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ANALYTIC SERVICES

Briefing Paper

EMBRACING THE CHANGE MANDATE

The 2020 Digital Transformation Agenda for Australia's Health Care Sector

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There has arguably never been a more dynamic time for health care globally. New medical technologies continue to deliver amazing advances. Patients are gaining greater control over their own care, and clinical outcomes are improving. Many view digital solutions as a key enabler—helping us deliver better health care today whilst preparing for the demands of the future.

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Australia's health care system is well on the way to building digital foundations. General practitioners (GPs) are migrating their practice systems to the cloud, and hospitals are implementing electronic medical records. Maturing computer science disciplines, such as analytics and artificial intelligence, can identify at-risk populations and allow health care providers to tailor treatments accordingly. For example, data-supported precision dosing could help avoid some of Australia's current 223,000 yearly hospital admissions linked to adverse drug events, which cost the nation $1.2 billion. Clinical data exchanges between primary and secondary carers also have potential to improve medical decision making and reduce the 14% of unnecessary pathology tests ordered due to patient history not being available.

In collaboration with Harvard Business Review Analytic Services, Microsoft sought input from Australian experts on the current and future state of our health care system. This report highlights the progress that is being made in digital-enabled healthc are, the barriers to progress, and how a digitally augmented system can improve the lives of all Australians.

Microsoft has a long-standing interest in championing digital innovation to support health. From its own research efforts, such as developing artificial intelligence technology to lower rates of mosquito-borne disease, supporting digital health start-ups, and establishing an extensive ecosystem of partners whose solutions extend across the entire health care continuum, Microsoft looks forward to being a part of a health care system that improves the health of Australians well into the future.

Microsoft Australia's Health Industry Group sincerely thanks all contributors to this report for their insights and recommendations. Special thanks go to:

- Dr. Andrew Hugman, physician informaticist and practising emergency physician, South East Sydney Local Health District, part of NSW Health
- Dr. Chris Pearce, GP and president of the Australasian College of Health Informatics
- Richard Royle, national digital health leader, PricewaterhouseCoopers Australia
- Dr. Zoe Wainer, head of public health, Bupa Australia and New Zealand
- Professor Johanna Westbrook, director of the Centre for Health Systems and Safety Research, Macquarie University

EMBRACING THE CHANGE MANDATE

The 2020 Digital Transformation Agenda for Australia's Health Care Sector

Australia's health care sector is facing a set of challenges poised to disrupt its world-leading quality of care. With an unsustainable spending trajectory, costly new medical innovations, an ageing population, increased chronic disease, and an emerging population of digitally literate consumers, it has become crucial for private and public health care organisations to turn to digital tools and technologies to improve health outcomes, reduce inefficiencies, and put patients at the centre of care.

'We need to deliver care; reduce errors, waste, and duplication of services; and create a sustainable system amid growing expectations and financial constraints', says Professor Johanna Westbrook, director of the Centre for Health Systems and Safety Research (CHSSR) at Macquarie University in Sydney.

This requires a dramatic mindset shift for a sector that has been reliant on largely paper-based processes, and in which data on patient care, treatment costs, and health outcomes has been fragmented and not easily accessed. 'We are on the verge of the most significant shift in how we deliver health care since the scientific method arrived', says Dr. Chris Pearce, a GP and president of the Australasian College of Health Informatics. 'People's records can't be locked up anymore. Those who adapt will gain work, and those who don't, won't'.

According to a recent study by Harvard Business Review Analytic Services, however, 32% of health care business decision makers globally reported a low reliance on digital technologies. Whilst progressive health care organisations in Australia have embarked on digital initiatives, including electronic medical record (EMR) implementations, e-medication programmes, and patient engagement platforms, it is clear that significant efforts will need to be pursued to realise the true value of digital health for improving health system efficiencies and outcomes.

Digital Health Care Drivers

Australian health care organisations that have embarked on digital health initiatives have seen positive results. At its opening in October 2014, St. Stephens Hospital in Hervey Bay, Queensland, was the country's first fully integrated digital hospital, with a fully tracked medication system. By packaging medication in individual, barcoded dosages, the organisation reduced waste and medical error resulting from duplicate or unnecessary dispensing of drugs.

