

# Health *SMART*

Strategy for the modernisation and replacement of information technology



## Whole of health Information and Communication Technology Strategic Plan 2003–2007

Information and Communication Technology that supports the delivery of **high quality, consumer focussed** health services through a **partnership** between public healthcare providers.

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## Foreword

Investment in information and communication technology (ICT) will improve the quality, safety and efficiency of Victoria's public health sector.

For the first time in Victoria, ICT is being considered, strategically, across the whole sector, specifically targeting the major challenges and business imperatives facing us now and into the future.

National and international experience with the application of ICT to health has been analysed and clearly demonstrates the opportunities available. It is now well recognised that ICT is a critical enabler for successful change to the health system. The Metropolitan Health Strategy articulates this in the context of the changes proposed for Victoria.

The strategy was developed with considerable stakeholder consultation to ensure that appropriate priorities were identified across the sector. A steering committee, chaired by Dr Andrew Perrignon, oversaw its development and was responsible for its final endorsement.

The strategy provides clear links between these business priorities, the options identified to impact them and the ICT developments proposed to enable and support these necessary changes. It presents an ambitious plan for the next four years but is pragmatic in its approach, recognising agencies are all starting from different points with their readiness to implement change.

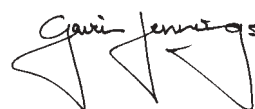
Health has been a chronic under-investor in ICT and lags sadly behind other industries in this regard. It is clear that the only way we are going to achieve the substantial changes required to alleviate the pressures on the health system will be to work together and to exploit the capabilities that information technologies now offer us. This government's recent allocation of funding for the implementation of this strategy over the next four years provides a sound base to redress the under-investment that has hindered us in the past.

A key principle of the strategy is that of approaching the implementation as a genuine partnership between government and agencies. This approach was successfully demonstrated throughout the development of the strategy and further established with the governance arrangements now in place to oversee the implementation. The membership of the Board of Health Information Systems and the three steering committees are clear evidence of this key principle.

The strategic initiatives will put Victoria's public health system in a pre-eminent position by harnessing the power of ICT to support the delivery of high quality, safe and efficient health care. It is with pleasure that we commend this strategy to you and encourage all members of the health system to work together to realise its vision and the benefits it offers to us all.



**Hon. Bronwyn Pike MP**  
Minister for Health



**Gavin Jennings MLC**  
Minister for Aged Care

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## The future

*In 2100, hospitals will focus on care of the sick, but the nature of health, sickness, treatment and care will be very different. Current hospital based diagnostic services will be automated and deliverable in the home, resulting in a major shift in the burden of caring. This shift will remove today's community hospital. Work of low to medium complexity will be undertaken, usually by machines, in the home. Ambulatory centres, usually highly automated, highly accessible, will be customer friendly, one stop health shops of tomorrow. Machines will substantially replace human labour... (Michael K Walsh, Australian Health Review, 25(5) 2002)*

In 2013, moving down this path, paper will fundamentally be a thing of the past in the delivery of health care. Consumer health records will be stored and managed electronically and access to them will be transparently available to the consumer and to all providers involved in their care. Access to these records will be authorised by the consumer and will be enabled using personal access devices.

Health care workers will be supported by technology that automates all administrative aspects of their work and provides them with intelligent decision support to optimise the outcomes they are able to achieve for their patients. Information systems will support the processes underpinning the delivery of care using evidence to promote best practice and optimal productivity.

The health system as a whole will be an integrated, cohesive and effective system with internal controls that monitor performance and forecast demand. The system will be adaptive and have adequate capacity and capability to respond to demands in a timely manner. It will have an infrastructure that supports the consumer in easily and effectively accessing services to achieve optimal health outcomes.

## Introducing the ICT strategy

### Aims of the strategy

Developed by the Department of Human Services, the Information and Communication Technology (ICT) strategy is a four-year plan to implement ICT across the whole of the Victorian public health system to provide a solid foundation for meeting demand over subsequent years.

This ICT Strategic Plan addresses the following key questions:

- What are the key ICT initiatives required to support the Victorian public health system over the next four years?
- How does the health system optimise the benefits it derives from all current and future investment in ICT?
- How should the Department of Human Services facilitate the development of the public health system from its current ICT position?
- How should the department support and manage the implementation of this strategy to ensure that optimal outcomes are achieved?

This plan identifies major opportunities to improve the efficiency of the Victorian public health system and the quality and safety of the care it delivers through strategic application of ICT.

A review of the use of ICT across the health and other industries, and assessment of trends and directions of technology has provided some direction and challenge for this plan.

### The case for change

#### Demand for services

As the population continues to grow and age and new medical technologies contribute to extending life spans, the demand for health services worldwide continues to increase. This demand is reflected in increased volume of services and increased complexity of services required from a health system that has a finite capacity. Consumer expectations of health systems also continue to increase, particularly in relation to ease and timeliness of access to services, freedom of choice, quality and consistency of outcome, continuity of care and informed participation in care.

Victorian hospitals have faced consistent growth in demand for their services over the past years. Hospital activity has increased by an average of 3.7 per cent per annum over the last four years, with an increase of 5.5 per cent in 2001–02 alone. Many strategies have been implemented to improve productivity, to minimise lengths of stay in hospitals and to substitute non-hospital based services where possible. This growth is expected to continue.

The pressures these increased demands have been imposing on the Victorian health system are well publicised. The amount of time patients can spend on trolleys in emergency departments, ambulance bypass and the delays in patients receiving elective surgery or outpatient appointments are all symptoms of the system being under considerable pressure. Public opinion shows concern about these pressures on the health system.

### Staff shortages

The health industry internationally is facing a projected shortage of key clinical staff over the next 5-10 years. Australia and Victoria face the same shortages. The shortage of nurses has been well publicised and is projected to worsen over the next years. Furthermore, specialist technical staff, such as radiation therapists and radiographers, are already difficult to recruit and will become more scarce over the next 5-10 years. Victorian agencies struggling to fill their current staffing needs will not be able to support the additional demand for services over the next 5-10 years without some fundamental change.

