MEDINFO 2007
K. Kuhn et al. (Eds)
IOS Press, 2007

Northern Territory Health*Connect*: Shared Electronic Health Record Service Implementation Experiences and Benefits Realised in Indigenous Health

Stephen Moo, John Fletcher

Northern Territory Department of Health & Community Services

Abstract

This presentation summarises the learnings from the HealthConnect Northern Territory (HCNT) Shared Electronic Health Record Service (SEHR) from Trial to Implementation and the emerging benefits realized as the project is implemented across the Northern Territory of Australia.

The presentation:

- *explores the challenges and experiences of implementing a SEHR service in urban and in some of the remotest regions on the Australian continent.*
- *demonstrates the emerging health benefits e-Health can provide in enabling the sharing of medical information between public and private health service providers in particular the service delivery and benefits provided to a highly mobile Indigenous population who currently experience the greatest health problems and experience difficulties accessing continuum of care created by factors which include remoteness, mobility and communication.*
- *explores the evolvement of the "opt in" consumer consent model adopted by the Territory for the implementation of the HCNT SEHR.*
- *advises of plans for future development, which inform other implementations, and NeHTA standards development for the implementation of the National SEHR Service.*
- *Informs project plans to incorporate NeHTA standards as they are developed and transition the HCNT SEHR to the National SEHR Service when implemented recognising the importance of developing strong partnerships with key stakeholders, in particular consumers, health care providers and system vendors who inform project development and implementation.*

Keywords:

Health*Connect,* e-Health, Health*Connect* NT Shared Electronic Health Record Service.

Introduction

Health*Connect* NT trial

Sponsored by the Australian and Northern Territory Governments, a Health*Connect* research and development trial commenced in Katherine in the Northern Territory in June 2002.

The Trial was established to help determine whether Health*Connect* could improve continuity of care in remote and rural areas of Australia by enabling health care providers timely access to vital health information.

The Trial centered on the development and utilisation of a secure Health*Connect* repository.

With a registered consumer's consent, health service providers participating in the Trial were able to send event summaries of health events including medical summaries and hospital discharge summaries via a secure network to the repository. Once in secure storage, other authorised health care providers involved in the Trial were able to access consumer medical summaries with consumer consent.

Consumers and providers embraced the concept of Health*Connect* in the Territory and 1,800 consumers, mostly from remote areas were registered to participate in the Trial by March 2005.

There were 49 registered Providers involved in the Trial. Users of Health*Connect* NT included Hospital medical officers and district medical officers, some accident & emergency nursing staff, remote clinic doctors, remote clinic nurses and Aboriginal Health Workers.

Consumer consent

During the early stages of the Trial Providers were required to obtain consumer consent at each occasion of care to retrieve and view consumer health information on Health*Connect* and to send a summary of that occasion of service to Health*Connect.* This created some issues in early 2004, where Providers became concerned that the model in their view could be medically dangerous and were also concerned that they could be legally exposed if they failed to obtain consent or forward information to Health*Connect.* Consumers also complained that it was humbug to be asked to consent each time they visited a health care provider. Many stated that the reason they had joined Health*Connect* was to enable providers to access their health information and expected their information to be sent to Health*Connect* after a consultation as a matter of course.

Provider and consumer concerns regarding the requirement to consent at each occasion of care culminated in a major consumer and provider workshop being held in Katherine. The outcome of this workshop resulted in a new consent model being introduced in the latter stages of the Trial with full consumer and provider support. The new consent model complied with national privacy legislation and required a Health*Connect* registered consumer to consent on registration to their health information being sent, retrieved and viewed from the repository on each occasion of service, unless at a particular occasion of service the consumer instructed the provider that he or she did not want the information viewed or sent. This model was adopted by the Territory and proposed by the Territory as the preferred model for national implementation.

