Victorian health sector information, communication and technology (ICT) vision and framework, 2009–13

Supporting high-quality, sustainable health services for all Victorians

Victoria's Health ICT Strategy

A Victorian Government initiative

Victoria The Place To Be

Victorian health sector information, communication and technology (ICT) vision and framework, 2009–13

Supporting high-quality, sustainable health services for all Victorians

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March 2010.

Foreword

Both international experience and evidence from within Australia demonstrate that through effective use of information, communication and technology (ICT) clinical processes can be made safer and more reliable by providing the right information when and where it is needed.

E-Health can also save time and effort for busy staff by reducing the need to re-gather information, streamlining the supply of data so it can be captured once and then used to support clinical decision making, research, policy development and management, all within a secure environment that protects individuals' privacy.

The demand for health services is continuously being driven by population growth, population ageing and the increasing burden of chronic disease. This is challenging the way services need to be delivered. As the Premier has observed in *Next steps in Australian health reform (June 2008)* "The reform that could have the greatest impact on integration of care is the development of better e-health infrastructure… e-health initiatives also put greater information in the hands of the consumer, allowing them to make better decisions about their care needs and the services they receive."

The *Victorian health sector ICT vision and framework, 2009-13* builds on the investment and achievements of the 2003 Health*SMART* Strategy and will provide direction for future investment in the use of ICT across the public health sector in Victoria for the period 2009-2013. It has been developed with a clear understanding of the national health and hospital reform agenda. Victoria intends to be a part of that reform and to effectively leverage its existing ICT investment and capability.

The Vision recognises the importance of innovation within a consistent architectural approach and common standards, so that the solutions implemented are able to interoperate effectively while remaining agile and responsive to emerging needs. It also acknowledges that to deliver the planned benefits will require not only meeting the technical challenges of implementation but also ensuring strong support for the change management required to deliver the outcomes needed.

Development of the *Victorian health sector ICT vision and framework, 2009-13* has drawn on a wide range of input from across the sector and I am looking forward to working with the sector in delivering the initiatives included in it. The Vision is ambitious and will require a sustained commitment but the benefits will help to keep Victoria at the forefront of the delivery of health services and high quality care.

Fran Thorn
Secretary
Department of Health
March 2010

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Executive summary

The *Victorian health sector ICT vision and framework* 2009-13 (the vision) has been developed from the perspective of the health needs of the people of Victoria, following extensive consultation. The vision acknowledges the *National e-health strategy* (commissioned by the Australian Health Ministers' Advisory Council) and seeks to leverage rather than duplicate its aims by providing a unified framework through which planned benefits can be delivered.

Recognising the impact of changing models of care, the vision sets the direction for the Victorian public health sector including a more effective interface with the non-government and private sectors. It also highlights opportunities for collaboration with service providers outside of the Victorian public health sector and with the broader human services community. To achieve many of the planned initiatives will require a partnership approach with other levels of government (both national and local) and with non-government providers.

The vision and framework comprises a portfolio of initiatives organised around:

- **quality and safety** – managing risks and making health care safer
- **accessibility** – improving access to the health system and its resources
- **continuity of care** – increasing the efficiency and effectiveness of all handovers throughout the patient journey
- **sustainability** – managing demand, reducing waste and improving productivity
- **supporting the workforce** – maximising workforce potential and having productive and motivated health care workers
- **building the foundation** – creating the core infrastructure to support effective delivery and interoperability of ICT solutions.

This vision succeeds and builds on the *Whole-of-health ICT strategy 2003–07* that provided direction for the development of ICT across the public health sector in Victoria through the Health*SMART* program and places strong continued emphasis on realising the benefits supporting the strategic goals of the health care sector and not simply deploying further applications.

As the Premier of Victoria has observed (*Next Steps in Australian Health Reform*, June 2008):

> *'Health care should be seamless from the patient's perspective, regardless of the number of health care professionals involved. Better links between primary and community health care providers and the acute sector are needed in order to improve the quality of care provided to patients, as well as the overall efficiency and effectiveness of the health care system.*
>
> *'The reform that could have the greatest impact on integration of care is the development of better e-health infrastructure.'*

When the initiatives outlined in the vision are implemented, Victorians can expect:

- statewide implementation of clinical systems providing support for order entry and results reporting and medication management that has expanded functionality to support clinical documentation and audit
- consumers better able to support the management of their care by more conveniently accessing information about their health problems and the services available to help them

- the management of patient flow across the sector enabled by an integrated view of patient movements between ambulance, emergency, and inpatient services, and subsequent discharge to the community
- Victoria's health services routinely providing clinically rich discharge summaries and using electronic referrals between service providers
- managers and clinicians having timely access to the information needed for planning and analysis through user-friendly and intuitive tools
- clinicians across the sector, including general practitioners (GPs), having improved information and knowledge to support delivery of care, access to learning materials and improved capability to engage with their peers
- better coordination of care for mental health and alcohol and drug clients through improved integration and implementation of a mental health and drug and alcohol client management capability
- a statewide approach to management of incidents and credentialing of the workforce, supporting a focus on continuous improvement and improved quality at all points in the system
- rural and remote communities having improved access to services through more effective coordination of telehealth supported by protocols, guidelines, payment models and training
- availability of a secure clinical network across the public health sector providing a consistent guaranteed service to all parts of the state with the potential to support other parts of the sector in the secure, reliable transfer of information through collaborative agreements.

The vision recognises the importance of innovation and the need to support opportunities that may arise from within the system or through technology advances. It places a strong emphasis on a consistent architectural approach, common standards and interoperability rather than use of particular technologies.

The vision will be supported by a strategy and associated plans that further detail the initiatives, high-level architecture, governance, resource requirements and the funding model needed to implement it. The extent to which the proposed functionality can be achieved across Victoria within the period covered by the vision will be dependent on the availability of adequate resources to support the strategy (both from the Victorian Government and complementary national investment) and the capability of the health sector to both meet the technical challenges and give effective support for the change management required to deliver the benefits.

A critical success factor will be obtaining buy-in from health care agencies and the service providers operating within them. To support this, there will be a transparent business case development process and a consistent approach to evaluation based on the agreed principles and clearly defined outcomes.

Achieving those defined outcomes across Victoria will require a high level of collaboration between the department and the health sector (both public and private) in implementing statewide solutions and will be dependent on strong leadership both centrally and locally, in particular clinical leadership, to realise the planned benefits. Processes will be established to monitor and report on the outcomes of individual initiatives and an annual review of the portfolio will ensure the continued relevance of the vision in delivering value to the people of Victoria.

1. Context of the vision and framework

1.1 What the vision and framework does

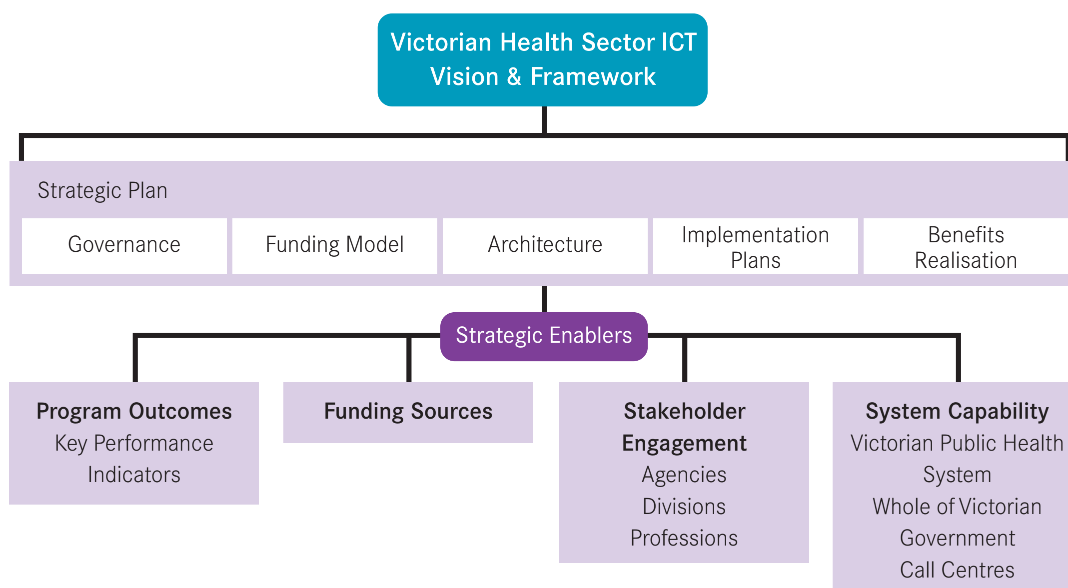
The purpose of the vision and framework is to:

- set the strategic direction for ICT for the Victorian public health sector and establish high-level architectural principles
- guide departmental and agency strategy and investment plans
- support and enable the national e-health strategy and departmental ICT strategy
- inform government and the public on the planned outcomes from future investment in ICT.

1.2 Where the vision and framework fit

The vision and framework will be supported by a strategic plan and associated business cases further detailing the requirements needed to implement the vision. The various components include:

- a vision of the future state for information, communication and technology to support the Victorian health sector encompassing:
  - a clearly defined relationship between the current Health*SMART* work program and the vision
  - a detailed description of the tasks supporting individual initiatives including, where required, the development of associated business cases
- a framework of internal governance and funding arrangement to ensure the long-term sustainability of the vision including:
  - a detailed enterprise architecture based on articulated principles
  - a governance model
  - a funding framework and investment plan
  - business cases for major investment streams, supported by investment logic maps
  - funding bids to central agencies and/or departmental program areas or national programs.



A critical success factor will be obtaining buy-in from health care agencies and the service providers operating within them. To support this, there will be a transparent business case development process and a consistent approach to evaluation based on the agreed principles and clearly defined outcomes.

The vision sets the direction for the Victorian public health sector including a more effective interface with the non-government and private sectors. It highlights opportunities for collaboration with service providers outside the Victorian public health sector and with the broader human services community. Achieving many of the planned initiatives will require a partnership approach with other levels of government (both national and local) and with non-government providers.

1.3 Background

In 2003 the Victorian Government developed and published the *Victorian whole-of-health ICT strategy 2003–07* to provide direction for ICT across the public health sector in Victoria that will assist with managing health system demand and performance over subsequent years. Funding was provided in the 2003–04 State Budget and the Health*SMART* program was established to implement the strategy.

A major emphasis of the 2003 strategy was the identified need to move away from the discrete islands of ICT that had been developed within each health service towards a solid, shared baseline of ICT capability used by all health services. The 2003 strategy also recognised the need to deliver higher levels of ICT reliability and performance than were then available to health services through their individual efforts.

The statewide infrastructure is in place and statewide configurations have been established for all Health*SMART* applications and progressively deployed to health services. Health*SMART* Services is now fully operational and, at the time of writing, supporting over half of the staff in the Victorian public health sector using one or more of the five core Health*SMART* applications.

Information services and systems are critical enablers to support the reform processes that the Victorian health system will need to undergo to meet the challenges of the next decade. Integration of services across primary and acute care settings and the continued provision of high-quality, safe and effective care will require access to robust, reliable, well-managed ICT systems, infrastructure and support services.

The *Victorian health sector ICT vision and framework 2009–13* builds on the investment and achievements of the 2003 strategy. The vision is intended to provide a clear direction for using ICT across the public health sector in Victoria for the period 2009–2013, leveraging and, where appropriate, extending existing ICT capability. The vision is supported by a strategic plan detailing the initiatives, high-level architecture governance and resource requirements needed to support the implementation of the vision.

The development of this vision has been overseen by a steering committee with broad Victorian health sector representation. The membership and terms of reference for the steering committee can be found in Appendix 1.

1.4 Definition and scope

This vision encompasses the dimensions of:

- information technology
- communications technologies (voice, video, data)
- applications and services
- integration with current infrstructure
- management of data, information and knowledge
- change management and workflow redesign.

The scope of the vision will recognise ICT issues and opportunities across all public, private and non-government health services in Victoria, but initiatives prioritised for implementation will be targeted to public health agencies. The vision will also consider issues impacting ICT used within the department, or impacted by ICT used within the department, but will not recommend initiatives that do not directly impact the health sector or that address broader human services objectives. This is not a simple either/or consideration, for example, use of common infrastructure (WAN) between the department and the health sector may realise significant savings. Similarly, health-led initiatives in e-referral will inform broader human services solutions.

1.5 Objectives

The objectives of developing the vision are to:

- ensure that investment in health ICT actively and effectively supports the Victorian public health sector in addressing its major priorities, challenges and opportunities to achieve a shared vision
- provide an overall framework, principles and direction to guide investment in health ICT over the next four years
- ensure that investment in ICT across the Victorian public health sector is applied to deliver outcomes that impact the priority business issues across the sector (including minimising risk)
- ensure that Victoria is positioned to leverage from, influence and participate in, the emergent national agenda for e-health while leveraging investments made to date.

