Advice to the Minister for Health and Wellbeing, Government of South Australia

DECEMBER 2018

Final Report
Version 2
## Glossary of Terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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<tbody>
<tr>
<td>ACHI</td>
<td>Australasian College of Health Informatics</td>
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<td>AHIFP</td>
<td>Australasian Health Informatics Fellowship Program</td>
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<tr>
<td>Allscripts</td>
<td>The supplier of the EPAS Sunrise solution suite</td>
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<tr>
<td>AMA(SA)</td>
<td>Australian Medical Association South Australia</td>
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<tr>
<td>ANMF (SA Branch)</td>
<td>Australian Nursing and Midwifery Federation (SA Branch)</td>
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<tr>
<td>BAU</td>
<td>Business as usual</td>
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<tr>
<td>CALHN</td>
<td>Central Adelaide Local Health Network</td>
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<tr>
<td>CBIS</td>
<td>Community Based Information System</td>
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<tr>
<td>CE</td>
<td>Chief Executive</td>
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<td>CHIA</td>
<td>Certified Health Informatician Australasia</td>
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<tr>
<td>CMIO</td>
<td>Chief Medical Informatics Officer, also often referred to as Chief Medical Information Officer</td>
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<tr>
<td>Clinical informatics</td>
<td>People with clinical training who have IT expertise</td>
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<tr>
<td>EDMS</td>
<td>Executive Director Medical Services</td>
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<td>EHR</td>
<td>Electronic Health Record</td>
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<td>EMR</td>
<td>Electronic Medical Record</td>
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<td>EMRAM</td>
<td>Electronic Medical Record Adoption Model</td>
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<td>EPAS</td>
<td>Enterprise Patient Administration System</td>
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<td>EPLIS</td>
<td>Enterprise Pathology Laboratory Information System</td>
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<td>ESMI</td>
<td>Enterprise System for Medical Imaging</td>
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<tr>
<td>FMC</td>
<td>Flinders Medical Centre</td>
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<tr>
<td>FTE</td>
<td>Full time equivalent</td>
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<tr>
<td>HIMAA</td>
<td>Health Information Management Association of Australia</td>
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<td>HRC</td>
<td>Hampstead Rehabilitation Centre</td>
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<td>LHN</td>
<td>Local Health Network</td>
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<tr>
<td>MGDHS</td>
<td>Mount Gambier and Districts Health Service</td>
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<tr>
<td>NALHN</td>
<td>Northern Adelaide Local Health Network</td>
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<tr>
<td>NHS</td>
<td>National Health Service (UK)</td>
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<tr>
<td>NIMC</td>
<td>National Inpatient Medication Chart</td>
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<tr>
<td>OACIS</td>
<td>Telus Health’s Open Architecture Clinical Information System used primarily in SA for diagnostic results viewing</td>
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<tr>
<td>PAS</td>
<td>Patient Administration System</td>
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<tr>
<td>Abbreviation</td>
<td>Description</td>
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<td>RAH</td>
<td>Royal Adelaide Hospital</td>
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<td>RDR</td>
<td>Rapid Detection and Response Observation</td>
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<td>RFP</td>
<td>Request for proposal</td>
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<td>RGH</td>
<td>Repatriation General Hospital</td>
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<td>SA</td>
<td>South Australia</td>
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<td>SALHN</td>
<td>Southern Adelaide Local Health Network</td>
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<td>SASMOA</td>
<td>South Australian Salaried Medical Officers Association</td>
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<td>South East LHN</td>
<td>South East Local Health Network, a regional LHN to be established in July 2019 which includes Mount Gambier and Districts Health Service</td>
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<td>Sunrise</td>
<td>The software suite known in South Australia as ‘EPAS’. For the purposes of this report it includes Sunrise Clinical Manager, Sunrise Financial Manager, Sunrise Records Manager and the Patient Flow module</td>
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<td>TQEH</td>
<td>The Queen Elizabeth Hospital</td>
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<td>VDI</td>
<td>Virtual desktop infrastructure</td>
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<td>WCHN</td>
<td>Women’s and Children’s Health Network</td>
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<tr>
<td>WOW</td>
<td>Workstation on Wheels</td>
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Table of Contents

1. Executive Summary ............................................................................................................. 6
   1.1 Business Case .................................................................................................................... 6
   1.2 Assessment of EPAS ......................................................................................................... 6
   1.3 Why the Current Situation ............................................................................................... 7
   1.4 The Way Forward ............................................................................................................ 9

2. Summary of Recommendations ......................................................................................... 15

3. Review Approach ............................................................................................................... 19
   3.1 Background to Review .................................................................................................... 19
   3.2 Approach Taken ............................................................................................................. 20

4. Benefits of Electronic Medical Records .......................................................................... 21
   4.1 Better Patient Outcomes ............................................................................................... 21
   4.2 Improved Operational Efficiency .................................................................................. 22
   4.3 Staff Satisfaction ........................................................................................................... 23
   4.4 Reduced Organisational Risk ....................................................................................... 23

5. Review Findings ................................................................................................................ 24
   Is the system fit for purpose? (Term of Reference 1) .......................................................... 24
   Functionality of EPAS (Term of Reference 8) ..................................................................... 24
   Safety of the Current System (Term of Reference 2) .......................................................... 40
   Reason for increased costs (Term of Reference 3) ............................................................. 43
   Impact on increased costs (Term of Reference 3) ............................................................. 46
   Adequacy of engagement and consultation (Term of Reference 5) ..................................... 49
   User experience (Term of Reference 6) .............................................................................. 51
   Implementation of EPAS (Term of Reference 7) .............................................................. 55

6. Future Direction ................................................................................................................ 63
   6.1 Creating an SA Health Digital Strategy ......................................................................... 64
   6.2 Governance - Structures and Processes ........................................................................ 66
   6.3 Governance - Measuring and Realising Benefits ......................................................... 71
   6.4 Software Improvements ............................................................................................... 72
   6.5 Exemplar Sites Model .................................................................................................. 73
   6.6 Implementation Approach ............................................................................................ 76
6.7 Developing a Clinical Informatics Workforce.................................................................77
6.8 Investment in Digital Health Beyond EPAS .................................................................79
6.9 Business as Usual (BAU) Model..................................................................................79
6.10 Implementation of the Review’s Findings.................................................................81

Appendix A – Terms of Reference ................................................................................. 82
Appendix B – Reference Group Members ..................................................................... 90
Appendix C – Incidents Pre and Post EPAS................................................................. 91
Appendix D – Clinical Informatics..................................................................................94
1. Executive Summary

1.1 Business Case

In 2011 South Australia commenced implementation of an integrated Electronic Medical Record (EMR) and Patient Administration System (PAS), called EPAS. The approved Business Case of $421.5 million was, in the first instance, for a single system for all public hospitals in metropolitan Adelaide, a number of metropolitan public outpatient/GP clinics, and two country hospitals.

The decision to digitise South Australia’s hospitals was soundly based. The experience internationally and in other Australian jurisdictions is that introducing EMR/PAS solutions into hospitals achieves considerable benefits in patient outcomes, safety and quality, efficiency and productivity, and staff satisfaction.

1.2 Assessment of EPAS

The approved Business Case outlined a program that would be completed by 2014. In 2018, around 78% of the funds for the original scope have been expended, with 28% of public hospital occupied bed days implemented.

The EPAS implemented sites strongly urged the Review Panel to ‘not go back to paper’. They pointed to the advantages of clinical notes being legible, in a single location, and simultaneously visible to multiple staff caring for a patient. At the same time, they often referred to EPAS as ‘clicky, clunky and cumbersome’ and to the difficulties in learning, personalising and getting improvements made to the software.

EPAS meets most of the general functionality envisaged in the Business Case and expected of an EMR/PAS. This includes:

- clinical documentation in a single location;
- computerised order entry for prescriptions, pathology and radiology;
- clinical decision support, through standardised order sets and alerts (e.g. medication risks);
- medication prescribing and an electronic medication administration record;
- patient administration (bookings, admissions, discharges, coding, billing etc);
- results viewing for pathology and radiology; and
- reporting.

However, there remain significant functionality shortcomings such as:

- difficulty in retrieving clinical notes arising from the lack of standardisation and the complicated user interface;
- presentation of medication charts and rapid detection and response observations are not entirely consistent with national clinical standards;
• no integration between electronic prescribing and the pharmacy system requiring manual data entry of medication orders and lack of integration with the ward level medication administration workflow;
• non-standardised and too many order sets, leading to confusion;
• issues with how the pathology and radiology systems connect with EPAS, both in workflow and reporting of results;
• the Allscripts PAS billing module remains not fit for purpose and does not link with Medicare’s billing gateway;
• reporting and analytic modules which are complex and require specialised expertise;
• inability to generate a succinct, reasonably structured, chronological medical record for legal purposes, such as for the SA Coroner, Crown Solicitor and Freedom of Information;
• limited decision support functionality switched on;
• incomplete customisation of modules, such as paediatrics, obstetrics and community mental health;
• minimal interfacing with biomedical devices;
• many WOWs (workstations on wheels) are too small, often requiring two or more at a time for ward rounds; and
• limited mobile use for viewing a patient record and inability to enter clinical documentation or place orders on the mobile or web-based platforms.

1.3 Why the Current Situation

The key question for the Review Panel is whether the issues with EPAS can be addressed adequately so that the system can meet the expectations of users in the future. To answer this question, it is important to assess whether the problem is with either:

a. the software solution (supplied by Allscripts),
b. the configuration of the solution (managed centrally by SA Health), and/or
c. the implementation and governance of the program.

The Review Panel concludes that all three factors have contributed to EPAS not meeting user expectations.

In relation to the Allscripts software solution, the Review Panel concludes:

• The Allscripts Sunrise software, which is the EMR component of EPAS, is widely used and respected internationally. The key agencies that rate EMRs around the world place the Sunrise EMR in the top 3-4 globally. Its strength is in its configurability and interoperability with other systems. Its configuration capability enables it to be localised (at times excessively and at the expense of standardisation). The interoperability strength supports a ‘best of breed’ strategy that allows South Australia to choose modules that meet clinical needs, rather than becoming overly reliant on a single vendor for all aspects of an EMR.
• The user interface of the Sunrise EMR needs improvement to meet modern user expectations, for example by presenting a simple patient summary and providing intuitive navigation.
• The billing module for the Allscripts PAS remains not fit-for-purpose and should be replaced by a system that is built and maintained for Australian billing conditions.
• The current software version implemented by SA Health is four years out of date and should be upgraded as a priority, with new features progressively adopted.
• As the software is highly configurable, success is reliant on clinicians agreeing on standardised workflows.

The configuration of the system has been a major challenge for South Australia as it requires agreement from clinicians across hospitals. On the configuration of the system, the Review Panel concludes:

• While the original procurement was robust, the assessment that the Allscripts product met 60% of the State’s needs ‘out of the box’ was incorrect. Consequently, the original business case was unduly ambitious on the timing of implementation, as it involved procuring a product that was yet to be localised for the Australian market.
• It is recognised that the templates used for Port Augusta Hospital, Hampstead Rehabilitation Centre (HRC), Noarlunga Hospital, the Repatriation General Hospital (RGH) and The Queen Elizabeth Hospital (TQEH) provide a basis for further refinement of the configuration. Much has been done, however more is needed to meet user expectations.
• The configuration was centrally driven with a lack of engagement with practising clinicians, particularly medical staff. Clinical engagement was reasonable in the early stages of design and build, however not sustained. Successful implementations in other states, observed by the Review Panel, required significant clinical transformation and clinical leadership. The Review Panel believes that there are committed and capable clinicians in South Australia who can be leaders in the design of a successful EMR implementation, in the same way as other hospitals around Australia have done. Reviving that engagement will involve taking clinicians ‘offline’ to put time into configuration and moving beyond clinician engagement to giving clinician groups the authority over how the system is implemented.

The implementation of EPAS contrasts with other successful EMR implementations in Australia, in particular:

• SA Health chose to implement the system without the assistance of expert organisations, including the Allscripts vendor, experienced in electronic workflow design and the change and adoption complexities associated with implementing EMRs.
• The governance model is flawed, with accountability for outcomes poorly understood and managed.
• Clinical benefits from the implementation of the system are not well articulated and consequently not tracked, measured nor managed.
• Current governance arrangements do not empower clinicians to be the key decision-makers, therefore clinicians have not taken ownership of the system.
• Local Health Networks (LHNs) are not given accountability for implementing the system within their hospitals. The system is viewed by LHNs as a program of work delivered by the Department.
• Training has significantly improved from the initial approach and is now fit for purpose, although there are still improvements to be made including a more flexible approach and not requiring training to be done in staff ‘spare time’.
• The implementation model involves an intense period of preparation by the central EPAS team (with support from local management), staff training (approximately 6 weeks), and strong presence during the go live period and for a limited time afterwards. Recent implementations have been mostly successful, and staff are very positive about the expertise and support given to them by the EPAS teams during the go-live period.
• The lack of a sustained presence of EPAS expertise within the LHNs post go live is problematic. Staff often take time to adapt to the system with the requirement to optimise their user interface occurring months later, at which time the EPAS expertise has moved onto another site. This arises from the lack of initial investment post go live (no funds set aside in the Business Case); and from the failure to identify the efficiency and quality benefits of an EMR/PAS, whereby ownership by the LHNs would encourage investment in post go live resources.

The Review Panel notes that the singular focus on EPAS implementation and investment has resulted in an underinvestment in digital health elsewhere in SA Health, including the unsupported PAS in regional South Australia. LHNs that are in scope but not yet implemented, such as Northern Adelaide Local Health Network (NALHN) and Women’s and Children’s Health Network (WCHN), have been without digital health investment since 2010 and may still not realise benefits from the statewide EMR/PAS program for some years. Additionally, investment is needed to sustain the existing IT computing and network infrastructure which represents a significant risk to the State; and in key enabling foundations such as secure messaging, contemporary desktops and mobility, unified communications and knowledge management.

Limited investment outside of EPAS is underpinned by the absence of a comprehensive digital health strategy that addresses the needs of healthcare consumers / patients, regional health services, and community health settings including integration with primary care, mental health, aged care, palliative care and hospital in the home.

1.4 The Way Forward

The Review Panel accepts that a return to paper is not a sensible option for South Australia. With so many important issues raised with EPAS, it is also not considered an option to continue ‘as is’. There is strong Australian and global evidence of improved patient outcomes and efficiency benefits from an EMR. The Review Panel believes that SA Health must continue to pursue these.

Initial examination of the Allscripts Sunrise EMR solution in Singapore indicates that it can be fit-for-purpose over time, provided sufficient effort is put into engaging clinicians to standardise workflows and configure the system.
The way forward described below involves:

- creating an SA Health Digital Strategy;
- significant governance reforms that devolve responsibility for implementation and configuration to LHNs and clinicians;
- actions to improve the Sunrise EMR and Allscripts PAS software solutions and implementation;
- focussing on two exemplar sites to implement the Allscripts solution that applies the Review’s proposed changed approach, and any future decisions to implement the Sunrise EMR and Allscripts PAS are contingent on user acceptance at the exemplar sites; and
- improving implementation approach and post go-live support, regardless of which solution is implemented.

**Need for an SA Health Digital Strategy**

There is currently no well-articulated SA Health digital strategy. The Review Panel recommends the following key principles of a renewed SA Health digital strategy that relate to an EMR/PAS solution:

a. **Re-commit to a single integrated South Australia wide system**

The Review Panel considers that the benefits of a single system for a state the size of South Australia outweighs the disadvantages of a lack of competitive tension from having multiple systems. These benefits include: patient information available wherever a patient is treated in SA Health; lower procurement costs; ease of use for clinicians moving between sites; familiarity of administrative staff wherever they work in SA Health; reduced training required for multiple systems; less complexity from integration with other systems; concentrating available health informatics expertise in configuring a single system; and support for standardised care processes, including decision-support. The core of the single integrated system should be a single access point (‘front door’) for both clinical documentation and processes (prescribing, ordering pathology etc). It should also provide a single view of all relevant patient information across SA Health sites, including results notification. This implies a single data repository and enterprise master patient index.

b. **While having a single core system, accept that a ‘best-of-breed’ approach is desirable and so any systems selected must be interoperable.**

SA Health already has various statewide ‘best-of-breed’ systems, including for pharmacy, pathology, theatre management and radiology. The renewed SA Health digital strategy should make clear which best-of-breed solutions will be selected in the future, and that they will interoperate with the core statewide PAS and EMR solution.

c. **It is preferable to have a single integrated EMR and PAS, although not essential so long as they interoperate.**

SA Health currently has multiple PAS solutions and this increases the complexity of interoperating between systems. Consideration has been given to separating the EMR and PAS, and while this is
possible and often the case elsewhere, it is preferable to have an integrated PAS and EMR. This is because:
• in principle, it is easier to align patient flow and decision-support based scheduling of services;
• it leverages existing investment, both in vendor contracts and configuration efforts;
• separation would increase the needs for integration between systems;
• going back to market would lead to greater delays while a different PAS is selected.

The main issue with the existing Allscripts PAS is that the billing module is not fit for purpose and should be replaced as a matter of priority.

d. Focus on standardised workflows based on consensus between clinicians for the EMR and administrative staff for the PAS.

This is essential in all EMR systems and its success is dependent on gaining a consensus between users, clinicians and sites.

Key Actions

Considering the substantial people and financial investment in the existing EPAS solution, the Review Panel believes that every effort should be made to optimise the underlying elements of the EPAS Program, that is, the Allscripts Sunrise EMR and the Allscripts PAS. This will require major changes to how the current EPAS Program operates.

It should be noted that the issues identified in this review are not unique to the Allscripts solution as all EMR systems require configuration and changes in workflows, including standardisation. Unless the governance, clinician engagement, configuration and implementation issues are addressed, there is unlikely to be a significantly better outcome from choosing a different software solution.

Governance Reforms

The governance and implementation models need to devolve authority and accountability to LHNs and clinical groups:

• Create a statewide Digital Health Strategy
• Establish a new statewide Digital Health Board, with strong LHN representation.
• Create a separate Digital Health SA body that reports to the Chief Executive of SA Health and Wellbeing via the proposed Digital Health Board, including a Chief Medical Informatics Officer and Deputy Chief Medical Informatics Officer.
• Return ownership of the system configuration to clinicians, under the oversight of LHNs. In the first instance, responsibility of configuring the system to be devolved to the Royal Adelaide Hospital (RAH) and Mount Gambier and Districts Health Service (MGDHS), as the key “exemplar sites”.
• Establish a network of around 10 Clinical Specialty Groups (reflecting how South Australian clinical programs are structured) responsible for standardising the system’s configuration, supported by clinical informatics staff (including doctors) employed part-time. These groups will be setup by the Central Adelaide Local Health Network (CALHN) and incorporate clinicians
from other LHNs. The Clinical Specialty Groups will be chaired by clinicians from across the LHNs.

- Discontinue using the term EPAS and replace it with the globally used names of the software: “Sunrise EMR” and “Allscripts PAS”.

The following diagram illustrates the proposed governance and program operating model.

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**Software Improvements**

The Sunrise EMR and Allscripts PAS needs significant improvement to meet clinician expectations. Priority improvements are to:

- Improve the presentation of information to clinicians.
- Upgrade to the new 17.3 version of the Allscripts solution, with more regular and frequent upgrades in the future including enabling new features.
- Provide a greater focus on standardising workflows, achieved through improved clinical ownership of the system configuration.
- Simplify order sets and align them with clinical practice.
- Personalise templates by specialty, based on standardised workflows.
- Create more efficient (less clicks) configuration, particularly by building the health informatics workforce to assist clinical specialty groups.
- Optimise integration with key systems such as pharmacy, pathology, radiology, theatre and vital monitors, and address significant defects and enhance the software in areas such as paediatrics and obstetrics.
- Implement a fit-for-purpose reporting and analytics module.
• Use the mobility platform – both in its current version (limited) and more extensively once version 17.3 is implemented.
• Upgrade the document scanning solution to address issues with poor indexing of scanned documents.
• Replace the billing module.

**Implement Exemplar Sites**

Resources should focus on successfully implementing two exemplar sites: the Royal Adelaide Hospital and the Mount Gambier and Districts Health Service (with Flinders Medical Centre scheduled for 2020) in order to demonstrate that, with a devolved and clinically owned model, the Allscripts solution can be configured and implemented to meet user expectations.

• This includes devolving about 100 staff from the current EPAS Program into the two exemplar sites, responsible for configuration (with clinicians across hospitals) and implementation.
• These two sites will be implemented in 2019, with the RAH implemented in stages and completed by the first quarter of 2020, to minimise risk and maximise results of the optimisation.
• Performance metrics will measure the success of the program, including whether the benefits are achieved (e.g. less medication errors, increased efficiency, reduced length of stay) and to assess user experience. LHNs will be accountable for identifying, realising and measuring the benefits. The same measures will be compared with sites who do not have the EMR and PAS.
• Depending on user acceptance at the exemplar sites, it is proposed that a decision be made in March 2020 whether Flinders Medical Centre (FMC) proceeds with implementing the re-configured Allscripts solution.
• If reasonable user expectations are not met, it is proposed that SA Health return to market to begin selection of a new enterprise system for the state. The current Allscripts contract ends in December 2021. Under this scenario, implementation of a new system would begin with those who do not have the Sunrise EMR and Allscripts PAS.

Technical upgrades and innovation in existing hospitals where the statewide EMR/PAS will not be rolled out for some years (NALHN, WCHN and regional LHNS) should be funded. This addresses the lack of IT investment at these hospitals for over 10 years.

