eHealth Strategy
for NSW Health

2016-2026

A DIGITALLY ENABLED AND INTEGRATED HEALTH SYSTEM
DELIVERING PATIENT-CENTRED HEALTH EXPERIENCES
AND QUALITY HEALTH OUTCOMES

NSW
GOVERNMENT | Health

Glossary

BYOD	Bring Your Own Device
CIAP	Clinical Information Access Portal
CHOC	Community Health and Outpatient Care
DAC	Data Analytics Centre
DOH	Department of Health
EHEC	eHealth Executive Council
eMR	Electronic Medical Record
eMeds	Electronic Medication Management
ED	Emergency Department
GP	General Practitioner / General Practice
GovDC	Government Data Centre
HETI	Health Education and Training Institute
HSOC	Health Security Operations Centre
HWAN	Health Wide Area Network
HCM	Human Capital Management
HR	Human Resources
ICT	Information and Communication Technology
ICU	Intensive Care Unit
LHD	Local Health District
NSW	New South Wales
PHN	Primary Health Networks
PRM	Patient Reported Measures
PACS	Picture Archiving and Communications Systems
PSAF	Privacy Security Assurance Framework
RIS	Radiology Information System
RACI	Responsible, Accountable, Consulted, Informed
ROI	Return on Investment
SMS	Short Message Service
SHN	Specialty Health Network
TCO	Total Cost of Ownership

NSW Health

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A digitally enabled and integrated health system delivering patient-centred health experiences and quality health outcomes

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Message from the Minister for Health

The vast opportunity for digital technologies to transform the way healthcare is delivered has been increasingly recognised around the world. Since becoming Minister for Health it has been a particular passion of mine to make sure we harness the potential of such innovations in NSW Health.

We began the digital journey with the *NSW State Health Plan: Towards 2021* setting out a clear pathway for eHealth priorities and funding to improve digital connectivity for a smart, networked health system. The *Blueprint for eHealth in NSW (2013)* further refined that vision, establishing eHealth NSW as a designated organisation within NSW Health and committing to a range of strategies, actions and programs for smarter healthcare right across the state.

The *eHealth Strategy for NSW Health 2016–2026* builds on the Blueprint and outlines a direction for NSW investment for the next decade. The strategy takes into account recent Whole-of-Government ICT strategies, the latest advances in health technology, policy directions including Integrated Care and ongoing enhancements to performance, quality and safety in our health system.

The strategy supports not only the largest hospital building and redevelopment programs, but guides investment in creating smart hospitals for the future, a connected health system and effective community-based services in NSW.

NSW is already recognised internationally as having developed a sophisticated and effective eHealth system in areas like electronic patient, medical and medication records, digital imaging and networked connectivity. This strategy seeks to spread these core capabilities consistently across the State. In addition, the Strategy sets out seven key focus areas for investment in areas like integrated care, health analytics and personalised healthcare to be delivered in three phases over 10 years.

As always, it recognises the need for both statewide resourcing and direction while embedding opportunities for innovation, management and delivery as close to local communities and patients as possible. NSW Health organisations and eHealth NSW will now work in partnership with other health and research organisations, jurisdictions and the Commonwealth to put this exciting plan in to action.

I want to thank eHealth NSW and the eHealth Executive Council in particular, for their work on the Strategy, and I look forward to ensuring we work together to create a smart, safe and sustainable, digitally enabled healthcare system in NSW.

Jillian Skinner MP
Minister for Health

Executive Summary

The *eHealth Strategy for NSW Health 2016–2026* has been developed to guide NSW to deliver world-class, eHealth-enabled healthcare services across the State over the next decade.

In particular, the Strategy establishes the direction for eHealth investment so NSW Health can harness innovations and solutions for integrated clinical care, patient engagement, cost-effective delivery and smart infrastructure, to meet growing healthcare demands long into the future. While consolidating and strengthening statewide and core eHealth goals, programs, standards, architecture and priorities, the Strategy also promotes innovation at the local and regional level.

eHealth solutions will continue to support new approaches for patient and provider engagement and deliver on strategic priorities in a number of areas, including Acute Hospitals, Community & Outpatient Care, Chronic Disease Prevention, Mental Health, Aged Care, Cancer Care, Aboriginal Health and Kids & Families.

The Strategy sets the focus and underpinning principles for NSW to realise the vision of *'A digitally enabled and integrated health system delivering patient-centred health experiences and quality health outcomes'*. Three key goals for eHealth in NSW have been identified – **patients** are supported, well informed and actively engaged in their health; **staff** have the tools to make effective decisions with access to the very best training; and our **organisations** have the capacity for smart, transparent and efficient management, business and service planning.

The increasing introduction of digital technology and information systems capability across NSW's healthcare system is a complex and evolving challenge.

To create the right environment in NSW, the Strategy identifies 11 principles that must underpin all eHealth activities, including Patient Centred Approach, Clinical Engagement, Robust Governance & Investment Management, Strategic Commissioning & Procurement, Delivery through Partnerships, Usable & Safe Systems, Standards Based Environment, Safeguarding Security & Privacy, Effective Change Management, Fostering Innovation & Research, and Flexibility & Openness to Change.

To support the delivery of effective eHealth across the state, the Strategy establishes seven key focus areas. Each one includes strategic investment priorities and initiatives in order to foster engagement across NSW Health and the wider community, identify investment and business case implications, and allocate resources to key initiatives and manage delivery. They are:

Core Clinical Systems: NSW Health will continue to develop and enhance delivery of accurate 'paper-lite' information systems for safe, high-quality healthcare through initiatives such as Electronic Medical Records, Electronic Medication Management, Diagnostic Solutions, HealtheNet Clinical Repository, and Incident Management Systems.

Integrated Care Solutions: NSW Health will continue to develop and enhance robust communication and information systems to support increasingly integrated care for patients through initiatives such as Shared Care Plans, Remote Patient Monitoring, Patient Reported Measures and Telehealth. This Strategic Plan is aligned with the *NSW Health Telehealth Framework and Implementation Strategy: 2016–2021*.

Workforce and Business Management Systems: NSW Health will continue to develop and enhance systems and tools to improve workforce management, support our staff and effectively manage our business through initiatives such as Human Capital Management, Streamlined Credentialing, Workforce Information and Rostering Systems, Financial and Asset Lifecycle Management and Learning Management Solutions.

Data and Analytics: NSW Health will continue to develop and enhance health analytics in alignment with the *NSW Health Analytics Framework*, which outlines the approach that NSW Health will take to improve decision making, insights and organisational performance. A number of initiatives including Standardised Data Structure & Reporting, Data Mobilisation, Population Health Intelligence, Enhanced Research & Continuous Learning, are designed to progress the analytics agenda in NSW Health.

Access to Information: NSW Health will continue to develop and enhance the coordination and integration of core information systems including eMRs, HealtheNet and the national My Health Record system. Further work will also be done to simplify workforce access to information and mobile access solutions.

Infrastructure, Security and Intelligence: NSW Health will continue to develop and enhance minimum standards of infrastructure and network capability so that electronic systems are highly available, reliable and secure through initiatives such as Health Identity Management, Security and Privacy Strategy and Whole-of-Government Data Centre Integration. In alignment with the *NSW Government ICT Strategy*, NSW Health will progressively shift elements of its infrastructure to 'cloud-based' and 'as-a-service' models.

Innovation: NSW Health will continue to create and enhance opportunities that encourage, develop and implement new ideas and innovations across the healthcare system.

The eHealth Strategy will be implemented as a 10-year program of innovation, investment and implementation across three 'horizons' that identify short, medium and long-term eHealth goals for NSW Health. They are:

Horizon 1 – Building Consistent Foundations over the next four years aims to mature NSW Health's core digital systems, services development, infrastructure and network standards development to create a consistent and reliable Information and Communication Technology (ICT) environment.

Horizon 2 – Integration over the next seven years will leverage increasingly consistent eHealth foundations to deliver a seamless continuum of care that responds to all of a patient's health needs across both public and private primary, community and hospital settings. Integration efforts will also increasingly involve other clusters within the NSW Government sector (eg Education, Family and Community Services, Justice) as well as other jurisdictions and the Commonwealth to support the national digital health agenda.

Horizon 3 – Personalisation over the next decade will progressively shift the healthcare focus toward preventative health and tailored patient engagement, where patients are enabled to make informed decisions and become active participants in maintaining their wellbeing. Our people will also access customised real-time information and training to support the individual within a networked health environment.

Finally the eHealth Strategy sets out a clear map of the roles and responsibilities of all the stakeholders who will be key to creating a 21st-century eHealth system in NSW. In line with its 'system manager' role, the NSW Ministry of Health will oversee the progress of statewide eHealth strategy, policy and investment. eHealth NSW is the key vehicle to drive the coordinated delivery of the eHealth Strategy, and will work in partnership with NSW Local Health Districts (LHDs), Specialty Health Networks (SHNs), Statewide Services and Pillars to implement statewide programs and support local innovation. Operating in a federated ICT environment, all NSW Health organisations are responsible for implementation and effective use of statewide and local ICT capabilities and services, working in a collaborative fashion and in alignment with agreed statewide architecture and standards.

1. Introduction

The NSW Health system is recognised for its world-class performance in areas such as life expectancy, cancer survival, low infant mortality and timely access to emergency department care. As the population in NSW ages, medical costs continue to rise, the burden of chronic disease increases and consumer expectations climb, there is constant pressure to meet these new demands while delivering high-quality, integrated and accessible healthcare services.

Technology is already impacting every aspect of life and our health is no exception. Rapid innovation in ICT is transforming how we engage with the community in the delivery of health services. eHealth-enabled health services are uniquely placed to help reach those people who are currently not accessing services by overcoming issues of distance, cost and stigma.

