OVERVIEW OF ON-LINE NOTIFICATIONS & E-SERVICES PLATFORMS

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ABSTRACT

On-line notifications and e-Services platforms are changes brought about by the Internet and the information technology developments in the last 30 years. The sum total is the inexorable change to the way we look things up, be connected, and get things done. On-line notifications include notifications of infectious diseases, of industrial diseases and accidents, post-vaccination adverse reactions, and reporting of adverse events to health products. E-Services platforms are provided by Government agencies, other organizations and agencies both locally and worldwide. Doctors of Generation X, the so-called digital immigrants may find it challenging to get into the digital world. Yet it is not impossible. It involves a 3-step strategy -- being aware of the benefits of on-line and e-services platforms; working with other stakeholders on specific changes needed to make a successful change; and planning, testing, and implementing all aspects of the transition from one organizational structure and process to another. The Ministry of Health, the College of Family Physicians, Singapore, and early adopters of the new healthcare delivery system can work together to make the change less steep for doctors in need of assistance.

INTRODUCTION

On-line notifications and e-Services platforms are changes brought about by the Internet and the information technology developments in the last 30 years. The sum total is the inexorable change to the way we look things up, be connected, and get things done.

People can be divided into the younger or "Generation Y" who is also dubbed the "Google Generation" and the older generation or "Generation X" who is also dubbed "Digital immigrant". (Spring, 2010)[1]. Whilst Generation Y takes to digital way of doing things quite comfortably, Generation X has to struggle to fit into the digital age – some more than others. The purpose of this Family Practice Skills Course is to provide information on the scope of benefits and the steps that need to be taken to practice effectively in the digital present and future.

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In a nutshell:
- The Google search engine has become so good and fast that to "Google" what we want is replacing reaching out for a dictionary, textbook, document, or newspaper. The Wikipedia is the encyclopedia that is on-line. Of course, Google is not the panacea for any knowledge gap but more of that later. (Sim, Khong, & Jiwa, 2008; Spring, 2010).[2,1]
- Health related information websites e.g., HPB-online, provide the information that we need to look up things, and to obtain education materials for our professional use and also for the patient.
- Through the service portals work gets done – notifications, applications, submission of various information, and information access for decision making in the course of our professional work are examples where increasingly, work can be done through internet portals. See Table 1. (MOH, 2008)[3].

THE DIGITAL PRESENT AND FUTURE

iN2015 – Infocomm Development Authority of Singapore (IDA)'s vision and goals

The Infocomm Development Authority of Singapore (IDA)'s iN2015 vision can be stated as "an intelligent nation, a global city, powered by infocomm." The three elements to build the competitive capability into the future are: high speed infocomm infrastructure; sectoral transformation in the 10 sectors, of which healthcare is one sector; and a developed workforce that is IT literate and savvy. (IDA, 2010)[4].

Much of the infocomm infrastructure available worldwide is now everyday equipment in Singapore. See Figure 1. Sectoral transformation and the actions to create a developed workforce that readily exploits IT are in progress.

Among the goals of iN2015 are 90% broadband usage in all homes in Singapore, and a 100% computer ownership in homes and school-going children. (IDA, 2010)[4].

Healthcare

Healthcare is one of the 10 sectors that IDA is enhancing in its iN2015 vision. The other 9 sectors are: Digital media & entertainment; Education; Financial services; Manufacturing & Logistics; Land management & transport; Tourism, hospitality & retail; Infocomm@SME progarmme; Society; and Government. (IDA, 2010)[4].

The goal of the iN2015 programmes for the healthcare sector is to accelerate its transformation through an infocomm-enabled personalized healthcare delivery system to achieve

high quality clinical care, service excellence, cost-effectiveness and strong clinical research. There are several elements to be developed in healthcare infrastructure (IDA, 2010)[4].

National Electronic Health Record (NEHR)

The National Electronic Health Record aims to enable the exchange of health information across the healthcare continuum by allowing secure "real-time" access to patients' NEHR by authorised clinicians and healthcare providers (IDA, 2010)[4].