In March 2020, the decision should be made to go to market for a single statewide PAS, based on whether the Allscripts PAS meets functional needs. This should include replacing the PAS in regional LHNS to address the risk of continuing with unsupported systems.
Better Implementation and Post Go-Live Support

Improve relationship with Allscripts

The program needs to re-engage with the Allscripts vendor to draw on its global expertise in configuration and implementation of the Allscripts solution. This will involve:

- Leveraging international expertise of the Allscripts customer base, including requiring the vendor to undertake an optimisation project, using best practice from other sites, and participating in international user group meetings.
- Involving the vendor in the governance process.

Improve Training

Modify the training approach to provide funded and flexible training time:

- Roster dedicated training time, particularly for doctors where it is currently lacking, with backfilling as necessary.
- Ensure training is customised by specialty and trainers are from that specialty area.
- Provide accessible training facilities, ideally onsite to support both face-to-face and self-directed learning.
- Offer a variety of training methods including face-to-face, online and ‘at the elbow’.

Improve Post Go-Live Support

Improve post go-live support and sharing of best practice through dedicated staff at each hospital, rotation of super-users between sites and an online portal for sharing tips including optimal personalisation of the system.

Implementation of the Review’s Findings

The existing governance arrangements create a significant risk that the responsibility and accountability for implementation of these Review findings will be unclear. In addition, the Review recommendations affect several existing bodies and a possible conflict of interest could exist.

Consequently, it is proposed that a Review Implementation Taskforce be established for a limited time to ensure each of the Review recommendations are progressed.
2. Summary of Recommendations

In consideration of the findings, the Review Panel makes the following recommendations for the future direction of SA Health’s Enterprise Patient Administration System (EPAS).

**Creating an SA Health Digital Strategy**

1. That SA Health develop a Digital Health Strategy which sets the future directions for enterprise hospital systems, interoperability with other systems (including community-based systems), telehealth, and consumer digital health innovations.

2. That in relation to the statewide EMR/PAS, SA Health’s Digital Health Strategy:
   - re-commits to a single integrated South Australian wide system;
   - accepts that a ‘best-of-breed’ approach is desirable, conditional on successful interoperability; and
   - prioritises connecting with clinical partners in primary and community settings.

3. That the term “EPAS” be replaced with the names of the two solutions: “Sunrise EMR” and “Allscripts PAS”.

**Governance - Structures and Processes**

4. That SA Health establish a new body ‘Digital Health SA’ to replace the existing eHealth Systems and EPAS Program areas, and that this be led by a new statewide Chief Digital Health Officer position. The new Digital Health SA should have at least two clinical informatics staff (doctors), with one being the Chief Medical Informatics Officer, who will lead the new part-time clinical informatics staff proposed in Recommendation 8.

5. That governance oversight of the new Digital Health SA body, including the Digital Health Strategy, be through a Digital Health Board chaired by the Chief Executive (CE) of SA Health and Wellbeing and comprising all metropolitan Local Health Network (LHN) Chairs or CEs, two regional LHN Chairs or CEs, the Chief Digital Health Officer, the Chair of the Sunrise EMR/Allscripts PAS Program Board, the Chair of the Clinical Advisory Council, and one independent expert.

6. That the governance of the Sunrise EMR/Allscripts PAS Program be through a reconstituted Program Board with an independent chair, the CEs of the CALHN (Central Adelaide Local Health Network), SALHN (Southern Adelaide Local Health Network) and South East LHN (South East Local Health Network), the Executive Director of Statewide Clinical Support Services, the SA Health Chief Medical Officer, the Chief Digital Health Officer, the Chair of the Clinical Advisory Council, and a senior executive from Allscripts.

7. That the responsibility for the clinical design of the Sunrise EMR and Allscripts PAS be through a reconstituted Clinical Advisory Council, comprising the Chairs of the Clinical Specialty Groups and their clinical informatics representatives, and nominees from AMA(SA), SASMOA and ANMF (SA Branch).
8. That Clinical Specialty Groups be created to standardise workflows, order sets and clinical documentation, and so determine the specifications for configuring the modules used in their clinical areas.

9. That each of the Clinical Specialty Groups be supported by at least 0.2 FTE clinical informaticians.

10. That the EMR/PAS business owner / senior responsible officer move from the Chief Information Officer role to the Chief Digital Health Officer.

**Governance - Measuring and Realising Benefits**

11. That SA Health establish a base set of benefit measures for the Sunrise EMR and Allscripts PAS program and that LHNs are then responsible for reporting against these measures on at least a quarterly basis.

12. That Digital Health SA be responsible for regular monitoring and reporting of system performance, such as screen time responses and the end user experience of system availability.

**Software Improvements**

13. That the existing Sunrise EMR / Allscripts PAS 14.3 software version be upgraded to 17.3, with the progressive implementation of its new features (not ‘like with like’), and that subsequently there be a regular upgrade path.

14. That a Sunrise EMR Optimisation Taskforce be established with assistance from Allscripts, drawing on its international expertise, to fast track making the system more intuitive.

15. That priority for the configuration and development of the software be:
   - user interface optimisation;
   - pharmacy integration;
   - meeting the patient record requirements of the SA Coroner, SA Crown Solicitor, SA Police, courts, Freedom of Information requests, and other statutory bodies;
   - implementing the new Sunrise EMR mobile platform;
   - clinical reporting and analytics capability;
   - replacement of the record scanning solution;
   - replacement of the billing module in the Allscripts PAS;
   - configuring important modules, such as paediatrics and obstetrics; and
   - integration with CBIS (Community Based Information System) for mental health.

**Exemplar Sites Model**

16. That a new implementation approach be created to focus on implementing two exemplar sites, to demonstrate whether the Sunrise EMR and Allscripts PAS can be configured and implemented to meet user expectations using the devolved and clinically owned model.
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<td>17.</td>
<td>That the two exemplar sites be the Royal Adelaide Hospital (RAH) and Mount Gambier and Districts Health Service (MGDHS), to be implemented by the first quarter of 2020.</td>
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<td>18.</td>
<td>That this include devolving the implementation and business change team from the current EPAS Program (approximately 100 staff) to the two exemplar sites, reporting to the Executive Director of Medical Services (or equivalent) in each respective LHN.</td>
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<td>19.</td>
<td>That any further implementation beyond the exemplar sites be dependent on achieving user acceptance. If user expectations are not met, go to market for a statewide enterprise EMR and/or PAS as required (different solutions for EMR and PAS are acceptable).</td>
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<td>20.</td>
<td>That if user acceptance at the RAH and MGDHS is achieved, then continue the rollout at Flinders Medical Centre (FMC) in 2020 and/or implement the Allscripts PAS at regional LHNs.</td>
</tr>
<tr>
<td>21.</td>
<td>That a new communication strategy be developed, particularly re-engaging frontline staff.</td>
</tr>
</tbody>
</table>

**Implementation Approach**

| 22. | That SA Health make significant improvements to the implementation approach including increased vendor engagement, dedicated training time, increased post go-live support, device upgrades, deploying a mobile version and a staged approach. |
| 23. | That the Allscripts vendor be re-engaged in the implementation of the system, including in optimisation and governance. |
| 24. | That post go-live support be improved through dedicated staff at each of the hospitals that have implemented the Sunrise EMR and Allscripts PAS. |
| 25. | That training resources be increased and customised, including dedicated training time using multi-modality delivery with flexible approaches. |
| 26. | That SA Health work with clinicians to establish a set of specifications for computer devices, screens and mobile carts appropriate for Sunrise EMR use in different clinical settings, drawing on benchmarks from other jurisdictions. |
| 27. | That SA Health replace devices in existing sites that do not meet these specifications and that future site implementations ensure that devices comply with these specifications. |
| 28. | That SA Health resolve VDI (Virtual Desktop Infrastructure) support and look to broadly deploy VDI as the preferred platform for Sunrise EMR in mobile settings (workstations on wheels) and remote settings. |
| 29. | That SA Health invest in single sign on capabilities, particularly in clinical areas where computer devices are regularly shared. |

**Developing a Clinical Informatics Workforce**

| 30. | That SA Health develop and offer a funded staff professional development program to build a clinical informatics workforce to improve knowledge and build capacity. |
### Investment in Digital Health Beyond EPAS

| 31. | That SA Health invest in digital health beyond the current scope of the core statewide EMR and PAS solution, in particular:  
|     | • resolving the regional hospital’s PAS, which is not currently in the funded business case;  
|     | • investing in outdated systems in NALHN (Northern Adelaide Local Health Network) and WCHN (Women’s and Children’s Health Network) following an audit of which systems require upgrading or optimising; and  
|     | • addressing key risks in existing data centre and network infrastructure. |

### Business as Usual (BAU) Model

| 32. | That a new, consistent BAU model is adopted by restructuring the current EPAS Program team, separating implementation and BAU functions. |
| 33. | That a permanent Sunrise EMR Experience Centre be established at the RAH as a drop-in centre for staff, with additional Experience Centres established at other LHNs in the future. |
| 34. | That an online Knowledge Hub be established to provide comprehensive, up to date and accessible EMR and PAS information to staff. |
| 35. | That each hospital that has the Sunrise EMR implemented, have allocated super user resources to assist with optimisation and personalisation post go-live. |

### Implementation of the Review’s findings

| 36. | That a Review Implementation Taskforce be established for a limited period to oversee the implementation of the Review recommendations, reporting to the Chief Executive of SA Health and Wellbeing. |
3. Review Approach

3.1 Background to Review

In December 2011 the then South Australian Government approved the implementation of a single patient administration and clinical system (EPAS) for all Adelaide metropolitan health services, and two country health services. This was to be completed by 2014.

On 30 March 2018, the future implementation of EPAS was paused pending an independent review to determine the best options for delivering a fully integrated patient administration system and electronic medical record across the South Australian public health system.

At the time of the pause EPAS had been implemented at Noarlunga Hospital, the Repatriation General Hospital (RGH), Port Augusta Hospital, The Queen Elizabeth Hospital (TQEH), St. Margaret’s Hospital, Hampstead Rehabilitation Centre (HRC), along with part of the Royal Adelaide Hospital (RAH) - patient administration system, Emergency Department and part of the Flinders Medical Centre (FMC), those services transferred from RGH. In addition to these hospital implementations, the SA Ambulance Service has been provided a read-only version of EPAS and the following current primary care and outpatient centres have implemented EPAS: Aldinga GP Plus, Marion GP Plus and Noarlunga GP Plus.

EPAS now has around 20,700 active users per month.

An independent expert panel was appointed to conduct the review, comprising Shane Solomon (Chair), Professor Chris Baggoley, and Dr Malcolm Thatcher. Dr Amandeep Hansra and Pamela Scicluna assisted the panel in the review.

The Terms of Reference are contained at Appendix A. The focus of the Review is on the way forward, and in proposing a future approach, it was required to address the following areas:

1. Whether the system is fit for purpose.
2. Whether the current system is safe.
3. Why the projected costs and schedule increased beyond the business case approved by Cabinet.
4. The impact of EPAS on hospital productivity.
5. Adequacy of engagement and consultation to inform the design and implementation of EPAS.
6. Whether the user experience can be improved.
7. Implementation of EPAS.
8. Functionality of EPAS.
9. Proposed future direction for EPAS.
10. Future roll-out of the program.
The panel has been supported by a reference group consisting of a wider team of experts, clinicians, union representatives and key stakeholders. The reference group has provided assistance and advice to the panel, including ensuring that all key issues have been captured and consideration of options for the way forward. Membership of the reference group can be found in Appendix B.

This Final Report addresses the questions posed in the review’s terms of reference and provides a series of recommendations for the Government’s consideration.

3.2 Approach Taken

The review panel undertook a detailed discovery process in order to assess the current state and inform its opinions on appropriate next steps and future direction. The discovery and assessment phase involved:

- A review of program and procurement documentation
- Meetings with key stakeholders including senior EPAS Program staff
- Site visits and staff forums
- Inviting written submissions that would be treated confidentially
- Reviewing national and international benchmarking data on EMR implementations

Activity data were analysed and comparisons made between functionality in the business case; the Allscripts contract; the functionality implemented; and functionality that is available but not used by SA Health.

Allscripts’ Sunrise solution, the software underlying EPAS, was also reviewed, fully implemented, at a major tertiary hospital (Singapore General Hospital). A market comparison was also completed, including an assessment of the two main EMR alternatives to Allscripts operating in Australia: Cerner (at Princess Alexandra Hospital, Brisbane) and Epic (at Royal Children’s Hospital, Melbourne).

A Consultation Paper was released by the Review Panel outlining issues, strategic questions, and options for the way forward. Over 80 submissions were received in response to questions raised in the Consultation Paper. These views have been considered in framing the final recommendations of this Final Report.

Activities informing the review are summarised below:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital visits</td>
<td>12</td>
</tr>
<tr>
<td>Staff submissions</td>
<td>300+</td>
</tr>
<tr>
<td>EPAS training</td>
<td>1</td>
</tr>
<tr>
<td>National &amp; international benchmarking</td>
<td>1</td>
</tr>
<tr>
<td>Hospital staff forums</td>
<td>8</td>
</tr>
<tr>
<td>Interviews with stakeholders</td>
<td>50+</td>
</tr>
<tr>
<td>Documents reviewed</td>
<td>250+</td>
</tr>
<tr>
<td>Electronic Health Record system comparisons</td>
<td>2</td>
</tr>
</tbody>
</table>
4. Benefits of Electronic Medical Records

Based on international and Australian experience, Electronic Medical Record (EMR) systems can have material benefits in patient outcomes, quality and safety, operational efficiency, staff satisfaction and organisational risk. They do this by:

- consolidating patient information in a single place, available to all involved in a person’s care simultaneously;
- automating key care processes, such as prescribing and ordering and receiving results for pathology and radiology; and
- reducing human error through decision-support systems, such as warnings about medication errors.

An independent academic review of digital hospitals in Queensland cited achievement of four key benefits: faster access to records; improved safety through alerts and controls; greater transparency to enable better management; and the potential to improve healthcare through analytics.¹

4.1 Better Patient Outcomes

Evidence shows that EMR systems can improve the quality of healthcare by increasing guideline adherence. This can decrease the use of inappropriate and ineffective clinical practice and reduce medical errors resulting in improved patient outcomes and more cost-effective care.²

The use of EMR systems improves the frequency of patient monitoring. Princess Alexandra Hospital reported a 56% reduction in hospital acquired pressure injuries.³ In the USA, an EMR system with basic decision support, including prompts and reminders for diabetes care, led to an increased number of HbA1c and LDL tests for screening and monitoring.⁴

Alerts within EMR systems can reduce adverse events such as acute deterioration, thereby improving patient care. The Princess Alexandra Hospital reported a significant improvement in the early identification of deteriorating patients with a 59% increase in Rapid Response team call, two years after the digital hospital was implemented.² The Royal Children’s Hospital, has for similar reasons, reported 32% fewer cardiac arrests.⁵

EMR systems have proven to be better predictors than clinicians in some areas and can make use of clinically validated checklists to assess emerging patient risks. For example, studies found EMR systems to be significantly better at predicting high-risk suicidal behaviour in patients attending the

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¹ Burton-Jones, Andrew. Is the digital hospital roll out helping to improve patient care, or is it a waste of public money? The University of Queensland. 2018.
⁵ The Royal Children’s Hospital Melbourne. EMR at the RCH. 2018.
Emergency Department and more effective than clinical assessment in predicting cardiac arrest risk and risk of Intensive Care Unit transfers across 270,000 patients in American hospital wards.

EMR systems can reduce medication errors and result in fewer adverse drug events. The Princess Alexandra Hospital reported 33% fewer incidents related to drug dispensing and supply and 14% fewer incidents related to drug administration and monitoring. The Royal Children’s Hospital reported a 30% reduction in prescribing errors and 22% reduction in overall medication errors. Patients no longer miss out on medication because their prescription has not been passed on to the pharmacy and medication mistakes are picked up automatically.

Although most studies report no, or very minor, statistically significant impact of EMR systems on mortality rates, the Royal Children’s Hospital reported a 14% reduction in patient deaths since the implementation of their EMR system. Orlando Health in the US (who use the Allscripts Sunrise EMR) reported a 14% reduction in overall sepsis mortality rate and 8% reduction in Average Length of Stay (ALOS) for patients with sepsis.

Improved management through an EMR system can increase patient satisfaction through faster clinical review. The Royal Children’s Hospital reduced outpatient waiting lists by 33%, meaning patients are seen by a clinician sooner.

4.2 Improved Operational Efficiency

Several studies focusing on the economics of EMRs reported significant cost reductions associated with medical errors, adverse drug reactions and time inefficiency. Information is all in one place, fast to view, easy to find and provides a clear overview of the whole patient.

EMRs improve the accuracy of healthcare information, are more convenient than paper records and can reduce documentation time. A study in a primary care clinic found 73% of doctors agreed documents were held in the correct patient’s record more often, 88% agreed documents were more legible, 68% agreed individual patient records are more complete and over 80% of clinicians valued being able to access information remotely. EMRs have been shown to reduce documentation time by an average of 22%, especially for nurses with contributing factors such as ease of typing, speed of

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9 The Royal Children's Hospital Melbourne. EMR at the RCH. 2018.
10 Burton-Jones, Andrew. Is the digital hospital roll out helping to improve patient care, or is it a waste of public money? The University of Queensland. 2018.
13 Allscripts. Client Outcomes Collaboration Program. 2015
developing a patient synopsis and reduced effort in communicating patient information between staff.\textsuperscript{16}

Standard hospital processes can be optimised through use of an EMR system, delivering better outcomes. Average length of stay (ALOS) reduced by 6% and 3.5% at the Princess Alexandra Hospital and Royal Children’s Hospital respectively\textsuperscript{17, 18}, which is consistent with a review of over 700 acute hospitals in the USA.\textsuperscript{19} The Royal Children’s Hospital also reported a 27% reduction in Emergency Department episode time.\textsuperscript{15}

The introduction of an EMR system has been associated with increased hospital revenue and reduced costs. The Royal Children’s Hospital reported a 9% increase in activity-based funding (4.4% per bed day); a 10% increase in private patient revenue; 12% increase in prosthetic revenue; and revenue increases associated with improved compliance (PBS scripts, MBS referrals). The hospital also reported a 14% and 29% increase in inpatient admissions and outpatient attendance respectively.\textsuperscript{15}

Cost reductions have been associated with drugs, paper and manual processes. The Princess Alexandra Hospital reported a 14% reduction in drug costs per weighted activity unit (WAU); clinical form costs (including printing) were reduced by 81% at Princess Alexandra Hospital and 32% at Royal Children’s Hospital; transcription correspondence costs have reduced by 87% at the Royal Children’s Hospital; and fewer pathology and imaging interventions are reported at the Royal Children’s Hospital despite higher patient throughput.\textsuperscript{14, 15}

4.3 Staff Satisfaction

Clinicians are sometimes perceived to be reluctant to use EMRs, however studies have found clinicians favour EMR use (citing room for improvement)\textsuperscript{20}. At the Royal Children’s Hospital, staff were measurably satisfied with the EMR and the recorded satisfaction increased over the 18-month period post go live. Over 50% of clinicians perceive that patient care was of higher quality than before the EMR and over 80% believed that they were more efficient in their day to day jobs.\textsuperscript{15}

4.4 Reduced Organisational Risk

EMRs provide a comprehensive record of activities and notes relating to each patient encounter that is fully auditable. This addresses medico-legal risks relating to adverse and sentinel events. Areas where standards are not being met can be highlighted – for instance, through a series of dashboards that track hospital performance against nationally-agreed standards, so that individual clinicians and healthcare leaders can manage their patients and the hospitals more effectively.\textsuperscript{21}


\textsuperscript{17} Metro Health South. Digital Hospital Benefits. 2017.

\textsuperscript{18} The Royal Children’s Hospital Melbourne. EMR at the RCH. 2018.


\textsuperscript{21} Burton-Jones, Andrew. Is the digital hospital roll out helping to improve patient care, or is it a waste of public money? The University of Queensland. 2018.
5. Review Findings

<table>
<thead>
<tr>
<th>Is the system fit for purpose? (Term of Reference 1)</th>
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<tbody>
<tr>
<td>Functionality of EPAS (Term of Reference 8)</td>
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</tbody>
</table>

The most difficult task in assessing whether an EMR or Patient Administration System (PAS) is ‘fit for purpose’, is whether issues with the system arise from:

a) The system itself (“the software”);

b) The configuration of the system (customising it to local needs is essential in every EMR and PAS); or

c) The implementation of the system (how users are trained, workflows are adapted etc).

Many of the functionality issues raised with EPAS relate to the configuration of the system, which flows from the lack of standardisation of workflows and shortage of health informatics expertise in translating these into user friendly application design (e.g. user interface, ‘number of clicks’, intuitive processes).

The implementation issues are addressed separately. This section focuses on the Review Terms of Reference that relate to the functionality of the system itself and how it is has been configured by SA Health.

Procurement Process

Initially South Australia sought a PAS to replace the multiple systems that manage the admission, tracking and discharge of patients through the hospital, including billing. In the process of examining the market during 2010 and 2011, the requirements expanded to cover both the PAS and an EMR. An EMR is a comprehensive system for managing patient care interactions, including entering all of a patient’s clinical notes in one system, prescribing medications, ordering pathology and radiology tests, reviewing results and generating reports.

SA Health approached the market for a combined PAS and EMR. It did not offer the option to vendors of providing a separate PAS and EMR, as is common in other parts of Australia and overseas.

The PAS component is a less significant part of the integrated PAS/EMR used in South Australia. The title ‘EPAS’ is a misnomer and does not reflect the main functionality of EPAS which is as an EMR system.