1.6 The Victorian context

The 2008–09 *Human services strategic framework* sets out the high-level outcomes that are expected of the Victorian health system. The strategic framework has been used as the broad context for the development of the vision, and includes the following prioritised areas of focus:

- improving service safety and quality
- providing timely and accessible services
- building sustainable, well-managed and efficient services
- strengthening the capacity of individuals, families and communities
- promoting the least intrusive and earliest effective care
- reducing inequality by improving health and wellbeing, particularly for disadvantaged people and communities.

The Victorian public health system performs extremely well and compares favourably with health systems of other jurisdictions across the country. It has the highest level of bed utilisation and the shortest average length of stay in the country. However, within the Victorian health system, as in other jurisdictions, a number of key issues are impacting the performance of the system.

- Victoria has effectively used substitution and diversion strategies for managing demand but still has the lowest average number of available beds per head of population.
- Population growth within Victoria has been at 1.5 per cent per annum over the past two years, which is the highest level of growth in 20 years, and is placing increasing demands on the health system.

- Acute and sub-acute services, both bed-based and ambulatory, are experiencing challenges in maintaining adequate access levels.
- As the average age of the population goes up, people rely more on health services to offset health and wellbeing decline. The ageing population also leads to a higher incidence of chronic diseases, placing greater demands on the Victorian health system.
- As larger proportions of the clinical workforce retire over the next five to 10 years, significant shortages will be experienced across general health service providers as well as across specialised areas. In 2006 the national nursing workforce experienced a shortage between 10,000 and 12,000 nurses. It is predicted that by 2013 there will be a shortage of between 800 and 1,300 GPs across the country.[i]
- The distributed governance model in place to oversee the delivery of public health services in Victoria provides strong local ownership of service outcomes but also adds a level of complexity to establishing system-wide capabilities, upon which current and projected future models of care will increasingly rely.

1.7 Linkages to national health ICT strategy and directions

Health ministers have endorsed and published the *National e-health strategy*, commissioned on their behalf. An important component of that strategy is the approach taken to progression towards the national implementation of an individual electronic healthcare record (IEHR) for which a business case has also been prepared for investment consideration. Further detail on the *National e-health strategy* is available at www.health.vic.gov.au/ocio/.

The Council of Australian Governments has approved a further three-year work program for the National E-Health Transition Authority (NEHTA) to continue its foundational work on identifiers, terminology and interoperability standards.

The vision has adopted a principle that it will seek to maximise leverage from any national initiatives and not look to develop separate Victorian solutions unless there is a clearly differentiated business need or local requirement that is inadequately supported through a national approach.

The vision recognises that an IEHR is not expected to be available within the timeline specified, but it is anticipated that there will be significant progress in many of the foundational elements for that longer term goal. This includes implementation of unique patient and providers identifiers, discharge notification, e-referral, e-prescribing and medication management.

Victoria had a lead role, on behalf of all jurisdictions, in progressing development of the *National e-health strategy* which has helped to ensure appropriate alignment with national e-health initiatives, including those managed by NEHTA.

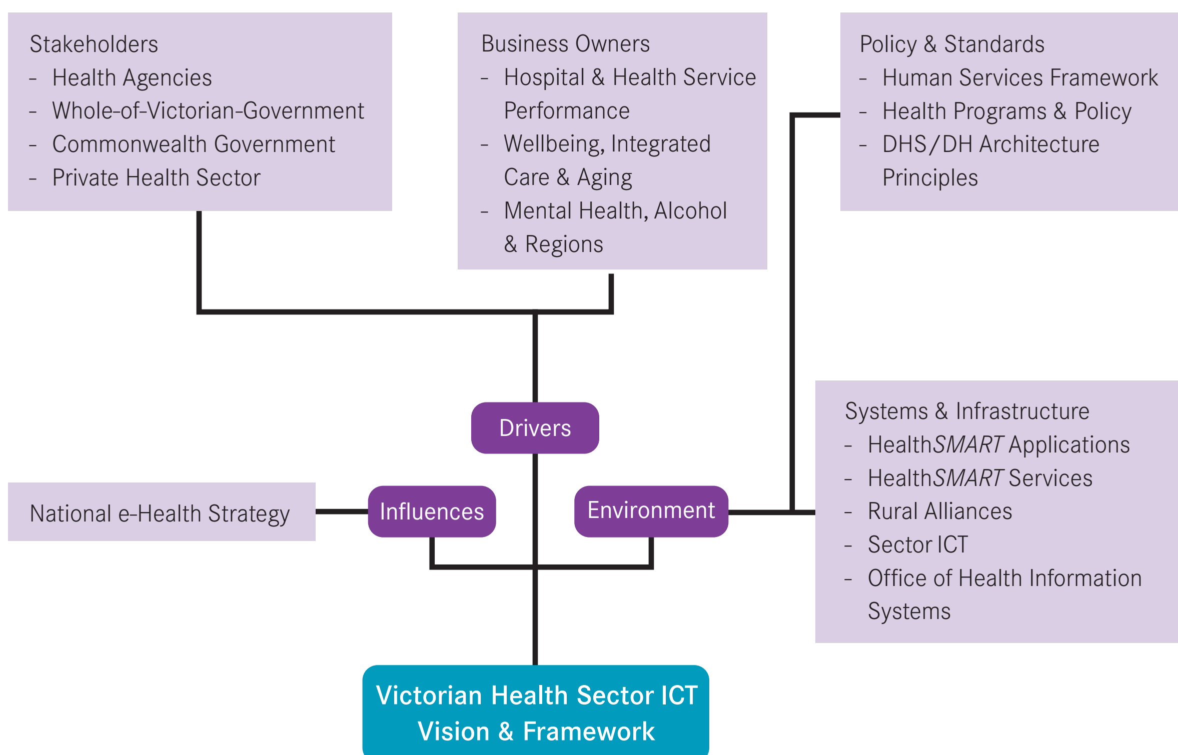
In addition to these, there are potential synergies between the vision and the telecommunications area through the national broadband initiatives.

2. Vision and framework development

2.1 The approach

The development of the vision has required review and analysis of the current state of the Victorian health sector ICT, review of national and international ICT landscapes, and consultation with health sector stakeholders to identify major issues and opportunities.

The vision has been developed from the perspective of the health needs of the people of Victoria, following extensive consultation. The vision acknowledges the *National e-health strategy* and seeks to leverage rather than duplicate its aims by providing a unified framework through which planned benefits can be delivered. It also complements the department's ICT strategy, which considers issues common across all human services. The vision has been developed with an awareness of the current business and ICT environment into which the planned initiatives will be delivered. This approach is summarised in the diagram below.



A set of principles were developed to underpin the development of the framework. These were then used, with the findings from each of the information gathering activities described above, to develop a cohesive vision and framework.

2.2 Principles

The following principles were established to underpin the development of the vision. These principles have taken account of the principles underpinning the 2003 strategy and refined them using information gathered through the environmental scan.

- Existing capability and investments in ICT across the sector must be maximally leveraged.
- ICT developments will be prioritised based on their ability to achieve the most significant contribution to Victoria's identified health priorities.

- The department will adopt a whole-of-life asset management approach to ICT investment in the Victorian public health sector. Doing so will help agencies address obsolescence and to develop their ICT capabilities and infrastructure with more certainty. In support of this increased investment, any new initiatives must be implemented in a way that minimises ongoing operating costs.
- The distributed delivery model of the health sector increases the need for ICT to provide the 'fabric' that connects individual health service providers to create a cohesive and effective health system. Components of the total ICT landscape in Victoria will be delivered and managed centrally where there are technical, functional, cost, efficiency and/or service-level outcomes that are best achieved through this approach.
- Standards for data definition, messaging, interoperability, privacy and security will be applied and mandated for all current and future developments. Agreed Australian standards will be used but, if they are unavailable or lack adequate detail, Victoria will develop a standard in collaboration with other jurisdictions with similar needs.
- Victoria will take account of the developing National e-health strategy, collaborating on establishing necessary foundations, and will not take on initiatives that are being addressed nationally. Specifically, Victoria will not develop an individual electronic health record (IEHR) outside of a national framework.
- To ensure success, Victoria, like other jurisdictions, needs to develop and grow the ICT workforce across the sector and enhance health ICT skills.
- Implementing best practice across all facets of ICT will be advocated.
- The need for innovation and research in health ICT must be recognised, and processes put in place to ensure that this is achieved.

2.3 Environmental scan

The environmental scan targeted experience in other Australian and international jurisdictions that have encountered similar challenges to Victoria. Scotland, Canada, Wales, Denmark and Sweden were found to have broadly comparable service configurations. The scan analysed e-health strategies from these jurisdictions and reviewed initiatives to identify where Victoria could learn from those experiences. Additionally, other industries were considered to identify areas where the health sector could gain knowledge and leverage applicable ICT developments. The environmental scan is available at www.health.vic.gov.au/ocio/.

2.4 Consultation

The primary purpose of the consultation process was to ensure that information about the current state and future expectations was gathered from stakeholders and that this was then refined through further consultation to develop the vision.

The consultation process involved predominantly face-to-face consultation through presentation and discussion at existing forums or through focus groups. The focus groups for service providers were conducted in both metropolitan and rural locations. Consultation sessions were also conducted with key clinical professional groups and there were individual interviews with some stakeholders. The process also provided for written submissions and email comment to be provided (see Appendix 2 for fuller details of the consultation undertaken).

3. ICT in the Victorian health system

The Victorian health system, like many around the world, is characterised by a data-rich but information-poor environment. Multiple uncoordinated investments at all levels have resulted in a patchwork of local systems, siloed around managing individual, specialist services within individual health services that do not leverage the opportunities that a health system the size of Victoria should realise.

There is currently limited ability to easily or securely transfer information along with clients/patients as they move through the system, with some critical enablers still absent including unique identifiers for patients and providers as well as standards to support semantic interoperability (that is, ensuring that the exchange of information preserves its meaning and context). The dominant modes of information transfer between health services remain paper, fax, telephone or email. Within health services there are large numbers of point-to-point interfaces between information systems to share patient identification details, predominantly using HL7 messaging.

Reporting, particularly to satisfy multiple regulatory, funding or legislative requirements, as well as operational management is a significant overhead for every health service. Despite the considerable effort to compile the data, the extent of use of the information to support detailed analysis and decision making across the sector remains low due to the absence of effective tools to aid that analysis and a lack of appropriately skilled staff to evaluate and interpret the data.

3.1 Current information and communications technology environment

Appendix 3 provides information about the current status of the rollout of the Health*SMART* program and other statewide initiatives as at December 2009, along with some detail on the state of ICT infrastructure based on a survey undertaken as part of the development of the vision.

3.2 Current business and clinical drivers

An understanding of the current state of information and its use was gathered through a series of focus groups and interviews with service providers, senior executives, policymakers and funding bodies. The consultation process was supplemented by an extensive review of departmental policy statements, strategies and plans. The findings from the information-gathering process are summarised below.[ii]

Providing timely and accessible health services

As clients and patients move through the health system, information does not currently flow seamlessly, causing unnecessary delay and frustration for both clinicians and patients, and adversely impacting the system's ability to manage patients efficiently.

Within health services pressure can occur at admission and discharge points, in emergency departments and in specialist services such as intensive care and operating theatres. The lack of access to integrated real-time bed management information linked to scheduling impacts on the ability to better manage patient flow.

As mentioned, the dominant modes of information transfer are paper, fax, telephone and email, resulting in delays, frequent re-entry of data and/or missing information. The lack of connectivity and interoperability between systems, together with extensive reliance on paper systems, means that sharing of information is restricted and time consuming.

The lack of a common identifier for Victorian patients and or provider, and the interpretation of the requirements currently imposed by the Victorian *Health Services Act 1988* contribute significantly to this situation.

The availability of diagnostic tests and specialist appointments, especially for patients in rural and remote areas who find it difficult to access specialist health services (such as geriatricians, rheumatologists), can create further delays in access that are often compounded by the slow, manual processes existing between GPs, radiology and pathology providers and the public health system.

Patient information flow is complex and impacts patient management and coordination across the health system. Within the hospital the patient moves between specialised service settings, between different shifts and between clinical staff. On discharge there may be many community-based service providers involved as well as their local GP. At the broadest level, engagement with the health system may have begun even before people were ill or displaying symptoms, for example, through preventative health or screening programs.

There are examples within Victoria of how each part of the care process can be delivered electronically; however, nowhere is the whole care process electronic. Seamless flow of electronic information together with reengineering of processes within each of the services/sectors will achieve greater efficiency. The use of ICT to support staff in improving patient experience of the health system is a key opportunity from the vision.