Integrated Clinical Management System (CMS)

The CMS programme that was completed in December 2008, aimed to encourage greater infocomm adoption by General Practitioner (GP) clinics to facilitate their operations. Moving forward, its next strategy the GP IT-Enablement programme was launched in 2009 to encourage greater adoption of Electronic Medical Records (EMRs) in the GP community starting with a pilot in 2011. (IDA, 2010)[4].

Personal Health Record (PHR) Programme

The PHR Programme seeks to empower individuals to optimally manage their health condition. Phase 1 of the programme was completed in April 2009, with the implementation of the Singapore eHealth Portal. Self-management modules such as the Behavioural Health Intervention Tools are made available on the portal to facilitate the use of the PHR by individuals. Moving forward, the portal pilot will inform a broader approach to Personal Health Management that will leverage the NEHR data and infrastructure in Phase 2 (IDA, 2010)[4].

Intermediate and Long Term Care

The Community Hospital programme aims to leverage on infocomm technologies to better improve clinical care and achieve greater operational efficiency for six community hospitals. The platform will also be linked to the NEHR to facilitate care co-ordination and management across care institutions. (IDA, 2010)[4].

NOTIFICATIONS – FROM HARD COPY TO ON-LINE

Notifications of infectious diseases, immunization activities, chronic disease (that are tracked in disease registries), and adverse events in medication use, together form the public health surveillance framework for control of disease in the community.

The two key purposes of notifications are to obtain:
- Surveillance information on diseases, events, activities of importance to health of the community.
- Indication for public action – outbreak levels have been reached e.g. dengue cases; next level of action required e.g. pandemic levels.

Going on-line

Hitherto, notifications of infectious diseases have been submitted electronically – through on-line platforms and hard copy forms submitted by faxes. Information received through fax need to be input into databases before data crunching and information for public action can be generated. As it is pointed out in Unit 2 (Communicable Diseases Division, Ministry of Health, 2011)[5], the move to on-line notification will result in timeliness of outbreak information.

It will however require the participation of every healthcare provider for a successful on-line notification system. As of 17 Dec 2010, there are more than 2000 general and specialist clinics licensed under the Private Hospitals & Medical Clinics (PHMC) Act. Every clinic has provided an email address for the purpose of the MOH Med-Alert. (Communicable Diseases Division, Ministry of Health, 2011)[5].

Notifications of diseases required in Singapore

Table 1 shows the notifications related to healthcare required in Singapore. They are discussed in detail in Units 2 to Unit 6 of this family practice skills course:
- Unit 2 – Infectious diseases.
- Unit 3 – Communicable Diseases - Live & Enhanced Surveillance (CD Lens) – one stop internet portal for infectious diseases notification and outbreak management.
- Unit 4 – Occupational diseases and accidents.
- Unit 5 – Immunisation update.
- Unit 6 – Reporting of adverse events to health products.

E-SERVICES PLATFORMS

Government agencies

Table 1 also lists the e-Services available linked with the various Government agencies namely, Ministry of Health, Singapore Medical Council, and the Health Care Clusters. Each of the website is also a store-house of healthcare information.

Ministry of Health website

The site contains information on the Health Care System in Singapore, Health care financing, Healthcare facilities, Healthcare services, Diseases and conditions, Funding and health research (MOH website, 2011)[6].

The health professionals /service providers page provides a link to the Health Professional Portal (HPP), the electronic licence application page, CD-LENS page, the notification of infectious disease form, information for participation in Medisave /Medishield Accreditation Scheme, and Participation in the chronic disease management scheme. (MOH website, 2011)[6].

TABLE 1. List of On-line services available in 2011

Government agncy	e-Services: Notifications, Applications, Submissions, Information access Source : MOH, 2008 and updated
Notifications	
HPB	Notification to National Immunisation Registry (NIR)
HPB	Notification to National Disease Registry (NDR)
MOH	Notification of Infections Disease
MOM	Notification of industrial disease, and accidents
HSA	Notification of Post-Vaccination Adverse Reaction
HSA	Reporting of adverse events to health products
Applications	
MOH	Application for medical registration
	Application for Extension of Temporary Registration
SMC	Application for certificate of good standing
SMC	Pre-Registration training application form
SMC	Application for renewal of practising certificate
SMC	Application for Registration of Additional Qualification
Submissions	
MOH	Submission of Medisave Claims (CDMP)
MOH	Submission Chronic Disease Indictors (Medisave for CDMP)
Clusters	Submission of PCPS claims and chronic disease clinical indicators through cluster e-Services & Integrated Clinic Management System
Information access	
MOH	Access to on-line laboratory results (from Integrated Screening Programme) via the Integrated Clinic Management System
MOH & Clusters	On-line medical records – work in progress in linking up with private sector

