How can we optimise translation of health and medical research into better health and wellbeing?

Focusing on matter for review number eleven:

"Ways in which the Commonwealth's e-health reforms can be leveraged to improve research and translation opportunities, including the availability, linkage and quality of data."

Submission

From

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ALCIDION

Executive Summary

Our submission is focused on a new and innovative perspective of improving the Australian health system through an incremental shift in the approach to e-health and the use of information technology.

We are asking that the panel in the process of their review investigate updating the current E-Health Strategy as written for the Australian Government, by Deloitte Touche Tohmatsu in September of 2008.

The current strategy has the following E-Health Strategic Work Streams:
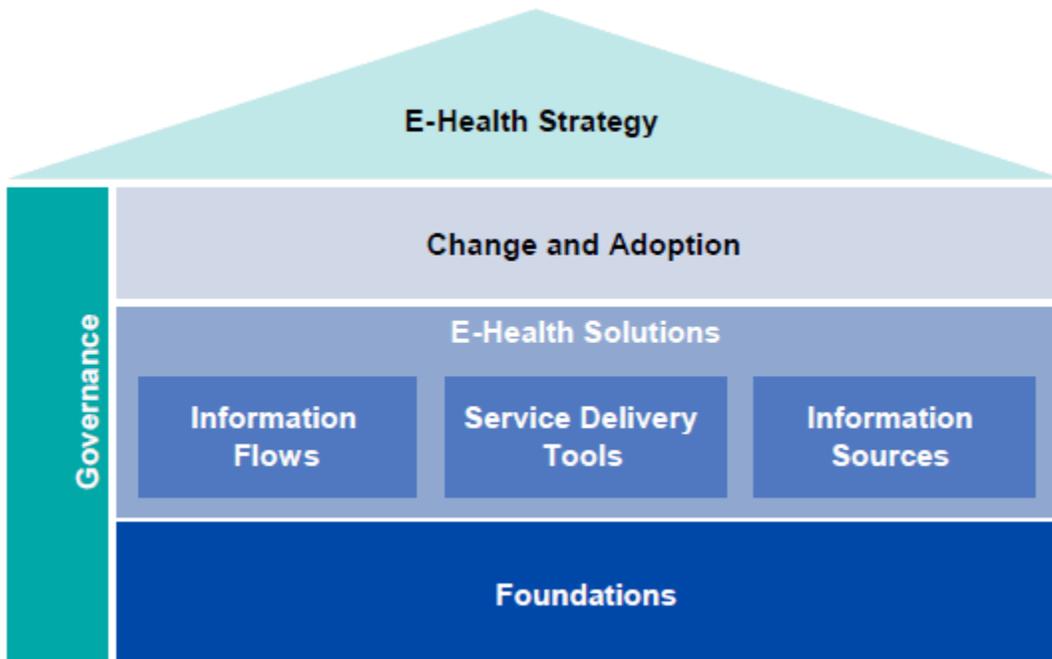
Our suggestion is that the Foundation work streams should include **an intelligent electronic health record** and that the Service Delivery Tools work streams should include a **focus on delivering intelligent health record infrastructure.**

Both of these approaches are currently being implemented in one of the twelve e-health projects, namely; The Cradle Coast, North-West Area Health Service Project.

Alcidion Corporation has solid evidence that adding computed intelligence to the current E-Health Strategy will save the Australian Government billions of dollars, and should lead to improving the health outcomes for millions of Australian citizens. Alcidion has spent ten years researching and developing this

intelligent health infrastructure and is now proving the technology with numerous customers around Australia.

Most acknowledge health care will experience unprecedented demand pressure over the next 30 years. Key causal factors include:

- Age related illness exacerbated by generational shifts in the population
- Rising burden of chronic disease driven by life style factors and environmental degradation
- More severe pandemics as antibiotic effectiveness reduces

In Australia the ageing of the population alone will see the proportion of complex, multi co-morbid patients rising by 3-4 times by 2040 based on the Australian Bureau of Statistics projections. These factors in rising health care demand are common across all Western countries that experienced the post-war "baby boom".