The procurement process commenced in December 2009 with a market request for proposal (RFP). This request included over 3,500 requirements based on contributions from more than 300 clinical and non-clinical SA Health staff.
The original business case for EPAS set out the major benefits of introducing a PAS and EMR across South Australia:

- Improved patient safety by reducing human error (e.g. prescribing, tracking pathology results, legibility of documentation);
- Better patient outcomes, for example by providing clinical decision support prompts (e.g. allergy alerts, drug interactions, compliance with evidence-based clinical pathways);
- Greater efficiency, for example by consolidating patient information in one place reducing delays for treatment and discharge, and by improving the billing process and performance reporting; and
- Benefits arising from replacing multiple legacy systems with a single integrated approach.

The Review Panel has examined the procurement process in detail and found it to be robust and consistent with normal IT procurement approaches. There were ten responses from the market, of which six were evaluated in detail. No Australian based systems were able to meet the requirements of the RFP.

It is noted that an existing SA Health system, OACIS, used mainly for reporting pathology results but with a functioning EMR in other countries, was not considered because it did not have a PAS.

After further evaluation of the remaining six solutions, a final shortlist of two solutions were selected for final detailed evaluation. The final evaluation involved the following steps:

- a series of second round product demonstrations;
- a series of teleconferences with selected reference organisations for each finalist vendor;
- a risk assessment;
- a 15 year NPV (Net Present Value) costing;
- site visits to the National Health Service (NHS), Lothian, Scotland for InterSystems and to Bronx-Lebanon Health, New York, USA for Eclipsys; and
- a strategic (technical) architectural review.

In addition to the full PAS/EMR solutions, the evaluation panel also considered the strategy of ‘best-of-breed’ standalone solutions, specifically for emergency departments and mental health. The evaluation panel however concluded that these did not significantly exceed the functional scores obtained by the shortlisted vendors.

This led to the selection of the Eclipsys Sunrise solution, now owned by Allscripts. The business case concluded that the Allscripts solution provided 60% of the required configuration ‘out of the box’. It was seen as highly configurable and more likely to be adaptable to South Australian circumstances. There were no other implementations of the Sunrise solution in Australia at the time.

The procurement process resulting in the selection of the Sunrise solution was thorough in its design, adopting an eight-stage process of evaluation. When selected, the software received a functional

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22 The site visits were attended by five SA Health representatives led by the SA Health Chief Executive and the SA Health Chief Medical Officer (as chair of the evaluation).
score of 14.71 out of 20, which the evaluation panel concluded had sufficiently met the scope envisaged by SA Health.

**Functionality: fit-for-purpose?**

There were two significant ‘fit for purpose’ issues with the selected system:

1) It did not have a functioning PAS which had to be built for South Australia. A key challenge was the lack of a billing module for the Australian context.

2) The claim that ‘60% of the system would work out of the box’ was inaccurate. Significant customisation was required and much of the pre-configured reports, worklists, alerts, order sets and clinical documentation needed substantial rework to cater for Australian healthcare practices.

As the first Australian implementation of the Allscripts’ Sunrise solution, SA Health and Allscripts committed to an intensive localisation work schedule. The challenges with PAS functions such as the billing module and with outpatient scheduling led to both delays and functionality that was not fit-for-purpose in early hospital implementations.

It is important to note that while EPAS was intended to replace a number of existing systems, it was also required to interface with many existing systems. That is, it was not intended to provide all functionality of an EMR or a PAS. This is an important strength of the Sunrise solution which is highly configurable and interoperable – in many EMRs, the emphasis is on a self-contained single system with multiple modules. Currently, EPAS interfaces to different degrees, with the following key systems:

- pharmacy (iPharmacy by DXC)
- pathology (EPLIS - Millennium by Cerner)
- radiology (ESMI - Carestream by Carestream Health)
- operating theatre management system (ORMIS by DXC)
- gastroenterology (Provation MD)
- GP clinic practice management software (Healthtrack by Healthtrack Medical Systems)
- master patient index (Infosphere by IBM)
- GP registry (for sending discharge summaries).

The original business case identified that the proposed EPAS solution would include a number of core modules and functionality. These modules are listed below together with the Review Panel’s conclusions in relation to key functions. The product name ‘Sunrise EMR’ is used when referring to the EMR component of EPAS and ‘Allscripts PAS’ used when referring to the PAS component.
**Module: Clinical Documentation**

**Description from Business Case:**
Provides access to comprehensive, integrated electronic clinical documentation to replace existing hard copy documentation including admission forms, case notes (including vital signs, intake and output), bed charts, drug charts, education logs and discharge summaries across numerous disciplines to, amongst other things:
- support more effective and efficient patient care
- improve admission, clinical handover, multidisciplinary care and discharge processes
- enable access to a fully integrated patient record irrespective of the nature and location of services accessed by patients and whether services are provided in a primary care, subacute or the acute care setting

**Conclusions:**
- Notes are consolidated in a single electronic record and accessible to all care staff simultaneously.
- Many notes have been standardised, but there remain over 200 notes templates which creates confusion about where data are stored (Allscripts has advised that usually an optimised configuration of the Sunrise EMR has around 50 notes templates). This reflects a lack of standardisation in workflows and, consequently, what data are to be routinely collected and in what format.
- Clinical documentation lacks sufficient structure and standardisation resulting in clinicians finding it difficult to locate clinical information. Clinical information is presented in different formats depending on the specialty or site.
- Scanned documents, including patient referral letters, are difficult to find and retrieve.
- Key features of some national clinical standards have been incorporated into EPAS, such as the National Inpatient Medication Chart (NIMC) and the Rapid Detection and Response (RDR) observation chart. However, their presentation is not completely consistent with formats familiar to clinicians thereby increasing patient risk.
- In the Allscripts PAS, there is some double entry of patient details leading to inefficiencies in patient flows.
- In the Sunrise EMR, there is some double entry of clinical information in fields that do not automatically auto populate which increases the data entry time required by clinical staff.
- Due to lack of integration with biomedical devices for vital sign measurement, there are requirements for staff to manually enter data. This leads to potential risk of inaccuracies in documentation.
- Key clinical modules are not yet available in the South Australian version of the Sunrise EMR (obstetrics, operating theatres, paediatrics, chemotherapy) requiring staff to use multiple systems or a hybrid paper/digital record system.
- The EPAS Clinical Manager and Patient Flow workflows are not optimised, causing delays in patient discharge and bed allocation (e.g. the RAH reported that complex workflows are not supported such as a patient being transferred to a transit ward from ED before discharge and no automated update to advise a bed has been cleaned).
Module: Computerised Provider Order Entry

Description from Business Case:
Enables clinicians to use the EPAS solution to record and submit orders for treatment. For example, orders for diagnostic tests, bloods, medications, scans, tests, referrals to another clinician for assessment etc. Includes access to pre-configured standard order sets (clinical protocols) for numerous priority or common conditions and circumstances which are based on best practice. Supports improved clinical outcomes through application of best practice; standardised clinical approaches to care; delivery of effective and efficient treatment and supports more junior clinicians.

Conclusions:
- Standardised order sets have significantly improved the efficiency of the care workflow incorporating medications, tests and treatment regimes using evidence based clinical practice. However, these order sets are often unintuitive and can take some time for clinicians, particularly doctors, to become proficient in their use.
- Pathology and radiology results reporting is inadequate with most users preferring to view through OACIS, an existing clinical information system, due to ease of use and access to historical results. There remains a major software defect in looking at pathology results where an error message is displayed when a pathology result is viewed more than once through the pathology summary screen.
- While the radiology system is integrated with EPAS, there are significant shortcomings. Clinicians are unable to sketch the area to be examined on a request form and the results are presented in a very rudimentary format (ASCI text). The interface between the radiology system (ESMI) and the outpatient module has created a significant workflow deterioration compared with the previous paper system. Patients are no longer given an appointment time for radiology exams when leaving the outpatient clinic and the presentation of the request status in the two systems is misleading. This leads to patients returning to follow-up outpatient appointments without the necessary radiology examination being completed.

Module: Allergy and Intolerance Documentation

Description from Business Case:
Enables information relevant to medication ordering to be recorded electronically and used by clinicians through the care continuum of a patient to, amongst other things:
- alert clinicians of known patient allergies/intolerances
- warn clinicians of possible allergic reactions/medication intolerances
- prevent clinicians from ordering a medication to which a patient has a known allergy/intolerance

Conclusions
- The Sunrise EMR supports the documenting and communicating of allergies and intolerances.
- The Sunrise EMR supports warnings and alerts when prescribing, to prevent a clinician ordering medication for a patient who has a known allergy/intolerance.
Module: Medication Management

Description from Business Case:
Supports communication between a clinician and pharmacist irrespective of the clinical setting and enables: medications to be prescribed and ordered by a clinician; pharmacist order review and verification; medication dispensing; medication administration; confirmation of administration and full order reconciliation at admission, discharge and transfer. Underpinned by clinical decision support capability built into the EPAS solution.

Conclusions:
- Medication prescriptions can be made through EPAS, however are manually re-entered into the iPharmacy system. Although this reduces the risk of error from illegible handwriting, it does not achieve the level of closed loop medication administration that would lead to major reductions in medication errors.
- This is a configuration issue, as South Australia has multiple medication catalogues which have not been integrated into a single drug catalogue based on the Australian drug formulary – without this ‘single source of truth’ for medications, the potential of the Sunrise EMR to minimise drug errors cannot be achieved.
- At the RAH, EPAS is not integrated with the Pyxis Medstations for on-ward medication dispensing, with nurses having to look at two screens in different parts of the medication dispensing rooms. This creates risks of incorrect medications being administered to patients.

Module: Clinical Decision Support

Description from Business Case:
Provides real time access to extensive, sophisticated clinical decision support tools and information that can be adapted to suit the South Australian health care environment and which operate 24 hours 7 days per week to support the provision of timely, safe and effective clinical care. The support tools and information are both proactive, enabling alerts to be delivered to clinicians and reactive, so that clinicians can access the information and support they require if and when they require it. Tools and support are provided in numerous areas including:
- Dose range checking
- Drug interaction
- Allergy checking
- Body Mass Index (BMI) and Body Surface Area (BSA) calculations
- Drug and diagnosis conflict
- Pregnancy and lactation drug conflict

Conclusions:
- The Sunrise EMR allows for decision support to be included, such as allergy or medication alerts.
- Decision support requires a high degree of clinical consensus and standardisation so as to avoid ‘prompt fatigue’ which leads to clinicians routinely ignoring alerts (some of which may be very important).
- Decision support in the Sunrise EMR is currently limited but continues to expand as clinical consensus is achieved. Current alerts include allergies, some medication alerts (e.g. drug interactions) and some nursing prompts (e.g. complete falls risk assessment, patient deterioration alerts). Other EMR systems appear to make greater use of alerts to standardise good clinical practice, such as prompts to check for pressure injuries.
### Module: Clinical Analytics

**Description from Business Case:**
Provides access to sophisticated, real time health system performance data including data related to clinical performance, clinical and patient outcomes and throughputs. Enables the data to be monitored and reported in various ways to meet SA Health’s requirements and to support improved patient outcomes and to increase the efficiency of health service provision.

**Conclusions:**
- Although the Sunrise Clinical Analytics module (SCA) has been licensed, it has not been implemented in a manner that clinicians are able to easily mine clinical data and generate analytic reports.

### Module: Patient Administration

**Description from Business Case:**
Provides a complete patient administration function that facilitates the provision of core services, workflows and processes including: patient bookings, admissions, transfers, coding of conditions / treatment, discharges; management of wait lists; service scheduling (i.e. outpatient visit, multidisciplinary care at a GP Plus Health Care Centre); patient billing; bed/chair management; patient flow management.

**Conclusions:**
- Following procurement, the Allscripts PAS was built for Australian conditions. On implementation at Noarlunga Hospital the Allscripts PAS was not fit for purpose.
- The Allscripts PAS now operates to an acceptable standard except for the billing module which has multiple shortcomings, including lack of integration with the Medicare payment gateway for eligibility checking and payments. There are multiple outstanding change requests in relation to billing.
- The deficits in the billing function require staff to manually process receipts and billing and manage large numbers of rejections from Medicare.
- The Allscripts PAS has resulted in better data. For example, easy visualisation of waiting lists for outpatient clinics.
- Staff report entering the same data into multiple fields across different screens as fields are not populated, causing inefficiencies.

### Module: Proactive Health Management

**Description from Business Case:**
Provides a complete set of tools to manage immunisation schedules and wellness events for patients to support enhanced proactive clinical care including:
- monitoring health care plans
- initiating call back systems for patients
- receiving timely alerts regarding patient care
- early intervention to avoid exacerbation of a condition or hospital admission

**Conclusions:**
- Allscripts advises that this functionality is available within the Sunrise EMR and licensed to SA Health but is not in active use.
<table>
<thead>
<tr>
<th><strong>Module:</strong> Patient Lists</th>
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</thead>
<tbody>
<tr>
<td><strong>Description from Business Case:</strong></td>
</tr>
<tr>
<td>Enables users to view patient lists based on particular criteria such as: location, care provider, service, or visit status, irrespective of where in the system a patient presents and in this way support improved scheduling of care and patient management.</td>
</tr>
<tr>
<td><strong>Conclusions:</strong></td>
</tr>
<tr>
<td>- Patients lists have been implemented and are readily available to clinicians.</td>
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<thead>
<tr>
<th><strong>Module:</strong> Patient Education Logs</th>
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<tr>
<td><strong>Description from Business Case:</strong></td>
</tr>
<tr>
<td>Provides education materials and resources for patients (i.e. information sheets for patients to take home) and enables caregivers to track and record education material given to a patient during a visit.</td>
</tr>
<tr>
<td><strong>Conclusions:</strong></td>
</tr>
<tr>
<td>- Allscripts advises that this functionality is available and licensed by SA Health.</td>
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<tr>
<td>- In practice, there is no evidence that the Sunrise EMR is being used to provide educational materials or resources to patients.</td>
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<tr>
<th><strong>Module:</strong> Point of Service Scanning</th>
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<tr>
<td><strong>Description from Business Case:</strong></td>
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<tr>
<td>Enables critical care documentation to be scanned into the system and recorded against the file for a particular patient. Of particular use in ensuring documentation from general practitioners or other service providers can be recorded without access to the EPAS solution.</td>
</tr>
<tr>
<td><strong>Conclusions:</strong></td>
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<tr>
<td>- Document scanning is available in EPAS.</td>
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<tr>
<td>- Users reported difficulties in retrieving scanned documents due to poor indexing. The Review Panel has been advised that this is improved in the current version of the Sunrise EMR (17.3).</td>
</tr>
<tr>
<td>- Allscripts recommends the current scanning module be replaced with their BOSSnet Scanning solution, which is regarded as best in class.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Module:</strong> Results Viewer</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description from Business Case:</strong></td>
</tr>
<tr>
<td>Enables caregivers to view the results for a patient’s current visit and all previous visits, irrespective of where across SA Health the patient presents for treatment. Supports enhanced care provision through access to a comprehensive care record; obviating the need for patient to remember or provide information from earlier visits and helps to avoid duplication of test ordering or treatment.</td>
</tr>
<tr>
<td><strong>Conclusions:</strong></td>
</tr>
<tr>
<td>- Patient viewing portal is not available.</td>
</tr>
</tbody>
</table>
### Module: Secure Health Messaging

**Description from Business Case:** Enables clinicians to have access to key information and messages in relation to their patients and patient care in one location (i.e. alerts, documents, prescriptions, results and secure health messages) and to action the messages as appropriate. Enables critical patient information and documentation (i.e. clinical results or referrals) to be communicated between health professionals involved in the care of a patient but who may not have access to EPAS or may be based outside of SA Health (i.e. general practitioner).

**Conclusions:**
- SA Health are yet to implement secure messaging, with health information either transmitted via an electronic fax gateway or posted by mail.

### Module: Signature Manager

**Description from Business Case:** Enables EPAS users to officially sign orders, documents and verify (approve) orders remotely and across multiple patients and charts through use of a secure electronic signature.

**Conclusions:**
- EPAS access is via password authentication which is the basis of electronic signatures.
- Ongoing education is critical so that clinicians do not share accounts or leave sessions logged in for extended periods which can compromise the use of electronic signatures, especially in relation to order entry.

### Module: Tracking Boards for ED and ICU

**Description from Business Case:** Provision of capability to allow caregivers to track patient status on large-screen monitors. With a bird’s-eye view of the department/service, clinicians can quickly understand patient status, initiate care for those who need it most critically and match available beds to patient needs.

**Conclusions:**
- Several hospitals and departments use the tracking capability within the Sunrise EMR, displaying patient information on large screen monitors to obtain an overview of patient status as they move through the hospital system.
- This was more evident in Emergency Departments.
- There are issues with bed tracking/cleaning system integration so full efficiencies of patient flow have not been realised, particularly at the RAH (ref. Clinical Documentation module).
Module: Work Lists for Clinicians

Description from Business Case:
Provides users of the EPAS solution with access to a range of work lists to assist in management of clinical activities and tasks including: medication administration records, nursing / midwifery work lists, medication work lists, admission/discharge work lists and respiratory work lists.

Conclusions:
- The Sunrise EMR has this functionality, however feedback from clinical staff is that it is not easy to setup or use.
- The latest version of the Sunrise EMR (17.3) has an optimised and improved Workflow Management Tool and Compass (which builds upon and combines the Workflow Management Tool and the tasking infrastructure released in 15.3, known as tasking, into a single user interface).

Module: Records Manager

Description from Business Case:
Enables users to automate and manage both electronic and paper medical records, while providing a transition to paperless medical records to support improved clinical care and increase efficiencies. This includes:
- up-to-the-minute access to information about the location of case notes and charts
- automatic overdue reporting by location and individual
- complete history and audit trail of all records

Conclusions:
- Records management is a core component of a PAS. The Allscripts PAS can track the location of patient charts and provide an audit trail of record movement.
- The current digital/hybrid situation at the RAH results in many clinical forms being created that are separate to the location of the medical record resulting in a backlog of loose sheets for filing. This creates a significant patient safety risk as the paper record is incomplete.

Other Observations

Mental Health

Conclusions:
- The original functionality included a mental health module.
- EPAS does not interface with the community mental health system (CBIS) which prevents integrated care for people with a mental illness, many of whom use inpatient and community mental health services.
- Mental health care staff working in the community use both systems for patient care. Information is viewed within EPAS with notes documented in CBIS.
- Mental health care staff report issues with medication management where the system does not prompt for second signatures when administering certain medications. With frequent use in mental health, these medications have become a safety concern for staff.
Theatre Management

Conclusions:

- Although the Sunrise EMR has theatre management functionality, during EPAS procurement it was considered not fit for purpose and the statewide system (ORMIS) was retained. Basic administrative integration with EPAS exists however there is no integration of clinical notes.
- The Anaesthetics module is not fully developed nor implemented. The RAH has implemented iPro Anaesthesia from iProcedures which although a separate product, is part of the Allscripts integrated offering.

System Integration

Conclusions:

- Broadly, the EPAS technology meets interoperability standards. Shortcomings in integration are mainly due to configuration of workflows, rather than inherent issues with the software (ref. previous issues with the configuration of pharmacy, pathology and radiology workflows).
- The new pathology laboratory information system (EPLIS) is being implemented across all active EPAS sites, integration with the radiology system (ESMI) is complete including closed loop ordering and results for medical imaging, and EPAS can launch results and PACS (picture archiving and communication system) viewing within the patient record and include results within clinical documents.
- Although integration with EPLIS facilitates electronic ordering, issues exist with the integration.
  For example, a staff member orders a pathology test through EPAS which communicates with the pathology system (Millennium), a label number is generated and returned to EPAS for printing. Ideally EPAS would produce a labelling number for instant printing at the collection site.
  Another example is that outpatient doctors are not notified when there are abnormal patient results. To overcome this, outpatient doctors request results be faxed to them.
- Of note, the lack of initial integration of EPAS with EPLIS was a significant contributor to the extra 40 FTE temporary staff required to manually enter pathology orders at a reported cost of $3.6 million.
- There is no integration with other key community systems in mental health and community health (e.g. CBIS).

Reporting

Conclusions:

- Reporting functionality, both clinical and performance is complex and requires specialist expertise (e.g. dynamic dashboards and presentation tools are missing or not made accessible to users).
- An acceptable printed report of chronological patient events for the purposes of the SA Coroner, SA Crown Solicitor, SA Police, Freedom of Information requests, and other lawful requests is unavailable.
- Delays in coding have been reported, particularly at the RAH where it is difficult to locate the clinical record.
SA Health have not upgraded EPAS since the first half of 2015 and is operating on a 2014 release of the software. Consequently, SA Health are not taking advantage of new functionality and resolved software defects, available annually by the vendor (for example, there remains a ‘bug’ that stops a pathology result from being viewed twice). There is a plan to upgrade to version 17.3 (from current 14.3) on a ‘like with like’ basis, with new and improved functionality progressively enabled.

Configuration and change requests

One way of assessing whether a system is functionally fit-for-purpose is to examine change requests. These are common in all EMR systems, arising from changes in clinical practice and from users’ engagement in how to improve a system. Examination of the Sunrise EMR (EPAS) solution in Singapore (in place since 1998), identified approximately 30 change requests a month, where most were minor enhancements and rejected as they would compromise standardisation. Similarly, the EPIC system at the Royal Children’s Hospital in Melbourne is undergoing constant enhancements, although these are perceived as improvements rather than essential changes.