HIGHLIGHTS

48%
OF RESPONDENTS SAY CREATING AN EXCEPTIONAL, HIGHLY RELEVANT PATIENT EXPERIENCE IS A PRIORITY IN THEIR DIGITAL TRANSFORMATION EFFORTS.

44%
OF RESPONDENTS SAID TOP BARRIERS TO DIGITAL TRANSFORMATION WERE RESISTANCE TO CHANGE AND ORGANISATIONAL RESTRUCTURING CHALLENGES.

18%
OF RESPONDENTS HAVE EMBARKED ON A COGNITIVE COMPUTING PROGRAM, ALTHOUGH 74% SAY THE TECHNOLOGY IS IMPORTANT FOR FUTURE SUCCESS.

‘Electronic records lead to an **improved length of stay**, operating theatre **throughput**, and clinical **outcomes**’, says Richard Royle, national digital health leader, PricewaterhouseCoopers Australia.

‘There are efficiencies gained in the lack of paper flying around hospital, and doctors can see a patient’s vital signs on their laptop, which gives them the ability to maintain constant vigilance’, says Richard Royle, national digital health leader, PricewaterhouseCoopers Australia.

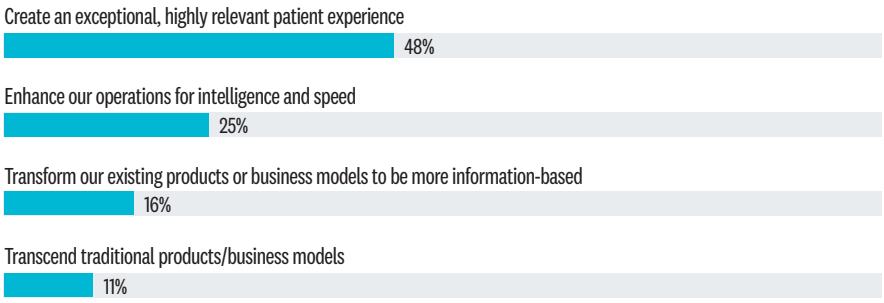
Furthermore, Royle continues, PwC research shows significant benefits of e-health systems leading to better clinical outcomes. ‘Electronic records lead to an improved length of stay, operating theatre throughput, and clinical outcomes’, he says. ‘The ability to document, in an electronic record, the clinical pathways to follow for diagnoses produces greater consistencies of clinical outcomes and reduces readmissions’.

FIGURE 1

DIGITAL DRIVERS IN HEALTH CARE

Health care industry digital efforts are driven by the desire to create an exceptional, highly relevant customer (patient) experience.

Rank the following in terms of the priority that is placed on them in your digital transformation efforts or plans.
[PERCENT RANKING RESPONSE HIGHEST PRIORITY]



SOURCE: HARVARD BUSINESS REVIEW ANALYTIC SERVICES SURVEY, DECEMBER 2016, HEALTH CARE SECTOR

At NSW Health, the South Eastern Sydney Local Health District’s e-medication management programme has replaced paper drug charts across four hospitals, resulting in reduced medication errors, according to Dr. Andrew Hugman, clinical lead for the programme. Hugman is a physician informaticist and practising emergency physician at the South East Sydney Local Health District, part of NSW Health, one of Australia’s largest state government health care organisations.

Equally crucial and perhaps more disruptive, according to Pearce, is providing patients themselves with data access. ‘Doctors used to be the font of all knowledge, and people had no means of questioning it’, Pearce says. ‘The biggest disruptive pressure on the health care system is the democratisation of data and the inexorable move to true patient-centred care’.

Royle agrees that the entire digital agenda for health care organisations needs to be driven by consumers as they gather more personal information through devices and desire a better understanding of their own health. ‘The health care industry is hugely conservative, with clinicians historically thinking the information they have is their own’, he says. Particularly with growing out-of-pocket costs, patients want to understand the value equation for their health expenditures.