### Innovation

The Department of Human Services has initiated a number of flagship and strategic projects to develop the systemic changes that are required to enable the health system to meet current and projected demand. These projects include the Hospital Demand Management Strategy, the Clinical Innovation Program and the Workforce Flagship. While each of these projects is tackling different aspects of health service delivery, they all carry some key assumptions that must be supported. These include:

- efficient use of resources (such as removal of unnecessary administrative burdens, particularly for clinical staff)
- easy and pervasive availability of information at the right location, at the right time and in the right form to support decisions and associated activities
- transparent continuity of care underpinned by appropriate communication between discrete service providers
- use of new technologies to improve the quality and outcomes of care.

Underpinning each of these assumptions is a dependence on access to ICT that is capable of effectively supporting service providers individually and as part of the broader health system, and supporting the health system as a whole.

## Investment

Health is an information dependent industry that will continue to increase its use of, and dependence on, ICT. It will not be able to meet future challenges and demands without a more strategic and active adoption of these technologies, many of which have been providing substantial benefits in other industries for years. Health has been a slow adopter of ICT, primarily due to the chronic under-investment in this area and the complexity of many of the information systems and their implementation.

The current level of errors occurring in the delivery of health care is too high. The consequential adverse events and outcomes have a significant impact, both clinically and financially. There is considerable evidence demonstrating that these errors can be prevented with better access to more information and more supported and automated processes.

There is less spent on ICT in health than in any other government sector, yet it is probably the most information intense and dependent of all sectors and carries the most significant consequences of errors.

The Department of Human Services recognises the need to increase the presence and capability of ICT used across the health system as well as the need for a more strategic and coordinated approach to the development of ICT. This ICT Strategic Plan provides direction for the development, use and provision of ICT across the whole of the public health system in Victoria. This document provides a summary of the major aspects of the ICT Strategy.

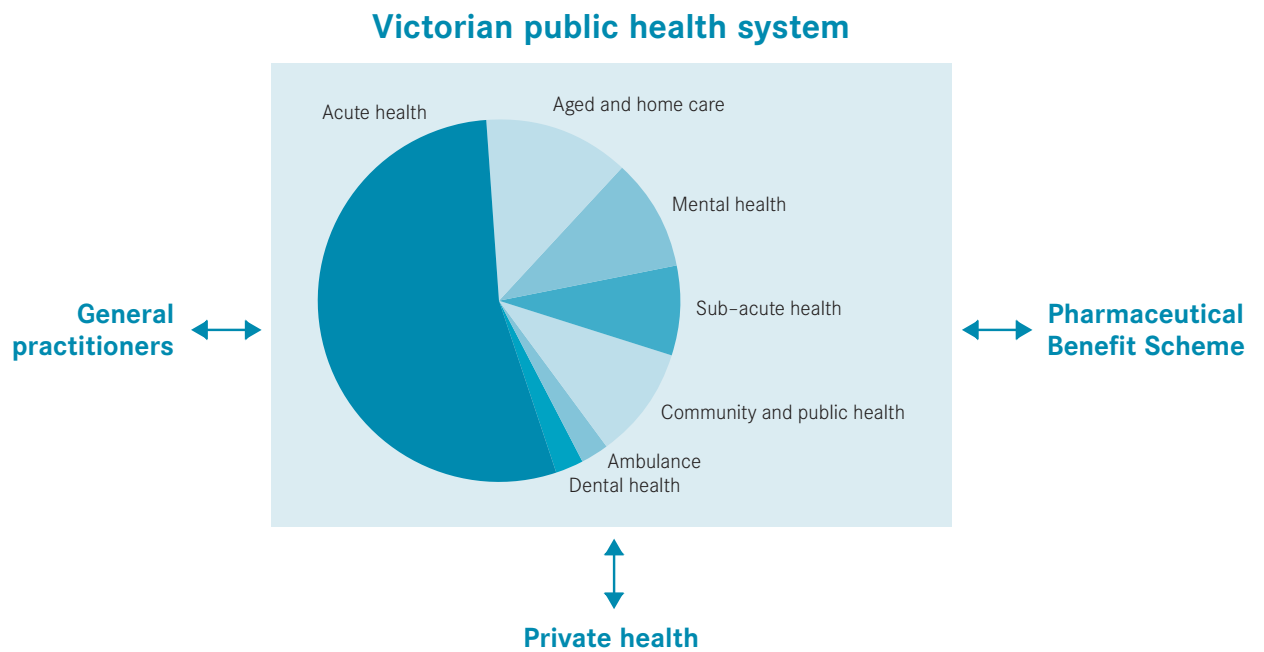
## Whole of health

The Victorian public health system is a large, complex system made up of a diverse range of individual service providers providing a large range of different types and levels of services. The system has a complex and well-entwined relationship with the private health sector, which becomes more and more consolidated as service delivery models continue to develop and change.

Funding sources supporting the system are also diverse and numerous, traversing state and federal jurisdictions and including a mix of service, program and outcome based models.

The Victorian public health system includes 14 metropolitan health services, comprising 35 hospitals; five rural alliances comprising 77 hospitals; and approximately 800 primary health agencies in Victoria. These primary health agencies include around 100 community health services, another 100 medium to large agencies including local government, hospital and community-based services and a diverse range of services covering ambulance, mental health, aged care, drug treatment, community health centre, public health and public dental services. Agencies delivering these services are distributed across metropolitan and rural areas.

**Figure 1**  
Broad services and key linkages  
of the Victorian public health system



## The current ICT position

### Investment in ICT

There has not been a central approach to the purchase and management of ICT across the Victorian public health system. Agencies operate independently and have approached ICT in this manner.

A recent review conducted by Trinitas Pty. Ltd. highlights that the Department of Human Services (including health) spends considerably less on ICT, both capital and recurrent, than all other government sectors. The difference between the level of ICT investment across Human Services when compared to other sectors is up to 11.3 percentage points (ICT expenditure as a percentage of operating expenditure), or twice the actual dollars invested in Human Services. Outside the government sector, health spends orders of magnitude less on ICT than industries such as banking and finance.

