

CHAPTER 7

ICT Possibilities

Effective clinical and executive leaders must know the potential of a wide range of e-health opportunities that can benefit health and healthcare. ICT and organisational change is complex. The boundaries between the two are often blurred, and leaders have to be aware of the current opportunities that they offer. Without this, they will be unable to choose effectively between competing demands.

There are many types of e-health, such as:

- Clinical information systems, such as specialised tools for healthcare professionals in hospitals, primary care and other care settings, including notes and records, test results, order entry and decision support (Amarasingham *et al.*, 2009)
- Telecare, telehealth, telemedicine and m-health systems and services (UNF/VF, undated)
- Integrated regional and national health information networks and distributed electronic health record (EHR) systems and associated services
- Logistics, including supply chain management and resource scheduling
- Non-clinical systems, including systems for health education and health promotion aimed at patients and citizens, specialised systems for researchers, and public health data collection and analysis and support systems for clinical processes not used directly by patients or healthcare professionals
- E-learning, especially undergraduate, post-graduate and continuous professional education
- Billing and healthcare management activities.

This is not a list of separate activities. It may be more helpful to see them as an integrated structure, rather like bricks in a wall. Chart 3.1 provides an example.

Chart 3.1. An example of structured and integrated e-health

Citizens' and patients' identities		Telecare, telehealth telemedicine and m-health services
Healthcare professionals' identities		
Clinical information and records		
Regional networks of clinical information	Logistics information	
Public health and non-clinical health information	E-learning	
Citizen, patient and customer relations		
Human resource management capacity building, succession planning, training, shift and leave allocation		
Planning, finance, billing and healthcare management		
E-commerce and e-government links		

From Chart 3.1, you can compile your own e-health structure to help you put the possible e-health project headings into a hierarchy, ranging from patients and communities through to healthcare management. You can change the shape and structure of the boxes using the text box facility using the tool bar at the bottom of the Word screen.

Chart 3.2. A template for you to compile your integrated e-health structure

An important feature of these types of ICT possibilities is making sure you assemble them in a way that is relevant to the health and healthcare perspectives of your e-health policy-makers and strategists. There is no right or wrong way to do this. The main goal is to set out the possibilities in a way that is reasonably comprehensive. You can then review these with your colleagues in the workshops, and establish your e-health options as a constructive mix of ICT and organisational change. There are numerous combinations, and you need to find one that fits your setting.

In addition to the specific information requirements of health and healthcare, e-health also relies on general ICT services. Some of these may also be available in the general economy, offering the enabling potential of helping with:

- Communications networks
- Architecture
- Interoperability
- Functionality
- Usability
- Capacity
- Coverage, especially for networks
- Informatics, such as data definitions, coding models and identifiers
- Technical and semantic interoperability
- Computers of all types
- Application software
- Middleware
- Analytical tools.

ICT potential is a vast area of knowledge. It changes constantly. You, your workshop colleagues and e-health leaders will find it demanding to keep up with all the information available. Hence, it is likely that dealing with relevant segments will be essential. This supports the need for collaboration between ministries responsible for health, technology development, suppliers and international agencies. It also requires good teamwork between e-health leaders, healthcare professionals, ICT managers in healthcare and ICT suppliers. Table 11 illustrates a possible assessment for you to use.

Table 11. Illustrative assessment of ICT requirements, benefits and costs

<i>E-health types</i>	<i>ICT application</i>	<i>Healthcare area</i>	<i>ICT requirements</i>	<i>Potential benefits</i>	<i>Your estimate of costs, by type</i>
Clinical	Diagnostic results with computerised physician order entry (CPOE)	Laboratories, outpatients, inpatients and primary care	Capacity, applications and reliable networks (CAN)	Faster access to results, fewer repeat tests, reliable access to patient histories	Payments to ICT suppliers, project management teams, changing clinical and working practices, engagement
	E-prescribing, including decision support	Treatment	CAN	More accurate prescribing and dispensing, sharing information	As above
	Picture archiving and communications system (PACS)	Imaging	CAN	Faster access to results, fewer repeat tests	As above
	Prescribing	Prescribing, dispensing, clinical decision support	CAN	Fewer errors, better use of generic drugs	As above
Health records	Transmission		CAN	Better dispensing	As above
	Summary		CAN	Healthcare professionals share data	As above
Clinical management	Detailed		CAN	Supporting healthcare professionals' clinical decisions	As above
	Follow-up		CAN, mobile phones (CAN+MP)	Improve health status and medical outcomes and control costs within current premium rates and continuous quality improvement	As above
Sharing information			Portable CAN + MP (PCAN+MP)	Improve quality and effectiveness of some 30 per cent of direct healthcare spending	As above
Tele- and m-health	Telemedicine	Outpatients	CAN	Increased patient access, avoided travel costs, time savings	As above
	Emergency care	Emergency care	CAN	Increased patient access, avoided travel costs, time savings	As above

