Queensland Health
- eHealth Program

Report to Parliament 4 : 2012-13

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November 2012

The Honourable F Simpson MP
Speaker of the Legislative Assembly
Parliament House
BRISBANE QLD 4000

Dear Madam Speaker

This report is prepared under Part 3 Division 3 of the *Auditor-General Act 2009*, and is titled *Queensland Health - eHealth Program.*

In accordance with s.67 of the Act, would you please arrange for the report to be tabled in the Legislative Assembly.

Yours sincerely

Andrew Greaves
Auditor-General

Contents

Summary

The eHealth Program was established by Queensland Health in 2007 to improve capability and delivery of state health services through information and communication technology (ICT).

The eHealth Program consists of multiple projects that aim to expand existing and develop new specialist clinical and administrative systems, and implement an integrated electronic medical record (ieMR) system at selected hospitals. Delivery of the eHealth Program was divided into two stages, or tranches of work, to be implemented progressively over four years, ending in 2012. The total approved funding for the eHealth Program was $466 million.

As part of the National Health Reform Agreement, the Australian Government is encouraging and funding States and Territories to integrate their electronic public hospital inpatient records with the national Personally Controlled Electronic Health Record (PCEHR).

In 2010, the Queensland Audit Office (QAO) undertook an information systems governance and control audit, *Report to Parliament No. 7 for 2010, Information systems governance and control, including the Queensland Health Implementation of Continuity Project.* This report included Queensland Health's new payroll and rostering system due to significant problems experienced by the department since the system was implemented. The report emphasised that Queensland Health needed to:

> *'… significantly improve program and project governance, including up front and ongoing scope management, vigorous controls over budgets, and comprehensive testing and implementation regimes. Specific attention must also be given to the development of robust benefit management plans to ensure that the Government achieves appropriate returns on these multimillion dollar investments'.*

In light of the weaknesses identified in Queensland Health's capability in managing and delivering complex ICT programs and projects, this audit was undertaken to determine whether the eHealth Program is being implemented as intended, and is achieving its planned outcomes and realising expected benefits.

During this audit Queensland Health separated its corporate and hospital functions. From 1 July 2012 executive decision making and financial control for public hospitals was devolved to 17 Hospital and Health Service Boards, and community health services.

Conclusions

Queensland Health has learned and applied lessons from the payroll project implementation during the eHealth Program. It can, however, still strengthen program governance, monitoring and oversight and in particular, pay greater attention to benefits management, measurement and realisation at all stages of such major ICT projects.

The eHealth Program, while well-conceived, is not being implemented in its intended timeframes. While the delays to date have not caused any significant loss of service or created extra risk to patients, they represent missed opportunities to sooner produce better clinical outcomes for patients.

Tranche 1, the first stage of work, the implementation of specialist clinical and administrative systems, fell more than two years behind schedule, mainly due to procurement, contract establishment and staff recruitment problems. While this stage is nearing completion, and improvements have been made in all identified priority areas, the expected outcomes and benefits cannot be adequately demonstrated. The lack of an overarching business case and delays in providing guidance on measuring and reporting have hindered the establishment of a benefits management framework to demonstrate return on investment.

Tranche 2, the second stage of work, the development and implementation of the integrated electronic medical record (ieMR), also fell two years behind its original schedule due to delays in the procurement processes. The delays occurred mainly during the approval stages due to additional due diligence to ensure that implementation problems experienced with the payroll system were not repeated.

Since then implementation has adhered to the revised schedule. However, the Health Services Information Agency, responsible for implementing the program, is now relying on Health Service Directives, issued to the new Hospital and Health Service Boards, to proceed with the ieMR implementation. These directives expire one year prior to the proposed completion of the ieMR in 2015. This time gap creates uncertainty about the continuity of the eHealth Program.

Queensland Health advises that funding will be adequate to complete Tranches 1 and 2. Financial information provided to audit and the eHealth Program Board however, is not sufficiently clear to verify this claim.

A systemic flaw in this program, one shared with other major ICT projects, is that investment decisions do not take account of full costs, and accordingly approved program funding is less than the total amount needed to deliver the proposed solution.

In the case of the eHealth Program, the enabling IT infrastructure and allied software applications required for the full realisation of the intended benefits of the ieMR were not identified, analysed, fully costed or funded when the funding submission was made for the investment. The cost and responsibility for the funding of infrastructure to complete the ieMR installation has not been resolved.

Key findings

Implementation

The eHealth Program was to be implemented in two tranches of work, over a four year period commencing in 2007-08, at an initial cost of $401 million:
- Tranche 1 - statewide rollout of 15 specialist clinical and administrative systems, including supporting infrastructure
- Tranche 2 - implementation of an integrated electronic medical record (ieMR) system to be delivered in four releases in nine hospitals, which represent 60 per cent of Queensland Health patient throughput.

The implementation of the specialist clinical and administrative systems (Tranche 1) is over two years behind schedule because of unforeseen problems with procurement, contract establishment, systems testing, and recruitment and retention of staff. Half of the Tranche 1 systems have been fully implemented, and significant progress made on the remainder. The balance of work is due to be completed by June 2013. Appendix B and C provide a list of the eHealth systems, implementation dates and examples of outputs, outcomes and benefits of these systems.

Currently multiple logins, with different usernames and passwords, are required for users to access individual clinical and administrative systems. This is inefficient and may result in clinicians being locked out of systems as their passwords expire.

For Tranche 2, the selection process of the vendor for the ieMR included appropriate due diligence activities and complied with procurement probity and propriety standards.

The ieMR is to be implemented at nine public hospitals in four releases. Development of the system started in late 2011 and is two years behind schedule. The revised completion date is set for 2015. The delays occurred mainly during the approval processes when additional due diligence was required to ensure that the problems experienced with the Queensland Health payroll system were not repeated in this project. Since then the implementation has proceeded on schedule.

A different version of an electronic medical record (eMR) was implemented, as a separate initiative, by the Gold Coast Hospital and Health Service (GCHHS) in December 2011. The system is not functioning as expected.

Learnings from the GCHHS eMR implementation are informing the development and implementation of the ieMR. Given the concerns raised by clinicians at the GCHHS about the eMR, it would be prudent to provide the system enhancements incorporated in the ieMR to the GCHHS. This would address its current deficiencies, and would also allow the enhancements to undergo hospital-based testing prior to implementation in other hospitals.

A third tranche of work is planned but not yet funded to extend the statewide rollout of the ieMR to facilities managing 80 per cent of Queensland Health patient throughput, and to replace the current patient administration system.

The patient administration system, Hospital Based Corporate Information System (HBCIS), which provides essential information to hospitals and is a crucial component of ieMR, is approaching technical obsolescence and will not be supported by the vendor once the contract expires in 2015. Queensland Health's 2007-08 budget submission to implement the eHealth Strategy identified the need to replace HBCIS at an estimated cost of $250 to $350 million.

Queensland Health is currently in the process of refining the business case for the replacement of HBCIS, with a focus on detailed options analysis, costings and benefits, to support a funding submission. Replacement of HBCIS, which is part of Tranche 3, is unfunded. Queensland Health estimates the cost to replace HBCIS is now $440 million.

Queensland Health has issued Health Service Directives (HSDs) to the relevant Hospital and Health Service (HHS) Boards requiring them to proceed with the ieMR implementation. The directives remain in force until 30 June 2014, but Tranche 2 of the eHealth Program is not scheduled for completion until 2015. Prior to the expiry of the Directives, Queensland Health proposes to review them with the HHS Boards in accordance with the Health Service Directives policy, management and consultation standards. However, this time lag creates uncertainty about the continuity of the eHealth Program.

Funding

The total of approved funding for the eHealth Program is $466 million, of which $249 million has been spent at 30 June 2012 on the implementation of specialist clinical and administrative systems, and an initial contract payment for the ieMR system. To date, program costs have been within the approved budget.

Queensland Health advises that the remaining budget is sufficient to complete the implementation of the eHealth Program, but the financial information presented to the eHealth Program Board is not clear or concise. This limits its usefulness in supporting effective decision making, and makes it difficult for Queensland Health to continually monitor the adequacy of the remaining budget.

The cost of the supporting infrastructure for the ieMR has not been finalised and is not reflected in the program budget. The absence of an overarching eHealth business case that identifies and costs all program elements means the approved funding is less than required for full implementation.

Governance

Governance of the eHealth Program has not been fully effective. The program is behind schedule and the inconsistent approach to performance measurement and reporting has limited the capacity to effectively assess outcomes and benefits.

Governance arrangements improved with the establishment of the eHealth Program Board in 2010, and with the adoption of the Queensland State Government standard methodologies for portfolio, program and project management when these became mandatory in 2011.

Performance reports to the eHealth Program Board do not clearly demonstrate the progress of each project, tranche of work, and the overall program against relevant budgets, baseline milestones, and the subsequent impact of variations to project plans.

