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Government
of South Australia

Report

of the

Auditor-General

Supplementary Report

for the

year ended 30 June 2016

Tabled in the House of Assembly and ordered to be published, 29 November 2016

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28 November 2016

The Hon R P Wortley MLC
President
Legislative Council
Parliament House
ADELAIDE SA 5000

The Hon M J Atkinson MP
Speaker
House of Assembly
Parliament House
ADELAIDE SA 5000

Dear President and Speaker

Report of the Auditor-General: Supplementary Report for the year ended 30 June 2016: Health information technology systems: November 2016

As required by the *Public Finance and Audit Act 1987*, I present to each of you my Supplementary Report for the year ended 30 June 2016 'Health information technology systems: November 2016'.

Content of the Report

Part A of the Auditor-General's Annual Report for the year ended 30 June 2016 referred to audit work that would be subject to Supplementary reporting to Parliament. This Report provides detailed commentary and audit observations arising from a review of a number of Department for Health and Ageing enterprise systems.

Acknowledgements

The audit team for this report was Andrew Corrigan and Tyson Hancock.

I also express my appreciation for the cooperation and assistance provided by Department for Health and Ageing staff during the course of the audit.

Yours sincerely

Andrew Richardson
Auditor-General

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1 Executive summary

1.1 Introduction

In 2016 we continued to review the Department for Health and Ageing's (SA Health) enterprise system programs and projects. Although we noted progress in the implementation of these systems and some benefits realised, SA Health continues to face a number of challenges, in particular ensuring system readiness for the opening of the new Royal Adelaide Hospital (new RAH).

In our June 2016 Supplementary Report to Parliament,[1] we provided an update on the Enterprise Patient Administration System (EPAS). This included confirmation of the current program implementation status, budget and expenditure to date, key risks and the system's impact and readiness for the new RAH.

Since that Report, we have reviewed other SA Health enterprise systems programs. The purpose of this Report is to provide the results of this review activity, which has included the:

- Oracle Corporate System (OCS) and associated One Procurement Solution (OPS) – the outcomes of the OPS Program closeout and operational system controls
- Camden Park distribution centre – ongoing activities for the distribution centre and its impact on the new RAH
- the Enterprise System for Medical Imaging (ESMI) – implementation status, budget and expenditure to date, key risks and the system's impact and readiness for the new RAH and details of any outstanding activities that will be transferred to business as usual at the conclusion of the Program
- EPAS – operational testing, including a number of usability aspects at selected Local Health Network sites and a follow up of previously raised identity access management issues.

1.2 Audit conclusion

SA Health's enterprise systems and the distribution centre are key components in achieving the objectives of the new RAH and South Australia's recent Transforming Health initiative.[2]

The OCS/OPS Program has been completed with some notable benefits and improvements experienced. However, not all the originally anticipated benefits have been achieved to date and ongoing challenges remain. This includes issues with the distribution centre that may impact the new RAH supply chain.

Some system workflow functionality and integration challenges exist between ESMI and EPAS. Our EPAS testing identified instances of workstation and device delays in responding to user input, document scanning inefficiencies and printing slowness. We also identified that

[1] Supplementary Report of the Auditor-General for the year ended 30 June 2015 'Enterprise Patient Administration System: June 2016'.

[2] For more information about SA Health's Transforming Health initiative refer to <http://www.transforminghealth.sa.gov.au>, viewed 10 November 2016.

not all details are electronically transferred between EPAS and ESMI for known patient infection controls, alerts and precautions. These activities require additional resourcing effort to address hospital staff concerns.

We have also noted multiple instances, including for the OCS and ESMI systems, where data quality issues are being experienced once the system is in operation. One contributing factor relates to the poor quality of data recorded in the legacy systems. We stress the importance of quality assurance over the data migration process for large and complex system implementations.

We acknowledge that ongoing issues and activities are likely to follow any major system implementation. All agencies face the challenge of prioritising activities and addressing user issues or requests for enhancements. SA Health will need to continue to closely monitor these activities to maximise expected benefits and to manage user concerns and expectations.

1.3 Key audit findings

Since we last reported on the OCS/OPS and ESMI Programs in June 2015,[3] both programs have been closed, with full implementation completed at all in-scope sites. In relation to EPAS implementation to in-scope sites is still in progress.

In this Report we have noted a number of benefits associated with these enterprise systems. Our reviews, however, have highlighted the following findings and challenges:

- OCS/OPS benefits have been further reduced from the original program estimate and ESMI benefits realisation deficiencies exist
- there are OCS stock catalogue unit of measure inconsistencies and ESMI data quality and migration challenges
- identity and access management controls for ESMI and EPAS and operational controls for OCS need strengthening
- distribution centre issues may impact the new RAH supply chain
- there are ESMI and EPAS integration challenges including patient information on infection controls, alerts and precautions and the inadvertent cancellation of EPAS orders by system users
- ESMI is more resource intensive when admitting patients than originally anticipated and potential delays are experienced in EPAS when performing patient administration and care related tasks
- ESMI is not able to effectively record radiation doses and obtain the required information fields to record a procedure team safety checklist
- a lack of formalised ESMI IT service resumption testing to support business recovery time objectives
- ESMI new RAH transition challenges remain

[3] Supplementary Report of the Auditor-General for the year ended 30 June 2014 'Health ICT systems and the Camden Park distribution centre: June 2015'.

- ESMI management reporting functionality and stability does not meet all business requirements
- a number of ESMI activities require attention as part of business as usual operations, including finalising a governance structure, maintenance of escrow deposits, system performance concerns and alignment of support environments
- EPAS patient treatment related orders can be placed by an administrative officer (non-clinical staff), increased controls are required for medical officer details registered in EPAS and hospital billing and transaction issues remain
- Local Health Network (LHN) management of EPAS training requires improvement.

Sections 2 to 5 detail our review findings and recommendations, and SA Health's responses to the identified matters.

1.4 Summary of SA Health responses

SA Health provided detailed and positive responses to each recommendation. This included details of their remediation status and approach.

Full remediation of most issues is planned to be completed by March 2017.

SA Health's response to each review recommendation and expected completion dates are included in this Report.

2 Oracle Corporate System and Camden Park distribution centre

The OCS Program commenced in July 2010 and closed in August 2015. OCS and its associated OPS has provided a number of benefits to SA Health. This includes improvements in financial reporting and procurement and supply chain management (PSCM), and has enabled the removal of certain legacy financial systems being used across the LHNs. SA Health also advised that this system has helped identify other activities that may drive further operational cost savings.

Given the importance of OCS/OPS we have previously reviewed and reported on the program as implementation progressed over a number of years, along with the Camden Park distribution centre (distribution centre). While certain control improvements and efficiencies have occurred over that time, our current review has highlighted the following challenges that need to be addressed:

Summary of key findings

- Benefits have been further reduced from the original program estimate.
- Distribution centre issues may impact the new RAH supply chain.
- Stock catalogue unit of measurement (UOM) inconsistencies are causing LHN and PSCM inefficiencies.
- Operational OCS risks were identified.

Summary of key recommendations

We recommend that SA Health:

- ensures that the OCS/OPS Program and Distribution Centre Investment Project (DCIP) benefits are diligently reviewed and updated regularly. This includes taking into consideration the assessment outcomes for an alternate distribution centre solution
- ensures that the proposed new distribution centre model meets all new RAH requirements. This model should be finalised as soon as practicable to minimise costs associated with the interim new RAH supply chain arrangements
- ensures that consultation with LHNs occurs on the overarching UOM business rule principles developed by PSCM as soon as practicable
- considers its current resourcing structure and the impact to SA Health supply chain operations if this issue is not resolved before implementation of an alternate distribution centre solution
- ensures that timely and accurate information is exchanged between impacted teams, including PSCM and the DCIP, to ensure that any dependencies and action plans are developed
- addresses known operational OCS issues in a timely manner.

2.1 Introduction

Since July 2010, SA Health has been implementing components of its new financial management system, OCS, to replace SA Health and health unit legacy general ledger and financial systems. The aim was to provide a whole-of-health integrated financial management system, which includes PSCM functionality.

The implementation of this system was conducted in three phases. The final phase was known as the OPS Program, which was closed out in August 2015. The closeout report detailed the overall performance of this program against initial plans. It also noted, however, that program-related activities would continue.

The original business case expected to achieve savings from centralising and eliminating duplicate supply chain operations at various site-based imprest[4] and distribution facilities. This was to occur through a new PSCM business model using SA Health's distribution centre.

2.2 Validation approach

Given the importance of the various program phases, we have maintained an ongoing review of program activities and associated outcomes, including the distribution centre.[5]

The main objectives of this review were to advise the outcomes of the OPS Program closeout and the ongoing activities for the distribution centre and its impact on the new RAH.

In addition, for financial audit assurance purposes, in 2015-16 we retested operational system controls and the remediation of previously raised issues. Operational control testing included:

- examining the operational effectiveness of key business processes, including expenditure, revenue, inventory, fixed assets, cash management and general ledger
- aspects of general IT and security controls applied at the overall OCS enterprise level.

We have included a summary of the outcomes of this operational control testing in this Report.

2.3 Program background

2.3.1 Implementation status update to June 2016

OPS was deployed as part of Phase 3 of the OCS Program, which was originally expected to be completed in the second quarter of 2014-15. This time frame was not met. Consequently, SA Health formulated a revised implementation plan, which included procurement, supply chain and some financials. Under this plan, the remaining sites were to be deployed in the following six groups, with an updated program closeout date of August 2015:

- Groups 1 to 3: Flinders Medical Centre, Lyell McEwin Hospital, existing RAH and The Queen Elizabeth Hospital, implemented in December 2014
- Group 4: Women's and Children's Hospital, implemented in February 2015

[4] An imprest is a local storage facility/room within each hospital site. Each imprest store typically contains medical supplies.

[5] Our last report was in June 2015.

- Group 5: SA Pathology and hospital services at Port Pirie, Whyalla, Southern Flinders and Mid North, implemented in May 2015
- Group 6: remainder of country health services, implemented in July 2015.

These hospital group implementations are now complete and the OPS Program delivered a closeout report to the relevant governance groups in August 2015. The purpose of the closeout report was to advise:

- the overall performance of the OPS Program against the plans defined at program initiation for authorisation
- the scope, cost, risks, baseline changes, benefits, team performance and lessons learned over the life of the OPS Program
- the status of OPS Program objectives and outcomes delivered
- follow-on actions, ongoing risks and further work required after closeout, and the time frames for outstanding activities.

The closeout report indicated that despite experiencing difficulties in early stages of the OPS Program, actions were taken to improve later stages. Lessons learnt were applied to later developments, resulting in the final three groups of hospital deployments being completed on target with very few issues.

The report also stated that many of the OPS Program objectives were now achieved. Prior to OCS, data could not be easily aggregated and viewed across the enterprise. As a result of increased visibility, outstanding issues and improvement opportunities were identified, which require further activities to be progressed after closeout. Some of these activities need to be remediated for SA Health to fully realise the program benefits.

These activities are further discussed in section 2.3.3.

2.3.2 Operational improvements since full implementation

Despite the reduction in expected tangible benefits, which are further discussed in section 2.4.1, the OPS Program closeout report advised the full achievement of a number of intangible benefits.[6] These included:

- a one-off reduction in working capital resulting from lower overall inventory holdings
- increased visibility of imprest holdings across sites enabling monitoring of expiry dates and product recalls, transfers between sites and reduced wastage
- increased visibility of freight costs enabling closer monitoring and reporting of freight performance across SA Health
- faster and cheaper future improvements and additions to enterprise resource planning systems which can be done once rather than multiple times across legacy systems
- reduced risk of operating and supporting aged legacy systems and temporary interfaces between legacy systems and OCS

[6] These intangible benefits were not specifically addressed as part of this review.

- an increased number of accounts payable invoices paid within 30 days as required by the Treasurer's Instructions
- increased visibility and control of accounts payable invoice processing
- increased operational flexibility because of common systems and processes, allowing staff to readily move across sites.

SA Health also advised that the implementation of OCS/OPS has increased the visibility of their operational costs. This has helped SA Health to identify a number of potential strategic procurement projects aimed at achieving overall savings through reduced unit costs and product standardisation.

Eight strategic procurement savings projects have since been identified that are currently in various stages of progress. If successfully implemented within budget, SA Health has estimated these projects would deliver around $36 million of savings over six years (2016-17 to 2021-22).[7] It is expected that the savings on some projects will take effect in 2016-17, with full year savings for the eight projects realised in 2017-18.

2.3.3 Program closeout activities to achieve and/or enhance expected benefits

The OPS Program closeout report indicated SA Health needed to complete a number outstanding activities, including OCS integration with the Catalogue Management System (CMS phase 2) and some OCS infrastructure related items.

As previously mentioned, the implementation of OCS/OPS also highlighted enhancement activities outside the original project scope. If implemented, they would assist business units to implement process improvements, optimise the system and further assist in the realisation of the original business benefits. Many of these activities highlighted in the closeout report were managed as a separate project, originally expected to be completed by 30 June 2016.

System enhancement activities included addressing:

- freight charges
- open purchase orders
- catalogue security
- catalogue of reports
- non-catalogue requisitions
- a review of the achievement of benefits associated with the costs of servicing and managing accounts payable activities.

SA Health advised that most of these activities related to data changes rather than configuration changes. Further details are discussed in section 2.6.

At the time of our review, SA Health advised that a number of these activities were completed. Outstanding activities are now being addressed and funded as business as usual activities by the Oracle support team. Any substantial changes, such as catalogue security, may require additional funding supported by a separate business case.

[7] We have not reviewed the business cases and expected savings for these eight projects.

The completion of some of these follow-on project activities is fundamental to achieving some program objectives and realising some outstanding benefits.

2.3.4 Program budget

The OPS Program closeout report, approved in August 2015 by the eHealth Steering Committee (eHSC), indicated that follow-on activities were to be funded from the existing OPS Program budget. The budget was planned to be closed at the end of June 2016, following completion of the follow-on activities and processing of outstanding invoices.

A summary of the budget as at 30 June 2016 for OCS and OPS is outlined in figure 2.1:[8]

Figure 2.1: Budget for OCS and OPS as at 30 June 2016

OCS full implementation	Budget $'million	Actual $'million
Phase 1 and 2 budget	22.853	
Underspend associated with phase 1 and 2	0.907	
Phase 1 and 2 actual		21.946
Additional project budget for phase 3	24.442	
Add: Carryover from phase 1 and 2	0.907	
Total project budget for phase 3	**25.349**	

OCS full implementation	Budget $'million	Actuals $'million
Phase 3 Actual:		22.361
OPS follow-on Project budget	-	
OPS follow-on Project actual (as at 30 June 2016)		2.597
Total direct project cost for full OCS Implementation		**46.904**
Additional transitional staffing cost	15.150	15.150
Totals (including transitional staffing)	**62.445**	**62.054**
Budget underspend (estimated)		0.391

2.3.5 Distribution centre status update

A February 2014 independent review engaged by SA Health concluded that the existing distribution centre, including the OCS warehouse management module, was not ready to support the proposed supply chain and distribution model for SA Health. In addition, future transactions and inventory holdings were expected to outgrow the current configuration and processes. Consequently, SA Health needed to centralise its distribution model.