There is a strong need for partnership-based initiatives to be able to share health record data (not just demographics and assessments but episodic, care planning, contact and intervention data) to allow effective coordination of care for the client across multiple partnership agencies. Consolidation of statutory reporting data by non-departmental contract holders is another requirement. These issues have a significant impact on quality of care for the client and also create administrative overheads for clinicians.

Improving health services safety and quality

Current information systems provide limited support for improving the safety and quality of health services. The variable quality of health information systems is a major factor in medical errors. A recent study[iii] has found that up to 18 per cent of medical errors in Victorian hospitals are due to the inadequate availability of patient information and that adverse events broadly account for up to 3 per cent of the total costs of care each year.

Clinical audits in the majority of settings are mostly conducted without the support of electronic information systems. Some proprietary products do exist; however, these are rarely integrated with other clinical systems. The low level of clinical system implementations to date means that many clinicians do not currently work with electronic clinical systems although they increasingly realise their potential. Clinical audit in Victoria is predominantly driven locally and data are not shared at a system level to maximise gain from the outcomes.

Although there are local examples of where this is being achieved, most decision support resources are not actively giving guidance to clinicians on best practice. While the Clinicians Health Channel exists, it could be better utilised, be more interactive and feature the latest protocols, evidence-based research, refereed journals, easily searchable knowledge and information resources.

Many care settings use part paper, part electronic systems, requiring multiple data entry that increases the risk of missing or incorrect information in handovers (of patients and between shifts), and requiring multiple points of approval. Settings using part paper, part electronic systems were seen by stakeholders as doubly disadvantaged with more data-entry effort and greater risk of missing or incorrect data.

The implementation of clinical information systems taking place as part of the current scope of work in the Health*SMART* program will address many of the issues raised in the consultation process, including a clinical view to assemble information from multiple sources and access to medication management. The system can support information being available at the point of care through appropriate devices but how this is achieved is determined at each agency rather than being a standard element of the system configuration. It will not provide a complete solution as it is focused on hospital-based services. There are also a range of local systems (such as cardiology and oncology) that will ultimately need to be part of an integrated view. Clinical audit is also not part of current scope.

Victoria is the only state that currently does not have some form of statewide critical incident management system to provide a statewide evidence base that can inform the development of measures to reduce the incidence of adverse events. Funding has recently been approved to progress this, with a system planned for introduction in 2010.

Promoting least intrusive and earliest effective care

Inconsistent reporting of similar data in different ways often means that information does not pass seamlessly between primary and acute care sectors. This can be compounded by incompatibility between different data transport systems. As a result access to information needed to support ongoing care is needlessly delayed.

Providing data for performance and public health reports to governing bodies can be time-consuming for health services, sometimes resulting in the need for clinicians to record the same or similar information into multiple systems. This can cause a discontinuity between systems so information then does not pass seamlessly between primary and acute care systems and care is unnecessarily delayed. This is often exacerbated due to incompatibility between different proprietary data transport mechanisms.

Privacy legislation by its very nature restricts the movement of client information across health providers without evidence of client consent. Many service providers see this as a challenging restriction that, when narrowly interpreted, prevents access to appropriate client information. The legislation, associated protocols and training will need to be reviewed to ensure that it is possible for an authorised health service provider to access appropriate information about the client within a clearly understood and articulated privacy framework. This should be undertaken within the policy and regulatory context being established through the *National health information regulatory framework*.

Clinician access to information about health services using the internet is currently supported by multiple service directories in use in Victoria. Directories are not always up to date and there are inconsistencies between them. As a result it can take longer than needed to find information about services for clients and this may delay them receiving the earliest effective care.

Strengthening the capacities of individuals, families and communities

Consumer access to health information and advice is available using the internet from reliable and accredited sites including the Better Health Channel and HealthInsite (Commonwealth site). However, such sites have little interactivity and are often not able to be tailored to individual needs.

With more than one million visits per month, the Better Health Channel (BHC) provides an online gateway for consumers to increase their understanding of preventative, early intervention and self-management health strategies.

Redevelopment of the BHC, commencing in 2009, will build on this foundation and exploit next generation technologies by introducing new consumer portal services, interactivity and tailored personalisation to encourage consumers to actively participate in their health care.

Further collaboration and integration between BHC and the sector-based health information portal www.health.vic.gov.au is also planned to allow consumers easier access to accredited health information services to support their own health and wellbeing.

Recent developments in internet applications including social networking sites such as Facebook, search sites such as Google and trading sites such as eBay are making consumers more aware of how they can interact with external service providers. This increasing awareness is resulting in rising expectations about how the public can use the internet to interact with health services. Consumers are also becoming more aware of services offering the capability to maintain their own personal health records through commercial offerings from vendors such as Google and Microsoft.

Reducing inequalities through improving health and wellbeing, particularly for disadvantaged people and their communities

Telehealth (including consultations via video, home health monitoring, mobile health monitoring, store and forward imaging for teleradiology, teledermatology and teleretinal imaging) has the potential to provide services to patients remotely, maximising the use of medical resources, minimising family disruption and reducing travel time for both patients and clinicians in rural areas. While there has been investment in Victoria in telehealth technology, and there are instances where it is used productively such as for psychiatry and gerontology services in some areas, it is not consistently used to best effect across the health system.

There is a shortage of some key specialist health workers including doctors, allied health professionals and nurses, especially in rural areas. This has significant impact on the availability and provision of services that could be mitigated through more effective use of technology.

There is no statewide approach to coordination of telehealth resulting in poor leverage of the technology and potentially missed opportunities for optimising Commonwealth investment. Protocols, payment models and training to use the equipment need to be developed. Resolution of these issues will significantly improve the utility of the infrastructure and improve equity of access to clinical services.

Information being more accessible to multiple providers involved in the provision of care through e-referral and support for shared care provides significant benefit to those who may be less able to cope with these complex service arrangements. These include those who may be homeless, have mental health or drug and alcohol issues, youths, refugees, new arrivals or Indigenous Australians.

Building sustainable, well-managed and efficient health services

Benefits of clinical information systems (such as improving quality and safety) accrue to the system as a whole while the costs are borne locally. Although there are financial incentives relating to adverse effects, risk management, litigation and insurance premiums, many health services find it difficult to justify investment in clinical systems. Many services believe the current health funding framework needs review. Current activity-based funding models are seen to leave little flexibility to invest in information systems that may return benefits well after that investment has been made. The current funding framework is thus considered to be a disincentive for health services to implement new information systems. There is also no specified funding made available to enable infrastructure refresh by the sector so that it is maintained fit for purpose.

There is currently a diversity of approaches to interaction with GPs who are funded through different areas of the department and the Commonwealth. This results in difficulties developing a comprehensive set of information systems that can support ease of secure movement of client information between the public health system and general practice.

Despite the efforts of rural health alliances, and some significant achievements such as the widespread introduction of IP telephony, connectivity in some rural and remote areas remains inadequate to support any service delivery model that significantly depends upon e-health applications. Telecommunication networks are seen to have many potential single points of failure, no built-in redundancy and, in some situations, have difficulty meeting peak demands. This is a major barrier to further adoption of e-health. Many existing local information systems are close to the end of their lives and are becoming increasingly difficult and expensive to maintain.

Some health services believe that the statewide software applications selected by the sector are not well suited to their local requirements and they may be paying for functionality they do not feel they need. Conversely, in other cases, the selected system may be perceived to not provide all of the functionality required. This situation can be addressed by acquiring applications that can be flexibly configured without impacting interoperability and maintenance costs. It may also require a more flexible approach to application selection where there is some choice of application, provided that those choices strictly conform to statewide specified interoperability and human computer interface standards.

The time and effort required to find information with current document/record management and clinical information archiving systems is excessive. This can result in vital information relating to patient care not being considered in clinical decision making or repeating of tests and investigations because it is quicker than trying to find the information. Document scanning is being implemented in some Victorian health services as a partial interim response to this problem.

The importance of the change management component of information system projects is often not sufficiently recognised. Resources are required to enable staff to step out of their clinical role to work on implementation tasks, mentor colleagues and share learning across organisations. The change effort should support the wider use of staff experienced in earlier system implementations as preparation for later implementations to foster and develop system-wide expertise in new work design.

4. Where do we want to be?

By 2013 Victoria's health services should be characterised by a model of care focused on providing a better patient experience, meeting the increased demand arising from an ageing population and the burden of chronic disease, and providing a satisfying place to work for a skilled and productive workforce.

The current Health*SMART* program will be fully implemented in line with its agreed scope and Health*SMART* Services will be supporting the full range of corporate, patient and clinical systems deployed.

The capture and transfer of health information will be conducted within a national health information legislative framework to regulate the privacy and security of information. This will be supported by comprehensive policy guidelines, technical standards and national services enabling the safe, reliable transfer of authorised information between patients/clients, health service providers and provider organisations.

With this infrastructure in place and subject to: the necessary level of investment; sustained management commitment; and appropriate clinical engagement across the sector to realise the initiatives in the vision, the following can be achieved:

- extending clinical systems implementation statewide providing support for order entry and results reporting as well as medication management, all with expanded functionality to support clinical documentation and audit
- consumers better able to support the management of their care by more conveniently accessing information about their health problems and the services available to help them
- the management of patient flow across the sector enabled by an integrated view of patient movements between ambulance, emergency and inpatient services, and subsequent discharge to the community
- Victoria's health services routinely providing discharge summaries and using seamless electronic referrals between service providers
- managers and clinicians having timely access to the information needed for planning and analysis through user-friendly and intuitive tools
- clinicians across the sector (including GPs) having improved information and knowledge to support delivery of care, access to learning materials and improved capability to engage with their peers
- better coordination of care for mental health and alcohol and drug clients through improved integration and implementation of a mental health and drug and alcohol client management capability
- a statewide approach to managing incidents and workforce credentialing supporting a focus on continuous improvement and improved quality at all levels
- rural and remote communities having improved access to services through more effective coordination of telehealth that is supported by protocols, guidelines, payment models and training
- availability of a secure, high-capacity telecommunications network across the public health sector providing a consistent, guaranteed level of service.

5. What we need to do

5.1 A vision for health ICT in Victoria

Delivering successful health outcomes for Victorians requires effective information management as well as managing the people and resources to deliver services. The vision comprises a portfolio of initiatives organised around the objectives set by the department for the delivery of all human services. Those objectives and the planned outcomes from delivering ICT in the context of health care are described below.

1. **Quality and safety – managing risks and making health care safer.** Patients and clients are confident that their service provider has access to all the relevant information to manage their care and can support them by contributing to that information base. The delivery of safe care and the management of risk are underpinned by clinical and business audit, and supported by technology enabling sharing of information across the system.
2. **Accessibility – improving access to the health system and its resources.** The public has easy access to the services they need by using technology to help find out information about their health and how to gain access to service providers. Clinical staff can easily assemble all of the resources and information they require to deliver services to their patients and to plan and coordinate their care.
3. **Continuity of care – increasing the efficiency and effectiveness of all handovers throughout the patient journey.** Every patient experience demonstrates a person-centred approach to their care, supported by accurate and effective handovers of information between providers both within and across services.
4. **Sustainability – managing demand, reducing waste and improving productivity.** A better patient experience of the system characterised by shorter waiting times, less time repeating information already provided and reduced cost and risk associated with unnecessarily repeated tests and investigations. Clinicians can focus on clinical care delivery and managers can focus on planning and management, both supported by effective resource and management systems to enable better planning, skills development and understanding of service effectiveness.
5. **Supporting the workforce – maximising workforce potential and having productive and motivated health care workers.** A health workforce that is managed strategically across the system is appropriately credentialed, and has access to the up-to-date knowledge needed to deliver their services.
6. **Building the foundation – creating the core infrastructure to support effective delivery and interoperability of ICT solutions.** Providing an assurance that patients' information is handled in a secure, reliable, confidential and consistent manner and can be accessed throughout the health system. A system that operates seamlessly and securely and enables accurate and unambiguous access to the information needed to support good decision making.

5.2 The initiatives

To meet the vision, many candidate initiatives were considered for inclusion in the vision. The initiatives shown below represent those that were evaluated to have the greatest impact across the sector and likelihood of delivering the associated benefits, taking into account cost, risk and time to deliver. The initiatives as presented in the vision, while each valuable in their own right, build upon each other and also leverage off existing capability and initiatives at the state and national level to enable the Victorian health system to meet the challenges of the 21st century.

1 Quality and safety – managing risks and making health care safer

1.1 *Faster identification and more reliable authentication and identification of patients* by use of a **individual health care identifier**. This will greatly reduce time and effort to find vital patient information leading to improved record quality, contributing to improved quality and safety and also reducing the inconvenience of gathering information from patients multiple times.

1.2 *Fewer days spent in hospital and fewer visits to the emergency department* by **remote monitoring of high-risk patients** at home to identify health issues earlier, encouraging self-management and achieving less intrusive intervention through using interactive technologies to provide guidance and feedback.