Evaluation

The phase 2 evaluation conducted during 2004 found that the Health*Connect* concept was unanimously supported by providers, health care managers and consumers involved in the Trial and that providers and consumers strongly supported the implementation of Health*Connect* across the Katherine Region and the Northern Territory. There was a strong belief among providers and consumers that Health*Connect* would provide major benefits in the delivery of coordinated health care across the Territory. There were also a number of lessons learnt from the evaluation, which are included in the "Lessons Learned from the Medi*Connect* and Health*Connect* Field Test and Trials" Report.

Promotion

During the Trial and as a major promotional tool supporting implementation, promotional material was developed using MARVIN. The development of MARVIN is a result of a collaborative partnership between Industry, Community and Government in the NT and contributes part of its existence to the Australian Flexible Learning Framework's (Framework) LearnScope professional development project. MARVIN allows community members to develop the learning and training resources themselves, typing in their own messages and recording their own voices, in their own languages. What is then seen onscreen is walking, talking computer generated characters, most of them modeled on elders within the community or upon the learners themselves. Promotional material developed for the Health*Connect* NT Trial and more recently for implementation has received wide acclaim.

Health*Connect* NT shared electronic health records service - implementation

Following the success of the Trial and the enthusiastic support of consumers, providers and other major stakeholders, the Territory decided to implement the Health*Connect* NT (HCNT) Shared Electronic Health Record (SEHR) Service Territory wide and to investigate the possibility of expanding the SEHR to cross border regions in South Australia and Western Australia.

Planning for the phased implementation of the Health*Connect* NT SEHR commenced in the latter part of 2004/2005 and initial implementation commenced across the Katherine Region on July 1 2005.

Health*Connect* NT implementation aims to break down over time the Territory's distance barriers to health services delivery, particularly to highly mobile remote indigenous populations by enabling:

- participating providers to create and view shared electronic health records for consumers in participating remote communities; and
- participating hospitals to generate discharge summaries to participating providers automatically.

This will contribute to enhanced clinical services in participating remote communities, including greater ability to manage chronic disease and enhanced care for children in remote communities through greater capability to deliver primary care, childhood development, immunisation and nutrition services.

Consumer registration

Vast distances complicate the registration of consumers to participate in the Health*Connect* NT SEHR, remoteness of communities, climate (in particular wet season access) and cultural diversity. This provides significant challenges in terms of engaging with, and gaining the informed consent of, consumers particularly with Territorians for whom English is a second language and where there is a range of cultural considerations.

- New marketing and promotional materials were developed, tailored to communicate with, and educate consumers from diverse cultural backgrounds and language groups.
- A partnership with Medicare Australia was negotiated and new registration forms for implementation were developed to register consumers to participate in the SEHR service, to confirm Medicare registration details and facilitate new Medicare registrations. A detailed registration process was established with data compatibility checks undertaken to a strict criteria – data compatibility at time of registration is checked to ensure consumer demographic details are a complete match with home health centre CIS, Medicare and CMI (Hospital) data prior to information being entered into the SEHR.
- New pamphlets informing consumers of consent, privacy, provider access to records etc were prepared and issued to consumers at time of registration.
- Consumer Advisory Group (CAG) established. The Chair of the CAG and an Indigenous cultural representative of CAG are represented on the HCNT Implementation Steering Committee.
- A dedicated Consumer Services team was established to focus on consumer registration and provide secretarial support and information to the CAG.
- Consumer registration involved community and stakeholder promotion and the appointment of casual Local Project Officers to assist with registration and consumer identification. This created employment and skills

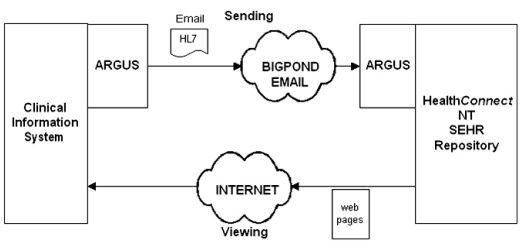
development opportunities in areas of high unemployment and community ownership in the program.

