Medinfo 2007 Congress: Building sustainable health systems. Twelfth World Congress on Health (Medical) Informatics 20-24 August 2007, Brisbane, Australia

Elizabeth Moss, Graeme Shields and Leanne Holmes

Medinfo 2007: Introduction and overview

Elizabeth Moss

Many health systems across the world face the challenge of increasing demand and diminishing resources, which Hovenga, Coiera and Lovis (2007) contend are ultimately unsustainable. Over the next 20 years national health systems will have to treat proportionally more people, with more illnesses, higher expectations and more expensive technologies, but with the investment of relatively less money and fewer workers. Information, knowledge management and communication technologies are seen as crucial enablers of system change. To overcome the challenges we need to employ these resources to design and implement new sustainable systems.

The conference theme focused on the following topics:
- Sustainable health systems
- Developing and developed national health challenges
- Knowledge informing safe and effective health care
- Social/political change (Medinfo 20071).

Keynote speakers from around the world spoke about what makes a system sustainable and how knowledge and communications technologies are being employed in health care today. The conference comprised 172 sessions with over 300 papers on topics ranging across e-health systems adoption, clinical guidelines and protocols, clinical terminologies and ontologies, sharing data, professional education, emerging technologies, health records and patient documentation.

The industry exhibition featured an interoperability showcase organised by HL7 Australia2, the Health Informatics Society of Australia (HISA)3, the Medical Software Industry Association (MSIA) and International Healthcare Exchange (IHE). The demonstration engaged 14 health IT vendors, HL7, the IHE cross enterprise document sharing, service oriented architecture, and web services to exchange patient data in four scenarios:
- screening – community health record, patient monitoring, communication, referral to diagnostic services
- diabetes review – patient health record, referral, diagnostic services and multidisciplinary care team
- new diagnosis – patient data in an electronic health record to manage acute illness in a coordinated care setting using electronic results, remote electronic health record access, and referral
- complications – hospital links to community care to share data about a patient’s emergency care and diagnostic services.

The demonstrations were held several times each day. Guided by the scripted scenarios, participants were able to see data and documents being created and exchanged between the different health care applications.

The International Medical Informatics Association (IMIA)4 members host a triennial international conference. The Health Informatics

1 www.medinfo2007.org
2 www.HL7.org.au/
3 www.hisa.org.au
4 www.imia.org
Society of Australia (HISA) won the honour to host the conference this year.

IMIA celebrated its 40th birthday this year. IMIA promotes informatics in health care, health research and bio and medical informatics, and disseminates and exchanges knowledge, information, and technology. It does this through the Medinfo conference and the Journal of the International Medical Informatics Association. The Health Informatics Society of Australia provides a national focus for health informatics, its practitioners, industry and users. It supports opportunities for learning and professional development in health informatics via its annual health informatics conference, and working groups.

The next Medinfo 2010 will be held in Cape Town South Africa, hosted by the South African Health Informatics Association. For more information see www.medinfo2010.org

Reference

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Perspectives on knowledge translation, Healthelink and interoperability in the context of building sustainable health systems

Graeme Shields

After returning from a week away at Medinfo 2007 I was asked by a friend outside the health industry it how was possible to spend the better part of a week discussing matters related to health informatics and what, indeed, was the congress all about? I sat back and pondered this, while scribbling notes (with one of the many pens picked up at the conference). I recalled HISA’s HIC 2005 conference and the information available on the current status of electronic health and medical records, common terminologies and messaging systems. I also remembered the reaction at the final plenary session to Health Minister Tony Abbott’s comments that he wanted to see tangible results in implementing electronic health records across Australia within 12 months (Bajkowski 2005).

Medinfo 2007 provided a yardstick with which to judge progress that has been achieved in this area since 2005, and has reinforced the understanding of the complexities and intricacies of such a task. Two years later there are still projects around the world involved with mapping between SNOMED-CT and ICD and myriad other terminologies and classifications. There have, however, been many advances in informatics during that time, not just in the field of the supporting technologies.

Many of us will be glad to note that the program focused on the use of existing data and information in smarter ways rather than on simply collecting more data. This is congruent with the sub-title of the conference, which was Building sustainable health systems. While there is not enough space or time to go through each
of the workshops and presentations I attended, let alone all of those on offer, I will outline a few major themes and a couple of specific papers I would recommend as being well worth tracking down if you want to examine them in more detail. With a little over 2000 registrants from across the globe, two days of workshops, four days of plenary and presentation sessions (sometimes running up to nine concurrent sessions with four speakers per session) and almost 500 individual poster displays, the conference was the largest I have ever attended.

