

Appendix 1.

**CHECKLIST: Computer Hardware and Software**

ITEM	NOTES
<b>Computers</b>	<p>Most practices have three computers types:</p> <ul style="list-style-type: none"> <li>▪ <b>Servers</b> – larger practices will consider servers to be dedicated machines while smaller practices dedicate one of the workstations to double up as a server.</li> <li>▪ <b>Workstations</b> - Desktop computers for office administration, reception, patient file management, and clinical routines.</li> <li>▪ <b>Mobile computers</b> – Laptops or notebooks.</li> <li>▪ <b>Computer protection</b> <ul style="list-style-type: none"> <li>○ <b>Anti-theft devices:</b> Desktop computers should have lock down devices securing the machine to the practice furniture or wall while laptops should be equipped with anti-theft cables.</li> <li>○ <b>Dust and shock protection:</b> When computers are positioned below desk-level; they should either be stored in properly ventilated computer cabinets or elevated at least 15 cm from the floor for protection against dust and shocks.</li> </ul> </li> <li>▪ For a review of common computer terms and terminology, see reference list.<sup>1</sup> Standard computer specifications include multimedia devices (DVD-ROM drives), speakers,</li> </ul>
<b>Computer monitors</b>	<p>Two types of computer monitors are available: More expensive LCD (liquid crystal display) or flat screen monitors and conventional monitors. LCD monitors have several advantages:</p> <ul style="list-style-type: none"> <li>○ 30% power saving compared to conventional monitors – repaying the extra cost of investing in LCD monitors within 18 months.</li> <li>○ Longer product life cycles</li> <li>○ Less strenuous on the eyes</li> <li>○ Takes up less desk space</li> </ul>
<b>UPS</b>	<p>UPS = Uninterrupted Power Supply. The UPS is a rechargeable battery system that connects to a computer. It is usually positioned between the computer and the mains power supply. The function of the UPS is to:</p> <ul style="list-style-type: none"> <li>○ Immediately take over the computer’s power supply in the event of the main power supply being lost or is interrupted or fluctuating.</li> <li>○ Protecting practice computers against unexpected power surges, dips or power spikes leading to data loss / data corruption or damage to software and applications.</li> </ul> <p><b>Note:</b> Most short-term insurance claims for damaged hardware or data do not pay out if the damage was due to power surges and power cuts occurring in the absence of a UPS.</p>

<b>Current surge protectors</b>	These devices protect computers and network against electric current surges and lightning.
<b>Networks</b>	<p>Practice technology partners do setup and configuration (setting up the network protocols and security settings). Recommendation: LANs (local area networks) in practices (as opposed to WANs: wide area networks) should be fixed cable type of networks rather than wireless networks since medical practices often have technology devices with magnetic, electronic or ultra-sound emissions affecting network quality.</p> <ul style="list-style-type: none"> <li>○ <b>Hub:</b> The common connection point for computer devices in a network. Hubs are commonly used to connect components of a LAN and the number of connections / segments connection to the LAN is determined by the port count on the hub.</li> </ul>
<b>USB drives</b>	<p>Universal Serial Bus drives are external drives used for data transfer. Since USB drives do not have moving parts, they are regarded to be more stable and reliable than e.g., CDs and DVDs.</p> <ul style="list-style-type: none"> <li>○ <b>Flash drives</b> are small, portable memory devices that plug into a computer's USB port. Their memory capacity is increasing (almost doubling every 6 months) and are user friendly, compact, and transportable. (Alternative names are <i>thumb drives, jump drives, pen drives, or key drives</i>)</li> </ul>
<b>Remote Access to practice</b>	Remote access capability enables practitioners to log onto the practice network from a remote location. The hardware requirements for remote access are: Computer / laptop, broadband type modem, remote access software (commercial or open source type) and a broadband connection. Through remote access the outside device can access the practice computer to become a full-fledged part of the LAN.
<b>Backup devices</b>	<p>During the back up of data files the process copies data to a second storage medium (such as hard disk, DVD, USB device) in order to take precaution in case the first data storage device failing. A key rules in using of backup routines is regular backups (see below).</p> <ul style="list-style-type: none"> <li>○ <b>Backup media:</b> Ensure that backup devices stay in step with the practice's growing data storage requirements. For example, when a practice introduces digital x-rays and video imaging, backup devices are required to step up to higher capacity. Technology partners will best be able to recommend the most appropriate type of backup devices most suitable for the practice, their advantages and disadvantages, appropriateness and suitability. Currently, a good practice is using a removable, USB-based external hard drive.</li> <li>○ <b>Backup software:</b> Different backup software methodologies can be used from compression software or mere data copying of files or disk mirroring.</li> </ul>
<b>Fax machines</b>	Conventional fax machines are still around but the better option is to opt for fax to e-mail solutions for incoming faxes (faxed to an 086 number) and paperless transmissions solutions

