Australia can see further by standing on the shoulders of giants

Driving digital transformation by adopting 'Meaningful Use' legislation

A Digital Healthcare Experience Centre Publication

pwc

www.pwc.com.au

Contents

Foreword

Richard Royle
Senior Adviser in Digital Health;
Chair PCEHR Review

The Commonwealth Government have recently been undertaking a series of reviews into various aspects of the health system, including the Primary Care Review, the National Review of Mental Health Programmes, the Medical Benefits Schedule review, the Reform of the Federation White Paper and the Private Health insurance consultations. Many issues arising out of these reviews will require access to integrated health data in order to further improve clinical outcomes as well as increasing efficiency and effectiveness.

The Commonwealth Government have moved to enact the majority of the recommendations from the review into the My Health Record[1] that I chaired in 2013. A new governance structure replaced the National EHealth Transition Authority (NEHTA) on July 1 2016, following the establishment of the Australian Digital Health Agency (The Agency). The Agency will oversee the National Digital Health Strategy, which will include mechanisms to ensure system interoperability between the various health information systems in Australia.

Experience in the United States has shown that the take up of digital health technology is greatly accelerated through Government financial incentives. In the Australian context, the platforms already built for the national digital health infrastructure (such as common language, individual health identifiers and a consistent messaging platform) will ensure that further Government investment in digital health will produce effective improvements in data integration and improved clinical outcomes.

The new St. Stephens Hospital in Hervey Bay, Queensland, has now been open for over 12 months as Australia's first fully integrated digital hospital, and the only Australian hospital to achieve Level 6 HIMSS certification. Experience at that hospital is already showing significant improvements in medication error rates, together with operational savings in a number of areas.

The development of this hospital was only possible due to a Commonwealth Government grant. An expansion of these types of grants under an equivalent Australian banner to the US Meaningful Use programme will rapidly encourage the further rollout of digital hospitals and bring forward the improved coordination of care that will be critical in ensuring better clinical outcomes and improved efficiencies in the Australian health system.

[1] https://health.gov.au/internet/main/publishing.nsf/Content/17BF043A41D470A9CA257E13000C9322/$File/FINAL-Review-of-My Health Record-December-2013.pdf.

Executive summary

This paper explores the significant benefits that patients and providers could experience if Australian healthcare providers were better incentivised to move away from a paper-based system. It is widely acknowledged that a move to digital healthcare would lead to a higher quality of care by clinicians – whether public, private, acute, primary, community, aged care, metropolitan, rural or remote – and make rich data readily accessible to inform patient care delivery, and to enhance developments in research and innovation.

Current state

Australia's healthcare system ranks among the best in the world in almost every quality indicator.[2] However, costs are rising at rates well ahead of inflation, putting significant pressure on providers to find new and better ways to keep Australians healthy. While quality of care is high, Australia has fallen well behind in its adoption of new technologies and processes that promise not just further improvements in patient outcomes, but significant gains in efficiency as well.

Australian healthcare could be more efficient and more effective if it took up the international trend to digital transformation. It is fortunate that just as the sector requires bold transformation it is being presented with an example of how to accelerate the pace of digital healthcare.

> **"**
>
> ***If I have seen further, it is by standing on the shoulders of giants."***
>
> **Sir Isaac Newton**

Meaningful Use in an Australian context

To successfully achieve the fundamental and necessary changes associated with digital transformation, policymakers and stakeholders must consider incentivising digital healthcare adoption through implementing a 'Meaningful Use' regime like that used in the United States. Meaningful Use requires providers to show they are using certified electronic health record technology in ways that can be objectively demonstrated to improve quality, safety, efficiency, and to reduce health disparities. Ultimately, Meaningful Use compliance will result in: better clinical and population health outcomes, increased transparency, better data and empowered patients.[3] Financial incentives set for providers to comply with the legislation in the US, have resulted in accelerated digital healthcare technology adoption. Significant quality and safety benefits for patients and service improvements for the system have flowed from 'digitisation' of acute hospitals.[4]
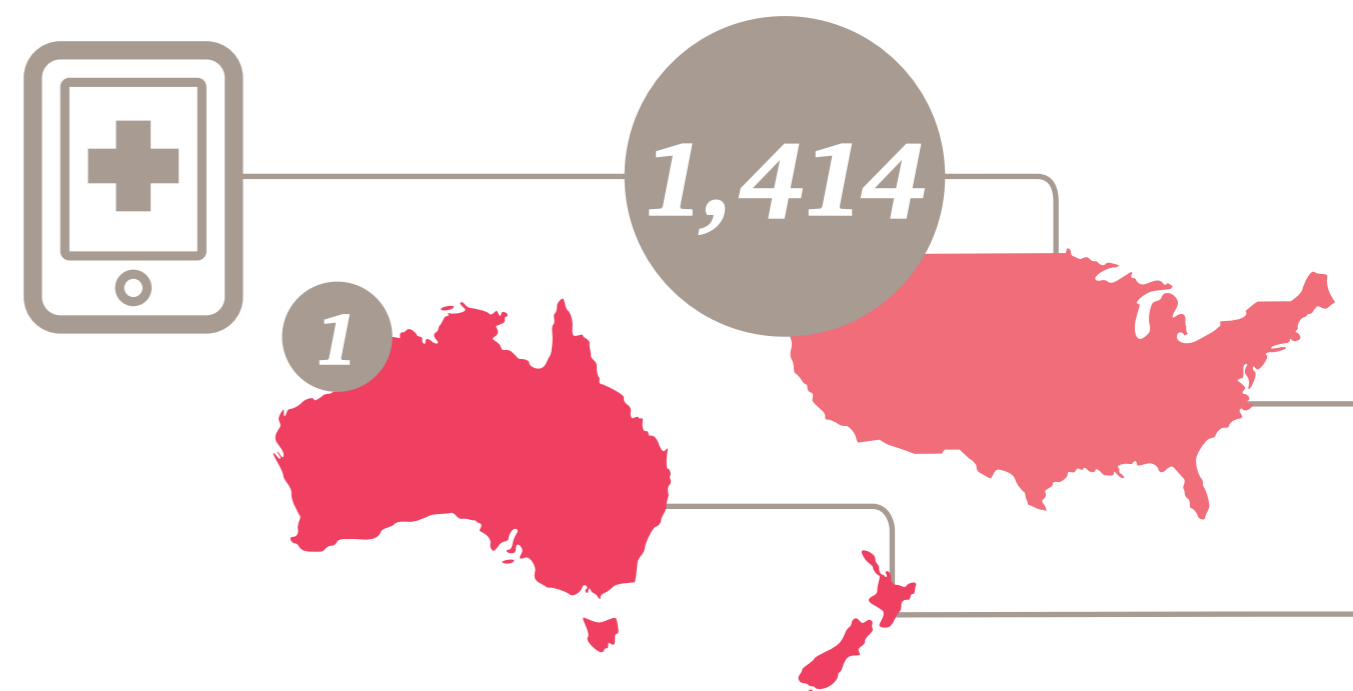
In 2015, there were 1,414 digital hospitals in the United States, in Australia and New Zealand? One.