The push toward eHealth has been recognised and endorsed in the *NSW State Health Plan: Towards 2021* and the *NSW Rural Health Plan: Towards 2021* as a crucial element in providing safe, high-quality and effective healthcare as we move forward. The eHealth Strategy is not an ICT strategy, rather a direction for clinical change and transformation supported by technology.

The Strategy builds on existing strategies including the Premier's Priorities of the *NSW Government State Priorities: Making it Happen, National Digital Economy Strategies, NSW Government ICT Strategy* and the *National Digital Health Strategy*, which further commit the NSW and Australian Governments to deliver digital and easily accessible services to the public through innovation and new delivery models such as 'cloud' and 'as-a-service' approaches.

eHealth encompasses a diverse range of technologies, including broadband connectivity, software, digital networking, big data, mobile connectivity, smart infrastructure and even artificial intelligence, which support the delivery and improvements in health and medical care for individuals and communities. Its potential to improve service delivery for patients is just as broad, ranging from smarter, more cost-effective models of care, remote monitoring, improved access particularly in rural areas, rapid data analysis, which is helping shift the traditional treatment paradigm of 'illness' to a collaborative, proactive management of 'wellness'.

NSW Health has already created one of Australia's most sophisticated eHealth environments. Innovations like the **Electronic Medical Records (eMRs)** for paper-lite digital documentation and communication, **HealtheNet** systems for seamless information flow, a web-based learning management system **HETI Online**, and collaborative **bio-informatics and genomic medical research and training** to support personalised translational medicine are already having a major impact for patients across the state. The infographic opposite represents the current state of clinical, infrastructure and corporate ICT initiatives. This strategy seeks to extend the coverage of these capabilities across the entire NSW heath system and to add new capabilities aligned with broader policy directions and priorities of NSW Health.

Focus Area	Current Initiatives	Current Progress	NSW Health Coverage Basis
CORE CLINICAL SYSTEMS	Electronic Medical Records		35% of facilities
	Intensive Care Systems		0% of ICU beds^
	Pathology Lab Results		55% of pathology laboratories
	Health*e*Net		73% of facilities
INFRASTRUCTURE, SECURITY & INTELLIGENCE	Health Wide Area Network		29% of facilities
	State-wide Infrastructure Services		66% of staff
	Wireless		30% of facilities
WORKFORCE & BUSINESS MANAGEMENT SYSTEMS	Finance Systems		100% of organisations*
	Asset & Facilities Management		100% of organisations*
	Rostering		25% of staff
INTEGRATED CARE	Patient Reported Measures		10% of targeted patients
	Patient Identification & Selection		20% of targeted patients
	Video Conferencing		5% of staff have desktop solution
DATA & ANALYTICS	Standardised Data Structures & Reporting		25% of data & reports standardised
INNOVATION	Standard Innovation Approach		Level 1 of 5 innovation maturity

*Fully implemented across the state. Further investments required for usability and adoption uptake.
^Currently in build and testing phase with implementation to commence in the second half of 2016.

Technology will always rely on the support of people to succeed, and placing patients, the community and our staff at the heart of an evolving eHealth system is our biggest priority. NSW Health staff at all levels are actively involved in helping to develop and use new technologies and remain a key resource moving forward.

Research also shows that consumers overwhelmingly expect to use digital services or technology as part of their healthcare.

Drivers for change

Patient redefined

New patient

Knowledge increase

Patient expectations in health care continue to increase.

Technology is strengthening patients' knowledge, allowing them to be increasingly empowered, health literate and engaged as partners in their healthcare and wellness. Technology is driving new ways for NSW Health and agencies to engage with patients, families and the community to better understand and improve satisfaction levels.

Workforce shifts

Service demand

Ageing population

An ageing population, increasing burden of disease and greater focus on health prevention results in increased demand for healthcare services and workforce.

NSW Health already experiences increasing demand for healthcare workers and pressure to address shortages of skilled health workers, predominately in regional and rural communities.

Across the state, there will be ongoing pressure to improve workforce retention, approaches to workforce education, regulation, financial incentives and personal and professional support.

Integrated care

Connected health systems

Patients with chronic and complex support needs

Healthcare demands are changing and increasing.

Responding to the overall health needs of a person, including their physical and mental wellbeing.

Integrated care means partnering with the patient, their carers and family, and health and social care providers. This requires new innovative models of care, so that the health system is more seamless, effective and efficient across the entire care continuum.

Digital disruption

Smart device

Portable diagnostics

Implant drug delivery

Digital therapeutics

Genome sequencing

Machine learning

The past decade has seen rapid development and adoption of technologies that change the way we live and will have a similarly transformative impact on health and care.

Some of these technology innovations are on the horizon, while others are already at play in our homes, hospitals, communities and care settings. Each new innovation, even if not yet systematically deployed in our healthcare system, is an opportunity to boost better health outcomes and more efficient care.

Open information and big data

Access to data

Knowledge increase

Greater access to quality data is increasing our understanding of how diseases develop and spread.

An era of open information in healthcare is underway. With years of research being aggregated in electronic databases, and with the government encouraging transparency across government agencies, quality data and analytics are now helping deliver greater impact across communities and industries, from finance to population health to clinical outcomes.

NSW Health

2. An eHealth strategy for NSW

The *eHealth Strategy for NSW Health 2016–2026* aims to guide NSW Health to deliver world-class, eHealth-enabled healthcare services across the State for the next decade. The eHealth vision for NSW Health captures the aspiration and intent of the Strategy.

Vision:

A digitally enabled and integrated health system delivering patient-centred health experiences and quality health outcomes

The Strategy establishes the direction for eHealth investment so that NSW Health organisations can harness innovations and solutions in clinical care, patient engagement, business services and smart infrastructure to meet future demands. The Strategic Framework provides an approach for LHDs and service providers to develop tailored eHealth plans to meet local needs while staying consistent with statewide eHealth goals, underpinning principles and priority ICT solution developments.

Strategic framework

Underpinning Principles

Patient Centred Approach

Clinical Engagement

Robust Governance & Investment Management

Delivery Through Partnerships

Usable & Safe Systems

Safeguarding Security & Privacy

Standards Based Environment

Strategic Commissioning & Procurement

Effective Change Management

Fostering Innovation & Research

Flexibility & Openness To Change

Organisations

Organisations and health system performance is optimised and informed by eHealth.

Our people

Our people are assisted by eHealth to make effective decisions and in the delivery of integrated care.

Patients, carers and families

Patients are well informed and supported by eHealth in achieving their health objectives.

Information

Infrastructure Management

Safety

Informed Decisions

Access

Communication

Training
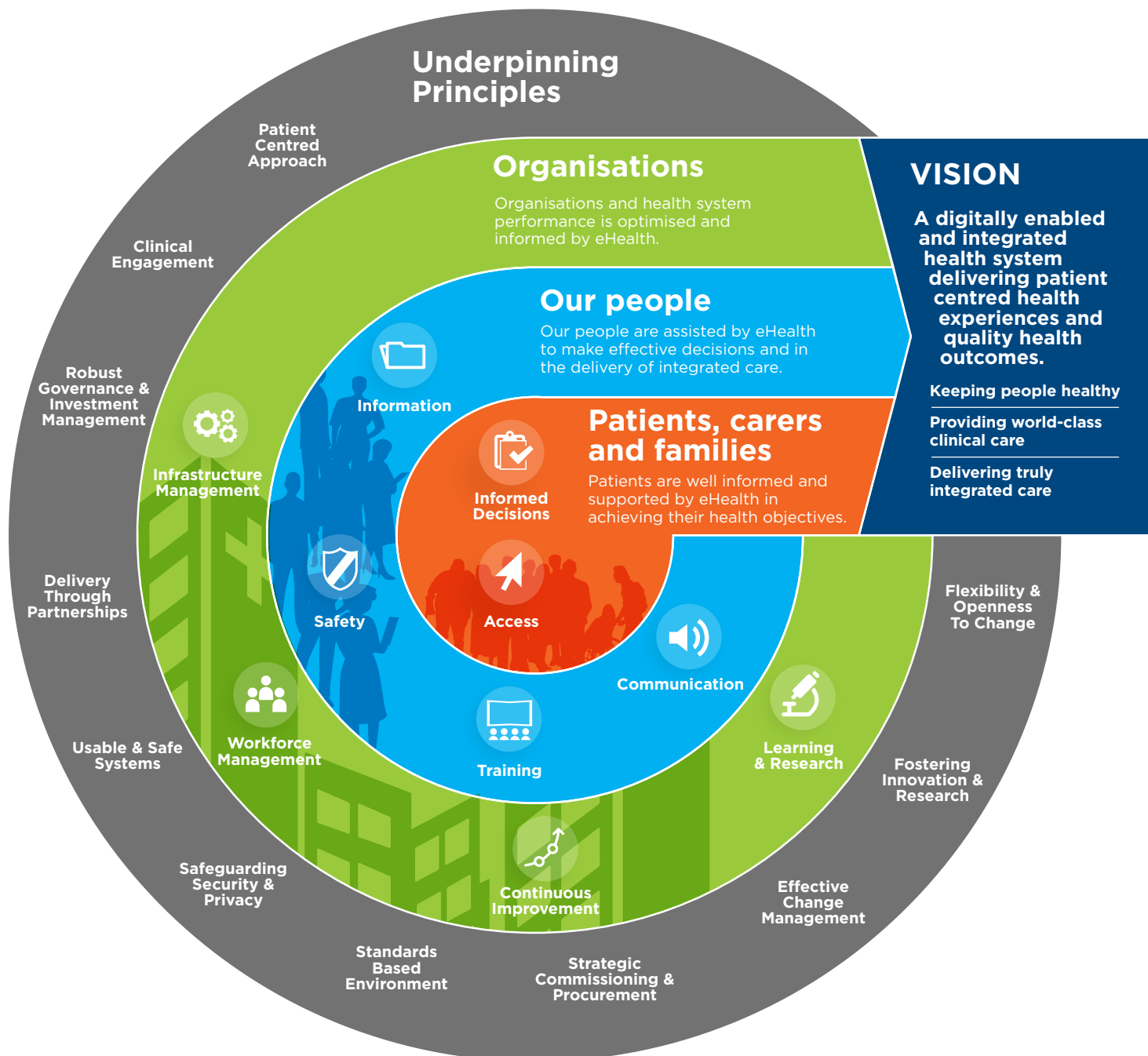
Workforce Management

Continuous Improvement

Learning & Research

VISION

A digitally enabled and integrated health system delivering patient centred health experiences and quality health outcomes.