Outcomes and benefits

Based primarily on anecdotal information, the clinical and administrative systems implemented to date have delivered substantial benefits which align with the priorities in the original eHealth Strategy. However, this is not a satisfactory basis for a conclusion on effectiveness.

Guidance for staff on the process through which the eHealth Program Office was to describe, measure and report benefits was not developed until October 2009. By that time, 13 of the 15 specialist clinical and administrative projects were already underway and performance measurement, particularly the collection of baseline data, which should have been done prior to the commencement of each project, was not undertaken in a consistent manner. Consequently, Queensland Health has had difficulty measuring, tracking and reporting on the achievement of outcomes and benefits resulting from changes to clinical and administrative processes.

Queensland Health does not expect the eHealth Program to directly deliver financial savings, and some benefits are intangible and difficult to measure. However, the financial investment in the eHealth Program is significant, and Queensland Health has not effectively demonstrated the link between improvements in capability and better health outcomes, improved service delivery or efficiency, and the resultant economic benefits.

Recommendations

It is recommended that Queensland Health:

1. **assess the full infrastructure upgrade costs necessary to effectively implement the ieMR at the nine selected hospitals, and fund the implementation accordingly**

2. **review the management and reporting of the eHealth Program to:**

    - **enhance financial reporting to the eHealth Program Board to clearly and concisely provide information on the financial status of the program, including a breakdown of future expenditure projected to complete the program**

    - **provide performance measurement data to the eHealth Program Board in a clear concise format that clearly demonstrates the progress of each project, tranche of work, and the overall program, against the relevant budgets, baseline milestones, and subsequent impact of variations to plans**

    - **report more clearly on the outcomes and benefits of eHealth specialist clinical and administrative systems, demonstrating clearly their impact**

3. **take appropriate action to address the obsolescence of the patient administration system, Hospital Based Corporate Information System (HBCIS), within a timeframe that will not impact adversely on hospital administration**

4. **progress the single sign on solution to increase the efficiency of accessing multiple systems, particularly for the ieMR sites**

5. **develop measures for outcomes and benefits for the ieMR, and future specialist clinical and administrative systems, that are specific, measurable, attainable, realistic and timely. Collect baseline data to facilitate performance measurement and reporting in accordance with the *Queensland Government Benefits Management Framework***

6. **provide system enhancements incorporated into the ieMR to the eMR at the Gold Coast Hospital and Health Service to address current deficiencies, and to test the practicality of these changes by using hospital based testing prior to implementing the ieMR in other hospitals.**

Reference to agency comments

In accordance with section 64 of the *Auditor-General Act 2009*, a copy of this report was provided to Queensland Health and to the Minister for Health with a request for comments.

Their views have been considered in reaching our audit conclusions and are represented to the extent relevant and warranted in preparing this report.

The full comments received are included in Appendix A of this report.

1   Context

1.1   Background

In 2006, Queensland Health commenced work on the eHealth Strategy. This was designed to take greater advantage of emerging technologies and improve clinicians' access to information to deliver quality patient outcomes and improve organisational effectiveness. In 2007, the eHealth Program was established. It consisted of the expansion of existing and development of new specialist clinical and administrative systems, and an integrated electronic medical record system at selected hospitals.

The eHealth Program was to be implemented in two stages, or tranches of work, commencing in the financial year 2007-08:

- Tranche 1 - statewide rollout of 15 clinical and administrative systems and supporting infrastructure
- Tranche 2 - implementation of an integrated electronic medical record system in four releases to nine hospitals, which represents 60 per cent of Queensland Health patient throughput.

Prior to 2009, there were a number of in-house and off-the-shelf clinical systems in use, but there was limited statewide integration or consistency. In 2009, Queensland Health developed a comprehensive strategy to develop new systems, integrate and further rollout some existing specialist clinical and administrative systems, and to develop or procure an electronic medical records system.

Given the time it has taken to implement the eHealth Program it has been subject to amendment and tailoring. Changes have been made to the specialty clinical and administrative systems, the procurement of the ieMR product, funding levels and timeframes. Appendix B and C provide a list of the eHealth systems, implementation dates and examples of outputs, outcomes and benefits of these systems.

Queensland Health eHealth present state and future state are represented in Figures 1A and 1B.

Figure 1A
Present state – pre implementation of full eHealth Program
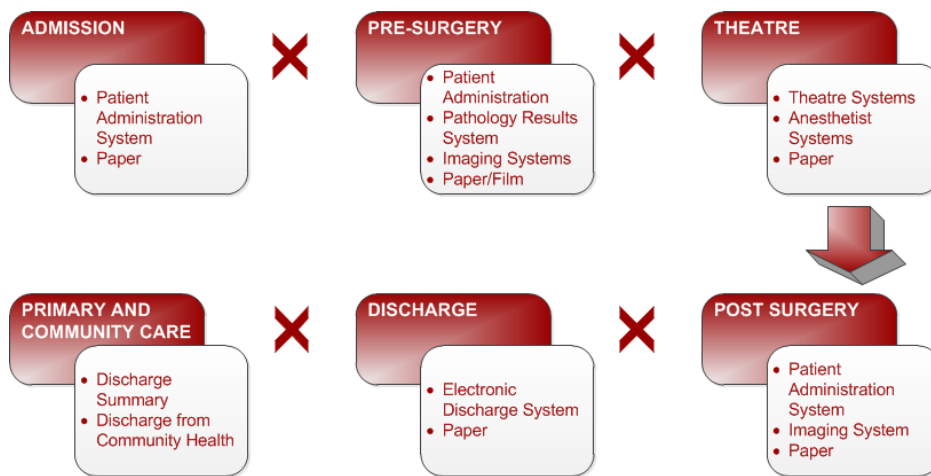
× - Indicates manual paper flow.

Figure 1B
Future state – post implementation of full eHealth Program
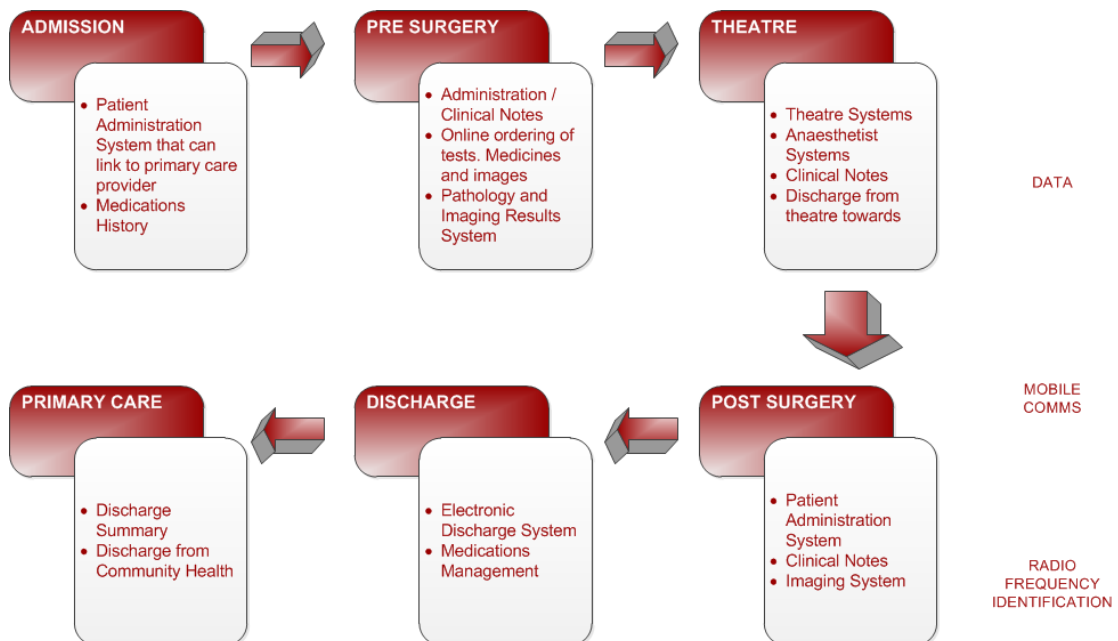
→ Indicates automated information flow

Source: Adapted from Queensland Health Brief for Noting – Electronic medical record strategy for Queensland, 30 September 2009, Pg. 3

Queensland Health plans to have completed the implementation of the 'future state' across nine of its busiest hospitals by the end of 2015.

1.2   Funding

The total budget for the eHealth Program is $466 million, inclusive of depreciation. This consists of new funding from the budget, and internal contributions from Queensland Health. As at 30 June 2012, $249 million has been spent on the implementation of the specialist clinical and administrative systems (Tranche 1), and an initial contract payment for the ieMR (Tranche 2), leaving a balance of $217 million.

A third tranche of work is planned to extend the rollout of the ieMR to facilities that represent 80 per cent of Queensland Health's patient throughput, and to replace the patient administration system, Hospital Based Corporate Information System (HBCIS). This system is approaching technical obsolescence and will no longer be supported by the vendor once the contract expires in 2015. A business case is being developed to support a funding submission for its replacement. Proposed work under Tranche 3 is currently unfunded.