<b>Telephony systems</b>	Present day digital telephone answering systems are computer-based systems with VOIP features (voice over Internet protocols) reducing high cost phone bills because call are made via the Internet, recording incoming voice messages to play back at later stage, call centre type features, logging outgoing call for cost-management.
<b>Printers</b>	Best recommendation is a printer integrated with a copier, scanning and faxing device.
<b>Anti-Virus</b>	Most quality anti-virus solutions are subscription based (annually renewable) and can be set to do periodic scanning as well as real time scanning.
<b>Business Software</b>	<p>Office suites: Most practices would consider Microsoft® Office (MS Word, Excel, Powerpoint, Outlook) as the only option for business software. Several lower cost and even Open Source options are also available.</p> <p><b>E-mail servers</b> route and store e-mails in and out of practice mail systems.</p> <p>Often referred to as simply the <i>mail server</i>, it acts as a electronic e-mail post office storing e-mails for local users, a set of user definable rules determining how the mail is routed, a central data storage facility of user accounts recognized by the server, and communications modules which are the components that actually handle the transfer of messages to and from other mail servers and e-mail clients.</p> <p>Technology partners are often responsible for the maintenance of e-mail servers (editing users, monitoring system activity) and are referred to as the postmaster and although most mail servers are designed to operate without any manual intervention during normal operations, the role of technology partners is strongly recommended.</p>
<b>Broadband access</b>	The two types of broadband access are wireless and fixed line. Typical examples of fixed line broadband is ADSL and for wireless either 3G, HSDPA, GPRS, or even satellite.
<b>Digital scanners</b>	A scanning function is important if you do not have a fax machine, and is incorporated into many printers. I have a high speed dedicated scanner than can copy both sides of a page at once, and scan batches of pages, so I can store my patient files in a digital format. These are expensive, but are an important part of digital paperless practice.

<p><b>Paperless Office</b></p>	<p>Further to the efforts to create paperless offices, other paperless-based solutions should be deployed:</p> <ul style="list-style-type: none"> <li>○ <b>Voice recorders</b> for dictation – rather than using dictation devices, rather employ MP3 digital devices</li> <li>○ Practice <b>websites</b> should display practice services, consulting hours, emergency contact details, road map and directions to the practice, parking arrangements, billing policy, welcome notices to new patients, etc.</li> <li>○ <b>SMS</b> (short messaging services) solutions are used for sending patient recalls and follow-up reminders, general practice announcements, and account payment reminders. Best-practice SMS solutions are integrated with PMA / EPR systems in order to export patient contact details directly to the SMS system (as opposed to typing all patient communication information manually)</li> </ul>
<p><b>DSS</b></p>	<p>DSS are decision support systems assisting both administrative and clinical decision-making. Most clinical decisions involve bridging the “inferential gap”, i.e., when it is required that clinicians "fill in" where they lack knowledge or where no knowledge yet exists regarding the patient condition. In a very real way, the clinical knowledge inferential gap is a product, in part, of how clinical knowledge is generated, the time allowed, sources of information and availability to access these sources, and the variable ways in which knowledge is translated into clinical decisions. In this regard, decision support systems will help narrow this gap by speeding of access to clinical information and evidence relevant to patient care needs and facilitating real-time use of knowledge in practice. Current EPRs increasingly integrated DSS within the EPR application<sup>ii</sup>.</p>