The conference commenced with a series of workshop discussions. The first I attended was a presentation by Joanna Kelly and Liz McCarthy from NSW Health, who unveiled the progress that has been made in developing an electronic health record and the linked implementation of a state-wide unique patient identifier. Healthelink (the NSW EHR) focuses on specific patient cohorts within specific postcodes (under 15-year-olds in the Greater Western Sydney pilot group and over-65s in the Hunter Area pilot group), and is being linked to the roll-out of the NSW Statewide Unique Patient identifier (NSW SUPI). The pilot project has been in operation since March 2006 and at the time of reporting covered approximately 16,000 individuals across the two pilot sites.

The Healthelink EHR is a summary record and covers participating hospitals, community health facilities and general practitioners, and the record also incorporates limited information from the Blue (baby) book and the Red (chronic care) book. Patients can access the record online and can also enter information into the record. It was interesting to note that the pilot projects have realistically highlighted and identified the limitations of existing IT and knowledge transfer in supporting reform, and that while the project has been more complex and challenging than anticipated there is still a planned state-wide implementation date of July 2009. Further information, including a demonstration of the NSW Healthelink EHR, can be found online at: http://www.healthelink.nsw.gov.au/gws/additional_resources/online_demo.

The second workshop was an interesting discussion titled ‘The unintended consequences of health informatics innovations’. While unintended consequences can have positive, negative and neutral effects, this was a theme that recurred throughout the conference in various discussions and presentations, including a panel discussion on the unintended effects of consumer health informatics innovations. A good example of unintended effects was highlighted at a very interesting and interactive workshop held on the concept of knowledge translation by Anne McKibbon and Nancy Wilczyski of McMaster University (the related issue is discussed in Wilczynski, Garg and Haynes [2007]).

Health informatics innovations such as electronic records, clinical decision support software and electronic access to library reference materials have provided a huge range of readily available information to clinicians at the bedside. This is a good thing, because clinicians can now have access to online results as well as information on the latest clinical practice, a more informed decision can be made about treating the patient. However, as discussed at the workshop, one unintended consequence of this can be a result of the pure volume of data that becomes available. Some of this (for example in the latest journal articles on clinical practice) may not be relevant to the treatment of the patient, and therefore more time needs to be taken to sift through and filter information to make sure issues that need to be highlighted are brought to the clinician’s attention. Also, as discussed in Wilczynski, Garg and Haynes (2007),
search strategies through electronic databases need to be responsive and ‘intelligent’ enough to be able to selectively filter evidence based advances in clinical practice from the range of articles published on any given clinical topic.

In the general discussion (at the workshop which was temptingly titled ‘Unlost in knowledge translation: understanding KT and how to do it faster and better’), ‘knowledge translation’ was described as the way of getting research into practice. While the focus was primarily on incorporating evidence-based clinical research into practice, the discussion did broaden to cover the different models of knowledge translation and examples, which raised these issues in the context of systems implementation, were presented. While this is a large and important area of work, a number of common ideas resonated with some areas of work I see around me. For example, in implementing new systems and applications the importance of project leaders, project drivers and the multidisciplinary project team is recognised, as too is the appreciation of the organisation’s culture and readiness to accept and adopt change. The importance of recognising psychosocial differences in people and targeting those who are in the best position to be champions for the change cannot be underestimated. Recognising that change is taken up at different rates is just as important as developing a strategy for its full implementation, and this factor should be built into the project. Being prepared to revise things as they go along was discussed in the workshop with reference to the article by Massaro (1993).

The other theme discussed in this workshop was the need for a common language in knowledge translation. This ranges from the need to be able to search on specific terms and to have related terms recognised as being within the search criteria from a research point of view through to the need for clarity in communication between the different professional parties in system/application implementation.

In addition to making sure the communication between us humans is as common (or at least interoperable) as possible, a common language/terminology, or at least the ability to reliably map or translate between terminologies/classification systems, is therefore integral to semantic interoperability. While humans can (with the right knowledge) understand that terms such as ↑BP, hypertension, I10 and F67A are all related concepts, this recognition needs to be programmed into the applications with which we work so that the interfaces and messaging can accurately reflect the information.

I attended a number of presentations where the mapping and semantic interoperability between different terminologies and classification systems was discussed. While much has been achieved since 2005 in the field of health informatics, there is still a great deal of effort being spent on the mapping between a range of terminologies/classifications, including ICD9 and SNOMED-CT (Fung et al. 2007). The fact that such work is still going on indicates how large and complex this field actually is, especially when other terminologies and classification systems are brought in to the mix.