The International Consortium for Health Outcomes Measurement is leading an initiative to create evidence-based, standardised data sets of health conditions and patient outcomes for patients, clinicians, payers, and governments, says Dr. Zoe Wainer, head of public health at Bupa Australia

and New Zealand, a health insurance provider. Wainer believes it is in the insurance industry's best interest to pursue chronic disease prevention at a community level, which will reduce hospital care and costs. Industry experts agree that better outcome and cost data is essential to ensuring the success of such initiatives.

Around the world, according to the study, improving the patient experience tops the agenda for health care providers' digital initiatives. FIGURE 1

Overcoming Digital Challenges

Health care organisations face comparatively steep barriers to digital transformation, particularly in the areas of regulatory compliance, data privacy, and cultural reluctance to change. Security concerns must also be balanced against the benefits of greater data sharing and utilisation.

The caution around avoiding anything that would cause patients harm is also a significant barrier to change, Pearce says. 'Health care is traditionally very conservative because interventions can harm patients, and therefore, adoption of new technology is slow', he says.

Additional barriers include funding and operational costs, Royle says, particularly with lengthy time frames for achieving ROI. 'The government must recognise the long-term benefits of digital', he says.

According to Hugman, NSW Health understands the benefits of digital transformation and is investing more, 'but there needs to be more appreciation by the end-user clinicians of the importance of the long-term, big-picture strategy', he says. 'More alignment of clinicians, governments, and vendors has to come from greater engagement across all stakeholders'.

These challenges extend worldwide. In the study, resistance to change and organisational restructuring challenges were top barriers for digital transformation initiatives, according to 44% of respondents. FIGURE 2

For health informatics to become mainstream, clinicians need to recognise its value rather than viewing it as a niche discipline, Hugman says. 'Many clinicians believe health IT projects create barriers to patient care as opposed to being the crucial tools for delivering the potential for massive gains', he says. 'Once there is a better awareness from both the public and clinicians of how we can use the huge amount of health data we are collecting, there will be more drive for greater transparency to interrogate and analyse the data'.

Educating a new generation of clinicians on the value of digital health is essential for breaking down cultural barriers, according to Westbrook. 'Changing how people work is a significant process for most front-line health care workers', she says. 'Clinicians need to engage in shaping the future, including making decisions on what should and shouldn't be done'.

Crucial Areas for Digital Advancement

Two categories of digital technology are vital for changing how the health care sector delivers care: the cloud and artificial intelligence-driven analytics.

Cloud services are central to leveraging the burgeoning volumes of patient data that health care organisations collect. Whilst organisations increasingly understand the value of digitising this data, the sheer size of the data stores—growing 48% per year, according to EMC[1]—poses a data management challenge. EMRs and medical imaging are current drivers of this growth. As

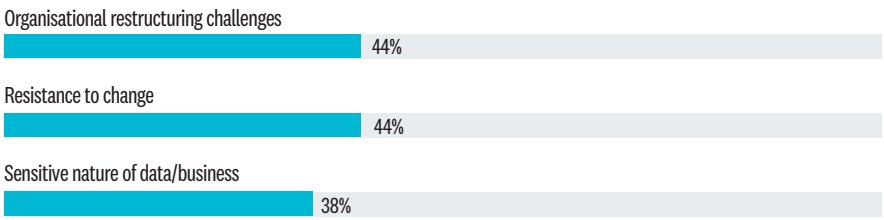
ACCORDING TO THE STUDY, IMPROVING THE PATIENT EXPERIENCE TOPS THE AGENDA FOR HEALTH CARE PROVIDERS' DIGITAL INITIATIVES.

FIGURE 2

CHANGE GOES DEEP

Resistance to change and the need to restructure health care organisations are obstacles to transformation.

What is most likely to get in the way of your digital transformation over the next three years?