For Western health care systems to be financially sustainable more health care delivery must be delivered effectively in the lower cost primary and community settings, with hospital service reserved for the most serious and complex cases. Intelligent systems are urgently needed to facilitate continuing improvements in workforce productivity and the assignment of patients to the most cost-effective service delivery point, with care integration across all services.
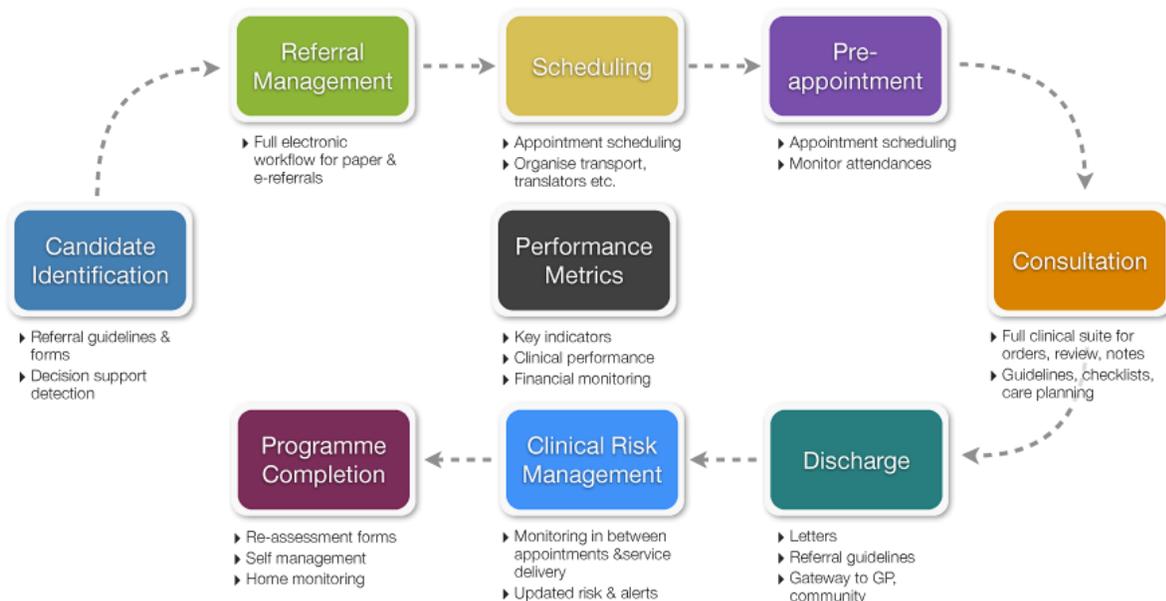
The diagram above is a high level map of processes involved when implementing an intelligent health record based integrated care model.

While there is wide agreement that hospital avoidance and community-based care is the path to a sustainable health care system, the ideas are still evolving on exactly how it will be implemented and funded as part of everyday health practice. Furthermore, there are changes ahead in the national infrastructure for e-Health in many countries.

With so much to learn it is important to build upon an infrastructure that is flexible, uses open standards, and that can evolve with the changing models of care as lessons are learned, and to do that, the whole system needs to have a level of intelligence not currently included in the E-Health Strategy.

Alcidion Corporation has presented a perspective based on our technology as we obviously know the capabilities of our intelligent health infrastructure; however, if there is comparable technology to ours the same projections would apply.

As our technology is in production in a number of health precincts around Australia! We would be pleased to provide demonstrations of the intelligent health record infrastructure, working, and delivering the intelligence described in this submission.

Introduction

Alcidion Corporation is an innovative Australian health informatics vendor that has developed intelligent health record technology, through ten years of research and development. We are a commercially focused entity, that has completed the research, developed the intelligent record concept, and are now in the process of proving this concept through the use of our intelligent health record technology in a number of significant implementations around Australia. The research and development has been funded through private and public funding.

Australian organizations that are currently using and/or implementing our intelligent health technology include:

- Australian Unity ([Disease Management](#))
- Western Health (VIC)
- Melbourne Health (VIC)
- FUJIFILM Australia
- Northern Territory Health Department – (Darwin and [Alice Springs](#) Hospitals)
- Tasmanian Department of Health and Human Services (PCEHR Project)

This submission, hopefully, will provide enough information for the panel to consider altering the current e-health strategy to include a focus on intelligent health record technology.

As a company we are committed to this strategy and would be prepared to provide considerable more detail to support our claims, should this be requested by the panel.

We are a small business in comparison to many international health vendors and consulting organisations but we are proudly Australian, and we believe that intelligent health record technology can provide a quantum leap in improving the delivery of health services.

