

eHealth: Ireland's approach to medicine in the digital age



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Over the last decade, Ireland has experienced tremendous growth. Its gross domestic product (GDP) has more than doubled, the population has grown by a startling 20%, and spending on public healthcare has tripled.^{1,2} Such enormous progress was largely attributed to Ireland's burgeoning information and communications technology (ICT) sector.³ This nascent technological engine spurred massive advances in almost all aspects of Irish life. However, the traditionally conservative field of medicine was not so readily swept forward. While 70% of all Irish households had a computer by 2008, only 58.5% of all single GP practices were equipped with a computer, the second lowest percentage of any EU country.^{4,5}

Such aversion to change is characteristic of medicine's inherent conservatism, which tries to protect patients from the potential harm of untested and unproven theories. However, this conservatism can, and has, come at a cost to patients, with pioneering advances being unnecessarily resisted or ignored. In the 1700s, Dr Lind's treatment for scurvy was discounted, in the 1800s Dr Semmelweis' passionate arguments for hand washing were resisted, and in the 1900s Dr Fleming's discovery of penicillin was initially dismissed. Now in the 21st century we face our own test with accepting innovation, as technology entwines itself further with the domain of healthcare, creating a new hybrid entity known as 'eHealth'.

eHealth

The goal of this hybrid entity is to improve the health of patients and populations by utilising advances in ICT across the whole spectrum of healthcare-related functions.⁶ Although the definition of eHealth is continually evolving, there is consensus that eHealth incorporates not only the discipline of medical informatics, but that it also includes the use of more generalised communications through networked digital technologies such as the internet. In its broadest sense, eHealth is the application of emerging ICT in order to improve or enable health and healthcare.⁶

However, the pervasive nature of technology makes such a broad definition of eHealth a real challenge when trying to clearly understand its scope. Indeed, there are many growing fields that can stand to benefit from ICT, and can thus all be considered elements of 'eHealth' (Table 1).

Instead of trying to create an overarching definition of eHealth, it is perhaps more useful to explore the limits and potentials of this field by closely examining one technology that has become synonymous with the field – electronic medical records (EMR). The issues and arguments surrounding the wide-scale adoption of EMR systems are indicative of the greater debate around eHealth, and a closer look at the promises and challenges faced by EMR provides a useful snapshot of the present and future of eHealth as a whole.

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Electronic medical records: promises and challenges

At a practical level, EMRs are simply a database solution whereby patients' medical information is encoded in a digital format allowing for ease of searchability, information transfer, improved legibility and automation. Proponents of EMRs argue that they reduce administrative costs (e.g., automatic billing and scheduling), improve treatments (e.g., reduced prescription errors), allow for quick and easy sharing of patient records (e.g., eReferrals, electronic lab results), increase the use of evidence-based medicine (e.g., online decision support tools such as UptoDate), and provide an unparalleled amount of data for research purposes.⁷

Opponents, however, are quick to point out substantial barriers that have prevented the full realisation of EMRs' potential benefits. Notably, EMR systems require a significant dedication of time during transitioning, can be expensive, necessitate additional training and do not have the same assurances of reliability and quality expected of other medical products.⁷ These concerns are not merely conjecture, but are rather real hindrances, as proven in a 2003 survey by the Irish College of General Practitioners. They found that lack of time, cost and poor training were the top three reasons preventing respondents from computerising their practices.⁸ In addition, a unique barrier that Irish practitioners identified was the problems surrounding system crashes due to power outages, computer viruses or hardware failures.⁹

These major barriers are largely related to the initial effort of digitising paper records, the cost and time associated with training staff, and the purchasing expense of database systems. The expense can vary widely depending on the database functionalities, the size of the practice and the extent of integration and customisation.¹⁰ However, in return for these initial outlays, EMRs hold the promise of greatly increasing efficiency and reducing wastage of medical resources (e.g., duplicated laboratory tests), thereby freeing up time and increasing profits in the long term.

Another significant issue that has limited the uptake of EMRs is the lack of legislation governing the vast number of products currently on the market, thus limiting trust in the quality and reliability of EMR systems. Currently, no centralised mechanism is in place for reporting problems with EMR systems, as exists for drugs and medical devices. Rather, contracts regularly stop clients from reporting systemic problems.⁷ There have been calls for regulatory agencies such as the United States Food and Drug Administration (FDA) and Irish Medicines Board to evaluate and approve EMRs using a process similar to that which governs medical devices and pharmaceuticals. Until Irish public policy catches up with technology, EMR systems will not be perceived to have the standards that are expected of medical products. The most detrimental criticism of EMRs is the lack of conclusive evidence demonstrating their efficacy in improving the quality of healthcare or in yielding significant savings.^{7,11,12} A 2007 study by Linder *et al.* found no relationship between EMRs and the

quality of patient care. However, the authors pointed out that even though their National Ambulatory Medical Care Survey (NAMCS) data set was the best available in terms of size and accuracy, it was outdated from a technological perspective. In addition, their analysis was limited to asking physicians whether they had an EMR and did not take into account the actual extent of EMR implementation.^{11,12} This study was pivotal in concluding that it is simply not enough to install EMR systems; rather, the usage of EMR systems is instrumental to quality improvements in healthcare.