1.3   Expected benefits and outcomes

Queensland Health identified a range of expected benefits and outcomes from the eHealth Program.

Figure 1C
Expected eHealth Program benefits and outcomes

Benefits	Outcomes
Less time spent on information management and more time spent on patient care	Access to care
Improved patient waiting times and capacity to deliver needed services	
Improved access for patients in rural and remote locations to specialist resources and expertise	
Increased patient participation in care	
A single view of patient information to support clinical decision making	Healthier outcomes
Decreased adverse drug events and prescription errors	
Improved interaction across a network of providers, including Queensland Health and GPs, thus reducing unnecessary re-admittance to hospitals	
Improved interpretation of diagnostic and laboratory results	
Improved and more timely access to accurate and reliable patient information	Increased productivity
Enhanced clinical and management reporting and planning capability	
More efficient ordering and prescribing practices	
Better sharing of information such as referrals and discharge summaries across the continuum of care	

Source: Queensland Health – eHealth Implementation Strategy and Plan 2009-2012, July 2009

1.4   Governance

The Queensland Health's Health Services Information Agency is responsible for implementing the eHealth Program, under the management of the Chief Information Officer. The eHealth Program Board was established in 2010, with approved terms of reference. The board oversees the eHealth Program and provides input and final approval of management's strategic, operational and performance objectives. The board also reports and makes recommendations to the sponsoring group, the ICT Executive Committee, as well as to the Clinical Informatics Steering Committee.

The Chair of the eHealth Program Board is the Deputy Director-General, Health Service and Clinical Innovation. The Deputy Director-General is also the Senior Responsible Owner (SRO) for the eHealth Program, and has ultimate accountability for the program, together with personal responsibility for ensuring that it meets its objectives and realises the expected benefits.

The Chief Information Officer (CIO) is the Senior Supplier, and is accountable for the quality of products delivered and responsible for the technical integrity of the eHealth projects that underpin the eHealth Program. The CIO is also the SRO for the ieMR project. The CIO is a member of the eHealth Program Board.

The Deputy Director-General, Health Service and Clinical Innovation, and the CIO, are members of the ICT Executive Committee.

The eHealth Program Board meets monthly and is actively involved in the governance of the program. Representatives are from clinical and administrative areas across the state. There are no external representatives.

1.5   National health reform

As part of the National Health Reform Agreement, the Australian Government is encouraging and funding States and Territories to integrate their electronic public hospital inpatient records with the national Personally Controlled Electronic Health Record (PCEHR).

Queensland Health is collaborating with the National E-Health Transition Authority (NEHTA) in developing plans for integrating with the national PCEHR system.

At the time of this audit, the design detail and supporting infrastructure for the PCEHR had not been finalised by the Australian Government. Queensland Health has ensured their electronic discharge data, which will ultimately be the information provided on the PCEHR, is compliant with the NEHTA data format standards to facilitate future integration.

1.6   Report structure and cost

This audit was carried out in accordance with *Auditor-General of Queensland Auditing Standards*, which incorporate Australian auditing and assurance standards.

The report is structured as follows:
- Chapter 2 examines the implementation of the eHealth Program.
- Chapter 3 examines outcomes and benefits of the eHealth Program.
- Appendix A contains responses received.
- Appendix B and C present the status of the eHealth Program as at 30 June 2012, as well as examples of outputs, outcomes and benefits of the clinical and administrative systems.
- Appendix D outlines the audit method.

The total cost of the audit was approximately $550 000.

2 Implementation

In brief

Background

Queensland Health is committed to improving the capability and delivery of state health services through a multi-year information and communication technology eHealth Program.

The Program was to be delivered progressively ending in 2012. It consists of specialist clinical and administrative systems, and an integrated electronic medical record system (ieMR).

Key findings

- Overall, the eHealth Program has not been implemented within the intended timeframe. Although Tranche 1 has fallen two years behind schedule, most of the specialist systems have been implemented. Tranche 2, which consists of the ieMR, will not be implemented until mid-2013, and is expected to be completed in 2015, instead of 2012.
- Expenditure is on budget. Queensland Health has advised that the remaining budget is sufficient to complete Tranches 1 and 2 however, the infrastructure for the ieMR has not been fully costed and funded.
- The process used to select the vendor for the ieMR complied with procurement probity and propriety standards.
- The establishment of the eHealth Program Board and adoption of the State Government methodologies for portfolio, program and project management have improved governance.
- The financial reports are comprehensive but overly complex and do not provide clear and concise information on the financial status of the program. Performance reports do not clearly demonstrate the impact of systems and their progress against budgets and baseline milestones.
- Replacement of the patient administration system, HBCIS, needs to be costed and funded.

Recommendations summary

It is recommended that Queensland Health:
- **assess and fund the infrastructure to implement the ieMR**
- **improve reporting to include a breakdown of future expenditure to complete the program in financial reports, and clearly demonstrate the impact of systems and their progress against relevant budgets and baseline milestones**
- **cost and fund the replacement of the patient administration system (HBCIS)**
- **progress the single sign on solution to improve access to systems.**

2.1   Background

The eHealth Strategy, developed in 2006, identified the need to use information and communication technology (ICT) to improve health care delivery and to facilitate better patient access and improved patient safety and quality through the reduction in the reliance on paper based medical and health records.

The eHealth Program, established in 2007, is complex. Delivery has been divided into two stages, or tranches of work, to be implemented progressively over four years.

Tranche 1 consists of 15 projects for the expansion of existing and the development of new specialist clinical and administrative systems, with limited integration between them at this stage.

Tranche 2 is the implementation of an integrated electronic medical record (ieMR) at nine of the busiest public hospitals in Queensland.

2.2   Conclusions

The delays in implementing the eHealth Program occurred mainly during the approval processes. Additional due diligence was required on the eHealth proposal to ensure that the problems experienced with the Queensland Health payroll system were not repeated. Since then the implementation has adhered to the revised timeframe.

One major challenge is the availability of funding to complete the ieMR implementation, which is proposed to be completed in 2015. The infrastructure costs have not been fully funded through the eHealth Program and may need to be met by the relevant Hospital and Health Services (HHS). However, the HHS have only been directed to continue with implementation until 2014. Prior to the expiry of the directives, Queensland Health proposes to review them with the HHS Boards in accordance with the *Health Service Directives Policy,* and management and consultation standards.

Another major challenge is the replacement of the patient administration system, Hospital Based Corporate Information System (HBCIS). The system is approaching technical obsolescence and will not be supported by the vendor past 2015. A replacement system will take five to seven years to develop and implement. The replacement of HBCIS has not been funded.

Queensland Health has advised the remaining budget is sufficient to complete the implementation of Tranches 1 and 2, except for the replacement of HBCIS.

2.3   Findings

2.3.1   Progress

Queensland Health's progress was assessed against the *eHealth Implementation Strategy and Plan (2009-2012)*. Deliverables are clearly specified in the *Benefits Realisation Plan - Clinical Informatics Program (October 2009)*.

The delivery of the eHealth Program was divided into two tranches to be implemented on an incremental basis commencing in 2007-08 through to 2011-12, and aligned with available funding. Thirteen of the 15 projects in Tranche 1 were underway before the establishment of the eHealth Program in July 2007, and were included in the program at its inception.

The *eHealth Implementation Strategy and Plan (2009-2012)* includes a high level implementation plan, termed the *'eHealth Roadmap'*, which provides a timeline of activities. In May 2011, Queensland Health developed an *eHealth Program Plan*, based on Queensland Government methodologies for portfolio, program and project management. This outlines the department's approach to track and control the progress and delivery of the program and resulting outcomes and benefits.

The *eHealth Implementation Strategy and Plan* also identified six eHealth priority areas to achieve a statewide electronic medical record (eMR). Half of the specialist clinical and administrative systems have been fully implemented. These systems have partially contributed to the six priority areas, including the provision of an electronic record with varying functionality for each system. A list of the specialist clinical and administrative systems is included in Appendix B and C, as well as examples of outputs, outcomes and benefits of these systems.

The mapping of specialist clinical and administrative systems to the six priority areas is as demonstrated in Figure 2A.