Alcidion believes there are a number of issues facing healthcare that are not effectively addressed in the current E-health Strategy, that if addressed could **save billions of dollars** in the Australian health sector.

We believe our developed intelligent health record technology addresses these issues and is scalable on a national level.

The problems not addressed in the current E-Health Strategy can be reduced to five issues:

1. **Healthcare is fundamentally about risk management**: the assessment of the clinical risk to the patient, followed by monitoring and management of the patient's clinical risk during treatment. It also requires management of the risk to the organisational and the health personnel delivering the health service;
2. The scalability of healthcare to the whole population depends on systems that can ensure the **appropriate resources (knowledge, expertise & information) get to the right people in a timely manner** to mitigate and/or reduce acute episodes and chronic illness. These resources must extend from hospitals, to clinics, and to the home;
3. The combination of limited resources, large volumes of complex data, patients with multiple diseases, with complex interactions and human memory-based workflows, make it **impossible for clinicians and healthcare workers to operate without a comparatively large number of errors.**
4. The **majority of problems in quality and patient safety are well known and can be specifically targeted**, so as to dramatically improve patient outcomes and reduce healthcare costs. For example, the Quality in Australian Healthcare Study [1] showed that only approximately 40 recurring problems were responsible for 50% of patient harm;
5. The **entire industry is time poor**, and the amount of information to be considered for any health issue, for any patient, is continually expanding and changing.

These challenges require approaches that assist healthcare organisations to improve performance. That is, they are able to reduce error, improve service efficiency and effectiveness, and improve clinical productivity. The current E-Health Strategy has not addressed these issues in the foundation strategy and streams, or in the service delivery strategy and streams.

Intelligent Electronic Health Record Facts

We have introduced computed intelligence to the health record to solve these issues. This intelligent health record technology is being used in one of the twelve e-health projects: **The Cradle Coast, North-West Area Health Service Project**.

The Cradle Coast, North-West Area Health solution provides an intelligent platform for health care, from the acute sector, to community care, to individual health records.

Underlying the solution is an intelligent health infrastructure that activates the intelligence in the shared electronic health record (SEHR) to:

- Detect emerging and unhandled risk, in real-time, to ensure that high risk patient's are managed in a timely manner;
- Identify service quality problems, in real-time, for example missing home visits, to ensure compliance with best practice standards;
- Customize care plans and guidelines, in real-time, based on individual patient factors to improve the effectiveness of evidence-based care; and
- Monitor for organizational risks, in real time, such as patient flow problems that can result in access block and patient harm.

A national focus on an electronic health record option, of an intelligent health record, as a priority, with Australia's e-health initiative, could offer all Australian health services the choice to enjoy some or all of the following attributes of the intelligent health record technology:

1. **Real time performance metrics,** specifically designed to enhance existing reporting and KPI measurements, by allowing real-time feedback.

2. **Monitor patients in real-time** and leverage other or existing information technology investments through service wide data integration to minimize data entry.

3. **Risk-based intelligent presentation** designed to integrate into busy clinical workflows and save time for health professionals.

5. **Reduced clinical risk by always working within a clinical context** and reducing the amount of information health professionals need to assess.

6. **Monitoring for safety and performance constantly; and in real-time**, rather than providing daily, weekly or monthly reporting.

7. **Active intelligence**; so if something is going wrong with patient care or health system performance, the appropriate clinical or management staff are alerted and if not responding, these alerts escalated.

8. **Knowledge management**; supporting local innovation, iterative development, and best evidence as it evolves.

As an example of the intelligent health record technology application **let's look at the measurement of hospital KPIs:** which are paramount for management of the hospital's resources, to ensure sustainability, and as of July 2012, to be measured by the national Performance and Accountability Framework, associated with the National Health Performance Authority.

The issues with reliance on hospital KPIs to drive a hospital's strategic planning and performance, are **that key performance indicators, today, are measured after the fact**, so any issues arising are not necessarily current, and strategies to mitigate those may no longer be appropriate by the time they are deployed. It therefore is appropriate to assume that the Performance and Accountability Framework being put in place for measuring our hospitals from July will suffer from the same issues.

The current E-Health strategy has not addressed this in any of the priority work streams.

Another problem with the reliance upon KPIs, as measured today, is that they fail to portray the complexity of many hospital issues.