The table below shows a high number of high priority change requests for EPAS, and that the number of changes sought is outpacing the rate of resolution.

<table>
<thead>
<tr>
<th>Priority Level</th>
<th>Total Number of Build Changes</th>
<th>Completed (July 2018)</th>
<th>Added (July 2018)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>27</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>P2</td>
<td>213</td>
<td>71</td>
<td>73</td>
</tr>
<tr>
<td>P3</td>
<td>106</td>
<td>13</td>
<td>17</td>
</tr>
<tr>
<td>P4</td>
<td>26</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>372</td>
<td>94</td>
<td>102</td>
</tr>
</tbody>
</table>

In addition to the planned build changes (enhancements) summarised above, there are 190 outstanding production defects as at 30 June 2018, including six priority 1 (P1) defects and 101 priority 2 (P2) defects.

Priority 1 (P1) defects are defined as having a severe impact on the business and, by definition, result in an immediate and sustained effort by all available EPAS Program resources until resolved. Anecdotally, categorisation of defects is highly subjective. The following table provides an overview of the prioritisation matrix.
The prioritisation matrix does not define the terms “severe”, “major”, “moderate”, “minor”. This means that the opinions and judgements of those assessing change requests becomes the most important factor in prioritising available configuration resources. It is not clear how (or who) makes these assessments. Whilst change request priorities are provided to the Advisory Council and EPAS Board, they are in the form of lists generated by the EPAS Program team, and there is no systematic way of gaining wider clinician consensus of the priorities for improvement. In examining other EMR implementations, the Review Panel observed that the extent of clinician ownership in the system configuration and prioritisation is critical to success.

Changes relating to the system’s ease of use are not prioritised in this matrix. This may lead to the relatively low user advocacy of the system.

Configuration and change requests focus on remediation and enhancement of core EPAS functionality and so non-core value-adding solutions (e.g. securing messaging to GPs) is not prioritised. Enhancements to allow viewing of the Commonwealth Government’s My Health Record by EPAS users is underway but is currently unavailable. EPAS does, however, send discharge summaries to the My Health Record.
National and international standards and benchmarks

In reviewing the software, it is necessary to assess whether it meets international standards and benchmarks. Most international standards surrounding the implementation of an EMR relate to interoperability standards (HL7) and informatics. Oversight of a majority of these standards is by the International Standards Organisation (ISO) Technical Committee, TC 215 – Health Informatics.

Specific to the adoption of an EMR, there are two relevant standards:

- ISO 18308:2011 Health informatics - Requirements for an electronic health record architecture, which defines the set of requirements for the architecture of a system that processes, manages and communicates electronic health record (EHR) information: an EHR architecture; and
- Standards Australia (SA) HB 163:2017 Digital Hospitals Handbook - developed as a set of principles and recommendations that inform the design and implementation of digital hospitals, both new and refurbished, that enables innovative ways for providing healthcare services and supports positive outcomes for stakeholders now and into the future.

A defacto standard for EMR adoption is the HIMSS Analytics EMR Adoption Model (EMRAM)23. The EMRAM model defines 8 levels of EMR adoption maturity as depicted in the following diagram:

![EMRAM Diagram]

The Allscripts Sunrise EMR generally complies with elements of these standards in that it uses HL7 for clinical messaging / interoperability and is capable of meeting the criteria defined by the EMRAM model. However, EPAS in its current form is only capable of progressing to level 5 of the EMRAM model, due to its inability to support closed loop medication administration, which arises from SA Health’s configuration rather than an inherent problem with the software.

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23 [https://www.himssanalytics.org/emram](https://www.himssanalytics.org/emram)
The Allscripts Sunrise EMR is a globally recognised and widely implemented system. The Review Panel examined three international health IT ranking bodies which compare the Allscripts Sunrise EMR with other key systems. In Australia, the other two leading systems are Cerner (implemented widely in NSW and Queensland and some sites in Victoria) and Epic (implemented in the Royal Children’s Hospital in Melbourne, and recently selected for three other major hospitals in Victoria’s Parkville Precinct). There are other smaller solutions in the market, but these have not reached the international recognition of Cerner, Allscripts and Epic.

The conclusions of the three international ranking bodies are summarised below:

a) The HIMSS Analytics EMR Adoption Model sets 8 levels of adoption maturity, with the top level requiring a complete EMR, external Health Information Exchange (to connect with other systems), data analytics, and meeting standards for governance, disaster recovery, privacy and security. It is the view of the Review Panel that EPAS in its current form can only meet level 5 of this standard, which requires physician documentation using structured templates. In the US, only two hospitals using Allscripts have achieved HIMSS Level 7 out of a total of 351 hospitals that have achieved this milestone. In Australia, no hospitals have achieved HIMSS level 7 and only three hospitals have achieved HIMSS Level 6 (which includes full closed loop medication administration). These hospitals are the Princess Alexandra Hospital in Brisbane (Qld), St. Stephen’s Hospital in Hervey Bay (Qld) and The Royal Children’s Hospital in Melbourne (Vic).

b) The authoritative health IT rating body in the US is KLAS Research. The table below summarises the Allscripts Sunrise EMR market position. While not the leader, it has a reasonable rating amongst the top five US EMR systems.

c) The Black Book user experience assessment system ranks Allscripts as number one in South Asia, mainly due to its Singapore implementation. Cerner ranks first in Australia and Epic first in the US.


<table>
<thead>
<tr>
<th>Rank</th>
<th>Platform</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Allscripts</td>
</tr>
<tr>
<td>2.</td>
<td>GE Healthcare</td>
</tr>
<tr>
<td>3.</td>
<td>Cerner</td>
</tr>
<tr>
<td>4.</td>
<td>AthenaHealth</td>
</tr>
<tr>
<td>5.</td>
<td>CPSI</td>
</tr>
<tr>
<td>6.</td>
<td>McKesson</td>
</tr>
<tr>
<td>7.</td>
<td>Meditech</td>
</tr>
<tr>
<td>8.</td>
<td>AdvancedMD</td>
</tr>
<tr>
<td>9.</td>
<td>Epic</td>
</tr>
<tr>
<td>10.</td>
<td>Harris Healthcare</td>
</tr>
</tbody>
</table>

## Healthcare Information and Management Systems Society (HIMSS) standards

<table>
<thead>
<tr>
<th>STAGE</th>
<th>2017 Q3</th>
<th>2017 Q4</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>6.1%</td>
<td>6.4%</td>
</tr>
<tr>
<td>6</td>
<td>32.7%</td>
<td>33.8%</td>
</tr>
<tr>
<td>5</td>
<td>33.5%</td>
<td>32.9%</td>
</tr>
<tr>
<td>4</td>
<td>10.1%</td>
<td>10.2%</td>
</tr>
<tr>
<td>3</td>
<td>12.6%</td>
<td>12.0%</td>
</tr>
<tr>
<td>2</td>
<td>1.9%</td>
<td>1.8%</td>
</tr>
<tr>
<td>1</td>
<td>1.5%</td>
<td>1.5%</td>
</tr>
<tr>
<td>0</td>
<td>1.6%</td>
<td>1.4%</td>
</tr>
</tbody>
</table>

Of the 351 hospitals in the US that meet HIMSS Stage 3 standard, only 2 are Allscripts hospitals.

HIMSS Stage 7 is the highest standard for an EMR. To meet this standard, a hospital should meet the following requirements:

- The hospital no longer uses paper charts to deliver and manage patient care and has a mixture of discrete data, document images, and medical images within its EMR environment.
- Data warehousing is being used to analyse patterns of clinical data to improve quality of care, patient safety, and care delivery efficiency.
- Clinical information can be readily shared via standardized electronic transactions with all entities that are authorized to treat the patient, or via a health information exchange.
- The hospital demonstrates summary data continuity for all hospital services (e.g., inpatient, outpatient, ED, and with any owned or managed outpatient clinics).
- Physician documentation and CPQA has reached 90% (excluding the ED), and the closed-loop processes have reached 95% (excluding the ED).

### KLAS Performance Report – Hospital EMR (over 200 beds)

<table>
<thead>
<tr>
<th>Question</th>
<th>Allscripts</th>
<th>Cerner</th>
<th>Cerner</th>
<th>MEDITECH</th>
<th>Epic</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Summit Clinical Manager</td>
<td>Millennium</td>
<td>PowerChart</td>
<td>Saurian</td>
<td>Clinicals</td>
</tr>
<tr>
<td>Product works as promoted</td>
<td>7.1</td>
<td>7.4</td>
<td>6.9</td>
<td>6.6</td>
<td>8.0</td>
</tr>
<tr>
<td>Money’s worth</td>
<td>6.5</td>
<td>7.2</td>
<td>6.3</td>
<td>7.2</td>
<td>7.6</td>
</tr>
<tr>
<td>Avoirds charging for every little thing</td>
<td>74%</td>
<td>65%</td>
<td>52%</td>
<td>86%</td>
<td>91%</td>
</tr>
<tr>
<td>Quality of implementation</td>
<td>6.6</td>
<td>7.0</td>
<td>6.6</td>
<td>6.3</td>
<td>7.8</td>
</tr>
<tr>
<td>Quality of training</td>
<td>6.6</td>
<td>6.4</td>
<td>6.4</td>
<td>5.8</td>
<td>7.5</td>
</tr>
<tr>
<td>Overall product quality</td>
<td>6.6</td>
<td>7.2</td>
<td>5.9</td>
<td>6.9</td>
<td>7.9</td>
</tr>
<tr>
<td>Delivery of new technology</td>
<td>6.4</td>
<td>7.0</td>
<td>5.1</td>
<td>6.5</td>
<td>7.6</td>
</tr>
<tr>
<td>Ease of use</td>
<td>6.9</td>
<td>6.8</td>
<td>6.3</td>
<td>6.8</td>
<td>7.1</td>
</tr>
<tr>
<td>Supports integration goals</td>
<td>6.5</td>
<td>7.1</td>
<td>5.4</td>
<td>6.5</td>
<td>7.9</td>
</tr>
<tr>
<td>Product has needed functionality (new)</td>
<td>6.4</td>
<td>7.1</td>
<td>5.7</td>
<td>6.3</td>
<td>7.6</td>
</tr>
<tr>
<td>Quality of phone/web support</td>
<td>6.6</td>
<td>7.0</td>
<td>5.9</td>
<td>6.7</td>
<td>7.9</td>
</tr>
<tr>
<td>Proactive service</td>
<td>6.1</td>
<td>6.6</td>
<td>5.9</td>
<td>6.2</td>
<td>7.6</td>
</tr>
<tr>
<td>Vendor executive involvement</td>
<td>7.2</td>
<td>7.5</td>
<td>6.4</td>
<td>7.0</td>
<td>7.8</td>
</tr>
<tr>
<td>Keeps ALL promises</td>
<td>52%</td>
<td>75%</td>
<td>62%</td>
<td>79%</td>
<td>92%</td>
</tr>
<tr>
<td>Part of long-term plans</td>
<td>72%</td>
<td>91%</td>
<td>19%</td>
<td>75%</td>
<td>100%</td>
</tr>
<tr>
<td>Likely to recommend</td>
<td>6.2</td>
<td>7.3</td>
<td>4.2</td>
<td>6.4</td>
<td>8.2</td>
</tr>
<tr>
<td>Drives tangible outcomes (new)</td>
<td>6.6</td>
<td>7.1</td>
<td>5.3</td>
<td>6.5</td>
<td>7.8</td>
</tr>
<tr>
<td>Overall satisfaction</td>
<td>6.4</td>
<td>7.1</td>
<td>5.7</td>
<td>6.7</td>
<td>7.8</td>
</tr>
<tr>
<td>Forecasted overall satisfaction</td>
<td>6.8</td>
<td>7.3</td>
<td>5.7</td>
<td>7.1</td>
<td>8.1</td>
</tr>
<tr>
<td>Would buy again</td>
<td>63%</td>
<td>84%</td>
<td>30%</td>
<td>68%</td>
<td>98%</td>
</tr>
</tbody>
</table>

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International evidence supports safety and quality benefits of an EMR. This has been proven locally with the Princess Alexandra Hospital in Brisbane reporting the following benefits, post implementation of their Cerner EMR:

- 56% reduction in reported hospital acquired stage 3 and 4 pressure injuries.
- 37% reduction in healthcare associated SAB (Staphylococcus Aureus Bacteraemia) infections per 10,000 bed days.
- 33% reduction in drug dispensing and supply incidents.
- 14% reduction in incidents linked to drug administration and monitoring.
- 59% increase in early identification of deteriorating patients.
- 17% reduction in readmissions to Emergency within 28 days of discharge.

While it is difficult to identify an EMR as the single discrete cause of a specific quality or safety improvement, there is general consensus that EMR benefits outweigh any new risks to patient safety and quality of care provided.

The quality and safety impact of EPAS in SA Health sites is inconclusive. With much functionality unavailable (e.g. decision support) and limited rollout across all sites, significant improvements in quality and safety cannot be expected.

Clinical incident information was gathered from the RAH, TQEH, RGH, Noarlunga Hospital and Port Augusta Hospital for the periods 12 months pre and post their respective EPAS implementations (except for the RAH where data was only available for 10 months pre and post go live). These incidents were reviewed to assess the impact of EPAS on the number of incidents at each site (see Appendix C for further details).

It is difficult to make assumptions about causation of incidents being related to EPAS, however some incidents have been investigated and the Electronic Patient Record listed as a contributing cause to...
the incident. The total number of incidents directly linked to the Electronic Patient Record post go live are:

1. Royal Adelaide Hospital: 29 incidents
2. The Queen Elizabeth Hospital: 58 incidents
3. Repatriation General Hospital: 36 incidents
4. Noarlunga Hospital: 15 incidents
5. Port Augusta Hospital: 11 incidents

Most EPAS related incidents did not result in harm and can be described as ‘near misses’, including:

- contact details not added to requests;
- medication incidents including duplicate orders;
- issues with access to clinical information;
- inadvertent cancellation of medical imaging orders;
- incomplete transfer summaries to another health service;
- EPAS information inconsistent with CBIS and OACIS;
- insufficient WOWs (workstations on wheels) to manage medication times;
- incidents related to lack of familiarity with workflow processes; and
- delay in APTT (blood test) ordering.

These incidents represent process issues (e.g. incomplete information entered by users, defined workflows not followed) and technology limitations (no interface between EPAS and CBIS).

The data show inconsistent trends which cannot be necessarily attributed to EPAS particularly when other quality improvement initiatives have been implemented across the system concurrently. For example, the full data pre and post implementation showed that medication errors went down at TQEH and RGH, whereas medication errors went up at Port Augusta Hospital. The pre and post implementation incident data is contained at Appendix C. A robust analysis would include examination of changes in incidents levels at other comparable hospitals which do not have EPAS.

Examples of improvements in quality mentioned to the Review Panel arising from the implementation of EPAS include:

- more complete patient information than ‘paper’;
- anecdotal claims of less deaths in the Noarlunga Hospital Emergency Department (although this may relate to new ambulance bypass policy);
- elements of safer medication (alerts, legibility compared with handwriting, ongoing charts rather than 7-day charts reduces risk of transcribing error); and
- observation prompts.

Examples of clinical risks with EPAS reported to the Review Panel include:

- prescribing errors due to a tick box system for drug dosing;

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25 EPAS partially implemented - Allscripts PAS and Sunrise EMR clinical notes for doctors in the Emergency Department
• infusions do not present as complete until they have been marked as done, leading to a risk of unnecessary re-ordering;
• display inconsistent with the National Inpatient Medication Chart (NIMC) as familiar to clinicians;
• problem with the display layout of observation ranges; and
• continuation of hybrid systems at RAH leading to loose sheets in patient notes.

The SA Coroner has expressed concern since the introduction of EPAS because he is unable to receive a complete medical record in a succinct chronological order. The report generated by EPAS is an excessive number of pages (“boxes of paper”), does not follow a logical sequence of events and makes it difficult and time consuming to conduct a timely review. The latter will be amplified if EPAS is implemented across the state’s health services, creating a potential major backlog in the Coroner’s Office. Although SA Health have offered EPAS access to the SA Coroner to review records electronically, it is reasonable to request a succinct report of chronological patient events be provided.

Similar concerns exist for the SA Crown Solicitor, SA Police, Freedom of Information requests, and other legal matters, including the capability of the system to meet requests for subpoenas.

Some staff reported that patients expressed concern that staff are constantly looking at the screen, rather than interacting with them. On the other hand, improvements to the patient experience is reported through better care handover (faster discharge summaries).

The RAH has raised concerns about continuing with a hybrid EPAS and paper-based system citing clinical risks and efficiency issues, highlighted in the CALHN (Central Adelaide Local Health Network) submission to the Review:

“The hybrid EPAS/paper system at the RAH creates an extreme risk regarding the loss of patient information and handover within the RAH itself, and an atmosphere where staff are concerned that mistakes may be inevitable. This is noted on the CALHN risk register.

All documentation in the Emergency Department (ED) is managed on EPAS and is not available in the paper record for admitted patients. This can lead to a risk of failure in clinical handover and discontinuity of clinical documentation.

Medical, nursing and allied health staff who provide a consult service in ED are currently unable to document in EPAS, resulting in clinical information in multiple places, during the time the patient is in ED and when transferred from ED to their next phase of care.

The current hybrid record solution was designed with the intention to transition to EPAS full functionality within six months of the opening of the new RAH. In the absence of full functionality, workflow changes have been put in place, which are inefficient for staff throughout the hospital.

The workforce at the RAH have demonstrated their willingness to learn, embrace and adopt EPAS, and there is great frustration with clinical staff with the pause.

All staff and services have invested a considerable amount of time in training and preparation. The pause will result in staff requiring re-training or at least refresher training which will again have a clinical, financial and patient impact. Medical staff will also need to be released from clinical duties to train for a second time.”
Reason for increased costs *(Term of Reference 3)*

Cost Performance

Cabinet approved $421.5 million in funding for the EPAS Program in December 2011. The scope was all metropolitan health services and two country health services. In September 2017, Cabinet was advised that the approved budget would be insufficient to complete the program and that the program costs would increase to $471.1 million, however no approval was sought.

At 30 September 2018, $329.5 million of this budget had been spent. This is 78% of the approved budget and 70% of the revised forecast. Based on occupied bed days, about 27.5% of the original scope in the Business Case has been implemented. This would increase to 50% of the original scope had the new RAH been successfully implemented as planned in April 2018 (delayed by the Government’s pause on implementations).

The Review Panel estimates that the total cost to complete the program as per the original scope is $695 million, which includes significant additional site specific costs not previously accounted for in the program. This represents $273 million more than has been approved by Cabinet. No revised budget has been authorised or submitted for Cabinet approval to complete the roll-out as originally planned in the Business Case.

To understand the reasons for the cost increase, it is important to understand the key cost components of the program. These are summarised in the table below for the current implementation stage:

<table>
<thead>
<tr>
<th>Cost Component</th>
<th>Percentage of Cost for Current Implementation Stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vendor Capital</td>
<td>8.4%</td>
</tr>
<tr>
<td>Vendor Recurrent</td>
<td>11.0%</td>
</tr>
<tr>
<td>EPAS Project Team</td>
<td>49.6%</td>
</tr>
<tr>
<td>Other Central SA Health Costs</td>
<td>27.4%</td>
</tr>
<tr>
<td>Hospital Related Costs</td>
<td>3.5%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>

This indicates that the key driver of costs are the fixed costs associated with the central EPAS Project Team and related SA Health expenses, accounting for 77% of the total cost of the program. Vendor costs are 19.4% and contributions directly to hospitals 3.5% (e.g. staff backfill, some equipment).

The implication is that the increase in costs is a direct function of the delay in implementing the program, as conceived in the original Business Case. The Project Team costs accumulate at $2.4 million per month. Delays in the program incur these extra costs, plus related vendor expenses. The full program costs are approximately $4.5 million per month.
The original Business Case did not include costs for devices at the hospital, as it was assumed bedside monitors would be used (they were subsequently deemed impractical).

**Timeframes**

To understand the cost growth, it is necessary to analyse why the program has been delayed. The Business Case set out a very ambitious program of completion within three years, by 2014. This assumption was based on 13 months to configure the software for Australian (and specifically South Australian) conditions, with 60% of the Sunrise EMR and Allscripts PAS solution working ‘out of the box’. Two teams were proposed to implement hospitals concurrently.

Australian and international experience indicate that the Business Case was extremely optimistic, particularly as Allscripts did not have a functioning PAS for Australia and had not previously configured the Sunrise EMR for Australian conditions. Based on the experience at the Australian Cerner and Epic sites, a more realistic timeframe would have assumed:

- two years for configuration
- one major hospital each year
- one smaller hospital each 8 months.

Based on these assumptions, and without any unexpected delays, a more realistic timetable for the program would have been completion by between 2018 and 2020. As the program is 27.5% complete, the increase in costs cannot be attributed to an overly optimistic Business Case alone.

The first activation (go live) of the solution occurred 19 months after the program was approved (Noarlunga Hospital). The initial three implementations at Noarlunga Hospital (August 2013), Port Augusta Hospital (December 2013) and RGH (April 2014) were extremely difficult experiences for staff and created considerable bad publicity.

After this problematic implementation, a formal eight-month “stabilisation phase” commenced in June 2014 to address issues with various system functions, including the Allscripts PAS which was not fit for use (particularly the billing and outpatient scheduling functions). Further implementations were on hold during this time with the exception of investigating activation at the old RAH. In effect, the stabilisation, which included two upgrades of EPAS, continued throughout 2015.