In response, SA Health advised Cabinet in August 2014 that it had commissioned a project to identify feasible delivery options and develop a business case for change. The preferred option was to implement high-technology improvements to the existing distribution centre. The revised business case to modify the existing SA Health Distribution Network was finalised in November 2014 and approved by Cabinet in December 2014.[9] This project was called the DCIP.

[8] This information was provided by SA Health and has not been audited.

[9] In section 3.6.2 of our June 2015 Supplementary Report we reported that the approved option involved investment in an equipment kit solution at the distribution centre. This was to enable investment in an upgrade of the distribution centre to proceed and facilitate the transition to the direct to imprest model. SA Health advised that the business case would address many of the February 2014 review's 85 recommendations, in particular the requirement to reconfigure the OCS warehouse management module from supporting the current site warehouses to the planned direct to imprest model.

The major drivers for this distribution network reform included:

- achieving an SA Health savings target of approximately $3 million p.a. associated with centralisation and elimination of duplicate supply chain operations
- meeting the fundamental operating requirements of the new RAH.

Following our June 2015 Supplementary Report, the SA Health DCIP continued setting up project planning and controls. This included completing a detailed overall project schedule and performing procurement and supply chain related activities, distribution centre facility changes, IT services and workforce planning and communications.

In July 2015, an independent assessment identified a number of issues with the current distribution centre infrastructure and additional emerging requirements not included in the original DCIP project scope. This assessment, conducted as part of the project's due diligence activities before procuring the high-technology equipment, highlighted:

- the inadequacy of the fire sprinkler system to support new storage and handling arrangement following implementation of high-technology improvements
- insufficient water flow pressure to the site to support the current and required water sprinkler system[10]
- the current power supply was operating at 85% of capacity and would require an update to support the proposed high-technology equipment to be installed as part of the DCIP
- desirable modifications to the building structure were required to improve the storage conditions of sterile medical consumables to provide better protection from exposure to dust, pests and direct sunlight
- further potential desirable modifications to the distribution centre were required to improve temperature controls
- additional insulation requirements to support a controlled temperature environment
- the requirement to minimise noise to adjacent residents
- additional site security requirements.

We note that the only design constraint discussed in the November 2014 finalised business case was the acknowledgment that the existing fire sprinkler system was at maximum water pressure capacity. If additional sprinklers were required, there would be a significant cost for pumps and water tanks to increase the water pressure.

To address these issues the DCIP Steering Committee was presented with four options:

Option 1 continue as planned with the DCIP and business process changes

[10] SA Health advised that the water flow pressure will fluctuate depending on demand, water improvement or maintenance works. For example, when routinely tested in the subsequent period, SA Health advised that water pressure was found to be acceptable.

Option 2 revert to delivery of sterile stock in bulk units only

Option 3 implement 'controlled environment'[11] improvements to the current distribution centre (preferred option selected)

Option 4 implement purpose built small dedicated decanting and sterile clean rooms.

In September 2015 the DCIP Steering Committee considered that the high-technology improvements were now more expensive than originally anticipated. It recommended the DCIP be halted and the business case be revised. Following this, in December 2015 the DCIP was formally suspended, pending SA Health completing an options analysis and a revision of the project scope.

The DCIP then commenced work with SA Health Infrastructure to explore a range of alternative options, notably including moving to an alternate warehouse facility and seeking partnership with a third party logistics provider. SA Health noted that these options would result in increased time and costs above the current DCIP budget.

SA Health advised that it was continuing to assess and develop a revised distribution centre model. This included reassessing key performance indicators and gathering information to develop a revised business case, as previous metrics were based on the legacy systems.

At the time of our review, SA Health had developed alternative options but was still in the process of assessing them. SA Health advised that should further funding be required, the outcomes of this assessment and associated costs would form the basis of a Cabinet submission in the second half of 2016.

2.3.6 Distribution Centre Investment Project budget

A summary of the current DCIP budget as at 30 June 2016 is provided in figure 2.2.[12] As noted above, the outcomes of assessing alternative options may result in changes to the costs associated with the DCIP.

Figure 2.2: DCIP budget as at 30 June 2016

	Approved budget (December 2014)	Expenditure to date (June 2016)	Remaining budget
	$'000	$'000	$'000
Capital and operating expenditure	9 631	168	9 463
Contingency	389	-	389
Total budget	10 020	168	9 852

[11] A controlled environment includes being free of dust, insects and vermin, the implementation of sterile stock controls for unpacking, storage and transportation, temperature and humidity controls and separate sterile and non-sterile storage facilities.

[12] The expenditure to date figures have not been audited.

2.3.7 Expected benefits of procurement and supply chain reform and centralised distribution model

Although a number of the benefits of adopting OCS have been achieved (refer section 2.3.3), to date not all expected benefits of the proposed procurement and supply chain reforms have been realised. This includes a centralised distribution model (highlighted in figure 2.3). This has been previously reported as a contribution to the overall reduction in expected program benefits (refer section 2.4.1).

SA Health has continued to maintain and operate bulk warehouses at individual sites, instead of the distribution centre providing the planned 'direct to imprest' supply model.[13]

In December 2014, Cabinet approved a revised investment of $8.5 million to modify the existing SA Health Distribution Network (high-technology solution). SA Health expected it to deliver a $10.79 million saving over 10 years (2014-15 to 2023-24) compared to the current budget of $55.33 million, with a payback period of five years. It was also expected that the revised model would deliver certain productivity gains necessary to support the new RAH and SA Health's new procurement and supply chain model. This was planned to reduce the risks associated with the projected growth in demand for health services.

Based on the expected benefits in the revised business case, unrealised benefits from June 2014 amount to $1.09 million to the end of June 2016. At the time of this Report, the expected tangible benefits from procurement and supply chain reform are shown in figure 2.3.

Figure 2.3: Expected tangible benefits from procurement and supply chain reform (including centralised distribution centre model)[(a)]

Expected tangible benefit description	$'000
Status June 2014 (2013-14 to 2022-23)[14]	33 516
No longer expected to be realised[14]	25 387
Realised to 2021-22 through FTE reduction	8 129
Revised DCIP expected benefits (2014-15 to 2023-24)[15]	10 790
Unrealised DCIP expected benefits to June 2016 (2014-15 and 2015-16)	1 088
Reduced expected benefits from original estimate (July 2013)	14 597

[(a)] Reduction of FTE count as part of the procurement and supply chain reform enabled (includes PSCM operations and the centralised distribution centre model).

2.4 Program audit risks and concerns

2.4.1 Benefits have been further reduced from the original program estimate

Recommendations

SA Health should ensure that the OCS/OPS Program and DCIP benefits are diligently reviewed and updated regularly.

[13] Direct to imprest refers to a direct-to-ward approach that centralises medical consumables inventory at the distribution centre. This contrasts SA Health's current supply chain model of both the distribution centre and hospital site based imprest stores.

[14] SA Health OPS Benefits Realisation Plan, version 2.0, June 2014.

[15] SA Health Distribution Network Review – Business Case for Change, Final Report Stage 2, version 2.0, November 2014.

SA Health should also ensure that the DCIP benefits realisation plan is appropriately reviewed and updated based on the outcomes of an assessment for an alternate distribution centre solution (discussed in section 2.3.5).

Findings

We previously reported that despite SA Health still expecting an overall positive benefit from OCS/OPS, the expected tangible benefits were reduced from the July 2013 estimate of $85.9 million to $57.3 million over 10 years (2012-13 to 2021-22). These reduced benefits took into consideration delays in some start-up activities and a revision of the business model using the distribution centre to service all health sites.

While the follow-on project activities included identifying solutions to realise other benefits in full, it also included activities to determine the achievability of certain tangible benefits. Activities included:

- ***Reduction in Shared Services SA (SSSA) accounts payable service costs:*** originally expected a total reduction of 29 FTEs. SSSA was expected to accrue a benefit of $2.1 million p.a. ($10.5 million over five years) due to streamlined invoice processing enabled by OPS.

  At the time of our review, a key system functionality had not been enabled to assist in streamlining invoice processing. This was due to integration constraints with the accounts payable system controlled by SSSA (Basware). As a result, the Program's planned FTE reduction was limited to 18.5 FTEs.

  However, we were advised that SSSA was able to realise the full financial benefits to the end of 2015-16 through other efficiencies not directly related to the Basware rollout. This benefits reduction was attributed to SSSA rather than SA Health.

- ***Reduced cost of managing accounts payable by decommissioning the SA Health Invoice Management Team (SAHIMT):*** originally expected a total reduction of 15 contract positions and one FTE. These benefits were expected to commence from 2015-16. Despite the team being disbanded, at the end of 2015-16 no staff reductions had occurred. These staff were instead retained to perform other ongoing OPS related support functions not previously envisaged. As such, there has been a further reduction in benefits as detailed in figure 2.4 (offset PSCM FTE costs).

Other items that contribute to the OCS/OPS Program tangible benefits include:

- ***Reduction of FTE count enabled in SA Health's Finance and Administrative Services division:*** originally expected a total reduction of 45 FTEs, with an expected $28.7 million benefit realised over the ten years to 2021-22. At the time of our review, SA Health advised that most of this benefit to the end of 2015-16 was yet to be realised as detailed in figure 2.4. An internal review had identified timing delays and there were a number of additional functions previously not envisaged that have become recurrent functions within the Financial Accounting team. Consequently, not all the FTE reduction could be achieved.

- ***Reduction of FTE count as part of the procurement and supply chain reform enabled:*** the OPS closeout report advised these remaining benefits had been realised in full ahead of schedule. However, the total original expected benefits are included in the centralised distribution centre model. These benefits are discussed further in section 2.3.5.

At the time of this Report, the expected tangible benefits to be realised over ten years (2012-13 to 2021-22) are shown in figure 2.4.

Figure 2.4: Expected tangible benefits over 10 years

Expected tangible benefit description[16]	Expected OPS benefits (at 02.06.14)[17] $'000	Benefit realised (at 30.06.16) $'000	Revised expected benefits to 2021-22 (at 30.06.16) $'000	Difference between expected benefits 02.06.14 to 30.06.16 $'000
Finance function FTE reduction	28 667	310	13 382	(14 975)
PSCM function reduction	8 129	1 578	6 551	-
Removal of SAHIMT costs	10 031	1 049	8 982	-
Offset PSCM FTE costs	-	(1 049)	(6 853)	(7 902)
Total	**46 827**	**1 888**	**22 063**	**(22 877)**

As previously mentioned, the implementation of OCS/OPS has also allowed SA Health to identify a number of potential strategic sourcing projects. In particular, eight of these identified projects are currently in various stages of progress. If successfully implemented, these projects would deliver approximately $36 million of savings over six years (2016-17 to 2021-22).

In our prior review, we recommended that SA Health regularly track the realisation of predicted tangible benefits. SA Health responded, advising that the Program Board reviews the benefits monthly. In addition, following program closure, SA Health advised that it will monitor unrealised predicted tangible benefits through its internal business owners.

We noted that the Benefits Realisation Plan has not been updated since June 2014. In addition, the OPS follow-on project status reports continued to reflect the expected benefits recorded in June 2014. This is despite the identification of potential changes to the extent and timing of the realisation of expected benefits.

SA Health response

The OPS benefits were under review at the time this audit was conducted and the updated benefits position approved by SA Health governance is reflected in this Report.

The resulting benefits reduction was due to the FTE reductions not being achieved as envisaged by the implementation, however there is no impact on SA Health budgets.

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[16] Tangible benefits are those that can be measured in monetary terms. The estimated benefits of legacy system decommissioning are not included in the table. The OCS/OPS Program originally estimated these benefits to be $9.32 million (over 10 years from 2013-14 to 2022-23), however the August 2015 OPS closeout report reduced this estimate to $6.87 million. These benefits are yet to be confirmed by the EPAS Program and if realised will be assigned to EPAS and not the OPS Program.

[17] SA Health OPS Benefits Realisation Plan, version 2.0, approved in June 2014.

SA Health will monitor the remaining OPS Program benefits through quarterly review by the eHealth Systems' eHealth Program Management Office (ePMO) until they have been achieved.

DCIP Business Case scope and timelines are currently being revised. As part of this activity, a review has recently been undertaken of the tangible benefits documented. This review has re-confirmed that savings from Procurement and Supply Chain's Health Services Support unit can still be achieved, once the direct to imprest reforms are implemented. Furthermore, PSCM and DCIP will routinely assess any changes in Health Services Support staffing levels to monitor any impact on the proposed benefits. Any potential impact will be escalated to the DCIP Steering Committee for resolution.

Once the revised solution for the DCIP project is finalised, the business case will be re-baselined and the project benefits realisation plan developed. This activity is targeted for completion by December 2016. This plan will be routinely monitored and reported on by the project to the DCIP Steering Committee throughout the project.

2.4.2 Distribution centre issues may impact the new Royal Adelaide Hospital supply chain

Recommendation

SA Health should ensure that the proposed new distribution centre model meets all new RAH requirements. The model should be finalised as soon as practicable to minimise costs associated with the interim new RAH supply chain arrangements.

Finding

In our June 2015 Supplementary Report, we noted that modifying the existing SA Health Distribution Network was expected to deliver certain productivity gains necessary to support the new RAH and SA Health's new procurement and supply chain model. The initiative was also expected to reduce the risks associated with the projected growth in demand for health services.

SA Health originally planned for the central distribution centre to service the new RAH on transition and the existing RAH central store to be closed. However, the revised distribution centre model, approved by Cabinet in December 2014, advised it was not expected to be immediately available for use to fully service the new RAH on initial operation for medical consumables. As such, a temporary alternative solution would be required for six to nine months to service initial operations at the new RAH from the originally scheduled opening date of 18 April 2016. SA Health advised that an interim distribution centre service was to be funded by the new RAH Program budget from $1.48 million of contingency funding (from 2016-17 to 2017-18).

In March 2016 SA Health entered into a six-month contract with the supplier (with the option to extend it by six months) to service initial operations at the new RAH. The new RAH Program advised that this contract is due to commence four weeks prior to the clinical move date, which is yet to be confirmed. At the time of this Report, no payments had been made to the supplier for these contracted services. SA Health advised that the supplier will provide the facility and staff for receiving, unpacking and storing, labelling, stock counts and picking and transport to the new RAH, initially on a seven day delivery model. Smaller quantities can then be delivered to approximately 150 locations within the hospital, as the new RAH does

not have the storage space to undertake such activities. SA Health will continue to perform tendering, ordering, inventory management and supplier management.

Until issues with a central distribution centre are fully resolved, there is a risk that SA Health will be subject to additional costs and any other associated operational challenges of maintaining an interim alternative distribution centre service. To help address this risk SA Health advised that a revised business case included funding arrangements proposed beyond the initial 12-month supplier contract. At the time of this Report, however, this business case was still being reviewed and will be subject to SA Health's internal governance approval process.