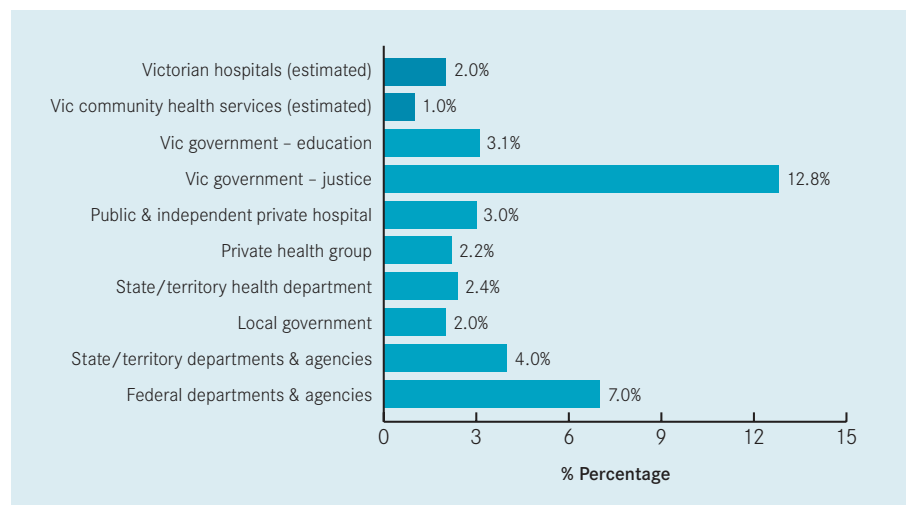
Investment in ICT across the different sectors of the health system varies greatly but the majority of investment to date has been on basic administrative systems required to identify patients, record activity and support funding and other reporting requirements. In the hospital sector, expenditure on ICT is less than 2 per cent of the total operating expenditure of the organisation; in the community-based sector, this amount is even less. When compared to other Victorian Government departments with substantially less intense information requirements, for example transport, health is considerably lagging in its access to ICT.

### Funding source

There is no funding source for ICT, capital or recurrent, within the existing funding arrangements. The Department of Human Services has provided additional funding to hospitals for the development of their ICT (\$12.5 million per annum for the past five years). This amount has allowed agencies to undertake some maintenance and limited development of their systems but not to support the major developments required to replace the high-risk legacy systems or to progress with the implementation of clinical systems. Within agencies, ICT competes for funds with general medical equipment, which also requires substantial refresh and update.

This amount will continue to be provided in support of ICT, but across agencies substantial additional funding is required to address the 'backlog', to bring the health system, as a whole, to an acceptable level of ICT access and capability, and then to maintain this.

**Figure 2**  
ICT expenditure as percentage of operating expenditure



Industry comparisons show that IT capability in most public hospitals is at least a decade behind most commercially oriented organisations.

## ICT in health elsewhere

### Other Australian states

In November 1999, the National Health Information Management Advisory Council (NHIMAC) released Health Online: a health information action plan for Australia. In July 2000, the National Electronic Health Records Taskforce presented Health Online in their report to the Health Ministers who unanimously endorsed it. Health Online espouses the creation of a national health information network across Australia and recommends that key principles be developed to support this, including:

- innovation through use of IT&T tools
- consumer having authority over their information
- research, policy and planning information being a spin off from primary system transactions
- consultation with providers and consumers on new developments
- data protection in the individual and public interest
- government role being one of leadership, direction setting and setting a framework of incentives
- national planning for a consistent architecture
- value for money in health IT&T projects.

A number of trials and projects have been developed in support of the Health Online strategy over the past two years. There is not yet any definitive plan or funding stream in support of states and territories adopting a more centralised and cohesive approach to the development and implementation of ICT. There is, however, an expectation that there will be alignment between the strategies and plans developed by the individual states and territories and those of the Commonwealth.

The governance arrangements in each state have significantly influenced the models of delivery of ICT services to date. By comparison, Queensland has a well-established centralised delivery model and Victoria has had services delivered from individual agencies with limited collaboration, standardisation or sharing of infrastructure.

All states and territories are grappling with the need to replace old administrative systems, particularly hospital patient administration systems (PAS), and the desire to implement clinical systems that will support the transformation of health care delivery. In most states, government health departments have assumed central policy and governance roles and are purchasing ICT centrally, either directly or through establishing and managing panels.

While there has been no national activity geared toward the selection of standard 'Australian' products, the same products are dominant across most states in the core areas of patient administration and clinical systems. While the states are each adopting slightly different approaches, they are all trying to achieve the same outcomes of functionally rich and technically robust information systems across their agencies that will provide the base for development of electronic health records.

### Existing information systems

With few areas of exception, ICT within the Victorian public health sector is currently limited in scope and capability, outdated, fragmented and inefficient. With health care delivery being so heavily dependent on a diverse and complex range of information from a large number of sources, the fact that paper is still the primary storage medium for most of this information is a contradiction, a risk and a real constraint.

A number of core functions performed within each agency are totally dependent on information systems. Some of these functions are specific and exclusive to health; others are generic across all industries.

Agencies are independent and quite discrete legal entities. They have, with few exceptions to date, each provided their ICT services quite separately with the associated resources (servers, applications and support staff) all being replicated within each agency. There are, for example, more than 900 servers in place across the hospitals alone.

The agencies are heavily dependent on these systems yet they typically have no redundancy, they live in environments that are inadequately protected and they have no refresh or upgrade paths planned, as inadequate funds have been available to provide these services.

There are in excess of 30,000 PCs across the health system. About two thirds of these are more than three years old, out of warranty and do not have the capacity or performance to meet expected business needs, yet there are no funds or a refresh plan to replace them.

### Mix of major applications in hospitals

With the historical independence of health agencies in Victoria, it is the only state with a large number of different software applications operating across public hospitals. In NSW hospitals only two types of applications are used for PAS and only two for Financial Management Information (FMIS) systems. In Queensland there is a single standard for PAS and one for FMIS applications in hospitals.