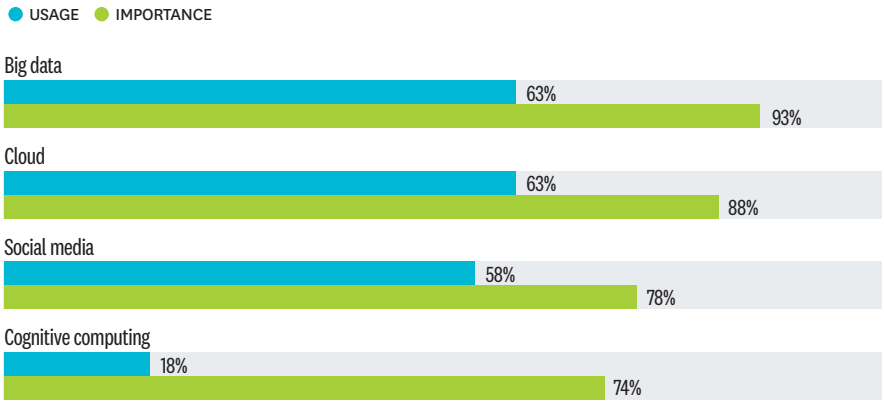
SOURCE: HARVARD BUSINESS REVIEW ANALYTIC SERVICES SURVEY, DECEMBER 2016, HEALTH CARE SECTOR

FIGURE 3

THE TECHNOLOGY ADOPTION GAP

Health care leaders recognise the importance of data and AI to their future, but have not yet deployed key technologies.

Which of the following technologies does your organisation employ today? How important will each be to your organisation's success in 2020?



SOURCE: HARVARD BUSINESS REVIEW ANALYTIC SERVICES SURVEY, DECEMBER 2016, HEALTH CARE SECTOR

we look to the future, genomics and a growing number of connected medical devices will only accelerate this data deluge, requiring scalable systems to handle this.

'Connecting the patient journey is essential', Westbrook says. 'We need to use records to follow people beyond one consultation to see improvement over time'. This is particularly important with the disappearance of the 'GP for 30 years' care delivery model; according to Pearce, it is not uncommon for someone to visit five different clinics and 11 doctors in their lifetime, just for primary care.

Not only can cloud services provide cost-effective and secure data storage, but they can also aggregate the fragmented data stores across the health care continuum and provide secure access for all relevant stakeholders, including patients. With real-time access to the most up-to-date and accurate data, health care providers will be able to deliver the best quality of care, quickly.

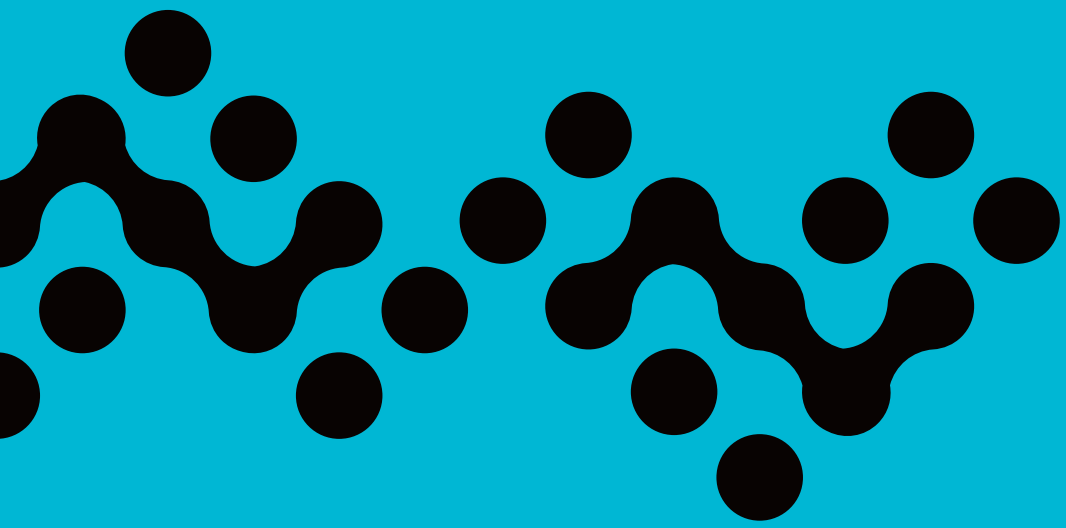
Cloud services are also a necessity for delivering maturing computer science approaches such as machine learning and real-time analytics. Early-use cases of AI-driven solutions include improving the speed and accuracy of image-related diagnostic investigations, such as interpreting radiology images. Whilst direct interaction with human providers will always be central to health care delivery, according to Pearce, cognitive computing will likely play a role once these systems mature. 'Like the autonomous car analogy, they won't work until we can truly set and forget them', he says.