<sup>i</sup> For Computer Terms and Terminology, see Webopedia ([www.webopedia.com/Top\\_Category.asp](http://www.webopedia.com/Top_Category.asp)) or TechTerms ([www.techterms.com/](http://www.techterms.com/))

<sup>ii</sup> [*Health Affairs* 26, no. 2 (2007): w181-w191 (published online 26 January 2007; 10.1377/hlthaff.26.2.w181)]

## Appendix 2

### **eHealth Communication Governance: Patient Confidentiality and Patient Correspondence**

#### **Governance on e-mail communication**

- Separate work-related (practice) e-mail boxes from personal e-mail boxes.
- Use a “Request Read Receipt” function in order to prompt recipients to confirm they have received or have read to e-mail.
- At new patient registrations / patient re-registrations, the practice should inform and obtain an agreement from the patient / guarantor that receiving an e-mailed document from the practice is regarded as valid communication / correspondence between the practice and patient.
- Sending statements and receipts via e-mail is accepted by both parties as valid delivery of such documents.
- Inform patients of the practice Request patient to view and administer e-mailed documents as confidential documents.

The PMA / EPR e-mail function enables the practice to do paperless transmission of:

- Individualized patient statements
- Statement from month-end statement runs
- Patient Treatment Estimates / Quotations

Typically, using the e-mail function requires minimum software applications such as:

- Microsoft® Outlook Express (Version 5 or higher) or Microsoft® Outlook
- Microsoft® Internet Explorer (Version 5 or higher)
- PMA / EPR system

#### **E-mail versus Paper-based Patient Correspondence**

- 1) Costs - saving paper, postage etc.
- 2) Time (direct time saving from folding letters, printing addresses on envelopes, visiting the post office).
- 3) Improving overall document flow and management which contributes to practice efficiency, and office productivity.
- 4) Enhancing speedy patient communication
- 5) Improving professional presentations to patients
- 6) Maintaining medico-legal governance through saving copies of documents in the e-mail system's *Sent Items* folder for confirmation of communication.
- 7) Shortened turn-around time – quicker responses - responding to patients' need to be informed.

#### **E-mail Guidelines, Protocols and Standards**

E-mailing patient information (such as treatment estimates and statements) is sharing **patient confidential information** across the Internet. Since the Internet does have a certain level of

information security risk, it is strongly recommend that practices compile a set or clear practice guidelines and protocols regarding standard ethical practice of patient communication. An outline of such “minimum guidelines” are:

- 1) If required to conform to patients that documents have been e-mailed, use e.g. the **“Request Read Receipt”** function of the mailer system. This function will return an e-mail to your from the recipient’s mailbox that the recipients has received and has read the mail. In Outlook Express, to activate this, go Outlook Express → create a new message → Click on Tools → **“Request Read Receipt”**. Practices may file the read receipt confirmations in a folder created in Outlook Express for Practice Correspondence.
- 2) Consider creating a folder in the mailer system (such as Outlook Express) called **“Practice Correspondence”** and move all sent, received and read receipt confirmations to this folder. In Outlook Express, in order to create such a fold go Outlook Express → go to the Folder section of the screen → right click on Local Folders and → select New Folder. Type the name **“Practice Correspondence”** and move all important practice e-mails to this folder.
- 3) Ensure that the practice backup system also includes back up of the practice e-mail folder.

Some practices may require a more extended disclaimer – then the following may be considered.

**SAMPLE 2: Practice / Dentist Disclaimer**

**This message contains privileged and confidential information intended only for the use of the addressee(s) named above. If you are not the intended recipient of this message, you are hereby notified that you must not disseminate, copy or take any action in reliance on it. If you have received this message in error, please notify the undersigned at the practice address immediately.**

**Any medical and clinical views expressed in this message are those of the practice.**

**ALSO NOTE:**

**Electronic media are subject to the possibility of distortion in transmission and to unauthorized changes being made to files. The recipient hereof must check and compare the information in this e-mail with the information directly obtained from the practice (such as during patient visit(s)), as e-mail content may be subject to electronic disturbances. Patients are requested to report any discrepancies to the practice.**