Thus far, evidence-based studies that support EMRs only report modest benefits. Parente and McCullough analysed four years of Medicare data and found just marginal improvements in patient outcomes because of EMRs: specifically, two fewer infections a year at the average US hospital.¹³ Another study by the Veterans Administration in the United States showed similar small gains from EMRs in reducing costs and improving care through enhanced patient safety, in particular automatic detection of drug interactions.⁷

In an attempt to reconcile these two divergent arguments, Greenhalgh *et al.* from University College London undertook a meta-analysis of EMRs in order to identify "fundamental and often overlooked tensions in the design and implementation of [EMRs]".¹⁴ Interestingly, the study's results found an unexplored middle ground. It identified that certain administrative functions are made more efficient by EMRs, while clinical work can actually be made less efficient. Significantly, the rigid nature of EMR templates do not always allow for clinicians to arrange information in a manner most suitable for the patient history, and the technical challenges of digital drawings eliminated the ability to include diagrams and sketches. This study acknowledged that paper-based systems offer superior flexibility in clinical work when compared to the EMR systems, and it found that smaller localised EMR systems have greater efficacy than larger ones. If we regard EMRs and their parent field of eHealth as merely another set of medical tools, then any measure of their effectiveness will depend not just on their intrinsic properties, but also on our appropriate use of them in correct situations. This elucidates that the technology alone is not enough; we must also know how to use it. It is only through a clear understanding of the possibilities, limits, costs and benefits of eHealth that we will be able to realise the full potential of this emerging entity.

Ireland's approach to digital medicine

Ireland has been relatively progressive in its strategic policies regarding the integration of eHealth into its larger ongoing healthcare reforms. Following the creation of the Health Services Executive (HSE) in 2004, a National ICT Directorate was formed. For the first time, this agency examined eHealth in an Irish context in their report 'Embedding the e in health'. The HSE followed up on this by implementing Ireland's current eHealth strategy, titled 'National Health Information Strategy' (NHIS), which sets targets and strategies for modernising the Irish health

Table 1: The scope of eHealth.

Areas of eHealth	Definitions	Aspects
Electronic patient/health/medical records	A database solution whereby patients' medical information is encoded in a digital format allowing for ease of searchability, information transfer and automation.	Immediate access in emergencies to medical alerts, multi-professional access to patients' medical records, record linkage for family members, clinical coding for easy searchability.
Professional clinical informatics	Electronic resources used by healthcare professionals in order to make medical decisions or to inform themselves about medical topics.	Decision aids for practitioners (e.g., prompts, guidelines), educational aids, overview of latest medical journals and best practice, clinical management tools.
Consumer health informatics	Electronic resources used by patients or a population in order to make medical decisions or inform themselves about medical topics.	Decision aids for patients, shared decision-making tools, informed consent aids, clinician-patient communication tools, online screening, TV or web-based medical information.
Healthcare administrative management	Electronic solutions catering to the administrative duties surrounding healthcare.	Appointment scheduling, work schedule management, billing and tracking systems, audit and quality assessment systems.
Telemedicine	The provision of medical consultations and treatments at a distance.	Medical services to remote/rural communities, on board ships/planes, space-based medicine, clinical email and web-based messaging systems.
New technologies	Advances in science making previously unrealised medical potentials possible or improving on current functions.	Robotics, nanotechnologies, virtual reality environments (e.g., remote surgery), mobile telephone-based monitoring, paperless palmtop technologies (e.g., iPad charts).
Research outcomes	Utilisation of electronic databases and informatics for larger population-based studies.	Epidemiological research, bioinformatics.

sector's ICT infrastructure by 2011.^{5,15} The Oireachtas is considering a Health Information Bill, which will address issues relating to the collection, use, storage and disclosure of personal health information.¹⁶

In contrast to these progressive policy initiatives, the state of eHealth infrastructure in Ireland is below the European average. Compared to a European average of 80%, only 65% of GP practices in Ireland store administrative patient data and use local EMRs.⁵ The transfer of EMRs is even less common, with only 40% and 17% of practices exchanging medical data and administrative data, respectively. In light of this mixed performance, it is no surprise that in 2008, the European Commission found Ireland to be performing at an average level in the eHealth sector when compared to other EU27 members.⁵

To improve its performance, Ireland must overcome the massive challenges of a shrinking economy, an ageing population and unprecedented cuts in Government budgets, to the amount of €600 million for 2011.¹⁷

These issues are likely to converge, such that the Irish healthcare sector will be faced with the challenge to provide for a greater number of patients with fewer resources. This perhaps presents an opportunity for growth and, given the current need for increased efficiency, cost saving and enhanced productivity, it is an ideal time to implement appropriate eHealth solutions. The future of eHealth in Ireland will largely depend on the willingness of the medical community to accept these latest innovations and capitalise on these changes, which will be beneficial for both patients and healthcare professionals.

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