The next significant activation at an acute hospital, TQEH, occurred in June 2016 which was regarded as a success. This suggests that it took four and a half years to get a ‘fit-for-purpose’ PAS/EMR. The go live at TQEH was reported by staff as an improved implementation, however there were major problems with the infrastructure (slow, freezing regularly), which resulted in a major review and remediation by Allscripts. This is the last major hospital go live to date.

This was followed by Phase 1 at the new RAH, with the Allscripts PAS and limited Sunrise EMR clinical functionality in the Emergency Department activated in September 2017.

The HRC went live with EPAS in March 2018 following six months of activation preparation.
The timing of the activations is illustrated below.

External factors have contributed to implementation delays, for example, transferring part of RGH to FMC, delays with the new RAH building construction and several abandoned activations (one at the RGH, Lyell McEwin Hospital, and Modbury Hospital; two at TQEH and the RAH). Although the old RAH was assessed for activation, it was considered infeasible due to legacy IT infrastructure.

These external factors were not well managed and reflect weaknesses in the governance approach, whereby decisions were not made quickly to redirect resources once it was clear that implementation at a site was not practical (e.g. effort could have transferred from the RAH to FMC once it was clear the system could not go live at the old RAH).

In summary, additional program costs can be attributed to:

- an overly optimistic business case;
- delays in configuring the system to be fit for purpose for SA Health, particularly in relation to the Allscripts PAS;
- poor implementations that led to delays in further implementations while problems were rectified; and
- external factors, compounded by governance limitations that led to delays in pivoting to alternative implementations.
Impact on hospital productivity (Term of Reference 4)

A major reason for implementing an EMR is to improve productivity and efficiency. This is done by automating manual processes (like scheduling or prescribing), making the recording and retrieving of patient information quicker (clinicians do not need to be at the bedside to review notes or complete orders) or by providing better data for management.

Efficiency gains have been reported for EPAS, including:

- reducing the time spent searching for and retrieving paper records - paper notes can be stored in multiple locations and patient records and medication charts separated, whereas patient records in EPAS (including previous admissions at the same or alternative EPAS sites) are available instantly;
- outpatient letters can be provided at discharge rather than multi-day delays and discharge summaries can be sent earlier; and
- improved visibility into workflow information, e.g. notification of patient arrival minimises waiting times, delays and manual checks.

Decreases in productivity have also been reported for EPAS, including:

- increased time taken for ICU ward rounds;
- additional administration staff required in some areas e.g. billing and outpatient departments; and
- unproductive time spent logging on to the system.

Currently, productivity gains appear to be offset by slower workflow processes attributed to EPAS. There is also a requirement to collect more information (which may positively impact quality). Lower outpatient activity during a site activation has been experienced, however users report normal activity resumes some period after the system is implemented.

Analysis of inpatient, emergency and outpatient activity was undertaken to assess this claim. The only differences in activity that can be attributed to EPAS were in outpatients. Changes to inpatient and emergency activity is strongly influenced by the restructuring of SA Health, including the relocation of the RAH and moving of the RGH to FMC.

The following graphs show the change in outpatient activity pre and post implementation of EPAS at each site. The table summarises the change at one and three months after go live and how long before each hospital returned to previous levels of activity. The data show a significant slowdown in outpatient activity immediately after implementation for Noarlunga Hospital, RGH, TQEH and the RAH, with a return to pre EPAS levels some months after implementation. It should be noted that the RAH outpatient activity is likely to be more affected by the relocation to the new hospital than the partial implementation of EPAS.
<table>
<thead>
<tr>
<th>Hospital</th>
<th>% reduction in outpatient attendances</th>
<th>Time to return to previous levels of activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noarlunga Hospital</td>
<td>-7.6%</td>
<td>10 months</td>
</tr>
<tr>
<td>Port Augusta Hospital</td>
<td>21.1%</td>
<td>higher than pre EPAS</td>
</tr>
<tr>
<td>Repatriation General Hospital</td>
<td>-38.1%</td>
<td>12 months</td>
</tr>
<tr>
<td>The Queen Elizabeth Hospital</td>
<td>-29.0%</td>
<td>4 months</td>
</tr>
<tr>
<td>Royal Adelaide Hospital</td>
<td>-46.4%</td>
<td>8 months</td>
</tr>
</tbody>
</table>

**Noarlunga Health Service**
Before and After EPAS go-live (25 August 2013) monthly outpatient attendances

**Port Augusta Health Service**
Before and After EPAS go-live (15 Dec 2013) monthly outpatient attendances
Adequacy of engagement and consultation *(Term of Reference 5)*

Stakeholder and LHN Engagement During Procurement

Initial stakeholder engagement commenced in 2009 with the release to market of the RFP for a new EPAS solution. This RFP included over 3,500 requirements which were based on contributions from more than 300 clinical, administrative and technical staff. An independent review of the procurement process in March 2012 concluded that the then ICT Division of SA Health heavily influenced the project. Whilst governance arrangements were established during the evaluation of the RFP, there is no evidence of strong clinical governance oversight of the development of the RFP.

In March 2010, 80 clinical and non-clinical staff evaluated the RFP responses. The evaluation had oversight by a strategic evaluation team, chaired by the SA Health Chief Medical Officer. The evaluation consisted of seven sub-groups:

1. EPAS Clinical and Functional - 13 clinicians
2. EDIS (Emergency Department) - 11 clinicians
3. MHPCMS (Mental Health) - 8 clinicians
4. Technical
5. Commercial & Contractual
6. Enterprise Requirements
7. Billing

The first three of these groups were clinician-led with a total of 32 clinicians participating from across the State and from different disciplines.

Overall, engagement of stakeholders was appropriate during procurement, however the process would have benefited from external expertise during the establishment and evaluation of the RFP. The need to engage external experts is a key lesson for complex and high-risk government procurement, especially where the government is procuring these systems for the first time.

Clinical Governance Design

Clinical governance of the original design of EPAS was the responsibility of the Clinical Design Team which reported to the Clinical Advisory Group. The Clinical Design Team had oversight of a number of clinical working groups. The clinical working groups were established to ensure cross-regional representation from all local health networks and the SA Ambulance Service. The original design of the governance model is depicted in the diagram below.
The approval process for the design is depicted in the following table:

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>APPROVAL PATHWAY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>APPROVE&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td>EPAS PROGRAM BOARD</td>
<td>✓</td>
</tr>
<tr>
<td>EPAS ADVISORY GROUPS</td>
<td></td>
</tr>
<tr>
<td>EPAS CLINICAL WORKING PARTIES</td>
<td></td>
</tr>
<tr>
<td>EPAS DESIGN TEAM</td>
<td></td>
</tr>
</tbody>
</table>

Over time, the Clinical Working Parties became less engaged and did not operate as originally intended, for example, the system design was not driven by them. Clinicians were ‘consulted’, but there was no sense of ownership of the configuration of the system, or a belief that they had the authority to determine the configuration. The Program Board and Clinical Advisory Committee did
not have a well-structured way of ensuring that configuration decisions were being made with the adequate senior clinical ownership from the different clinical groupings. This reflected a lack of approval delegation of the system configuration.

Combined with the ‘poor press’ surrounding the EPAS program, this lack of system ownership led to clinician engagement and ownership being dissipated.

User experience *(Term of Reference 6)*

**User Expectations**

There is a reasonable expectation that EPAS should make clinicians’ and other staff’s work easier, save time, improve patient outcomes and optimise funding.

To meet these expectations, EPAS should have the following features:

- Be intuitive, easy to use and simple to navigate;
- Support and improve existing workflows;
- Reduce risk to patient care;
- Support good clinical decisions by prompting best practice (without creating alert fatigue);
- Be consistent with local practices, national and international clinical standards;
- Be reliable; and
- Cover all clinical areas so everything about the patient is in one place.

In order to maximise the benefits of EPAS, users expect to be involved in the enhancement of the system; be proficient in the use of the system; better communicate with the patient; and have visible workflow information.

In broad terms, the user expectations described above are not being met.

Users of the system (with very few exceptions) expressed the strong view that they did not want to return to a paper-based system. Users value having all the patient notes and information in one place - citing previous experience of chasing physical medical records in another part of the hospital, tracking down drug charts, and finding diagnostic test results that were often on fax machines. Users also pointed to improvements in prescribing from not having to read illegible handwriting.

While holding this view that EPAS is ‘better than paper’, users also told the Review Panel that EPAS is a difficult system to use, described often as ‘clicky, clunky and cumbersome’.

Workflows are often unintuitive, with numerous steps to complete a simple task. For example, recording observations is a slow process requiring users to click, enter data and accept in each box individually rather than entering all the information before accepting the group of observations. This also causes clinical staff inefficiencies. The steps are often in an illogical order that do not simulate
previous practical workflows. There are multiple ways to complete the same task, which is confusing for staff and does not encourage consistency across units and hospitals.

The system is highly configurable, with some standardisation issues, resulting in considerable time and resources spent by staff to configure and personalise the system to make it useful for their particular role or specialty. While this can be a strength, it has added to the complexity of the system overall.

The presentation of patient information is sometimes not clinically meaningful (e.g. infusion rates are separated from blood pressure readings and from urine output readings in the ICU module). Although functionality exists and training material available to support a single view for infusion rates, blood pressure and fluid balance on a single screen (visible within the Clinical Data Viewer tab within the software), in practice users have not configured the solution to take advantage of this.

Physical performance issues are experienced by users with the system often being described as ‘slow’ and requiring a long time to navigate between screens. Load time delays experienced when navigating multiple screens to perform a task compound the perception of slowness. Logging on to the system is time consuming and constantly repeated, with no proximity or persistent log-in capability.

End user system performance is actively managed centrally, manual testing of the end user experience at active sites is ad hoc. Performance issues are often not reported as support issues by users.

Results from recent performance testing are below. These results will be used as a baseline for ongoing monitoring. It has been observed that system performance is slower if computers have not been rebooted for some time.
The recent performance tests\(^\text{26}\) as reported by the EPAS Program team found:

- General PC functions were slow and variable across sites e.g. PC Reboot and Windows Logon.
- No issues were identified with EPAS application performance after PC reboot.
- Slowness and freezing were not identified or reported as part of the testing.

### Devices

There are serious hardware limitations. Small screens mean that each ward round requires two to four workstations on wheels (WOW) devices, there is very limited use of mobile devices and the availability of terminals is insufficient in many areas. It is noted that the original Business Case did not include the extra costs of hardware devices, as it was assumed bedside entertainment / point-of-care devices would be used for viewing and data entry - in practice, the bedside devices are not fit-for-purpose, particularly for data entry other than some nurses opting to use them as a touch screen for recording medication administration. Consequently, the cost of hardware is borne by the LHNs, which has led to compromises and seriously affected user experience (including concerns about workplace health and safety).

Significant feedback was received from users of EPAS that the WOWs were not fit-for-purpose due to their small screen size. The trolleys also create repetitive strain injuries for staff due to the need to bend down towards the screen to view the screen content. For taller staff, the trolleys did not extend high enough to prevent such injury.

\(^{26}\) Testing was completed across all activated sites including Allied Health rooms, Consult rooms, ICU, Medical Records, Outpatients, Ward Clinical areas and all Emergency Department locations.
In essence the WOWs generally deployed are unsuitable and represent a workplace health and safety risk to staff.

Each hospital where EPAS was deployed also had a small number of WOWs with larger screens fitted. These configurations allowed multiple windows to be open concurrently, which proved much more effective. These devices however were in demand and usually reserved by medical officers.

In addition to the utility of the devices, staff have raised concerns regarding the slowness of the devices, including freezing of sessions. Data received from the program on session performance suggests that the problem with slowness is likely a combination of two factors:

1. Older devices running 32-bit Windows operating systems that limit memory on the devices to 4 gigabytes (GB); and
2. Devices running multiple user EPAS sessions that result in the memory swapping;

The EPAS software is memory intensive running as a ‘thick client’ on the personal computer (PC). 4GB of memory is insufficient to run the software and ensure users do not experience slowness, particularly if there are many user sessions running on the computer.

**Remote Access**

Clinicians have identified that there is significant benefit in being able to access EPAS remotely, that is when not at a hospital / clinic, but rather when at home or travelling.

Currently clinicians with an SA Health issued laptop can access EPAS remotely by first establishing a Virtual Private Network (VPN) connection. This requires a second factor authentication in addition to a user ID and password. Non SA Health issued laptops can also establish a VPN connection for remote access however the current technology makes the process difficult from an end user perspective.

Remote access can be simplified and made more secure through the deployment of virtual desktop infrastructure (VDI). VDI is an alternative desktop delivery model that allows users to access desktop sessions running in the data centre. The host device effectively operates as a dumb terminal as the desktop session, including the operating system (such as Windows 10) and all the applications are run from the data centre. VDI also has the benefit of session portability where the current desktop session, including running applications, will present to the user should they move to another device.

SA Health has deployed Remote Desktop Services (RDP) which is a similar concept to VDI except that RDP users share resources and are not issued with their own virtual machine, meaning that RDP sessions are impacted by other RDP sessions. The RDP offering from SA Health does not support session portability.

SA Health is piloting VDI, however there are issues with EPAS not being supported by the vendor on the preferred VDI platform which is offered and managed by an outsourced provider.
Single Sign On

Single sign on is a technology that broadly describes three capabilities:

- The ability to use an alternate method to user ID and password for authentication; examples include proximity cards or Radio Frequency Identification (RFID), a biometric identity such as fingerprint, facial recognition, palm veins, iris/retina recognition and hand geometry.
- The ability to provide the same sign-on automatically to multiple applications. Once a clinician has authenticated to the device, then those credentials are automatically applied / passed through to other applications as they are opened, thus removing the need for the clinician to login to every system manually.
- Persistent Sessions – the ability for a clinician to move between devices and resume their previous session on the next device. Thus, the clinician does not need to restart applications.

These single sign-on capabilities provide considerable time savings to clinicians particularly in areas where computer devices are regularly shared, e.g. Emergency Departments.

Currently SA Health does not support single sign on capabilities.

Should SA Health progress the deployment of VDI, the approach to single sign on can be simplified to focus on fast authentication as session persistence / session portability will be provided by the VDI environment.

Implementation of EPAS *(Term of Reference 7)*

Approach

Transitioning from a paper-based to a digital solution requires a significant investment in workflow redesign and change management. Implementations have experienced success where strong clinical engagement has driven the process. However, where health informatics expertise is unavailable, the process has been overwhelming and time consuming for staff and resulted in suboptimal outcomes (creating ‘unfriendly’ digitised paper forms).

SA Health’s EPAS implementation model has been to drive the program centrally with a focus on achieving what must be viewed as unrealistic time frames.

Engagement with the solution provider, Allscripts, is minimal having diminished over time. It is common both in Australia and internationally for the supplier to be heavily involved during an implementation to complement the team’s capability (lessons learned from previous implementations, product domain knowledge). For example, the EPAS Program team currently includes 10 full-time Allscripts personnel, whereas Queensland had up to 130 Cerner staff to support their statewide implementation (now reduced to 50-60 to support business as usual), the Royal Children’s Hospital had upwards of 70 Epic staff during go live, and SingHealth (Singapore) had 25-30 Allscripts staff during go live.
With limited prior experience in statewide EMR/PAS roll outs, capability has been developed by learning on the job over time. Areas of capability building include the training model, system configuration, system integration, activation (go live) approach and ensuring infrastructure (network, computer hardware, devices) are robust (resilience tested).

It is broadly acknowledged that the current EPAS Program team are dedicated, professional and well-regarded by hospital staff when they go onsite in the lead up to activation / go live. While it is recognised that the skills and capability of the implementation team has significantly improved, it has followed initial poor implementations and reputation damage to EPAS. The capability for future success needs to draw upon best practice from outside of South Australia.

Engaging with the international Allscripts customer community would allow SA Health to learn from product experts and peers on how to optimise the solution in the SA Health environment. For example, by attending international user conferences.

Clinical informatics expertise during the software configuration process has been insufficient resulting in suboptimal or poorly structured clinical data. Contributing to the lack of intuitive workflow design is a noticeable absence of doctors with clinical informatics experience as part of the core implementation team, and process redesign skills at a local level where departments are required to standardise work processes.

The hardware and infrastructure are reported as unreliable at times, with EPAS sites reporting issues with performance (slow response times) and network black spots. Initial analysis suggests this may be caused by inadequate network infrastructure and the age (processing and memory capacity) of devices. Performance testing prior to each activation has been inadequate to date.

The central SA Health EPAS team has been divided into two teams, implementation and ‘business as usual’ (BAU). However, during a site activation there are ‘all hands on deck’ and the BAU activity suffers. This impacts on responsiveness to improvement requests and defects identified at existing EPAS sites.

**Training and Support**

Users expect to be well trained prior to initial use of EPAS and as their skills develop, so they are proficient in its use.

The training approach has evolved in response to user feedback. Initial training was provided in a classroom style setting where the material covered general functions of EPAS. Users found this approach inconvenient and an inefficient use of their time, as much of the material was generic and not specific to their roles.

A combined approach of online training modules and face-to-face were introduced in August 2014 to increase program efficiency and user flexibility. eLearning now represents the core EPAS training.
eLearning modules have been developed in the following disciplines: EPAS basics, pathology, medical imaging, scientific and technical staff, allied health, nursing and midwifery, medical officer and administrative staff. On average, online modules take 2-3 hours to complete. Training is supplemented by face to face learning, workshops and in-service training. For example, medical officers are required to undertake the following training activities:

- General computer competency
- eLearning - Medical Officer basics
- Workshops and in-service training
- Additional courses for medications
- Other self-directed learning as appropriate to their discipline

The EPAS training model also singles out managers (clinical service coordinators / department heads) and other senior staff as playing a key role during and after implementation. Referred to as implementation leads, these users undergo additional training to ensure higher levels of competency in the use of EPAS. The EPAS program has a target of 20% of all EPAS users being designated as implementation leads.

In addition to supporting other staff in the use of EPAS, implementation leads also have a responsibility for ensuring workflows are appropriately designed and implemented (understood).

Implementation leads undergo an average of one full day training followed by self-directed and supported learning. Implementation leads have not been released for extended periods, which impacts on their ability to upskill. Implementation leads attend more face-to-face training than other staff and there is an expectation that they are involved in workflow and business rule decisions. Implementation lead training occurs during implementation preparation so the updated workflows and business rules can be used in the subsequent end user training.

The business case for EPAS assumed that 80% of staff training would be backfilled (funded by the LHNs). Training however mostly occurs during users’ ‘spare time’ and during changeover periods. The approach of whether users are taken offline to undertake training is inconsistent and generally depends on the clinical demands of each area.

Users are expected to personalise EPAS to suit their needs. Those who invest time in this have reported higher satisfaction. However, as there is limited sharing both within and across sites, each user re-invents their own personalised profile. The process is inefficient and creates inconsistencies of how and where data are captured and stored.

As is common with EMR/PAS implementations, it takes several months for users to feel competent with EPAS. There is very limited (or no) ongoing support onsite to assist with system optimisation post go live, leaving users to rely on their peers who may lack time and expertise.

Although training has improved, most users feel marginally competent at go live and that they are not making the best use of the system. Users have responded well to the online content, however
requested improvements include more hands-on and face-to-face experience before go live, tailored role-specific training by knowledgeable trainers, flexibility in training methods (online, onsite/offsite, face-to-face), and dedicated face-to-face time for training (particularly for doctors).

While the level of support from the central team during implementation is highly valued, the ongoing support post go live is regarded as inadequate, described as the “EPAS train comes and leaves”.

The business case for EPAS assumed that ongoing training for EPAS would sit with the LHNs, which was unrealistic. All EPAS sites highlighted the lack of onsite resources and support post go live, preventing optimisation as users familiarise themselves with EPAS over some months. Onsite super-users are seen as essential for assisting with system customisation and to share learnings of how to make best use of the system. Currently users rely on a call centre support line which reportedly can result in frustration - time taken to resolve issues in a high-pressure environment and a lack of confidence in problem solving.

**Governance**

Governance of the EPAS Program is a major concern, with a lack of clear accountability, authority, transparency and focus on outcomes.

The governance framework envisaged in the original EPAS Program Plan was well structured. However, accountability for outcomes was misdirected as it sat with the Program Board rather than with the LHNs. Put simply, the LHNs have never been accountable for clinical and non-clinical benefits associated with EPAS.

Whilst the original EPAS Program Board was chaired by the Chief Executive of SA Health and membership included Chief Executives from the LHNs, this is no longer the case. The prominence of the Program as a major transformation initiative across the health system has declined.

The role and accountability of LHNs is unclear. Although a centrally driven program, the consequences reside with the LHNs and activation readiness an LHN responsibility. Low training rates close to go live could reflect a lack of engagement at the local level.

Currently, the Chief Information Officer (CIO) is the business owner / senior responsible officer for the Program. As an EMR/PAS is essentially a clinical and business initiative, it is important that the senior responsible officer for the program come from the mainstream business of SA Health, and not just the IT area.

Accountability for the Program needs to sit with the LHNs and the program needs to be recognised as a major clinical and business transformation initiative rather than an IT project.

The Review Panel observed that the level of engagement and authority for key decisions is unclear and has impacted significantly on the timeliness of the program and functionality of the system. These key decisions include:
• lengthy delays surrounding the RAH implementation (to do, or not to do);
• problematic scheduling decisions (e.g. Hampstead Rehabilitation Centre was implemented at short notice);
• decisions to not keep EPAS software versions up to date with the current version being four years old and decisions made to only implement the latest version 17.3 like-with-like, rather than accepting upgrades that address usability and functionality concerns; and
• prioritising configuration requirements (e.g. not focussing on medication despite the evidence elsewhere of how an EMR reduces medication errors).