In 2015, there were 1,414 fully digital hospitals in the United States[5,6] while in Australia and New Zealand there was one[5]. The health sector in Australia isn't just lagging that in the US, it is also lagging other sectors within Australia. It is many years behind other sectors such as financial services in engagement, interactivity and access. It is a sector in urgent need of transformation and digitisation.

While the Meaningful Use Program within the US has had its challenges, it has also achieved good results in adoption and improved information at the point of care. Australia is well positioned to learn from both its successes and its mistakes.

Digital service delivery underpinned by affordable Meaningful Use principles would thus provide a platform for innovation and a more seamless, integrated, effective, responsive and mobile healthcare system.

The building blocks of the digital healthcare landscape

Australia promises its citizens universal healthcare, but the cost of that promise is rising as the population ages and as new diagnostic tools and advanced therapeutics drive medical inflation.
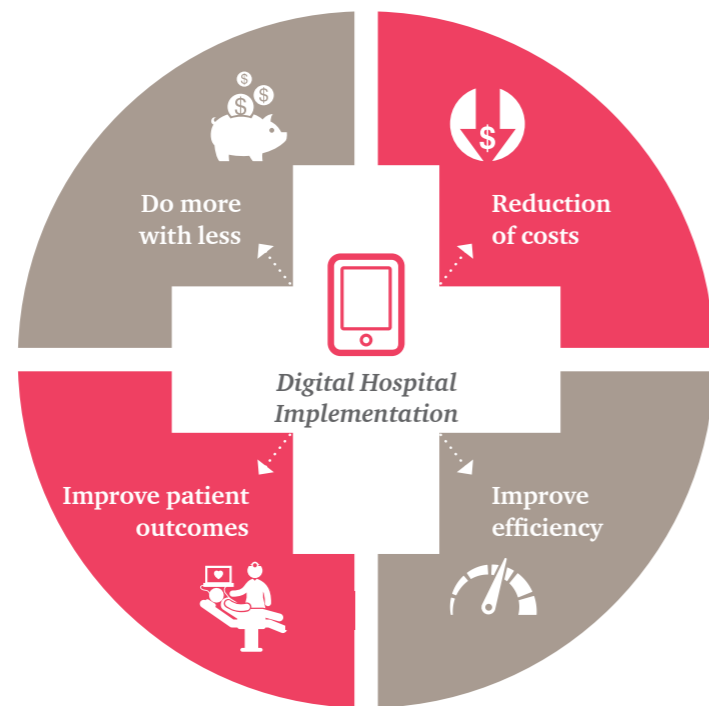
In addition, successful management of previously life-threatening conditions is leading to an ageing population with an increasing prevalence of chronic and complex diseases, placing further pressure on the overall costs of healthcare.

Expenditure on health in Australia as a share of Gross Domestic Product (GDP) has more than doubled over the last 50 years, to just over 9.8 per cent of GDP in 2013-2014.[7] Hospital spending has, on average, increased by 6.6 per cent every year between 2008–09 and 2013–14,[7] and spending on public and private hospitals is increasing faster than inflation.