Keeping people healthy

Providing world-class clinical care

Delivering truly integrated care

Patients, Carers and Families

Goal 1:

Patients are well informed and supported by eHealth in achieving their health objectives.

Supporting patients to become active participants in managing their healthcare and wellbeing underpins the shift from reactive to preventative healthcare. Empowered consumers are enabled to make the right healthcare choices and have access to better value care. eHealth can help foster access to information, personal healthcare management, and targeted prevention that encourages participation in all health decisions.

Key benefits of 'customised' eHealth solutions for patients, carers and families include:

- ability to safely access and share agreed information with all relevant healthcare providers and agencies
- easy and immediate access to health information and resources
- personalised healthcare interactions and integrated models of care
- new opportunities to engage with health providers through digital channels

Our People

Goal 2:

Our people are assisted by eHealth to make effective decisions, access education and training, and deliver integrated models of care.

Our people encompass all employees of NSW Health, including clinical and non-clinical staff. For clinicians, this will mean the delivery of consistent, accurate and real-time information that can foster better clinical outcomes, quality and integrated care, and underpins safer and more effective treatment. Networking our people empowers clinical staff to innovate, share knowledge and deliver health services with a patient-centred focus across primary, community and acute-care settings to holistically address the needs of patients and the community.

For non-clinical staff, eHealth can improve operational, cost and training outcomes through streamlined digital corporate processes such as payroll and rostering, data and analytics, and more accurate resource planning.

Key benefits of eHealth solutions for our people include:

- intelligent applications to support clinical decision-making and patient safety
- equitable on-demand access to training and education across NSW
- enhanced personalisation of our peoples' experience with clinical and corporate systems
- technology-enabled workforce support options (eg remote video conferencing, collaborative shared care tools)
- enhanced tools to manage recruitment, workforce education, credentialing management and career development
- better access to human resource information
- sharing of information across NSW Health to support clinical and workforce processes

Our Organisations

Goal 3:

Organisations and health system performance is optimised and informed by eHealth.

eHealth can help boost the performance of NSW Health organisations and the overall health system by being adaptive, flexible and responsive to patients, staff and the community. An eHealth-supported system is much smarter at identifying needs and tailoring solutions for all stakeholders, particularly the effective management of supply and demand of organisational resources.

Key benefits of eHealth for organisations include:

- analytics and insights to drive improvements in service delivery and planning, in particular safety, quality and appropriateness of care
- timely access to linked data from a range of sources (public and private)
- financial efficiency through improved operational performance
- effective health data security and privacy management
- optimised workforce management to ensure 'Right People, Right Skills, Right Place'
- support of individual organisations and Ministry of Health as a system manager in planning services, allocating resources and monitoring performance

Underpinning principles

Eleven principles underpin all eHealth programs and initiatives

Patient Centred Approach

Ensuring that investments in eHealth support an integrated health system to deliver patient centred health experiences.

Clinical Engagement

Supporting the creation of ICT systems that are fit for purpose and align to clinical processes. Allow clinicians to take a more active role in achieving outcomes and operational efficiencies.

Robust Governance & Investment Management

Supporting consistent service for patients and allowing all stakeholders to coordinate and plan effectively at local and state levels.

Strategic Commissioning & Procurement

Driving efficiencies in the funding, procurement and management of external provider arrangements to achieve a more adaptive approach to vendor management.

Delivery Through Partnerships

Forging strong partnerships – considerate of strategic priorities, cost, resources, value for money, service need and technology – to implement innovative models of care and enabling technologies.

Usable & Safe Systems

Driving quality and safety in the design and development of ICT systems through strategies that measure safety concerns at the intersection of health ICT and patient safety.

Standards Based Environment

Adopting health information standards to facilitate and streamline the interoperability of ICT systems, reducing integration costs while improving the overall quality of delivered components.

Safeguarding Security & Privacy

Protecting patients, clinicians and staff information as we shift from paper-based systems to 'paper-lite' digital systems.

Effective Change Management

Enabling the sustainable and seamless transition of ehealth programs to business as usual, including embedding digital literacy.

Fostering Innovation & Research

Proactively anticipating stakeholder needs to better predict and meet future expectations and trends.

Flexibility & Openness To Change

Embedding a culture of innovation driven by leaders in emerging technologies, change management and service provision who promote a universal approach to the redesign of healthcare.

Underpinning Principles

Patient Centred Approach

The needs of patients and consumers fundamentally drive the design, development and implementation of eHealth solutions. A patient-centred approach ensures that investments in eHealth support an integrated health system to deliver patient-centred health experiences. Capturing the range of needs from acute treatment to wellness management, guides NSW Health to keep the people of NSW healthy.

Clinical Engagement

Our clinical workforce is the backbone of health service delivery. Ongoing clinical consultation and engagement is critical to ensure ICT systems are fit for purpose and align to clinical processes. This will allow clinicians to take a more active role in the implementation of eHealth systems and clinical process redesigns to support and achieve quality health outcomes and operational efficiencies. Increasingly, NSW clinicians guide the design of eHealth solutions and work in partnership with technology experts to create solutions that are safe, usable and able to generate insightful data and information.

Robust Governance and Investment Management

The effective and timely introduction of eHealth solutions across NSW Health requires robust governance and investment management frameworks. Success requires governance models that continually adapt as the NSW embraces integrated care, standardisation and quality improvement across core systems to deliver service consistency for patients. As NSW moves to a more agile, integrated care model, the acquisition and funding of ICT will also need to be more flexible to support all types of delivery and a culture of innovation. This will allow all stakeholders to coordinate and plan effectively at local and state levels across relevant agencies and non-government organisations.

Strategic Commissioning and Procurement

Wherever possible, efficiencies in the funding, procurement and management of external provider arrangements will be sought. Strategic commissioning and procurement will create new implications for a more adaptive approach to vendor management. In some instances, this will mean eHealth NSW will purchase and manage statewide technology solutions and services on the behalf of LHDs, and in other circumstances, eHealth NSW may establish panels for LHDs to purchase from. Where LHDs are seeking solutions and services unique to their geographic location, they may seek to purchase these independently.

Delivery Through Partnerships

The NSW Health system includes a mix of government, not-for-profit providers, and for-profit providers working individually and together to ensure the best health outcomes for the people of NSW. Forging strong partnerships across LHDs, the NSW Ministry of Health, Shared Services, Pillars, clinicians, community service providers and private industry is essential to implement innovative models of care and enabling technologies. Partnerships with research institutions, universities and other academic organisations will help accelerate research, innovation and commercialisation of eHealth-enabled products and services. Active engagement of industry partners (eg technology vendors) will ensure that NSW Health is able to leverage the best developments from around the world and adopt them within its environment in ways that are safe, flexible and aligned with NSW Health's enterprise architecture and interoperability requirements.

Importantly, strong governance frameworks that support partnerships with NSW Government departments, other jurisdictions and the National Digital Health Agency will be crucial to ensure clear roles, responsibilities and accountabilities are in place.

Usable and Safe Systems

For NSW Health to deliver the best eHealth solutions, it is essential that quality and safety underpin the design and development of ICT systems through the development of strategies that measure safety concerns at the intersection of health ICT and patient safety[1]. NSW Health will deliver eHealth solutions which are usable and can be effectively, efficiently and satisfactorily adopted by clinicians. The eHealth ecosystem must be supported by the widespread adoption of usable clinical systems to ensure the 'big data' and analytics strategies continuously measure performance data and inform the way ICT systems are designed, implemented, and ongoing quality improvements to deliver safer patient care[2]. Also, as clinical services become more reliant on information technology, the reliability and resilience of our systems needs to be ensured.

Standards Based Environment

Minimum standards need to be in place for key tasks such as consistent identification of patients and sharing of information in a uniform approach while allowing innovation, localisation or specialisation of other components of the technology environment. Adoption of health information standards facilitates and streamlines the interoperability of ICT systems, helping to reduce integration costs while improving the overall quality of delivered components. Implementation of common architecture and standards, particularly for infrastructure and data structures, will ensure information exchange across disparate systems and diverse provider groups both within and outside the health sector (eg social services, justice).

Safeguarding Security and Privacy

NSW Health aims to maintain a trusted digital environment where information security and privacy is an integral principle for delivering optimum benefits. Health information management protocols and monitoring tools support the acquisition, analysis and protection of both paper and electronic medical and health information. The shift from paper-based systems to 'paper-lite' digital systems demands policies and standards that guide the responsible collection, storage, analysis and distribution of healthcare information. Effective engagement of patients and communities in the dialogue about key topics such as consent, privacy and security of health information is essential.

Effective Change Management

Change management support will be required for all ICT systems implementations and include engagement of end users, needs analysis, user training and ongoing functional and technical support post go-live. Change management support for the uptake of eHealth applications and integration into clinical workflows is vital to ensure the sustainability and seamless transition of eHealth programs to business as usual. To gain the greatest benefits from eHealth, digital literacy support needs to be embedded into systems, policies, practices and education across all NSW Health. Moving forward, delivering changes to business process may require additional consumer-facing change management strategies. For example, e-literacy initiatives will need to be targeted towards all stakeholders in the health system, including patients, their families and carers.

