 'near to 24 hours' strata.

The following principles were used to determine the sample sizes of the stratified samples:

- In the strata of special interest, those with patients close to 8 or 24 hours length of stay, all records were sampled if the population size was fewer than 30.
- For strata of special interest with population size greater than 30 the average sample size that would be obtained from a simple random sample of the size indicated was doubled. Where this resulted in a sample size for that stratum of fewer than 30, the stratum sample size was increased to 30.
- In the other stratum, the sample sizes are equal to the average sample size that would be obtained in that stratum from a simple random sample.

These principles led to the following sample sizes, with appropriate rounding applied, shown in Figure B2.

Figure B2
Sample sizes for stratified random sample for VEMD

Stratum	Hospital A	Hospital B	Hospital C	Hospital D
6–8 hours	130	90	80	100
20–24 hours	30	7	30	30
All other times	160	200	190	200
Total	320	297	300	330

Source: Victorian Auditor General's Office.

Records were randomly selected to each stratum using the random numbers tool within Microsoft Excel. Hospitals were provided with an over sample to allow for inability to obtain records currently in use.

Audit of medical records was undertaken by senior nursing staff with previous experience in project, research and/or administrative tasks.

Records were coded as 'patient stayed longer in the emergency department' (than reported in the VEMD) if:

- emergency department documentation continued after the departure time recorded in the VEMD

- there was an hour or more between the VEMD departure time and the time that observations were first taken on the ward. This was on the basis that nursing staff at each hospital reported that observations are among the first tasks undertaken when a patient arrives in the ward and usually occur within 15 minutes of their arrival. Auditors also looked for evidence of detours to radiology, etc, which may have led to the delay in arriving on the ward
- a ward nursing note clearly documented the time of arrival as an hour or more later than the VEMD departure time.

Where there was no indication of time of arrival on the ward, e.g., no records of clinical observations and no clearly stated arrival time, the VEMD time was considered accurate.

Records were coded as 'patient stayed shorter in the emergency department' (than reported in the VEMD) if ward documentation showed the patient was present on the ward at a time earlier than the emergency department departure time shown in the VEMD.

Auditors also documented those records showing the patient was not admitted to a ward but discharged home from the emergency department.

Results

Figure B3 shows the audit findings of medical records for patients admitted from the emergency department between 1 January and 30 June 2007.

Figure B3
Accuracy of reported emergency department departure times
for admitted patients

Hospital	Finding (in comparison to VEMD data)	6hrs–7hrs 59mins (%)	20hrs– 23hrs 59mins (%)	All others (%)	All records (%)
A	Departure in record earlier	10.3	10.0	11.9	11.4
	Departure in record later	15.9	6.7	5.0	8.1
	Total inaccurate departure times	26.2	16.7	16.9	19.5
B	Departure in record earlier	22.2	42.9	18.5	19.2
	Departure in record later	0.0	14.3	3.5	2.9
	Total inaccurate departure times	22.2	57.2	22.0	22.1
C	Departure in record earlier	13.8	6.7	11.6	11.8
	Departure in record later	2.5	16.7	7.9	7.3
	Total inaccurate departure times	16.3	23.4	19.5	19.1
D	Departure in record earlier	16.0	10.0	12.5	13.2
	Departure in record later	3.0	3.3	2.0	2.2
	Total inaccurate departure times	19.0	13.3	14.5	15.4

(a) Figures for 'all records' are the findings for the total sample after representative weighting of the strata results

(b) Figures shown for Hospital B, group 20hrs–23hrs 59mins appear high due to the small sample size for this group

Source: Victorian Auditor General's Office.

Figure B4 summarises these findings showing the estimates and 95 per cent confidence intervals for the total percentage of records found to show inaccurately recorded departure times in the VEMD, as well as the total percentage of records showing emergency department stays of more than eight or 24 hours that were not recorded in the VEMD.

Figure B4
Estimates and 95 per cent confidence intervals for the percentages of inaccurate files and unreported target breaches

Hospital	Outcome	Estimate (%)	95% confidence interval (%)
A	Inaccurate files	19.5	15.2–23.8
	Unreported target breaches	4.5	2.9–6.1
B	Inaccurate files	22.1	17.2–26.9
	Unreported target breaches	0.8	0.0–1.9
C	Inaccurate files	19.1	14.5–23.7
	Unreported target breaches	0.8	0.0–1.7
D	Inaccurate files	15.4	11.4–19.5
	Unreported target breaches	1.1	0.1–2.2

Source: Victorian Auditor General's Office.

As a high percentage of unreported target breaches was found at Hospital A, testing was conducted to identify the significance of this finding. The results of this test are shown in Figure B5.

Figure B5
Comparison of 6 hours–7 hours 59 minutes stratum and 'all others' stratum for records showing a longer stay in the emergency department (ED)

Hospital	6 hours–7 hours 59 minutes				All others			P-value
	n	Records showing a longer ED stay	%	n	Records showing a longer ED stay	%		
A	126	20	15.9	160	8	5.0	0.003	
B	90	0	0.0	200	7	3.5	0.1	
C	80	2	2.5	190	15	7.9	0.11	
D	100	3	3.0	200	4	2.0	0.69	

Source: Victorian Auditor General's Office.

The P-values were obtained using Fisher's exact test. The null hypothesis for this test is that the population percentages in the two strata are the same. In the case of Hospital A, the test was statistically significant, showing strong evidence of a true difference between the strata. At the other hospitals the data were consistent with the null hypotheses.

Appendix C.