**The practice does not accept responsibility for any errors, inaccuracies or unauthorized changes made to the files transmitted herewith. Section of this message contain a file attachment prepared for transmission using the Internet MIME message format. If you are using Pegasus Mail, or any another MIME-compliant system, you should be able to save it or view it from within your mailer. If you cannot, please ask your system administrator for assistance.**

### Appendix 3

#### **The Practice Standing Operating Procedure**

The practice manager should be tasked to write and maintain the **Practice SOP** (Practice Standing Operating Procedure). The SOP is the practice manual outlining all the practice management policies and operating procedures required to ensure the efficient operation of the practice. Typical themes to write up in the Practice SOP include:

- Practice team procedures for:
  - Attendance, notification of non-attendance (reporting sick)
  - Process for application for leave / sick leave
  - Work schedule / work roster
- House rules: Lunch, tea time arrangements
- Access to the practice:
  - Unlocking / locking the practice (daily / end of week)
  - After hour access / emergency access
- Alarm activation / de-activation, alarm activation notification from security contractor
- Mail – collecting / dispatching mail
- Managing e-mails / faxes
- Reception – Managing phone calls / Message management
- Policies about patient confidentiality, confidential patient information and digital document management, storing digital documents.
- Data security, system security and logon procedures, password management..
- Backup routines, backup management.



- Arrange for data backup disks and the data itself to be insured through proper financial insurance and that the requirements and specifications of the said insurer are adhered to.
- NEVER do incremental backups unless the PMA / EPR system specifically allows for it. Always run full / complete backups of PMA / EPR data files.
- Maintain a backup logbook to record the dates and other notes when backups were made.

**Table 5: Backup Schedule**

	<b>Week 1</b>	<b>Week 2</b>	<b>Week 3</b>	<b>Week 4</b>	<b>Month 1</b>	<b>Month 2</b>
<b>Monday</b>	Backup 1A	<i>Backup 1B</i>	Backup 1A	<i>Backup 1B</i>	Month1 *	Month2 **
<b>Tuesday</b>	Backup 2A	<i>Backup 2B</i>	Backup 2A	<i>Backup 2B</i>		
<b>Wednesday</b>	Backup 3A	<i>Backup 3B</i>	Backup 3A	<i>Backup 3B</i>		
<b>Thursday</b>	Backup 4A	<i>Backup 4B</i>	Backup 4A	<i>Backup 4B</i>		
<b>Friday</b>	Backup 5A	<i>Backup 5B</i>	Backup 5A	<i>Backup 5B*</i>		
<b>Key</b>						
<ul style="list-style-type: none"> <li>• <b>Backup 1A to 5A:</b> Use 5 different backup media or, on a disk drive with adequate disk space, setup 5 different destination folders. Backups 1A to 5A (for Monday to Friday, Week 1) are done to these 5 different backup media / folders respectively.</li> <li>• <b>Backup 1B to 5B:</b> Then, in Week 2, the backups on 1A to 5A are not used, but another set of 5 media or 5 different folders on a different (second) hard disk drive are set up for backups for Week 2.</li> <li>• In Week 3, the media / destination folders of Week 1 (Backups 1A to 5A) are re-used.</li> <li>• In Week 4, the media / destination folders of Week 2 (Backups 1B to 5B) are re-used.</li> <li>• The backup for Month 1 is done on the same day as the backup for Backup 5B.</li> <li>• The backup for Month 2 is done on a different destination media / folder than the backup for Month 1.</li> </ul>						
After each successful backup, the practice manager completes a backup log register. A typical log is illustrated below.						
<b>Sample Backup Log Register</b>						
<b>Backup Date</b>	<b>Media / Folder Used</b>	<b>Notes</b>			<b>Staff Name</b>	
19/01/08	Friday					
22/01/08						
23/01/08						

**Testing Backups**

A well designed PMA / EPR system will prompt users logging onto the system for verification that a backup had been made. For example, on the first day of a new month, the first user logging onto the system may be prompted with a question such as: “Have you made a working back of the data for the previous month?”

When answering “yes”, the system login is successful. When answering “no”, the system login should be unsuccessful and the user should first request the system administrator / practice manager to verify that a backup had been made

### **Data / Disaster Recovery Plan**

The practice technology partner should assist the practice to draft a disaster recovery plan / contingency plan in the event of unforeseen loss of key staff / an emergency / systems breakdown hits the practice and backups were not / are not done or need to be restored.