The general theme of the conference was ‘sustainable health systems’ with a particular focus on how an interoperable EHR and other advances in health informatics can sustain as well as help develop and improve healthcare systems. Many advances have been identified and examples demonstrating how the patient journey and experience has been improved and better quality and more coordinated information to health care professionals were provided.

Overall, much interesting and useful information was presented over the six days, some of which will lead me to further reading.
and research as the subject areas relate to the tasks I am involved and interested in. As with most conferences I have attended, the experience and opportunity to meet other professionals working on similar projects and in related fields is probably its most valuable aspect. It will be interesting to see where these developments lead over the coming years. Certainly it would seem that this body of work will impact on all of us as Health Information Managers in our respective areas of work.

References

Perhaps one of the most fascinating aspects of attending the Medinfo 2007 conference was having the opportunity to learn first hand about the electronic health record (EHR) projects and initiatives undertaken in other countries. Of particular interest were the electronic patient record (ePR) developments in large busy health authorities such as the Hong Kong Health Authority, Sao Paulo City Health System, Brazil and the Veteran Affairs department in the US government. On the other hand it was inspiring to hear of some more humble initiatives undertaken to develop small scale but useable ePR applications in developing countries such as Kenya, Rwanda and Peru.

How Hong Kong built one of the world’s largest integrated longitudinal electronic patient records
As far back as 1990 when the Hong Kong Hospital Authority (HA) was formed to manage all public hospitals in Hong Kong, plans were underway to develop an electronic patient record system. Over the next few years they developed the Clinical Management System (CMS), which gave over 4,000 clinicians access to all available electronic clinical information as well as providing direct entry of orders and care or patient documentation. By 2000 the Electronic Patient Records (ePR) was introduced, which provided a standardised data repository as well as a clinician-friendly view into a comprehensive longitudinal lifelong record. The CMS and ePR were integrated across all inpatient, outpatient and emergency settings and have also become the platform for the development of subsequent clinical modules. Today the CMS and ePR handle over two million clinical transactions per day. There are over 57 million episodes in the ePR for 7.9 million patients.

What I was interested to learn was: How did they do it? The speaker explained that the

Electronic health records development across the world
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evolution of the ePR in Hong Kong was long and difficult. He said that ‘despite promises of the “paperless” or “electronic” hospital for over 30 years, comprehensive adoption of such systems has not materialised’. He also stated that in most countries electronic medical records are ‘the wave that never breaks’.

The success of their ePR to date is that they have kept the focus on a number of principles.

The seven principles for medical informatics success are worth considering and mentioning:

1. **The customer is always right (well, almost)**
   At Hong Kong Health Authority (HA), the focus is always on the needs of the customer. The customer, that is the clinician, has always been of prime importance in the development of their clinical systems. Establishment of a Clinical Informatics Program Steering Group (CIPSG) early on in the project was crucial and this involvement continues to play an important role in the future evolution of the ePR.

2. **Win-win**
   Too often we create an IT-based program that provides benefits to patients or the organisation, but at significant cost to the clinicians who use it. They may be asked to implement the program, change their work practices and undertake even more administrative work than they did previously with no obvious and immediate benefit to themselves. To avoid this problem you must ensure there are system benefits that are at least cost-neutral to all stakeholders.

   The win-wins should cover all four major stakeholder groups: clinicians, patients, management and other secondary data users, and health informatics personnel.

   Key considerations in enabling common benefits are:
   - Can the needs of individual clinicians be met with a standardised system?
   - Can structured data be captured by clinicians at the point of care without delays in time?
   - Can the system adjust for different practices and workflows?
   - Can the data gathered by the system flow onto management, quality assurance and other such uses?

3. **One step at a time (success breeds success)**
   It was recommended that taking small and successful steps or milestones breeds success.

   It is uplifting when clinicians and users can see the benefits and understand the issues. The stepwise approach has also allowed them to make mistakes earlier and on a smaller scale and make amendments and corrections as they go.

4. **Medicine is an art and a science (and so is medical informatics)**
   The challenge with developing the ePR is the interface between individual flexibility in documentation and standardisation of coded data. Whilst it was agreed that there should be some scope for flexibility it was decided that the design should conform to the standards laid down in the HA’s Information Architecture.

5. **Use it or lose it (data use begets data quality)**
   The main approach was to reuse the data wherever possible: ‘write once, use many’.

   Development of clinician friendly data mining tools has allowed clinicians to run their own ad hoc queries on the massive data warehouse that has accrued over the years. Improved data quality has become a by-product of their data interrogation.

6. **Prioritise ruthlessly (first things first)**
   Initially the clinicians did not drive the system but over time they have found benefits of the ePR in decision support. Now there are far more requests that can be met by available resources so all requests must be evaluated and prioritised. Evaluation criteria and processes have been put in place to enable an equitable approach.