- Consumers across the region embraced the concept of Health*Connect* and readily committed to register to participate. A 90% uptake was realized in remote communities across the Katherine Region.
- Over 9,000 consumers registered to participate in the HCNT SEHR service by 30 November 2006, most from remote communities spread over a very large geographic area.

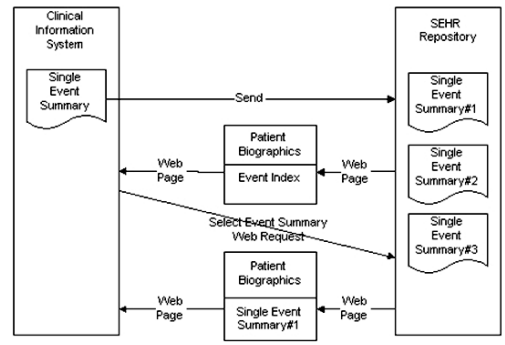
System capability

The HCNT SEHR system is designed around a central server sending and receiving medical information from numerous clinical information systems. The HCNT SEHR system receives secured medical summary messages (called event summaries) from feeder systems and stores them in the HCNT SEHR Repository database. Medical providers via the Internet can view these event summaries.

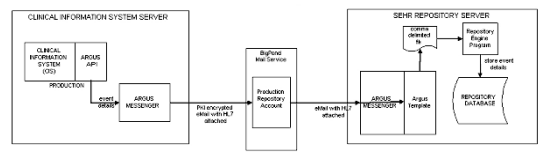
The HCNT SEHR system uses an Argus messaging tool to generate HL7 messages, containing the event summary, and attaches them to HeSA PKI encrypted message sent to the Repository Database via a Big Pond email account. Medical providers using their clinical information system can securely view, using SSL, via the Internet the medical information stored in the SEHR Repository for a specified consumer. The diagram below illustrates these concepts.



The event summaries generated by the feeder systems are usually single consultation events from health centres, or hospital emergency/inpatient discharge summaries, but may also be an initial health profile summary or a pathology test result. All these summaries are stored as discrete pieces and these events can be viewed specifically via the Internet directly or via a web window within a clinical information system. Accessing the medical data over Internet requires medical providers to enter a user id and password. An index listing all the event summaries for a patient is shown. Once selecting the appropriate event summary a web view of that event summary is sent to the viewer. The following diagram shows the basic overview of these concepts.

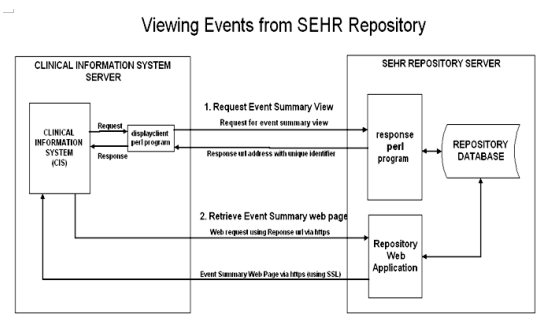


Sending and Viewing Technical Design in detail



The above diagram shows in detail the sending processes. The key to sending is the use of the Argus email tool, which has two key components; the first is the Argus API that allows the Feeder System to directly call functions that interact with Argus Messenger. The second Argus component is Argus Messenger, which can generate an email, attach files to them and encrypt the emails. These emails are sent to a single bigpond email account where it awaits retrieval.

At the HCNT SEHR Repository Argus Messenger is also running, automatically downloading emails from the bigpond email account about every 10 minutes. Argus Messenger has a set of predefined rules that require HL7 attachments on emails to be interpreted by Argus' Template tool, which convert the HL7 into a more readable comma delimited file. In turn a perl program called the Repository Engine reads the comma delimited file and stores the event summary against the appropriate patient in the Repository Database.