**Figure 3**  
Major applications in Victorian hospitals by vendor

	Patient administration systems	Financial management information systems	Payroll systems	Clinical information systems
ADP				
AppenGen				
Cerner				
CDSIS				
Chiron				
GEAC				
Homer				
iSoft				
IBA				
Mayne HT				
Oracle				
PayGlobal				
PeopleSoft				
Trak				
Microsoft				
SAP				

## Patient administration systems

### Role/function

Patient (or client) administration is a critical function for the delivery of health services. It includes identifying the individual, maintaining their personal and demographic information and tracking their status in relation to service provision. Within a hospital, for example, this includes tracking which bed the patient is in, what services are booked for them (for example, surgical procedures), who is responsible for their care, when they are due for discharge and basic hotel functions such as what specific dietary requirements they may have. As all services provided within a hospital are dependent on accurately identifying patients, this administrative function is absolutely critical to the delivery of services and care.

### Obsolescence

Across the hospitals there are currently at least seven different PAS, most of which are more than 10 years old (the prevalent system, 'HOMER', is 20 years old) and are unable to use new Web and database technologies. The HOMER products have already formally been declared obsolete by the vendor who will withdraw support for the products in the near future. Vendors of other products have also informed of their intention to declare their products obsolete.

The organisations running these obsolete products are at significant risk. The products are not technically capable of being developed to meet current business needs or to support the level of integration required with other systems used across agencies. Technical staff with skills required to support or develop the product are scarce as the technologies are so old.

### Client administration systems

The client administration system used for mental health services (RAPID-CMI) is a more recent development and is consistent with modern open architecture standards. However, it does not currently link with the systems used by other agencies, particularly hospitals, so data entry must be duplicated in these different systems as clients present.

The community-based service providers have even less in the way of client administration systems, although some individual services (such as ambulance and dental) have recently implemented systems specific to their particular services.

## Resource management systems

Resource management includes the major areas of financial management, materials management and human resource management.

There are more than 10 different financial and materials management systems used across the agencies. These range from some industry standard products (such as Oracle or PeopleSoft) used in a few hospitals to the ‘off the shelf’ MYOB product being used by some smaller agencies.

Most hospitals are using ageing products that are over 10 years old and, in addition to having no support from the vendors, these products are incapable of supporting electronic business functions such as E-commerce or E-purchasing or other processes considered to be current best practice. Hospitals are now part of larger organisational structures (health services or rural alliances) that have operating budgets up to \$500 million. Such large businesses require appropriate financial management support.

Human resource management systems are not used within agencies except for supporting the payroll function. There are a few small installations of staff rostering systems but none of these are enterprise-wide (they run in isolated departments or wards). Without access to this functionality, the human resource processes for such large workforces are inefficient and monitoring and planning are very limited given the restricted information available.

## Clinical systems

Systems designed to support the delivery of clinical care have developed significantly over the past 5–10 years. They include electronic access to investigation results and to request services (for example, ordering tests, requesting theatre time, scheduling equipment, making appointments) as well as electronic decision support and support for the use of clinical pathways and evidence-based care. These systems are fundamental structures for the development of the electronic health record.

Clinical systems enable significant change to current work practices to increase the quality and outcome of care, increase the efficacy of resource use and reduce the variability of service delivery. While a few of the hospitals have started to implement ‘bits’ of these systems, there has been inadequate funding available for them to be deployed universally and comprehensively. As these systems rely on technically and functionally robust patient management systems, many agencies with obsolete patient administration systems have been constrained technically in trying to progress these developments.

## Goals for the Victorian public health system

There are a number of strategic business goals that are fundamental to the Victorian public health system developing to support projected future demands. These are to:

- increase the quality and safety of care and improve health outcomes
- develop more consumer oriented health care
- increase the efficiency of health care provision
- improve the management and use of resources
- attract, retain and support a highly skilled workforce.

### Increase the quality and safety of care and improve health outcomes

#### Misadventure

The 1995 Quality in Australian health care study identified that adverse drug events are a major problem in Australian hospitals. Adverse events account for 3.3 million bed days of which 1.7 million could be classified as highly preventable, and cause death or major adverse outcome in some 10,000 patients each year. The estimated cost of highly preventable adverse events is approximately \$867 million per year. Over a five-year period this would amount to \$4.3 billion.

Furthermore, medical misadventure consumes over half the amount spent on compensation and insurance by state treasury departments.

#### Clinical planning and decision support

There is considerable evidence demonstrating the benefits of applying more controlled plans of care to patient treatments. The use of clinical pathways, derived from well reviewed clinical evidence, has been shown to reduce hospital length of stay, reduce the associated cost of admissions and improve the health outcome of patients for a number of different groups of patients. The need to provide this sort of structured support, as well as other intelligent decision support (such as electronic medication ordering including e-prescribing), for clinical staff, particularly junior staff, is well recognised.

For example, the Leapfrog Group was established in the United States by The Business Roundtable, a national association of Fortune 500 CEOs, to improve the outcomes of health services. This group identified three major initiatives to improve the quality and safety of care:

- computerised physician order entry
- evidence-based hospital referral
- ICU physician staffing.

This group is now providing financial incentive for hospitals adopting these technologies to support their provision of care.

## Develop more consumer-oriented health care

### Case management

The Victorian public health system is currently fragmented and agency-centric, rather than consumer-centric. Much of this is due to the inability of agencies to easily share the information they have on common consumers. Quite often the consumer is the only one who knows the full scope of services they are receiving and they are often not well positioned to convey this to the various service providers.

Studies have shown that effective case management, supported by appropriate information systems, has the potential to reduce the number of services required by the consumer, improve outcomes for the consumer and reduce the overall cost of their care.

### Access to services and information

Society is developing its level of knowledge and understanding of the opportunities ICT provides and, with this, is emerging a heightened demand for Victoria's health system to deliver services and care differently. Health consumers are demanding increased access to, and control over, their health information and they are using knowledge bases in support of self-assessment. There is demand for wellness programs, information that will support the comparison of providers and much easier access to the system as a whole. These demands will continue to increase over the next 5-10 years as the uptake and use of information systems within society also increases.