Several clinics in Victoria are already rolling out big data and machine-learning solutions to decrease hospital admissions, using data collected when patients visit their local doctor. By analysing current and historical patient data and correlating it with lifestyle and other demographic information such as age, the system can predict which patients have an 80% chance of going to hospital in the next 30 days. This gives treatment providers a chance to devise an intervention to keep the patient from needing hospitalisation.

Few health care respondents in the global study have embarked on a cognitive computing program, although nearly three-quarters are well aware of its importance for future success. FIGURE 3 Respondents were much further along with cloud and big data implementations, but there is still a wide gap between awareness of these technologies' importance and actual usage of them.

With increasing constraints on hospital budgets, more are looking to cloud services as a way of lowering the cost and improving the ease of infrastructure management. Collaboration and device technologies (such as the Internet of Things), meanwhile, show promise for reaching patients in Australia's dispersed population to improve treatment and outcomes. Pearce, who chairs the digital health committee for regional and remote health care, points out that patients with a good digital connection can access their information, use devices to administer treatment, monitor vital signs, and perform point-of-care testing. All of this can

CLOUD SERVICES PROVIDE COST-EFFECTIVE AND SECURE DATA STORAGE, AND CAN ALSO AGGREGATE THE FRAGMENTED DATA STORES ACROSS THE HEALTH CARE CONTINUUM.



‘The challenge is to **equalise aspects of health care** as less reliant on physical distance, but more on **connections and information** access’, says Dr. Chris Pearce, a GP and president of the Australasian College of Health Informatics.

be connected with remote monitoring solutions to support care outside of the traditional hospital environment.

‘And if there are drones which can deliver stuff, I’m probably in a better place than a homeless person in the middle of a city with no access to my health care information’, Pearce says. ‘The challenge is to equalise aspects of health care as less reliant on physical distance, but more on connections and information access’.

Australian Health Care in the Digital Age

The health care sector can consider several key steps for leveraging digital technologies to support changing health care needs:

WORK TOWARDS FULL DIGITAL TRANSFORMATION

The benefits of piecemeal digital initiatives are far fewer than programmes involving full integration. ‘Digital can deliver a seamless single pane of glass for the whole life of patient care—from admission to discharge and follow-up care’, Royle says. According to Wainer, digital programmes need to look at the entire journey of the patient, not just one point. ‘We need less usage of the health care system, fewer repetitions of tests, and the right practitioner engaged for the disease.’

LOCALISE INTERNATIONAL TECHNOLOGY OPTIONS

Whilst health care organisations are aware of the need for digital transformation, Westbrook says, the systems themselves do not always deliver to these needs. ‘Australia is adopting large commercial systems from overseas and adapting them for the local market, which can be a challenge as the systems are not as adaptable as they could be’, she says.

COLLABORATE WITH TECHNOLOGY PROVIDERS AND IT STAFF

Government and the health care sector need to work with software and technology providers to forge a path towards interoperability and data exchange. Clinicians must collaborate with software and technology providers, as well as organisation health IT staff, to get the most out of digital technologies in their front-line roles. In his work with St. Stephens Hospital, Royle recounts that success hinged on staff engagement across the spectrum of clinical areas, from medical to pharmacy. ‘And we have to make it usable for the clinicians, like enabling a tap-on, tap-off facility for electronic medical records so that clinicians can more readily access the system, whilst still ensuring appropriate security’, he says.