Figure 2A
eHealth priority areas and related eHealth systems

eHealth priority area	eHealth system *
Clinical order entry	Implemented: Emergency Department Information System (EDIS), Intensive Care Unit Clinical Information System (ICU-CIS). Under development: Public Health Information & Clinical Services Solution (PHICSS) and ieMR (Order entry due in Release 2).
Results reporting	Implemented: AusLab system, Breast Screen Queensland (BSQ), Endoscopy Services Information Systems Solution (ESISS), ICU-CIS, Radiology reports (QRiS system), The Viewer. Under development: ieMR interface in Release 2, and Cardiac Information Solution Project (CISP).
Medications management**	Implemented: Automated Anaesthetic Record Keeping System (AARK), Oncology Information Management Solution (CHARM), Enterprise-wide Liaison Management System (ELMS), Ferret (patient information recall system), ICU-CIS, iPharmacy, Mirrijini Dispense System (MDS), PHICSS, Practix (clinical practice management and communication solution). Under development: ieMR (Medications Management in Release 4).
Clinical notes	Implemented: AARK, Consumer Integrated Mental Health Application (CIMHA), eMR (at the GCHHS), ESISS, and ICU-CIS. Under development: ieMR in Release 1 contains scanning of the current paper clinical notes to a digitised format. ieMR in Releases 2 & 3 will add to clinical notes capability.
Scheduling	Implemented: AARK, BSQ, CISP, ESISS and PHICSS - systems with patient scheduling and booking capability.
Electronic discharge summary and referrals**	Implemented: Enterprise Discharge Summary (EDS), EDIS, ICU-CIS, CISP - these systems produce an electronic discharge /event summary. Under development: Tactical eReferral Project (TeRP) - electronic referrals.

* Some of these systems existed prior to the eHealth Program

** Functionality varies from system to system

Source: Queensland Health

Overall progress in the implementation of the eHealth Program is summarised in Figure 2B.

Figure 2B
Progress delivering the eHealth Program

Tranche/phase	Deliverables	Original milestone	Revised milestone
1	Statewide rollout of specialist clinical and administrative systems and supporting infrastructure	2007-10	2007-mid 2013
2	Integrated electronic medical record (ieMR) to 9 hospitals that represent 60% of Queensland Health patient throughput: Cairns Base, Carrara, Mackay Base, Princess Alexandra, Robina, Royal Brisbane and Women's, Southport, Townsville and the new Royal Children's hospital. Delivered in four releases:		
	Release 1: • Core build and scanning • Growth charts • End user devices and infrastructure	2010-12	2011-mid 2013
	Release 2: • Order entry • Results reporting • Alerts and adverse reactions	2010-12	2012-14
	Release 3: • Structured clinical notes • Discharge summaries • Advanced decisions support	2010-12	2012-late 2014
	Release 4: • Medication management • Scheduling	2010-12	2012-15
3	Completion of the statewide rollout of an ieMR to facilities that represent 80% of Queensland Health patient throughput.	2012-beyond Unfunded	Unfunded
	Replacement for the Hospital Based Corporate Information System (HBCIS).	2012-beyond Unfunded	Unfunded

Source: Queensland Health

Tranche 1 was to commence in 2007, with expected completion by 2010. However, issues in the areas of procurement, contract establishment, recruitment and retention of staff, and systems testing all delayed the implementation of some systems so milestones were not achieved.

Eight of the 15 specialist clinical and administrative systems planned for statewide rollout of Tranche 1 have been completed as at 30 June 2012. Five more are substantially complete, and two projects did not proceed beyond the design phase. Implementation of the remaining Tranche 1 projects is expected in June 2013.

Queensland Health acknowledges in the eHealth Tranche 1 Report (January 2012) that implementation of the specialist clinical and administrative systems could have been better managed. The Queensland Government standard methodologies for portfolio, program and project management were adopted in full when they became mandatory in 2011.

Tranche 2 is the implementation of an integrated electronic medical record (ieMR) at nine public hospitals. The development and implementation of the ieMR was scheduled to commence in 2010 and be completed in 2012.

The start date for the commencement of the ieMR was revised to September 2011, when the contracts were signed with the vendor. The main reason for the delay was that additional due diligence activities were required as part of the approval process to ensure that the implementation problems experienced with the Queensland Health payroll system were not repeated. Throughout this period Queensland Health downsized the project team and undertook other related work such as establishing baseline parameters for the ieMR implementation.

Implementation processes and documentation have been standardised to ensure a consistent rollout to facilitate appropriate project monitoring, reporting and control. Equipment has been procured and installed to establish two south east Queensland data centres. These are expected to be fully operational in late 2012. Site assessments, planning and user device procurement is underway at the nine ieMR facilities. Of the three sites visited, implementation at each site was on schedule.

An *ieMR Benefits Realisation Plan, Release 1 (May 2012)* has been developed. It includes guidance for measuring, tracking and reporting benefits and outcomes. The *ieMR Benefits Realisation Plan (2012)* is aligned with the *eHealth Benefits Management Strategy (2009),* methodology and toolkit so that a consistent approach is applied to measurement and reporting against the five core capabilities, six benefits and three outcomes. Further specific, measurable, attainable, realistic and timely measures are to be developed.

Baseline measurement for the ieMR started in September 2012. A benefits team is to work with the sites to assist in the baseline collection, measurement and reporting of the prioritised benefits.

The ieMR is to be delivered in four releases at nine selected facilities. Release 1 is now being built and delivered. It is expected to 'Go Live' in mid-2013. The full rollout of the ieMR is expected to be completed in 2015. Queensland Health has advised that implementation at all sites was running on schedule except for Townsville Hospital, as the preparatory work for Release 1 had not been completed. Releases 1 and 2 will be implemented concurrently at Townsville Hospital.

It is planned to extend the rollout of the ieMR to facilities that represent 80 per cent of Queensland Health patient throughput as part of Tranche 3, although this work is currently unfunded.

An electronic management record (eMR) system was implemented locally at the Gold Coast Hospital and Health Service in December 2011. The learnings from the implementation of the eMR are informing the development and implementation of the ieMR.

The Viewer is an online read-only web browser that provides a single portal for clinicians and support staff to access and share key summary patient information currently stored in separate clinical and administrative systems. It is the first step in preparing the transition from paper-based medical records to electronic medical records. Development of the Viewer commenced in December 2009 and by February 2012 it was implemented in 234 facilities.

Access

Each clinical and administration system application requires a separate logon by users requiring different usernames and passwords. The use of a single sign on would avoid users needing to re-authenticate for every application. The current approach could result in clinicians being locked out of systems as their passwords have expired. This would ultimately impact on patient services with clinicians unable to access vital information. Queensland Health is progressing work on a single sign on solution.

Replacement of the patient administration system (HBCIS)

Queensland Health's Hospital Based Corporate Information System (HBCIS) is one of the foundation components of the eHealth Program's clinical, administrative and ieMR systems. It is the core system used to:

- register and manage patient identity, tracking patients through admissions, discharge and transfers
- feed core information to other local and enterprise systems
- provide core information for management and reporting at local and central levels.

HBCIS has been used across the state since 1991. It is approaching technical obsolescence and will not be supported by the vendor beyond 2015. Queensland Health considers the system to be 'mission critical' for healthcare delivery. Queensland Health reports indicate that a full statewide rollout of a new patient administration system to over 170 facilities that use HBCIS would take around seven years to develop and implement.

Queensland Health's budget submission in 2007-08 to implement the eHealth Strategy identified the need to replace HBCIS for $250 to $350 million. The department has advised that the replacement of the patient administration system is its highest priority. A business case is in the process of being refined for the replacement of HBCIS, with detailed options analysis, costings and benefits to support a funding submission. Replacement of HBCIS, which is part of Tranche 3, is currently unfunded. Queensland Health estimates that the cost to replace HBCIS now is $440 million.

Given the lengthy lead times often associated with complex ICT projects, Queensland Health should give priority to ensuring the patient administration system remains fully operational to support public hospitals. Delays in replacing HBCIS may result in system unavailability and impact on the implementation of the ieMR.

Departure from planned implementation

The development and rollout of two eHealth clinical systems were not as planned. The initial tender was for an Endoscopy Services Information System Solution (ESISS) through the procurement of a statewide endoscopy scheduling and reporting system. The statewide enterprise system has not been developed and as a result, each public hospital has its own scheduling system not linked to the others. This is not the outcome proposed in the original business case.

The Automated Anaesthetic Record Keeping (AARK) system was planned to be rolled-out to all major hospital facilities and a selection of smaller hospitals. However, the Southport hospital and the Robina hospital, two of the largest and busiest hospitals in Queensland, were excluded from the rollout and to date do not have the system. A decision was made not to accept the system as the rollout plan only required it to be implemented at Robina hospital, and the district wanted it implemented at both sites.

Training

Queensland Health incorporated training into the funding and timelines for the implementation and rollout of the eHealth specialty clinical and administrative systems. This was applied as a short training program to coincide with the system implementation at each facility.

The concentrated timeframes of the training program for the Viewer, an online read-only system of key summary patient information, did not always suit the nature of the hospital workforce, particularly at rural and remote facilities that have fewer staff to backfill those attending training. There were also instances of key hospital staff who were not aware of the Viewer's existence, or had not been trained in its use.

Hospital and Health Services did not consistently measure the effectiveness of eHealth specialist clinical and administrative systems post implementation, to ensure all relevant staff use the systems to maximise the benefits of the investment, and to measure and report issues.