This is putting fiscal pressure on the states, which fund hospitals, and on the Commonwealth Government, which funds General Practitioner (GP) and specialist visits, as well as providing the 30% rebate for private health insurance. Healthcare costs are outstripping governments' abilities to pay, and posing difficult questions about the sustainability of health services.
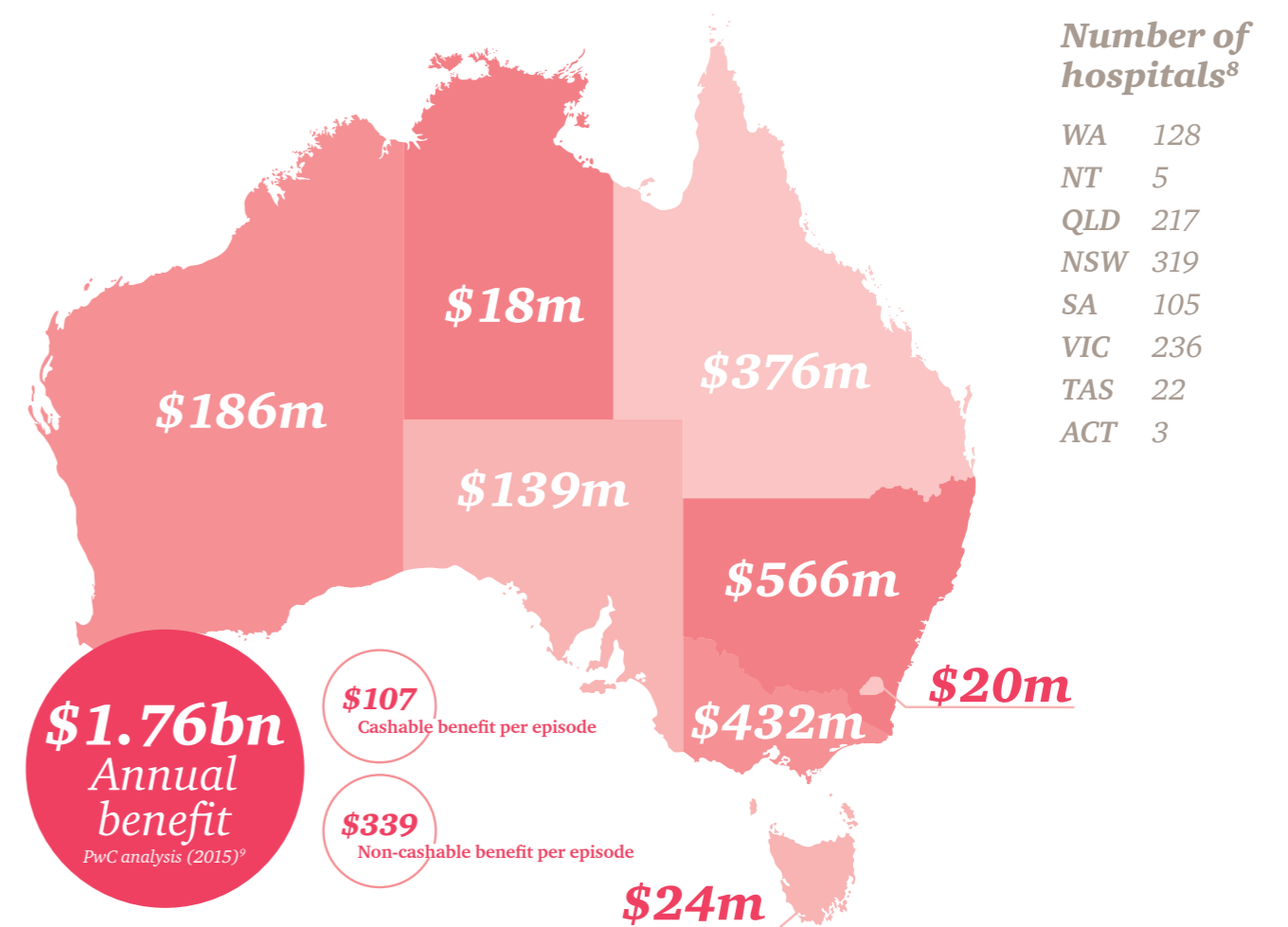
It is widely acknowledged, in publications and case studies of digital hospital implementations, that embracing digital services offers a highly attractive way forward: a way to cut costs, boost efficiency, improve patient outcomes and, overall, do more with less.

Electronic Medical Records (EMRs) for acute services and Electronic Health Records (EHRs) for primary and community care are fundamental to digital transformation, as the basic building blocks of any digital healthcare system. The adoption and use of these systems is a leading indicator of digital health maturity.

Do more with less

Reduction of costs

Digital Hospital Implementation

Improve patient outcomes

Improve efficiency

[7] Australian Institute of Health and Welfare (2015), Health expenditure Australia 2013–14. Health and welfare expenditure series no. 54. Cat. no. HWE 63. Canberra: AIHW.

The quantified benefits

The potential economic benefit, when quantified across the Australian population (using publically available data), equates to approximately $1.76 billion annually.*

$18m

$376m

$186m

$139m

$566m

$432m

$20m

$24m

$1.76bn
Annual benefit
PwC analysis (2015)[9]

$107
Cashable benefit per episode

$339
Non-cashable benefit per episode

Number of hospitals[8]

WA	128
NT	5
QLD	217
NSW	319
SA	105
VIC	236
TAS	22
ACT	3

The benefits[9] that can be achieved through implementing Electronic Medical Records (EMRs) have been derived from PwC's national and international experience. Benchmark benefits have been calculated on a per-episode basis, and have been extrapolated across Australian public (acute) and private hospitals.

The greatest proportion of benefits relate to EMR deployments across New South Wales, Queensland and Victoria, given these states have approximately 75 per cent of the hospitals in Australia.