SA Health response

The project is working in conjunction with the new RAH supply team and PSCM operations to develop plans that incorporate a transition from the interim new RAH Supply Chain arrangements as soon as practicable after the DCIP solution has been fully implemented and processes and systems are bedded down. This activity is targeted for completion by February 2017.

2.4.3 Stock catalogue unit of measure inconsistencies

Recommendations

SA Health should ensure that LHNs are consulted on the overarching UOM[18] business rule principles, developed by PSCM, as soon as practicable.

SA Health should consider its current resourcing structure and the impact to SA Health supply chain operations if this issue is not resolved before implementing an alternate distribution centre solution.

SA Health should ensure that timely and accurate information is exchanged between impacted teams, including PSCM and the DCIP, to ensure that any dependencies and action plans are developed.

Findings

Separate from the follow-on activities discussed above, SA Health is faced with the requirement to spend significant time and logistical effort in making changes to the UOM recorded in the existing OCS catalogue. This is due to inconsistent data in OCS, derived from a number of LHN business rules applied since inception.

In following up this issue, SA Health advised that it originally underestimated the volume of data and the extent of migration effort required. This includes data requirements from the original legacy systems and the performance of data cleansing to ensure consistent data and business rules are applied across LHNs.

Without the availability of accurate and consistent UOM data, the ability to accurately assess the size of warehouse and storage handling equipment, throughput (velocity) of items and transport requirements for the distribution centre solution is reduced. This also impacts the

[18] Unit of measurement refers to the quantity of an item, such as a medical consumable. The quantity of an item can be measured by packaging, item weight or other unit quality related measures. SA Health currently measures item quantities at the packaging level.

ability to measure unit volumes, including matching units purchased against the primary UOM and units issued to hospital sites.

These UOM inconsistencies were originally identified as a major impediment to the DCIP in its assessment of an alternate distribution centre solution. To reduce the risk of inaccurately sizing warehouse requirements, SA Health conducted additional stock scanning where UOM inconsistencies were identified at the existing distribution centre. Due to the frequency of product changes, SA Health advised that manual scanning processes will be an ongoing responsibility of the distribution centre.

Inconsistent configuration of UOM is also resulting in LHN and PSCM inefficiencies. PSCM is tasked with cleaning up orders and addressing UOM issues including:

- picking and ordering errors. There may be situations when two of the same item, in different sizes, have different UOM configurations
- variance in supplier invoices, which leads to increased manual matching and coding rework
- inconsistent reporting and analytics as it is difficult to assess the usage of two comparable items.

These challenges make it difficult for SA Health to plan and actively monitor and control overall stock levels and associated costs.

At the time of our review, SA Health advised that an Assistant Director has been engaged and is tasked with addressing the UOM inconsistencies. The PSCM team has performed significant work to address these issues, including developing overarching business rule principles. SA Health further advised that any draft business decisions and data quality improvement action plans were still subject to further impact assessment, LHN consultations and approvals.

SA Health response

PSCM is currently operating to a set of business rules developed in 2015 and is in the process of preparing a project plan that will incorporate the required consultation with the LHNs.

Several workshops with key stakeholders have already occurred to speed up the consultation process and assessment of the required data cleansing before the new distribution centre commences. As part of this review, PSCM is exploring ways to enhance the UOM business rules and implementation practices in OCS, to expedite standardisation of catalogued product data. Key LHN stakeholders will be engaged in the process. This activity is targeted for completion by January 2017.

PSCM is regularly considering resourcing structures and their impact on the supply chain.

2.4.4 Operational risks were identified

Recommendation

SA Health should address the identified operational OCS control issues in a timely manner.

Finding

In 2015-16, for financial audit assurance purposes, we retested operational system controls and the remediation of previously raised issues.

Despite the remediation of a number of matters raised in our 2014-15 review, we have identified that certain matters remain outstanding and need remediation.

Our review highlighted the following issues:

- excessive privilege user access granted across various business processes
- potential segregation of duties conflicts. This related to OCS business roles and responsibilities and insufficient segregation between production and development environments
- no formalised specifications relating to backup and recovery of critical organisation data
- certain IT general security controls need strengthening.

IT general control weaknesses increase the risk of inappropriate or unauthorised access, potentially resulting in a loss of confidentiality, integrity or availability of SA Health financial data.

SA Health response

SA Health has addressed a number of our concerns including those associated with excessive user access privileges, segregation of duties and general IT controls over specific business processes. It advised it would address the remaining matters, including those relating to strengthening of IT general security controls and backup and recovery procedures, by October 2016.

2.5 Additional details of closeout activities to achieve and/or enhance expected benefits

In section 2.3.3 we noted the need to complete a number outstanding activities to achieve expected benefits. We also indicated that SA Health was implementing a number of system enhancements.

Details of some of these activities follow.

Development and integration of Catalogue Management System

The current process for making catalogue item changes is manually intensive and provides increased opportunity for manual error. As such a Data Management System was added to the scope of the OPS Program, intended to meet the requirements of certain benefits identified in the business case. The implementation of a full Data Management System and an electronic trading solution was subsequently removed from the program scope in September 2013 due to program delays. Following this, in August 2014, the OPS Program reinstated the implementation of the data management system (now called CMS), which required contingency funding to implement and integrate with OCS, costing approximately $2.5 million.

Expected benefits included faster interaction with suppliers for item and price information resulting from increased interoperability with the National Product Catalogue. This relates to the synchronisation with the National Electronic Health Transition Authority. This was a mandated update to enable more reliable and efficient exchange of data with suppliers. However, the National Product Catalogue was subsequently removed from follow-on project scope pending the completion of a number of other activities. At the time of our review, SA Health did not have a firm date for when this upgrade would occur.

CMS is planned to improve workflow approval practices for making catalogue changes, including new and modify requests. Implementation was to be completed following closeout of the main OPS Program (Phase 1), however this was delayed due to procurement and some implementation challenges. Phase 2, which involves integration with OCS, was not completed until September 2016.

Vendor system development and integration activities were not completed and there were outstanding issues that needed resolution before progressing, including certain OCS interface issues and other items requiring vendor action. The follow-on project also identified that some imprest changes were needed in OCS.

An example of an imprest change included the development of an additional OCS screen, independent of CMS, that aimed to streamline the process for site based Health Service Support staff to update imprest items direct in OCS. SA Health has since advised that this screen has been implemented.

These outstanding activities have been transferred to business as usual.

Freight charges

OCS is currently automatically replenishing site imprest levels, resulting in a significant number of small direct supplier orders. Consequently high freight charges have been applied to 16 000 imprest lines across SA Health. This issue is primarily due to the data configuration of the replenishment of site imprest levels.[19]

SA Health was continuing to identify the full extent of the increased freight charges. At the time of our review, SA Health had examined invoice histories for freight and other procurement activities related to direct from supplier imprest lines. Where approved, a number of data updates have been made to imprest replenishment levels. Recommended sourcing arrangements for a number of items will occur over time when business as usual resources are available.

SA Health advised that all new strategic procurement projects related to large volumes of medical consumables are now given due consideration to freight models. In addition, at the time of this Report, SA Health has recently submitted an outgoing freight tender to further alleviate freight charges. A separate tender for all inbound freight is currently being developed.

Open purchase orders

As at 16 September 2016 a total of 31 993 purchase orders older than 60 days, across all networks, inclusive of both catalogued and non-catalogued orders, remain open. Of these,

[19] We were advised that when LHN Health Service Support performs a stock check at the site imprest, if an imprest line is identified to be below its maximum level, it is automatically replenished. This is due to the minimum and maximum level being set to the same value.

2319 are standing orders and will naturally remain open until they expire. This issue is mainly due to supplier mismatches and invoices being processed without matching to a valid purchase order (ie invoice processed manually, rather than matched to purchased and receipt provided for processing).

SA Health advised that the preferred OCS solution cannot be supported by the current accounts payable system controlled by SSSA (Basware).

As a consequence, SA Health identified a secondary solution involving the automatic closure of purchase orders older than 90 days. This solution is currently in the testing phase.

In addition, a system solution (within Basware) to prevent manual coding when matched to a purchase order is being investigated. This solution relies on other associated processes and data structure issues being resolved and is currently being trialled.

Catalogue security

Users can only purchase items assigned to their LHN organisational business unit but are able to view the entire order catalogue. We were advised that this has resulted in continued user frustration.

The follow-on project plans to modify the existing OCS catalogue configuration by restricting visibility to a user LHN or group in OCS, including catalogue reporting. This activity is not expected to take effect until late 2016.

Non-catalogue requisitions

There has been a high volume of non-catalogue purchase requisitions, with continued manual process work by the Purchasing Team. An SA Health review, which included low value requisitions and specific types of requisitions, indicated that this was largely due to:

- users only being able to purchase items assigned to their LHN organisational business units
- catalogue changes not being reflected in users outdated purchase order favourites, which may include a combination of catalogue and non-catalogue items.

Over 100 000 non-catalogue requisitions were reviewed, which identified 11 095 items that exist on the catalogue but have not been assigned to particular LHN business units. At the time of our review, 6304 were approved to be changed, 4291 have been provided to affected LHNs for their review and a further 500 require consideration by PSCM.

Finalisation of this activity is being conducted as business as usual.

Catalogue of reports

The OPS Program closeout report advised that the objective to provide standard reporting capabilities was achieved. Although reporting capabilities have been enabled, there is an outstanding request to develop a standard catalogue of reports with a particular focus on the requirements of SA Health Corporate Finance and PSCM staff. This work was originally expected to be completed by November 2015.

At the time of our review, the design and implementation of inventory reports was still being negotiated to suit business requirements.

3 Enterprise System for Medical Imaging

Executive summary

ESMI is a key enabler to achieve the clinical, quality and efficiency benefits underpinning the establishment of SA Medical Imaging (SAMI). It has been implemented to deliver a single system with consistent business rules and workflows across in-scope health sites.

Following initial program delays, ESMI was implemented across SA Health sites from September 2014 to May 2016. SA Health advised that ESMI has provided a number of benefits, including:

- an overall reduction in radiology report turnaround time frames of up to 50%
- increased visibility of medical images and radiology reports across all ESMI sites
- a reduced risk of legacy system failures
- improvements to imaging quality to meet the diagnostic requirements and address risks that were raised in critical incident reports and Coroner's findings[20]
- provided digital imaging functionality at the Women's and Children's Hospital (WCH).

SA Health also advised that numerous benefits will continue to be realised after completing the ESMI Program, including defined financial benefits.

In 2014-15 we reviewed and reported on this program as implementation progressed. ESMI has now been implemented across the in-scope SA Health sites. It will continue to be consolidated across SA Health.

Summary of key findings

This review highlights a number of challenges that need to be addressed as part of this consolidation process, including:

- benefits realisation deficiencies
- system integration challenges remain outstanding
- data migration challenges remain outstanding
- lack of formalised IT service resumption testing to support business recovery time objectives
- new RAH transition challenges
- ESMI governance structure challenges
- other activities to be completed as part of business as usual operations
- lack of maintenance of escrow deposits following system changes.

[20] Extract from Coroner's report by Anthony Schapel, Deputy State Coroner, South Australian Coroners Court, Preliminary Finding after Inquest – Amber Jayne Sweetman (issued 6 October 2011).

Summary of key recommendations

We recommend that:

- SAMI conduct a review to ensure that expected tangible benefits are on target and assess the impacts of other external factors. This includes the current expectations of the new RAH transition. SAMI should also ensure that sufficient information is provided in the benefits realisation plan to define how expected tangible benefits are planned to be realised
- SA Health continue to allocate appropriate resourcing attention and funding to integration activities with other systems
- SA Health ensure that outstanding data migration requirements are resolved as soon as practicable. In addition, SA Health should ensure that future project/programs data migration strategies are subject to a thorough review and governance approvals before being implemented
- SA Health conduct periodic IT service resumption testing of the disaster recovery site to ensure recoverability within the established recovery point and time objectives
- prior to implementation at the new RAH, SA Health follow up and perform a risk assessment of the identified performance related issues. This includes those raised by the Public Service Association on behalf of SA Health ESMI users. This is to ensure they have been adequately addressed by the September 2016 system upgrade
- SA Health ensure that all integration activities with other systems, planned to be adopted for the new RAH, are completed as soon as practicable and appropriately tested
- SA Health ensure that a mitigation strategy and contingency plans are developed in the event that the legacy PACS environment is still required (for historical PACS images older than two years) on decommissioning of the existing RAH site
- SA Health finalise the planned ESMI governance review as soon as practicable. This should include the ESMI current operational support structure and establishing and documenting key roles and responsibilities
- SA Health ensure the activities to be completed as part of business as usual operations are closely monitored to maximise expected tangible benefits
- SA Health proactively monitor ESMI software updates and new release deposits, including all major software updates.

3.1 Introduction

The SA Government announced the consolidation of imaging services across SA Health as part of the 2010 State Budget.

SA Health subsequently identified ESMI as the platform to implement an integrated state-wide imaging solution. The aim outlined in a December 2011 ESMI business case was to improve efficiency, and provide a more cohesive, consistent, and accessible state-wide

service. The business case also noted that ESMI would be a critical enabler in achieving SAMI[21] objectives.

ESMI is comprised of the following technologies:

- an Enterprise Radiology Information System (RIS) – used to record, store, manage and distribute patient medical imaging data and imagery. The RIS complements the patient administration systems and provides data for billing
- an Enterprise Picture Archive and Communication System – provides for storage and convenient access to images from multiple modalities,[22] eliminating the need to manually create, file, retrieve or transport film jackets
- a Voice Recognition System (VR) – used by radiologists to produce medical imaging reports without an intermediary typing stage, to enable quicker provision of results to referring clinicians, their patients and clinical departments
- a billing and revenue collection system.

3.2 Validation approach

Since our previous commentary on ESMI in a June 2015 Supplementary Report,[23] we have performed a further review of the ESMI Program. This has involved relating with key SA Health stakeholders. We sought an update on the ESMI Program's implementation status, budget and expenditure to date, key risks and the system's impact and readiness for the new RAH and details of any outstanding activities that will be transferred to business as usual at the conclusion of the ESMI Program.

We have also conducted some operational and usability testing of ESMI, primarily at the existing RAH. We also followed up remediation activity from an internal identity and access management review that impacted certain ESMI security controls. The outcomes of this review are outlined in this Report.

3.3 Program background

3.3.1 Program drivers for development

SA Health's vision for SAMI (2014-2017) identified ESMI as the platform to implement an integrated state-wide imaging solution.

A December 2011 ESMI business case noted that ESMI is a critical enabler in achieving SAMI objectives. It also noted a number of key drivers for SA Health's implementation of ESMI. These have remained unchanged, in particular:

- to provide access and visibility of imaging results anywhere across SA Health to support patient care

[21] SAMI is a business unit of SA Health.

[22] Modality is the equipment that is responsible for the acquisition of the medical images, including computed tomography, magnetic resonance imaging, ultrasound, computed radiography, digital radiography and nuclear medicine, and other such devices.