### **Data Security**

Some of a practice’s essential data security actions are:

Passwords should be issued by practice officers who have been issued the necessary security clearance and who have this responsibility assigned as part of their job descriptions. In the event of a security breach, the matter could thus be resolved as both a problem of conduct as well as a labour issue.

Secure passwords for data system dealing with patient information are considered to contain more than five 5 alpha-numeric characters.

Passwords should be replaced or reissued to team members on a regular basis in order to avoid password abuse.

A password register should be maintained and stored with the practices human resource files in a secure (locked) place.

## **Appendix 5:**

### **Responsive support and Help Desk services**

Traditional software support – such as for PMA / EPR systems – is facilitated through Call Centres and Help Desks. New generation client support services include:

- Remote access services where the support service logs onto the practice system via the Internet and execute support, troubleshooting - even do training - from a remote location. Remote access can be supplemented with voice support – either via the Internet or telephone.
- A responsive Help Desk service would include a **trouble ticket process** issuing a support number for routine and less urgent support requests.
- A hot-line (emergency line) for requests / after hours emergencies
- Data transfer (upload and download) services in the event when data maintenance is required.
- Live chat services where clients can log onto a live chat platform with real time voice interaction.
- Self-help library or wiki resources with access to *FAQ* (Frequently Asked Questions) and *How To* features, and self-paced training services.
- Support request escalation services and a dispute resolution process.

## Appendix 6:

Electronic patient record management has decisively positive contributions to quality of care. The Institute of Medicine (USA) has several reports and research findings on the use of digital information management addressing issues relating to patient wellbeing, medical errors and inaccuracies, medical record quality, outcomes of care, and protecting patient privacy and confidentiality.

The focus of Health ICT and the input and throughput processes of information management should be the **quality of care**<sup>i</sup>. The key areas (macro-level) that Health ICT should focus on within the health care system towards improving quality of care are:

- Clinical information and data management
- Outcome and result management
- Logistics and order management
- Decision support systems
- Electronic communication and connectivity
- Patient education and support
- Administrative processes and reporting
  
- Reporting and population health<sup>ii</sup>.

On the level of individualized patient encounters and patient care, the three most essential patient needs expressed during the doctor-patient encounter are:

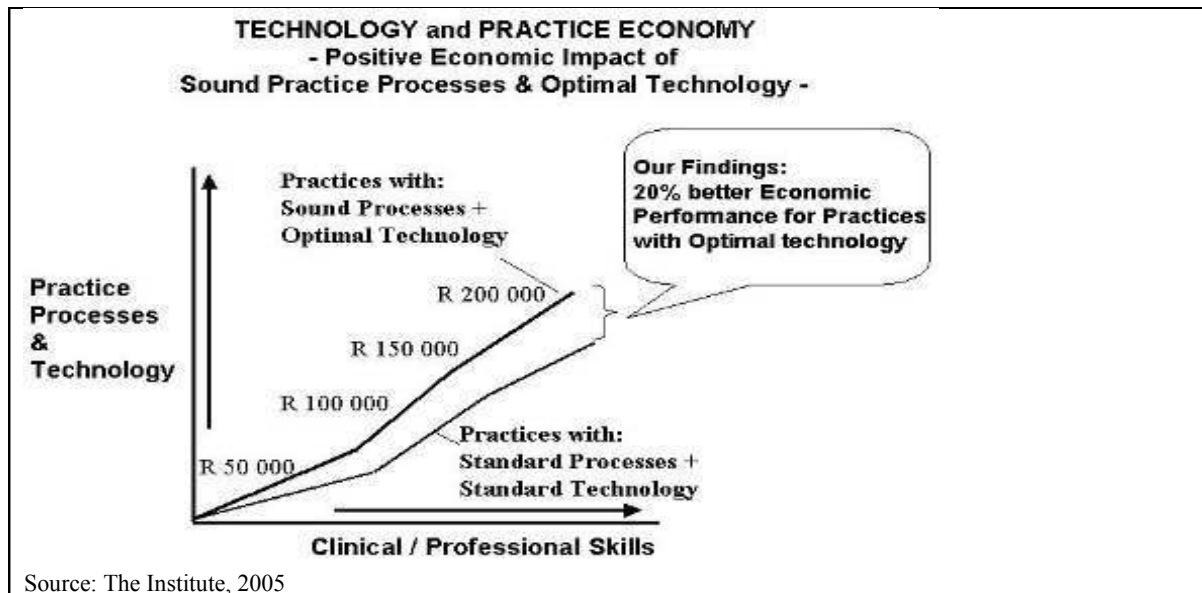
- Clarification of the patient's condition (patients ask: "*What is happening to me?*")
- Forecast the most likely future (patients ask: "*What's going to happen to me?*"),  
and
- Formulate options for improving the most likely outcome and future (patients ask: "*What can be done to improve what happens to me?*").