Replacement of the Clinical Data Repository

The Clinical Data Repository (CDR) is an information repository populated with data from existing systems. The purpose of the CDR is to manage data independently of applications that may change over time, and to allow information to be shared between multiple applications.

The current CDR cannot adequately support the specialist clinical and administrative systems and the ieMR. Queensland Health is redeveloping the CDR to ensure it has sufficient capacity to meet future demand levels. Release 1 of a redeveloped CDR was implemented in August 2012 and Queensland Health is on track to replace the existing CDR with a new one by January 2013.

2.3.2   Business case and funding

The eHealth Program arose from a submission to government, which was developed to request funds to implement the *eHealth Strategy (2006)*. The funding request was for a seven year investment and was considered as part of Queensland Health's 2007-08 budget submission. Funding was granted in June 2007 and provided for the 2007-08 to 2010-11 forward estimate period totaling $244 million (inclusive of depreciation).

There was no single business case developed to cover the eHealth Program. The *eHealth Strategy (2006)* does not contain sufficient detail to be considered a business case. The submission in June 2007 had some elements of a business case but was not designed to be a business case as it lacked pertinent information and detail that could be used to assess the ongoing viability of the eHealth Program.

The lack of an overarching eHealth business case has resulted in incomplete funding and difficulty for Queensland Health in quantifying benefits for the eHealth Program, as not all elements of the program were identified, analysed and fully costed. For example, the need for additional infrastructure to enable implementation of eHealth systems was identified a number of years after the submission, resulting in a funding shortage.

The shortage of funds for the implementation of infrastructure was temporarily resolved when the eHealth Program loaned $26 million to the department's Infrastructure Program to enable it to proceed with the implementation of the necessary infrastructure. The loan was based on the expectation that this amount would be repaid to the eHealth Program in future funding submissions by the Health Services Information Agency. However, to date the submissions have not been successful.

Similarly, the *eHealth Strategy (2006)* and the submission to government in 2007 identified benefits in general terms, whereas a sound business case would have established a benefits management framework to enable performance measurement to be undertaken earlier than has been done.

Individual business cases were developed for the 15 eHealth specialist clinical and administrative systems implemented as part of Tranche 1, however, they were developed over a period of years after the funding was provided. The business case for the ieMR was developed in October 2009.

Within the seven year investment period, Queensland Health made an internal contribution of $59 million to deliver the eHealth Strategy. A further contribution from government of $157 million (inclusive of depreciation) was secured for the forward estimates period from 2011-12 to 2013-14. At that stage, the total seven year investment to deliver the eHealth Strategy was estimated at $460 million.

During 2011-12, Queensland Health contributed an additional $6 million for two systems, Cardiac Information Solution Project (CISP) and the Consumer Integrated Mental Health Application (CIMHA phase 2). This brought the total revised seven year eHealth Strategy investment to $466 million.

The following table is a summary of the total of $466 million funding that was approved for the eHealth Program, as at 30 June 2012.

Figure 2C
eHealth Program funding as at 30 June 2012

Date	Detail of funding	Amount ($ M)
June 2007	CBRC submission was approved based on the then forward estimates period being 2007-08 through to 2010-11	244
June 2007	Queensland Health internal contribution – alignment of existing clinical and corporate applications to the delivery of the *eHealth Strategy (2006)*	59
2007	CBRC balance of the seven year investment aligned to financial years 2011-12 through to 2013-14 within the funding schedule	157
2010-12	Additional Queensland Health internal contribution for two clinical systems, CISP and CIMHA phase 2	6
Total		**466**

Source: Queensland Health (Inclusive of depreciation)

Of the original $466 million allocated for the eHealth Program, $249 million had been spent as at 30 June 2012, leaving a remaining budget of $147 million (plus a depreciation allowance of $70 million). Queensland Health has advised that the remaining budget is sufficient to complete implementation of Tranches 1 and 2. The IT infrastructure needed to fully implement the ieMR at the nine selected hospitals has not been fully funded through the eHealth Program and may need to be met by the relevant hospitals.

ieMR infrastructure

Queensland Health is undertaking end user device and associated infrastructure assessments to determine the minimum upgrade requirements at the nine ieMR facilities and the implications of these upgrades.

These assessments involve a ward-by-ward examination to identify what devices are needed to provide bedside access to data viewing and input, and the wiring/server upgrades necessary to support these devices. Assessments have been completed for all nine hospitals and identified the need for an additional $4 million in device and infrastructure funding. The source of funds for the implementation of infrastructure, and who will pay, that is the Health Services Information Agency or each ieMR facility, has not been determined at this stage.

2.3.3 Probity and procurement

The *State Procurement Policy* requires government agencies to use their purchasing activities to advance government priorities, achieve value for money, and ensure probity and accountability.

Queensland Health's decision to procure an integrated electronic medical record (ieMR) was supported by a comprehensive and systematic assessment process. In 2006, an *eHealth Strategy* was developed that identified the need for an ieMR. Queensland Health undertook comprehensive consultation across the state in 2008, resulting in the selection of the six priority areas relating to individual eHealth clinical systems.

The procurement process undertaken by Queensland Health for the selection of a suitable vendor for the development of an ieMR system was appropriate and implemented with probity and propriety. The selection process was:

- undertaken with an approved procurement strategy
- conducted with due diligence activities
- compliant with the Queensland State purchasing policy.

The selection of a vendor for an ieMR included an external global market scan of vendors to assess their suitability. This process identified a limited choice of vendors with a system to satisfy Queensland Health's business requirements. Some of the requirements were:

- an appropriately mature ieMR product
- a Generation 3 or greater maturity of computer-based patient record products and related services
- an Australian presence.

The global market scan narrowed the field from three vendors down to one that met Queensland Health's requirements. In April 2010, four options for implementing the *eHealth Strategy (2006)* were considered by government, which endorsed, in-principle, the procurement of a commercial-off-the-shelf ieMR system via closed request for proposal to a single supplier, subject to a risk assessment of the product.

The risk assessment was rigorous and provided a sound basis for Queensland Health to progress with contract negotiations. An external assessment concluded that the vendor's proposal was of fair market value when compared with contracts for entities of comparable size. The government subsequently gave approval to proceed with the ieMR implementation.

Two contracts were signed in September 2011 between the vendor and Queensland Health. The contracts were subject to legal scrutiny, and complied with the *Government Information Technology Contracting Framework* for the procurement of ICT products and/or services, as required under the *State Procurement Policy*.

Work orders will be created by the Health Services Information Agency for each component of work. The work orders are performance based and include significant penalties. To date, three work orders have been placed with the vendor for a total commitment in excess of $100 million.

2.3.4   Governance

eHealth Program Board

The eHealth Program Board receives regular progress reports on the eHealth Program implementation, technical issues, and financial reports. However, the information is not presented against a consistent, clear and identifiable baseline for measurement, such as the *eHealth Implementation Strategy and Plan (2009-2012)*. This makes it difficult to adequately assess the eHealth Program's progress and performance against what was planned.

Financial reports are provided monthly to the eHealth Program Board. The reports are comprehensive but overly complex, and do not provide clear and concise information on the financial status of the program sufficient to allow the board to effectively assess and challenge management's performance in implementing the eHealth Program, or to make a fully informed assessment of the adequacy of the remaining budget. This weakness has recently been identified and board members have requested clearer financial presentations for future board meeting papers.

Local Hospital and Health Service Boards

On 1 July 2012, 17 Hospital and Health Service Boards, which are statutory bodies, were appointed to operate the state's public hospitals and other community health services, autonomously. Executive decision making and financial control was devolved to the boards. Queensland Health has issued two Health Service Directives (HSDs) to the relevant Hospital and Health Service (HHS) Boards that require them to proceed with the ieMR implementation. The directives are limited to two years and it is not clear what formal arrangements will exist beyond this timeframe, nor the impact of this on successful completion of the program.

Prior to the expiry of the directives, Queensland Health proposes to undertake a review with the HHS Boards in accordance with the HSD policy and management and consultation standards. The outcome and recommendations will be presented to the HSD Executive Committee for endorsement. The Director-General of Queensland Health has responsibility for the final decision as vested under the legislative requirements.

Additionally, Queensland Health has advised that safeguards have been built in to the contractual mechanisms between Queensland Health and the vendor of the ieMR, which requires a centralised implementation by the Health Services Information Agency (HSIA). The HSIA is the service provider to the Hospital and Health Services. This role is underpinned by a technical support service level agreement and support services agreements between the HSIA and the Hospital and Health Services.

2.3.5   Program and project management

The Queensland Government has developed standardised methodologies for portfolio, program and project management. The eHealth Program office is responsible for administering the methodologies across the eHealth Program. In 2009, the eHealth Program Office received approval to develop and implement a *Benefits Management Strategy*, methodology and toolkit to align with the *National E-Health Strategy*, rather than adopting the *Queensland Government Benefits Management Framework*.