1.3 *Reducing medication errors and risks* by continuing to implement **medications management systems** across the public health system. This will minimise transcription and transposition errors and provide decision support to reduce adverse events.

1.4 *Continuous improvement processes supported by information systems allowing clinical staff to use evidence gained to monitor and improve their practice* through use of **clinical audit systems** that are integrated features of clinical management systems.

1.5 *Building an evidence base supporting continuous improvement* through implementation of a consistent **statewide incident management system** that will manage documentation, tracking and learning from adverse events.

1.6 *Improving collaboration with and supporting decision making by primary care* by providing **general practitioners access to the Clinicians Health Channel**.

2 Accessibility – improving access to the health system

2.1 *Enabling clinicians to conveniently access treatment protocols and information about drugs, order tests, receive results and record clinical information* on **devices available at the point of care** in association with the continuing implementation of clinical systems.

2.2 *Having a complete view of patient flow that provides an understanding of potential bottlenecks* through a system that enables an **integrated real-time view of activity and resources** across all relevant service delivery areas within a health service including ambulance, emergency, operating theatres, intensive care units and outpatient departments.

2.3 *Increasing access to specialist medical, nursing and allied health services* by developing a centralised capability to support the **consistent and pervasive use of telehealth** across the state.

2.4 *Creating accessible trustworthy general health advice about people's health problems and details of where services are available and how these services can be accessed* by consolidating currently dispersed information resources. Also, further developing the *Human services provider directory* and providing access through a range of electronic delivery channels such as a **simple, easy-to-use public website** that can also assist those with disabilities or language difficulties.

2.5 *Saving time for clinicians in searching for external services* by re-engineering and maintaining the **Human services directory** with reliable up to date information about available services and giving easy web enabled access to the information.

2.6 *Improve management of emergency departments and patient flows through the hospital system* by implementing or upgrading to capable information **emergency department systems** that can integrate with other systems.

2.7 *Improve management of operating theatres and patient flows through the hospital system* by implementing or upgrading to capable **operating theatre systems** that can integrate with other systems.

3 Achieving continuity of care – improving the patient experience throughout every episode of care

3.1 *Enabling the data to follow the patient across activities and settings to support appropriate care* by implementing **ubiquitous electronic referral** capability across the Victorian health sector, with a capacity to incorporate services within the community care sector.

3.2 *Making timely information available to care providers produced as an integral part of the discharge process* to ensure continuity of care for the patient and to minimise the risk of adverse events by continuing the implementation of **standardised discharge summaries**.

3.3 *Providing better coordination of care for mental health and alcohol and drug clients* through improved integration with the applications used across the broader health system and implementation of an enhanced **mental health and drug and alcohol client management capability**.

3.4 *Improving the operational interface between the ambulance service and hospital emergency departments* through **improved communication systems** between the two, resulting in better decision making in the distribution of patients in metropolitan and rural Victoria.

3.5 *Enabling care planning and shared care across partner agencies* through **innovative approaches to shared client information** that leverage current investment and learning and planned national initiatives.

4 Sustainability – managing demand, reducing waste and improving productivity

4.1 *Reducing the burden of data capture and providing more flexible and responsive reporting to managers and clinicians* by **rationalising data collection** requirements, extracting data as an automated by-product from service delivery systems and populating data repositories to obtain information through user-friendly and intuitive tools.

4.2 *Reducing repetitive and inconsistent data capture* by ensuring **common names and definitions** for data elements to allow both statewide core systems and local systems to easily and accurately exchange information.

4.3 *Enabling faster, more reliable purchasing and reducing wastage* across the supply chain through improved work practices supported by **electronic technologies such as barcoding and radio frequency identification**, building on the implementation of FMIS.

4.4 *Ensuring that ICT applications and infrastructure are maintained fit-for-purpose and are responsive to service demands* by developing and establishing a **sustainable funding model** for ICT support and delivery.

5 Supporting the workforce – maximising workforce potential and having productive and motivated health care workers

5.1 *Establishing an interactive knowledge management resource for health professionals* (clinical protocols, best practice, evidence) that can enable interactive learning based on individual needs by creating a new **knowledge portal**.

5.2 *Removing the dependency on local access to images by radiologists and specialist providers* by making **medical imaging technology** available to authorised users at sites across the state supported by a central imaging archive.

5.3 *Supporting assurance that staff are appropriately qualified for clinical care* roles by enabling broader access to credentialing information and integrating the local management of **credentialing and scope of practice** with other relevant resource management systems already in use within health services (such as human resource management and theatre management).

5.4 *All staff in the public system being able to access mandatory training such as OH&S and privacy at any location*, reducing the need for each service to develop their own programs and providing access to consistent best practice knowledge through a **statewide e-learning and online education system**.

5.5 *Enabling clinical networks to support communities of practice* where people and organisations can exchange knowledge and information by establishing and using **interactive internet forums**.

6 Building the foundation – creating the core infrastructure to support effective delivery and interoperability of ICT solutions

6.1 *Enabling the transfer of core demographic and assessment information between settings* (for example, GP, ED, ward, ambulance, community health and community care) by using **interface and messaging standards** so information received is presented as intended.

6.2 *Enabling secure, fast and reliable transmission of information* between systems and settings by maintaining a **high-capacity telecommunications capability** across the health system to establish a secure, clinically effective network. This will involve access to broadband capacity across the state, especially to rural services.

6.3 *Enabling e-referrals to be reliably sent and acknowledged* by **uniquely identifying providers and provider organisations**. This is a basic building block.

6.4 *Enabling easier access to ICT services and improved document management capabilities* by taking a statewide approach to common technologies, **enabling single sign-on capability** and better sharing of information and processes across the Victorian public health sector.

6.5 *Ensuring effective oversight of the ongoing development of the vision and framework and strategies for implementation and maintenance of the initiatives*. This will be achieved through developing and supporting a responsive and accountable **governance model** and supporting processes such as a central statewide repository of all databases and strategic initiatives.

6.6 *Guiding the acquisition and organisation of applications and infrastructure within an overall framework of standards and protocols* by developing and promoting an **enterprise architecture** for the Victorian public health sector.

6. How Victoria will benefit

As the initiatives outlined in section 5.2 are implemented, benefits will be observable incrementally by patient/clients, service providers, researchers, policymakers and funders. The benefits can be broadly classified as follows.

Enhanced quality and safety

Health care is mostly episodic involving multiple 'handovers' of patients between services and when shifts change. The vision will support improved patient safety by enabling information to flow seamlessly, accurately and in a timely manner when handovers occur. As a result patients will have safer treatment through the following measures.

- Clinicians being able to conveniently access the latest treatment protocols through decision support tools and up-to-date consumer information and knowledge sources at the point of care. By actively guiding clinicians in the use of the proven, effective protocols, clinical decision support systems can enhance clinical performance for drug dosing, preventative care and administration of recommended care.[iv]
- Health services being able take a 'systems' approach to preventing incidents acknowledging that, while human error is unavoidable, the conditions that people work under can be controlled. Clinical incidents can have serious health and quality-of-life consequences for patients. At worst, they can result in death and can also have significant financial implications for health services, with costs estimated at around $511 million annually in Victoria.[v]
- Clinicians having active clinical alerts to warn them of risks like adverse drug interactions. Studies have shown there is direct effect from use of such systems to reduce prescribing errors such as implementation of computerised physician ordering systems (included alerting) in both the hospital and primary care settings reduced adverse drug events by up to 75 per cent in the US,[vi] Canada,[vii] Sweden[viii] and the UK.[ix] There is substantial international evidence demonstrating that a minimum of 25 per cent of adverse drug events can be avoided due to the availability of patient information at the point of care.
- People empowered to better manage their own health care through electronic access to trustworthy information about health conditions and tools to manage them. Active consumer management and engagement in their health conditions has a significant positive impact on their condition. Some studies indicate reduced use of hospital bed days, fewer emergency visits and improved clinical condition in patients that actively manage their own health care. The studies compare consumer groups who actively managed their care using trustworthy information with a control group to exclude extraneous factors. The results included a reduction in costs of over US$500 per patient per year, as well as secondary benefits such as reduction in depression.[x]
- Reduced avoidable medical errors or avoidable degradation of chronic conditions when there is comprehensive information readily available to clinicians. There are estimates that 10 per cent of hospital admissions are due to adverse drug events and that up to 18 per cent of medical errors are due to the inadequate availability of patient information.[xi] Adverse events may account for as much as 3.8 per cent of total costs of care each year in avoidable annual expenditure.

Improved accessibility

Clinicians, patients and the public will have easier access to the services they need using technology to help find information about their health and contact service providers. This technology will enable the following.

- Remote access to diagnostics will provide consumers in rural and remote areas with a range of quality services that are delivered from metropolitan areas. The use of remote diagnostics will mean that patients will travel less to access specialist services. In a remote area of Sweden, a diagnostic imagery solution was used to provide online consultations. This resulted in a 50 per cent reduction in waiting times and a 34 per cent increase in the number of tests conducted while minimising travel for patients.[xii]
- Travel times visiting or travelling from rural and remote communities will be reduced. US studies have identified significant cost savings from telehealth. One implementation of in-home monitoring generated a return on investment of more than 200 per cent and total savings of US$5,271 per patient per year as clinical staff did not have to travel to see the patient. Further benefits would accrue as patients would require fewer admissions to hospitals.
- Clinicians would be able to access treatment protocols and information about drugs, order tests, receive results and record clinical information at the point of care, which results in less time spent gathering information about the patient.
- Clinicians will be able to obtain readily available information through hand-held and other devices resulting in time saved in searching for external services. UK experience has shown 35 per cent of referrals are inappropriate due to insufficient direct access to specialists and insufficient information being passed from primary care to specialists.[xiii]

Continuity of care

Achieving better standards of care relies on clinicians having detailed information about patient health needs available during diagnosis and treatment. Improved information systems will make care more personal and improve the patient's experience. Information about a patient's history, visits, tests, allergies, medications and preferences would be available to clinicians and verifiable by the patient. Having this information aids in the continuity of care by allowing users to access and coordinate their lifelong health record and make appropriate parts of the record available to others who may need it.[xiv]

Using electronic systems to provide order entry and results reporting as part of a continuous client care record has demonstrated a reduction in drug interactions, as well as unnecessary repetition of tests and rework that may already have been performed but not recorded or available in the paper record system.[xv]

An electronic medical record provides the foundation for improved continuity of care and has the potential to result in considerable time saving for care providers. It has been suggested that nurses spend nearly 30 per cent of their time on patient care documentation.[xvi] The research also affirms that if time savings could be spent on further patient care, patient outcomes would improve dramatically. An increase of 30 minutes of care per day would lead to a 4.5 per cent decrease in urinary tract infections, 4.2 per cent decrease in pneumonia and 2.6 per cent decrease in deep vein thrombosis as these issues get identified and addressed earlier.[xvii]

The ability to have tests, plans, results, scans and communication in one record will save time and frustration by eliminating the need to 'juggle multiple pieces of paper and mentally integrate illegible handwritten notes, blurry faxed reports, and multiple past records'.[xviii]

Reducing time spent by clinicians making referrals can be done through use of convenient, easy-to-use e-referral systems. The implementation of e-referrals increased the quality of referrals in Denmark and reduced the average time spent on referrals by 97 per cent[xix] by providing more effective access to patient information for both clinicians (senders and recipients).[xx]

Greater health system sustainability

The current proportion of GDP spent on health care is expected to grow from 9 per cent today to an estimated 16–20 per cent of GDP by 2045. Any ability to constrain growing health care costs will directly support future sustainability.

The use of information systems that can make patient information readily available to clinicians will result in patients having a better experience of the system through:

- shorter waiting times
- less time repeating information already provided
- reduced stress and risk associated with unnecessarily repeated tests and investigations
- greater awareness of what they can expect from the health service and when.