Go live readiness has been an ongoing issue, for example, business consultants’ reports have not accurately foreseen major problems including at TQEIH, indicating governance oversight weaknesses.

The change request process is obtuse to front line users with many unclear of the process. Assessing and implementing a change request is excessively slow, taking between six and twelve months, with users reporting no feedback on progress, although this has improved recently.

Communication and support for subsequent releases and changes post implementation has been reported as an issue by users. In effect, change requests lack the level of appropriate clinical engagement required to give confidence that these represent front-line priorities and needs. The process for prioritising change requests for CALHN is summarised in the below diagram. The Southern Adelaide Local Health Network (SALHN) has no central clinical oversight of changes being requested and relies upon relationships within the EPAS Program to prioritise the change request and navigate the change request process.

The below diagram provides an overview of the LHN escalation process for improvement requests within the CALHN (prior to the improvement being accepted).
The process of evaluating and progressing improvements requests once received by the Program is significantly more complicated (as illustrated below).
Network and System Performance and Resilience

The EPAS solution functions reliably from a data centre infrastructure perspective.

System performance issues reported to the Review Panel (e.g. perceived slowness) have been attributed to the hardware supporting end user devices which are unable to cope with multiple applications running or multiple sessions of EPAS, and old end-of-life networking infrastructure in the hospitals (other than the new RAH). Infrastructure and technology upgrades have improved system performance enabling more than one instance on a single device.

EPAS users have reported that certain areas of the hospitals have Wi-Fi black spots where mobile devices lose network connectivity.

There is no routine testing of system speed from an end-user perspective, but testing following anecdotal reports to the Review Panel showed acceptable screen response times, but slow login times (ref. User Expectations section).

The initial system performance issues at Noarlunga Hospital, TQEH and HRC have largely been resolved. These seem to have arisen primarily from hardware problems, rather than with the EPAS software itself.

Remote access via the web version is limited to viewing only (a clinician is unable to order a test or drug remotely, unless they have VPN). Users have the option to access full EPAS functionality remotely via VPN using SA Health devices and improvements are underway to address the shortcomings experienced with VPN use (e.g. difficulty using personal devices). When EPAS is used remotely, performance is reported as slow.

The Business as Usual Model

The original business case and program plan envisaged a BAU model that consisted of six components:

1. **Clinical Outcomes Measurement**, where clinical key performance indicators (KPIs) would be monitored and evaluated.  
   *Current state:* there is no evidence that clinical KPIs associated with EPAS are routinely captured, assessed and reported on.

2. **Clinical Content Management**, where processes would be established for managing changes to clinical workflows, alerts and order sets based on best evidence.  
   *Current state:* Inconsistent processes have been established within LHNs for assessing and prioritising changes and there would appear to be no clinical rigour regarding the assessment of changes as they relate to evidence-based best practice.
3. **Clinical Change Management**, where processes would be established to sustain enterprise wide clinical workflow change management.  
*Current state:* The original approach to change management involved the training of clinical leads within each facility. While this approach is laudable, the lack of ongoing support for EPAS clinical leads within the LHNs has led to diminished effectiveness of the clinical leads in supporting other staff in coping with and adjusting to changes in clinical practice.

4. **Technical Release Management**, where technical procedures would be established to implement enterprise wide clinical content and workflow changes.  
*Current state:* Processes around technical change management have been well implemented with appropriate levels of testing. Change documentation is comprehensive and communications management with users is appropriate.

5. **Adoption Support**, where mechanisms would be established for monitoring, improving and reporting on EPAS adoption.  
*Current state:* There are inadequate mechanisms for monitoring and improving EPAS adoption which is a consequence of there being insufficient BAU resources located directly within the LHNs.

6. **Ongoing Training**, where mechanisms would be established for monitoring, improving and sustaining ongoing training to ensure training is embedded in clinical operations.  
*Current state:* The current model of ongoing training is based on staff travelling to the central EPAS Program team in the Adelaide CBD. This is too removed from clinical practice and although there are effective online training options, this is not a substitute for ‘at the elbow’ training and support within the hospitals.

The original program plan also discussed the need to establish ongoing clinical support mechanisms to ensure EPAS continues to meet the needs of clinicians, however no detail was provided. The original program plan expected that 78 staff (excluding help desk staff) would be retained post implementation of the system to provide ongoing BAU support. The EPAS Program currently utilise approximately 230 full time equivalents (FTEs), however it is difficult to quarantine which of these 230 staff are dedicated BAU resources as many of the BAU staff move to supporting implementations.

There is a need to resolve the BAU model following implementation at sites, with a focus on how to achieve the six components originally envisaged in the program.
6. Future Direction
(Terms of Reference 9 and 10)

The Review Panel accepts that a return to paper is not a sensible option for South Australia. With so many important issues raised with EPAS, it is also not considered an option to continue ‘as is’. There is strong evidence of improved patient outcomes and efficiency benefits from EMRs. The Review Panel believes that SA Health must continue to pursue these.

Therefore, the key question for the Review Panel is whether the issues with EPAS can be addressed adequately so that the system can meet the expectations of users in the future. To answer this question, the Review Panel considered whether the key problem is with either:

a) the software solution (supplied by Allscripts),

b) the configuration of the solution (managed centrally by SA Health), and/or

c) the implementation and governance of the program.

The Review Panel concludes that all three factors have contributed to EPAS not meeting user expectations.

Initial examination of the Sunrise EMR solution in Singapore indicates that it can be fit-for-purpose over time, provided sufficient effort is put into engaging clinicians to configure and standardise the system. Examination of other Australian EMRs indicates that the configuration and implementation approach is essential for achieving the benefits of an EMR. The Review Panel concludes that all three elements are critical.

Considering the substantial people and financial investment in the existing EPAS solution, the Review Panel believes that every effort should be made to optimise the current EPAS Program. However, this will require major changes to how the current EPAS Program operates.

It should be noted that the issues identified in this review are not unique to the Allscripts solution, as all EMR systems require configuration and changes in workflows. Unless the governance, clinician engagement, configuration and implementation issues are addressed, there is unlikely to be a significantly better outcome from choosing a different software solution.

The Review Panel has determined that the future direction of the EPAS program should include:

- creation of an SA Health Digital Strategy;
- significant governance reforms;
- actions to improve the Sunrise EMR and Allscripts PAS solutions;
- a proposed program of establishing two exemplar sites for the Allscripts solution;
- improving the relationship with the Allscripts vendor;
- improving the approach to training; and
- improving post go-live support.
6.1 Creating an SA Health Digital Strategy

There is currently no well-articulated SA Health digital strategy.

The original business case for EPAS discussed the alignment of the EPAS investment with SA Health's careconnect.sa Strategic Directions 2009-10 to 2016-17 document. This document outlines a significant program of foundational eHealth enablers such as the health information broker (interoperability platform) and the enterprise master patient index.

The status of the current eHealth Strategic Plan 2016-2020 is unclear and is not ‘owned’ by LHNs and clinicians. It does not have a detailed plan of strategic initiatives and funded investments required to deliver the vision. The strategy lacks Ministerial and Treasury endorsement and does not have visibility amongst current LHN executives, which contributes to the perception of the strategy being an eHealth Systems initiative and not a SA Health-wide initiative.

The absence of a stakeholder-endorsed digital health strategy adversely affects the ability to govern the EPAS program against a clear plan.

The Review Panel believes that a renewed digital health strategy is needed including the following key elements that relate to an EMR/PAS solution:

a) **Re-commit to a single integrated South Australia wide system**

   The Review Panel considers that the benefits of a single system for a state the size of South Australia outweighs the disadvantages of a lack of competitive tension. These benefits include: patient information available wherever a patient is treated in SA Health; lower procurement costs; ease of use for clinicians moving between sites; familiarity of administrative staff wherever they work in SA Health; reduced training required for multiple systems; less complexity from integration with other systems; concentrating available health informatics expertise in configuring a single system; and support for standardised care processes, including decision-support. The core of the single integrated system should be a single access point (‘front door’) for both clinical documentation (prescribing, ordering pathology etc). It should also provide a single view of all relevant patient information across SA Health sites, including results notification. This implies a single data repository and enterprise master patient index.

b) **While having a single core system, accept that a ‘best-of-breed’ approach is desirable and so any systems selected must be interoperable.**

   SA Health already has various statewide ‘best-of-breed’ systems, including for pharmacy, pathology, theatre management and radiology. The renewed SA Health digital strategy should make clear which best of breed solutions will be integrated with the core PAS and EMR solution.
c) **It is preferable to have a single integrated EMR and PAS, although not essential so long as they interoperate.** SA Health currently has multiple PAS solutions and this increases the complexity of interoperating between systems. Consideration has been given to separating the EMR and PAS, and while this is possible and often the case elsewhere, it is preferable to have an integrated PAS and EMR. This is because:

- in principle, it is easier to align patient flow and decision-support based scheduling of services;
- it leverages existing investment, both in vendor contracts and configuration efforts;
- separation would increase needs for integration between systems;
- going back to market would lead to greater delays while a different PAS is selected.

The main issue with the existing Allscripts PAS is that the billing module is not fit for purpose and should be replaced.

d) **Focus on standardised workflows based on consensus between clinicians for the EMR and administrative staff for the PAS.**

This is essential in all EMR systems and its success is dependent on gaining a consensus between clinicians and sites.

In addition to the digital health strategy describing EMR principles, the strategy also needs to address issues such as:

- clinical and patient administration systems for regional health services;
- interoperability with primary and community care settings, including the Commonwealth’s My Health Record;
- interfaces with other enabling and emerging technologies (e.g. the internet of things);
- which functionality will be delivered by EPAS or by best of breed clinical solutions integrated with EPAS;
- how patients will be engaged in the management of their care and their interactions with SA Health; and
- clinical knowledge management including clinical data warehousing, reporting and predictive and prescriptive analytics based on advances in personalised medicine.

The Strategy needs to give priority to the key parts of the system that are necessary to gain the maximum benefits of an EMR, reflecting what others have achieved through implementing digital hospitals. Improving the interfaces with the following systems is critical, and a strategy is needed to determine how and when they will be connected, and whether a ‘best-of-breed’ approach should be used in certain cases, rather than relying on a Sunrise EMR module if it is not the best solution. The recent tender for an oncology prescribing system reflects this approach and other potential areas should be identified (for example, OACIS operates a popular and well-functioning renal system which could be considered as an enterprise-wide renal solution, interfacing with the Sunrise EMR).
The Review Panel believes that the historical negative perception of EPAS is likely to persist and so continue to be seen negatively by staff in new implementations. Consequently, combined with the changes in approach proposed here, there should be a change in communication strategy, including changing the name of EPAS to the globally used title of ‘Sunrise EMR’ and separately using the title ‘Allscripts PAS’ for the Patient Administration system.

**Recommendations:**

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<tr>
<td><strong>1.</strong></td>
<td>That SA Health develop a Digital Health Strategy which sets the future directions for enterprise hospital systems, interoperability with other systems (including community-based systems), telehealth, and consumer digital health innovations.</td>
</tr>
</tbody>
</table>
| **2.** | That in relation to the statewide EMR/PAS, SA Health’s Digital Health Strategy:  
  - re-commits to a single integrated South Australian wide system;  
  - accepts that a ‘best-of-breed’ approach is desirable, conditional on successful interoperability; and  
  - prioritises connecting with clinical partners in primary and community settings. |
| **3.** | That the term “EPAS” be replaced with the names of the two solutions: “Sunrise EMR” and “Allscripts PAS”. |

### 6.2 Governance - Structures and Processes

A fundamental governance shift is proposed that moves the authority over the program from being an “IT project” to a “business transformation project”, owned by the clinicians and LHNs.

Responsibility for how the system is configured and for its implementation should move to the LHNs, recognising that standardisation across LHNs is also necessary for the successful implementation of an EMR. This recognises that LHNs are accountable for the operation of the system and that implementing an EMR is a clinical and business transformation program, not primarily an IT program.

As one of the exemplar sites, it is proposed that the current EPAS Program staff responsible for adoption and developing specifications for configuring the Sunrise EMR to be implemented at the RAH report to the CALHN Executive Director Medical Services (EDMS). If possible, the staff will be located at the RAH. It is critical that other hospitals and LHNs be involved in the configuration process, including chairing various clinical groups that will determine the system’s configuration.

The Mount Gambier implementation team should report to the regional South East Local Health Network (South East LHN) CEO or EDMS as appropriate.\(^{27}\)

The clinician engagement model will move from one where clinicians are ‘consulted’ to where clinicians own and direct, with appropriate support, how the system is designed. This is critical to the success of all EMR implementations as it gives clinicians the authority to configure the EMR to meet their workflows and needs. Although the team involved in implementing and processing

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\(^{27}\) Or equivalent if prior to the establishment of the South East LHN in July 2019.
change requests has strong nurse representation (who have developed solid capabilities), the absence of doctors is problematic.

It is proposed that the clinical specialty groups comprise senior and interested clinicians and be structured around the established clinical structures in the key SA Health hospitals. These should be broad enough to examine cross-clinical configurations, such as infusion workflows. As a starting point for discussion, it is proposed that the following clinical specialty groups be established, with clear authority and responsibility for the configuration of their part of the Sunrise EMR:

<table>
<thead>
<tr>
<th>Clinical Specialty Group</th>
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<tbody>
<tr>
<td>Medical</td>
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<tr>
<td>Pharmacy</td>
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<td>Surgical</td>
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<tr>
<td>Radiology</td>
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<tr>
<td>Obstetrics and gynaecology</td>
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<tr>
<td>Pathology</td>
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<tr>
<td>Paediatrics</td>
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<td>Nursing</td>
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<tr>
<td>Mental Health</td>
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<tr>
<td>Allied health</td>
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<tr>
<td>Outpatients</td>
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</tbody>
</table>

Where clinical areas are led by doctors, these should be strongly represented in the clinical specialty groups. It is preferable that representatives in these groups both have authority within their day-to-day service area and also a strong interest in digital health.

It is proposed that each of the clinical specialty groups have assigned at least a 0.2 FTE clinician from that clinical area. This will ensure that design is not ‘by committee’ and that work is done to standardise and mediate differences outside of the clinical specialty group meetings. These clinical specialty groups will be setup by CALHN.

A key to the success of clinician engagement is building a clinical informatics workforce. These people are able to mediate between the expressed needs of clinicians and the technical aspects of the system. In successful EMR implementations observed by the Review Panel, strong clinical informatics teams operate with a mix of doctors, nurses and allied health staff. This is discussed further below.

The SA Health Clinical Advisory Council will comprise the Chairs of each of the Clinical Specialty Groups, supported by the clinical informatics staff assigned to each of the clinical specialty groups.

Centralised functions will continue to be important, including support of the SA Health statewide infrastructure, operating the support desk and managing the key governance and procurement processes. The technical configuration of the Sunrise EMR will also be done centrally, based on the functional specifications of the clinical specialty groups as will the Allscripts PAS.

It is proposed that the existing eHealth Systems and EPAS Program areas within SA Health be replaced with a new body called Digital Health SA, modelled on the similar organisations in NSW and Queensland. The new body will have greater autonomy and authority to implement SA Health’s
digital reform program. It will be led by a Chief Digital Health Officer (replacing the Chief Information Officer) and report to the Chief Executive of SA Health and Wellbeing through the proposed SA Digital Health Board and not be a separate statutory authority.

Digital Health SA responsibility will include:

• supporting the Digital Health Board in its role of advising the Chief Executive of SA Health and Wellbeing;
• developing the Digital Health Strategy for consideration by the Digital Health Board; and
• day-to-day implementation and operations of the SA Health digital portfolio.

A key priority of the proposed Digital Health SA will be strengthening clinical informatics capability, that is, doctors who have both clinical and informatics expertise. Centrally, there should be at least two strong clinical informaticians, including a Chief Medical Informatics Officer (CMIO).

The following diagram illustrates the proposed governance and program operating model.

In this model, the CALHN and South East LHN play an important role in managing the implementation teams, including the Sunrise EMR Optimisation Taskforce. Specifically, these LHNs will have responsibility for:

• Convening and providing management support to the Clinical Specialty Groups, which determine the configuration of the Sunrise EMR and Allscripts PAS.
• Implementation of the Sunrise EMR and Allscripts PAS within their hospitals.
• In the short term, supporting the Sunrise EMR Optimisation Taskforce, in conjunction with the Clinical Specialty Groups.
As a consequence of this devolution of responsibility for implementation to the LHNs, the Implementation Teams will report to the Sunrise EMR / Allscripts PAS Program Board on progress.

The components of the proposed governance model are described in the following table:

<table>
<thead>
<tr>
<th>Entity</th>
<th>Description</th>
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</table>
| **Digital Health Board** | **Purpose:** The overarching governance authority. The Board will be advisory to the Chief Executive of SA Health & Wellbeing who is ultimately the responsible officer for the program. This Board would replace the existing eHealth Steering Committee.  
  **Key Functions and Accountabilities:**  
  1. Create a Digital Health Strategy and oversee its implementation.  
  2. Advise CE, SA Health and Wellbeing on:  
     - strategic and key financial decisions of all digital health projects, including the Sunrise EMR/Allscripts PAS.  
     - major go-live decisions where there is significant change and risk.  
  **Management support: Digital Health SA**  
  **Composition:**  
  • SA Health & Wellbeing CE (chair)  
  • Chief Digital Health Officer  
  • Board Chair or CE from each metro LHN  
  • Board Chair or CE from two regional LHNs  
  • Clinical Advisory Council Chair  
  • Sunrise EMR / Allscripts PAS Program Board Chair  
  • 1 independent expert |
| **Sunrise EMR / Allscripts PAS Program Board** | **Purpose:** Responsible for the implementation of the Sunrise EMR and Allscripts PAS.  
  **Key Functions and Accountabilities:**  
  1. Make recommendations to the Digital Health Board on key strategic, financial, and go-live decisions.  
  2. Responsible for the Sunrise EMR/Allscripts PAS Program, including implementation and financial delivery.  
  3. Oversee the configuration process of the Sunrise EMR/Allscripts PAS solution, including ratifying Clinical Advisory Council processes and proposals.  
  **Management support: Digital Health SA**  
  **Composition:**  
  • Independent chair  
  • SALHN CE  
  • CALHN CE  
  • South East LHN CE  
  • Executive Director Statewide Clinical Support Services  
  • SA Health Chief Medical Officer  
  • Chief Digital Health Officer  
  • Clinical Advisory Council Chair  
  • Allscripts senior account executive |
<table>
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<tr>
<th>Entity</th>
<th>Description</th>
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<tr>
<td><strong>Clinical Advisory Council</strong></td>
<td><strong>Purpose:</strong> Responsible for the overall clinical configuration of the system.</td>
</tr>
<tr>
<td></td>
<td><strong>Key Functions and Accountabilities:</strong></td>
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<tr>
<td></td>
<td>1. Sunrise EMR/Allscripts PAS configuration based on input from the Clinical Specialty Groups.</td>
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<tr>
<td></td>
<td>2. Co-ordinate and reconcile configuration issues arising between Clinical Specialty Groups, including setting overall priorities for configuration based on available resources.</td>
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<td></td>
<td>3. Advise on implementation and training needs and approaches.</td>
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<td><strong>Management support: Digital Health SA</strong></td>
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<td></td>
<td><strong>Composition:</strong></td>
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<tr>
<td></td>
<td>- <strong>Rotating Chair</strong></td>
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<td></td>
<td>- Chair from each Clinical Specialty Group</td>
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<td></td>
<td>- Clinical Informaticians</td>
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<tr>
<td></td>
<td>- AMA SA nominee</td>
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<td>- SASMOA nominee</td>
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<td>- ANMF nominee</td>
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<td></td>
<td>- Other co-opted clinicians as required</td>
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<td><strong>Clinical Specialty Groups</strong></td>
<td><strong>Purpose:</strong> Responsible for system configuration associated with their clinical specialty.</td>
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<td><strong>Key Functions and Accountabilities:</strong></td>
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<tr>
<td></td>
<td>1. Determine the configuration of the Sunrise EMR/Allscripts PAS solution related to their specialty area, including standardised order sets and templates for their clinical area.</td>
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<td>2. Collaborate with other specialty groups to determine the configuration where there is overlap.</td>
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<td></td>
<td>3. Advise the Clinical Advisory Council on priorities for configuration within their clinical area.</td>
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<td></td>
<td><strong>Management support: CALHN</strong></td>
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<td></td>
<td><strong>Composition:</strong></td>
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<tr>
<td></td>
<td>Clinicians drawn from clinical specialties across SA Health &amp; Wellbeing.</td>
</tr>
</tbody>
</table>
Recommendations:

4. That SA Health establish a new body ‘Digital Health SA’ to replace the existing eHealth Systems and EPAS Program areas, and that this be led by a new statewide Chief Digital Health Officer position. The new Digital Health SA should have at least two clinical informatics staff (doctors), with one being the Chief Medical Informatics Officer, who will lead the new part-time clinical informatics staff proposed in Recommendation 8.

5. That governance oversight of the new Digital Health SA body, including the Digital Health Strategy, be through a Digital Health Board chaired by the Chief Executive (CE) of SA Health and Wellbeing and comprising all metropolitan Local Health Network (LHN) Chairs or CEs, two regional LHN Chairs or CEs, the Chief Digital Health Officer, the Chair of the Sunrise EMR/Allscripts PAS Program Board, the Chair of the Clinical Advisory Council, and one independent expert.