[23] Supplementary Report of the Auditor-General for the year ended 30 June 2014 'Health ICT systems and the Camden Park distribution centre: June 2015'.

- to provide the opportunity for a standard and efficient workflow for all staff groups within SAMI
- to eliminate manual based systems such as filing and transcription and contribute to SAMI's savings strategy
- to provide the ability for patients to choose where they have their image taken based on a common booking system
- to enable savings targets across SAMI to be achieved.

The implementation of ESMI aimed to support a consistent process across SA Health sites. This includes supporting clinicians to be able to efficiently share a patient's X-ray, magnetic resonance image (MRI) or other medical images between hospitals.

Some legacy systems to be replaced did not provide sufficient image quality to meet diagnostic requirements and had limited ability to be upgraded. In addition, Country Health SA Local Health Network Incorporated (CHSA) and WCH did not have a Picture Archive and Communication System (PACS), resulting in clinical risks. These risks were raised in critical incident reports and Coroner's findings.[24]

SA Health expected that ESMI would provide the capacity to manage over 675 000 images and reports each year to be used by over 600 SAMI users and accessed by thousands of clinical users, both internal and external to SA Health.

SA Health have advised that ESMI is a critical system for the operation of the new RAH. Without ESMI, patient care would potentially be compromised. In particular, the new RAH's emergency department and intensive care units require urgent onsite imaging capabilities to ensure timely diagnosis for the commencement of treatment.

3.3.2 Implementation background

In August 2011, Carestream Health Australia (Carestream) was selected as the preferred vendor for the ESMI solution.[25] Following this, the original December 2011 ESMI business case was approved by Cabinet in December 2012 for the replacement of ageing legacy systems at a number of hospital sites. This included six metropolitan hospitals, two CHSA reporting sites and 51 non-reporting CHSA sites. Rollout to these sites was originally expected to be finalised by 2013-14.

However, in February 2013 SA Health slowed down the ESMI Program. This was primarily due to recommendations of an external review that expressed concerns about the number of concurrent ICT projects being performed by SA Health.

Due to issues raised in a Coroner's inquest from not having digital imaging functionality at the WCH, implementation at the WCH was to be progressed, followed by a Gateway Review to determine the further rollout plans.[26]

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[24] Extract from Coroner's report by Anthony Schapel, Deputy State Coroner, South Australian Coroners Court, Preliminary Finding after Inquest – Amber Jayne Sweetman (issued 6 October 2011).

[25] The contract was subsequently executed with Carestream in January 2013.

[26] Coroner's report by Anthony Schapel, Deputy State Coroner, South Australian Coroners Court, Finding of Inquest – Amber Jayne Sweetman, dated 26 March 2012.

Following this decision, due to operational issues with failing legacy systems, in January 2014 the Minister for Health and Ageing approved ESMI to be implemented at The Queen Elizabeth Hospital (TQEH). A Gateway Review would also occur concurrently with implementation at the Lyell McEwin Hospital (LMH).

The Gateway Review was completed in December 2014. It concluded that there were no compelling reasons to further delay the full implementation of ESMI. As such, in January 2015 the Minister for Health and Ageing approved a new implementation plan for ESMI to revert back to the original in-scope sites.

In February 2015 the ESMI Program revised the implementation dates:

- WCH (September 2014)
- TQEH (November 2014)
- LMH (May 2015)
- RAH (August 2015)
- Flinders Medical Centre (FMC) (October 2015)
- Repatriation General Hospital (RGH) (December 2015)
- Murray Bridge Soldiers' Memorial Hospital (February 2016)
- Berri Riverland Regional Health Services (Berri) (March 2016).

The revised implementation schedule expected the program closeout to occur in early April 2016.

ESMI implementation at the new RAH is currently managed by the new RAH ICT Program and is governed by the ESMI Program Board.

3.3.3 Implementation status update to June 2016

At the time of writing this Report, the ESMI Program had implemented ESMI at all current in-scope sites, including:[27]

- WCH (September 2014)
- TQEH (November 2014)
- LMH (May 2015)
- RAH (November 2015)
- RGH (January 2016)
- FMC (February 2016)
- Berri (April 2016)
- Murray Bridge Soldiers' Memorial Hospital (May 2016).

SA Health adjusted its business model for the CHSA non-reporting sites. This model replaced the implementation of ESMI at a certain number of sites linked to RGH and the Murray Bridge Soldiers' Memorial Hospital through the use of an external viewing system (Medinexus). Under this model, images taken at these sites are sent to RGH or Murray Bridge, requesting a radiology report. The radiology report is then produced in ESMI and received at the non-reporting site through Medinexus.[28]

[27] The December 2011 ESMI business case indicated that the roll out to all Metro sites and 2 big country sites will be managed by the ESMI Project Manager (ESMI Program) whilst the remaining sites would be coordinated by the ESMI Support Manager (ESMI operational unit).

[28] Under the ESMI business case, any subsequent rollout of ESMI to these sites is required to be performed by SAMI ICT as part of business as usual activities.

In May 2016, the eHSC approved the extension of the ESMI Program by three months to the end of September 2016. This was primarily to oversee the ESMI upgrade required to address system performance issues and to complete a number of program closeout activities.

At the time of our review the new RAH ICT Program continues to work on the implementation of ESMI at the new RAH.

3.3.4 Budget status update to June 2016

In our June 2015 Supplementary Report we raised the issue that the ESMI budget and contingency may be insufficient to finalise full implementation. Following this, the ESMI Program's reforecasting estimated that the allocated budget was not sufficient to complete all program activities.

As a result, in September 2015 the eHSC approved an additional $1.615 million in program funding. This additional funding was reallocated from SA Health's existing budget.

The main reasons for the additional funding were an overspend in internal and external resources due to program resourcing instability, reacting to enforced program delays, a number of program scope changes and addressing post-go live solution and support issues.

A summary of the ESMI Program budget (capital and contingency) as at 30 September 2016 is provided in figure 3.1.[29]

Figure 3.1: ESMI Program budget (capital and contingency) as at 30 September 2016

	Original approved budget (December 2011) 2011-14 $'000	Revised approved budget (September 2015) 2014-16 $'000	Expenditure to date (September 2016) $'000	Remaining budget $'000
Capital costs	15 779	20 731	20 488	243
Contingency	3 444	-	-	-
Total budget	19 223	20 731	20 488	243

3.3.5 Updated benefits realisation

Although the December 2011 ESMI business case estimated ESMI benefits to be $13.98 million over five years, in our June 2015 Supplementary Report we raised the issue that SA Health had not yet developed a full benefits realisation plan for ESMI.

SAMI subsequently developed a benefits realisation plan in July 2015, which reflected updated expectations from the implementation of ESMI. The benefits realisation plan was updated in February 2016.

The February 2016 benefits realisation plan advised that the original December 2011 business case based the expected benefits in an environment in which ESMI was fully implemented. The staggered implementation and a number of program delays has affected the timing of benefits to be achieved. As a result, the ESMI Program has extended the benefits realisation period to six years (ending 2019-20). The expected benefits were now estimated to be $14.718 million.

[29] The capital costs and contingency figures were taken from the September 2016 ESMI Program Closure Report version 1.0. These figures have not been audited.

In September 2016, the ESMI Program estimated the total cost at completion to be $20.49 million. Based on the updated benefits over the six-year period, the total cost of ownership is expected to be $5.77 million.

At the time of this Report, the expected tangible benefits to be realised over a six-year period (2014-15 to 2019-20) are shown in figure 3.2.

Figure 3.2: Expected tangible benefits of implementing ESMI

Type of benefit	Original expected benefits (December 2011) 1-5 years $'000	Updated expected benefits (February 2016) 1-6 years $'000	Reason for variation
Staff savings	4 473	4 032	Delays with the deployment schedule has affected the timing of benefits to be achieved.
Reduction in use of film	2 305	3 009	Success to date in reducing the use of film via other initiatives and alterations to the expected benefits from the implementation of external imaging viewing software products.
Reduced IT-related ongoing costs for SAMI sites	6 520	7 677	Delay with the deployment schedule has resulted in legacy PACS/RIS/VR systems being maintained for a longer period of time.
Total benefits	13 298	14 718	

SAMI has acknowledged that a portion of benefits is attributed to the existing RAH. These benefits may be subject to review when ESMI is implemented at the new RAH.

3.4 Details of key findings

As part of this review, we requested an update on the findings we raised in our June 2015 Supplementary Report to Parliament. The detailed results are in section 3.5. In summary, SA Health stated that it has either remediated or at least made progress on all issues raised.

Despite this progress and the various benefits received by the ESMI implementation, our recent review has highlighted some current challenges that need to be addressed. These challenges are contained in sections 3.4.1 to 3.4.8.

3.4.1 Benefits realisation deficiencies

Recommendations

Consistent with the benefits realisation plan, SAMI should conduct a review to ensure that expected tangible benefits are on target and assess the impacts of other external factors.

SAMI should ensure that sufficient information is provided in the benefits realisation plan to define how expected tangible benefits are planned to be realised. This includes defining and documenting a decommissioning approach.

SAMI should ensure that the benefits realisation plan is appropriately updated to reflect current expectations on transition to the new RAH.

Findings

ESMI tangible benefits relate to staff savings, reduction in medical imaging film and reduction in IT related costs.

In reviewing the current ESMI benefits realisation plan, we noted it does not contain detailed information of how these expected benefits will be achieved, particularly benefits relating to staff savings and reduction in IT related costs.

For the expected benefit of the reduction of IT related ongoing costs for SAMI sites, we noted that the ESMI Program continues to have considerable issues and delays in migrating data from various legacy PACS systems. In addition, as noted in the ESMI Program's June 2016 issue log, there has been no formal decommissioning approach defined and agreed with SAMI staff at hospital sites.

Further, the realisation of expected tangible benefits appears to be highly dependent on a number of assumptions and also factors outside of the program scope. These include:

- PACS data migration – estimated to be completed by December 2016
- full implementation of Viewpoint (a radiology system used for image management, clinical workflow for ultrasound) – estimated to be completed by December 2016
- EPAS implemented at all metropolitan hospitals and integrated with ESMI to perform electronic ordering
- the timing of the opening of the new RAH.

The current benefits realisation plan advised that a further review is needed after full implementation of the enterprise Medinexus (external image solution) and external Vue Motion (external image images and report solution). This is to further assess potential benefits related to staff savings and reduced use of medical imaging film. At the time of our review the ESMI Program advised that Medinexus is now implemented and provides the capability for external referrers to access images and results. Vue Motion is available for SA Health staff but due to certain limitations it cannot be made available to external referrers. These external solutions directly impact an expected intangible benefit to improve service quality for referrers by making images and results accessible externally.

SA Health response

SA Health is pleased that ESMI has been implemented at all in-scope sites, addressing significant issues with legacy applications, addressing clinical risks, providing a far more reliable platform and already realising benefits with improved report turnaround times.

The current benefits realisation plan was approved by the eHSC in April 2016 and the benefits will be monitored by that Committee. SAMI will review and update benefits as part of that process. This activity is targeted for completion by March 2017.

3.4.2 System integration challenges remain outstanding

Recommendation

SA Health should continue to allocate appropriate resourcing attention and funding to integration activities with other systems.

Finding

We note that SA Health is continuing to develop and test certain aspects of integration with other systems. These aspects relate to the existing interface with EPAS and integration with the Patient Queuing and Wait Management System (PQWMS) for the new RAH.

SA Health response

The successful implementation of ESMI to EPAS integration was a complex activity between two of SA Health's largest enterprise systems. This integration has automated many manual processes and improved business process efficiency.

The EPAS Program has developed a comprehensive resource plan with resources allocated to key integration activities including ESMI, EPLIS, and new RAH specific interfaces with PQWMS and Biomedical Engineering devices.

There have already been improved technical solutions implemented to support the ESMI integration with EPAS, with a final technical solution planned for implementation in November 2016.

The new RAH ICT Program has allocated resources to deliver ESMI to PQWMS integration and resolve any post-go live issues. This activity is targeted for completion by June 2017.

3.4.3 Data migration challenges remain outstanding

Recommendations

SA Health should ensure that outstanding data migration requirements are resolved as soon as practicable.

SA Health should ensure that future project/programs data migration strategies are subject to a thorough review and governance approvals before being implemented.

Findings

Data migration strategy did not document all processes

The ESMI Program was able to provide details of how it performed a range of data migration activities.

We were also provided with a draft ESMI data migration strategy document, developed in February 2014. In reviewing this draft document, however, we noted a number of gaps. This included the reconciliation process for migrated data, establishing approval controls and responsibilities, access controls and the back-out plan in the event of an unsuccessful conversion.

The extent of data migration planning and rigour of testing was potentially not sufficient. We identified that the ESMI Program has resolved a number of data migration issues, however certain challenges still remain. The most notable are outlined below.

Delays in data migration have raised new risks

The ESMI to PACS data migration process has proceeded slowly, largely due to the instability of legacy system environments. This has required input from the ESMI Program, legacy system vendors and administrators and Carestream (the ESMI vendor). In terms of the RIS, most archived data has been migrated into ESMI.

However, PACS historical data migrations are continuing at the existing RAH and Berri, with TQEH, LMH and FMC not yet formally signed off. Delays in data migration have raised the following risks:

- delay in decommissioning legacy PACS environments and receiving expected ICT related cost savings
- additional costs associated with upgrading the existing RAH legacy PACS
- continuing failures of the existing RAH legacy PACS, in terms of system and potential loss of data
- depending on the timing of the transition, an increased risk of impacting the new RAH ESMI deployment due to the potential physical move of the system from the existing RAH to the new RAH.

The rate of data migration for the legacy RAH PACS was reduced to avoid continued failures and potential loss of data, however the rate of transfer is not adequate to meet reasonable timelines. The legacy existing RAH PACS environment is also planned to be upgraded to further reduce these risks and improve the efficiency of the data migration process.

Incorrect data to describe scanned images

SAMI staff at hospital sites approved the data migration process. Our operational testing has identified certain examples of data migration issues, including incorrect descriptors of scanned body parts.

The ESMI Program has advised that the data migration process was subject to certain limitations due to fundamental differences between the legacy systems and ESMI. In addition, the various legacy systems introduced complexities and constraints in executing each data migration.

Other data migration issues

Due to the post-go live issues experienced after ESMI was implemented at LMH (May 2015), SA Health commissioned an independent review. This identified certain data migration issues, including:

- billing code errors, that resulted in charges raised against incorrect cost codes
- inconsistency of Medicare provider numbers between OACIS and ESMI
- historical studies were not migrated at the time of going live, making the effort to provide comparative studies more complex and lengthy
- communications and role clarity needed improving, and the management of all tasks over the implementation period needed to be centrally coordinated.

SA Health response

The data migration processes used included technical and business verifications and signoffs including reconciliations to ensure the migrated data integrity was maintained.

The RIS data migrations standardised disparate and poorly maintained data from multiple legacy RIS systems into a single consolidated data set within ESMI, facilitating the required business processes, system functionality and enterprise level reporting.