Multidisciplinary planning and delivery of care will increase. Consumers already expect their health and personal information is sensitively and confidentially managed to support these activities, with their knowledge and authority, respecting their rights and maintaining their privacy. Consumers will increasingly expect that they have more control over their health information.

## Increase the efficiency of health care provision

There are numerous areas of inefficiency within the Victorian public health system as a whole.

### Data redundancy

It has been estimated that various personal and demographic details may be requested from a patient as many as 15–20 times during one single admission in a large hospital. If this situation is extrapolated to encompass the number of interventions that an individual may have each year, then it is obvious that the amount of effort wasted in this duplication, not to mention the unnecessary imposition on the patient, is considerable.

### Hard copy recording

Medical and nursing staff spend significant amounts of time transcribing results of investigations from various systems to the paper medical records as this information is used pervasively through an episode of care. This not only places a large administrative burden on clinicians, it also has the potential for errors, which then undermines the integrity of stored patient information.

### Test redundancy

It is extremely unlikely that investigations performed in one sector of the health system (for example, in the community) are made available to any others (for example, hospitals) unless the patient acts as a courier. Studies have estimated that the amount of unnecessary investigations, through results not being available to providers, may be as high as 20–30 per cent in the acute sector. A study of investigations for which there are criteria defining the earliest interval at which a repeat test might be indicated, found that 28 per cent were repeated earlier than recommended and that 40 per cent appeared redundant.

### Referral access

There are more than 2.2 million specialist visits provided through outpatient clinics in Victorian hospitals each year, many of these the result of referrals from practitioners outside the hospitals. A general practitioner typically has to make multiple phone calls to get an appointment for their patient at a hospital outpatient clinic. If they have time, they may ring around a few hospitals to determine which hospital can provide the earliest specialist appointment, but often the patient is simply referred to the closest hospital. There is no system that provides easy access to these services or provides the 'statewide' picture. Consequently, patients are also booked for multiple appointments to see which may come up first. Similar issues occur with the management of elective surgery cases on hospital waiting lists.

## Improve the management and use of resources

### Human resources

Human resources are the single biggest cost to the Victorian public health system, representing approximately 72 per cent of the total system cost; yet beyond supporting the payment of staff, health agencies have no information systems supporting the effective management of these resources. Timesheets are typically completed manually (on paper), transcribed into a system for payroll purposes, and limited reporting is derived from this data. Rostering is manual and, in a major teaching hospital, extremely resource intense (particularly for nursing and medical staff), occupying 10–15 EFT across the clinical disciplines.

### Financial

Financial management is, similarly, a significantly manual process. Reporting is usually restricted to cost centre reporting, as there is limited capacity to extend this to include program costs or service level costs. Reporting reflects actual costs only; commitments made but not yet paid are not included so reporting can be quite misleading.

The manufacturing industry has demonstrated they can improve their stock management, purchasing costs and financial services costs significantly through the use of new generation information systems. Reporting ability and accuracy of monitoring similarly increased.

Case studies of organisations successfully implementing resource management systems, such as FMIS, indicate potential savings of 2–10 per cent of gross revenue, with most delivering savings of around 3 per cent. The Auditor General in NSW reported savings of 3 per cent through eProcurement services, while Queensland reported savings of 1.5 per cent for e2e business.

## Attract, retain and support a highly skilled workforce

### Skill shortages

Approximately 45 per cent of the health workforce is made up of nursing staff, 9 per cent medical staff and 18 per cent medical support staff. The nursing shortage has been well publicised, however, there are also considerable shortages in some medical specialties and some technologists (such as radiation therapists, radiographers, cardiac technicians, audiologists, podiatrists, speech pathologists, physiotherapists and occupational therapists).

### Administrative burden

Clinical staff across all disciplines spend considerable amounts of time performing administrative tasks as well as locating, collating, extracting and transcribing data

for the paper medical record. Case studies have shown that junior medical staff across a number of clinical units in a typical large hospital spend an average of one hour per shift per day just locating x-ray films required for ward rounds. This can be as high as three hours per junior medical staff member per shift per day for some specialty areas.

These non-productive non-clinical activities all detract from the amount of time the clinicians have to provide care to their patients and add to the frustration and dissatisfaction felt by these staff. Additionally, there is an expectation that clinical staff will stay abreast of all developments within their field of specialisation. With the abundance of literature that is available, this is an extremely time consuming activity if there is no structured approach to reduce the 'information overload'.

## The vision and mission for ICT

### The vision

**Information and communication technology that supports the delivery of high quality, consumer focused health services through a partnership between government and health care providers.**

### The mission

To deliver ICT that:

- is well integrated, and actively used in clinical practice
- optimises the use of all data collected and removes the need for duplication of capture
- successfully supports the provision of consistently high quality, cost effective care
- supports the use of evidence-based, best practices across the health system
- supports the consumer in accessing the system to meet their needs while protecting their rights and privacy
- supports clinical staff in providing optimal health outcomes through decision support and communication with other clinicians and care providers
- provides a seamless interface between various segments and sectors of the system in support of continuity of care
- supports effective planning, monitoring and evaluation
- is implemented, managed and developed in a coordinated, systematic, cost-effective and sustainable manner.

## Strategic observations

Information systems in health care are extremely complex, due to the range and scope of functions they are required to support and the diverse range of agencies where they are in use. There are no industry products that have the capacity to support all functions but there is a need for all products to be integrated to create a single, functional system.

The Australian market for health information systems is a very small component of the total international market and one that has been reasonably volatile over the past 10 years. The fragmented approach to the purchase, implementation and development of information systems has significantly contributed to this volatility. Three scenarios have been experienced too frequently in the past.

1. Local vendors develop product for a single agency in a commodity fashion, with no broader industry context. This product is then purchased by some other agencies but the vendor is unable to derive the additional business required to sustain their viability.
2. Agencies purchase products from international vendors with no presence or experience within Australia. The local needs are not well accommodated by the products and significant development is required to 'Australianise' them. These developments become technically, financially and commercially unviable.
3. Monopolistic arrangements emerge, through an accumulation of individual arrangements, without strategic assessment, direction or overarching vendor management. These arrangements have resulted in poor service delivery, significant loss of control, lack of vendor responsiveness and increased costs.