Fostering Innovation and Research

The digital landscape is a dynamic one and the health sector must leverage evidence-based research to proactively anticipate the needs of its stakeholders to better predict and meet future expectations and trends. Concurrently, innovation is constantly occurring locally across NSW Health organisations. An innovation and prioritisation framework will enable the system to identify local ideas and support the development, implementation and statewide adoption where possible. Developing a culture of innovation and collaboration between all stakeholders is critical to fast-track the best ideas, maximise return on investment and building eHealth capacity.
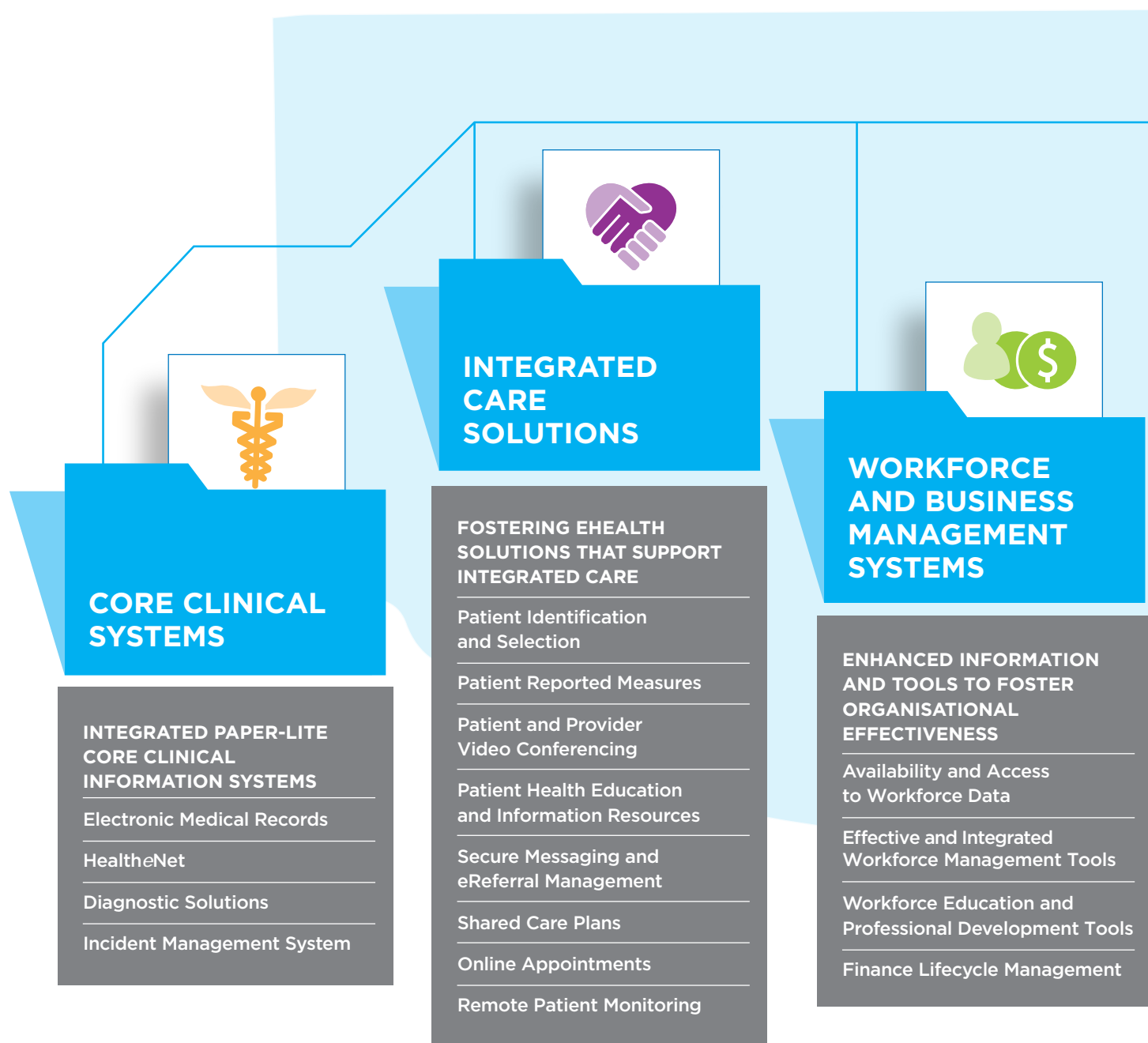
Flexibility and Openness to Change

World-class eHealth-enabled healthcare must rely on a culture of innovation driven by leaders in emerging technology, change management and service provision who can also promote a universal approach to the redesign of healthcare. Fostering an open mindset that is flexible and open to change will be essential to investigate new technologies as they become available, adopt initiatives incorporated in future Horizons and meaningfully uptake and use eHealth systems across clinical and technical stakeholders.

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1   Singh, H, Sittig, D, 2015, Measuring and improving patient safety through health information technology: The Health IT Safety Framework, BMJ, Safety and Quality First

2   Health system analytics: The missing key to unlock value-based care, Findings from the Deloitte Centre for Health Solutions 2015 US Hospital and Health System Analytics Survey

Building an eHealth landscape in NSW

Focus areas and examples
of key initiatives and investments

CORE CLINICAL SYSTEMS

INTEGRATED PAPER-LITE CORE CLINICAL INFORMATION SYSTEMS

Electronic Medical Records

Health*e*Net

Diagnostic Solutions

Incident Management System

INTEGRATED CARE SOLUTIONS

FOSTERING EHEALTH SOLUTIONS THAT SUPPORT INTEGRATED CARE

Patient Identification and Selection

Patient Reported Measures

Patient and Provider Video Conferencing

Patient Health Education and Information Resources

Secure Messaging and eReferral Management

Shared Care Plans

Online Appointments

Remote Patient Monitoring

WORKFORCE AND BUSINESS MANAGEMENT SYSTEMS

ENHANCED INFORMATION AND TOOLS TO FOSTER ORGANISATIONAL EFFECTIVENESS

Availability and Access to Workforce Data

Effective and Integrated Workforce Management Tools

Workforce Education and Professional Development Tools

Finance Lifecycle Management

INNOVATION

CONSISTENT APPROACH TO FOSTERING IT ENABLED INNOVATION

Creating a Culture of Innovation and Collaboration

Coordination of ICT and Health Enabled Innovations

DATA AND ANALYTICS

ENHANCED DATA MANAGEMENT, ANALYTICS AND HEALTH INTELLIGENCE

Standardised Data Structures, Storage and Reporting

Enhanced Capture and Use of New Data Sources

Enhanced Data Mobilisation

Enhanced Population Health Intelligence

Enhanced Preventative Health Analytics

Enhanced Research and Continuous Learning

INFRASTRUCTURE, SECURITY AND INTELLIGENCE

ROBUST MINIMUM STANDARD FOR INFRASTRUCTURE, NETWORKS AND CYBER SECURITY

High Speed Clinical Grade Network

Wireless Services and Standards

Health Digital Identity Management

Security and Privacy Strategy

Government Data Centre Consolidation

ACCESS TO INFORMATION

ENHANCED PATIENT AND PROVIDER ACCESS TO DIGITAL HEALTH INFORMATION

Seamless Information Flow Between Core Systems

Workforce Access to Applications Anywhere Anytime

Highly Mobile and Intuitive Solutions

3. Building an eHealth landscape in NSW

This section identifies the seven key focus areas to support the delivery of the eHealth Strategy. Each focus area includes strategic investment priorities and initiatives, as well as specific approaches to delivery of technology platforms, eHealth-enabled services and digital experiences. Underpinning principles will need to be incorporated and addressed as part of planning, delivery and governance for each initiative.

3.1 Core Clinical Systems

> ❝ Integrated paper-lite core clinical information systems ❞

NSW Health's core electronic health systems support acute, integrated and comprehensive care, active patient involvement and timely decision-making. Core digital systems, service development, and infrastructure and network standards development ensures access to accurate information to improve decision-making for safer and higher-quality healthcare.

NSW Health will continue its journey toward an integrated digital patient record so patients have consistent health and wellbeing engagement no matter when or where they interact with it. This includes developing enhanced functionality and integration of core clinical information systems across care settings, clinical specialties, NSW Health Organisations, Jurisdictional Health Organisations, and private care providers.

Electronic Medical Records

An Electronic Medical Record (eMR) securely shares information from all NSW Health clinicians involved in a patient's care, to provide a more integrated picture of patient health across different care settings including hospitals, community and outpatient care, or speciality and diagnostics services. The eMR is a core frontline clinical system which supports:

- core clinical documentation such as comprehensive clinical assessments, checklists, progress notes, clinical summary and medication history
- test ordering and diagnostic results
- electronic medications management

These capabilities support healthcare delivery across the following settings:

- inpatient care
- peri-operative suite information
- emergency department information
- intensive care systems
- community health and outpatient care

On a typical day in NSW, over 32,000 clinicians use the eMR to open 290,000 charts, order 165,000 tests and book 22,000 appointments electronically. NSW Health will focus on further reduction of the hybrid medical record (use of paper and electronic records simultaneously) through expansion of the digital patient record across care settings, such as cardiology and maternity.

Ongoing developments aim to have core eMR functionality implemented across all LHDs to fully achieve the NSW Health

strategic goal to establish consistent core platforms and better integration of clinical and electronic record systems beyond the hospital setting, with a priority on core systems that support intensive care systems, clinical pathways, outpatient clinics and community health services.

HealtheNet

HealtheNet is a central clinical repository providing a statewide view of clinical history and seamless information-sharing between hospitals, community health, GPs, patients and private clinicians. HealtheNet information includes patient demographics and identifiers, eDischarge summaries from LHDs (including alerts, allergies and adverse reactions), inpatient and outpatient encounter listings and more.