The key control documents used to manage the eHealth Program in accordance with Queensland Government methodologies are:
* *Benefits Management Strategy (October 2009) -* describes how projects and sub-programs contribute to the achievement of the eHealth Program strategic objectives
* *eHealth Program Blueprint (March 2011) -* outlines how the eHealth Program is to be delivered to the organisation
* *eHealth Program Plan (May 2011) -* used to design the overall program and then to monitor and control progress
* draft *eHealth Program Monitoring and Control Approach (July 2011) -* describes the processes involved in monitoring and controlling programs and related projects.

A *Program Performance Report Handbook* was approved in June 2011 to guide the reporting of the eHealth Program, and is based on state methodologies. Program performance reports and eHealth Program update reports are provided to the eHealth Program Board at each monthly meeting. Escalation reports are provided to the board to identify areas of concern, as well as financial impact assessment briefing notes. An eHealth Program risk register has been developed and is updated regularly and presented at each board meeting.

Queensland Health did not conduct a formal assessment of the eHealth Program's progress and achievements until a standard management control known as a 'Post Implementation Review' was performed at the end of Tranche 1 in January 2012. This was four years after the program commenced in 2007. The *eHealth Blueprint (March 2011)* and the *eHealth Program Plan (May 2011)* were used as baseline documents rather than the *eHealth Implementation Strategy and Plan (2009-2012)*.

An external assessment of the Health Services Information Agency's portfolio, program and project management maturity was undertaken between March and May 2012. This assessment identified opportunities for improvement in Queensland Health's overall portfolio, program and project management, particularly in relation to its benefits management and resource management. Comments on benefits management are provided in Chapter 3 of this report.

2.4   Recommendations

It is recommended that Queensland Health:

1.   **assess the full infrastructure upgrade costs necessary to effectively implement the ieMR at the nine selected hospitals, and fund the implementation accordingly**

2.   **review the management and reporting of the eHealth Program to:**

   - **enhance financial reporting to the eHealth Program Board to clearly and concisely provide information on the financial status of the program, including a breakdown of future expenditure projected to complete the program**

   - **provide performance measurement data to the eHealth Program Board in a clear concise format that clearly demonstrates the progress of each project, tranche of work, and the overall program, against the relevant budgets, baseline milestones, and subsequent impact of variations to plans**

   - **report more clearly on the outcomes and benefits of eHealth specialist clinical and administrative systems, demonstrating clearly their impact**

3.   **take appropriate action to address the obsolescence of the patient administration system, Hospital Based Corporate Information System (HBCIS), within a timeframe that will not impact adversely on hospital administration**

4.   **progress the single sign on solution to increase the efficiency of accessing multiple systems, particularly for the ieMR sites.**

3   Outcomes and benefits

In brief

Background

The eHealth Program is focused on improving clinical capability and capacity, and subsequently patients' overall health and safety.

Queensland Health states that the eHealth Program is not expected to directly deliver financial savings, and that some benefits are intangible and therefore difficult to measure. Nevertheless, the financial investment in the eHealth Program is significant and therefore there is a need to demonstrate the link between improvements in capability and better health outcomes; to determine whether services are being delivered more efficiently; and to identify the costs and economic benefits, where possible, for all eHealth initiatives as a basis for expenditure commitments.

Key findings

- Most of the specialist clinical and administrative systems have been implemented. Clinical capability has improved, but the outcomes and benefits are primarily based on anecdotal evidence.
- Queensland Health is unable to effectively evaluate and report on outcomes and benefits for some clinical and administrative systems due to delays in issuing guidance on performance measurement, and inconsistent practices in collecting baseline data.
- An electronic medical record (eMR) system, a Gold Coast Hospital and Health Service initiative, implemented at Robina and Southport hospitals, is not operating to user expectations. Issues relating to the eMR need to be addressed to improve the functionality and efficiency of the system.

Recommendations summary

It is recommended that Queensland Health:

- **develop measures for outcomes and benefits and collect baseline data in accordance with the *Queensland Government Benefits Management Framework* for eHealth systems**
- **address deficiencies in the eMR at the Gold Coast Hospital and Health Service.**

3.1   Background

The Queensland Government has an obligation to ensure that value for money in terms of both efficiency and effectiveness is delivered through its ongoing investments. *The Benefits Management Framework* outlines benefits management processes and provides guidance to agency personnel involved in the business planning process, and in program management and project delivery.

The principal aim of benefits management is to ensure that benefits are clearly defined, are measurable and provide a compelling case for investment – and ultimately to make sure that those benefits are actually achieved.

eHealth's primary stated outcome is to significantly improve Queensland Health's clinical and organisational capability and capacity, subsequently improving patients' overall health and safety, through the provision of information technology.

This audit assessed whether the expected outcomes and benefits are being realised as set out in the *eHealth Implementation Strategy and Plan (2009-2012).*

3.2   Conclusions

The planned outcomes and expected benefits cannot be adequately proven through the current performance measurement methodology to demonstrate a return on the investment in eHealth. Guidance for staff on the process through which the eHealth Program Office will describe, measure and report benefits was not developed until October 2009. At that time, 13 of the 15 Tranche 1 projects were underway and performance measurement, particularly baseline data, was undertaken inconsistently.

Five projects from Tranche 1 remain to be completed by June 2013. Time is needed for those benefits to be realised, measured and then reported upon.

Although Queensland Health is unable to effectively evaluate and report on outcomes and benefits for some systems, the specialist clinical and administrative systems implemented to date have delivered substantial benefits. Primarily based on anecdotal evidence, they have contributed towards better outcomes for patients and clinicians.

3.3   Findings

3.3.1   Measurement of outcomes and benefits

The eHealth Program commenced in 2007, and 13 of the 15 specialist clinical and administrative system projects were underway before that date. However, key documents that provide guidance to Queensland Health staff for performance measurement and benefits management were not developed until two years later when the *Benefits Realisation Plan-Clinical Informatics Program* was produced in October 2009.

Similarly, the *eHealth Program Blueprint* and the *eHealth Program Plan* were not developed until 2011, four years after the eHealth Program commenced. The Blueprint identified five core capabilities, six benefits and three outcomes, based on the *eHealth Strategy (2006)* and the *eHealth Implementation Strategy and Plan (2009-2012).*

3.3.2   Achievement of outcomes and benefits

The specialist clinical and administrative systems implemented to date have delivered substantial benefits. For example, clinical capability has improved in the areas of electronic recording, workflow, decision support, location independent diagnosis and a networked model of care that aligns with the areas identified as priorities in the *eHealth Strategy (2006)*. Appendix B and C provide a list of the eHealth systems, implementation dates and examples of outputs, outcomes and benefits of these systems.

Although outcomes and benefits have resulted from the implementation of clinical and administrative systems, Queensland Health is unable to effectively evaluate and report on outcomes and benefits as the evidence is primarily anecdotal.

The impact of the delayed focus on establishing measures for outcomes and benefits is evident in the January 2012 *eHealth Program–Tranche 1 Report*, on the first tranche of clinical and administrative systems as at 30 June 2011. Four years from the commencement of the program, the report includes anecdotal information on the benefits of each system. However, it lacks adequate reporting on formal performance measurement.

The progress of achievement for the 37 benefits reported in the Tranche 1 Report illustrates the difficulty Queensland Health has in demonstrating realised benefits.

Figure 3A
Achievement of benefits for Tranche 1 eHealth specialist clinical and administrative systems

Progress in achieving benefits for Tranche 1 specialist clinical and administrative systems	Benefits realisation
Fully achieved	15
Partially achieved	9
Pending measurement	13
Total number of benefits	**37**

Source: Queensland Health, eHealth Program, Tranche 1 Report, January 2012

Many of the measures for clinical and administrative systems in the Tranche 1 Report do not meet better practice principles of being specific, measurable, attainable, realistic and timely. This makes the identification, tracking, measurement and reporting on the impact of the systems difficult. In addition, no baseline data was collected for over 40 per cent of the outcomes and benefits, and there is no Hospital or Health Service level measurement of financial and patient clinical outcomes and benefits.

These deficiencies in benefits management were recognised by Queensland Health at the completion of Tranche 1, and there is now a greater focus on establishing baseline data and performance measures to support Tranche 2 of the eHealth Program.

3.3.3   User perceptions

The audit assessed the effectiveness of the rollout of the specialist clinical and administrative systems at a selection of Queensland hospitals. Interviews were conducted with systems users at Atherton Hospital, Cairns Base Hospital, Royal Brisbane and Women's Hospital, Robina Hospital, Roma Hospital, Southport Hospital and St George Hospital.

At all hospitals visited the clinical and administrative systems were in place and functioning as planned. Interviews were conducted with medical officers and nurses to ascertain their satisfaction with the functionality of the eHealth systems implemented. Except for the *Electronic Discharge Summary* and *Enterprise-wide Liaison Medication System* (discussed below) user perceptions were positive for all systems, even when the functionality delivered was less than planned.