* Public acute and private hospitals only – benefit when extrapolated to community and primary care settings will far exceed this.
[8] Australian Institute of Health and Welfare (2014), Australia's hospitals 2012-13 at a glance. Health services series no. 55. Cat. no. HSE 146. Canberra: AIHW, [ONLINE] Available at: http://www.aihw.gov.au/publication-detail/?id=60129547006. [Accessed 03 March 2016].
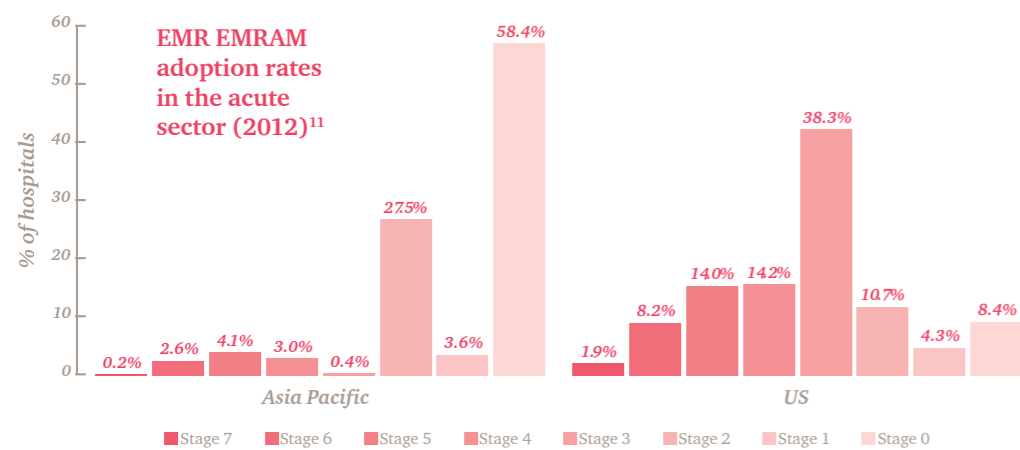[9] Cashable benefits relate to quantifiable, monetary savings or revenue gains whilst non-cashable benefits can be represented as equivalent values or opportunity costs.
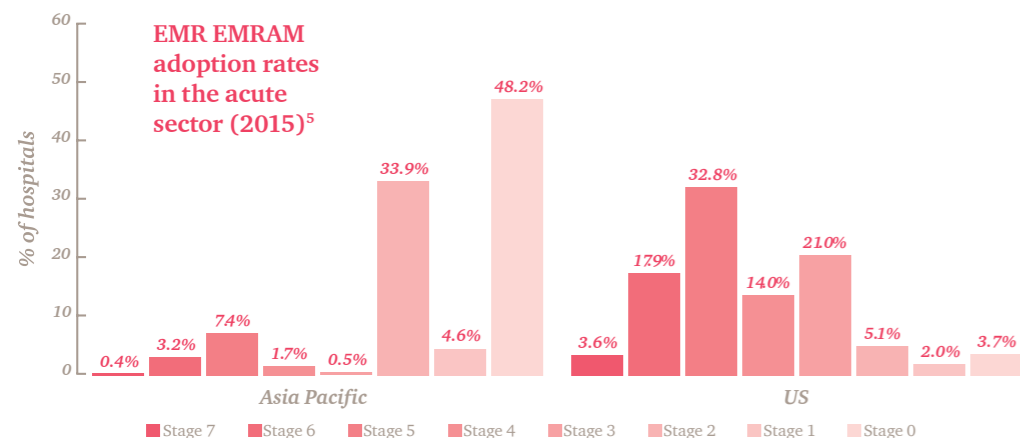
Poor adoption in Asia-Pacific

Over the past five years, EMR adoption rates have risen across the globe. This is measured by the EMR Adoption Model or EMRAM which is a maturity curve that benchmarks one organisation to another and is provided by HIMSS Analytics. By the end of 2012, the majority of acute hospitals (58.4%) in the Asia Pacific region had not yet reached Stage 1 in HIMSS EMRAM[10] maturity. In contrast to the US, the Asia Pacific region also had a lower proportion of hospitals ranked at a high maturity level (between stages 5 and 7).

EMR EMRAM adoption rates in the acute sector (2012)[11]

Asia Pacific: 0.2%, 2.6%, 4.1%, 3.0%, 0.4%, 27.5%, 3.6%, 58.4%
US: 1.9%, 8.2%, 14.0%, 14.2%, 38.3%, 10.7%, 4.3%, 8.4%

■ Stage 7　■ Stage 6　■ Stage 5　■ Stage 4　■ Stage 3　■ Stage 2　■ Stage 1　■ Stage 0

Note: Figures in the graphs may not add up due to rounding (some above and below 100).

Three years later, hospitals in the Asia Pacific region have slowly grown in maturity, with a smaller gap between stages 0 and 3 (30.9% in 2012 and 14.3% in 2015), and a small increase in maturity at the higher end of the scale. In the US, hospitals staged 4 and above increased by 30% (from 38.3% to 68.3%) over two years. In the same period, hospitals staged 4 and above in the Asia Pacific region increased by only 2.4% (from 10.3% to 12.7%) in comparison.

EMR EMRAM adoption rates in the acute sector (2015)[5]

Asia Pacific: 0.4%, 3.2%, 7.4%, 1.7%, 0.5%, 33.9%, 4.6%, 48.2%
US: 3.6%, 17.9%, 32.8%, 14.0%, 21.0%, 5.1%, 2.0%, 3.7%

■ Stage 7　■ Stage 6　■ Stage 5　■ Stage 4　■ Stage 3　■ Stage 2　■ Stage 1　■ Stage 0

Note: Figures in the graphs may not add up due to rounding (some above and below 100).

In EMR terms, a stage 4-5 facility of EMRAM maturity relates to a minimum functionality of computerised clinician order entry and clinical decision support. Stage 6 and above relates to facilities with closed-loop medication management, advanced clinical documentation and advanced clinical decision support.[12] Studies have shown that organisations with advanced EMRs (with an emphasis on integration and interoperability) report the greatest benefit.[13] Integrated EMR systems are able to leverage advanced capabilities and technologies to better engage patients in hospitals and in the community to bring about improved health outcomes.

Why the big contrast to the US?

In 2015, there was a significant investment in EMRs across Australia, but current uptake is nowhere near as sharp as in the US, where Meaningful Use – a Commonwealth incentive program enabled by the 2009 Health Information Technology for Economic and Clinical Health (HITECH) Act[14] – is accelerating digital transformation.

The HITECH Act provides subsidies for hospitals and non-hospital based doctors to implement digital healthcare technologies and processes. These incentives are tied to strictly defined outcomes:

1. Improving the quality, safety and efficiency of care while reducing disparities
2. Engaging patients and families in care
3. Promoting public and population health
4. Improving care co-ordination
5. Promoting EMR privacy and security.

The authors of this publication believe that such a program would be beneficial to stimulate Australian digital health investment – and that it would be highly effective in improving patient care and financial returns. The Australian College of Rural and Remote Medicine (ACRRM) supports a transition towards a Meaningful Use policy with the My Health Record, Australia's national digital health record system, in the primary sector.[15]

Further, the Australian health sector is even more likely to enhance the returns of Meaningful Use in that:

- The Australian healthcare system is far less complex in that providers and competing interests are substantially reduced.
- Meaningful Use would help align the Commonwealth and State governments' health policy settings, goals and priorities.
- Meaningful Use would shift demand from hospitals to GPs, reducing costs and providing better care outcomes for the consumer.