HealtheNet's connection to the My Health Record system benefits clinicians and their patients by allowing patients, clinicians and hospitals to view and share health information between care settings to foster integrated care and patient participation. NSW Health will continue to focus on alignment of HealtheNet with the My Health Record information sharing standards for clinical document types, including Specialist Letters, Pathology Reports, Radiology Reports, Community Health Discharge Summaries and Community Health Event Summaries.

Diagnostic Solutions

Radiology and Pathology solutions are core enablers for diagnostic workflows. Radiology services are currently supported through implementation of the Picture Archiving Communications System (PACS) and Radiology Information Systems (RIS).

NSW Health Pathology is a statewide clinical service providing quality, reliable public pathology services to NSW from four NSW Pathology Hubs. Each year approximately half the NSW population receives at least one pathology test through the service. Pathology results are crucial during the monitoring and prevention (screening) stages of care as well as in infection prevention, public health surveillance and reporting, and health protection functions.

NSW will continue to build on work to facilitate complete access to pathology results for clinicians and patients through a common pathology messaging model across NSW Health. This will result in the statewide and centralised storage of pathology data and improved access for clinicians, GPs, specialists, hospital staff, nurses and allied health staff to provide the right care no matter where the patient receives treatment. NSW Health will also continue to invest in the lifecycle management of the PACS and RIS systems.

Incident Management System

The Incident Management System (IMS) facilitates the process by which staff notify, document and manage incidents, near misses and systems risks through a user-friendly platform integrated with other NSW Health systems. The IMS solution helps improve real-time and consistent incident data entry while enhancing data quality and tools used to enable data analysis and reporting efficiencies.

NSW Health will focus on IMS system enhancements to deliver a patient-friendly feedback portal to provide patients with a simple process to comment on the healthcare they have received as reflected in the incident report. The enhancements will provide user-configurable dashboards and the ability for NSW Health staff to share actions with other staff to reduce the risk of recurrence of similar incidents. The ability to quickly notify, receive electronic feedback and track the progress of incidents will enable NSW Health to continue to deliver a safer, stronger health system.

3.2 Integrated Care Solutions

" Fostering eHealth solutions that support integrated care "

In March 2014 the NSW Government announced the *NSW Integrated Care Strategy* to better respond to all of a person's health needs. Under this Strategy, eHealth NSW is progressing new technologies to allow consumers and healthcare providers to communicate with each other so no patient is lost in the system or undergoes unnecessary duplication of medical tests. eHealth can be used to:

- more easily and comprehensively identify risks to a patient's health
- share clinical information with patients, carers, GPs and specialists
- enable patient experience and outcome surveys to be run in real time through Patient Reported Measures
- boost collaboration between care providers around patient care needs through shared care plans, collaboration tools and referral solutions
- identify new approaches for patient engagement in self-management strategies
- support models of care using telehealth technologies, such as video consultations or biometric monitoring solutions, for chronic disease management

Patient Identification and Selection

Patient identification and selection tools identify people with complex healthcare needs in order to link them to the right community health or primary care service and reduce the risk of unnecessary trips to hospital.

NSW Health will focus on improved tools that assist with the identification of individual patients at risk of hospitalisation, via electronic databases using a standard set of risk predictors. Improved solutions will also support the selection of at-risk individual patients based on additional screening for predictive factors.

Patient Reported Measures

Patient Reported Measures (PRMs) allow patients to provide direct, timely feedback about their healthcare experiences by completing a brief online survey anywhere, anytime.

NSW Health will focus on improved, real-time feedback for a more comprehensive view of patient satisfaction for clinicians and managers to address relevant issues. The feedback can be combined with analytics to significantly improve patient outcomes by recognising best practice, discovering complications in procedures and processes, and improving patient relationship management.

Patient and Provider Video Conferencing

Virtual Consultations using video conferencing allow care providers to obtain broader input into a patient's treatment without requiring the patient to attend a face-to-face visit. Video conferencing capabilities are already being used in some LHDs to improve access to specialists and reduce travel time in both rural and metro areas. In many cases patients are able to attend a facilitated consultation with a nurse where healthcare providers are not present in the same physical location.

Provider-to-provider video conferencing is also being used to support tele-workforce education between sites and multidisciplinary consultations (with or without patient attendance) for case planning.

NSW Health will focus on the implementation of a standard statewide conference, collaboration, communications and messaging capability, which will include mobile solutions and tele-video consultations (in facility or from home) between patients, GPs and/or specialists.

Patient Health Education and Information Resources

Mobile applications and online health education resources are increasingly being developed and used to disseminate information regarding specific health conditions or to provide 'self-help' online resources for patients and providers. This information may also be disseminated via mass communications (eg internet, television, radio, print), targeted communications (eg social media, SMS, mail out), or face-to-face group sessions (eg health coaching sessions).

NSW Health will focus on ongoing alignment and integration of content management systems with local tools, social media or state and national health education and literacy resources (eg HETI, HealthDirect, health councils). NSW Health will focus on improved solutions and platforms to enable consistent, scalable development and delivery of patient health education and information via multiple communication channels and mediums.

Secure Messaging and eReferral Management

Healthcare secure messages (including eReferrals) contain clinical documents and/or other information shared between healthcare organisations, either directly or through one or more messaging service providers that need to conform to message format standards.

eReferrals are increasingly replacing paper-based referrals and have great potential to deliver seamless communication, improve workflow and reduce duplication between care providers. Currently, eHealth-enabling systems are at different levels of maturity with respect to their implementation to support secure messaging and eReferral management between LHDs and primary care. The early adoption of secure messaging solutions and eReferral management workflows must also support existing channels for cross-organisational information exchange, including paper, fax and telephone communications.

NSW Health will continue to work with local stakeholders to develop requirements for referral tracking and alerting (eg local vs state solutions), including evaluating solutions to enable referral workflows. At a national level, eHealth NSW will continue to engage with the Australian Digital Health Agency and HealthDirect on national standards and integration with state and national provider directory and secure messaging endpoint solutions.

Shared Care Plans

Shared care plans allow providers from various care settings to collaborate through a single workflow tool. The shared care plan identifies tasks set by the owner of the care plan (eg GP or patient initiated), assigns resources and responsibilities for specific tasks, tracks the status of each task in the plan and supports integrated workflow among multidisciplinary care teams. Shared care planning solutions also permit consumers to engage on their own care plan management by having access to the plan, tasks, status and assignments for each.

NSW Health will continue to work with primary and secondary care stakeholders to define business use and tool requirements, evaluate key solutions between GP and LHD systems and shared care workflows, and support proof of concept for statewide adoptions. NSW Health will focus on establishing consistent statewide enablers for shared care tools, integration with point of care information systems and national health infrastructure solutions.

Online Appointments

Online appointment bookings (eg eScheduling) allow providers to manage information about their availability for patients or other care providers (via referrals). Online appointment tools will require local electronic health systems to interface, contribute and manage booking information via common standards.

NSW Health will focus on the development of an online appointment scheduling system to enable online booking of appointments, as well as the exchange of information between the referring clinicians and specialist reviewer to ensure patients are where they need to be on the continuum of care and to reduce waiting periods to improve overall system efficiency and satisfaction ratings.

Remote Patient Monitoring

Remote patient monitoring allows patient biometric information to be gathered remotely or at home so that it can be reviewed in conjunction with other information held in the patient record or shared care collaboration tools. Remote patient monitoring regimes may be part of a recommended pathway for managing a chronic condition, set up as an alternative to hospitalisation, used to track the health of remote patients that cannot make it to a facility or used as a formal part of a care plan.

In general, the key components to enable biometric monitoring include:

- patient biometric monitoring devices
- monitoring and alerts platform
- integration with existing health records and data repositories

NSW Health will continue to support the development of local and state telehealth strategies and implementation plans that will require ongoing collaboration with local teams to define remote patient monitoring architecture, tools and support. Broader engagement with state and national bodies will foster development of standards for recording and exchange of biometric monitoring information.

3.3 Workforce and Business Management Systems

❝ Enhanced information and tools to foster organisational effectiveness ❞

Workforce and business management systems provide the tools to enable us to attract and retain the best talent, effectively utilise our workforce, maximise our capacity to deliver patient care and effectively discharge our duties as a public sector organisation.

Availability and Access to Workforce Data

NSW Health has developed guidelines for integrated statewide planning so that LHDs have access to workforce data sets and planning resources to enable more informed local and statewide decision making. Our statewide HR system, StaffLink, provides the foundation for this and with further investment in our reporting and analytical capability, as well as integration to other corporate systems, we will be able to provide accurate, up to date and manageable information based on historical trends and predictive analysis.

NSW Health will focus on improving existing workforce data and informatics as part of our reporting and analytical capability including access to consistent workforce reporting dashboards as part of an integrated employee portal.

Effective and Integrated Workforce Management Tools

The capability and capacity of our people is pivotal for delivering effective patient care. An integrated Human Capital Management (HCM) suite that supports us in recruiting and retaining the right people, managing their performance, and ensuring their effective deployment to meet patient care demands is central to our workforce management strategy.

These systems will standardise processes across the state and provide rich workforce data which, when collated with clinical and patient data, will give us valuable insights. This will support predictive analysis and future workforce planning to meet peaks and troughs in demand and the need for specialised skills reducing waiting times and ensuring effective utilisation of clinicians.

Key goals of the *NSW Health's Health Professionals Workforce Plan 2012–2022* include efficient utilisation of the healthcare workforce and flexible work arrangements that allow our

workforce to meet patient needs. We have established the foundation for this with the implementation of a statewide rostering system which enables us to better manage our front-line staff. Further enhancements to the rostering system will help drive compliance with employee award and safety conditions whilst roster costing will assist with more effective organisational decision making.