The diagram above describes the viewing processes required to allow a medical provider using their Clinical Information System to read the SEHR Repository event summaries.

The first step is a request to view made by the medical provider via their clinical information system, in which the provider must enter their HC NT SEHR user id and password. The HCNT SEHR Repository server through a response program returns a url address with a parameter of the selected patient's unique identifier, only if the provider's user id and password are accepted.

In the second step the clinical information system on receiving the returned url puts this url into its built-in web browser, which makes a web request for that url address. This url address uses https, which uses SSL encryption. The url address location is the SEHR Repository's web server, which returns the requested first web page containing the patient's demographics and an index of event summaries. The event summaries can be reached via links on the presented web pages.

System features via seamless integration into participating feeder systems include:

- automatic flagging notifying of consumer registration status.
- notification (prompt) to send event summaries including inpatient and emergency discharge summaries in hospital systems.
- viewing features of event summaries.
- sending of initial health profiles (IHPS).
- sending of pathology results.

Participating providers are able to create and view initial health profiles, medical event summaries and pathology results for consumers who have registered to participate.

Participating hospitals generate inpatient discharge and emergency event summaries to participating providers automatically for consumers who have registered to participate.

Daily notification to providers of inpatient and emergency discharge summaries for their clients is provided.

Medical summaries generated by the HCNT SEHR Service include:

Medical Summary of a consultation/encounter with Individual - includes Diagnosis, Medications, Immunisations, Observations, Risk Factors, and Allergies.

Hospital Discharge Summaries (ED and Inpatient) - includes Diagnosis, Procedures, Medications, Observations, Pathology Results.

Pathology Results.

Initial Health Profile - 2-year history of patient from their home Health Centre. Includes Diagnosis, Medications, Immunisations, Observations, Pathology Results, Risk Factors, and Allergies.

Current Health Profile – Will replace Initial Health Profile in 2007 and be generated at each occasion of service.

Provider engagement

- Providers enthusiastically supported the HCNT SEHR service, believing it would assist greatly in delivering health services to their clients across the continuum of care.
- 258 providers registered and participating in the HCNT SEHR service by 30 November 2006. These include Hospital medical officers and district medical officers, some accident & emergency nursing staff, remote clinic doctors, remote clinic nurses and Aboriginal Health Workers.
- Clinical Advisory Committee (CAC) established and meets monthly. Representation on the CAC includes Drs, Nurses, Aboriginal Health Workers and Allied Health Professionals. The CAC informs HCNT management and the Implementation Steering Committee on issues including: protocols, privacy, change management / provider engagement and training, QA and system requirements, capability, user friendliness and has a major influence in the system enhancement development program.
- Provider protocols were implemented and provider agreements at organizational level were agreed to. All providers apply to register, are trained in Health*Connect* and are provided with user ID and Password access.
- HCNT hotlines were introduced to enable providers to obtain HCNT HCIDs for consumers visiting their health service from another location, to address user ID password / access issues and to report system faults.
- Quality Assurance procedures in conjunction with providers were established to monitor data quality and audit provider access.
- Considerable effort was undertaken in engaging providers and influencing change management to enable providers to incorporate utilization of the HCNT SEHR within normal work practice when utilizing feeder
system clinical information systems. A joint Communicare / HCNT SEHR user manual was developed by HCNT with input from participating providers and "how to" sheets were prepared for users of all participating CIS's.
- 17 sites actively participating in the SEHR service at November 2006 as well as the Royal Darwin, Katherine and Tenant Creek Hospitals.
- Provider participation increased markedly during 2005/2006 as a result of the increase in the number of registered consumers, efficient provider engagement practices, system reliability / major decrease in system failure and faults, system enhancements, data quality and the SEHR began delivering real service outcomes.

Governance

New Governance arrangements were implemented in 2006 to reflect Territory e-Health implementation and the HCNT Implementation Steering Committee (HCNTISC) was established.