Health Professionals Portal (HPP)

Life is made easier by one-stop portals. A good example is the Health Professionals Portal (HPP). This is a one-stop portal for the healthcare professionals to access multiple secure e-Services and information using a common password entry and interface. This removes the need for separate password access to each MOH or Professional Board's e-Services. Future health professional e-Services would also be able to use HPP to authorise entry of healthcare professionals registered in Singapore. (HPP website, 2011)[7].

Within the HPP webite, one can search healthcare professionals, healthcare establishments, medical specialist training, and accreditation.

One can also get on to various important websites with one click of the mouse – namely, that of Ministry of Health, Health Promotion Board, Health Sciences Authority, National Health Care Group, Singhealth, National University Health System, Alexandra Health Pte Ltd, College of Family Physicians, Singapore, and Singapore Medical Association.

Within HPP are also links to healthcare topics e.g. Influenza A (H1N1), Avian Influenza, Adverse Drug Reaction News, Advance medical directive, Medical Acts and Statutes, and Safety information on drugs and health products.

Other websites providing information related to health and healthcare

There is a plethora of websites providing information related to health and healthcare. The following are a sampling of such websites:

General information websites
- eCitizen – the health & environment section – useful for general information relevant to Singapore; the other sections are also useful for general knowledge relevant to the Singapore context.

Public Health and communicable disease websites
- World Health Organisation.
- Centers for Disease Control.

Medical Associations and Academic bodies
- Singapore Medical Association (SMA).
- College of Family Physicians, Singapore (CFPS).
- Academy of Medicine, Singapore.
- American Academy of Family Physicians, Royal Australian College of General Practitioners, Royal College of General Practitioners, and similar websites.

Journal websites
- Asia Pacific Journal of Family Medicine, Annals of Internal Medicine, British Medical Journal (BMJ), Journal of American Medical Association (JAMA), Canadian Medical Association Journal (CMAJ), and many other websites too many to mention by name.

Background information on primary healthcare
- GP Handbook – created for GPs practicing in the UK – very useful to look up family medicine relevant topics.
- e-Medicine.

Foreground information on healthcare
- **Up-to-date** – This is a clinical decision support system that helps clinicians throughout the world provide best practice. It is a repository of current evidence to answer clinical questions quickly and easily at the point of care. This saves clinicians time, improves outcomes and lowers health care costs.
- **PubMed** – This is a service of the U.S. National Library of Medicine that has over 19 million citations from MEDLINE and other life science journals.

Google as a search engine for healthcare information

A small survey of GPs in Perth, Australia (n = 132) in 2007 found that Google was the most popular site used by respondents. Twenty-five respondents provided comment about

their use of Google. It was particularly valued for its ability to lead to other websites of value (n=9), ease of use (n=8), its fast search engine (n=5), convenience (n=4), and wide applicability (n=4). Three respondents noted that Google was a good starting point for finding information that led to other sites. One respondent said it was useful to find medical information for patients. (Sim, Khong, & Jiwa, 2008)[2].

In the same study by Sim et al, 2008, it is clear that GPs assess the credibility of websites. Examples of comments relating to websites used are:

- "God patient handouts, worksheets" – Centre for Clinical Intervention.
- "Validated information" – Centre for Disease Control.
- "Reliable, good pictures", "Good concise information" – Dermnet.
- "Good summary of information" – Family Practice Handbook.

Google is used as a starting point to find information on the internet. More specific websites are chosen as a result of familiarity and assessment of value of the information. More work remains to be done on how GPs assess the credibility of and make choices about websites. (Sim, Khong, and Jiwa)[1].