Audit of registration and removal dates in ESIS

Method

Statistical methods employed were recommended by the University of Melbourne Statistical Consulting Centre. Calculations of confidence intervals and power were conducted by the centre.

For each audited hospital the following data fields were sourced from DHS's Elective Surgery Information System (ESIS) for all patients admitted from the waiting list between 1 January and 30 June 2007:

- patient identification number
- date of birth
- administrative registration date
- removal date
- total ready for care days
- total not ready for care days.

This period was selected as elective surgery data at one hospital was unavailable for the period 1 July to 31 December 2007 due to issues implementing the *HealthSMART* iPM system.

For each hospital the total population of patients admitted from the waiting list for this period was divided according to number of days spent waiting while ready for care:

- patients with days spent waiting between 70 and 90 days
- all others.

Population totals for each of the four hospitals are shown in Figure C1.

Figure C1
Population totals

	Hospital A	Hospital B	Hospital C	Hospital D
70–90 days	61	97	209	143
All others	1 220	1 336	2 448	1 119
Total	1 281	1 433	2 657	1 262

Source: Victorian Auditor General's Office.

We determined that the sample estimate of the percentage of medical records showing inaccurate ESIS data should have a 95 per cent confidence interval width no greater than ± 5 per cent.

Stratified random sampling was employed to allow comparison of accuracy of reported information between the two groups identified. Principles to determine the sample sizes of the stratified samples were employed as outlined in Appendix B. These principles led to the following sample sizes, with appropriate rounding applied, shown in Figure C2.

Figure C2
Sample sizes for stratified random sample for ESIS

	Hospital A	Hospital B	Hospital C	Hospital D
Waiting time 70–90 days	30	30	40	50
All other waiting times	200	200	220	190
Total	230	230	260	240

Source: Victorian Auditor General's Office.

Records were randomly selected to each stratum using the random numbers tool within Microsoft Excel. Hospitals were provided with an over sample to allow for inability to obtain records currently in use.

Audit of medical records was undertaken by senior nursing staff with previous experience in project, research and/or administrative tasks.

Records were coded as inaccurate if:

- the ESIS registration date was more than three days after the date the clinical referral was received, as documented by a 'date received' stamp or fax documentation
- the removal date was earlier than the admission date for the procedure
- the removal date was later than the admission date for the procedure.

Where the date of referral receipt was not recorded the ESIS registration date was considered accurate. Auditors also documented the date of the clinical referral.

Results

To determine the accuracy of the registration date it was necessary for hospitals to document the date they received the referral. Figure C3 shows the frequency that this occurred within the samples.

Figure C3
Auditable records

Hospital	Records with documented date of referral receipt (%)
A	61.4
B	16.8
C	5.2
D	68.6

Source: Victorian Auditor General's Office.

Figure C4 shows the audit findings of medical records for patients admitted from the elective surgery waiting list between 1 January and 30 June 2007.

Figure C4
Accuracy of reported registration and removal dates in ESIS

Hospital	Finding (in comparison to ESIS data)	70–90 days (%)	All others (%)	All records (%)
A	Late registration date	3.3	7.0	6.8
	Early removal date	0.0	0.0	0.0
	Later removal date	0.0	0.0	0.0
	Total inaccurate records	3.3	7.0	6.8
B	Late registration date	3.3	5.0	4.9
	Early removal date	0.0	0.5	0.5
	Later removal date	3.3	3.0	3.0
	Total inaccurate records	6.6	8.5	8.4
C	Late registration date	0.0	1.4	1.3
	Early removal date	0.0	0.0	0.0
	Later removal date	2.5	4.1	4.0
	Total inaccurate records	2.5	5.5	5.2
D	Late registration date	16.0	25.8	24.7
	Early removal date	0.0	0.0	0.0
	Later removal date	0.0	0.0	0.0
	Total inaccurate records	16.0	25.8	24.7

(a) Figures for 'all records' are the findings for the total sample after representative weighting of the strata results.

Source: Victorian Auditor General's Office.

Figure C5 summarises these findings showing the estimates and 95 per cent confidence intervals for the total percentage of records found to show inaccurate waiting times recorded in ESIS, as well as the total percentage of records showing waiting times of more than 90 days that were not recorded in ESIS.

Figure C5
Estimates and 95 per cent confidence intervals for the percentages of inaccurate files and unreported target breaches

Hospital	Outcome	Estimate (%)	95% confidence interval (%)
A	Inaccurate files	6.8	3.7–9.9
	Unreported target breaches	0.0	0.0–1.3
B	Inaccurate files	8.4	5.0–11.7
	Unreported target breaches	0.5	0.0–2.4
C	Inaccurate files	5.2	2.6–7.9
	Unreported target breaches	0.0	0.0–1.3
D	Inaccurate files	24.7	19.6–29.8
	Unreported target breaches	1.1	0.1–2.2

Source: Victorian Auditor General's Office.

The strata were also compared for consistency. P-values were obtained using Fisher's exact test. The null hypothesis for this test is that the population percentages in the two strata are the same. Data shown in Figure C6 are consistent with the null hypothesis demonstrating that the strata are the same.

Figure C6
Comparison of percentage of inaccurate files between 70–90 days stratum and 'all others' stratum

Hospital	70–90 days			All others			
	n	Inaccurate files	%	n	Inaccurate Files	%	P-value
A	30	1	3.3	200	14	7.0	0.70
B	30	2	6.7	200	17	8.5	1.00
C	40	1	2.2	220	12	5.5	0.70
D	50	8	16.0	190	49	25.8	0.19

Source: Victorian Auditor General's Office.

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