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Sharing Singapore’s Experience on the National Electronic Health Record

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CMIO
Ministry of Health/MOH Holdings
eHealth Systems in Singapore in early 2000

Multiple EMR Systems Multiple Lab & Radiology Systems

- Public healthcare clusters
  NHG and SingHealth hospitals, polyclinics and specialist clinics
- Ministry of Defence (MINDEF)

Minimal EMR Systems

- Private GPs (over 400 out of more than 2,000 have a CMS)
- Community Hospitals and other ILTC providers
Hospitals and polyclinics integrated into 2 cluster with 2 different IT Systems 2000-2004

EMRX is use to facilitate the data sharing between the 2 Clusters
In today’s world, InfoComm technology wizardry can solve puzzling medical cases within seconds. Take the case of a 36-year-old housewife who had a drug overdose. Armed with the woman’s name and identity card number, and the knowledge that she had just been discharged from another hospital the previous day, the doctor tapped into a computer system and found out what drugs that she had taken. Providing a remedy, the woman was soon declared out of danger.

This computer system is the Electronic Medical Record Exchange, or EMRX and it is proving to be a lifeline to the hundreds who pack the hospital emergency units since its launch in April 2004. The EMRX
The NEHR was created as a strategic long term enabler to support care delivery for both healthcare providers and citizens.

- Growing population
- Ageing population
- Increase in burden of care for chronic diseases
- No means to share data across different care settings or even between different acute settings
- Low IT maturity outside of RHS
- Lack of patient centricity

“What does it mean when we say our population will be older? It means there will be more demand on healthcare because older people are sick more often.

**But this also means it is a different pattern of healthcare**

So we have to respond to this by putting in more resources into our hospital system, building new hospitals.

...get the whole system to be structured properly so that it will be adapted to cater to the ageing population. To structure it properly means we need step-down care.”

“And one key thing we must do with this step-down care is to link up our acute hospitals [...] with community hospitals, so that you can have the best of both worlds.”

Prime Minister Lee Hsien Loong
National Day Rally 2009
Vision of
“One Patient, One Health Record”

The EHR is an integrated healthcare record centered on each person. It extracts and consolidates in one record, all clinically relevant information from their encounters across the healthcare system throughout his/her life.

Secure “real-time” access to patients’ EHR by authorised clinicians and healthcare providers:

> enable greater coordination and informed decision-making;
> resulting in more accurate diagnosis, better treatment and patient-centric integrated care.
# EMR vs EHR

<table>
<thead>
<tr>
<th>EMR</th>
<th>Specific to a facility (institution, private office)</th>
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<tbody>
<tr>
<td></td>
<td>• Equivalent of its paper predecessor</td>
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<td></td>
<td>• Includes everything recorded by the organization about a given patient</td>
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<td>• Has “depth” but lacks “breadth”</td>
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<table>
<thead>
<tr>
<th>EHR</th>
<th>Specific to an individual</th>
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<tr>
<td></td>
<td>• Captures a key subset of health information from multiple point-of-service systems</td>
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<td>• Available electronically to authorized healthcare providers anytime, anywhere</td>
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<td>• Designed to facilitate the sharing of data across the continuum of care, across healthcare delivery organizations and across geographies</td>
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Healthcare Demand Changes and Growing

#1 Demographic Changes

- Ageing, smaller families, rising singlehood

#2 Changes in Disease Patterns

- More chronic conditions

#3 Changing Social Compact & Rising Expectations

- Communicable diseases, TB, diseases of early infancy, external and other causes

#4 Advances in Medical Technology

- Partners gets $12.3M to advance genomic medicine
Further shifts in Healthcare needed

• To **transform models of care**
  – From being institution-centric/ acute-focused to be patient-centric, providing appropriate cost effective care at the right setting
  – Find ways to increase manpower productivity

• To deepen **partnerships and collaborations with private sector** across the care continuum
  – E.g. Across primary, acute hospital, ILTC settings
  – To **add value** to overall healthcare system and meet national healthcare needs including for subsidised patients

• To strengthen coordination of six RHSes to serve as **one Public Healthcare System**
  – E.g. common IT platforms for synergies and economies of scale
Singapore Healthcare Ecosystem
Complex & inter-connected.
Many opportunities for Public/Private partnerships
NEHR is evolving from capturing of summary record to continuity of care record (CCR) so as to provide the necessary clinical information to facilitate care transitions.
NEHR facilitates the sharing of a summary care record from EMRs so as to have a comprehensive longitudinal care record for the patient.
The NEHR programme will be focusing to empower the citizen, provide greater meaningful information and functionality to the clinician and scale the architecture to deal with increased demand.

Connecting with the Patient

- Empowering patients to better manage their own health through the sharing of NEHR data with HealthHub, our National consumer health portal
- Extending strong, secure, user-friendly authentication services
- Supporting access through Telehealth capabilities
- Ease of access through federated appointment capabilities

Supporting the Care Provider

- Better integration of care through Continuity of Care Record and Care & Case Management System
- Information when it is needed through bidirectional information exchange and more data types (depth) and data source (breathe)
- Easier transfer of care with provider service registries and eReferral capabilities

Facilitating the Administrator

- Access to extensive, rich data sources to support insights into all aspects of healthcare delivery through the Analytics and Health Data Grid initiatives
- Economies of scale and more effective coordination through centrally delivered national initiatives such as authentication services and mobile capabilities.

Infrastructure, operational and security enhancements to support the diverse and expanding user base
CCMS enables a **multidisciplinary approach** to clinical care, thus enabling **improved coordination among clinicians and care providers** across the continuum of care (including the community) and provides **care transformation from the traditional doctor-centric model to a team-based, patient-centric model** while facilitating community-based care as well.