To optimise the impact of investment in ICT, it is imperative that a much more structured and strategic approach is adopted within Victoria, as well as across the other states. Most of the successful international vendors of health systems are now developing their products in a more global manner and view the Australasian market as an important one. In parallel, technologies have now developed to the point that integration between health products and other industry standard products (particularly in the resource management arena) can be achieved allowing Australian health agencies to access the opportunities these products offer.

The tactic emerging is one of adopting an enterprise approach to:

- reduce the overall number of different products that are used
- develop panels of preferred products for each group of core functions
- share as much ICT infrastructure between agencies as possible
- optimise the leverage and influence available through larger purchases from a limited number of vendors.

Critical to the success of this approach is an overarching strategic direction and technical architecture, including the systems integration, a sound and rigorously enforced implementation methodology and the development, management and enforcement of standards. These must be provided through a coordinating body such as the Department of Human Services.

## Opportunities for ICT

The strategic business goals identified previously provide significant opportunities for ICT.

### **Increase the quality and safety and improve health outcomes**

There is significant opportunity and obligation to apply current (and emerging) technologies to improve the quality and safety of care and, therefore, health outcomes. Much of this opportunity relates to removing the current dependency on paper-based records. Some key potential contributions include:

- making clinical information available to clinicians at the points of care to remove errors introduced through transcription of data and to increase clinicians' ability to make timely, informed decisions
- using decision support tools that actively engage best practice information with specific patient information to support clinicians
- enabling better communication between service providers
- reducing adverse events and improving the appropriateness of care through introduction of intelligent e-prescribing and investigation ordering/reporting applications
- removing the inefficiency and inaccuracy of relying on paper records with progressive development of electronic patient records
- introducing systems that support the active use of clinical pathways that reflect best practice care
- actively providing details of clinical allergies and alerts at relevant points and times to ensure that clinical care incorporates this information
- increasing the use of telehealth, including home monitoring.

### **Develop more consumer-oriented health care**

Implementing ICT initiatives in the Victorian public health system will provide significant benefits to the health consumer as well as to health care providers through:

- scheduling systems to improve access to services
- transparent communication between all providers involved in a consumer's care
- increased access to electronic patient records
- active communication of event details and patient information between providers
- access to health information knowledge bases and wellness programs
- increased use of home-based monitoring.

## **Increase the efficiency of health care provision**

A more integrated approach to health care delivery will be possible through the use of ICT. Significant efficiencies and improved efficacy in the delivery of health care to consumers will be achieved by:

- reducing unnecessary investigations through electronic ordering systems
- improved use of medications through e-prescribing
- improved resource allocation through automated scheduling systems
- removing the wasted time and potential error associated with transcription of data through access to appropriate aspects of electronic patient records
- removing unnecessary administrative tasks through the introduction of automated, intelligent patient and resource management systems.

## **Improve the management and use of resources**

Current and emerging technologies provide significant opportunities to improve the management and use of resources. This includes financial management, human resource management, asset and equipment as well as materials management. Improvements will be achieved through:

- electronic commerce support
- improved financial reporting
- staff rostering
- increased use of telehealth to increase access to specialist services with less requirements to transport patients
- decision support tools
- performance reporting.

## **Attract, retain and support a highly skilled workforce**

Achieving the goals of the Victorian public health system will be totally dependent on developing and retaining a workforce that is appropriately skilled and capable. Significant shortages of key staff groups are projected over the next 5–10 years so it is imperative that ICT is applied to reduce the risk in this area. This can be achieved through:

- removing unnecessary administrative activities by automating these where appropriate
- removing wasted effort required administrating patient data, particularly transcription of results, location of x-ray films

- taking patient data to the clinician at points of care rather than the clinician having to 'go to' the physical paper records
- supporting evidence-based care through systems actively supporting clinical protocols and pathways
- automating staff rostering
- removing the inefficiency and inaccuracy of relying on paper records.

### **ICT implications**

The opportunities described above carry a number of implications that must be considered in developing a plan to move forward.

1. Information needs to be managed and used as a critical asset of the health system
  - Right information at the right location in the right form at the right time
  - Unique patient identification
  - Privacy and security.
2. Communications and Technology Infrastructure
  - Comprehensive and reliable communications infrastructure required
  - Pervasive presence of PCs and other access devices will be required
  - Mobility of access to systems.
3. Workforce skills and competency
  - Clinical workforce must be adequately proficient in, and comfortable with, use of technology
  - Organisational structures and procedures will need to change to fully utilise the ICT proposed.
4. Applications and integration
  - Applications must be easy to use
  - Applications must be robust and reliable
  - Open, non-proprietary technologies must be used to support inter-operability
  - Applications must be flexible and responsive to ensure that future needs will be met without substantial replacement or redevelopment required.

## The approach

The approach that has been adopted for Victoria is intended to leverage as much as possible from investments in ICT to date while removing the significant risks and exposures that have been identified in the existing ICT. It is intended also to recognise and support agencies that are ready to move forward with more complex systems. The aim is to establish a solid baseline of systems that will support the system in meeting current and future demands, within and across agencies.

This approach will be implemented by introducing developments on a number of fronts simultaneously to:

- **replace** unsupported, core legacy applications with capable, industry standard ones
- introduce **new systems** capable of supporting the **transformation** of health care
- refresh and develop the **ICT infrastructure**
- develop a centralised **service delivery model** to implement this strategy and to deliver core infrastructure services.

This focus will ensure that:

- all ICT developments are **targeted to derive optimal business benefits** for individual agencies as well as for the system as a whole
- **agencies prepare** for the highly functional clinical systems (for example electronic prescribing) through a structured program of technology, applications, staff and organisational development.

The high level priority of ICT development will be to:

1. focus on core administrative and clinical systems for all major agencies (hospitals and major community health centres)
2. make core systems available to smaller agencies where appropriate and use telehealth to increase access to specialist services
3. focus on systems that support the provision of care across the acute and primary care sectors
4. improve state reporting systems to remove the unnecessary overhead they currently provide
5. develop systems that support the provision of care across any agencies
6. develop systems with which the consumer can interact directly.