[12] HIMMS Analytics (2015), Asia Pacific Electronic Medical Record Adoption Model [ONLINE] Available at: http://www.himssanalyticsasia.org/EMRam/. [Accessed 30 November 15].
[13] Bates et al. (2003), A proposal for Electronic Medical Records in U.S Primary Care, Journal of American Medical Information Association, Jan-Feb, 10(1): 1–10; OCIO Health Design Forum Report (2012), Electronic Medical Record Evaluation Tools and EMR Core Report: Guide for Victorian Public Health Services; Cann (2014), EMR Challenges, Benefits and Tips for Integration, Insight On, [ONLINE] Available at: http://www.insight.com/insighton/healthcare/EMR-benefits-challenges-and-tips-for-integration/. [Accessed 27 January 16].
[14] U.S. Government Publishing Office (2009), American Recovery and Reinvestment Act of 2009, HR 1, 11th Cong. § 3005 [ONLINE] Available at: http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=111 cong bills&docid=f:h1enr.pdf. [Accessed 30 November 15].
[15] Pulse IT (2015), ACRRM supports moves towards Meaningful Use of My Health Record, [ONLINE] Available at: http://www.pulseitmagazine.com.au/australian-ehealth/2725-acrrm-supports-moves-towards-meaningful-use-of-My Health Record. [Accessed 30 November 15].

[5] op.cit page 5.
[10] HIMMS Analytics (2015), Electronic Medical Record Adoption Model [ONLINE] Available at: http://www.himssanalyticsasia.org/EMRam/index.asp. [Accessed 30 November 15].
[11] Evans (2014), The HIMSS EMRAM Model – Showing how information technology can assist improvements in patient care, Slainte Healthcare [ONLINE] Available at: http://www.slaintehealthcare.com/Insights-Information/Insights/ArtMID/6323/ArticleID/51/The-HIMSS-EMRAM-Model-%E2%80%93-Showing-how-information-technology-can-assist-improvements-in-patient-care. [Accessed 30 November 15].

The potential benefits of Meaningful Use in Australia

A well-positioned Australian Meaningful Use policy would deliver benefits for State, Territory and Commonwealth governments via greater co-ordination of patient care across the public and private acute, community and primary care sectors.

Importantly, it could help support and co-ordinate care in the community. This would allow patients to remain in the community, in turn improving clinical outcomes, quality of life, and reducing costs.

EMR investments provide significant benefits (cashable and non-cashable) in a number of areas, including:

Patient-centric care, through improving the safety and quality of healthcare (e.g. reduced readmissions)

Service improvements, through increasing operational efficiency (e.g. reduced patient length of stay)

Patient, clinician and administrator satisfaction

Cost savings and revenue gains (e.g. reduced drug expenditure)

A well designed Meaningful Use scheme in Australia is a stepping stone to increasing EMR uptake and benefits that can be achieved. Recent literature[16] also highlights the potential benefits of implementing and adopting EMRs, as identified below.

A comprehensive, integrated digital health system (which includes community organisations as well as hospitals) would enable a number of highly beneficial improvements. These include patient-centric care, service improvements, more sustainable healthcare and improved information flow.

Patient-centric care

Through increased compliance with clinical guidelines and standards, patients can receive more direct care at the bedside, which leads to improved safety and clinical outcomes, and a better experience overall.

Care integration can be enhanced between the primary and acute sectors as well as within hospitals themselves – for example, between emergency departments and wards, and between wards and surgical theatres.

Advanced digital healthcare capabilities create value by improving medication safety, optimising transitions between care settings and enabling flexible real-time reporting from digital 'dashboards'.

Service improvements

Increasing access to digital information can improve quality of service. The unproductive time clinicians now spend preparing, managing and accessing paper records can be applied to patient care. Improving clinical handover and the use of facilities such as beds and operating theatres can boost patient throughput and allow additional episodes of care.

Sustainable healthcare

Digital health solutions provide sustainable healthcare through cost savings and revenue gains. A significant reduction in paper records will reduce management, scanning and logistics costs.

Advanced clinical decision support and clinical alerts improve decision making and the quality and sustainability of healthcare; by improving adherence to best practice care guidelines and allowing clinicians to make the most appropriate decisions in a timely manner.

Revenue gains can be achieved through the potential to negotiate longer-term funding contracts based on guaranteed patient outcomes. Other cost efficiencies include reducing the use of consumables (e.g. reduction in duplicate drug orders due to the availability of a patient's medication history and clinical decision support), decreasing unnecessary testing, and prescribing medications more efficiently and effectively.

[16] Westbrook et al. (2015), Cost-effectiveness analysis of a hospital electronic medication management system, Journal of the American Medical Informatics Association, vol. 22, no. 4, 784-93, Oxford University Press, Melbourne; Groves et al. (2013), The 'big data' revolution in healthcare: accelerating value and innovation, McKinsey & Co, Centre for US Health System Reform, Business Technology Office; Bornstein, S. (2012). An integrated EHR at Northern California Kaiser Permanente: Pitfalls, challenges, and benefits experienced in transitioning. Applied Clinical Informatics, vol. 3, no. 3, 318–325.

Potential societal outcomes for Australia

A successfully implemented Meaningful Use scheme in Australia, could lead to positive outcomes for patients and clinicians, including:

- Patients receiving a greater standard of care, including reduced clinical incidents, more appropriate interventions and integrated care pathways into the community

- Rural and remote communities having greater access to health services closer to home

- Through an overall decrease in patient length of stay, health providers reducing Weighted Activity Units (WAU), resulting in a lower cost per admission

- Health providers may find it favourable to negotiate outcome-based funding (e.g. lock-in contracts linked to improved health outcomes and reduced readmissions)

- By leveraging predictive analytics capabilities (genomics, population disease management etc.), at-risk patients can be identified early; allowing for the formulation of appropriate interventions for specific patient cohorts

- Population health management would allow research into complex predictive models and further enhance statistical studies

- Some of the overall benefits to society include a reduced cost of illness, an overall improvement in productivity and reduced absenteeism.