Our workforce management tools will support mobility and access 'anywhere at anytime' allowing employees and managers to work flexibly whilst maintaining contact and delivering the outcomes required. In line with our intent to provide a seamless patient experience, we will deliver integration and interoperability between our workforce and business systems to provide a seamless intuitive experience for our staff. Our goal is to make technology work for our workforce, streamlining processes and enabling our staff to spend more time on providing frontline services.

Workforce Education and Professional Development Tools

Ensuring 'the right people, with the right skills, in the right place' requires insight into clinical workforce 'credentials' and 'appointment scope of practice' to ensure clinicians have the appropriate skills to perform the roles in which they are appointed. NSW Health will continue to develop and implement a statewide credentialing system that assists to minimise risk in the placement of clinical staff.

In addition, further enhancements to the statewide Learning Management System will provide greater equity in access and more engaging interactions with learning and development courses and the ability to plan and log both formal and informal learning and professional development. Technology to support higher education course provision including student management and marking tools, personalised learning programs and virtual classrooms will form part of an integrated learning and development capability. Our technology will enable us to support staff in fulfilling their career objectives and digital literacy, whilst building a world-class workforce skilled and enabled by industry-leading learning opportunities.

Finance and Asset Lifecycle Management

The implementation of StaffLink has provided a statewide foundation for standardised financials, procurement and supply chain management. We will continue to develop this capability, ensuring the system keeps pace with industry standards. Further integration with other corporate and clinical systems will enable better insights into the financial and asset management lifecycle and support activity costing, enabling better operational and strategic funding decisions. Improved alignment with the Treasury's Financial and Asset Management Transformation programs will also require some system changes to support improved governance and performance enabled by greater transparency, accountability and sustainability in financial management processes and decisions.

NSW have established a statewide system for Asset and Facilities Management to improve our capacity to deploy, track, manage and maintain clinical and non-clinical assets, ensuring they are in the right condition and available in the right place at the right time for optimal patient care. We will continue to improve our capability in asset management by providing mobile access to our asset and facilities management tools enabling officers in the field to better track and maintain assets on location.

The introduction of inventory management will provide a more efficient and cost-effective approach to managing assets across the State and deliver a consolidated system for booking workspaces and equipment use, which will lead to efficiencies in access to and utilisation of assets. Our capability in financial and asset management will mitigate risks, provide greater transparency and provide opportunities to support more informed operational and strategic decision making.

3.4 Data and Analytics

66 Enhanced data management, analytics and health intelligence 99

Health analytics is the use of data, technology, and quantitative and qualitative methods to make informed and evidence-based decisions to improve health outcomes, and health system planning and performance. Examples of the application and benefits of health analytics include:

- highly informed clinicians are able to continually improve clinical practice
- informed providers maximise workforce resourcing and financial efficiency
- empowered consumers making the right healthcare choices
- NSW Health operates at an optimal level through greater transparency on the quantity and quality of operations
- the NSW population has improved health and wellbeing through better risk factor prediction and management of population-level programs and interventions

The *NSW Health Analytics Framework* is scheduled to be released in 2016, which aims to transform health through data and insights. The Framework will drive broader and more sophisticated analytics use across the system to allow key decision makers across NSW Health access to timely, consistent and high quality information.

Enhanced business information provides greater visibility and informs improved decision making capability for better patient care, and a more sustainable and well-governed health system. NSW Health will focus on improved analytics capabilities to effectively access, interpret, analyse, report on and utilise the increasing volume and complexity of health data for decision making.

Standardised Data Structures, Storage and Reporting

Standard data structures and reporting indicators help identify variability between care settings and changes to performance over time. They provide hospital management insights to drive improvements in clinical operations, including unwarranted clinical variation, workforce efficiency and resource utilisation. Data capture, storage and management standards and technology solutions are required to support the increasing amounts of data being generated and used to enable business intelligence.

Access to timely, relevant and accurate information lays the foundations for building valuable analytics capabilities. Achieving this requires:

- creation of consistent statewide data standards, definitions and dictionaries
- mapping data sources and storage of data to allow for optimisation of data flow patterns that enable timely and accurate data collection
- reporting processes and key indicators that are consistent statewide
- analytics and reporting capabilities that are aligned across local and state perspectives to provide standard insights into performance of LHDs and operational effectiveness of specific hospitals, speciality units and wards

NSW Health will focus on improving the consistency of corporate and clinical data, including metadata standards and definitions for use across NSW Health and, where necessary, align with other state and federal government agencies or private sector. Based on these standards, NSW Health will continue to enhance analytics capabilities and statewide rollout to effectively access, interpret, analyse, report on and utilise the increasing volume and complexity of health data for decision making. Based on data and reporting standards, NSW Health will continue to improve statewide data acquisition, data linking and storage solutions for more efficient data collection processes and reporting capabilities.

Enhanced Capture and Use of New Data Sources

Creating large volumes of structured data will not only drive deeper insights in both clinical and business applications within the system, but also allow benchmarking with interstate and international health systems. Data sets for analytics will increasingly combine NSW Health data with data from many other public, private and community sector agencies. New sources of data may also arise from medical and technological advances such as genomics, 'wearables, ingestibles or implantables', and new data sources outside the health system like those generated by social services, education or justice. As new data sources are identified and integrated into the NSW Health data holdings there will be increased demands on improved data acquisition, storage and data linking solutions.

NSW Health will continue to work with internal and external stakeholders to identify and use new data sources in alignment with the *NSW Health Data Analytics Framework, NSW Government ICT Strategy*, the NSW Government Data Analytics Centre (DAC) and the *Australian Public Service ICT Strategy 2012–2015*, to support agencies to design and deliver better services, particularly where policy issues cross portfolio boundaries.

Enhanced Data Mobilisation

The increasing focus on data and analytics will drive new challenges and opportunities for sharing of data with NSW citizens, healthcare providers, government and private organisations. NSW Health is already experiencing increasing demands for data sharing with government agencies, including social services, justice, and education, as well as universities and research organisations.

NSW Health will focus on improving data exchange/brokerage solutions that support the access and sharing of data between NSW citizens, NSW Health LHDs, Primary Health Networks (PHNs), Private Health Providers, other NSW Government agencies and interstate health jurisdictions. This will require NSW Health to continue to work on high-impact and innovative data linkage, collaborate with the NSW Government DAC and to work with health and government stakeholders, to address policy, privacy and security requirements to support increased data mobilisation.

Enhanced Population Health Intelligence

The enhancement of advanced analytics at a population level will significantly improve NSW Health outcomes and service experiences through proactive identification of, and support for, those groups at risk of developing certain diseases. NSW Health will focus on improving Population Health and Population Risk Analysis using historic, predictive and prescriptive analytics, including developing and supporting population health information infrastructure and data management.

Enhanced Preventative Health Analytics

The use of real-time analytics, wearable devices, mobile application technology and medical advances will allow patients to continuously assess and monitor their health, as well as fast and tailored health and wellbeing solutions.

Translational medicine initiatives will enable faster diagnosis and quicker recovery through targeted treatments and allow patients to personally track health, wellbeing and recovery from illness. This is key to shifting the focus of healthcare from responsive to preventative medicine, ultimately leading to reduced expenditure on acute care, and improving the quality of living and wellbeing for many.

NSW Health will focus on improving preventative health analytics capabilities that support population health and translational research. Preventative health analytics will help to expedite the discovery of new diagnostic tools and treatments and identify new opportunities to engage and support citizens of NSW to improve their health and wellness.

Enhanced Research and Continuous learning

Partnerships with research institutions, universities and other academic organisations will help accelerate research, innovation and continuous learning to inform health policy. eHealth solutions, such as big data and analytics, are being increasingly identified and adopted to enable analysis and improve the 'speed to insight' from research initiatives. Key opportunities to enhance eHealth-enabling tools will focus on:

- improving the availability of data and analytics tools to support research and learning
- facilitating the translation of research evidence and information into policy and practice
- the relationship between translational research and personalised medicine, and the opportunities this represents
- undertaking research on the factors that have the greatest return on investment for attracting and retaining health professionals

NSW Health will focus on improving continuous learning capabilities and tools used to translate research findings into medical and nursing practice and meaningful health outcomes.

3.5 Access to Information

66 Enhanced patient and provider access to digital health information 99

Seamless Information Flow between Core Systems

Simpler technology interfacing, as well as better integration and coordination, means clinicians will need less training or administrative requirements while having a greater understanding of where to find information when they need it. Examples include HealtheNet linking the eMR and eMeds system to the My Health Record system. Future initiatives may include:

- clinicians accessing information through the eMR that is integrated with a range of hospital departments
- mobile view will allow great mobility to access the eMR
- clinical device integration with the eMR
- much broader geographic integration with eMeds to improve medications management for community and outpatients
- HealtheNet link to eMeds, pathology and radiology
- linking of Ambulance eMR to the emergency department eMR and patient data

NSW Health will focus on improving the coordination and integration of core systems between NSW Health care settings and non-clinical services to boost the seamless flow of information. This will require interoperability of technology solutions and active engagement of industry partners (eg technology vendors) to enable access and information sharing between systems.

Workforce Access to Applications Anywhere Anytime

Clinicians will have simplified access to secure staff systems through a single portal, significantly reducing administration times, while organisations will have improved oversight to manage the workforce through the integration of core corporate systems. All staff will have remote access to core corporate systems from mobile devices within care settings.

NSW Health will focus on improving access to clinical and operational applications through online portals and mobile access solutions.

Highly Mobile and Intuitive Solutions

There is a growing expectation by both consumers and service providers that mobile platforms and opportunities will be easily accessible to help deliver and manage healthcare services. The ongoing engagement of stakeholders via surveys and focus groups will help NSW Health understand the demands for mobile applications, and guide NSW Health's investigation of other health systems innovations or private sector mobile applications, development and support services.

NSW Health will focus on implementing more intuitive and mobile-enabled solutions to help improve the usability, uptake and utilisation of technology capabilities.