Similarly, the PACS data migrations conducted have consolidated image data from multiple legacy PACS systems into ESMI, enabling these to be visible across all sites, along with a reduced risk of legacy PACS system instability.

Due to severe technical issues and the instability of some of the legacy systems, the PACS data migrations to ESMI needed to be executed in a way to ensure they did not further exacerbate the existing instability and impact business operations. This led to some data migrations being delayed, with the RAH legacy PACS being the most unstable.

The RAH legacy PACS upgrade is a funded activity and is currently in progress to stabilise the system and expedite the RAH PACS data migration to ESMI. This upgrade and finalisation of the data migrations, expected to be completed in six months, will mitigate the current existing risks associated with the legacy system instability and data loss. Data back to November 2011 has already been migrated.

The finalisation of a number of RIS and PACS data migrations has enabled SAMI to realise the benefits of reduced vendor support costs for some legacy RIS systems. Further benefits will be realised as all the PACS data migrations are completed and legacy system decommissioning occurs.

All RIS data migration activities within the scope of the ESMI Program have been completed. However SAMI has since noted some data issues relating to incorrect descriptors of scanned body parts which are being analysed and options to manage the risks are being considered. This activity is targeted for completion by March 2017.

eHealth Systems will ensure that future project/programs data migration strategies are subject to review and governance approvals prior to being implemented. This will be an ongoing activity through the ePMO.

3.4.4 Lack of formalised IT service resumption testing to support business recovery time objectives

Recommendation

SA Health should conduct periodic IT service resumption testing of the disaster recovery site to ensure recoverability within the established recovery point and time objectives.

Finding

ESMI has experienced multiple system outages since implementation. During March 2016 existing RAH and FMC users were unable to access Vue Motion and FMC users experienced issues receiving images in the PACS.

More recently, in September 2016, difficulties were experienced with a planned major system upgrade that resulted in SA Health attempting to temporarily recall a backup and/or reverse out the upgrade. We were advised that the upgrade was eventually successful and there was minimal backlog or manual report entry required once the system was returned to normal service operations.

SA Health maintains a business continuity plan for medical imaging services, with established recovery point and time objectives, with the ESMI Program providing a documented IT service resumption plan. However, there has been no formal testing to ensure this plan can support the objectives of the business continuity plan. This increases the risk that, in the event of a disaster, ESMI may not be able to be recovered in accordance with business objectives.

We were advised that the ESMI production environment is replicated at a secondary data centre. ESMI was implemented across SA Health sites from September 2014 to May 2016. During this period, the full system functionality was not available if the system needed to be operated from the disaster recovery site. At the time of this Report, functionality issues had only recently been addressed but not fully tested. In addition, a stage gate review performed by the ePMO in May 2016 identified a lack of failover capacity to the secondary data centre. As noted above, no formal IT service resumption testing has been performed to ensure the production environment can be successfully transitioned to the disaster recovery site in the event of a disaster.

SA Health response

SAMI sites have business continuity plans in place that operated very effectively during a recent planned outage for a system upgrade.

Disaster recovery infrastructure for ESMI has been successfully designed and built, with testing of components completed. Business continuity plans and an IT service resumption plan are developed and in place.

A full disaster recovery test of ESMI is being planned for the first quarter of 2017, followed by annual testing.

3.4.5 New Royal Adelaide Hospital transition challenges

Recommendations

Prior to implementation at the new RAH, SA Health should follow up and perform a risk assessment of the identified performance related issues. This includes those raised by the Public Service Association, on behalf of SA Health ESMI users. This is to ensure they have been adequately addressed by the September 2016 system upgrade.

SA Health should ensure that all integration activities with other systems, planned to be adopted for the new RAH, are completed as soon as practicable and appropriately tested.

SA Health should ensure that a mitigation strategy and contingency plans are developed in the event that the legacy PACS environment is still required (for historical PACS images older than two years) on decommissioning the existing RAH site.

Findings

The legacy system at the existing RAH had significant problems and was replaced by ESMI. SA Health advised this replacement has made significant improvements to medical imaging operations. However, our review has highlighted the following challenges for the new RAH implementation.

System performance related issues

System performance issues including slowness and instability were particularly noted after the activation of ESMI at FMC in February 2016. In addition, a number of performance issues were raised by the Public Service Association on behalf of SA Health ESMI users.

SA Health advised that most of the identified system performance issues were resolved as part of a system upgrade in September 2016. At the time of this Report we had not performed validation testing to confirm the effectiveness of this remediation.

Systems integration

SA Health continues to work on certain system integration activities that impact the ESMI solution. These integration activities are to meet planned new RAH workflows and resolve some outstanding operational issues. These include:

- integration with PQWMS. The new RAH will have a dedicated outpatient imaging area where patient appointment notifications will be provided from PQWMS via SMS. At the time of this Report, integration work had been completed but not tested.
- addressing current system integration challenges with EPAS, notably:
  - resolving the issue of active patient treatment orders being automatically cancelled on discharge. We note that these orders are cancelled if an EPAS user does not select the correct session type of 'outpatient order' rather than the default session type of 'standard'
  - processing patient treatment orders with invalid provider numbers or invalid or incorrect requesters name and provider numbers.

At the time of this Report, the new RAH ICT Program and EPAS Program continued to manage these integration works.

PACS data migration delays

SA Health has acknowledged there are risks involved in a physical move of the legacy system environment from the existing RAH to the new RAH. The rate of data migration was reduced to minimise the risk of critical failure. At the time of this Report, SA Health was in the process of upgrading the legacy existing RAH PACS system environment to reduce the chance of a critical failure or loss of data and to improve the efficiency of the data migration process.

Depending on the timing of the transition, there is a risk that the legacy system environment will not be able to be operated from the existing RAH once the site is decommissioned. This would result in historical PACS images (older than two years) not being available on request.

SA Health response

The ESMI system is in operation at the existing RAH and is far more robust and reliable than the legacy systems, which had regular failures.

The ESMI RIS was successfully upgraded in September 2016 to address most identified performance issues. Further testing is to be conducted to ensure that the upgrade did address all issues adequately and that no new issues have been introduced.

The RAH legacy PACS upgrade is a funded activity and is currently in progress to stabilise the system and expedite the RAH PACS data migration to ESMI. This upgrade and finalisation of the data migrations will mitigate the existing risks associated with legacy system instability, data loss and transition to the new RAH.

These activities are targeted for completion by December 2016.

The new RAH ICT ESMI Project is working with the EPAS Program to implement ESMI to EPAS integration for the new RAH. This activity is targeted for completion by June 2017.

SAMI is working with the EPAS Program to address integration issues relating to patient discharge and order numbers. This activity is targeted for completion by March 2017.

The RAH SAMI group will develop mitigation and contingency plans should the legacy PACS migration not be completed prior to decommissioning the existing RAH site. This activity is targeted for completion by March 2017.

3.4.6 Governance structure challenges

Recommendation

SA Health should finalise the planned ESMI governance review as soon as practicable. This should include the current operational support structure and establishing and documenting key roles and responsibilities.

Finding

In January 2015, the ESMI Program issue log contained an item concerning the ongoing governance structure and support arrangements of ESMI, which included SAMI ICT and eHealth Systems (SA Pathology ICT).

The ESMI Program closeout report also advised that the split of support activities across the two teams has led to inconsistent application of systems support for ESMI including governance, incident and change management. This report recommended a review of ESMI support roles and responsibilities.

Our interviews with relevant stakeholders also identified concerns about the current structure and support arrangements for ESMI. We noted that agreement is required with a clear understanding of the key roles and responsibilities to govern and support the system moving forward. This includes application support, desktop and infrastructure support and vendor management.

To address this issue, an initial ESMI governance review was completed in mid-2015, however certain outcomes were not agreed by all internal SA Health parties and a subsequent review was approved in June 2016. At the time of this Report, that review was in progress.

SA Health response

The governance review is in progress and targeted for completion by March 2017.

3.4.7 Other activities to be completed as part of business as usual operations

Recommendation

SA Health should ensure the activities to be completed as part of business as usual operations are closely monitored to maximise expected tangible benefits.

Finding

A number of activities will need to be completed as part of business as usual operations. The full realisation of ESMI expected tangible benefits is dependent on completing aspects of these activities. They are planned to be managed by various business units within SA Health, notably including:

- PACS data migration for the existing RAH, TQEH, LMH, FMC and Berri
- system enhancement activities to meet business requirements, including operational issues with the ESMI to EPAS interface
- reviewing the deployment model for the CHSA non-reporting sites
- implementation/upgrade of GE Viewpoint (enterprise version across multiple SA Health sites)
- other infrastructure related activities and IT service resumption testing.

SA Health response

All handover activities were documented, assigned to the relevant parties in SA Health and approved by the ESMI Board and the eHSC. They will be monitored by the ePMO and regularly reported to the Steering Committee.

3.4.8 No maintenance of escrow deposits following system changes

Recommendation

SA Health should proactively monitor ESMI software updates and new release deposits, including all major software updates.

Finding

As part of our review we requested supporting information for updates to the escrow agreement with Carestream,[30] including the most recent deposit. However, the ESMI Program

[30] In accordance with the Software Escrow Agreement dated 21 January 2013, whenever any software modification is made, Carestream needs to deposit the updated software with the escrow holder as soon as practicable.

could not provide any deposits subsequent to the original agreement. We note that several changes to the system have been made since this time.

There is a risk that SA Health may not be able to maintain or correct the current production version of the ESMI software and documentation for its own internal business purposes. This is in the event that the software vendor is no longer able to support the ESMI software product or a trigger event occurs under the terms of the escrow agreement.

In response to our enquiry, the ESMI Program advised that a request for a further deposit was submitted in September 2016.

SA Health response

An escrow deposit was initiated in September 2016 following the completion of the ESMI RIS upgrade to ensure currency. This activity is targeted for completion by December 2016.

Future escrow deposits will be made as appropriate in line with system changes.

3.5 Update on prior review findings

Figure 3.3 provides a brief status update on our review findings documented in our June 2015 Supplementary Report. We were advised that SA Health Internal Audit maintains a register to track the progress of items raised as part of our reviews.

Figure 3.3: Status of previous review findings

Prior review finding	SA Health's original response (July 2015)	SA Health updated response (September 2016)
Implementation to the new RAH has significant challenges.	The ESMI and new RAH Programs are collaborating to develop the plan and exception report to transfer funding held in the new RAH contingency for the purpose of transitioning ESMI to the new RAH and meet the critical new RAH milestones such as State Operational Commissioning testing. The ESMI Program maintains tight scope control and any changes require eHSC approval. On receipt of the risk assessment from the new RAH detailed planning stage, the ESMI Program will assess the mitigation actions and promptly escalate any impact on the ESMI new RAH delivery to the Director, eHealth Portfolio and Strategy. Where required these escalations will be referred to the ESMI Program Board.	The ESMI Program has successfully completed deployment of ESMI to the approved scope of health sites. Scope control was closely managed in line with approved program tolerances which required appropriate change control and approvals, including the ESMI Program Board and eHSC. The new RAH ESMI technical delivery was de-scoped from the ESMI Program in February 2016, to be managed by the new RAH ICT Program. Ongoing scope management for the new RAH ESMI deployment is with the new RAH ICT Program.

Prior review finding	SA Health's original response (July 2015)	SA Health updated response (September 2016)
ESMI budget and contingency may be insufficient to finalise full implementation.	The ESMI Program Board has approved a review point post-RAH implementation and new RAH planning to assess the delivery model for future sites and the solution design for Berri and Murray Bridge. This will confirm the costs. The ESMI Program maintains up-to-date expenditure monitoring. Forecasts are reviewed monthly and the financial position is reported to the ESMI Program Board and the eHSC. SA Health acknowledges the risk to the budget, the program is currently forecasting to complete its rollout within its approved budget, following budget adjustments to reflect new RAH contingency funding. The current planning for the new RAH will identify the associated costs.	Additional funding of $1.615 million was endorsed by the ESMI Program Board and approved by the eHSC in October 2015. The ESMI Program has successfully completed deployment of ESMI to the approved scope of health sites and completed program activities within the approved budget. New RAH ICT Program is funding the new RAH ESMI deployment.
Development of some key ESMI interfaces remains in progress.	The new RAH planning study will identify and plan for all in-scope interfaces. On receipt of the plan the ESMI Program will assess the interface requirements and identify any candidates for exclusion.	The ESMI Program has successfully completed deployment of ESMI to the approved scope of health sites and has finalised program closure activities. The following interfaces have been successfully implemented: • EPAS Interface was implemented in January 2016 for the RGH ESMI go-live. This same interface has now been deployed at TQEH and will be utilised for the new RAH ESMI go-live. Finding and recommendation closed. • Medinexus interface was implemented in January 2016 for the RGH ESMI go-live. This same interface has since been deployed to the existing RAH and will be utilised for the move to the new RAH. The new RAH ESMI Project is managing development of the PQWMS interface as part of their scope.

Prior review finding	SA Health's original response (July 2015)	SA Health updated response (September 2016)
The ESMI Program has experienced a lack of resources.	The ESMI Program actively monitors resource requirements and has moved to secure critical resources with longer term contracts. Where possible, internal backup resources will be identified and made available. The program works with the service delivery teams to secure ESMI services. SAMI staff have been leveraged for support services and agency contractors are engaged as required. Furthermore, the ePMO continually assesses opportunities to utilise experienced program resources from programs that are winding down, such as OCS. Discussions are ongoing with Carestream to ascertain vendor resource availability.	The ESMI Program has successfully completed deployment of ESMI to the approved scope of health sites, has finalised program closure activities.
The ESMI Program gateway review raised areas for improvement.	Recommendations are recorded as issues in the program's issue register and are actively reviewed with actions managed through to completion.	The recommendations of the Gateway Review were implemented in 2015. The ESMI Program has successfully completed deployment of ESMI to the approved scope of health sites, and has finalised program closure activities.

4 Enterprise System for Medical Imaging operational testing

Summary of key findings

We noted a number of positive impacts identified by end user representatives since the activation of ESMI, notably:

- the delivery of clinical reporting is expedited, with estimates that the time it takes to report has halved
- improved patient data capturing processes, improving data completeness, accuracy and consistency
- centralised billing team and billing data delivers efficiencies.

However, we identified a number of ESMI system usability and operational issues that are not meeting staff business requirements at the existing RAH. We also identified some additional user issues at RGH.

This Report also highlights a number of identity and access management issues that remain outstanding from a previous SA Health Internal Audit.

Key findings included:

- ESMI is not able to effectively record radiation doses
- ESMI does not receive all EPAS patient information on infection controls, alerts and precautions
- ESMI does not obtain the required information to record a procedure team safety checklist
- the ESMI cancelled order list does not include scheduled examinations
- ESMI data entry requirements when admitting patients are more resource intensive than originally anticipated
- ESMI management reporting functionality and stability does not meet all business requirements
- ESMI performance concerns
- data migration has led to data quality issues
- certain support environments have not been refreshed to reflect the current production environment
- identity and access management controls require strengthening.

We note that many of these issues may be addressed as the system is consolidated throughout SA Health. In addition, this system has addressed a number of significant limitations in the legacy systems.