In short, these three patient needs can be summarized as: *Assessment, prediction and positive intervention*. It is towards this end that practitioners are upgrading Health ICT solutions in their practices; to be more efficient, effective and productive. These primary tasks should take precedence over all other responsibilities clinicians encounter during consultations<sup>iii</sup> and best summarized by Kleinke (2001): "*The only progress we make in health care is the progress we make in medicine ... there are but three elements that matter: patients, caregivers, and medical technologies. Everything else is noise*"<sup>iv</sup>.

*Validation:* Practices successfully implementing Health ICT demonstrate clinical and economic benefits. Given that investing in Health ICT *per se* should not be the prime motivating force - there is ample evidence that technology contribute to the health care cost spiral (health care inflation), the literature nevertheless reports that appropriate technology will demonstrate considerable higher levels of productivity and cost-efficiency when compared to low-technology (technology averse) practices.

Figure 1 illustrates this observation<sup>v</sup> and shows the difference in economic performance of high-end versus low-end technology practices. High-end technology practices almost always outperform practices with “standard” processes and “standard” (or average) technology by a margin of upwards of twenty percent.

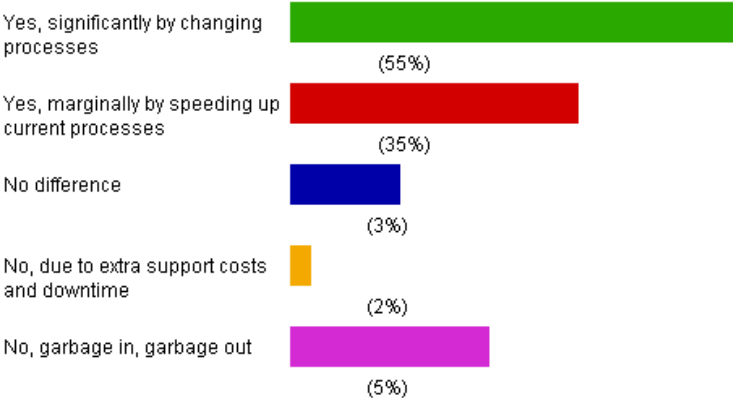
**Figure 1:** Technology and Practice Economy



The appropriate use of ICT adds value to most businesses processes. This finding is in line with market realities: Computerized technology boost business productivity for international surveys across many industries (health care, electric utilities, transportation, banking, information management) yielded similar results. The survey results show that up to 90% of businesses benefit from their investment in ICT (Figure 2) (see report by the Information Technology and Innovation Foundation<sup>vi</sup>).

**Figure 2:** Benefits from Technology Investment

**In the last five years has your investment in technology improved productivity?**



- <sup>i</sup> [www.iom.edu](http://www.iom.edu) - see The Computer-Based Patient Record: An Essential Technology for Health Care, Revised Edition 1997; Protecting Data Privacy in Health Services Research, 2000; Crossing the Quality Chasm: A New Health System for the 21st Century, 2001; Key Capabilities of an Electronic Health Record System, 2003
- <sup>ii</sup> [www.iom.edu](http://www.iom.edu) - see Key Capabilities of an Electronic Health Record System, 2003
- <sup>iii</sup> Reinertsen (in Gosfield, 2004:202
- <sup>iv</sup> Kleinke JD. 2001. OXYMORONS: *The myth of a US health care system*. San Francisco: Jossey-Bass.
- <sup>v</sup> Technology Guide for Clinical Excellence and Practice Success. 2004; page 7. The Institute for Health Economics and Technology Innovation. [www.ecizone.com](http://www.ecizone.com). Used by permission.
- <sup>vi</sup> Information Technology and Innovation Foundation , [www.itif.org](http://www.itif.org)

## Appendix 7

### **Benefits of Electronic Patient Records**

One study (summarizing more than 855 other studies) reported research on the economic and time benefits of EPRs.