<i>E-health types</i>	<i>ICT application</i>	<i>Healthcare area</i>	<i>ICT requirements</i>	<i>Potential benefits</i>	<i>Your estimate of costs, by type</i>
	Telehealth	Home monitoring	PCAN+MP	Increased patient access, avoided travel costs, time savings	As above
	M-health	Remote patients	Mobile phones and their networks	Better informed patients and compliance	As above
Networks	District	Hospitals	CAN	Faster decision-taking, continuous quality improvement	As above
		Primary care	CAN	Faster decision-taking, continuous quality improvement	As above
		Communities	PCAN	Faster decision-taking, continuous quality improvement	As above
		All	CAN	Faster decision-taking, continuous quality improvement	As above
	National and regional	Hospitals	CAN	Faster decision-taking, continuous quality improvement	As above
		Primary care	CAN	Faster decision-taking, continuous quality improvement	As above
		Communities	PCAN	Faster decision-taking, continuous quality improvement	As above
		All	CAN	Faster decision-taking, continuous quality improvement	As above
	Public health	Public health	CAN	Reduced risk, faster decision-taking, continuous quality improvement	As above
Secondary	Managing diseases	Public health	CAN	Reduced risk, faster decision-taking, continuous quality improvement	As above
	Managing new diseases	Public health	CAN	Reduced risk, faster decision-taking, continuous quality improvement	As above

<i>E-health types</i>	<i>ICT application</i>	<i>Healthcare area</i>	<i>ICT requirements</i>	<i>Potential benefits</i>	<i>Your estimate of costs, by type</i>
	Health surveillance	Public health	PCAN+MP	Reduced risk, faster response and reduced need for healthcare	As above
	Health promotion	Public health	PCAN+MP	Reduced need for healthcare	
	Health education	Public health	PCAN+MP	Reduced need for healthcare	As above
	Research	Clinical, public health	CAN	Increased use of clinical standards	
	Clinical practices	Medical and nursing	PCAN	Better quality healthcare	As above
e-learning	Undergraduate	Medical and nursing	PCAN	Reduced travel time and costs on training	
	Postgraduate	Medical and nursing	PCAN	Reduced travel time and costs on training	As above
	Continuous	Medical and nursing	PCAN	Reduced travel time and costs on training	As above
	General IT	All health workers	PCAN	Reduced travel time and costs on training and more access	As above
	Project management	Project managers	PCAN	Reduced travel time and costs on training and more access	As above
Logistics	Supply chains	Drugs	PCAN	Efficiency, stock holding, traceability, ¹ avoided fraud (Ottieno, 2006)	As above
	Theatres	Medical supplies	PCAN	Efficiency, stock holding, traceability, avoided fraud	
		Availability	CAN	Efficiency, reliability, streamlined care	As above
		Sterile supplies	CAN	Efficiency, reliability, streamlined care	

1. GSI Healthcare presentation. <http://www.gsi.org>

<i>E-health types</i>	<i>ICT application</i>	<i>Healthcare area</i>	<i>ICT requirements</i>	<i>Potential benefits</i>	<i>Your estimate of costs, by type</i>
	Beds	Availability	CAN	Efficiency, reliability, streamlined care	As above
Planning	National planning		CAN	More analytical, more comprehensive and faster	
	Regional planning		CAN	More analytical, more comprehensive and faster	
Management	Capacity building	All staff	CAN	Supports all other benefits	
	Staff scheduling	All staff	PCAN + databases	Efficiency	
	Billing	Finance staff	CAN + databases	Efficiency, accuracy	
	Activity	Doctors, nurses, allied health professions, managers	PCAN + databases	Efficiency, knowledge, resource allocation	
	Cost and utilisation	Managers, finance managers	CAN + databases	Efficiency, knowledge, resource allocation	

You will probably find the potential benefits to be the hardest part of this template to deal with. There is little hard knowledge about the potential net socio-economic and health benefits, how long they take to realise and where total benefits exceed the total costs over e-health life cycles. There are three main reasons for this:

- There is rarely any systematic identification, measurement and collection of all costs and benefits for e-health projects
- Net benefits depend on the performance before ICT, and again identification and measurement knowledge is lacking
- Potential benefits depend on organisational change as well as ICT, which is often a separate perspective and variable in e-health.

Consequently, when you assess the ICT possibilities, you will have to rely on knowledge from other places, combined with your best available knowledge of local performance. An example of international knowledge is WHO's publication on EHRs (WHO, 2006a).

Other examples are:

- Toward the Establishment of a European eHealth Research Area²
- Canada Health Infoway³
- Australia's national e-health strategy⁴
- New Zealand's national e-health strategy – a commentary⁵
- Africa Health Infoway.⁶

2. See: <http://www.ehealth-era.org> [last accessed 17 July 2010].

3. See: <http://www.infoway-inforoute.ca> [last accessed 17 July 2010].

4. See: <http://www.health.gov.au/internet/main/publishing.nsf/Content/National+Ehealth+Strategy> [last accessed 17 July 2010].

5. See: <http://www.govis.org.nz/conference2007/presentations/brendan-kelly.ppt>

6. See: <http://www.who.int/africahealthinfoway/en/index.html> [last accessed 20 July 2010]; <http://www.who.int/africahealthinfoway/AHI%20Brochure.pdf> [last accessed 20 July 2010].