Health system

Healthcare professionals
Doctors, nurses, specialists, GPs, etc

Family & friends

Patient

Providers
Hospitals, clinics and other institutions

Funders
Commonwealth and State governments health insurers, etc

Community
The general public

Digital healthcare challenges

Improved models of care are required to meet the challenges healthcare systems face globally and in Australia. This is particularly the case for chronic disease management. Desired features include improved personalised medicine, and greater consumer control and empowerment.

Digital healthcare will play a central role in enabling these changes. The recent Primary Care review (chaired by Dr Steve Hambleton) focuses on chronic disease management and the criticality of ensuring the availability of digital health data to encourage the coordination of care across care settings.[18]

Experiences in Australia have shown that technological shifts in the healthcare industry need to be supported by substantial planning and change management efforts, as well as effective collaborative frameworks across organisations and providers.

There is a disparity in the use of information systems across public, private and not-for-profit with no one single source of truth, no one single vendor dominance and poor information sharing across the continuum. Where information should be supporting the journey of a patient regardless of the care provider, it is siloed and archaic.

In 2015, Martin Bowles, the Secretary of the Australian Department of Health, addressed these themes when he told a conference in Canberra that a new approach was required.

Bowles said it was important for the department to shift from tactical thinking around specific programs to strategic thinking around Australia's health system.[19]

"
We need to think differently and we need to learn from our mistakes"[19]

Martin Bowles,
*Secretary of the
Department of Health*

[18] Primary Healthcare Advisory Group (2015), Better Outcomes for People with Chronic and Complex Health Conditions through Primary Healthcare, Discussion Paper, Australian Government, The Department of Health, [ONLINE] Available at: http://www.health.gov.au/internet/main/publishing.nsf/Content/2D8BCF439DE725CACA257E93001B462A/$File/discussion.pdf. [Accessed 27 January 16].
[19] Bowles, M (2015), Innovation within the Department of Health, Innovation Summit 2015, [ONLINE] Available at: https://innovation.govspace.gov.au/events/innovation-month-2015-dream-dare-do/innovation-month-summit

A path to transformation

Inevitably, Meaningful Use in Australia will be different from the US version. It can be better and more effective if it incorporates lessons learnt from the US experience.

One criticism of Meaningful Use in the US is that integration between healthcare providers has proved difficult and gains in rural locations have been minimal.[20]

The HITECH program in the US sought to first achieve uptake, then integration and interoperability. The challenges associated with connecting several thousand independent clinical information systems and EMRs are still being felt today, and could have been minimised had clearly defined standards been established from the outset.[21]
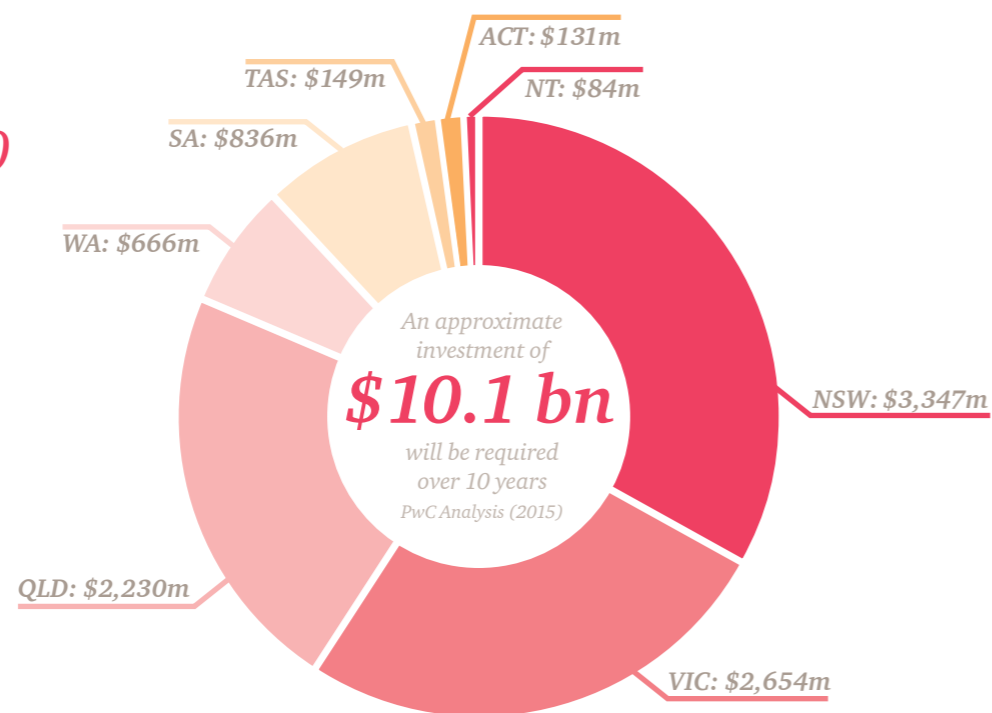
The recent Royle Review also highlighted the importance of ensuring interoperability of health software in Australia – an issue that will be taken up by the new governing body for digital health.[22]

There needs to be flexibility in standards based on the size and type of provider while still enforcing a minimum level of compliance to achieve interoperability. Clinicians and clinical workflow requirements should drive the design and use of EMRs, not standards compliance.