For example, the KPI for the percentage of patients in the ED for longer than 8 hours does not represent the proportion of patients with high complexity who may have contributed to a longer stay, or whether the ED was experiencing access block at any point throughout the analysis period; simple counts aren't always good enough to reflect the state of a hospital's performance.

If intelligent health record technology was used, for example, an estimate of current "ED load" may take into account the number of senior staff on duty, the number of patients requiring resuscitation, the number of mental health patients and so on. Furthermore, the technology can integrate information in real-time from a variety of systems in the hospital to generate metrics that present a true reflection on the operational state of the organisation.

Research in Support of the Intelligent Health Record Facts

The healthcare sector has a much higher rate of errors and inefficiency than most other industry sectors. While many industries aim for six-sigma goals of 3.4 errors per million opportunities, error rates in healthcare are documented at 500,000 errors per million.

The healthcare system in Australia and other Western countries is under enormous stress: high error rates, overcrowding, long waiting lists, skills shortages and rapidly increasing costs [2-6]. Overcrowding leads to inconvenient delays in treatment, and recent research demonstrates that problems with patient flow result in patient harm and increase overall length of stay in hospital [7]. Congestion and clinician overwork increase the likelihood of adverse events and increase mortality [5, 8] due to problems including delayed treatment, medication errors, incorrect management and missed results.

Patient safety is a term used to describe harm to patients through preventable error. It is a significant problem in healthcare that results in death, suffering, increased length of stay, and wasted resources. Well-publicised figures from international reports [1, 9-10] suggest that **annual death rates** due to preventable error in hospitals are devastatingly high: up to **14,000 people in Australia**, 44,000 in the United Kingdom, for instance. The number of people who suffer non-fatal harm is even greater.

Specific examples of errors leading to reduced patient safety are highlighted in studies showing that up to 40% of pathology laboratory results ordered in hospitals are never read [11], and that only 50% of patients are put on recommended medications after suffering a myocardial infarction [12], and numerous problems in medication management. An Institute of Medicine (IOM) report [13] concluded that factors contributing to the high rates of error in health include process complexity, patient complexity and the lack of information technology adoption.

The problem gets worse. Age-related issues will dominate healthcare in the next 30 years due to generational shifts in population. Using the Australian Bureau of Statistics population projections [14] Alcidion recently collaborated with the Orthopaedics Unit at South Australia's Flinders Medical Centre (FMC) to project the increase in demand due to fractured neck of femur (NOF) – a condition of the elderly and frail.

Figure 1 illustrates this problem for the FMC. The **number of patients** presenting with fractured NOF will **increase by a factor of 3 or more**. Similar growth will be observed in other age-related morbidities such as heart disease, arthritis and diabetes. All this amounts to a "perfect storm" facing all healthcare professionals, administrators and policy makers.
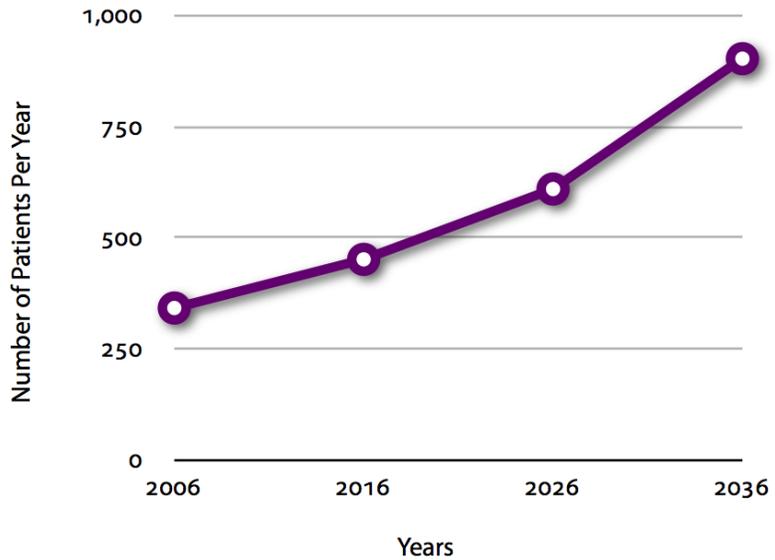
Figure 1. The projected increase in patients requiring operative correction for fractured NOF at FMC based on ABS projections for population changes in South Australia.

The challenge for our healthcare is: *how to scale up to meet the demands of the future while improving performance of the current system?*

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