6. That the governance of the Sunrise EMR/Allscripts PAS Program be through a reconstituted Program Board with an independent chair, the CEs of CALHN (Central Adelaide Local Health Network), SALHN (Southern Adelaide Local Health Network) and the South East LHN, the Executive Director of Statewide Clinical Support Services, the SA Health Chief Medical Officer, the Chief Digital Health Officer, the Chair of the Clinical Advisory Council, and a senior executive from Allscripts.

7. That the responsibility for the clinical design of the Sunrise EMR and Allscripts PAS Program be through a reconstituted Clinical Advisory Council, comprising the Chairs of the Clinical Specialty Groups and their clinical informatics representatives, and nominees from AMA(SA), SASMOA and ANMF (SA Branch).

8. That Clinical Specialty Groups be created to standardise workflows, order sets, and clinical documentation, and so determine the specifications for configuring the modules used in their clinical areas.

9. That each of the Clinical Specialty Groups be supported by at least 0.2 FTE clinical informaticians.

10. That the EMR/PAS business owner / senior responsible officer move from the Chief Information Officer role to the Chief Digital Health Officer.

6.3 Governance - Measuring and Realising Benefits

Strong opinions have formed about EPAS, without much data to confirm or refute these views. This is partly because the benefits being sought from an EMR/PAS have not been well articulated. If success is not defined and measured, then it will not be possible to assess whether continuing investment is justified.

One layer of benefits relates to the outcomes of the program. Other implementations in Australia and overseas have put considerable effort into benefits realisation and measurement. The areas that the Review Panel would expect to see include:

- **Patient outcomes** (e.g. use of electronic clinical guidelines and reminders leading to reduced hospital acquired pressure injuries, reduced SAB infections, reduction in emergency admissions, early identification of deteriorating patients, patients managing their own health through better information).
• **Quality of care** (e.g. reduced medication errors and fewer adverse drug events, reduced incidents arising from allergy identification, reduced outpatient waiting lists).

• **Efficiency and productivity** (e.g. better use of clinical time by reducing time of documentation, reduction in length of stay from improved patient flow, reduced time in ED arising from quicker access to patient information and test results, increased hospital revenue from better patient data capture)

• **Staff satisfaction** (e.g. less frustration from chasing patient records and waiting for test results)

• **Better use of data** (e.g. management reporting, clinical analytics).

LHNs should be accountable for identifying, realising and measuring these outcome benefits. This should include baseline measures of benefits prior to implementation. Benefit targets should be based on industry standards. A routine collection of data relating to user experience needs to be implemented to move beyond the current anecdotal views of the system (e.g. Net Promoter Score).

Alongside these outcome measures are **system performance metrics**, that reflect user experience of the system. These include login times (including subsequent logins), time taken for specific tasks, printing time, time to switch between screens within the application. It should also report on performance including downtime and response times. Routine metrics on network performance and data centre capacity is important to alert to emerging capacity risks.

**Recommendations:**

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<tr>
<td><strong>11.</strong></td>
<td>That SA Health establish a base set of benefit measures for the Sunrise EMR and Allscripts PAS program and that LHNs are then responsible for reporting against these measures on at least a quarterly basis.</td>
</tr>
<tr>
<td><strong>12.</strong></td>
<td>That Digital Health SA be responsible for regular monitoring and reporting of system performance, such as screen time responses and the end user experience of system availability.</td>
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**6.4 Software Improvements**

Although considerable effort has been put into configuring the software, there is a need for a concentrated effort to make the best use of the available software. Priorities are (in no particular order):

a) Improving the presentation of information to clinicians;
b) Upgrade to the new 17.3 version of the solution, with more frequent upgrades in the future including enabling new features.
c) Greater focus on standardising workflows, achieved through improved clinical ownership of the system configuration.
d) Simplifying order sets and aligning them with clinical practice.
e) Personalised templates by specialty – this will require co-opting staff specialists, senior doctors and junior doctors with links to their wider clinical networks.
f) More efficient (less clicks) configuration, particularly by building up the health informatics workforce to assist clinical specialty groups.
g) Prioritise the optimisation of integration with key systems such as pharmacy, pathology, radiology, theatre and vital monitors, as well addressing significant defects and enhancing the software in areas such as oncology, pediatrics and obstetrics.

h) Implement a fit-for-purpose reporting and analytics module, either the available Allscripts module or another that interfaces with the Allscripts solution.

i) Use of the mobility platform – both in its current version (limited) and more extensively once version 17.3 is implemented.

j) Upgrade of the document scanning solution to address issues with poor indexing of scanned documents (evaluate Allscripts module versus alternatives).

k) Replace billing module.

It is proposed that a Sunrise EMR Optimisation Taskforce be established for an initial 12-month period to address key user concerns. This would draw on the considerable international expertise that is available through Allscripts.

Recommendations:

| 13. | That the existing Sunrise EMR / Allscripts PAS 14.3 software version be upgraded to 17.3, with the progressive implementation of its new features (not ‘like with like’), and that subsequently there be a regular upgrade path. |
| 14. | That a Sunrise EMR Optimisation Taskforce be established with assistance from Allscripts, drawing on its international expertise, to fast tracking making the system more intuitive. |
| 15. | That priority for the configuration and development of the software be: • user interface optimisation; • pharmacy integration; • meeting the patient record requirements of the SA Coroner, SA Crown Solicitor, SA Police, courts, Freedom of Information requests, and other statutory bodies; • implementing the new Sunrise EMR mobile platform; • clinical reporting and analytics capability; • replacement of the record scanning solution; • replacement of the billing module in the Allscripts PAS; • configuring important modules, such as pediatrics and obstetrics; and • integration with CBIS (Community Based Information System) for mental health. |

6.5 Exemplar Sites Model

The Review Panel proposes a range of actions and initiatives to give the Sunrise EMR and Allscripts PAS the best chance of meeting user expectations. However, it is yet to be proven that these changes can be successfully implemented by SA Health and change the user experience and so realise the potential EMR/PAS benefits.

Consequently, the Review Panel proposes that available resources focus initially on implementing two exemplar sites, to demonstrate that the Sunrise EMR and the Allscripts PAS can be configured
and implemented to meet user expectations, provided the devolved and clinically owned model is implemented, along with the other initiatives proposed by the Review.

The Review Panel nominates the RAH as the exemplar metropolitan site and MGDHS as the exemplar regional site. The RAH is proposed primarily because of the quality and financial risks associated with maintaining a hybrid system. A staged implementation at the RAH is proposed and completion by the first quarter of 2020 to minimise risk and maximise results of the optimisation.

As previously noted, CALHN executives have raised numerous ongoing clinical and corporate risks with the current hybrid EPAS/paper system that will be addressed by early implementation as an exemplar site. The safety risks of continuing a hybrid system have been outlined above, in addition, the following concerns have been raised:

- **Compliance, Safety and Data** - Non-compliance with accreditation (e.g. timely discharge summaries); poor communication with consumers and other health professionals including GPs (availability of discharge summaries, letters and outpatient department letters); inability to make service provision improvements without data and reports; inability to streamline standards of care for junior staff; incomplete and inaccessible documentation for cancer patients across multiple visits.

- **Across the LHN** - No “single source of clinical truth” for staff working across multiple CALHN sites (TQEH and HRC are EPAS enabled); clinical history not immediately available for patient transfers between the RAH, HRC and TQEH; longer patient length of stay as consulting medical, nursing and allied health services are unable to prioritise patients and reduce delays in treatment without access to the patient’s medical record; no access to the patient’s clinical journey for CALHN ambulatory services or for other LHNs.

- **RAH Design** - Access to records and storage of paper records is problematic. There is no onsite storage for the volume of paper records (the RAH was designed to be a ‘paper light’ hospital), including no purpose-built storage for inpatient areas. Approximately 2,000 patient records are delivered to the hospital daily, with about 7,000 patient records in circulation or stored onsite at any time. Additional administrative staff are required to find and maintain the paper records including scanning approximately 2,000 loose files/papers into EPAS daily.

- **Financial** - Offsite storage services cost approximately $4 million per annum and issues remain with flow of records, missing records for appointments and record tracking.

This exemplar site model includes devolving about 100 staff supporting the current EPAS Program into the two exemplar sites, responsible for configuration (working with clinicians and administrative staff from other hospitals) and implementation.

Depending on user acceptance, it is proposed that a decision be made in March 2020 whether to proceed to FMC in 2020 with the implementation of the re-configured Allscripts solution. At the same time, decisions should be made on whether to implement the Allscripts PAS in regional LHNs or go to market for a new single statewide PAS.

If reasonable user expectations are not met, then it is proposed that SA Health return to market to begin selection of a new enterprise system for the state, separating the PAS and EMR components.
If this decision is taken, then implementation should commence with the hospitals that do not have the Sunrise EMR and Allscripts PAS, i.e. FMC, NALHN, WCHN and regional LHNs.

The role of the exemplar sites will include leading the configuration of the Sunrise EMR and Allscripts PAS. This will require devolving the existing EPAS program configuration staff to the RAH, who will be required to establish clinical lead groups for different parts of the system (see below discussion on governance). The clinical lead groups must involve clinicians from other hospitals and the chairs of these clinical lead groups selected on merit and include chairs from other LHNs and hospitals.

Building on previous configurations at Port Augusta Hospital and similarly sized hospitals, a configuration team should be assigned to MGDHS.

This approach builds on the configuration and implementation capability already developed in SA Health and avoids disillusionment of staff who have gone through the difficult process of implementing EPAS and users trained in EPAS.

The Review Panel recognises that the changes proposed are significant and are dependent on SA Health’s capability to implement successfully. There is a risk that following these changes, the system may still not meet user expectations and so there is a need to make a further assessment once the best efforts at implementation have been exercised. Any decision to implement beyond these two hospitals should be made after a thorough assessment of user experience and measurement of benefits (see below). If this has not improved significantly, then the Review Panel proposes that SA Health return to market to select a different statewide core system solution.

It is noted that the existing Allscripts contract is to December 2021.

**Recommendations:**

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<tr>
<td><strong>16.</strong></td>
<td>That a new implementation approach be created to focus on implementing two exemplar sites, to demonstrate whether the Sunrise EMR and Allscripts PAS can be configured and implemented to meet user expectations using the devolved and clinically owned model.</td>
</tr>
<tr>
<td><strong>17.</strong></td>
<td>That the two exemplar sites be the Royal Adelaide Hospital (RAH) and Mount Gambier and Districts Health Service (MGDHS), to be implemented by the first quarter of 2020.</td>
</tr>
<tr>
<td><strong>18.</strong></td>
<td>That this include devolving the implementation and business change team from the current EPAS Program (approximately 100 staff) to the two exemplar sites, reporting to the Executive Director of Medical Services (or equivalent) in each respective LHN.</td>
</tr>
<tr>
<td><strong>19.</strong></td>
<td>That any further implementation beyond the exemplar sites be dependent on achieving user acceptance. If user expectations are not met, go to market for a statewide enterprise EMR and/or PAS as required (different solutions for EMR and PAS are acceptable).</td>
</tr>
<tr>
<td><strong>20.</strong></td>
<td>That if user acceptance at the RAH and MGDHS is achieved, then continue the rollout at Flinders Medical Centre (FMC) in 2020 and/or implement the Allscripts PAS in regional LHNs.</td>
</tr>
</tbody>
</table>
21. That a new communication strategy be developed, particularly re-engaging frontline staff.

6.6 Implementation Approach

Changes to the implementation approach are proposed as follows:

a. **Re-engage with the vendor to draw on their global expertise in configuration and implementation of the Allscripts solution.**
   - Leverage international expertise of the Allscripts customer base including best practice from other sites and participating in user groups.
   - Engage the vendor in an optimisation project.
   - Involve the vendor in the governance process.

b. **Modify the training approach to provide dedicated, funded and flexible training time, particularly for doctors.**
   - Roster dedicated training time, particularly for doctors, with backfilling as necessary.
   - Ensure training is customised by specialty and trainers are from that specialty area.
   - Provide accessible training facilities, ideally onsite to support both face-to-face and self-directed learning.
   - Offer a variety of training methods including face-to-face, online and ‘at the elbow’.

c. **Increase post go-live support and sharing of best practice** through dedicated staff at each hospital, rotation of super-users between sites and an online portal for sharing tips including optimal personalisation of the system. Utilise the ‘Knowledge Hub’ as a tool for logging and tracking change requests and incidents.

d. **Investment in device upgrades.** There are currently about 1,000 WOWs (Workstations on Wheels) deployed. It is estimated that around 200 of these should be replaced to address work health and safety concerns for taller staff and to reduce eyestrain. The existing screen size is too small to allow for multiple windows to be open, which is necessary for both viewing and recording information or ordering tests. While more work is needed on the balance of screen size in the WOWs, it is likely that half the current fleet should have the larger screens over the next 12 months. This will make a significant impact on user experience.

e. **Deploy mobile versions of the Sunrise EMR.** The mobile platform of EPAS currently available by SA Health supports mobile viewing only. The 17.3 release incorporates order entry and will increase accessibility to patient records for mobile staff via smartphones or tablets. Device security will need further consideration, particularly if a bring your own device model is chosen.

f. **Taking a more staged approach to implementation.** SA Health’s implementation approach is to “activate” an entire site at go live (with the exception of FMC and the new RAH). A staged implementation of EMR is possible, meaning a progressive rollout throughout the site, for example, by function (e.g. prescribing) or by department (e.g. outpatients). This de-risks the implementation, particularly for large and complex sites with varying levels of readiness between parts of a hospital. The Australian Medical Association (AMA) summarised the advantages and challenges of the ‘big bang’ versus the staged implementation model:
Recommendations:

22. That SA Health make significant improvements to the implementation approach including increased vendor engagement, dedicated training time, increased post go-live support, device upgrades, deploying a mobile version and a staged approach.

23. That the Allscripts vendor be re-engaged in the implementation of the system, including in optimisation and governance.

24. That post go-live support be improved through dedicated staff at each of the hospitals that have implemented the Sunrise EMR and Allscripts PAS.

25. That training resources be increased and customised, including dedicated training time using multi-modality delivery with flexible approaches.

26. That SA Health work with clinicians to establish a set of specifications for computer devices, screens and mobile carts appropriate for Sunrise EMR use in different clinical settings, drawing on benchmarks from other jurisdictions.

27. That SA Health replace devices in existing sites that do not meet these specifications and that future site implementations ensure that devices comply with these specifications.

28. That SA Health resolve VDI (Virtual Desktop Infrastructure) support and look to broadly deploy VDI as the preferred platform for Sunrise EMR in mobile settings (workstations on wheels) and remote settings.

29. That SA Health invest in single sign on capabilities, particularly in clinical areas where computer devices are regularly shared.

6.7 Developing a Clinical Informatics Workforce

Approaching EPAS as an IT rather than a clinical and business transformation project and lack of clinical engagement and ownership have been identified as key issues with the current EPAS program.

Source: AMA. Practicexs improvement series: EHR implementation. 2015.
The Review Panel recommends SA Health develop a strong clinical informatics capability and network that will lead the program going forward. These clinical informaticians will support each of the clinical specialty groups.

A funded professional development program, developed by SA Health, will improve knowledge and build capacity in clinical informatics across the workforce which can be harnessed by the Sunrise EMR/Allscripts PAS program and other digital health initiatives; and can be used as an incentive for clinicians to lead the program.

Options for professional development include:

- **Participate in a relevant professional or industry association**
  (e.g. HISA, Health Information Management Association of Australia – HIMAA). HISA support clinical informaticians through several of their networks such as the Clinical Informatics Community of Practice, User Experience Community of Practice, and the Digital Health Executive Leaders and CXIO Networks.²⁸

- **Recognition through professional accreditation**
  For example, Certified Health Informatician Australasia (CHIA) certification or the Australasian Health Informatics Fellowship Program (AHIFP).

  The CHIA certification developed by HISA²⁹, the Australasian College of Health Informatics (ACHI) and HIMAA provides a base level credential for aspiring clinical informaticians based upon international standards and competencies. A number of State Governments and Health Services have committed to ongoing staff professional development programs by providing access to CHIA certifications for individuals including Queensland Health (150+), Bendigo Health (50+), eHealth NSW (50+) and DHHS Victoria (15+). Organisational-led CHIA programs are also available focusing on individual professional development, internal capacity building and bridging clinical care and technology.

  The AHIFP was established by ACHI³⁰ as a training pathway to ACHI Fellowship over four years. The AHIFP is designed to prepare professionals for leadership roles in the Health Informatics workforce and to address the current demands for experienced and qualified Health Informatics specialists from various disciplines. Increasingly workplaces are offering placements within their organisations to assist in fellowship training. This may be of consideration for SA health in the future.

There is also a range of online courses and resources available to support staff education, awareness and professional development (e.g. Digital Health Academy).

Further information on Clinical Informatics is available in Appendix D.

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²⁸ The Digital Health Executive Leaders and CXIO Networks are sponsored by ADHA and a number of state governments to build a community and agenda on digital health leadership across Australia.

²⁹ HISA is Australia’s peak professional body for the digital health, eHealth and health informatics community with over 1,400 active members and a community of over 13,000 and has prioritised workforce development in its three to five year outlook.

³⁰ In Australia, the ACHI is the professional organisation for Digital Health and eHealth.
Recommendations:

30. That SA Health develop and offer a funded staff professional development program to build a clinical informatics workforce to improve knowledge and build capacity.

6.8 Investment in Digital Health Beyond EPAS

Due to the singular focus on EPAS, and the long-time delays in implementation, there has been serious neglect of other digital health areas. This includes the unsupported PAS in country South Australia; and NALHN and the WCHN who have not received IT investment for 10 years (and are likely to wait for another 3-5 years under the current program). Investment is needed to sustain the existing IT computing and network infrastructure which represents a significant risk to the State. There has been limited or no investment in key foundations such as secure messaging, contemporary desktops and mobility, unified communications and knowledge management.

Applications that continue to support clinical staff in the absence of an EMR have not received further investment, such as OACIS used for pathology results reporting, renal dialysis and as a shared record at NALHN.

The replacement of the PAS for regional hospitals is a high priority, as it is no longer supported by the vendor and is not in the current EPAS scope.

Recommendations:

31. That SA Health invest in digital health beyond the current scope of the core statewide EMR and PAS solution, in particular:
   • resolving the regional hospital’s PAS, which is not currently in the funded business case;
   • investing in outdated systems in NALHN (Northern Adelaide Local Health Network) and WCHN (Women’s and Children’s Health Network) following an audit of which systems require upgrading or optimising; and
   • addressing key risks in existing data centre and network infrastructure.

6.9 Business as Usual (BAU) Model

The BAU functions of the EPAS Program need changing. Currently, when there is an activation of a site, the majority of shift focus to implementation at that site, and the BAU functions are neglected. This creates significant problems with post go-live support and the need for continuous improved configuration and enhancement of the system.

The current EPAS Program team consists of three functional areas, totalling 221 FTE (with additional headcount on an as-needed basis):

   • EPAS Operations (103 FTE)
   • EPAS Implementation and Business Change (designers) (95 FTE)
   • Program Delivery (23 FTE).
Of these 221 FTE, 132 are considered BAU staff. However, during activation of a site, as few as 16 FTE remain in a BAU support role, with the balance of the program staff focussed on site activation. Of the 132 FTE staff considered to perform BAU functions, only 78 FTE have recurrent funding, with the balance of staff funded from program (capital) funds.

The following changes are recommended to the structure of the EPAS Program and BAU model:

- Within the EPAS Operations Team (103 FTE), 25 FTE provide services that are not strictly the domain of EPAS and consequently should be moved to eHealth Systems as part of central support:
  - Registry Integrity Unit (EMPI): 8 FTE
  - Integration Team: 6 FTE
  - OACIS Team: 7 FTE
  - Data Migration Team: 2 FTE
  - Decommissioning Team: 2 FTE

This restructure of the EPAS Operations team is proposed as part of creating the new Digital Health SA body. This should achieve better integration of the existing eHealth systems and EPAS Program resources.

- The remaining EPAS Operations Team (78 FTE) should focus on BAU functions and be located centrally within eHealth Systems as part of applications support. It is recognised however that a number of the clinical analysts will be required to assist in configuration changes associated with the new exemplar hospital model.

- The Program Delivery Team (23 FTE) will remain a central function.

- The EPAS Implementation and Business Change Team be devolved and integrated with the LHN teams for activation. In the first instance this would be principally with the RAH and a smaller contingent at MGDHS as the exemplar sites.

To support clinicians post activation, it is recommended that:

- The RAH establish a permanent SA Sunrise EMR Experience Centre to be funded initially by the program for the next two years with educators reallocated from within the EPAS Implementation and Business Change Team. After two years, funding of the Experience Centre should be incorporated within the normal activity-based funding model.

- The Sunrise EMR Experience Centre will showcase new features and allow staff to drop in with questions.

- Initially the Experience Centre will support other EPAS sites outside of CALHN, with a view to establish additional Experience Centres in other LHNs once the new BAU model has been established and proven effective.

- Super user staff be assigned at each hospital which has implemented the Sunrise EMR system.