3.6 Infrastructure, Security and Intelligence

❝ Minimum standard for infrastructure, networks and security ❞

The implementation of core electronic systems across NSW requires a robust minimum standard of infrastructure and network capability so that electronic systems are reliable and secure across the state.

High Speed Clinical Grade Network

The Health Wide Area Network (HWAN) connects all hospitals and data centres within NSW and underpins the statewide rollout of advanced clinical applications. All electronic patient information can be transferred to centralised data centres for secure and efficient storage, while standardised applications like HealtheNet provide patient information when and where it is needed.

NSW Health will focus on centralised resourcing and cost-effective implementation of applications and services enabled by HWAN for a more efficient workforce. Within the next three years all LHDs will have core connections to HWAN.

Wireless Services and Standards

Clinical workforce productivity is expected to increase as staff are supported to make on-the-spot decisions and accelerate diagnostic evaluations by accessing enabling systems and information at any time and location. Wireless network workspaces and Bring Your Own Device (BYOD) strategies help improve the mobility of clinicians by allowing them to connect to local hospital networks via mobile access points and access applications via mobile devices.

NSW Health will continue to focus on the installation of wireless networks in health facilities across the state and address gaps in coverage at critical sites supported by a BYOD strategy.

Health Digital Identity Management

The Health Digital Identity Management program establishes a framework for the secure adoption of authentication, authorisation and auditing to a single identity. The framework enhances sign-on to internal and external systems and applications, while improving the ease of signing onto disparate systems via a single integrated identity management capability.

The approach will enhance secure integration with external systems and partners, while the ability to automate and limit access to systems will enable the system to monitor and control access to health systems and information. The implementation of independent security auditing across the health system ensures the NSW Health integrity mechanisms are maintained.

NSW Health will focus on improving patient and provider health digital identity management through implementation of the digital identity framework, enhanced 'same sign-on' capabilities, including proximity technology, across all locations (local and remote) and user access security auditing.

Security and Privacy Strategy

Large volumes of sensitive and structured data will be introduced into the health network from a broad range of applications. This information must be secure, with a statewide security and privacy strategy to protect the confidentiality, integrity and availability of our patients, systems and networks.

Together with the security frameworks, technology and strategy, NSW Health is able to adapt and mitigate constantly evolving threats and risks. Within eHealth NSW, a Privacy & Security Assurance Framework has been put in place to ensure security, privacy and legislative controls are built into all eHealth programs, to comply with NSW and Federal Government security requirements and legislation.

NSW Health will focus on improving the Health Security Operations Centre (HSOC) that continuously monitors our data centres, HWAN and LHD networks, systems and applications for any threats and intelligence. Initiatives identified for delivery include statewide network threats and vulnerability monitoring, data handling and classification standards, clinical application security monitoring, security assurance capabilities, incident and crisis response strategies.

Whole of Government Data Centre Consolidation

NSW Health is currently in the process of consolidating its local data centres and computer rooms to two high-performance whole-of-NSW Government Data Centres (GovDC). Centralised data centres eliminate replication and improve the security, reliability, efficiency and cost-effectiveness of data storage across the state, supporting the increasing reliance on electronic information. NSW will focus on ongoing consolidation of NSW Health Data Centres to the GovDC, with expected completion by late 2019. Consideration will be made to investigate 'cloud' and 'as-a-service' models of delivery in alignment with to the *NSW Government ICT Strategy*.

3.7 Innovation

66 Consistent approach to fostering IT enabled innovation 99

NSW Health has made significant progress to encourage new innovations through ACI's Innovation Exchange and Clinical Innovation Program. The Innovation Exchange provides a single, collaborative place to share and promote local innovation and improvement projects and resources, from all healthcare organisations across NSW.

NSW Health will focus on supporting and enabling identification, prioritisation and delivery of eHealth-enabled innovation projects with local, state and national stakeholders. eHealth NSW will also have a pivotal role in researching new eHealth innovations both nationally and internationally. In partnership with the wider health system, eHealth NSW will transparently evaluate and support large and small-scale eHealth innovations and solutions that may benefit NSW Health and the healthcare system as a whole, with a focus on the scalability of innovations across the system.

Creating a Culture of Innovation and Collaboration

To get the most out of new ideas and return on investment, innovation should be shared between providers and organisations throughout the healthcare system. NSW Health will focus on improving ways to encourage a culture of innovation as well as collaboration, including:

- creating a framework that incentivises the sharing of innovative ideas and collaboration

- developing innovation funding to support the development of new ideas

- identifying and promoting examples of innovative initiatives, as well as the processes that lead to generating ideas and opportunities for improvement

- improving tools to share knowledge and creating structures to encourage routine collaboration such as regular meetings to showcase new ideas

- gaining support for new ideas by ensuring clinicians play key leadership roles and are empowered to support innovative initiatives when they arise

Coordination of ICT and Health Enabled Innovations

Innovation can come from all areas of the ecosystem, including NSW Health, the agencies or Pillars, eHealth NSW, LHDs, allied health, private providers or private organisations. Harnessing great ideas and turning them in to reality will rely on collaboration and rapid assessment and prioritisation.

A process of prioritisation and evaluation will need to be supported at all stages of innovation: at the idea generation stage, after the initiative brief stage, after initiatives have been prioritised and after the completion of detailed business cases. The outcomes of proof-of-concept innovation projects need to be evaluated as a basis for developing further domain strategies for high-priority ICT-enabled innovations and work with local and state stakeholders to support scalable solution investments.

NSW Health will focus on improving our approach to assessing the strategic importance of innovation and ideas in line with health and government strategic priorities. This approach will include a more formalised process to help identify and determine which of many ideas should be accepted to attain the designation of strategic initiative, proof-of-concept implementation and planning for statewide applicability.

NSW Health will endeavour to identify opportunities to establish innovation and research 'hubs' in collaboration with universities and research institutes which support the NSW Health and broader NSW Government priorities. Innovation initiatives will also involve health consumers, their families and carers, as well as other stakeholders in the health system eg NGOs, industry partners and research communities.

4. The eHealth journey for NSW

This eHealth Strategy will be implemented across three horizons that identify short, medium and long-term goals for NSW Health. The 10-year program of innovation, investment and implementation aims to build consistent statewide technology foundations that are integrated and enable personalised experiences for healthcare providers and patients interacting with NSW Health. This journey will continue to support the integral role of ICT in facilitating healthy communities in NSW.

The horizon model outlines the intended eHealth journey for NSW Health, acknowledging that LHDs, Pillars and Agencies will progress through the horizons differently due to variations in business readiness and system maturity across organisations. In the short term, core functions will be grounded across the system whilst fundamental capabilities necessary to deliver future initiatives are concurrently seeded. To achieve this, planning and investment for future activities must occur in parallel to ensure NSW Health delivers value, harnesses smart ideas and builds the right initiatives, capabilities and talent to achieve the eHealth vision.

Horizon 1
Building Consistent Foundations (Years 1–4)

As NSW Health continues its journey towards delivering digitally enabled and integrated healthcare, the system will build on existing progress so **patients have consistent interactions** no matter where they are.

Horizon 1 aims to mature NSW Health's current ICT footprint to deliver consistent foundational capabilities across the state. Core digital systems, services development, infrastructure and network standards development will create a consistent and reliable ICT environment which allows **our people to have access to accurate information for improved decision-making**, leading to safer and higher-quality healthcare.

The transition to a 'paper-lite' environment from traditional paper and manual systems will require significant changes to clinical and business processes. Key to the effective and efficient delivery of core systems will be **clear standards, policies and frameworks** that enable organisations to provide robust governance, effective risk management, and enhanced performance monitoring and planning.

The current NSW Health eHealth investment approach is aligned to this strategy for Horizon 1 focus and priorities. This is evidenced through the current four capital business cases including:

Whole of System Digital Platform: Extending upon current ICT and data infrastructure capabilities, this business case will facilitate the delivery of the foundational ICT and data infrastructure required to support the delivery of digital patient records.

Achieving Integrated Patient Records: This business case seeks to mature the eMR capability throughout NSW through the completion and optimisation of existing clinical applications, to realise the stated benefits and provide NSW Health with the foundational platforms required for ongoing service delivery.

Pathology Results Repository: Extending upon the initial investment to consolidate results from two of NSW Health's pathology laboratories, this business case will facilitate complete access to pathology results (ie results from the four pathology laboratories) for clinicians and patients, providing a common pathology messaging model and enabling integrated models of care

Corporate Systems 3: A further business case for Corporate IT systems is currently in development, with a focus on enhancing the foundations established in the statewide HR and Financial systems and providing improved Human Capital, Learning and Development and Financial Management capabilities going forward.

Horizon 2
Integration (Years 1–7)

The health system is truly integrated to deliver a seamless continuum of care that responds to all of a patient's health needs across both public and private primary, community and hospital settings.

In Horizon 2, the consistent technology foundations will be leveraged to create an integrated environment where **patients benefit from strong partnerships that provide coordinated and integrated health services**.

NSW Health solutions will strengthen the safe and secure sharing of information with other states and territories, or public sector agencies to allow **our people to efficiently deliver care using data, systems and processes integrated across the continuum of care**. Integration will be facilitated through a highly networked environment where clinicians are connected through advanced conference and collaboration solutions and shared care tools.

Horizon 3
Personalisation (Years 1–10)

The healthcare experience is personalised for both patients and our people. In Horizon 3, the NSW Health system will be responsive to patient needs and easy to navigate, so patients can make informed decisions and become active participants in maintaining their wellbeing. **Patients will experience customised healthcare and education that is available when and where it is needed**. Intelligent use of health analytics and the early identification of at-risk patients enable the development of tailored care plans that address a broad range of factors.