- *Electronic Discharge Summary (EDS) -* the EDS was created to be a summary of the patient's episode of care. There are inconsistent work practices and inefficiencies occurring with under and over documentation. There are instances where fields are not being completed or not completed appropriately, which means the EDS may not be fully relied upon for clinical decision making by internal and external clinicians. The EDS is provided to the patient's private doctor. If the EDS is incomplete then the patient's doctor can contact the referring hospital to obtain the required information, but this may delay commencement of treatment.
- *Enterprise-wide Liaison Medication System (eLMS) -* one Hospital and Health Service has a very low rate of completing eLMS by pharmacists, where 90 per cent of local patients do not have an eLMS report. The eLMS data automatically populates into the EDS. However, if there is no eLMS record the doctor has to manually enter the patient's medication into the EDS which increases the risk of transcribing errors. This impacts on the usefulness of the EDS system for clinical decision making as well as the level of care for the patient.

3.3.4   eMR at the Gold Coast Hospital and Health Service

The Gold Coast Hospital and Health Service (GCHHS) implemented a limited version of an electronic medical record (eMR) district-wide in late 2011. The Health Services Information Agency-Corporate Office provided assistance and partial funding for the implementation of the eMR. The eMR cost approximately $8 million, including hardware, and went live across the district in December 2011, six months behind schedule.

The eMR will be replaced by the integrated electronic medical record (ieMR) in the second release as part of the ieMR plan.

Functionality of the eMR

Concerns regarding the functionality of the eMR at the Gold Coast Hospital and Health Service (GCHHS) were raised at interviews with users. There was no formal process to capture and analyse the implementation and ongoing system issues. Clinicians indicated that the difficulties they were experiencing in some key areas of the eMR had not been addressed by GCHHS management, and there had been no system improvements since implementation in December 2011. Formal processes have commenced to capture and analyse system issues.

Clinicians indicated that while they accepted the need to move from manual to electronic patient records, some felt patient safety may be compromised without system enhancements.

The learnings from this eMR implementation are informing the development and implementation of the ieMR. However, given the concerns raised by clinicians, it would be prudent to provide the system enhancements incorporated into the ieMR build to the eMR at GCHHS to address its current deficiencies. This would also permit the practicality of these changes to undergo hospital based testing prior to implementing the ieMR in other hospitals.

3.4   Recommendations

It is recommended that Queensland Health:

5. **develop measures for outcomes and benefits for the ieMR, and future specialist clinical and administrative systems, that are specific, measurable, attainable, realistic and timely. Collect baseline data to facilitate performance measurement and reporting in accordance with the** *Queensland Government Benefits Management Framework*

6. **provide system enhancements incorporated into the ieMR build to the eMR at the Gold Coast Hospital and Health Service to address current deficiencies, and to test the practicality of these changes by using hospital based testing prior to implementing the ieMR in other hospitals.**

Appendices

Appendix A - Comments

Auditor-General Act 2009 (Section 64) – Comments received

Introduction

In accordance with section 64 of the *Auditor-General Act 2009,* a copy of this report was provided to Queensland Health and to the Minister for Health, with a request for comments.

Responsibility for the accuracy, fairness and balance of the comments rests with the head of this agency.

Comments received

Response provided by the Director-General, Queensland Health on 14 November 2012.

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14 NOV 2012
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Queensland **Health**

Enquiries to:	Mr Ray Brown
	Chief Information Officer
	Health Services Information Agency
Telephone:	3170 4770
Facsimile:	3170 4999
File Ref:	DG068998

1.4 NOV 2012

Mr Andrew Greaves
Auditor-General
Queensland Audit Office
Level 14
53 Albert Street
BRISBANE QLD 4000

Dear Mr Greaves

Thank you for your letter dated 24 October 2012, regarding the Performance audit on Queensland Health – eHealth Program.

Since the 1990s, Queensland Health has pursued a combination of local and enterprise information technology systems to support clinicians delivering care. Queensland led the nation to have a single wide area network connecting all health care facilities with a patient administration system (HBCIS) and email service. Queensland became the first State to implement a single laboratory information system which shares pathology results on all Queensland public hospital patients.

Your report acknowledges that prior to 2009 there were a number of in-house and off the shelf clinical systems in use with limited State-wide integration or consistency. In 2009, Queensland Health developed a comprehensive strategy to develop new systems, integrate and further roll out some existing specialist clinical and administrative systems and to develop or procure an electronic medical records system.

This last decade has seen major investment in digital radiography with Queensland again the first State to have a fully digital x-ray and Breast screen imaging service.

Queensland Health is continuing to invest in eHealth systems with ongoing projects occurring in:
- Intensive Care Units
- Cardiology
- New hospitals
- Breast screening, and
- Sharing of clinical information across all public hospitals via the award winning Viewer application.

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As acknowledged in your audit report many benefits have been realised to date including:

- Electronic discharge summaries are available at all hospitals and are shared with general practitioners to support continuity of care once patients are discharged.
- A comprehensive picture of a patient's mental health record and care needs is available at 120 locations.
- Pathology and radiology reports and digital images are available at more than 120 facilities.
- A standardised endoscopy information system supports timely clinical decision making and underpins bowel cancer screening programs at more than 20 hospitals.
- Anaesthetic records are available on line at 43 locations.

The major eHealth priority for Queensland Health is the implementation of an integrated electronic medical record (ieMR). The Department followed rigorous and appropriate processes for the selection of the ieMR solution, and as acknowledged in your report, complied with procurement, probity and propriety standards. The ieMR rollout will occur at nine key hospital sites commencing in 2013.

Queensland Health supports your conclusion that delays in implementation of the eHealth program primarily occurred during the approval processes as a result of applying additional due diligence to ensure that problems experienced with the Queensland Health payroll system were not repeated.

Additionally, you identified that the eHealth Program costs have been within the approved budget and the clinical and administrative systems implemented have delivered substantial benefits aligned with the eHealth Strategy.

Some of your audit recommendations relate to the requirement for additional program funding. Since the initial case for eHealth investment was made in 2006, Queensland Health has worked to specify the investment requirements for Information Technology infrastructure and allied software applications to support effective implementation of the ieMR. Queensland Health has actively sought funding through the budget process to meet these requirements. In 2010 Queensland Health raised the criticality of the replacement of the Queensland Health Patient Administration system as part of 'urgent and unavoidable' priorities and in line with your recommendation in this report, continues to actively pursue funding opportunities to progress QPAS replacement. However, as raised during the conduct of the audit, it is important to note that the ieMR is not dependent on the replacement of the patient administration system nor is it part of the current eHealth program of work.

Attached to this letter is Queensland Health's response to the specific recommendations contained in your report. It should be noted that progress has already been made in relation to a number of these recommendations.

Should you require further information, Queensland Health's contact is Mr Ray Brown, Chief Information Officer, Health Services Information Agency, on telephone 3170 4770.

Yours sincerely

Dr Tony O'Connell
Director-General

Queensland Health response to recommendations

Recommendation	Agree/Disagree	Timeframe for Implementation	Additional Comments
1. assess the full infrastructure upgrade costs necessary to effectively implement the ieMR at the nine selected hospitals, and fund the implementation accordingly.	Agree	October 2013	QH estimates for the investment required to deploy infrastructure to enable the delivery of eHealth were included as a component of the Department's budget process from 2009-2012. QH has continued to refine the investment requirements and options to support the definition of the infrastructure required to support the eHealth implementation through investment planning. QH will assess the infrastructure investment required to effectively implement the ieMR at nine selected sites and identify appropriate sources of investment.
2. review the management and reporting of the eHealth Program to: • Enhance financial reporting to the eHealth Program Board to clearly and concisely provide information on the financial status of the program, including a breakdown of future expenditure projected to complete the program • Provide performance measurement data to the eHealth Program Board in a clear concise format that clearly demonstrates the progress of each project, tranch of work, and the overall program against the relevant budgets, baseline timeline, and subsequent impact of variations to plans • Report more clearly on the outcomes and benefits of eHealth clinical and administrative systems, demonstrating clearly their impact	Agree	June 2013	As noted in the Report, the eHealth Program Board is actively involved in the governance of the eHealth program as evidenced by its identification that although Board reports were comprehensive, they were also complex and clearer financial reporting was required to support future board meetings. There is significant work being undertaken to continue to improve the maturity of program reporting. The eHealth Program will continue to mature program reporting to the Board's satisfaction by June 2013.
3. take appropriate action to address the obsolescence of the patient administration system, Hospital Based Corporate Information System (HBCIS), within a timeframe that will not impact adversely on hospital administration	Agree	December 2013	The criticality of the QPAS replacement was first raised for consideration as part of Queensland Health's 'urgent and unavoidable' priorities in September 2010. As raised during the conduct of the audit, the ieMR is not dependent on the replacement of the HBCIS patient administration system and HBCIS replacement is not part of the current eHealth program scope. Queensland Health will complete the refresh of the 2012 QPAS Replacement business case by March 2013 and actively pursue funding opportunities to progress QPAS replacement.
4. progress the single sign on project to increase the efficiency of accessing multiple systems, particularly for the ieMR sites.	Agree	December 2014	QH will implement Single Sign On, in line with ieMR deployment to the nine ieMR sites.