7. **Embrace your informaticians (and feed them well)**
   Implementing sophisticated clinical systems is a difficult endeavour, and there is no shortage of literature examining case studies of failure. Having a well trained, dedicated informatics team who understand the complexities and issues over a long period of time is paramount. Not only do the team need the knowledge base but they also need to understand the organisational needs, the technical limitations and possibilities, the standards and architectures, as well as change management issues which will be necessary to sustain long-term changes associated in operating a successful ePR.
Integration of longitudinal electronic records in a large healthcare enterprise: the U.S. Veterans Health Administration (VHA) experience

The speaker in this session highlighted the enormity of the USA's VHA electronic health record system which caters for over 5.2 million patients across the country. It covers 157 medical centres, nearly 900 outpatient clinics, long-term facilities, and home care. In 2005, Veterans Affairs (VA) workload included 587,000 inpatient admissions and some 52 million outpatient visits. Like Hong Kong, the USA has been developing and improving its eHR over the past decade to a point now where VHA healthcare has imposed a requirement for longitudinal electronic health records and integration of those records to be across the enterprise at the point of care. VHA has now evolved through three generations of applications that support such integration.

The Veterans Health Information Systems and Technology Architecture (VistA) system supports day-to-day operations and incorporates both administrative and clinical applications at VA health care facilities. It also includes what is known as the Computerized Patient Record System (CPRS). While it has been in constant development since 1996 it has some of its older applications written in MUMPS and Delphi. Current developments will see a major technology migration that will shift application development to Java and relational database systems.

The CPRS is the electronic 'clinical practice environment' for clinicians and all members of the healthcare team. The CPRS provides a longitudinal medical record as well as active functionality with:

- electronic order entry and processing
- entry and retrieval of clinical notes and discharge summaries
- display for laboratory and imaging results
- alerts of abnormal results and clinical reminders
- inpatient and outpatient medication management.

It also serves as an enterprise integration platform, giving clinicians the ability to see electronic records from any other VHA facility where the patient has received care. VHA has gone through three approaches to enterprise integration: WebTop, CPRS Remote Data Views and VistAWeb.

WebTop has the ability to extract and display data from the VistA system using browser-based technology. Development of CPRS Remote Data Views (CPRS/RDV) began in 2001. Its objective was to support on-the-fly remote data views of patient information within VHA's mainstream clinical application. VistAWeb was initially developed within one of VHA's regional networks as an exploration of alternatives to WebTop and CPRS Remote Data Views. It also explored user interface alternatives, including alternative ways to deliver graphical information such as ECG or DICOM images.

Users authenticate to VistAWeb via standard VistA credentials and are then able to browse the clinical record. Connections are made to sites determined by MPI data stored with the patient. If necessary, a new visitor identity is created at remote sites to support auditing of remote data access.

In 2005, the release was extended to the field and has become, in turn a corporate product itself. This development has established not only the use of web services, but also now provides a convenient integrated view of data.

The lessons learned from VHA mimic the Hong Kong experience, which suggest clinician ownership and participation throughout its evolution is paramount. They also discovered that 'clinicians favour working in a single application over multiple applications or multiple browser windows'. They suggest it is essential to compromise the notion of perfection in terms of normalisation of vocabularies and forms of representation. Their experiences demonstrate that we are 'capable of smoothing over discontinuities that could otherwise prevent a project from getting started at all'.

They identified the importance of designing a system to accommodate research needs and stated that this was not adequately appreciated in their own organisation.

The Veterans’ Health Administration sees the desire for a patient-centred, ‘gold standard’ legal electronic record available for decision support, so have plans to undertake migration to a new environment, referred to as ‘HealthVet’, a core component of which is a health data repository.
(HDR) at a national level. The HDR will eventually serve as the source of a patient’s electronic health record, providing a superset of the integration available today.

In closing, the speaker provided an anecdote about the benefits of the existence of an enterprise-wide electronic patient record system when a number of their medical centres in the South East were severely affected by Hurricane Katrina in 2005. Main medical centre buildings were destroyed, including the one which contained the computer room at the New Orleans VA Medical Center. Subsequently most inpatients were transferred to Houston, Texas. The New Orleans computer system was replicated in Houston within 24 hours, with all ePR records restored. Outpatients were evacuated to various medical centres outside the affected disaster areas where VHA staff would not ordinarily have access to New Orleans patient data. The solution of granting temporary special user privileges to all VistAWeb users gave users the ability to do patient lookup at other sites, and thus get VHA-wide data on any VA patient. Electronic health records played a major role in maintaining continuity of health care through a massive natural disaster.

Suggested readings

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