This sequence is not exclusive; it provides focus and guidance for the substantial development that is required over a short period of time. It is proposed that some development projects, representing priority 3 and 4 items, would commence immediately as there is more research and development and, therefore, lead time required to get these systems to a point that will meet Victorian needs.

According to the approach and priorities defined above, a number of specific areas have been identified as priority initiatives. While these focus on different functional aspects, the interdependencies are critical to achieving the outcomes required. Therefore, they need to be managed as a cohesive program.

The Department of Human Services will assume a strategic, policy and facilitation role in the implementation of these developments but agencies (with the selected vendors) will be responsible for the actual implementation of the systems and the associated work practice changes required to optimise their use.

## The initiatives

Six major initiatives will be undertaken. While each focus on different functional aspects, the interdependencies are critical to achieving the outcomes required.

The initiatives are to establish the following systems and functions and achieve appropriate standards:

- **Resource management** systems across all health services, rural alliances and major health centres.
- **Patient management** systems across all health services, rural alliances, community health, ambulance and dental services.
- **Clinical systems** supporting access to clinical services and their results across all health services and regional hospitals (providing the structure and initial content of the electronic health record).
- **Electronic medication ordering** across all health services and regional hospitals.
- An appropriate **governance and program management** structure to facilitate the implementation of this strategy.
- Infrastructure refresh and **shared ICT service**.

The Department of Human Services will establish a Program Office responsible for ensuring this strategy is implemented appropriately. The Office will not assume responsibility for the delivery of projects within agencies but, rather, for providing the methodology, policies, standards and facilitation required for agencies to then manage their individual projects.

Consideration will be given to establishing a Board of Health IT to oversee implementation of the strategy and ongoing planning and strategic development. This Board should be chaired by a senior executive of the department and should include representation from agencies, Department of Treasury and Finance and Multi Media Victoria.

The intent of the program approach is to ensure that the interdependencies between projects are managed in a systemic and controlled manner to ensure that optimal outcomes are achieved. The program will provide the structure for agencies to move forward in a way that recognises their varying states of readiness to implement change enabled by the ICT proposed. This will include the readiness of the existing technology, applications, staff skills and the organisation as a whole to drive and manage the changes required.

Within each of these initiatives there are a number of specific projects that will be undertaken.

## Resource management

This includes financial management, materials management and human resource management. The aim is to bring all agencies to a point where their information systems provide the management, reporting and planning support required for them to optimise their internal resource use and effectively meet the broader state planning and monitoring needs.

### Activity includes:

- replace financial information management and materials management systems in health services and rural alliances currently using inadequate or unsupported systems
- pilot patient acuity systems (major agencies)
- introduce staff rostering systems (major agencies).

## Patient management

This includes the support of all functions associated with the administration and management of patients and clients, particularly their identification, management of personal and demographic details, case management and tracking (what hospital bed are they in, when are they due for discharge, what community services are planned, what elective waiting list are they on). A key development will be the introduction of a unique patient identifier that is required for the development of a longitudinal electronic health record. These systems have a broader functionality than the old PAS.

### Activity includes:

- replace the HOMER PAS and others not capable of meeting current requirements
- design a unique patient identifier for Victoria
- integrate the mental health client management system (CMI) with the hospital PAS
- implement a system that supports the management of patients (case management) across the acute–primary health interface in an integrated manner
- introduce a client management system across the major community agencies.

## Clinical systems

This includes the ordering and scheduling of services for patients, access to results relating to these services and scheduling resources to ensure that everything necessary is available (equipment, staff, facilities) at the right place and time to deliver the services required. The management and access technologies for these data create the structure of the electronic health record.

Currently, there is significant inefficiency caused by the inadvertent booking of clients for more than one appointment at any one time or booking clients in for appointments that are hours or days apart, causing significant and unnecessary inconvenience for both clients and staff. Additionally, there is considerable inefficiency caused by the inability to schedule resources to ensure that they are available to deliver a service at the time it is booked. Too often key staff are unavailable or vital equipment is being used elsewhere resulting in inefficiency, delays and dissatisfaction of both clients and staff.

Some of the most frequently used information within a medical record is the results of investigative and therapeutic services. Electronic access to this information is, therefore, a critical element of the development of an electronic health record.

#### **Activity includes:**

- introduce electronic ordering and results reporting for pathology, diagnostic imaging and cardiology to health services and rural alliances
- introduce resource scheduling systems for outpatient clinics, theatres and allied health services
- enable access to knowledge bases at points of care
- increase the use of telehealth, including home monitoring.

### **Electronic prescribing**

This includes the creation of a request for medications to be dispensed and the provision of decision support for the request that incorporates drug-drug reactions, drug-allergy reactions, drug-condition warnings and drug-pathology result contraindications. The conversion of the administration record to an electronic form allows the medication administration function to also be supported.

Success of this initiative will depend on comprehensive integration between the ordering system, the pathology and radiology systems, the patient's record and the dispensing system.

#### **Activity includes:**

- select standard product for the state
- establish common formulary
- develop a standard medication administration record
- implement a fully integrated medication ordering system in all metropolitan and rural/regional health services
- evaluate the impact of the initiative on adverse drug events and other outcomes measures.

## Develop a governance and program management structure

This will include developing and establishing an appropriate governance model. Consideration will be given to the establishment of a Board of Health IT to be responsible for implementing this strategy and for subsequent strategic planning and development.

### Activities to be undertaken will include:

- finalise the governance model
- establish a Program Office within the Office of Health IT
- establish project methodologies to be applied
- establish a reporting framework.

## Refresh and develop shared ICT services and infrastructure

The ICT development proposed will require a significant level of technology, communications and support infrastructure. While there is a large amount of this already in place, it is fragmented and, in some areas, unnecessarily replicated. To provide the level of technology and services needed, there will be a considerable use of shared infrastructure.