Clinicians will be able to focus on clinical care delivery as clinical, resource and management systems will ensure that clinician time is not wasted through:

- less time searching for information buried in paper files – it is estimated that 25 per cent of a clinician's time is spent seeking information about patients[xxi]
- less time finding diagnostic information – diagnostic ordering and results management systems reduced the time spent by clinicians finding information about test results by over 70 per cent in implementations in the US and France[xxii]
- reduced burden of reporting as information is produced as a by-product of the health service delivery
- less time checking existing medication – e-prescribing implementations in Sweden, Boston and Denmark report reduced provider costs due to time saved, improving productivity per prescription by more than 50 per cent[xxiii]
- reduced repetitive and wasteful data entry through not having to enter the same or similar information into multiple systems
- reduced time and cost undertaking unnecessary or duplicated treatment activities such as diagnostic tests by having an ability to make the diagnostic tests already done available in real-time at the point of care. There are hospital studies that indicate between 9 per cent[xxiv] and 17 per cent[xxv] of tests are unnecessary duplicates.[xxvi] When alerted at the point of care of duplicate testing, 69 per cent[xxvii] of clinicians cancelled their test orders. Alerts like this can cut the absolute number of tests by up to 25 per cent,[xxviii] reduce transcription errors from 12 per cent to zero,[xxix] and reduce the waiting time for radiology results by 24–48 per cent.[xxx]

Supporting the workforce

The initiatives in the vision will also address critical workforce shortages that contribute to some segments of the population having poor access, plus enable significant efficiency gains and options for community-based models of care. It will do this by making information easier to access and analyse through systems that are easy to access and navigate. The workforce will also be more supported and skilled through easier access to up-to-date knowledge needed to deliver their services through:

- *Access to e-learning*. Internet-based e-learning has been demonstrated to provide an ideal environment for organising and implementing continuing professional development and further training in more flexible formats tailored to individual needs.[xxxi]
- *More intuitive and standardised human computer interfaces*. ICT systems will cut down time-consuming administration for all personnel so that more valuable time can be spent on vital meetings between the doctor and patient.[xxxii] Existing ICT-based tools must not only be user friendly but also simplify routine health care procedures such as barcode reading which, in one US hospital, was reported to decrease medication errors by up to 70 per cent and also had a positive effect on nursing satisfaction.[xxxiii] Tools that have a common user interface and single sign-on, security and communication functions have been shown to improve workforce productivity.

7. Enabling the vision

The consultation process and the environmental scan have identified a range of enablers required to support the successful implementation of the vision. These include:

- a strong and compelling vision about integration of services over the continuum of care (including prevention and home-based services) that is linked to the health goals of the Victorian Government
- maintaining goodwill with key stakeholders, particularly clinicians, so that objectives can be pursued from a range of starting points (clinician leadership and the development of skill capacity across the sector are essential for implementation of a successful strategy)
- clear governance and accountability frameworks to cover all aspects of the program from determining priorities to realisation of benefits
- faster patient identification and better linking of patient records achieved through universal patient and provider identifiers (as part of the national e-health strategy)
- comprehensive standards to achieve practical implementation, especially where the purpose is interoperability between points of care; the standards required for interoperability are those affecting the transfer and exchange of information and data at transition points (for example, emergency department, ward, community care) and data reporting across a range of funding programs
- positioning of e-health to support process redesign in clinical areas, cross-sector management of long-term chronic care conditions, the reduction of waiting times, and patient safety priorities that are more likely to achieve government, health service and community support.
- quick wins in areas such as e-learning, developing online communities of practice, consumer information and systems to support better monitoring of patients at home (quick wins will bolster stakeholder support for the longer term elements of the vision)
- joint funding arrangements designed to maintain autonomy in take-up in the context of large national or statewide projects should be complemented by local projects aimed at building capacity and alignment
- providing access to the most complete patient care information by authorised service providers within agencies through improvements to clinical record management and processes by making any necessary policy changes to privacy, consent, records management and associated legislation to enable appropriate access to information and provide clear guidance to the sector
- defining outcome measures (such as quality of care) and progressively measuring and publishing the extent to which these outcome measures have been realised; this will demonstrate progress and provide evidence that the aims and objectives of the vision are being realised.

8. Future state architecture

The objectives of the future state architecture are to provide:

- a current and relevant enterprise architectural view of the Victorian health system to assist in its planning initiatives and migrating to the future state architecture
- policy-level guidance on the use and implementation of information and communications technology within the Victorian public health system
- a framework for:
  - integrating and organising components, infrastructure and applications to support the seamless transfer of information between providers and business units across agencies and settings within the Victorian health system
  - integrating and organising components, infrastructure and applications to support the seamless transfer of information to and from the Victorian public health system and external parties such as private providers, community services, Commonwealth agencies
  - the staged update of the current ICT architectures and infrastructure within the Victorian public health system to ensure they align with the *Victorian health sector ICT vision and framework 2009–13*, national initiatives and technology trends.

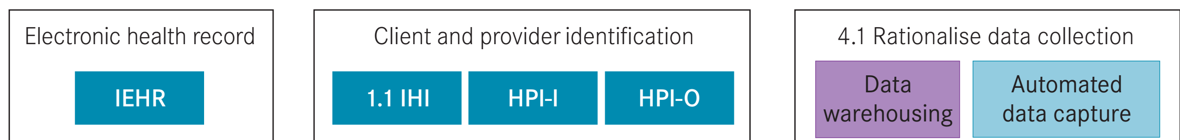
The business context for the architecture is the initiatives prioritised in this vision. The architecture should leverage existing investments (including, but not limited to, Health*SMART*) and have the agility to quickly and easily meet emerging business needs. An important feature of the architecture is consideration of what services are regarded as core, which as common and which as local. The basic principle is the level of conformity required to be developed or acquired to meet statewide architecture standards for service interoperability in achieving the business goals of the Victorian health system. Some key principles proposed for each of the conceptual architectures are described in Appendix 4.

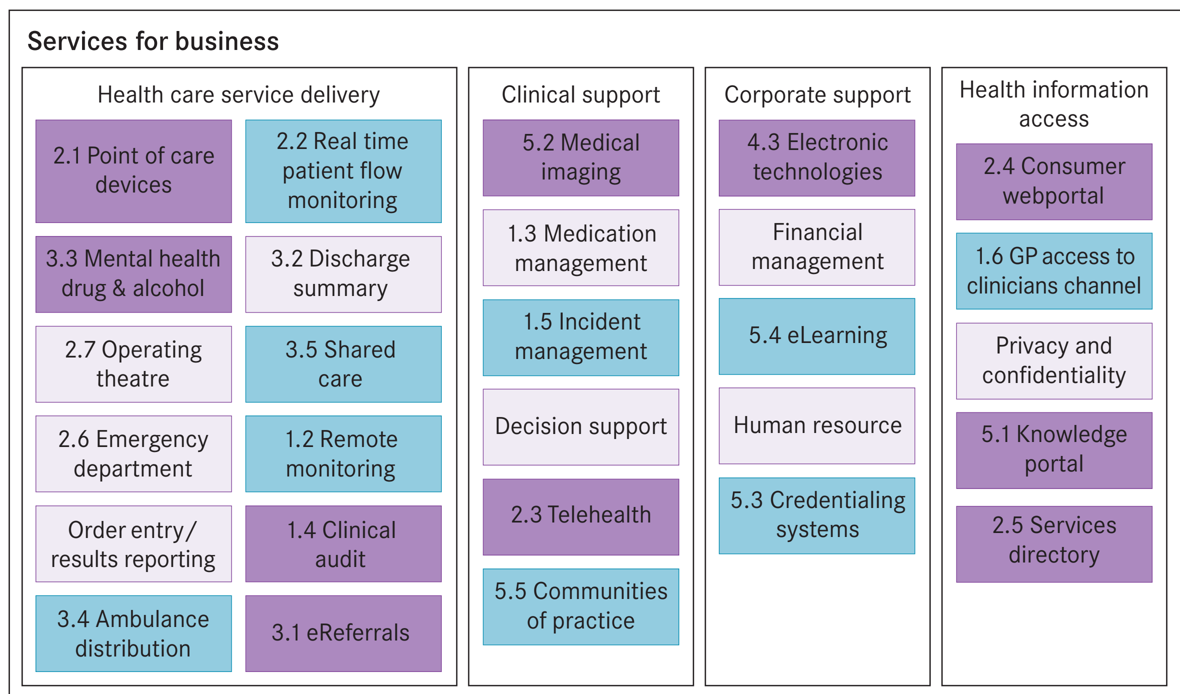
There are a number of significant challenges associated with this approach that will need to be managed:

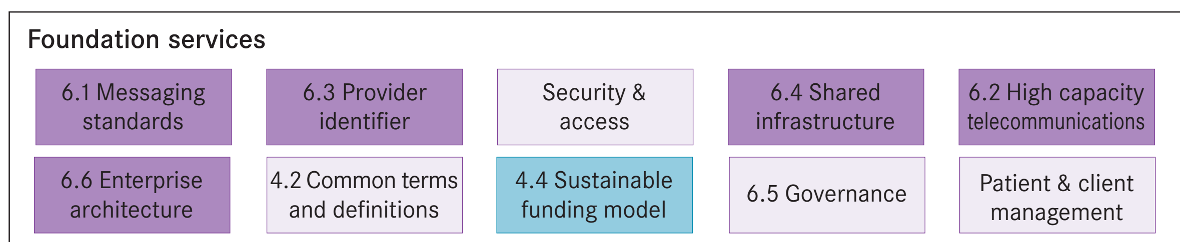
- There is a strong interdependency on the rate of development of national initiatives through NEHTA and Medicare to establish the national provider and client identification and terminology services.
- The Victorian health system will need to develop a service oriented architecture capability over time, commencing with the implementation of a single service and expanding to others as the capability and business needs are established.
- For this architecture to mature and progress over time, health services and other entities must agree with the future state architecture and move towards consistent design principles. The governance over the architecture must effectively engage the sector to ensure that both the architecture and its associated guiding principles continue to be relevant to need.
- The capacity of vendors to adopt the agreed standards will be constrained, which could be either because they are multinational and maintaining a global version or, conversely, because they are a local provider that cannot economically change outside of their normal upgrade cycle. Migration will be a significant and complex task for all of the proposed services.
- The physical and logical architecture to support reporting will need to take into account the legislative framework in which information is managed, particularly where the department is accessing private sector data.

Functions supported by the future architecture

The architecture will support the high-level functions shown below. The diagram shows a future state including national patient (IHI), provider (HPI-I) and organisational (HPI-O) identifiers and an individual electronic health record. While it is not currently anticipated that an individual electronic health record will be achieved during the time period covered by the *Victorian health sector ICT vision and framework 2009–13*, the architecture will be designed to support this future state.







The extent to which this target functionality can be achieved across Victoria within the vision's timeframe will depend on the technical and organisational challenges in migrating to the future architecture.

9. Challenges and risks

Victoria is strongly positioned to leverage the capability established through the Health*SMART* program to implement the vision. However, there are significant challenges and risks including:

- *A very busy workforce and busy patients*. People providing health services say the time they spend chasing up results and appointments is frustrating and vital information supporting safe handovers is often missed. Additionally, patients give their details multiple times and staff enter data in multiple data collections and across multiple service points. There is significant opportunity for improvement but systems design must be as intuitive as possible to operate in a time poor environment.
- *Different starting points and priorities for local health services*. Health services across Victoria have responded to different local needs, local development and investment opportunities over a decade or more. For the past four years, the Health*SMART* program has provided a statewide framework for common infrastructure approaches for health services but the timing and scope of implementation varies from service to service.
- *Sustaining investment over a long period*. Across the world, moving towards a more client or patient-centric ICT environment has required substantial committed investment over a period of up to 10 years because public health systems are made up of large complex organisations in which major system change requires a long-term commitment to delivery.
- *Workforce has skill development needs*. The health workforce is predominantly tertiary educated professionals. Many have had little access to computer technology for use in the workplace. To move to an electronic information base of practice will require a targeted program of skill development as clinical systems are introduced.
- *The complexity of applications and integration to achieve initiatives*. A number of the initiatives proposed in this vision requires the staged development, implementation and integration of multiple applications that have critical interdependencies. Examples implicit in the proposed initiatives include the need for a statewide approach to extending the scope and footprint of clinical systems, implementation of enhanced and consistent emergency and operating theatre systems, managing the interface between ambulance and hospital systems and a statewide data warehousing strategy. Those interdependencies and their impact in terms of schedule, cost and risk will be considered in the development of the strategic plan that complements this vision.
- *Some dependencies are being managed nationally so are outside Victoria's control*. Current plans estimate that national unique patient and provider identifiers will be available to implement in 2010 and the capacity for the patient identifier to be used as the primary identifier for health care delivery, while recommended, is still pending endorsement from health ministers. Foundation work to prepare for Victorian uptake would minimise duplication of effort and provide clear strategic direction for Victorian health and community services. Victoria needs to continue to influence and leverage national initiatives as they emerge.
- *Change management requires time*. Re-designing work processes and clinical protocols, testing new ways of working and requiring direct service staff to adapt in an environment of high demand will require resourcing and concerted effort. A number of factors will influence the timing of individuals' readiness to change.
- *Models of care are changing*. For the vision to remain current and relevant there will need to be appropriate governance, health sector input and ongoing review of the strategy to ensure that it is not continuing to support historical ways of working rather than enabling new models that are better aligned with the clients' expectations and needs.

10. Financing the vision

The vision and the initiatives it proposes must be affordable and sustainable. To achieve this it must be underpinned by a transparent funding framework that considers not only the cost of new development and implementation of the initiatives but also the ongoing cost of operations and the need for health services to maintain capability in their local ICT infrastructure.

Project costs must transparently recognise all elements, including change management, that are necessary to achieve the planned benefits, not simply the deployment of the technology, and will require equally transparent processes to monitor and assess achievement of the benefits.