Summary of key recommendations

We recommend that:

- SA Health ensure that ESMI's specific functionality to record patient radiation doses is effectively configured
- SAMI work with the EPAS Program to investigate the automatic transfer of EPAS patient information on infection controls, alerts and precautions into ESMI
- SA Health ensure that the system tab to complete the procedure team safety checklist is configured to obtain information required by the relevant Practice Accreditation Standards
- SAMI reconfigure the existing ESMI cancelled order list to include orders that have been scheduled in ESMI or create another cancelled scheduled examination list
- SAMI review the feasibility of reducing the transcription and administration effort by using voice recognition
- SAMI continue to work with the system vendor (Carestream) to identify and address any outstanding reporting requirements. This should include the demand for ongoing reporting development and support
- SA Health address any outstanding issues not remediated by the September 2016 system upgrade
- SAMI conduct a review to address incorrectly labelled records by considering the data mapping that was originally conducted
- for future system implementations, SA Health ensure that increased rigor is applied to data mapping and post-migration testing activities
- SA Health ensure that all environments used to perform development and testing activities are refreshed to reflect the current production environment. In addition, SA Health consider the current environment landscape, such as the ability to perform system load testing when making system changes.
- eHealth Systems and the LHNs progress the strengthening of identity and access management controls.

4.1 Introduction

In our June 2015 Supplementary Report[31] we provided an update on developments and implementation processes for ESMI.

We noted that SA Health had experienced a number of challenges in implementing ESMI. We also noted certain ESMI issues related to identity and access management (IAM) that were raised in an SA Health Internal Audit report dated July 2015.

[31] Supplementary Report of the Auditor-General for the year ended 30 June 2014: 'Health ICT systems and the Camden Park distribution centre: June 2015'.

4.2 Validation approach

In early 2016, we performed some operational testing of ESMI. This included a follow-up of IAM issues in relation to ESMI that were identified as part of an SA Health Internal Audit report dated July 2015. It also included a review of a number of system usability aspects at the existing RAH.

Some additional limited testing was performed at the RGH. This additional testing was subsequently validated with staff at the existing RAH and TQEH.

Given the size and complexity of the system, we engaged an external audit firm to assist with our review.

Throughout the review process we consulted with a number of SA Health representatives, including hospital staff (administrative and clinical), the ESMI Program, SAMI and eHealth Systems. From a usability perspective, our review also included end user consultations, process walkthroughs and observations of user interaction with the system.

4.3 Details of key findings

Findings 4.3.1 to 4.3.4 relate to our limited testing of ESMI performed at the RGH. This testing related to aspects of system functionality, including recording radiology dosage, procedure safety checklists and the ability to easily identify scheduled orders that have been inadvertently cancelled. Some additional validation was performed at the existing RAH and TQEH.

Findings 4.3.5 to 4.3.9 relate to our operational testing performed in early 2016. This testing included a follow-up of IAM and system usability aspects at the existing RAH.

4.3.1 ESMI cannot effectively record radiation doses

Recommendation

SA Health should ensure that ESMI's specific functionality to record patient radiation doses is effectively configured.

Finding

Additional testing performed at the RGH and further validated with staff at the existing RAH, identified that ESMI radiation dose functionality is not configured and is not currently being used to record patient radiation doses. This includes doses for angiography/screening and Computed Tomography (CT).

Our testing identified that information can be entered but only minimal information can be saved. In addition, aspects of the user input fields are not appropriately configured. These include:

- no field to record the radiation unit of measure (recorded differently for each modality)
- the fluoroscopy[32] time field is not correctly configured for alphanumeric entry required for some medical procedures.

[32] Fluoroscopy is a type of medical imaging technique that uses x-rays to obtain real-time moving images.

As a workaround, users at the RGH and existing RAH currently record this information in the order notes field. However, this notes field is also used to record other patient related information and therefore users are not easily able to produce an extract to display patient doses over time.

We were advised that each hospital may have adopted different workaround methods to record radiology dose information. For example, the Radiology Department at the RGH allocated a specific field in its legacy radiology information system (Kestral) to record this information. If required, users were able to produce an extract of this field to identify total radiology doses for a patient over time.

The ESMI system limitation reduces the ability to easily track, measure and ensure effective radiology doses.

At the time of our review, SAMI advised that this issue is on its priority list for remediation.

SA Health response

This is a complex clinical requirement that was only recently identified. SAMI will review with campus clinical heads and physicists to implement a short-term solution to record dose data in the RIS, with a longer term solution for cumulative dose recording likely to be sourced via third party software. This activity is targeted for completion by March 2017.

4.3.2 ESMI does not receive all EPAS patient information on infection controls, alerts and precautions

Recommendation

SAMI should work with the EPAS Program to investigate the automatic transfer of EPAS patient information on infection controls, alerts and precautions into ESMI.

Finding

Prior to the ESMI implementation, medical imaging orders were processed by the receipt of a hardcopy print-out from EPAS. This print-out included details of known infection controls, alerts and precautions.

Since EPAS had been integrated with ESMI, these orders are now submitted electronically from EPAS. We were advised that this electronic transfer of information does not include all details of known patient infection controls, alerts and precautions. To receive all details, RGH Radiology Department staff must now check the patient's electronic EPAS medical record. However, we were advised that this does not always occur, as it is a time consuming process to constantly log in and out of multiple systems to view the necessary patient information.

Although ESMI has a clinical history tab, most information such as alerts and contact precautions recorded in EPAS need to be manually entered. For example, this includes a patient's infection status, any recent falls (injuries), isolation precautions (aggression) or relevant allergies. However, any manually entered information is only saved for the patient's current treatment order.

We were advised that the RGH Radiology Department has had multiple incidents in which patients were treated without staff being aware that the patient has a highly infectious disease. Examples of these diseases include influenza, scabies and gastroenteritis. This may result in insufficient patient treatment room cleaning and patient segregation.

Hospital staff are required to report any incidents or near misses. This issue has contributed to five reportable incidents since May 2016.

To partially mitigate this issue, we were advised that the following manual workarounds have been implemented:

- daily infection control lists are printed and made available in clinical areas. Radiology Department team leaders are then required to check this information against all inpatient bookings and where applicable manually enter precautions into ESMI. This process does not capture new precautions identified after the list is printed. In addition, it does not include alerts
- at the time of processing a medical imaging order, clerical staff request the details of all known patient alerts and precautions over the phone. If known, these details are then manually entered into ESMI
- signage over beds notify staff of patient alerts and contact precautions. These details are normally provided on patient handover. However, this does not always occur, especially if the patient is not escorted by a nurse.

ESMI users we consulted advised that this problem has been raised with both the EPAS and ESMI Programs. SA Health advised that remediation of this issue is currently in progress.

SA Health response

The EPAS Program is developing the capability to send this information in the messages sent to ESMI. SAMI is liaising with the EPAS Program to ensure this information is displayed. This work has commenced. This activity is targeted for completion by March 2017. In the interim a manual workaround is in place.

4.3.3 ESMI does not obtain the required information to record a procedure team safety checklist

Recommendation

SA Health should ensure that the system tab to complete the procedure team safety checklist is configured to obtain information required by the relevant Practice Accreditation Standards.

Finding

Additional testing we performed at the RGH Radiology Department identified certain compliance requirements with relevant diagnostic imaging practice accreditation standards. These mandatory requirements are directly linked to the payment of Medicare benefits for diagnostic imaging services.

One requirement is that the patient's health status is documented relevant to the diagnostic imaging procedure being undertaken.

The current 'IRSA checklist' tab within ESMI, intended to gather the required information, has the following shortfalls:

- the documentation tab mostly contains 'Yes or No' tick boxes and does not allow for the recording of necessary information related to an individual patient
- the document is not clear in some sections and does not include some required reporting options. For example, breast feeding, medications, medical devices, asthma and diabetes are not included in the checklist
- the form requests if the consent form has been signed with a 'Yes or N/A' option. Interviewed hospital staff advised there should not be a N/A option, because written patient consent is required before invasive or high risk procedures. All interventional procedures are considered to be high risk or invasive
- the form was based on a surgical checklist and aspects are not specific or relevant to radiology procedures.

As a workaround, we were advised the RGH and existing RAH Radiology Departments have continued to complete a paper checklist. This checklist is then attached to the patient's paper medical record or scanned and attached to the patient's record in ESMI. ESMI users at the RGH advised that each hospital radiology department may be completing this checklist in a different way.

SA Health response

SAMI will ensure this information is updated within ESMI by March 2017.

4.3.4 ESMI cancelled order list does not include scheduled examinations

Recommendation

SAMI should reconfigure the existing ESMI cancelled order list to include orders that have been scheduled in ESMI or create another cancelled scheduled examination list.

Finding

We identified that scheduled examinations in ESMI that are subsequently cancelled in EPAS by the referrer, or inadvertently auto-cancelled on patient discharge, do not appear in the ESMI cancelled order list. The inability to easily identify incorrectly cancelled scheduled examinations increases the risk that patient treatments will not be appropriately reordered.

Enquiry with RGH, TQEH and the ESMI Program identified that these cancelled examinations are only identifiable by searching the patient's details in ESMI or searching future scheduled examination dates.

To help mitigate this issue, the EPAS Program has provided TQEH Radiology Department with a daily list of recently cancelled orders. The aim is to capture all recently cancelled orders, including scheduled examinations. TQEH Radiology Department then sends this daily extract to hospital department heads advising them to manually assess if these orders, including scheduled examinations, are still required.

SA Health response

SAMI is currently investigating requirements and will raise a request with Carestream to provide this functionality in a worklist. This activity is targeted for completion by March 2017.

4.3.5 ESMI data entry requirements when admitting patients are more resource intensive than originally anticipated

Recommendation

SAMI should review the feasibility of reducing the transcription and administration effort using voice recognition.

Finding

We consulted with ESMI users responsible for performing both administrative and patient care and also observed the system in operation. We identified that ESMI users have experienced a resource requirement shift from reporting tasks to other administrative workflows. In particular, we noted that ESMI data entry requirements when admitting patients are more resource intensive than originally anticipated.

SA Health advised that workflow changes requiring additional data capture during the admitting process may reduce the extent of workload and rework in later stages of the medical imaging process.

Due to the implementation of ESMI, we were advised that a total of five FTEs (dictation typists) were expected to be reduced at the existing RAH Radiology Department. At the time of our review, FTEs had been reduced by three, however two dictation typists have been retained and redeployed to front-end administration roles. This is to assist with the additional ESMI data entry requirements, including the extent of paper-based orders currently being processed.

SA Health response

This was recognised and accepted from the first implementation. The impact will be assessed as part of the planned benefits review so no further action is required.

4.3.6 ESMI management reporting functionality and stability does not meet all business requirements

Recommendation

SAMI should continue to work with the system vendor (Carestream) to identify and address any outstanding reporting requirements. This should include the demand for ongoing reporting development and support.

Finding

Consultation with different types of ESMI users within the existing RAH Radiology Department identified several reporting issues, including:

- the limited ‘out of the box’ reporting functionality does not meet all business requirements. An example includes a report to assist in determining the costs and benefits of using radiographers on night shifts, rather than having an on-call radiographer

- reporting has increased through the use of Crystal Reports. However, this reporting system becomes unresponsive while generating management related reports each day.

  Subsequent to our testing, SA Health advised that system changes have been made to address reporting capabilities. These changes were still being reviewed. At the time of our review we had not tested these changes for adequacy

- SAMI site staff had the skills to design new reports quickly in Kestral. There are now significantly fewer personnel onsite with Crystal Reporting skills and delays have been experienced in preparing reports when required.

The instability of reporting functionality and the reduced ability for the business to develop reports is potentially resulting in a reduced level of user acceptance. In addition, it is increasing the risk that the data currently being captured cannot be adequately interrogated for management decision-making purposes.

SA Health response

The ESMI RIS management reports were implemented as part of the first implementation at the WCH. As the deployment of all sites was completed and the RIS data migrations completed, requirements have been identified for further reporting needs. This is a normal part of a system lifecycle.

SAMI is currently working with both ESMI users and the ESMI vendor (Carestream) to improve reporting. This is an ongoing activity.

4.3.7 ESMI performance concerns

Recommendation

SA Health should address any outstanding issues not remediated by the September 2016 system upgrade.

Finding

Users have experienced delays when workstations running ESMI have either failed to respond or required the user to restart.

ESMI users advised that on initial implementation, system downtimes were high, with issues occurring at a local and enterprise level on a daily basis. Some of these downtimes were for extended periods of time. We were advised that although these occurrences have decreased, instances of system instability still exist, including:

- ESMI becomes unresponsive on individual workstations every day. As a result data input may be lost and require re-entry. This is caused by a known issue, with users advised of an interim manual workaround

- ESMI produces generic error messages when it becomes unresponsive. These do not accurately describe the nature of the problem (ie whether it is a system stability issue or user error).

These delays may inhibit successful user adoption and increase the risk of losing unsaved patient data. It may also result in some users performing alternate workarounds or shortcuts from the intended system workflow.

Subsequent to our review, SA Health advised that many of these known issues were remediated as part of a system upgrade in September 2016. At the time of our review we had not tested the adequacy of this remediation.

SA Health response

ESMI was successfully upgraded in September 2016 to directly address identified performance issues. Further testing is to be conducted to ensure that the upgrade did address all issues adequately and that no new issues have been introduced. This activity is expected to be completed by December 2016.

4.3.8 Data migration has led to data quality issues

Recommendations

SAMI should conduct a review to address incorrectly labelled records by considering the data mapping that was originally conducted.

For future system implementations, SA Health should ensure that increased rigor is applied to data mapping and post-migration testing activities are conducted.

Findings

SA Health estimates that over a million medical image data records were migrated from legacy systems to ESMI. Consultation with ESMI users identified certain issues with the migrated historical data, including mislabelling of examinations. Examples included scans that have been mislabelled with an incorrect body part (eg scan of 'knee', labelled as 'shoulder') or position (eg 'right shoulder' labelled as 'left shoulder').

SA Health advised that the data migration process was subject to certain limitations due to fundamental differences between the legacy systems and ESMI. In these instances key differences existed in the labels available in the legacy systems and those available in ESMI, resulting in direct data mapping difficulties.

We were advised that there is no formal process being conducted to address these historical data issues and errors, which continue to be identified and resolved on a daily basis. There is a risk that the data migration approach adopted, which includes the labels to describe historic medical images, is unreliable. This has the potential to cause confusion and inefficiencies where clinicians need to identify and analyse historical images.

SA Health response

The data migration processes used included technical and business verifications and signoffs, including reconciliations to ensure the migrated data integrity was maintained.

The RIS data migrations standardised disparate and poorly maintained data from multiple legacy RIS systems into a single consolidated data set within ESMI, facilitating the required business processes, system functionality and enterprise level reporting.

Data issues relating to incorrect descriptors of scanned body parts within ESMI are being analysed and are investigating options to manage the outstanding risks. This activity is expected to be completed by March 2017.

eHealth Systems will ensure that future project/programs data migration strategies are subject to review and governance approvals prior to being implemented. This will be done through the ePMO.