Keeping up with the literature with evidence based resources

There are now available websites that help medical practitioners keep up with the medical literature with evidence based resources. Table 2 shows a selection of such resources relevant to primary care. (Shaughnessy, 2009).

An overview of on-line notifications and e-Services platforms is not complete without a brief description of the clinic management system, and the management of change in the digital age.

CLINIC MANAGEMENT SYSTEM

Clinic management tasks and check list

A clinic management system needs to fulfill a number of tasks that would cater to both the administrative and clinical functions of the business. Current available systems in Singapore lacks clinical maturity hence there are national strategies on-going to develop suitable IT systems that meets our local needs for GPs to adopt IT successfully.

The following is a check list of the tasks that could be available in such a system:

- Registration of patients and maintenance of a patient database.
- Queue system with LCD TV with SMS alert to patients when their Q no. is up.
- Drug inventory.

Table 2. Source & description of evidence based resources

- American College of Physicians Journal Club (http://www.acpjc.org) -- One-page summaries of about 30 valid research papers. Published biweekly in *Annals of Internal Medicine*. Articles are rated for relevance by a national network of primary care physicians.
- Bandolier (http://www.medicine.ox.ac.uk/bandolier) -- Monthly on-line newsletter on evidence based topics.
- Daily POEMs Alerts (http://www.essentialevidenceplus.com/product/features_dailyip.cfm) -- Daily e-mail summary of a single valid research article.
- Evidence-Based Practice newsletter (http://www.ebponline.net) -- Evidence-based answers to common clinical questions in primary care. Produced by the Family Physicians Inquiries Network (http://www.fpin.org). Questions are derived from sentinel practices. Their relevance is graded, and the evidence for the answer is systematically reviewed, analyzed, and rated.
- Evidence Updates from the BMJ Evidence Centre (http://plus.mcmaster.ca/evidence updates) -- Weekly e-mail updates of article titles linked to Medline abstracts. Validated evidence considered to be relevant and newsworthy.
- Journal Watch (http://www.jwatch.org) -- Biweekly print or on-line newsletter. Annotated reviews of clinically important studies from a broad array of medical journals.

Source: Shaughnessy, 2009

- Dispensing including allergy alerts, and label printing.
- Medical Certificate issue.
- Appointment system. If it can also provide auto SMS alerts for the patients this will be good too.
- Billing of patients individually and also corporate billing. If it can also produce Medisave billing, that will be an additional feature.
- Reports – depending on need. This can range from statistical charting for patient parameters, disease statistics, demographics, to income & expense reports.
- Electronic clinical documentation.

Of these features, developing an electronic medical record that is easy to enter and retrieve information for patient referral letter writing and medical reporting is an important end in mind.

MANAGEMENT OF CHANGE

Doctors of Generation X, the so-called digital immigrants, may find it challenging to get into the digital world. Yet it is not impossible. It involves a 3-step strategy -- being aware of the benefits of on-line and e-Services platforms; working with other stakeholders on specific changes needed to make a successful change; and planning, testing, and implementing all aspects of the transition from one organizational structure and process to another. The Ministry of Health, the College of Family Physicians, Singapore, and early adopters of the new healthcare delivery system can work together to make the change less steep for doctors in need of assistance.

CONCLUSIONS

The Internet and information technology has surreptitiously introduced changes to the way we look up information, be connected, and get things done. On-line notifications and use of e-Services platforms increasingly will be the new way of getting things done. By creating awareness, and helping doctors, particularly those in Generation X, to bridge the digital gaps between past, present and into the future, mastery of the digital future envisioned by iN2015 for the healthcare sector should be possible.

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LEARNING POINTS

- **On-line notifications and e-Services platforms are changes brought about by the Internet and the information technology developments in the last 30 years.**

- **On-line notifications include notifications of infectious diseases, of industrial diseases and accidents, post-vaccination adverse reactions, and reporting of adverse events to health products.**

- **E-Services platforms are provided by Government agencies, other organizations and agencies both locally and worldwide.**

- **A 3-step strategy can be used to help doctors get into the digital world.**

- **The Ministry of Health, the College of Family Physicians, Singapore, and early adopters of the new healthcare delivery system can work together to make the change to the digital world less steep for doctors in need of assistance.**