**Study Outline.** The study monitored, and eventually incorporated 256 studies in their analysis which were submitted to methodical reviews, testing of hypotheses, meta-analyses, and prognostic investigations.

**Study Objective:** Of these 256 studies, 156 studies dealt with decision support, 84 focused on electronic medical record keeping, and 30 studied electronic provider order entry, the different groups not being mutually exclusive. A sum of 124 of the investigations focused on the impact of the electronic applications in consumer-based settings (such as walk-in patients) while 82 investigations looked at facilities that were dealing with hospital environments. In 97 of the investigations a randomized model was utilised, 11 investigations were performed as regulated clinical experiments, in 33 investigations a pre-post model was utilised, in 20 investigations a time sequence was utilised, and 17 were case investigations running parallel with a control.

Eighty two of the 211 hypothesis-testing investigations included some degree of cost information.

This research project was a landmark report for up to this report, little systematic material had been available in the industry, outside of those from a few of Health ICT leaders, that enabled the generalization of knowledge on EPRs, and data on the implementation process and the economic benefits after implementation<sup>1</sup>.

**Study Outcome:** By means of investigations conducted at four sites (one Dutch and three United States medical facilities) this study established that EPRs could facilitate the dramatic improvement of health care provision in outpatient settings. These improvements realized when tools assisting in decision making and clinical data administration were made accessible inside the EPR system and predominantly when these systems had the capability to accumulate highly reliable data which could be easily accessed and interpreted by practitioners.

- Regardless the fact that the analytic methods utilised were of such diverse nature, all economic investigations concerning the cost benefits in this study resulted in generous savings after EPR implementation.
- Although the long term savings and advantages were projected to surpass the initial investment costs, the expected period to break even fluctuated dramatically from as little as 3 to as many as 13 years.
- In conclusion, EPRs demonstrated the potential to fuel a massive health care industry transformation by dramatically improving the effectiveness, efficiency and the safety of patient care and facilitating health care workers to accomplish massive improvements through the utilisation of multifunctional, real-time computerized record systems, fully integrated with patients' medical records.

- Additional studies in the use of computerized record systems in the health care practice environment is required to fully grasp the performance and managerial requirements for proper implementation that will lead to successful utilisation. The mass diffusion of health information technology has been restricted by a shortage of universal knowledge concerning the technology options to select, an understanding on the methods used to improve care and manage costs for in the health care industry, cost, technical issues, system performance, concerns about patient confidentiality and privacy, and a shortage of skilled clinical staff to guide the implementation.

<sup>i</sup> Shekelle, P.G., Morton, S.C., Keeler, E.B., (ed). 2006. *Costs and Benefits of Health Information Technology*. Rockville: Agency for Healthcare Research and Quality.

[www.iom.edu](http://www.iom.edu) - see The Computer-Based Patient Record: An Essential Technology for Health Care, Revised Edition 1997; Protecting Data Privacy in Health Services Research, 2000; Crossing the Quality Chasm: A New Health System for the 21st Century, 2001; Key Capabilities of an Electronic Health Record System, 2003

[www.iom.edu](http://www.iom.edu) - see Key Capabilities of an Electronic Health Record System, 2003  
Reinertsen (in Gosfield, 2004:202

Kleinke JD. 2001. OXYMORONS: *The myth of a US health care system*. San Francisco: Jossey-Bass.

Technology Guide for Clinical Excellence and Practice Success. 2004; page 7. The Institute for Health Economics and Technology Innovation. [www.ecizone.com](http://www.ecizone.com). Used by permission.

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