4.3.9 Certain support environments have not been refreshed to reflect the current production environment

Recommendations

SA Health should ensure that all environments used to perform development and testing activities are refreshed to reflect the current production environment.

SA Health should consider the current environment landscape, such as the ability to perform system load testing when making system changes.

Findings

In September 2016 the production environment was subject to a major upgrade. We were advised that not all environments used to perform development and testing activities have been refreshed to reflect this upgrade. In addition, we were advised there is no pre-production environment that appropriately reflects the production environment to perform system load testing.

SA Health response

Following the completion of the ESMI Program deployments and the upgrade to the RIS, eHealth Systems is progressing with the realignment of the non-production environments (development and test environments) to reflect the current production environment. This will be aligned to ongoing operational support requirements.

eHealth Systems will review the current environment landscape and assess its capacity to perform system load testing when making system changes. This activity is targeted for completion by December 2016.

4.3.10 Identity and access management controls require strengthening

Recommendation

eHealth Systems and the LHNs should progress the strengthening of IAM controls.

Finding

Consultation with the ESMI Program, eHealth Systems and selected ESMI end users identified that several IAM issues remain outstanding following the SA Health Internal

Audit.[33] Until addressed, there is a risk of unauthorised or inappropriate access to ESMI, which could impact the completeness and accuracy of data or loss of integrity of sensitive patient information.

Outstanding issues include deficiencies in authoritative source of user identity and password reset controls. Control improvements also need to occur in the periodic review of user access and account validity. This includes regular independent monitoring of privileged users, including third party access.

SA Health response

eHealth Systems, in conjunction with the LHNs, will review IAM controls and strengthen them where necessary. This activity is targeted for completion by June 2017.

[33] The SA Health Internal Audit of IAM also included a number of other SA Health systems and was not solely focused on ESMI.

5 Enterprise Patient Administration System operational testing

Summary of key findings

We noted a number of positive impacts identified by end user representatives since the activation of EPAS, notably:

- improved patient data capture, including completeness, accuracy and consistency
- improved admission times for returning patients
- improved access to digital patient records, including the time to locate patient information compared to paper records. Patient information can also be accessed through the use of various methods at any EPAS activated site
- EPAS has the ability to provide a single, comprehensive clinical record to understand the patient's clinical history to assist in timely, informed clinical decisions.

However, we identified a number of EPAS system usability and operational issues that are not meeting staff business requirements at hospital sites tested (primarily at the Noarlunga Hospital). The issues were identified through end user consultations, process walkthroughs, and our observations of the EPAS system in use.

This Report also highlights a number of IAM issues, previously identified by SA Health Internal Audit, that remain outstanding.

Key findings included:

- EPAS orders may inadvertently be cancelled by system users
- increased controls required for medical officers' name and provider and prescriber numbers registered in EPAS
- patient treatment related orders can be placed by an administrative officer (non-clinical)
- potential delays in some patient administration and care related tasks
- LHN management of EPAS training requires improvement
- IAM controls require strengthening
- EPAS hospital billing and transaction issues at the Southern Adelaide Local Health Network Incorporated (SALHN).

Summary of key recommendations

We recommend that:

- the EPAS Program progress with the planned system configuration change to prevent the cancellation of outstanding patient treatment orders on discharge
- the EPAS Program work with the eHealth Systems and SAMI business support to automatically provide sufficient information from EPAS to ESMI, to identify the reason for a cancelled order
- the EPAS Program work with LHNs to reduce the extent of the ability to view and request patient treatment orders using another EPAS registered provider and prescriber number
- the EPAS Program work with LHNs to implement a process to ensure that registered provider and prescriber numbers in EPAS are formally periodically reviewed and updated, with appropriate evidence maintained. The EPAS Program should also recommunicate with LHNs the requirement to advise changes to registered provider details when submitting user access requests
- the EPAS Program review the current EPAS access levels that provide the ability to request patient treatment related orders
- EPAS training provided to new starters includes sufficient coverage and consideration of associated workflows at each specific LHN site
- LHNs give consideration to requesting periodic refresher training to EPAS users at activated sites. This should include specific LHN workflows
- LHNs address the low attendance levels for the EPAS Program's on-site retraining and support for significant system upgrades
- eHealth Systems and the LHNs progress the tightening of IAM controls
- the EPAS Program review and improve the reporting process to support the interface between EPAS transaction data and the OCS general ledger. All EPAS reconciling items should be investigated and explained
- LHN Hospital Billing continue to manually trigger the identified compensable and non-Medicare outpatient charges until this process is automated
- the EPAS Program continue to work towards a resolution where compensable and non-Medicare outpatients can be charged as part of an automated process
- the EPAS Program consider implementing a EPAS report to capture any back-dated changes made to patient records after the daily discharge report has been run, in order to ensure accurate invoicing.

5.1 Introduction

EPAS is intended to be a key platform for the achievement of SA Health's single state-wide electronic health record for each patient. It is also an important component for SA Health to achieve the objectives of South Australia's Transforming Health initiative.[34]

The key drivers for an EPAS solution remain unchanged, in particular:

- the reliance of the new RAH on an integrated electronic system to manage patients and their care
- the ability to meet State policy and strategic agendas
- the need to address the costs and inherent risks associated with maintaining current patient administration and billing systems. Many of these systems have reached 'end of life' with vendor support being reduced and scheduled to finish in the near future.

At the time of this Report, EPAS implementation has been limited to the following sites:

- Noarlunga Hospital and Noarlunga GP Plus Super Clinic (25 August 2013)
- Aldinga, Morphett Vale and Seaford GP Plus Health Care Centres (18 November 2013)
- SA Ambulance Service Inc metropolitan headquarters (20 November 2013)
- Daw House at the RGH (1 December 2013)
- Port Augusta Hospital (15 December 2013)
- RGH (3 April 2014)
- FMC (select service areas) – view only access to the system (January 2015)
- TQEH (29 June 2016).[35]

Since late 2014 we have provided updates on EPAS developments and implementation processes in Supplementary Reports to Parliament.[36] Our reviews have noted that SA Health has experienced a number of challenges in implementing EPAS. We also noted certain EPAS issues related to IAM that were raised in an SA Health Internal Audit report dated July 2015.

5.2 Validation approach

In early 2016, prior to the EPAS activation at TQEH, we performed some operational testing of EPAS. This testing included a follow-up of IAM issues in relation to EPAS that were identified in an SA Health Internal Audit report dated July 2015. It also included a review of a number of system usability aspects at the Noarlunga Hospital, with some additional limited control testing at the RGH.

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[34] For more information about SA Health's 'Transforming Health' initiative refer to www.transforminghealth.sa.gov.au

[35] Our operational testing was primarily performed prior to EPAS being activated at TQEH.

[36] Refer to Supplementary Reports of the Auditor-General for the years ended 30 June 2014, 30 June 2015 and 30 June 2016 'Matters of specific audit comment: December 2014', 'Health ICT systems and the Camden Park distribution centre: June 2015', 'Information and communications technology report: October 2015' and 'Enterprise Patient Administration System: June 2016'.

Some subsequent validation was also performed at TQEH. This additional testing was related to the viewing and submission of patient treatment orders within EPAS.

Given the size and complexity of the system, we engaged an external audit firm to assist in the completion of this review.

We also separately examined selected EPAS hospital billing and transaction controls across SALHN.

Throughout the review we consulted with a number of SA Health representatives, including hospital staff (administrative and clinical), the EPAS Program and eHealth Systems. From a usability perspective, our review included end user consultations, process walkthroughs and observations of user interaction with the system.

5.3 Details of key findings

Findings 5.3.1 to 5.3.3 relate to our limited testing of EPAS controls at the RGH. This testing related to the submission, cancellation and viewing of patient treatment orders. Some additional validation was performed at TQEH.

Findings 5.3.4 to 5.3.6 relate to our operational testing in early 2016, prior to the EPAS activation at TQEH. This testing included a follow-up of IAM and system usability aspects at the Noarlunga Hospital.

Finding 5.3.7 relates to our testing of selected EPAS hospital billing and transaction controls at SALHN.

5.3.1 EPAS orders may inadvertently be cancelled by system users

Recommendations

The EPAS Program should progress with the planned system configuration change to prevent the cancellation of outstanding patient treatment orders on discharge.

The EPAS Program should work with the eHealth Systems and SAMI business support to automatically provide sufficient information from EPAS to ESMI, to identify the reason for a cancelled order.

Findings

In our June 2016 Supplementary Report, we highlighted certain outstanding interface issues between EPAS and ESMI. This included the auto-cancellation of orders in EPAS at patient discharge. Orders placed in EPAS range from orders for patient care and diet orders through to pathology, medications and medical imaging.

We note that users are not following the correct EPAS workflow. However, the nature of this workflow, which requires users to manually adjust the existing order on patient discharge or reorder following discharge, is contributing to these occurrences.

RGH and TQEH Radiology Departments have indicated that the inadvertent cancellation of EPAS patient treatments orders increases the risk of orders being missed and not appropriately resubmitted. This is due to the additional administrative effort required to monitor this issue. This risk has the potential to be even greater at larger sites.

Auto-cancellation of orders on patient discharge

Despite communications from the EPAS Program to the LHNs providing advice on how to avoid this issue, we identified that EPAS patient treatment orders are being cancelled on a daily basis at the RGH. The RGH Radiology Department first raised this issue with the EPAS Program during February 2016 following integration of EPAS with ESMI. Consultation with TQEH Radiology Department identified it is also experiencing daily cancelled orders.

Consultation and information obtained from the RGH and TQEH Radiology Departments indicated they are experiencing approximately five cancelled orders per day. The Radiology Department at the TQEH advised that the EPAS Program has provided a daily list of recent cancelled orders.

Although this list is only a portion of the total orders submitted, we were advised that from EPAS go-live on 29 June 2016 until 25 August 2016, there were 258 EPAS orders inadvertently cancelled by discharge. The reason for their cancellation was not clear in ESMI. This requires follow-up with the requesting clinician and resubmission of the order in EPAS.

Through consultation with the RGH Radiology Department and the ESMI Program, we were able to obtain evidence of the cancellation of a medical imaging order on discharge of an outpatient visit. As part of this testing we noted that an inpatient or outpatient order is automatically cancelled on patient discharge. This can occur if an EPAS user does not select the correct session type of 'outpatient order', rather than the default session type of 'standard'.

Although our order cancellation test was in ESMI, as these systems are integrated, the extent of this ordering issue may not just be limited to medical imaging.

In response, the EPAS Program advised for outpatient orders, if the order is placed from within an 'outpatient clinic note' the EPAS session type is defaulted to 'outpatient order'. However, our testing and consultation with EPAS users identified that in most instances users place an order through the 'order entry worksheet', which is defaulted to 'standard'.

The EPAS Program advised it is currently working on system configuration changes to address this issue. One particular change will involve the notification of pending treatment orders on patient discharge.

Manual workarounds required to identify the reason for an EPAS cancelled order in ESMI

We identified that in most instances, the reason for EPAS order cancellations are not filtered through to ESMI. As such, radiology administrative staff are required to manually follow up each instance to determine the underlying reason for cancellation.

Advice provided by the TQEH Radiology Department indicated that, of the 258 cancelled orders, approximately 25% did not contain an identifiable reason for the cancellation.

As a partial mitigating control specific to TQEH, a separate EPAS custom report is provided to the medical imaging department. This daily report contains a full list of cancelled orders and scheduled examinations specific to TQEH requirements to assist in the manual follow-up for these requests. This custom report, however, is currently not generated for other EPAS and ESMI sites.

The EPAS Program advised that work is being progressed to address the underlying issues around patient treatment orders being inadvertently cancelled on discharge.

SA Health response

The EPAS Program has progressed with improved technical solutions to support the correct workflow for outpatient medical imaging. A report was provided to TQEH Clinical Directors highlighting patients with cancelled orders, both as a result of discharge or deliberate cancellations. This report will be provided to clinicians until final technical solutions are implemented in November 2016.

5.3.2 Increased controls required for medical officer's name and provider and prescriber numbers registered in EPAS

Recommendations

The EPAS Program should work with LHNs to reduce the ability to view and request patient treatment orders using another EPAS registered provider and prescriber number. This includes reviewing the current EPAS access levels to perform these functions. With the current configuration, the EPAS Program should consider the use of alerts and notifications of such occurrences.

The EPAS Program should work with LHNs to implement a process to ensure that registered provider and prescriber numbers in EPAS are formally periodically reviewed and updated, with appropriate evidence maintained. The EPAS Program should also recommunicate with LHNs the requirement to advise changes to registered provider details when submitting user access requests, including adding, modifying and deleting accounts.

Findings

View and request patient treatment order under any practitioner's details registered in EPAS

Currently all providers and prescriber numbers are viewable and can be used to request a patient treatment and medication order in EPAS. This includes those not specific to a user's hospital or business unit.

For testing purposes, we observed the replication of this at the RGH. This involved a clinician with the EPAS user role of medical officer requesting a medical imaging order under another registered practitioner's name and provider number. We were advised that prior to EPAS, the RGH Radiology Department only processed medical imaging orders with the signature of an authorising medical officer.

Consultation with two separate doctors indicated there may be instances where doctors in similar business units may be required to request a patient treatment on behalf of another doctor. However, both indicated that not all doctors' provider and prescriber numbers should be viewable and therefore able to be used to request patient treatment orders.

An April 2016 briefing note presented to SAMI by the EPAS Advisory Council contained certain options to address issues relating to the use of provider numbers for patient treatment requests. In summary, this briefing note advised that the EPAS Advisory Council did not support the automatic insertion of the admitting medical officer's provider details due to the potential medical and legal risk associated with being allocated the responsibility for patient treatment orders they are unaware of.

This risk is present given that any medical officer registered in EPAS can be selected as the requester of a patient treatment order.

Notification of patient treatment orders requested using a Medical Officer's details registered in EPAS

Our testing indicated that if a clinician requested a medical imaging order under another registered practitioner's name and provider number the other practitioner did not receive an alert or notification in EPAS. We acknowledge that an audit trail is maintained of all EPAS patient treatment orders, however these logs are not periodically reviewed for anomalies or unusual occurrences of patient treatment orders.

As noted above, the EPAS Advisory Council acknowledged the potential medical and legal risk associated with medical officers being unaware of being allocated the responsibility for placing a patient treatment order. This was supported by the RGH Medical Officer we performed this testing with.

Lack of formal review and timely update / removal of provider and prescriber numbers registered in EPAS

LHNs are responsible to ensure system access is removed for terminated employees.

As part of our testing, we obtained evidence from an authorised medical officer at the RGH that an SA Health terminated employee's name and provider number could be selected to request a patient treatment order. This reduces the level of accountability and responsibility for patient treatment requests.

SA Health response

EPAS was initially designed, in consultation with clinicians, to include functionality that allows a clinician the ability to enter orders on behalf of another. This functionality is required in order to support clinical use of EPAS and has valid application across SA Health, with particular relevance to medication management and pathology ordering. The initial design was also intended to meet the clinical needs for medical imaging, as outlined by the Clinical Working Parties, with the assumption that printed order forms would be used.