SHARE LESSONS LEARNED WITHIN THE SECTOR

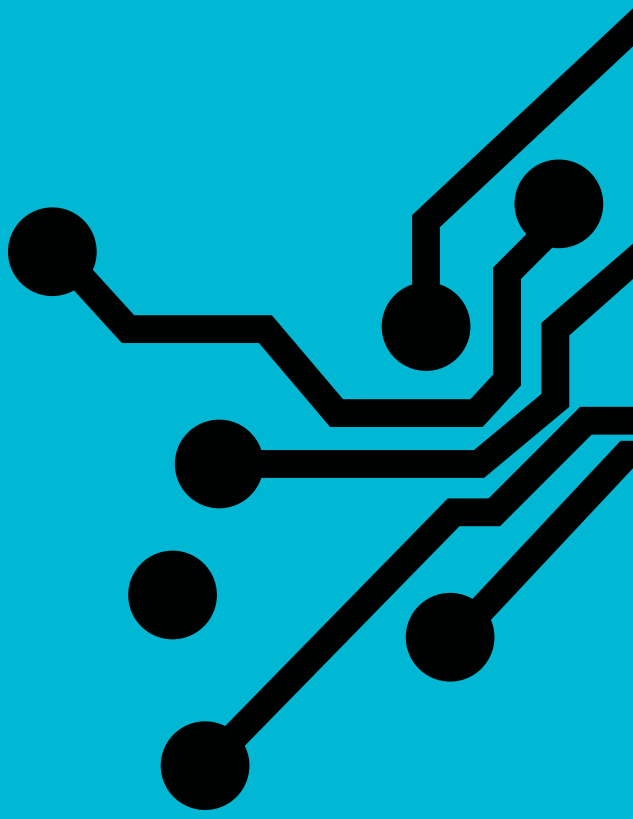
Health care organisations need to be more open about sharing lessons learned, benefits achieved, and how they’ve addressed pain points. Learning from others—rather than from their own mistakes—will require a culture change, Pearce says.

PROMOTE DIGITAL SUCCESS

Government health organisations should build exemplars of value delivered from digital health programmes and develop standards, improving regulation and supporting innovation. In addition to communicating the possibilities of technology, the health care sector also

KEY STEPS FOR LEVERAGING DIGITAL TECHNOLOGIES

1. Work towards full digital transformation
2. Localise international technology options
3. Collaborate with technology providers and IT staff
4. Share lessons learned within the sector
5. Promote digital success
6. Develop digital health skills



HEALTH INFORMATICIANS AND SOFTWARE DEVELOPERS WHO CAN TRANSLATE TECHNICAL CAPABILITIES INTO CLINICAL OUTCOMES OFFER A PARTICULARLY ESSENTIAL SKILL FOR DIGITAL TRANSFORMATION PROJECTS.

needs to prove the concrete benefits, Hugman says.

DEVELOP DIGITAL HEALTH SKILLS

Organisations will need to invest in strengthening the skills of workers unfamiliar with newer technologies, such as applying chat and other cognitive services in health care. Although educational institutes have a role in the development of a health care IT–capable workforce, including data scientists, health informaticians, and software developers, being able to translate technical capabilities into clinical outcomes is a particularly essential skill for digital transformation projects, according to Hugman.

Australia can retain its world-leading standing in health care through effective use of digital technologies. Making health care data more accessible and manageable will improve treatment outcomes, increase efficiencies, and connect patient journeys. As Royle says, 'Organisations that don't keep up with this have the potential to lose market share and authenticity in the marketplace'.

Methodology and Participant Profile

A total of 783 business decision makers completed the Harvard Business Review Analytic Services survey on digital transformation. Among them, 9% are employed in the health care sector globally. Sixty-eight percent of respondents reside in North America, Europe and Australia.

Qualitative interviews were conducted with the following experts in July and August 2017 to provide insight into digital transformation within the health care sector in Australia:

- **Dr. Andrew Hugman**, physician informaticist and practising emergency physician, South East Sydney Local Health District, part of NSW Health
- **Dr. Chris Pearce**, GP and president of the Australasian College of Health Informatics
- **Richard Royle**, national digital health leader, PricewaterhouseCoopers Australia
- **Dr. Zoe Wainer**, head of public health, Bupa Australia and New Zealand
- **Professor Johanna Westbrook**, director of the Centre for Health Systems and Safety Research (CHSSR), Macquarie University

Endnote

1 'The Digital Universe: Driving Data Growth in Health Care', EMC, 2014, https://www.emc.com/analyst-report/digital-universe-healthcare-vertical-report-ar.pdf

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