Integration between new and existing systems is still a problem in Australia, but there are a reasonable number of organisations to co-ordinate and an opportunity to set national standards in advance. For rural and remote services, there is both an incentive and an opportunity for 'hub' hospitals to extend their EMR implementations to their satellites and realise the benefits of integrated care.
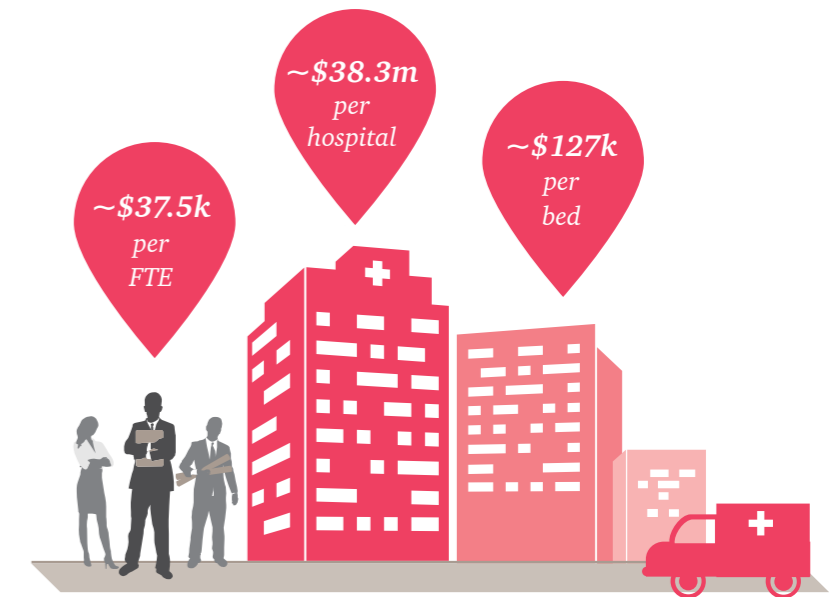
Total EMR Implementation Costs (2015-2025)
(PwC Analysis 2015)

ACT: $131m
NT: $84m
TAS: $149m
SA: $836m
WA: $666m

An approximate investment of
$10.1 bn
will be required over 10 years
PwC Analysis (2015)

NSW: $3,347m
VIC: $2,654m
QLD: $2,230m

The required investment to implement an EMR has been estimated to cost approximately $126,800 per bed[23] (average cost based on an average sized facility with 300 beds). This factor has been used as a lever and extrapolated across the hospital profile of Australia (public acute and other private facilities only). Preliminary expenditure on EMRs in Queensland, Victoria and New South Wales Health look to support this.

In this context, an EMR can be defined as being a standard build, but not limited to having the following functionality:

- *Computerised clinician order entry and results reporting*
- *Advanced clinical documentation*
- *Clinical decision support*
- *Electronic medication ordering*
- *Single integrated clinical data repository.*

~$37.5k per FTE
~$38.3m per hospital
~$127k per bed

Laflamme et al. (2010) and PwC Analysis (2015)[23]

The analysis shown includes the estimated capital costs based on a standard EMR build, including only the core elements related to vendor costs (software licensing and support), infrastructure costs (hardware and devices) and project resources (project, change management, training, clinical SMEs and other implementation resources).[23] The above costs do not include any on-going costs, involvement or contributions at a local level; related to governance, clinical and administrative input or further localised change management and training activities.

Other costs that are not included relate to local infrastructure builds outside the standard EMR platforms. Further investment in enhanced capability through hardware (biomedical device integration at the bedside, mobile devices, telehealth or automated dispensing cabinets etc.) is also not included.

[20] Terry, NP (2013), Meaningful adoption: what we know or think we know about the financing, effectiveness, quality, and safety of electronic medical records, The Journal of Legal Medicine, 34(1), 7–42.
[21] Mostashari, F (2013) Moving closer to patient centred care, Health IT Address: Committee on Finance, US Senate http://www.hhs.gov/asl/testify/2013/07/t20130717b.html.
[22] Department of Health (2013), Review of the My Health Record (Royle Review), [ONLINE] Available at: http://www.health.gov.au/internet/main/publishing.nsf/content/17BF043A41D470A9CA257E13000C9322/$File/FINAL-Review-of-My Health Record-December-2013.pdf>. [Accessed 27 January 16].
[23] Laflamme, F.M, Pietraszek, W.E, Rajadhyax, N.V. (2010), Reforming hospitals with IT investment, McKinsey & Co. accessed at < http://www.mckinsey.com/insights/health_systems_and_services/reforming_hospitals_with_it_investment>

Conclusion

Despite the limited scale of adoption to date, and given the current level of investment and capability in Australian digital health solutions, (from a number of leading vendors) it would be feasible to implement a comprehensive solution in a large site within 12-18 months. Available funding would determine the number of sites that could be implemented in parallel in any jurisdiction. However, the number of sites actively implementing concurrently would be constrained by the availability of vendor support resources for the Australian system.

Taking the above factors into consideration, it is assumed that it would take approximately 5-7 years to deliver EMR solutions to the principle metro and regional facilities across the country.

International experience has shown that there can be significant benefits when investing in a single EMR across a whole hospital (as compared to individual service areas) or a whole of system EHR. In the US, by achieving Stage 1 and Stage 2 Meaningful Use (somewhat similar to the advanced functionality on the EMRAM model) the greatest benefit potential can be achieved.[24]

It is important to note that the realisation of benefits, and therefore the return on investment, is heavily dependent on the speed of delivery and the success of the implementations.

The realisation of benefits is not only delivered through the mass arrival of digital solutions; it is also heavily dependent on the people involved, their comprehensive engagement, the culture of leadership and enablement, and support for, and acceptance of change.

If there is resistance, unwillingness, or weak leadership then implementing digital solutions can result in a variety of disadvantages (for example, the time taken to adjust to new processes and technology, and the significant costs that may arise from training, change management and adoption).