As a result of the implementation of ESMI, which includes an interface for ordering, the process for placing medical imaging orders has been reviewed by practicing clinicians. The clinicians have agreed to, and support, a change in functionality to be progressed which prevents electronic medical imaging orders from being sent to the medical imaging Worklist prior to the order being authorised by an accredited clinician.

A change request has been developed and will be submitted to the EPAS Program Board for review and approval, with the intent to change functionality such that non-accredited staff are prevented from submitting a final order to medical imaging without the signature of a valid (accredited) requestor. They will still be able to enter an order into EPAS but this will remain with a status of 'pending verification' until it is signed by an accredited clinician and will not transmit to ESMI.

SA Health will help LHNs to establish a process to capture provider and prescriber numbers as part of their on-boarding practices. The EPAS Program can assist by providing a report to LHNs to assist them with identifying the required information through the existing

eWorkflow form to ensure that provider and prescriber numbers are checked prior to forms being submitted. It will remain an individual's responsibility to notify their provider and prescriber numbers and any changes, including the expiration of these numbers.

This activity is targeted for completion by October 2017.

5.3.3 Patient treatment related orders can be placed by an administrative officer

Recommendation

The EPAS Program should review the current EPAS access levels that provide the ability to request patient treatment related orders.

Finding

We observed a request for a patient treatment order using an EPAS account with an EPAS user role of Administrative/Clerical. We did note that the extent of patient treatment order types available to be selected by the Administrative/Clerical were decreased.

In response, the EPAS Program advised that administrative staff should be able to make billing, precaution and diet orders. However, as part of this review, our testing identified that the administrative officer was also able to make patient treatment related orders, which appeared to be associated with nursing tasks.

SA Health response

SA Health will review current access levels for administrative staff to order 'on behalf of', referring the recommendation to the Clinical Advisory Group. This activity will be completed by June 2017.

Administrative staff require access to precaution, billing, leave and transport orders, therefore they have been provided with limited access to some nursing orders, however they do not have access to patient treatment orders. There is no evidence of administrative staff placing patient treatment orders where were not authorised/legitimate; this would breach the SA Health Code of Conduct and Scope of Practice.

5.3.4 Potential delays in some patient administration and care related tasks

Recommendations

We recommend that the EPAS Program identify and address the specific cause(s) of individual EPAS workstations and devices becoming unresponsive (crashing) on a daily basis.

We also recommend the EPAS Program continue to review the performance of the printing and scanning functionality to identify and address the cause(s) of delays.

Findings

We consulted with EPAS users responsible for performing patient administrative and care related tasks and also observed the system in operation. We identified a number of process inefficiencies due to delays experienced in using EPAS.

In response, the EPAS Program has advised that an investigation into system freezes is in progress and deployment of a series of fixes has occurred. Further investigation and identification of the root causes will continue.

Notable inefficiencies raised in our review included the following.

EPAS workstation and device delays in responding to user input

Users have experienced delays when EPAS devices have either failed to respond or required the user to restart.

These delays may inhibit successful user adoption, increasing the risk of losing unsaved patient related data. It may also result in some users performing alternate workarounds or shortcuts from the intended system workflow.

User consultations and observations identified the following examples:

- A sample of users consulted indicated that EPAS does not respond to user input approximately twice a day. Users must wait for the system to respond, unaware of the period of time to wait for the system to become responsive, or if a restart is required. Users reporting of these issues to the EPAS Program ranges between daily and weekly.
- System exception errors intermittently occur, requiring devices to be restarted.
- Quick user mouse clicks between EPAS screens result in the system becoming unresponsive for approximately five seconds and sometimes more. Users consulted advised that this occurs approximately twice a day.
- When switching between modules the system can take up to 20 seconds to respond. This issue was replicated during our observation on five separate occasions.

Printing from EPAS is a slow end-to-end process

We identified several different printing tasks that contribute to a slow end to end process. These inefficiencies may delay the admission or discharging of patients and/or the production of other care related information during a patient's visit.

Examples included:

- we observed a printout of a nine page medical discharge summary form. These forms are printed at a doctor's discretion when a patient requires follow-up treatment or information to be supplied to the patient's general practitioner. In this example it took over two minutes to display a print preview on screen and commence printing. The complete printing process took over four minutes
- multiple user consultations identified that printing of prescriptions can take up to 20 minutes. We were advised that these slow response times were generally greater during night shifts, particularly when printing pathology and x-ray requests.

Document scanning into EPAS is inefficient

Document scanning into EPAS has introduced process inefficiencies, including the following:

- Several different document types are scanned into EPAS in a non-searchable format. These include consent forms, health questionnaires, referral letters and general patient

treatment notes. This results in data being stored in EPAS that cannot be indexed or easily found through typical search functions, other than by date or document type. When seeking patient related information contained in EPAS scanned documents, users advised that they were required to open each document to view and search the information contained within. As such, there was no way to search a patient's scanned record history efficiently.

To reduce this inefficiency the EPAS Program advised that scanning categories had been created to allow information to be found easier and further work is being undertaken to introduce additional improvements.

- To be considered a compliant business system by State Records of South Australia, certain metadata must be attached to scanned documents before the original paper copy can be destroyed. At the time of our review, aside from recording a document type and scanned date, no other required metadata is added to EPAS. As a consequence, original paper copies continue to be retained for State Records compliance.

  To address this issue the EPAS Program has advised that it will continue discussions with State Records of South Australia to determine an approach to scanning that is efficient, guarantees continued accuracy of scanned documents and supports the ability to destroy documents after scanning.

These process inefficiencies have the potential to cause delays in patient administration and care related tasks.

SA Health response

The number of reported incidents of unresponsive devices was a small percentage of the overall number of users. Most incidents were experienced on individual devices in administration areas of Outpatient Clinics. The EPAS Program has implemented a significant number of fixes to resolve issues with unresponsive (crashing) devices, with a key fix implemented in August 2016 that has provided significant relief. The EPAS Program has worked closely with eHealth Systems and Allscripts (the vendor), to conduct extensive root cause analysis of the problem. Diagnostic tools have been installed to capture logs if the problem reoccurs and to monitor activity. The EPAS Program will continue to monitor instances of reduced system performance and has robust business continuity plans in place if any issues arise.

SA Health will continue to monitor the performance of printing and scanning functionality. At the time the audit was conducted, the functionality to categorise scanned documents had already been implemented. Further enhancements are in progress.

Scanning of paper documents into EPAS complies with the State Records of South Australia requirement that copies are saved in a format that cannot be altered. The scan is effectively a picture of the paper document, as such there is no means to search the picture for text.

EPAS has improved clinical user education and configuration of the documents filters on the documents tab in the EPAS clinical module. EPAS has also implemented the ability to allocate a specialty against relevant scanning categories at time of scanning. As result of both improvements there has been an increased ability for clinicians to easily find the scanned document they require.

EPAS will resume conversation with State Records of South Australia in relation to the minimum metadata required to permit a scan and shred approach for paper patient documentation. Any additional metadata item required has an administrative resource impact, as such EPAS would seek support from State Records of South Australia to utilise the current system function.

The usual performance time of printing of prescriptions is typically under one minute, and performance time for discharge summaries is just over 1.5 minutes. Optimisation of reports will continue with the aim of reducing the execution time from requesting printing to actual printing a report. The EPAS Program will continue discussions with State Records of South Australia to determine an approach to scanning that will meet requirements.

These activities are targeted for completion by May 2017.

5.3.5 Local Health Network management of EPAS training requires improvement

Recommendations

EPAS training provided to new starters should include sufficient coverage and consideration of associated workflows at each specific LHN site.

LHNs should give consideration to requesting periodic refresher training to EPAS users at activated sites. This should include specific LHN workflows.

LHNs should address the low attendance levels for the EPAS Program's on-site retraining and support for significant system upgrades

The extent of specific workflow training requirements may be reduced if SA Health increases the amount of workflow consistency applied across LHNs.

Findings

The responsibility of training users at new EPAS sites is shared between the EPAS Program and the LHNs. Once EPAS has been implemented at the site, training for subsequent new users and refresher training is then the responsibility of the LHN.

Users must complete their training before being provided with a valid user account to login to EPAS. For the Noarlunga Hospital this training is currently scheduled approximately once a month. LHNs can, however, organise with the EPAS Program on-demand training for medical, allied health and administration training.

Our review identified certain issues in relation to pre and post-implementation training, including:

- many staff have not received any formal refresher training since EPAS was adopted. We have identified that some EPAS users who attended the initial EPAS training have an insufficient understanding of current EPAS processes and functionality
- some system changes appear to be ineffectively and inconsistently communicated to staff. In response, the EPAS Program advised system changes are broadcast to effected users and provided on-site retraining and support for significant system upgrades. However, the EPAS Program noted low attendance levels for these update sessions

- some procedure manuals are currently incorrect or out of date. This includes reference to some outdated EPAS functionality, screenshots and process descriptions.

As a consequence, some users are potentially incorrectly logging system issues or incorrectly using the system. Some users are also not aware of new system features and improved functionality that has been deployed. In these instances, some users are reliant on others to provide ongoing informal guidance and training in system processes. This both increases the risk of staff being distracted from their job role/function to train other users and users potentially inheriting incorrect practices.

SA Health response

Over 13 000 SA Health staff have completed EPAS training and have been assessed as ready to use the EPAS system. Approximately half of the staff who currently use EPAS work in SALHN. In addition over 3000 non-SA Health staff have been trained, including university students, VET students and Clinical Agency staff.

EPAS training within SALHN is coordinated and facilitated informally through the RGH Nursing Education Team and Executive Office staff. Specific dedicated funding and or resources have not been allocated to SALHN EPAS training since implementation in August 2013. The training program is reliant on goodwill and staff being released to provide training to new staff.

Transition to a sustainable training model is required to continue to deliver a quality training model and to ensure that staff have the capability and capacity as end users. Ongoing refresher programs and evaluation is also required of the trainers to ensure that training is relevant and user focused.

The EPAS Program will continue to work with LHNs to ensure that training is delivered at an appropriate time and delivers all necessary training for staff to commence from day one. The EPAS Program will engage with LHNs to ensure that EPAS training is included as part of the staff on-boarding process. The existing training strategy of developing agreed workflows with implementation leads and managers as part of their initial training will continue, with workflows delivered to all other staff in a series of dedicated workflow workshops.

The EPAS Program will continue to work with LHNs to develop training and communication strategies to engage staff and assist with boosting attendance levels for all types of training, on a site-by-site basis.

5.3.6 Identity and access management controls require strengthening

Recommendation

eHealth Systems and the LHNs should progress the tightening of IAM controls.

Finding

Consultation with the EPAS Program, eHealth Systems and selected EPAS end users identified that several IAM issues remain outstanding following the SA Health Internal Audit.[37] Until addressed there is a risk of unauthorised or inappropriate access to EPAS, which could impact the completeness and accuracy of data or loss of integrity of sensitive patient information.

[37] The SA Health Internal Audit of IAM also included a number of other SA Health system and was not solely focused on EPAS.

Outstanding issues include deficiencies in user access management, identity and provisioning. Control improvements also need to occur in the periodic review of user access and account validity.

SA Health response

The EPAS Program has agreed a process with the Central Adelaide Local Health Network Incorporated (CALHN) to improve IAM controls, with key staff identified within CALHN to approve end users. SA Health will continue to work with other LHNs to develop appropriate IAM processes. This activity is targeted for completion by October 2017.

5.3.7 EPAS hospital billing and transaction issues at Southern Adelaide Local Health Network Incorporated

Recommendations

The EPAS Program should review and improve the reporting process to support the interface between EPAS transaction data and the OCS general ledger. It should also ensure that all EPAS reconciling items are investigated and explained.

LHN Hospital Billing should continue to manually trigger the identified compensable and non-Medicare outpatient charges until this process is automated.

The EPAS Program should continue to work towards a resolution where compensable and non-Medicare outpatients can be charged as part of an automated process.

The EPAS Program should consider implementing an EPAS report to capture any back-dated changes made to patient records after the daily discharge report has been run, to ensure accurate invoicing.

Findings

Issues with completeness of EPAS transactional data

In our review of EPAS data extracts for SALHN we noted discrepancies with the EPAS transaction data and the general ledger.

We have also been advised that there have been regular and unexplained variances occurring as part of the monthly balance sheet reconciliations. While these are considered immaterial the reason for these transactions not being extracted to the general ledger cannot be explained.

Due to the difficulties in extracting and reconciling EPAS transaction data, there is a risk that not all EPAS transactions have been completely and accurately transferred to the general ledger and ultimately the SALHN financial statements.

EPAS billing issues within SALHN

Our review of patient billing at SALHN identified that:

- charges are still not automatically generated for compensable and non-Medicare outpatients. While a report to allow for manual billing of these visits was implemented in May 2016, a backlog of visits from the initial implementation of EPAS still remain unbilled

- while validation reports that outline EPAS billing where automatic charges are not generated are followed up by EPAS hospital billing, an escalation process to ensure that appropriate action is taken is yet to be implemented.

This known EPAS issue may increase the existing workload for Hospital Billing, due to the additional requirement to perform the manual triggering of charges on a daily and monthly basis.

Where this error can be addressed, there will still be significant delays in the recognition of revenue within the SALHN financial statements.

A backdated EPAS transaction report is currently unavailable

Discharge reports are generated from EPAS and reviewed each day. These reports cover the previous day and are reviewed to ensure all billable charges were invoiced. Any backdated changes made after the daily report is generated do not appear on subsequent discharge reports. For example, if a patient's record in EPAS is changed after discharge, the information will not be captured by subsequent discharge reports.

In a previous review, we were advised that a backdated discharge report could not be generated from EPAS to list any changes made to patient records after the discharge report had been run. This process was in place for the previous system (Homer).

Although a change request was submitted for a report detailing backdated transactions in EPAS, at the time of our review a backdated discharge report was not available. The absence of this reporting capability may result in some patients not being billed and a loss of fees and charges revenue for SALHN.

SA Health response

The EPAS Program has developed and implemented a process to review the transactional data that has been sent to OCS through the general ledger interface. This process is performed each month with the results being reviewed jointly by the EPAS Program and SA Health Financial and Corporate Services Oracle team, with any identified discrepancies jointly investigated.

The EPAS Program will be able to automate the billing of compensable and non-Medicare outpatients after the capability has been made available in the 15.3 upgrade that is due to be implemented in February 2017. Current work to change the outpatient checkout process will be applied to EPAS in December 2016.

The EPAS Program has improved the Billing Discharge Report to allow the review of patient billing transactions in the past. This, used in conjunction with the Repricing Report, provides the tools for SALHN Patient Billing staff to identify any patient visits that require recharging due to changes in the patient status that have been applied after the visit was discharged. The EPAS Program is working with SALHN to develop a single report that can help identify these occasions and provide all the data required on a single report. The EPAS Program is waiting for a specification to be forwarded.

This activity is targeted for completion by December 2017.