Horizon 3 shifts the healthcare focus to preventative health and tailored patient engagement where **our people will offer and support personalised health and wellbeing solutions supported by agile technology and information in an efficient environment**. Providers have access to up-to-date evidence and real-time information in one place to support decision-making and are networked with a broader range of partners that impact the patient's health. Our people will also experience personalised education and professional support.

Personalisation will take place in a context where the NSW Health system **can proactively and intelligently identify needs and respond with tailored solutions for patients and our people**. Organisations are adaptive and responsive to patient, staff, and community needs. They are able to utilise real-time analytics to optimise decision-making to find the most appropriate solutions for better health outcomes, as well as to improve the management of resource supply and demand, delivering expertise to the most appropriate care setting.

VISION

A digitally enabled and integrated health system delivering patient centred health experiences and quality health outcomes.

HORIZON 1 — YEARS 1-4

Patients, carers and families

Patients are well informed and supported by eHealth in achieving their health objectives.

Patients have consistent interactions with healthcare systems that address their health and wellbeing.

Our people

Our people are assisted by eHealth to make effective decisions and in the delivery of integrated care.

Our people have access to accurate information to improve decision-making.

Organisations

Organisations and health system performance is optimised and informed by eHealth.

NSW Health organisations have access to consistent core functionality underpinned by clear standards, frameworks and procedures.

Focus areas

Integrated paper-lite core clinical information systems including eMR, IMS, Health*e*Net, Diagnostic Solutions

Patient identification and selection

Patient reported measures

Patient and provider video conferencing

Patient health education and information resources

Availability and access to workforce data

Effective and integrated workforce management tools

Finance lifecycle management

Standardised data structures, storage and reporting

Robust minimum standards for infrastructure, networks and security

Consistent approach to fostering ICT enabled innovations

NSW Health

HORIZON 2

HORIZON 3

Patients benefit from strong partnerships that provide coordinated and integrated health services.

Patients experience customised healthcare and education available when and where needed.

Our people efficiently deliver care using data, systems and processes integrated across the continuum of care.

Our people offer personalised health and wellbeing solutions supported by agile technology and information in an efficient environment.

Organisations collaborate to leverage expertise to optimise decision-making and resource use.

The broader health system can proactively and intelligently identify needs and respond with tailored solutions for patients and our people.

Secure messaging and eReferral management

Enhanced capture and use of new data sources

Enhanced data mobilisation

Seamless information flow between core systems

Shared care plans

Online appointments

Remote patient monitoring

Workforce education and professional development tools

Enhanced population health intelligence

Enhanced preventative health analytics

Enhanced research and continuous learning

Workforce access to applications anywhere anytime

Highly mobile and intuitive solutions

5. Making it happen

eHealth NSW was established In July 2014 as the dedicated organisation within NSW Health to guide eHealth strategy and planning, set policy and standards, and lead implementation and operations.

Since then eHealth NSW has worked to refine and strengthen these capabilities, develop architecture standards, mature change management processes and redefine the operating model to deliver programs with a stronger customer focus.

Robust privacy and security measures are paramount for ICT initiatives, and eHealth NSW has established a Health Security Operations Centre to protect, detect and respond to threats against the system and ensure security controls are embedded into ICT initiatives in alignment with NSW and Federal Government security requirements.

eHealth NSW is well positioned to be the key vehicle for the delivery of the Strategy and will work in partnership with LHDs, Pillars and Agencies to implement statewide programs and support local innovation. Increased resources and investment will accelerate many of these projects and enable patients, our people and organisations to reap the benefits of these strategic initiatives ahead of schedule.

6. Roles and responsibilities

NSW Health operates within a federated ICT environment, made up of local and statewide capabilities, systems and services. It also works across a range of state and federal boundaries. Clearly defined roles and responsibilities are key to the successful delivery of the eHealth initiatives. In particular, the joint commitment and ownership of the Strategy by NSW Health organisations will be crucial to ensuring the successful realisation of the eHealth vision. There are strong foundations in place from the current programs across NSW Health as roles and responsibilities have been defined for initiatives to drive responsibility, accountability and communication across the system and within the organisations.

The focus of this forward strategy will be to continually mature the operational aspects of the governance model and stakeholder roles and responsibility. This will require ongoing focus for engaging and collaborating across NSW government agencies, NSW Health organisations, our clinicians, our patients and technology professionals.

Customer-centred approaches will take into account the end-to-end journey for customers with health service needs. This will require leveraging existing governance mechanisms that support strategic partnerships with other government agencies, jurisdictions, NGOs and patients.

The roles and responsibility of key stakeholders are outlined as follows.

Patients, carers and families

To ensure eHealth initiatives are patient-centred and fit-for-purpose, NSW Health will work in consultation with patients, carers and families. Adequate consultation and representative participation of these stakeholders will inform eHealth policy development, initiative prioritisation, solution design, testing and evaluation. eHealth NSW will seek opportunities to enhance patient involvement in eHealth solution developments, such as patient reported measures, via exiting patient engagement and advocacy forums as well as community consultation frameworks of LHDs, Pillars and the Ministry of Health.

Local Health Districts, Specialty Health Networks, Pillars and Agencies

Critical to the success of eHealth programs is commitment from LHDs, Pillars and Agencies to support the implementation of statewide core systems, while continuing to respond to other local priorities. This includes ensuring compliance with statewide standards, procuring and supporting local functions, measuring benefits realisation and continually driving an internal culture of innovation.

LHDs, SHNs, Pillars and agencies will be supported by eHealth NSW to predict future funding requirements for core statewide implementations and ascertain how this funding will be sourced. Key responsibilities of LHDs, SHNs, Pillars and Agencies will be to:

- establish formal **local eHealth governance structures** to engage clinicians and connect with eHealth NSW
- supporting the **implementation** of statewide core systems
- ensuring **compliance** with statewide standards
- selecting, **procuring** and supporting local functions and systems
- with clinicians, identify eHealth strategies at a statewide level and take responsibility for successful implementation of key programs at the regional and community level
- develop capacity to tailor new systems to local practice within statewide requirements

- jointly plan system rollout and timelines
- align **workforce management** plans to address changing workforce needs
- engage clinical and business **process redesign** to match IT application improvements

eHealth NSW

eHealth NSW reports to the NSW Health Secretary, who is advised by the eHealth Executive Council (EHEC) which includes a representative membership of Chief Executives across the system. The EHEC is responsible for overseeing program prioritisation, supporting the analysis of business cases for their strategic fit and contribution to business value, monitoring current change projects for their delivery against plan, and supporting the running of infrastructure projects that are capital in nature.

An established governance framework is essential for all strategic programs and projects that are capital in nature to provide an accountable and effective way of identifying and selecting initiatives.

eHealth NSW will map the current architecture, identifying the different maturity levels of LHDs, and develop a future statewide architecture plan, to drive transformation of ICT solutions in line with the eHealth vision and strategic objectives. eHealth NSW's other responsibilities will be to:

- develop and update the **eHealth strategy** and drive consistent implementation of eHealth capabilities across the State
- drive **consistency through standardisation** and measuring compliance of data structures, infrastructure and information management (taking into account LHD maturity levels)
- **govern and manage the performance of programs** in alignment with best practice management systems to monitor compliance and implementation, and support adoption and use of new ICT solutions
- support the **management and communication of transparent funding**, ensuring LHDs are informed of future funding plans
- drive consistency through **developing core standards** to foster partnerships across agencies and key stakeholders
- **manage the portfolio of statewide programs** with an overarching view of benefits realisation
- drive a **culture of innovation** to foster innovation from early proof of concepts, to delivery of scalable solutions across the state
- develop **capability and skills** to support eHealth programs
- **facilitate participatory focus groups** to ensure that all eHealth solutions are designed with the stakeholders' wants and needs in mind, creating a constant feedback loop for new ideas
- implement rigorous **risk management** capabilities to monitor and mitigate risks throughout program delivery

eHealth NSW will deliver core statewide ICT programs funded by the Ministry, where local financial support for implementation and operation may be required. In this capacity, eHealth NSW also fulfils an important role as the conduit between the Ministry and the LHDs, to ensure that funding requirements are clearly quantified and communicated to enable LHDs to predict future funding.

NSW Health

NSW Ministry of Health

The NSW Ministry of Health endorses the eHealth strategy and policy for NSW and monitors its delivery. Core funding of ICT initiatives and strategic investment is provided by the Ministry to ensure NSW Health delivers world-class eHealth-enabled services while continuing to innovate.

As NSW works towards realising truly integrated care, strong leadership and support from the Ministry will be instrumental so key stakeholders foster a coordinated effort across the State, other jurisdictions and Commonwealth to drives standardisation. Success will require collaboration within public, private and non-government sector organisations to design and roll out systems to cope with the future demands on the health system.

NSW Government Agencies

NSW Government Agencies work in collaboration to support State strategies and priorities, including the *NSW Government ICT Strategy*. In particular, to achieve the NSW State priority to deliver better government digital services, NSW Government agencies will be responsible for identifying opportunities to leverage cross-agency integration of core ICT systems to enable the seamless sharing of information to provide improved and accessible services to NSW.

States and Territories

Australian States and Territories work in collaboration with NSW Health to identify opportunities to leverage cross jurisdictional core ICT systems for seamless sharing of information to deliver truly integrated care. In alignment with the national eHealth agenda, State and Territories will lead local strategies and implement programs that support national initiatives, including the national My Health Record.

Commonwealth Department of Health

NSW Health works in collaboration with the Commonwealth Department of Health (DOH) to align service planning, policy, funding and eHealth initiatives across state primary care and private healthcare providers. In July 2016 the Australian Digital Health Agency will be established as a national agency of DOH to set national eHealth standards and policies to enable cross-jurisdictional sharing of information in accordance with privacy principles. This agency is responsible for leading the uptake and adoption of national eHealth solutions through the health system.