### Activity includes:

- develop the communications and support infrastructure required to maintain the FIMS replacement in a central location
- develop a detailed plan and design to extend shared ICT services for use with PAS replacement
- develop an overall governance structure for shared ICT services
- establish communications and support for ongoing development of the service
- develop a technology refresh plan
- establish procedures to implement the plan.

## Guiding principles

Successful implementation of this plan will depend on adhering to a number of well-defined principles. Many of these principles will require translation into specific procedures that must be embedded into the operation of each participant agency (including the Department of Human Services) and must be suitably enforced.

A summary of the key principles is included here.

### Information

- **Information is an asset** that will be managed and shared appropriately, within and across health agencies and service providers, to optimise its contribution and value to the health care system.
- Individuals will have a **unique identifier**.
- **Patient care and service delivery** processes will drive information needs.
- Information must be **accurate, timely and highly available**.
- **Standard code sets and data definitions** will be developed, managed centrally and used by all relevant systems.
- Appropriate processes and technology will be implemented to ensure **data quality, integrity, security and accessibility**.
- Information needed for research, policy and planning will be obtained as a **by-product of agency operational systems**.
- **Data will be captured once only** and captured as close to its source as possible.
- An individual's information is used and transferred securely with their knowledge and authority, respecting and protecting the **individual's rights and privacy**.
- Information is **used to empower** individuals and communities.

### Applications and integration

- **Maximal leverage will be derived from existing applications** where they are technically robust and capable.
- **Internal development of software will be minimised**, selection of new applications will first consider reuse of something existing, then buy, then build.
- Panels of **preferred products** will be selected for all core applications.
- Applications will be sourced from **commercially viable, leading edge software houses**.
- New applications must:
  - **build on** the existing foundation
  - be capable of meeting **integration** standards and overall requirements
  - use industry **standard databases and tools**
  - be **supported easily**

- have defined **ongoing development** paths.
- Applications will be **integrated to increase the functionality and effectiveness** of the total information systems, using industry standards.
- Applications and information repository design will address **security** concerns to protect data from unauthorised access without obstructing functionality.

### Information technologies

- Maximal **leverage should be derived from previous acquisition processes**, which have resulted in financially sound contractual relationships with commercially viable, leading edge technology providers.
- Data processing technology will be **located for most cost effective and technology effective** support.
- Data processing and storage **technologies will be shared** for most effective use, management and support.
- Technologies supporting core applications will be **housed in class A facilities** that provide backup for each other.
- Technologies supporting core applications will provide **adequate redundancy** to support the required level of application availability and efficient recovery in the case of a disaster.
- **Common hardware architecture using industry standards** and offering choice of operating system environments will be enforced.
- Hand held devices, voice activated systems and pen **technologies will be promoted** to support ease of data entry.
- Technology will be **refreshed** to maintain its ability to meet the needs of the organisations.
  - Infrastructure design will address **security** concerns to protect data from unauthorised access without obstructing functionality.
  - Infrastructure will address security requirements for **exchange of information with external sources**.

### Communications technologies

- All communication channels will have **adequate redundancy** to ensure continuity of access.
- **Voice and data** channels will be integrated when advantageous to either service.
- **Continued integration of voice and messaging modalities** (pagers, mobile phones, e-mail, voicemail, radio, nurse call, cordless phones).
- Technology will be **refreshed** to maintain its ability to meet the needs of the organisation.
- All data that traverses non-trusted networks will be encrypted.
- There will be **no unprotected gateways** to external services or systems.

### Commercial/financial

- **Purchasing power** will be maximised through government arrangements and collaborations with other agencies.
- The Department of Human Services will provide **financial support to agencies for the implementation** of projects defined in this strategy, conditional on their adopting the associated principles and conditions.
- **Agencies will contribute** to the project implementation costs.
- Agencies will be responsible for the **ongoing support and maintenance** costs of the applications they implement.
- Agencies should develop **business cases** for the implementation of new systems to ensure that they have a clear understanding of benefits to be realised and the technical and financial implications of the project.
- Implementation of **departmental or specific agency systems** that provide benefits directly back to the agency should be funded by the agency.

### System implementation

- The Department of Human Services will **facilitate the implementation** of projects within this strategy through a Program Office established for this purpose.
- Agencies will be responsible for the **management of projects within their agency** under the auspice and direction of the Department's Program Office.
- **Knowledge and skills** will be transferred between staff on different projects through structures and methodologies established by the Program Office.
- **Lead agencies** will be identified for the implementation of all core systems and it is expected that other agencies will participate in these implementations through the development of standards as required.
- Agencies will ensure that they provide **appropriate resources, structure and management** to support the work practice changes required.

## Governance and management

- The Department of Human Services will support **business driven**, not technology driven, initiatives.
- **Governance and management structures** will be developed to support strategy implementation.
- Governance and management of ICT will support **innovative application of ICT** to enable improved business outcomes.
- Governance structures will be developed for **shared ICT services** to ensure that they deliver against their agreed service levels and that they remain cost-effective.
- The Department will develop **strategic direction, policy and standards** and provide program management and direction.
- Agencies will be responsible for **project sponsorship, project management, management of business changes** and full participation and support of strategic ICT initiatives. Investment of ICT will focus on the **implementation of this plan**.
- Strategic ICT projects will have a **reporting responsibility** to the Department of Human Services Program Office.
- Operational ICT initiatives across the system will be **managed to maximise total business value**, not just reduce costs.
- Agencies will commit the appropriate resources, management, governance and support to their ICT projects and will **demonstrate the benefits and outcomes** of these investments in a structured manner.
- ICT projects will undergo a structured **initiation process**, appropriate to their order of magnitude and impact, before they are approved and have resources assigned. This will include consideration of the total cost of ownership over the expected life of the solution.

## After word

The strategy and specific initiatives described in this plan are a beginning. The outcomes at the end of the initial four-year program across the community, clinicians and agencies will form a sound basis for the system to continue with building the longitudinal health record, automating clinical processes and proactively responding to the increasing demands of a more informed health consumer.

The capability to make timely, accurate and complete health information available to health service providers is a critical element of the health system of the future. The role of ICT in facilitating this capability is critical and will continue to be a strategic focus for future activities.