The extent of funds required to support the proposed initiatives will become clearer through the strategic planning and business case development processes. Sources of funds potentially include government, health services and external bodies. The framework must reflect incentives for action by each of these parties.

The funding framework must be clear about its expectations of the department's 10-year capital plan currently under development, specifically in expectations of investment in health service ICT infrastructure.

Funding of national initiatives sponsored through the Council of Australian Governments (COAG) and potentially other national initiatives that may arise from the *National e-health strategy* or the Australian Health Care Agreements may require jurisdictional investment. The framework must be sufficiently robust and flexible to ensure that Victoria's priorities are able to be achieved and that any national opportunities that will arise over time can be effectively leveraged.

It is unlikely that a single, substantial funding submission to achieve all of the initiatives identified in the vision would be supported. There needs to be a stronger emphasis on the specific benefits associated with the initiatives.

There is also a natural limit on the capacity of both the system implementers and the health sector itself to cope with the extent of change implicit in the full range of initiatives included in the framework. An alternative approach is therefore required. It is proposed that the funding framework incorporate the following components:

- an ongoing source of funding to allow health services to prioritise the maintenance of local ICT infrastructure to ensure that it is adequate to meet the expectations of the current suite and planned future applications (this is not currently addressed within base health service funding)
- an ongoing source of funding to support the incremental development of ICT capability across the sector (this would include ongoing development of current statewide systems and targeted specialised needs but would not be expected to address the implementation of major new initiatives)
- submissions for additional funding for high-value, high-cost projects targeted at priority needs, incorporated within more widely endorsed health program business cases
- a pool of loan funds to enable health services to implement initiatives with harvestable benefits that are capable of supporting repayment of the loan within a limited fixed period where they do not have the funds available to support this locally
- contributions from external agencies to achieve mutually beneficial outcomes where the interests of these agencies and the Victorian public health services intersect.

Particular emphasis is to be given to obtaining Commonwealth support for initiatives that are directly supportive of national directions or complementary to them. Potential national funding sources include:

- the Department of Health and Aging (DoHA) in association with the *National e-health strategy*, the Australian Healthcare Agreements, the National Hospitals Infrastructure Fund and targeted investment from DoHA program areas
- the National E-Health Transition Authority (or the national entity that succeeds it), in particular through access to the proposed eHealth Solutions innovation funds
- the National Broadband Strategy and other telecommunications investment programs such as Clever Networks
- the Department of Veterans' Affairs with respect to support for services that include a significant DVA cohort in their client base.

Within Victoria, the Transport Accident Commission and the Victorian Workcover Authority both may have an interest in potentially funding contributions to specific initiatives that will benefit those agencies. Multimedia Victoria also has an interest in supporting innovation and initiatives that support ICT industry development.

At the whole-of-Victorian-Government level there is a significant opportunity to leverage investment in network infrastructure such as the 'Fibrelinks' program in formulating a response to the identified need for a clinically effective network that is accessible statewide.

11. Governance

Governance of ICT across the health sector needs to be considered in light of the distributed governance that exists over public health services across the state. Each health service has a board of directors that is responsible for the performance of the health service.

To achieve the outcomes proposed within this vision, there will need to be clear governance and accountability over a number of key areas including:

- oversight of the vision and its alignment with Victorian and national health objectives
- maintenance, implementation and ongoing review of the future state architecture and the associated information management and technology policies, principles and standards
- statewide systems and services
- common expectations, including implementation of and compliance with standards, policies and protocols at each individual health service
- the overall program of implementation of the prioritised initiatives, including the realisation of planned benefits
- ongoing review of the validity and effectiveness of the framework, including evidence of progressive incorporation of lessons learnt along the way in terms of governance, communication and engagement, process, methodology and implementation.

The governance over ICT across the funded public health sector is currently provided through the Board of Health Information Systems, which is chaired by the Secretary and draws its membership from the department and the Victorian public hospital sector, external input from the Department of Treasury and Finance and executive representation from the sector and expert advice from the Victorian CIOs Committee.

The role of the Board of Health Information Systems is to oversee the implementation and development of the *Whole-of-health information and communications technology (ICT) strategic plan 2003–08* to ensure that it achieves:

- optimal business benefit
- effective commercial arrangements
- robust technical outcome.

The board also informs and applies departmental policy to the Health*SMART* program, such as the Health*SMART* participation policy (Appendix 5).

The Board of Health Information Systems is supported by the Health*SMART* Services Council (the council) which reports to it through an independent chair who is also a member of the board. The role of the council is to oversee the performance of Health*SMART* Services as an operational not-for-profit entity, supporting the delivery of critical business systems to the Victorian public health sector.

The council is focused on ensuring that Health*SMART* Services delivers against the obligations set out in the Health*SMART* Services Agreement and acquits its responsibilities within the agreed financial parameters. The council is responsible for approving any change to the scope or type of services provided by Health*SMART* Services, including ensuring that the Board of Health Information Systems endorses the strategic alignment of any proposed changes to scope, prior to provision to the Secretary for approval via a business case.

The council comprises representatives of all agencies that are currently receiving Health*SMART* Services and ensures that Health*SMART* Services continues to provide a cost-effective high-quality service across the sector that is measurable against industry benchmarks.

There is executive cross-membership between the Board of Health Information Systems and the Health Portfolio Board. The governance structure has been approved for a limited period after which it will be reviewed to assess its effectiveness and appropriateness given recent organisational and structural charge within the Department or Health. When the current Health*SMART* program draws to a conclusion, system-level ICT governance will be reviewed in readiness for future implementations.

Appendix 1: Victorian Health Sector ICT Vision & Framework 2009–13 Steering Committee

Role statement

The role of the Victorian Health Sector ICT Vision and Framework Steering Committee was to provide strategic direction and governance to the development of the *Victorian health sector ICT vision and framework 2009–13* and the associated implementation plan and business case.

Responsibilities

The steering committee's responsibilities are to:

- provide overall project guidance
- ensure the ICT vision and framework's goals and objectives are achieved
- review and endorse key milestones, including
  - descriptions of current and future states of practice,
  - ICT vision and framework,
  - Business case and implementation plan,
- ratify and monitor a project plan that includes milestones relating to the development of the health ICT vision and framework
- ensure the opportunities for input from the sector are maximised while recognising the practical limitations associated with dealing with such a large and diverse group of organisations
- canvass issues with colleagues in the constituency they represent and ensure stakeholders are kept informed of the project's progress and that the stakeholders participate as required
- provide a forum for the escalation of issues and their resolution
- make decisions with respect to authorising changes to the project plan or scope
- receive draft milestone deliverables
- review and advise on relevant business cases
- advise and support the project director and project team
- provide advocacy for the project through their normal Victorian public health sector business contacts.

Steering committee membership

The steering committee was composed of:

- Ms Shelly Park, Chief Executive Officer, Southern Health (Chair)
- Dr Brendan Murphy, Chief Executive Officer, Austin Health
- Dr Annie Moulden, Clinical Leader, Patient Safety & Risk, RCH
- Ms Jenni Gratton-Vaughan, Executive Director Community Integration/Chief Allied Health Officer, Northern Health
- Ms Lydia Dennett, Executive Director, Nursing, Western Health
- Ms Fiona Wilson, Director, Office of Health Information Systems (resigned)
- Mr Bruce Ryan, A/g Director, Office of Health Information Systems

- Ms Frances Diver, Director, Access and Metropolitan Performance, DHS
- Mr Greg Stenton, A/g Director, Planning and Resources, DHS
- Mr Pier De Carlo, Director, Policy, Planning and Strategy, Mental Health and Drugs, DHS
- Mr John Mulder, Chair, Loddon Mallee Health Alliance
- Ms Claire Amies, CEO, Western Region Health Service
- Mr Bill Newton, CEO, General Practice Divisions Victoria
- Mr Richard Hill, CIO, St Vincent's Health (resigned)
- Mr David Ryan, Executive Officer/CIO, Grampians Health Alliance
- Mr Peter Williams, Director, IM&T Health
- Mr Christopher Hewett, Project Officer, OHIS (Secretariat)

Appendix 2: Consultation and submissions

Focus group participants

Alfred Health
Alpine Health
Ambulance Victoria
Austin Health
Ballarat Health Services
Barwon Health
Beechworth Health Service
Bellarine Community Health
Benalla and District Memorial Hospital
Bendigo Community Health Services
Bendigo Health Service
Boort District Hospital
Casterton Memorial Hospital
Castlemaine District Community Health Service
Central Bayside Community Health Services
Clinical Networks Forum
Darebin Community Health
Doutta Galla Community Health Service
East Wimmera Health Service
Eastern Access Community Health
Eastern Health
East Grampians Health Service
Echuca Regional Health
Edenhope and District Memorial Hospital
General Practice Victoria
Gippland Southern Health Service
Grampians Health Information & Communications Technology Alliance
Hepburn Health Service
Inner South Community Health
Kerang District Health
Kilmore & District Hospital
Kyabram and District Health Services
Kyneton District Health Service
Latrobe Community Health Service
Loddon Mallee Health Alliance
Lorne Community Hospital
McIvor Health and Community Services
Melbourne East GP Network
Melbourne Health
Mercy Health
MonashLink Community Health Service
Moreland Community Health Service
Mt Alexander Hospital
North East Health Wangaratta
Northern Health
Otway Health
Peninsula Health
PMCC
Portland Health
Respiratory Outreach CNC COPD
Royal Children's Hospital
Royal District Nursing Service
Royal Victorian Eye & Ear Hospital
Seymour District Memorial Hospital
Southern Health
Southwest Healthcare
St Vincent's Health
Stawell Regional Health
Sunbury Community Health Centre
Terang & Mortlake Health Service
The Royal Melbourne Hospital
The Royal Women's Hospital
West Wimmera Health Service
Western District Health Service
Western Health
Western Region Health Centre
Whitehorse Community Health Service
Wimmera Health Care Group
Wodonga Regional Health Service
Yarram and District Health Service
Yarrawonga District Health Service

Written submissions

Australian and New Zealand College of Anaesthetists

Emergency Access Reference Group

St Vincent's Mental Health, Department of Addiction Medicine and Nexus Dual Diagnosis Service

Victorian Health CIO Forum

Meetings and forums

Australian Medical Association

Australian Nurses Federation

Board of Health Information Systems

Clinical Networks Forum

Community Health CEOs Forum

Department of Veterans Affairs

HACC Departmental Advisory Committee

Health Service Management Innovation Council

Human Resources Directors Forum

IMT Communities of Practice

Industry Finance Council

Metropolitan Health Service CEOs

Metropolitan Directors of Medical Services

Metropolitan Directors of Nursing

Pharmacy Guild of Victoria

Region Public Health Service CEOs,

Rural Health ICT Forum

Rural Health Forum

Rural Health Service CEOs

Transport Accident Commission

Victorian CIOs Forum

Victorian Workcover Authority

Appendix 3: Current information and communications technology environment

Applications

At December 2009, the Health*SMART* applications had been implemented into health services as follows:

- The Finance and Supply Management Information System (Oracle Business Suite) was in use across eight metropolitan health services and three rural health alliance and under implementation across the two remaining rural health alliances (for completion by August 2010).
- The Human Resource Management System – Payroll and reporting (Frontier Chris 21) has completed it implementation across seven health services/rural health alliances, paying over 50,000 health workers.
- The Human Resource Management System – Rostering (KRONOS) has completed its implementation in three health services/rural health alliances.
- The Integrated Patient and Client Management System (iSoft) was in use in acute settings across seven health services and under implementation across a further three health services/rural health alliances.
- The Client Management System (Trakhealth) has completed its implementation in 22 stand-alone metropolitan community health centres.
- The Clinical System (Cerner) has been implemented at its first health service with the next group due to commence implementation early in 2010. More detail is described below.
- The Picture Archive and Communications System (FujuFilm) was in use across six health services/rural health alliances.
- The Victorian Ambulance Clinical Information System (VACIS) had been implemented throughout the metropolitan component of Ambulance Victoria and is being implemented in the rural component of the service.
- Dental Health Services Victoria had implemented a new application (Titanium) across the community dental and school dental services.

Clinical systems

The term ‘clinical systems’ can refer to a multitude of applications with the common characteristic that their primary purpose is to support clinicians in the delivery of clinical care. For the purposes of the vision and framework this term refers to a core set of functions that support clinicians through a suite of core functions, and is typically referred to as an electronic medical record system. It may integrate with other specialised clinical systems (for example, ICU) or it may incorporate such specialist requirements as a module within the core product.

The Health*SMART* Clinical Systems (Cerner) Release 1 comprises the Clinical Workbench and Electronic Prescribing and includes patient/episode lists, problem lists, allergies, alerts, integrated results reporting (pathology/imaging), discharge summary, medication summary, medication profile, electronic discharge medications and decision support.