5. develop measures for outcomes and benefits for the ieMR, and future specialist clinical and administrative systems, that are specific, measurable, attainable, realistic and timely. Collect baseline data to facilitate performance measurement and reporting in accordance with the Queensland Government Benefits Management Framework	Agree	June 2013	The ieMR Program is currently baselining all nine sites through the capture of appropriate baseline information.
6. provide system enhancements incorporated into the ieMR to the eMR at the Gold Coast Hospital and Health Service to address current deficiencies, and test the practicality of these changes by using hospital based testing prior to implementing the ieMR to other hospitals.	Agree	June 2013	ieMR design decisions have been made available to the GCHSD eMR team for consideration and implementation as appropriate. Where applied to the eMR, ieMR system enhancements will be tested in the hospital prior to production release. Lessons learnt from the GCHSD eMR are being incorporated into the design of the ieMR.

Appendix B – Status of the eHealth Program as at 30 June 2012

No.	eHealth System	Tranche	Start date	Original end date	Status	Outputs
1	AARK (Automated Anaesthetic Record Keeping)	1	Jul 2006	Mar 2009	Completed Jun 2011	Live at 43 sites
2	BSQ 1 (BreastScreen Queensland Digital Project)	1	Jul 2006	Jun 2011	Completed Phase 1 Jun 2012	Live at 133 sites
3	CHRISP (Centre for Healthcare Related Infection Surveillance and Prevention)	1	Jul 2006	Jun 2010	Due for completion Oct 2012	N/A
4	CIMHA 1 (Consumer Integrated Mental Health Application)	1	Sep 2005	Nov 2008	Completed Phase 1 Nov 2008	Available statewide
5	EDS (Electronic Discharge Summary)	1	Jun 2006	Dec 2010	Completed Jul 2011	Live at 173 sites
6	ESISS (Endoscopy Services Information Systems Solution)	1	Nov 2005	Jun 2009	Completed Oct 2011	Live at 31 sites
7	ICU-CIS (Intensive Care Unit Clinical Information System)	1	Jul 2007	Dec 2010	Due for completion Mar 2013	Live at 4 sites
8	MAIS (Medical Aids Information System)	1	TBA	N/A	Sep 2010 put on hold at end of design phase	N/A
9	MAPLE (Management of Applications Permits and Licensing Events)	1	Jul 2008	Feb 2011	Due for completion Dec 2012	N/A
10	PenPath (Pen Computer Systems Pathology Interface Module)	1	Aug 2005	N/A	Oct 2011 closed at end of design phase	N/A
11	PHICSS (Public Health Information and Clinical Services Solution)	1	Sep 2007	Oct 2012	Due for completion Feb 2013	19 infection diseases clinics, 6 family planning clinics, 15 mobile women's health services and 5 tuberculosis clinics

No.	eHealth System	Tranche	Start date	Original end date	Status	Outputs
12	QRIS / PACS (Queensland Radiology Information System / Picture Archive and Communication System)	1	Mar 2003	Jun 2013	Completed Feb 2012	Live at 97 sites
13	SOHSIP (School Oral Health Service Information Project)	1	Jul 2006	June 2009	Completed Mar 2010	Live at 355 sites
14	TERP (Tactical eReferral Project)	1	Dec 2009	Sep 2011	Completed Sep 2011	Live at 13 sites
15	The Viewer	1 & 2	Dec 2009	Jan 2011	Due for completion Jun 2013	Live at 234 sites
16	ieMR (Integrated Electronic Medical Record)	2	Release 1 late 2011	Dec 2014	Due for completion 2015	N/A
17	BSQ 2 Phase 2	2	TBA	TBA	Due for completion Dec 2012	N/A
18	CIMHA 2 Phase 2	2	TBA	TBA	Due for completion Apr 2014	N/A
19	CISP (Cardiac Information Solution Project)	2	Nov 2009	Jun 2012	Due for completion Mar 2013	Live at 1 site

Legend:

N/A = Not applicable
TBA = To be advised

Source: Queensland Health

Appendix C – Examples of outputs, outcomes and benefits of specialist clinical and administrative systems

eHealth specialist system	Outputs	Outcomes and benefits
Automated Anaesthetic Record Keeping (AARK) • Award finalist in the Premier's Award for Excellence in Public Service Delivery Awards (2011)	Implemented at 43 sites 592 192 anaesthetic and recovery reports generated.	Electronic medical record • Anaesthetic record keeping module Improved clinical decision making • Ability to view past episodes of care, as well as trend on the current episode of care. Location independent service
BreastScreen Queensland Digital Project (BSQ 1)	Implemented at 133 sites 469 000 screens 7 000 technical recalls avoided	Electronic medical record Improved clinical decision making • Improved efficiencies by having immediate digital images and remote reading capability Location independent service
Consumer Integrated Mental Health Application (CIMHA 1)	Implemented – single statewide database	Electronic medical record Improve clinical decision making Location independent services
Electronic Discharge Summary (EDS)	Implemented at 173 sites 500 000 + summaries sent to GPs	Electronic medical record • More complete and timely access to summary discharge information Improved clinical decision making • Allows clinicians to spend more time with patients on current issues rather than having to manually record past diagnosis/treatment
Queensland Radiology Information System (QRIS)	Implemented at 97 sites 1 000 000+ validated radiology reports generated to 4 Nov 2011	Electronic image sharing Improved clinical decision making • Ability to view past images and reports as well as the clinical indicators for the current request Location independent service
The Viewer • Merit award in the eHealth category at the 2012 Queensland iAwards • Winner of the Applications Development Category of the National Excellence in eGovernment Awards	Implemented at 234 sites Provides key summary patient information	Electronic medical record • Statewide consolidated key patient information from multiple systems in one place Improves clinical decision making • Warning of duplication of requests thus saving potential additional radiation dosage and duplication of appointments Location independent service • Increased visibility of patient data

Source: Queensland Health, eHealth Program, Tranche 1 Report, January 2012

Appendix D – Audit details

Audit objective

The objective of this audit was to determine whether the eHealth Program:
- is being implemented as intended
- is achieving its planned outcomes and realising expected benefits.

Reason for the audit

In 2007, the Queensland State Government invested over $244 million in Queensland Health to implement the eHealth Strategy for the purpose of improving the capability and delivery of state health services through information and communication technology (ICT).

An information systems governance and control audit was undertaken by the Queensland Audit Office (QAO) in 2010, *Report to Parliament No. 7 for 2010, Information systems governance and control, including the Queensland Health Implementation of Continuity Project*. The audit included Queensland Health's new payroll and rostering system due to significant problems experienced by the department since the system was implemented. The report identified weaknesses in Queensland Health's capability in managing and delivering complex ICT programs and projects.

In a report by the Victorian Ombudsman in November 2011, in consultation with the Victorian Auditor-General, on the investigation into ICT-enabled projects, it was stated that agencies should have been aware of the key issues in ICT enabled projects and taken steps to address them. Similarly, it is expected that Queensland Health has identified key issues in the eHealth Program based on its past experiences, and that it has taken steps to mitigate against such risks.

This audit was undertaken to examine Queensland Health's implementation of the eHealth Program and to assess the achievement of outcomes and benefits. In light of the weaknesses identified in *Report to Parliament No. 7 for 2010,* it was recognised that further significant system implementation issues could adversely impact on public confidence in the Health systems.

Performance audit approach

The audit of the eHealth Program was conducted between February 2012 and October 2012. The audit examined the implementation and achievement of the planned outcomes and benefits for the eHealth Program. The audit consisted of:
- interviews with staff at the Health Services Information Agency, Queensland Health, and staff at the following public hospitals: Atherton Hospital, Cairns Base Hospital, Robina Hospital, Roma Hospital, Royal Brisbane and Women's Hospital, Southport Hospital and St George Hospital
- attendance as observers at eHealth Program Board meetings
- observation of specialist clinical and administrative systems at selected public hospitals, and the eMR at the Gold Coast Hospital and Health Service
- analysis of documents including strategies, plans, policies, guidelines, finance and performance reports, funding submissions and business cases, and eHealth Program Board agendas and minutes.

The audit was undertaken in accordance with *Auditor-General of Queensland Auditing Standards*, which incorporate Australian auditing and assurance standards.

Auditor-General
Reports to Parliament

Tabled in 2012-13

Report Number	Title of report	Date tabled in Legislative Assembly
1	Racing Queensland Limited: Audit by arrangement	July 2012
2	Follow up of 2010 audit recommendations	October 2012
3	Tourism industry growth and development	November 2012

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