Facilitates the sharing of information and supporting care of patients among ILTCs and community partners.
Common Workflow for Case Management

Frequent Admiters, Chronics, Living Alones

Clients in the community

Identified Client

Enroll Client

Perform Assessment

Clinical and economic evaluation of health care

Identify Problems

- Dementia
- Fall Risk
- Depression

Identify Interventions

- Drugs
- Therapy
- Befriending

Clinical Interventions

Social Interventions

Create Care Team & Assign Tasks

Team member delivers the care

Update MDN Notes

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Core modules of CCMS

Business Services

- Client Management
- Assessments
- Manage Care Plan
- Manage Tasks
- Manage Care Team
- Access Management
- Audit Trails & Reports
- Messaging
- Volunteer Management
- MDM Notes

Data From external systems

- Lab Results
- Medications
- Diagnosis
- Referrals
- Demographics
- Visits
- Appointments
- Radiology
- Advance Care Plans
What does it mean to Clinicians?

The Programme Case Summary (PCS) - a reviewed snapshot documenting the current state of patient’s care plan – facilitates the continuity of care.

Clinicians to displace appropriate clinical roles to nurses/ AHPs and home care staff thereby reducing their workload while ensuring the patients are well taken care of.

Clinicians to get connected with the multi-disciplinary teams from across the public and private care settings to manage cases in a coordinated & effective manner.

Provides visibility to the care plan tasks whether they are completed on time and in the correct order so that follow-up can occur in a timely, effective manner.

Clinicians to collaborate with family caregivers/community/case managers to perform non-clinical patient support roles in the community.

Facilitates in continuity of care

Helps to communicate with the care team members

Provides support for multi-disciplinary approach

Enables collaboration beyond hospital boundaries

Provides Visibility to the unified longitudinal care plan

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Harness information using technology to provide Singapore population with access to essential health content and services to help them in the care and management of their health and wellness.
HealthHub gives patients access to selected portions of their medical records thereby allowing clinicians to engage the patients in managing their health better.

Patient’s Health Records
- Hospital discharge summary
- Lab results for Chronic Disease
- Health screening record (HPB)
- View their medical appointment

What does this mean to the clinicians?
- Clinicians can now share health information (e.g. condition specific health articles, health results) with patients easily.
- Clinicians can empower patients to monitor and manage their conditions - patients to share their health information with the clinicians through HealthHub in future.
- Clinicians can develop new services for delivery of care that will allow patients to be engaged through HealthHub so that they can be better managed in the community / home.

Health & Wellness content
- Wellness programs
- Directory of healthcare facilities
- Medical A-Z, healthy living
Healthhub – A digital health companion
Integration of content & services to influence health
behaviour & simplify interaction with health service providers

Content & Services

Health Content
Trusted source of information, tips and advice

Health Services & Navigation
Locate health services, facilities & healthcare professionals from one place

Health Admin & Finance
Single point of contact to various health service transactions

Personal Health Records
Simplified access to individual and dependent’s health records

Personal Health Management
A gateway to personal health monitoring and management programmes

Communities & Marketplace
Source of community support and care services
Clinicians are empowered by Nursing Home IT Enablement Programme (NHELP) IT system to provide better care to the nursing homes residents

- Ability to maintain problem list specific for nursing care (such as activity of daily living and diagnosis) for follow through.
- Built in variety of standard assessment tools for care assessment of an admitted resident electronically.
- Maintain electronic clinical documentation that includes assessments, observations, progress notes etc.
- Facilitate the administration of medication and capture adverse drug reaction electronically.
- Assign or deactivate an infection tag to a resident.
- Support multi-disciplinary assessment and review through the system.
- Auto reminder to clinician to create care plan for a resident within 72 hours upon admission.
- Track and update care plan based on residents’ medical progression electronically.
- Prescribe and manage clinical orders (such as diet, lab tests, medication orders etc) electronically.
- Auto notification to clinician on medication review if it is not initiated within 48 hours after resident’s admission to the nursing home.
- Ability to retrieve summary view of basic clinical information (e.g. demographic, assessments, allergies, wounds, infection, incidents etc) real time.
- Ability to generate reports electronically instead of looking through all the paper documents to analyze data.
Some sample features of GPConnect to improve clinic’s operation and enhance GP’s clinical care

<table>
<thead>
<tr>
<th>Clinic Management System</th>
<th>Electronic Medical Records</th>
<th>Common Functionalities</th>
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<tbody>
<tr>
<td>• Registration</td>
<td>• Doctor’s Queue Log</td>
<td>• Data Archival</td>
</tr>
<tr>
<td>• Medication Dispensation</td>
<td>• Patient’s Records &amp; Notes</td>
<td>• Support Mobility</td>
</tr>
<tr>
<td>• Results &amp; Referrals</td>
<td>• Referrals &amp; Medical Certs</td>
<td>• Roles &amp; Access</td>
</tr>
<tr>
<td>• Billings &amp; Payments</td>
<td>• Prescriptions</td>
<td>• Patient’s Drug Allergy History</td>
</tr>
<tr>
<td>• 3rd Party Claims</td>
<td>• Immunisation</td>
<td>• Search Functions</td>
</tr>
<tr>
<td>• Clinic Administration</td>
<td></td>
<td>• Integration with National Systems</td>
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<tr>
<td></td>
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<td>• Offline Capabilities</td>
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- Lab Results
- 2-way Update to CMIS
- Clinical Entry Set
- Prompt to Notify Infectious Diseases
- Chronic Management Templates
Thank You