Cerner Release 2 comprises Order Entry and Medication Management including electronic order entry (pathology, imaging, medications, medication administration record, medication/patient barcoding and decision support).

Both releases are within the scope of the existing Health*SMART* program. The functionality to be included in Cerner Release 3 will be based on business need and will be informed by the requirements to be derived from this vision, but will include capability to support clinical documentation within specialty areas (such as cardiology and intensive care).

Mental health

In addition to the Health*SMART* systems, the mental health (statewide) system (CMI/ODS) is used by all health services that provide public mental health services.

Human services directory

The Victorian *Human services directory* (HSD), launched in 2004, is a directory of some 11,500 service providers (predominantly health and community services) and also contains 6,500 GPs and the same number of other professionals (such as specialists). The HSD is a mature information resource that supports many functions, including discharge summaries from hospitals (such as St Vincent's, Austin Health and Eastern Health), NURSE-ON-CALL, referrals and the front-end reception within CSMSP, the directory function within Connecting Care, the services directory within the Better Health Channel and Disability Online. In future it will support discharge summaries within Health*SMART* and will be an integral part of e-referral across the human services sector.

E-referral

There are no systems currently in use that provide ubiquitous capability to share information across health services. There has been a significant investment to develop some informational enablers to support electronic referral of patients across health services (most notably the significant work undertaken to develop the service coordination tool templates) and numerous establishments of local systems to achieve this outcome using point-to-point relationships, but there is no sector-wide capability at this time.

Local systems

Within the health services there are hundreds of local systems ranging from small access databases supporting a specialist service to more sophisticated web-based systems operating across agencies. In some instances they also use functionality from the Health*SMART* suite of products that is not part of the current scope of works at the state level.

Many of these local systems have arisen in the absence of a core clinical system. There will be a challenge in making the transition to a more sophisticated and ultimately more supportive core clinical system without compromising the value of the existing local information base built up over many years with highly customised functionality.

Hospitals manage their own systems to support their management of diagnostic services, particularly the high-volume services pathology, radiology and cardiology. They also have local solutions to support emergency departments and operating theatres and other specialised needs.

ICT infrastructure and resources

Statewide infrastructure

Through the Health*SMART* program the statewide shared infrastructure has been established to provide:

- dual data centres to ensure redundancy in the event of disaster
- shared servers and storage to provide high availability for mission-critical systems
- a secure, statewide communications network (HealthNET) with redundant paths to connect all public health services and rural alliances
- a centralised integration service that allows data to be securely and reliably shared between systems
- a shared ICT service (Health*SMART* Services) to operate the systems and the infrastructure into the future.

Health service (local) infrastructure

Within health services, ICT infrastructure is used predominantly to support their major applications. Major investments have been made in access devices, communications equipment (LAN and WAN) and servers and storage.

These assets are at varying stages of their lifecycle across the different health services but some averaged parameters are included below to provide an indication of the status of these assets across the sector.

Type of ICT asset	Estimated volume across the sector	Aged 0–2 yrs (%)	Aged 3–5 yrs (%)	Aged >5 yrs (%)
Desktops	37,449	35	44	21
Laptops/tablets	5,709	38	45	16
PDAs	3,018	32	63	5
Servers	1,877	36	40	23
Data routers	412	46	25	28
Data switches	3,621	24	40	30

Data in the table above have been extrapolated from the data collected through a survey conducted in August 2008 as part of the development of the vision and framework,

The table shows that a significant proportion of the infrastructure in the sector is nearing or beyond its expected useful life which constrains the sector’s capacity to make effective use of new applications. Provision needs to be made for the maintenance core ICT assets on the expectation that they will typically require replacement every four to five years depending on the nature of the asset.

From the same survey data, in both metropolitan health services and rural health alliances, the most common ratio of clinical staff to computers is one workstation to four clinical staff. For stand-alone community health centres, clinical staff have slightly better access to workstations but 20 per cent of sites only have one workstation to four clinical staff.

There is a wide variability in the quality of WAN services across the state. The bandwidth capacity diminishes as the system moves from hospital services to the community health centres (by a factor of 20) and as it moves from metropolitan to rural to remote.

Of significance is the lack of redundant WAN infrastructure, leaving most sites vulnerable to total disconnection under adverse circumstances outside of HealthNET. The proportion of non-redundant WAN connections in rural areas is less (61 per cent) than in metropolitan areas (77 per cent). In stand-alone community health centres there is a similar ratio of non-redundant connections but data is the only major service carried by this cohort, whereas many metropolitan and rural health services also carry significant volumes of voice and video traffic.

HealthNET is already in place to provide core infrastructure and the current local network(s) are capable of (and are delivering) telehealth and other services, but there is no consistency or equality of performance between facilities due to the current patchwork of solutions.

Human resources and ICT skills

ICT helpdesk and general support services were reported as the most significant outlay in terms of total cost, as well as staff numbers. Project management and business analysis skills were shown to cost more per FTE than ICT management, suggesting a strong reliance on contract skills to implement new systems and reflecting the general theme regarding the lack of support and resources available in-house or at an affordable rate when implementing new systems.

For nominally equivalent skill sets, rural health alliances spent less than metropolitan health services and often far below the market rate, suggesting a different level of expertise. Specialist ICT skills such as integration management were scarce and much scarcer in rural areas. This might suggest the employment of more multi-skilled personnel who switch between roles. Specialist skills were rarely employed in the stand-alone community health centres.

Reflecting an industry-wide trend, health services typically have little capability in terms of information management skills and infrastructure. A very small number of health services reported having a data dictionary, while most did not. Statewide, there are few application integration staff, virtually all of whom are in the major metropolitan health services. This suggests a strong need to support new systems rollouts with not just standards, but the skills required to implement those standards.

Appendix 4: Architectural principles

To conform with the commonly accepted enterprise architecture frameworks, the principles are aligned with 'information', 'application' and 'technology' views of the architecture. In addition to these views the document outlines a small number of 'general' principles. As indicated under General Principle 1 the principles are not absolute and the aim should be to progressively migrate to the fullest possible compliance over time, if there are compelling business reasons to implement 'noncompliant' solutions, that may occur, but the rationale must be clearly articulated and endorsed within the governance framework described in Section 10 of the vision and framework, and in accordance with departmental policy.

General principles

GP-1 As a general rule the health sector architecture principles will be based on the endorsed principles of the department's enterprise architecture. Deviations from these 'base' principles are allowable, but are subject to the explicit exemptions approved through the appropriate architecture governance.

Rationale

Maximise the commonality/alignment of architectural directions across all business units and application solutions within the human services sector. Reduce the number of architectural frameworks to be defined and maintained within the human services sector.

Implications

Governance processes to manage the exceptions will need to be defined, endorsed and implemented within the charter of the department's Architecture Review Board.

GP-2 All future investments in new or substantially upgraded information systems funded by the Victorian public health system will be conditional upon the systems being compliant with a set of defined and endorsed messaging and data interoperability standards.

Rationale

Assure the ease of interoperability of future application solutions. Minimise the ongoing costs of application integration and maintenance.

Implications

Standards (and the associated governance processes) for data interoperability, including standards for code-sets and minimal datasets will need to be defined and implemented.

Governance processes will need to be implemented to support the verification of the compliance with messaging interoperability standards.

GP-3 The national standards for data content and interoperability (where these are available) should be assessed as the 'default' position for the adoption within Victorian public health sector context.

Rationale

Ensure the ability to leverage future national solutions.

Implications

Continue the ongoing engagement with NEHTA and other bodies responsible for the evolution of national standards.

Application principles

AP-1 The core business functionality will be delivered via a standard set of endorsed system solutions, each supporting a defined set of key common business functions. All future investments in new or substantially upgraded information systems funded by the Victorian public health sector will be conditional upon these systems being compliant with the endorsed business architecture.

Rationale

Enable the implementation of consistent business processes based on industry 'best practice'. Reduce the overall procurement and maintenance costs across the entire Victorian public health sector by using a small number of common application solutions. Facilitate the ability of health workers to operate across the broader Victorian public health domain by leveraging their familiarity with the common systems and processes.

Implications

There may be only one or a panel of applications but agencies will have a limited choice of application solutions available to support their core business functionality. As a corollary of this, agencies must be appropriately engaged in the selection process for the endorsed application solutions. Agencies may need to adjust their existing business processes to conform with the supported/endorsed model(s). Standard statewide application 'footprints' will need to be defined and maintained to ensure the consistency and manageability of application configurations deployed across the health system.

AP-2 Individual health agencies may choose to deploy 'local' solutions to support their non-core functionality; however, these solutions will need to be compliant with the minimum set of (interoperability) standards (refer to principle GP-2).

Rationale

Enable the health sector to foster innovative localised solutions while ensuring the ability of these solutions to function appropriately in a wider 'whole-of-health' system context by interoperating with the relevant core applications.

Implications

The choice of localised commercial, off-the-shelf (COTS) solutions capable of supporting the mandated interoperability requirements may be constrained. The appropriate governance processes will need to be implemented to support the verification of standards compliance or to approve variations from these standards as necessary. The local IT organisation may have limited capability to develop and deploy solutions compliant with the mandated interoperability requirements. New support processes and artefacts (such as reference interoperability framework implementations) may need to be developed to facilitate this deployment model.

AP-3 The application architecture (aligned to its business architecture) should ensure that mapping of applications to core business functions avoids duplication within the supported portfolio of applications.

Rationale

Reduce the complexity and improve consistency of business processes, thus facilitating the adoption of optimised business practices. Reduce the number of standard application interfaces requiring the development and ongoing support.

Implications

Agencies may be required to adjust their existing business processes to conform with the supported/endorsed model(s). Governance processes enabling consistent mapping of business function to applications need to be defined and implemented.

AP-4 The application architecture should enable, as much as practicable, the end user's experience of 'all applications working as one'.

Rationale

During execution of core business processes, end users should be shielded from understanding of application boundaries.

Implications

The technical architecture (and the underlying technology infrastructure) should enable the single sign-on capability, leveraging a single user identity across the entire suite of core applications. Wherever possible the user interface standards should enforce a consistent 'look and feel' of all core applications making up the solution suite. The workflow design will need to carefully consider the mapping of user roles, wherever possible striving to minimise the number of applications needed to support a given business role. The workflow design should support a seamless transfer of control across application boundaries, including the support for a single client view. Governance processes enabling the consistent mapping of business function to applications will need to be defined and implemented.

AP-5 SOA-style Web Services will be the preferred implementation model for enabling the interoperability of applications within the Victorian public health service domain.[1]

Rationale

Web Services is the most broadly supported platform-independent, standards driven, 'state of the art' industry interoperability framework in the current marketplace.

Implications

Some of the existing 'legacy' applications within the health sector may not be capable of 'native' support for Web Services integration. Such applications will need to be either substantially re-engineered or progressively replaced as part of their natural software development lifecycle. In the immediate term allowable integration patterns based on the alternative technologies will need to be defined and managed on an exception basis. The Web Services deployment and management capability across the health sector is in its early development phase and therefore is expected to evolve over time.

1. Note that in this context Web Services standards are deemed to be supporting the transport layer application-to-application interoperability protocols, and thus are distinct from standards governing the message payload content and semantics (such as HL7).

Information principles

IP-1 The information items that are required at the enterprise level or shared between applications will be standardised and strictly defined in terms of format and meaning. All information items in the above category will have an identified primary source, based upon the concept of a trusted source of information.

Rationale

Provide meaningful and consistent reporting at the whole-of-enterprise level. Maximise the data integrity thus reducing the incidence of errors due to incorrect interpretation of data. Support the interoperability and integrity of applications sharing information. Ensure that the data capture processes are commensurate with the accuracy required by the business processes consuming this data.

Implications

Service providers need to be involved in the planning of data capture processes. Information agreements need to be put in place with providers. Vendors providing software solutions to the sector need to be engaged to ensure their support and compliance with this principle.

Statewide metadata repositories, acting as a centralised reference point for definitions of shared information items and message content standards need to be continuously enhanced and maintained.

The governance processes (including the roles and responsibilities for management of metadata repositories) need to be defined and endorsed. A data custodianship regimen will need to be established and maintained with respect to each trusted data source.

The support for endorsed industry standards, such as messaging and clinical terminology, as defined by the common data and messaging framework, should be included as the key requirements for any new solution procurement. The implementation of these standards should be mandated by the relevant project charters.

IP-2 Confidentiality and privacy of information managed by Victorian public health sector applications must comply with relevant state and federal legislation.

Rationale

The confidentiality and privacy of health information must be protected in accordance with the existing legislative frameworks.

Implications

Endorsed design, technology standards and security policy mechanisms need to be defined and implemented throughout the lifecycle of protected information elements, including but not limited to:

- role-based access management
- physical data storage
- data ‘transit’ (in the context of application interoperability)
- enterprise reporting
- management of test data

- management of data backups and backup media
- management of data archiving and archiving media
- management of client consent.