However, we believe it is necessary to not only reflect on the value of EMRs, but also to explore investment in healthcare information technology outside of the acute sector. The potential areas of investment across the digital healthcare landscape could include the following:

Meaningful Use continues to be a health sector 'circuit breaker' in the US. It has driven the adoption of modern health processes and technologies that are improving the quality of service and healthcare, and delivering compelling financial benefits.
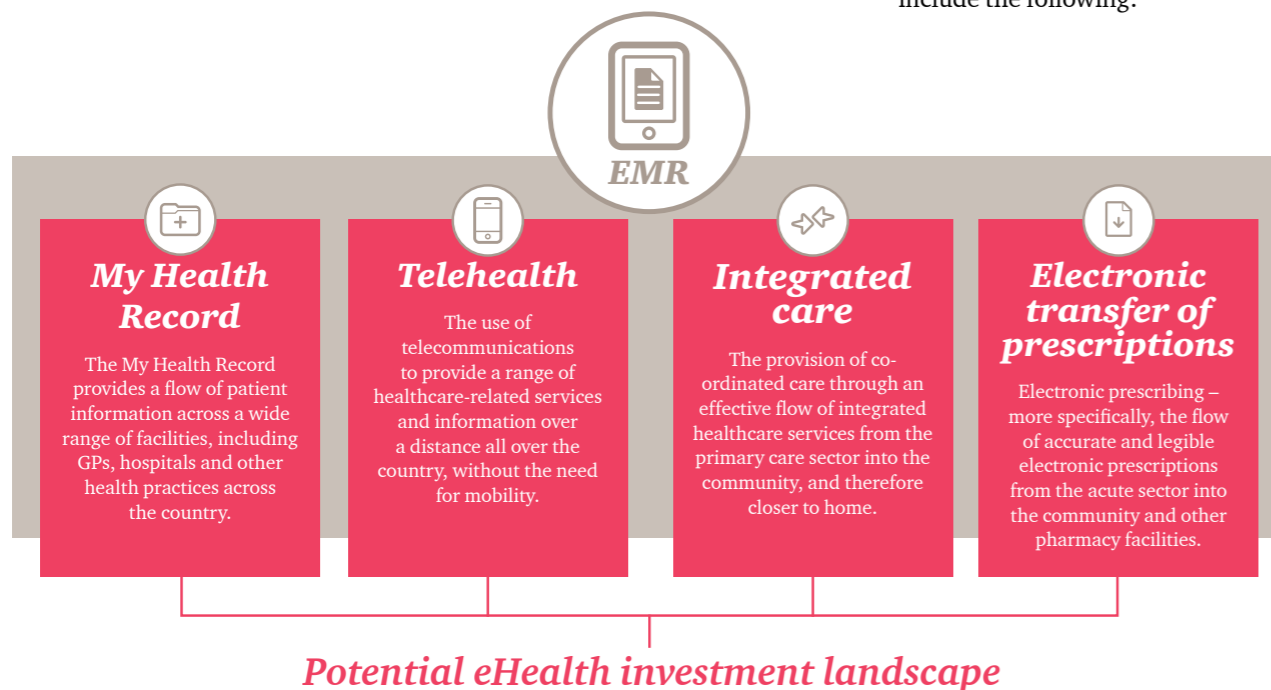
It can do the same for Australia. However the approach should be mindful of lessons learned from the US scheme.

Policymakers, health leaders and stakeholders in Australia's health system will have to answer the challenges that demographic changes and the ageing population pose to the universal healthcare system.

Meaningful Use funds are allocated to meet clearly defined goals and benchmarks of success. The structure helps ensure resources are applied in the most efficient and effective ways possible for maximum patient benefit.

It is rare in public policy to find clear "win-win" options – even more so in highly complex areas such as healthcare. Meaningful Use offers Australia precisely those options: *wins* for patients and providers, *wins* for the State and Commonwealth governments, and *wins* for taxpayers and citizens.

The sooner that we make a commitment to change, the sooner these benefits will be able to be realised for healthcare providers, front line clinicians, funders and above all, patients.

EMR

My Health Record	Telehealth	Integrated care	Electronic transfer of prescriptions
The My Health Record provides a flow of patient information across a wide range of facilities, including GPs, hospitals and other health practices across the country.	The use of telecommunications to provide a range of healthcare-related services and information over a distance all over the country, without the need for mobility.	The provision of co-ordinated care through an effective flow of integrated healthcare services from the primary care sector into the community, and therefore closer to home.	Electronic prescribing – more specifically, the flow of accurate and legible electronic prescriptions from the acute sector into the community and other pharmacy facilities.

Potential eHealth investment landscape

[24] Westbrook et al. (2015), Cost-effectiveness analysis of a hospital electronic medication management system, Journal of the American Medical Informatics Association, vol. 22, no. 4, 784-93, Oxford University Press, Melbourne; Groves et al. (2013), The 'big data' revolution in healthcare: accelerating value and innovation, McKinsey & Co, Centre for US Health System Reform, Business Technology Office; Bornstein, S. (2012). An integrated EHR at Northern California Kaiser Permanente: Pitfalls, challenges, and benefits experienced in transitioning. Applied Clinical Informatics, vol. 3, no. 3, 318–325.

About the authors

John Forsythe

John is a PwC Partner who leads the Digital Healthcare Experience Centre in Brisbane.

Chris Rogan

Chris is a PwC Partner who leads the Health team in Queensland. He specialises in healthcare strategy and financial effectiveness.

Dean Dimkin

Dean is a PwC Partner who specialises in Digital Transformation in Government and Healthcare.

Rowan Strain

Rowan is a Senior Manager in PwC's National Health Team. He specialises in Health IT, project management, organisational change management and supporting large scale ICT transformation projects in the healthcare sector.

Jacqueline Curran

Jacqueline is a PwC Senior Consultant. Jacqui specialises in IT change management, particularly as it relates to EMR implementations.

Vivek Odhav

Vivek is a PwC Senior Consultant in Technology Consulting. He specialises in digital and technological change, with a focus on data analytics, benefits realisation, clinical and financial modelling within the healthcare sector.

A special thanks to authors Rob Mackay from Aginic, Richard Royle and Dr. John Zelcer for their extensive contributions.