The HCNTISC is responsible for providing advice on policy and business issues associated with the implementation of

HealthConnect NT in accordance with project objectives and the revised HealthConnect Implementation Strategy.

The following sub committees inform the HCNTISC

- Implementation Management Group
- Consumer Advisory Group
- Clinical Advisory Committee
- Information Technology Advisory Committee
- Indigenous e-Health Advisory Committee

Progressive implementation – major program outcomes:

The Northern Territory is progressively implementing the HCNT SEHR service across the whole of the Northern Territory targeting first all remote communities and urban-based Aboriginal Medical Services.

Implementation of the HCNT SEHR builds upon and complements the implementation of the HCNT Point to Point (P2P) Service and major e-Health initiatives being implemented by the Northern Territory Department of Health and Community Services in the Northern Territory public hospitals and Remote Health Services Program which include:

- Implementation of Advanced Medication Management and Point of Care Clinical Workstation in NT Hospitals.
- Implementation of Remote Communications Infrastructure and WAN connections into all departmental operated Remote Health Clinics.
- Progressive implementation of a standardised integrated Patient Recall and Chronic Disease Management System (Primary Care Information System) into all public Remote Health Clinics.

Results

The implementation of the HCNT SEHR service in the Northern Territory will achieve the following major outcomes:

- *Passing the Patient Safely Back to their Community* – the generation of electronic discharge summaries (including electronically generated discharge medications for patients of NT Hospitals) for inpatient and Emergency Department attendances by consumers registered for the expanded HCNT SEHR Service.
- *Caring for the Chronically Ill and Children* – critical health information about consumers registered for the HCNT SEHR service, including records of immunisations, medications, accessed by participating health providers across the NT, enabling those professionals to better manage chronic disease and high risk child health issues such as "failure to thrive".
- *Breaking Down the Distance Barriers by Improving the Co-ordination and Delivery of Health Services to Indigenous Populations* – engagement and maximisation of registration of residents in the Northern Territory receiving services from health providers participating in the expanded HCNT SEHR service, targeting first, remote indigenous communities, Aboriginal Medical Services operating in remote and major urban centres and small regional centres and towns across the Territory;
- *Greater involvement of consumers in their health care* – establish two (2) consumer resource centres in remote health centres to pilot strategies for consumer access to their SEHR, telehealth services and video-conferencing with relatives in hospital;
- *An informed community ready for participation in integrated health care* – the Northern Territory will make continued progress in the development of the communities' understanding of and willingness to participate in Health*Connect* through localHealth*Connect* marketing and promotions aligned to national e-Health Strategies.

Conclusion

The Northern Territory will build on the proven successful development and implementation of its HCNT SEHR Service. The Northern Territory's HCNT SEHR implementation is the most advanced Health*Connect* service implementation of its kind in Australia in terms of range of services, service coverage, provider and consumer participation. The HCNT SEHR is being expanded to target the most disadvantaged Indigenous populations with the greatest health needs, residing in rural and remote communities and major urban centres. There is clear evidence that Indigenous populations have embraced the concept of HealthConnect with 90 % voluntary consumer participation rate and 100% provider participation achieved. There is also clear evidence of benefits realisation for a highly mobile Indigenous population through improved coordination and quality of health service delivery spanning vast distances, in some of the remotest areas in Australia. These initiatives will provide significant learnings and opportunities to inform the development of emerging national and cross-jurisdictional e-Health implementation strategies and standards/infrastructure developments, that is, the NEHTA work program.

Acknowledgements

The Australian Government Department of Health & Ageing

References

[1] Health Connect Implementation Strategy, version 2.01. June 2005 (revised).
[2] Lessons Learned from the MediConnect Field Test and Health Connect Trials. April 2005.

Address for correspondence

Stephen Moo
Director Health*Connect* Northern Territory
Chief Information Officer
Department of Health & Community Services –
Northern Territory Government of Australia