- Centralised BAU staff, in particular adoption managers (technical configuration function) with a deep understanding of the Sunrise EMR and Allscripts PAS solution, should be rotated through the Experience Centre to ensure they remain close to clinicians and the clinician experience.
In addition to the above Experience Centre, it is recommended that the program establish a comprehensive online Knowledge Hub for the Sunrise EMR and Allscripts PAS:

- Formal Education materials
- Discussion boards/threads
- How to Podcasts / Webcasts – including crowd sourced material and integrating social media platforms
- Change / Enhancement Request Register, Status and Online lodgement support
- “Acronym Alley” for intelligent assistance with finding acronyms
- Eventually consider the integration of Artificial Intelligence ‘chatbots’ to assist users with frequently asked questions

Recommendations:

| 32. | That a new, consistent BAU model is adopted by restructuring the current EPAS Program team, separating implementation and BAU functions. |
| 33. | That a permanent Sunrise EMR Experience Centre be established at the RAH as a drop-in centre for staff, with additional Experience Centres established at other LHNs in the future. |
| 34. | That an online Knowledge Hub be established to provide comprehensive, up to date and accessible EMR and PAS information to staff. |
| 35. | That each hospital that has the Sunrise EMR implemented, have allocated super user resources to assist with optimisation and personalisation post go-live. |

6.10 Implementation of the Review’s Findings

The improvements proposed by the Review involve significant changes to the existing model of configuration and implementation. Given the significant issues with the governance of the program and the proposals for change to the governance and organisation of the program, it will be difficult to expect the existing organisational structure to implement the required changes.

Consequently, it is proposed that a short-term EPAS Review Implementation Taskforce be established to ensure each of the Review recommendations are progressed. This Taskforce should report directly to the Chief Executive of SA Health and Wellbeing and include 2-3 full-time staff.

| 36. | That a Review Implementation Taskforce be established for a limited period to oversee the implementation of the Review recommendations, reporting to the Chief Executive of SA Health and Wellbeing. |
Appendix A – Terms of Reference
Terms of Reference

Independent Review of the Enterprise Patient Administration System (EPAS)

20 June 2018
Terms of Reference

The Terms of Reference outline the scope, governance and reporting requirements for the independent review of SA Health’s Enterprise Patient Administration System (EPAS).

The review will be concluded within 5 months of the appointment of an Independent Expert Panel, outlined below. The Independent Expert Panel will deliver the report to the Minister for Health and Wellbeing who will be responsible for implementation and budget impact of any recommendations that are accepted from the report.

Governance of Review

The Review will be overseen by a senior executive of the Department of Premier and Cabinet (DPC). It will be conducted by an Independent Expert Panel comprised of an independent chairperson, a clinician, and a person with health informatics expertise. The Independent Expert Panel can commission additional work, as required, when specialised expertise is needed.

A Review Reference Group will be convened to provide advice as required to the Expert Panel. Membership of the reference group is to be finalised prior to commencing the review and is proposed to consist of:

- An independent chairperson, who is also the chairperson of the Independent Expert Panel
- A senior executive of DPC
- Clinician nominated by the Australian Nursing and Midwifery Federation (SA)
- Clinician nominated by the South Australian Salaried Medical Officers Association
- Clinician nominated by the Australian Medical Association (SA)
- Clinician (Allied Health) nominated by the Public Service Association
- Patient Administration expert nominated by the Public Service Association
- Chair of the EPAS clinical advisory group
- SA Health Chief Medical Officer
- Executive Director eHealth Systems & Chief Information Officer, SA Health
- Director of Nursing from a Local Health Network where EPAS already deployed
- Four professionals with IT and change management expertise from beyond SA Health, including a representative from the Australian Digital Health Agency.

Scope of the Review

In addition to exploring the questions below, the review will make recommendations for the way forward. In essence, the review’s recommendations should plot a path that addresses the question of how South Australia can have the optimum medical record and patient management system from this point forward.

In recommending a way forward, the review should consider the functionality, performance and long-term prospects of EPAS, including:

- Useability
- Clinical safety
- Productivity (patient access, flow and throughput)
- Value for money
- Privacy and security
- Flexibility to cater for different health service settings, and also junior versus senior staff
- Optimal options for search and display of patient information
- Interoperability with other SA Health systems and external provider systems
- Ability to both upload and view information in the Commonwealth Government’s My Health Record (including discharge summaries, pathology, and diagnostic imaging).

To inform the recommendations, the review is specifically required to provide advice on the following areas, further detailed in Attachment 1.

- Whether the system is fit for purpose
- Whether the current system is safe
- Why the projected costs and schedule increased beyond the business case approved by Cabinet
- The impact on hospital productivity of the implementation of EPAS
- Adequacy of engagement and consultation to inform the design and implementation of EPAS
- Whether the user experience can be improved
- Implementation of EPAS
- Functionality of EPAS
- Proposed future direction for EPAS
- Future roll-out program.
Attachment 1

1. **Whether the system is fit for purpose.**
   - What did SA Health set out to achieve through the EPAS program and has the program remained true to its stated direction and approved scope?
   - How did SA Health come to choose the EPAS solution, rather than another suite, or even having software produced locally?
   - When selected, did the software product purchased meet the scope envisaged by SA Health?
   - How well does the product meet international and national best practice and standards for Patient Administration Systems (PAS) and Electronic Medical Records (EMR) systems?
   - Has the way the product been implemented by SA Health had any impact on its fitness for purpose?
   - What has been the impact of the system’s requirement for change in traditional practices and workflows?

2. **Whether the current system is safe.**
   - Are there any aspects of the system that create any issues for the safe delivery of clinical services to patients?
   - What is the evidence that clinical risk has increased or decreased in the sites that now use EPAS?
   - Is the system any more or less safe than equivalent EMR offerings from alternative systems?
   - What is the cause of the concerns expressed by the South Australian Coroner regarding EPAS?
     - What efforts were made to address these concerns?
     - What could have been done differently to address these concerns more completely?
   - Does the system impact on the ability to meet SA Health and/or Commonwealth compliance obligations?
   - Does the way in which the system is used impact on safety compliance?
   - Does the way in which the system is used impact on user/staff safety?
   - Is the current EPAS programmed hardware and associated equipment (Workstations on Wheels, 3 drawer printers) fit for purpose and do they maintain safe ergonomic working conditions for staff?

3. **Why the projected costs and schedule increased beyond the business case approved by Cabinet.**
   - Cabinet approved a 10-year total cost of ownership of $421.5 million to procure the software, to design its implementation for South Australia, to deploy the system to in-scope facilities, and to support and maintain the system for the duration of the 10-year period. The original schedule showed the EPAS deployment to all in-scope facilities being completed in 2014.
   - What has caused the increase in costs and the delay to the implementation schedule?
   - How does the performance against budget and schedule compare against eHealth programs of similar size and complexity both interstate and overseas?
   - Is the current model for ongoing support and maintenance appropriate to support users?
➢ What should the future model look like to deliver support and maintenance and what impact will this have on the budgeted costs within, and beyond, the total cost of ownership period.
➢ Assess the staffing establishment for support post implementation and ongoing support model compared with interstate/international experience of similar size and functional scope.

4. The impact on hospital productivity of the implementation of EPAS
➢ Are there aspects of hospital operations that have seen improvements in efficiency eg outpatients, theatre, emergency department, pharmacy etc?
➢ What have been the benefits of any productivity improvements, eg, cost savings, treating extra patients, reduced staff workload pressure?
➢ How does the South Australian experience compare to other health jurisdictions interstate and overseas?
➢ Are there areas where EPAS has led to inefficiencies, including increased staff workload? If so, how could the system be modified in the future to reduce these system created inefficiencies?
➢ Has EPAS had an impact on hospital demand, such as, transition from public hospital to community care/GP?

5. Adequacy of engagement and consultation to inform the design and implementation of EPAS
➢ Examine issues around staff buy-in and engagement associated with the system’s benefits, motivation and aims, and the system’s fitness for purpose.
➢ Has adequate clinical consultation been undertaken at different stages of procurement, planning, implementation and ongoing operation of the system?
➢ What were the governance and consultation mechanisms used to design the system and were they sufficient?
➢ Why do various clinical groups feel there has been a lack of consultation?
➢ Was clinical consultation undertaken with users from all specialty health fields/settings (i.e. outpatient department, inpatient, ambulatory, emergency, rehabilitation etc.) to ensure the system met all clinical requirements/needs?
➢ Do Local Health Networks provide adequate resources/commitment and ownership to support the program?
➢ Have industrial issues been adequately addressed? For example:
   o Have staff been adequately supported through change?
   o Are there issues in the way leadership of change is managed?
   o Has the impact on staff duties and responsibilities been appropriately addressed?
     o Are there issues with the industrial consultation mechanisms in place for EPAS?
➢ What models of clinical and non-clinical consultation are needed to inform the next steps to implement successful EMR and Patient Administration System (PAS) solutions?

6. Whether the user experience can be improved
➢ What is the general user experience, and how widespread are the claims that the system is ‘clunky’. How does this compare to other alternative systems?
➢ What are the causes of any poor user experiences (eg user interface; response times; down times; difficulty logging in; extra data entry, etc)
➢ Is the health language/nomenclature used in EPAS compatible with current SA Health standard health language/nomenclature (e.g. “admission” versus “visit”, “medication round” versus “medpass”)?
➢ What is the cause of perceptions that the system is difficult to use (e.g. poor interface out of the box, poor configuration/localisation by SA Heath, insufficient training)?
➢ Is a shortage of devices available to clinicians contributing to access and useability issues (e.g. number of Bedside Computers, Workstations on Wheels, Laptops, tablet computers, mobile phones)?
➢ What is the availability / reliability of devices in relation to devices that are non-functional, specifically Workstations on Wheels and printers?
➢ What issues are due to not having smart card login and / or persistent computer sessions across multiple devices (often referred to as 'tap on / tap off')?
➢ What remote access is available to the system and what level of remote access is required?
➢ Are SA Health’s hospitals and health services Information Technology infrastructure/platforms able to support the EPAS program (for example, Wi-Fi black spots leading to loss of access to patient clinical information at the bedside)?
➢ Are SA Health hospitals and health services able to accommodate the physical space requirements for safe and accessible storage of EPAS programmed hardware and associated equipment (Workstations on Wheels, 3 drawer printers, business continuity downtime packs)?
➢ Where a software change/improvement is requested or identified, is the improvement process visible & effective to users?
➢ What is the consumer’s / patient’s experience and feedback relating to EPAS?

7. Implementation of EPAS
➢ What issues have been identified in the implementation of EPAS, including availability of training and support resources? How does this compare with other EMR implementations in Australia and internationally?
➢ Have the frequency of changes and enhancements to the system and how users are made aware and trained in the new functionality contributed to problems in implementation?
➢ What has been the impact of uptime/downtimes on the performance of the system, and how does this compare to national and international benchmarks?

8. Functionality of EPAS
➢ To what extent have EPAS sites suffered a deterioration in data reporting functionality? Why has this occurred, and what should be done to remedy it?
➢ Does (or can) EPAS adequately interface with other systems and health services, including My Health Record, GPs, pharmacy, private diagnostic services? Does it satisfy national interoperability best practice, such as, use of national health identifiers?

9. Proposed future direction for EPAS
➢ Advise whether EPAS should be retained, and if so, what changes should be made to how it operates and is rolled out.
➢ In providing this advice, consideration should be given to cost implications of alternative approaches and the impact on service quality and staff.
➢ Consideration should also be given to future technology developments and whether the EPAS system is able to adapt to these changes, such as, interoperability and digital health advances (eg patient home monitoring).
➢ If EPAS is to be maintained, propose changes to how it is to be implemented, including any re-configurations and extra support resources, and associated cost implications.

10. Future roll-out program
➢ If EPAS is retained, what is a realistic roll-out program, taking account of any changes required as part of this Review.
➢ Why are there only two Country Health SA hospitals in the approved scope for EPAS deployment (Mount Gambier Hospital and Port Augusta Hospital), and what is the plan for the remaining (approximately 60) country hospitals?

➢ Should community mental health services be included in the future scope of EPAS, and what would be the estimated cost and benefits of such an expansion?

➢ What are the clinical and non-clinical risks borne by non-EPAS sites through continued use of end-of-life legacy Patient Administration Systems that are not being updated? Should support of these systems be resumed, taking account of the future roll-out program?

➢ Does the current workforce have capacity to resource a complete roll out? What are the benchmarks for implementation resourcing in successful rollouts in other jurisdictions?

➢ What are the impacts on the EPAS program of creating regional health boards and a more distributed and autonomous governance model for health networks?

➢ What would be a realistic revised implementation schedule and the costs associated with full rollout?
## Appendix B – Reference Group Members

<table>
<thead>
<tr>
<th>Name of Member</th>
<th>Representative Organisation</th>
<th>Work Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shane Solomon</td>
<td>Independent Chairperson of the EPAS&lt;br&gt;Independent Review Reference Group &amp;&lt;br&gt;Chairperson of the EPAS Independent Review Expert Panel</td>
<td></td>
</tr>
<tr>
<td>Karen Ballintyne</td>
<td>Department of Premier and Cabinet (DPC) – Representing Senior Executive</td>
<td>Director Policy and Public Value - DPC</td>
</tr>
<tr>
<td>Virginia McMillan</td>
<td>Australian Nursing and Midwifery Federation of SA (ANMF) – Representing Clinician</td>
<td>Manager, Nursing and Midwifery Information Systems at SA Health</td>
</tr>
<tr>
<td>Dr Sam Gluck</td>
<td>South Australian Salaried Medical Officers Association (SASMOA) – Representing Clinician</td>
<td>ICU Register, Royal Adelaide Hospital (RAH)</td>
</tr>
<tr>
<td>A/Professor William Tam</td>
<td>Australian Medical Association of SA (AMA SA) - Representing Clinician</td>
<td>President of the AMA(SA)</td>
</tr>
<tr>
<td>Doreen Heslop</td>
<td>Public Service Association (Allied Health) - Representing Clinician</td>
<td>Social Worker, Older Person’s Mental Health Service CALHN</td>
</tr>
<tr>
<td>Chris Tan</td>
<td>Public Service Association – Patient Administration Expert</td>
<td>Manager Revenue Operations, Royal Adelaide Hospital (RAH)</td>
</tr>
<tr>
<td>Dr Santosh Verghese</td>
<td>Chair of EPAS Advisory Group</td>
<td>Intensive Care Unit – Flinders Medical Centre (FMC)</td>
</tr>
<tr>
<td>Professor Paddy Phillips</td>
<td>Chief Medical Officer, SA Health</td>
<td></td>
</tr>
<tr>
<td>Bill Le Blanc</td>
<td>Executive Director, eHealth Systems &amp; Chief Information Officer</td>
<td></td>
</tr>
<tr>
<td>Rebecca Pearl</td>
<td>Director of Nursing from Local Health Network where EPAS has been deployed</td>
<td>Director of Nursing&lt;br&gt;Central Adelaide Rehabilitation Services CALHN</td>
</tr>
<tr>
<td>Julia Overton</td>
<td>Health Consumers Alliance of SA</td>
<td>Chief Executive Officer&lt;br&gt;Health Consumers Alliance of SA Inc.</td>
</tr>
<tr>
<td>Geoff Rohsheim</td>
<td>Chamonix – Professional IT Representative</td>
<td>Chief Executive Officer Chamonix</td>
</tr>
<tr>
<td>Dr Peter Del Fante</td>
<td>Australian Digital Health Agency Representative</td>
<td>General Practitioner</td>
</tr>
<tr>
<td>Marina Pullin</td>
<td>MCBI Business Consultants – Change Management Expert</td>
<td>Managing Director&lt;br&gt;MCBI Business Consultants</td>
</tr>
<tr>
<td>Vacant</td>
<td>Change Management or IT expert outside of SA Health</td>
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## Appendix C – Incidents Pre and Post EPAS

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<th>Type of Incident</th>
<th>The Queen Elizabeth Hospital</th>
<th>Repatriation General Hospital</th>
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<tbody>
<tr>
<td>Access, Admission, Transfer, Discharge (other)</td>
<td>218</td>
<td>58</td>
</tr>
<tr>
<td>Challenging Behaviour</td>
<td>154</td>
<td>63</td>
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<tr>
<td>Clinical Assessment</td>
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<td>Communication and Teamwork</td>
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<tr>
<td>Implementation of Care</td>
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<td>Maternal</td>
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<td>0</td>
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<td>Medical Device/ Equipment</td>
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<td>Patient Falls and Other Injuries</td>
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<td>Patient Information</td>
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<td>Staffing, facilities, environment</td>
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<tr>
<td>Treatment, procedure</td>
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<td>183</td>
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<tr>
<td>Unknown/ NA</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>3,176</strong></td>
<td><strong>3,593</strong></td>
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**Number of Incidents**

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<th>Pre Go Live</th>
<th>Post Go Live</th>
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</thead>
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<tr>
<td>Access, Admission, Transfer, Discharge (other)</td>
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<td>205</td>
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**Noarlunga Hospital**

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**Port Augusta Hospital**

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Clinical engagement was reasonable in the early stages of design and build, however not sustained.

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**Royal Adelaide Hospital (implementation limited to the Allscripts PAS and the Sunrise EMR clinical notes in ED)**

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**Total** | 7,117 | 8,940 |
Appendix D – Clinical Informatics

“Clinical engagement and leadership is essential in implementing digital healthcare change. These initiatives are clinical transformation activities, enabled through technology – they cannot be seen as technology changes.” - eHealth Queensland

Clinical informatics is an area of specialisation that enables clinicians to work at the clinical-IT-business interface and is inclusive of all clinical disciplines (whether a doctor, nurse, pharmacist or other healthcare professional). Clinical informaticians bring together an understanding of clinical processes and workflows, the healthcare ecosystem and the supporting information and technology.

“It’s impossible to properly reengineer a process using technology without the oversight of someone who can bridge the business and technical teams.” - Bill Gates

Clinical informatics includes a wide range of topics from clinical documentation to provider order entry systems and from system design to system implementation and adoption issues.

The mere existence of information technology and quality data are insufficient to bring about improvements if it is not clinically usable and embedded into the local clinical culture. Clinical informatics is more about the clinical, new ways of communicating and less about the technology imperative.

The American Medical Informatics Association (AMIA) has endorsed clinical informatics as a subspecialty of the medical profession, irrespective of primary practice and training. It recognises knowledge of patient care and access to information enabled by technology as essential to improving medical decisions at the point of care.

Simply digitising paper-based processes misses the opportunity to transform healthcare to reduce clinical errors, promote evidence-based practice, improve quality and efficiency and use information to make new discoveries. Evidence suggests that failing to integrate digital health into clinical workflows may lead to poorer health outcomes for the Australian community.

Building expertise among healthcare providers overcomes professional reluctance to change and embraces opportunities presented by better use of data in health. Clinicians, skilled in clinical informatics must be included in efforts to improve healthcare so that clinical need influences decisions about technology design, procurement and use and to adapt to the change that is increasingly driving healthcare provision outside of clinical settings to communities, home and on-the-go.

Change leadership is important to optimise and evolve digital solutions to meet clinical need, breakdown information silos and achieve better integration and sharing of information across the sector.

the power of technology to achieve better quality care. To make best use of technology, it is critical for healthcare organisations to have clinical informaticians who are trusted and understand how to influence and steer future advances in informatics. As health IT systems evolve and mature, so too the workforce and leadership must be appropriate for the task.

A professional informatics workforce trained in clinical care, informatics and change leadership is essential to achieve the difficult task of rethinking and redesigning clinical work. Lessons from other countries show that when informatics skills and change leadership capability are overlooked, expectations of better health, better healthcare and lower cost are not met.

Individuals with cross-disciplinary skill sets and experience are in short supply. 5.1% of the Australian health informatics workforce are employed in South Australia (with 4.8% residing locally) compared with 38% in Victoria, 23% in NSW, 15% in Qld, 9% in WA, 4.5% in Tas, 3.5% in ACT and 1% in the NT. Of the total Australian health informatics workforce, 12.3% individuals are currently a registered health practitioner under the national registration and accreditation scheme (“clinical informatician”). The need for skilled clinical informaticians will continue to grow as the volume of health information grows, along with reliance on digital systems for managing, storing and using health data.

There continues to be barriers to developing capabilities in relation to the effective deployment and use of technologies. One of the barriers is the lack of characterisation of the workforce and the training needed to most effectively implement health information technology systems. This need to delineate the workforce was a key finding of the Health Workforce Australia (HWA) 2013 report.

There is growing consensus that current and future health professionals need to be exposed to and be engaged with specific learning in health informatics. Most undergraduate health professional courses include little to no focus on eHealth or health informatics and there is a need to address the training needs of clinicians currently in the workforce.

In the USA, training programs and other initiatives are being deployed in order to meet their estimated 50,000-person shortfall. In Canada, a recent study found an additional 12,000 health informatic professionals will be needed over the next five years.

Our National Digital Health Strategy, developed by the Australian Digital Health Agency, states it is imperative that the whole health and care workforce is appropriately engaged with emerging digital health technologies and services; and all organisations, irrespective of size would at a minimum, ensure a trained, digitally aware workforce, appropriately equipped with hardware, software and digital literacy. The Health Informatics Society of Australia (HISA) advocates for clinicians to undertake training in advanced informatics so they are well-prepared and able to respond positively to the adaptive nature of digital transformation.

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44 Health Informatics is defined by the U.S. National Library of Medicine as the interdisciplinary study of the design, development, adoption and application of IT-based innovations in healthcare services delivery, management and planning.
46 Health Informatics Society of Australia. 2018.
47 Hersh, William. What Workforce is Needed to Implement the Health Information Technology Agenda? Analysis from the HIMSS Analytics™ Database. 2008.
49 Health Informatics Society of Australia. 2018.
50 Health Informatics Society of Australia. 2018.
Upskilling in digital health must be agile, integrated to clinical practice, bring about real improvement in the health of populations and be kept up-to-date.52

“A network of clinical digital health champions, who understand the benefits of digital health and encourage the upskilling of the workforce across the health system into the future, is important to build momentum and a critical mass of digital health proponents. Clinical leadership networks, professional societies and peak bodies have responsibility for guiding their members on how to embed digital health into routine clinical practice.” - Australian Digital Health Agency53