IP-3 To the extent that it is feasible, client-related information should be captured once and shared with relevant applications in a secure and controlled manner and in accordance with the privacy legislation and the Health Records Act.

Rationale

Ensure the integrity and consistency of client data used within Victorian public health sector.

Implications

Trusted sources of information will need to be identified for each critical component of client data. Full implementation of this principle is underpinned by the eventual deployment of the national unique patient identifier (UPI) framework.

IP-4 Data required to support the statewide and national reporting requirements should be collected once, close to its source, and not continually re-extracted at the disparate points of its lifecycle. The statewide and national reporting requirements should be met by the aggregation of raw atomic data, rather than by collating extracts from multiple derived data sources.

Rationale

Minimise the ongoing costs and complexity of data collection and reporting. Improve the quality, timeliness and integrity of data used to support the statewide reporting requirements.

Implications

The data collection requirements (and the supported architectural approaches) need to be defined as part of the procurement process for new application solutions. The data collection and data management to support statewide and national reporting capability will be managed within a framework of a centralised health system data warehouse. A core set of endorsed tools should be available to the sector to provide a base reporting functionality.

Technology principles

TP-1 HL7 V2.4 will be used as the predominant message content interoperability standard supporting application integration within the Victorian public health sector domain. Message content protocols other than HL7 can be used on an exception basis, subject to approval processes defined within the governance framework.

Rationale

HL7 is the most ubiquitous health industry messaging standard, broadly supported by both vendor and business communities. Health*SMART* messaging architecture is already underpinned by (derivation of) HL7 V2.4 standard, the Health*SMART* HL7 V2.4 standard.

Implications

Governance processes for the ongoing management of HL7 standards, as relevant to the Victorian public health sector implementations, need to be defined and implemented. This includes future support for HL7 V3 (CDA). Governance processes supporting the implementation of non-HL7 messaging need to be defined and implemented.

TP-2 The technology services supporting the health sector can be provided either through centralised or distributed model. The selection of specific delivery model(s) should be governed by a well-articulated and endorsed set of criteria.

Rationale

A single delivery model for technology services is not likely to provide the health sector with sufficient balance of cost efficiency, flexibility, manageability and responsiveness.

Implications

The library of supported technology deployment patterns and the decision framework to assist in the selection of the appropriate delivery model(s) will need to be defined and endorsed.

TP-3 The solutions should, as much as practicable, leverage common technology frameworks enabling delivery of high availability and disaster recovery services.

Rationale

Reduced cost and complexity of delivering high availability and disaster recovery services.

Implications

The ability to implement this principle will be to a significant degree predicated on the centralised model for technology service delivery.

Appendix 5: Health*SMART* participation policy

19 September 2008

Purpose

The purpose of this policy is to provide a clear statement of the expectations of the Department of Human Services in relation to agencies of the Victorian public health service using the products selected to make up the Health*SMART* Panel.

The Health*SMART* strategy

The Health*SMART* program was established with some fundamental principles underpinning it. Some of these reflect the culture and tradition in Victoria, wherein agencies should willingly participate to ensure the success of a venture. Key among these principles are:

- Generally, the health sector is not leveraging the benefits that current generation information technologies can deliver, largely due to chronic under-investment in ICT.
- Significant development of ICT across the sector will be best achieved through a genuine partnership between government and agencies, with a high level of participation and ownership by agencies.
- Victoria's approach to selecting and implementing information systems must reflect the integrated nature of the health system to deliver the benefits to the system as a whole, that is, not just to individual agencies.
- To support and maximise the effectiveness of a shrinking and mobile clinical workforce, it is important to reduce the number of different information systems they are required to learn as they move between organisations. This is also seen as a key strategy in reducing risk and adverse events.
- We need to significantly improve our ability to access and share information in an efficient and controlled manner. This is critical to help us support the rights of patients to access their own information and to support the seamless delivery of care across the sector. Reducing the number of different systems in use, and ensuring that standards are applied consistently across systems, significantly increases the ability to achieve these outcomes.

Why a change in policy?

The Health*SMART* strategy was developed with the support of the sector. While the resultant Health*SMART* program was launched with a voluntary participation policy, it was considered more an issue of timing as to when agencies would choose to implement the Health*SMART* solutions, rather than whether they would adopt the solutions at all.

The governance structure established for the program reflects the partnership model proposed. The establishment of the Board of Health Information Systems and the four steering committees, being the peak bodies of the program, is a significant reflection of the decision-making authority that the department has vested in agencies throughout the program.

The consequences and implications of this situation have led to the recognition that, to provide the Health*SMART* program a fair chance of delivering to its objectives, a change to the voluntary participation policy is required.

The program has now, essentially, completed the procurement phase and transitioned into the implementation phase. A review of the key outcomes the program is seeking to deliver and the critical success factors required to achieve these has highlighted the need for more certainty around agency participation.

Specifically, it is important that:

1. There is a greater recognition that the Health*SMART* products have been selected 'by agency staff for use by agencies'. Agencies should now be able to invest their effort on identifying how best to implement and use the Health*SMART* products to meet their local needs rather than in going back to reassess the market.
2. We ensure that we implement ICT to support the health sector as a whole rather then just to meet the individual needs of agencies.
3. We acknowledge the impact of delays and uncertainties of implementation. These will significantly compromise the ability of the Health*SMART* program to deliver its outcomes and particularly to leverage the efficiencies and benefits available. Lack of certainty of participation also increases the risk for early adopters of the Health*SMART* products.

Policy for participation

Any agency introducing a new (or replacement) information system with functionality that is delivered by a product on the Health*SMART* panel will implement the relevant Health*SMART* solution, accessed through Health*SMART* Services, unless the departmental Secretary approves an exemption for an alternate product to be used.

Where an agency wants to implement a major upgrade or new release to an existing product this policy will also apply.

Exemptions

Definition

An exemption to this policy will only be granted in the following circumstances:

1. Where the agency is a part of a larger national organisation and the parent organisation has implemented an alternate system and requires the agency to utilise this (national) system.
2. Where an agency demonstrates that their business needs differ significantly from the majority of other agencies of similar nature, particularly where the agency represents a sector whose needs were not explicitly represented in the requirements underpinning the selection of the relevant Health*SMART* product.
3. In the situation of an agency experiencing an unexpected failure of their existing system and the Health*SMART* program not being able to adjust implementation schedules to incorporate the implementation. Known 'failures', such as vendors providing reasonable notice of withdrawal of product, will not be included in this consideration.

Implications

The implications of an agency deviating from the Health*SMART* solutions, having been granted an exemption, will include the following:

1. The agency has full responsibility for, and bears the full cost of, ensuring that the solution meets all relevant Victorian requirements. The department will not provide any funding to support implementation, development or support for the alternate product (including year end changes for example).
2. The agency will bear the full cost of integrating this solution to any of the Health*SMART* solutions.
3. The agency will not have access to general participation funds from the Health*SMART* program, including technology refresh funds.

Some examples of circumstances that **would be considered** for exemption would include:

1. A national health service organisation takes a decision to implement a financial management solution different from Oracle. The Victorian-based public health agency, as part of this chain could contemplate the corporate solution but would be responsible for ensuring that it met all Victorian requirements and would bear the full cost of integrating the solution with any others.
2. A community health service wishes to proceed with an alternate financial management system – the needs of community health services were not explicitly defined in the scope of requirements used to select the Health*SMART* product.

Some examples of circumstances that **would NOT be considered** for exemption would include:

1. An agency states a preference for an alternate product that delivers the same or reduced functionality as the selected Health*SMART* product.
2. An agency believes that they can implement a cheaper solution than the Health*SMART* solution.

Authority to approve an exemption

The Secretary, Department of Human Services will be the only person authorised to provide an exemption to this policy.

Review panels

Review panels will be established for each of the resource management, patient and client management and clinical systems steering committees. Each review panel will consider applications for exemption for the projects that the relevant steering committee is responsible for implementing.

Each review panel will include two or three representatives of the steering committee plus an independent person. The executive director of MH&ACS will approve the membership of the review panels, on recommendation from the chair of the relevant steering committee.

Process to seek an exemption

To seek an exemption the agency must undertake the following:

1. Prepare a detailed statement that presents the explanation for the proposed deviation from this policy. This must include clear statements of the way in which the proposed alternate solution will deliver the level of standardisation, integration and other sectoral requirements that will be achieved through the Health*SMART* program.
2. Submit this statement to the Director, Office of Health Information Systems.
3. The submission will be provided to the relevant review panel for consideration and recommendation.
4. If the review panel considers the application to be complete and compelling, it will be presented to the Secretary for consideration.
5. The agency will be notified of the outcome of the Secretary's review.

Scope

This policy applies to:

- metropolitan health services
- regional public health services
- rural health alliances.

Effective date

This policy will be effective from Monday 5 March 2006.

Department of Human Services commitment

This policy is based on the assumption that the department will maintain its commitment to:

1. continuation of the partnership approach through the Board of Health Information Systems
2. developing suitable processes to review and manage the membership of the Health*SMART* panel – this being particularly to ensure that where a majority of agencies support the capability of a new entrant to the market it can be reasonably considered for membership
3. establishing suitable governance and management structures to ensure that the performance of Health*SMART* Services meets the needs of agencies – this will include Service Level Agreements for each of the solutions
4. negotiating timing of implementations with individual agencies and wherever possible will ensure that the business and financial imperatives of agencies are accommodated in determining these timings (through the steering committees)
5. referencing Health*SMART* implementations through budget build-ups discussions and development of statements of priorities, considering the financial and other impacts of the implementation as well as the benefits and efficiencies that should be realised.

Definitions

The following definitions will be used throughout this policy statement.

Agency	**A health or related service, as defined under the Health Services Act, including:** (a) a registered funded agency, multi-purpose service or health service establishment; or (b) any other person, body or organisation that provides funds, facilitates access or provides insurance in relation to health services, being services that include, but are not limited to– (i) aged care services; or (ii) palliative care services; or (iii) disability services; or (iv) pharmaceutical services; or (v) ambulance services; Note – Rural ICT Alliances are referred to as agencies.
Victorian public health service	All agencies within Victoria.
Health*SMART* Panel	The group of products selected to deliver specific functionality for use across the Victorian public health sector. Initially, this will include: Finance & Materials Management (FMIS) – **ORACLE** Human Resource Management (HRMS – Payroll) – **Frontier Software** Human Resource Management (HRMS – Rostering) – TBD Patient & Client Management (P&CMS) – **ISOFT** Client Management (CMS) – **TrakHealth** Clinical System (Orders, Results Reporting & Medication Management) – TBD These products, with ongoing support and maintenance, will be accessed through the Victorian Health Shared ICT Service – known as Health*SMART* Services. The members of the panel will develop and change over time as new products are introduced or incumbent products are removed. A process to review the panel for appropriate coverage of functionality and to incorporate new products where an adequate number of health services support such introduction will be developed. Note – the systems for ambulance service and for dental health services are specific to these services so are not emphasised here.

Health*SMART* Services	The entity that will operate and manage the Health*SMART* systems once they have been implemented into agencies.
Major upgrade or new release	Any significant change to an existing system that involves the vendor installing new software to add to or replace existing software. Note – this does NOT include patches and minor changes that are provided, predominantly, to correct flaws and faults in the existing software.

Addendum 19 September 2008

Application system upgrade – definition

A software upgrade is a newer version of the same software that is currently used; for example, if VITAL v8.0 is currently used and it is upgraded to VITAL v9.0

In determining whether a major change to an existing software application is an upgrade or is actually replacement with a new system, the level of change, associated effort and cost will be a good guide.

From a technical perspective, the following characteristics should be taken into account when assessing whether a software application is being upgraded or replaced as these application characteristics would be consistent after the change event:

- **security model** – user authentication and access privileges would be implemented in the same manner
- **user interface** – screen layouts, icons, drop down lists, key combinations etc would have the same look and feel
- **technology platform** – databases, operating system, coding language, third party software requirements (such as reporting add-ons) would be the same
- **system management** – backup approach, key alert points and levels, key transactions for performance monitoring and availability testing would be consistent
- **incident management** – an upgrade would close some incidents, problems or known errors (a replacement would reset incident and problem baselines)
- **product versioning** – versioning would follow an incremental and consistent identification pattern for the product; for example, an upgrade from Homer 2.8 to Homer 2.9, for the purpose of resolving known problems or incidents, or to enhance existing functionality.

If these application characteristics are consistent after the change event, the change would be classified as a software upgrade and not a major upgrade or new release.

System replacement within a common ownership arrangement is not an upgrade. For example, where a vendor has purchased an application (such as IBA purchasing SWITCH or Trak purchasing VITAL) and agencies want to replace these old applications with the vendor's newer core product, this is not an upgrade even though the vendor remains the same.

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