A deluge of data

Information collected from eHealth digital sources and technologies could one day bridge the gap between scientists, doctors and patients, and spur the creation of further medical advances. These data are central in the European Commission’s eHealth Action Plan.
LONG WAITING TIMES, lack of bedside manners and costs of care are ranked among the top 10 complaints patients express about healthcare in most countries. The European Commission (EC) is looking to use eHealth technologies to change this state of healthcare across Europe.

EHEALTH AND TELEHEALTH

While scientific discoveries and technological improvements have propelled innumerable advances in the field of healthcare, often the actual care patients receive does not reflect this fact. Limited access to medication and medical procedures often arise from lack of facilities, an overworked workforce and high cost.

Enter eHealth – the means of using digital tools and services for the purposes of healthcare. It also goes under the moniker ‘telehealth’ and can be a practice as simple as a patient using an online form to request a prescription refill or as innovative as a scientist using an iPhone camera-turned-microscope to diagnose intestinal worm infections in schoolchildren in rural Tanzania.

In countries where eHealth has already started to take off, the results are clear: technology in the medical sector is saving doctors’ and patients’ time and money. For example, in 2012 the EC noted the use of digital prescriptions has saved Italy approximately €2 billion. Moreover, the Danish Health Data Network’s information system, cited by several studies as being the most efficient in the world, has been saving doctors approximately 50 minutes per day normally spent on administrative tasks. The system, which provides fast and efficient communication between patients, general practitioners and social care professionals, has also led to cumulative savings of just over kr 650 million (US $120 million) per year.

EHEALTH ACTION PLANS

Initiated in 2004, the EC announced the first eHealth Action Plan. The plan promised to embed information and communication technologies (ICT) into healthcare systems to increase efficiency, improve quality of care and life, and unlock healthcare innovation. Unfortunately, this promise has yet to come to fruition. Estonian President Toomas Hendrik Ilves, Chair of the independent high-level eHealth Task Force, explained in the 2012 eHealth Action Plan: “We know that in healthcare we lag at least 10 years behind virtually every other area in the implementation of IT solutions. We know from a wide range of other services that information technology applications can radically revolutionise and improve the way we do things”.

In 2012, the EC initiated its second wave of the eHealth Action Plan with a clear focus: to enable medical institutions to use technological advances in an interoperable, preventative, curative and cost-effective manner for patients all across Europe. The EC asserts that eHealth, when sensibly deployed, can play an important role in remotely and cheaply monitoring people who are chronically or acutely ill and allowing for timely (if not early) recognition of symptoms.

The current eHealth Action Plan, which will run until 2020, is pushing for this improved healthcare future in several novel ways. Once such method is through enabling patients to use digital

### eHealth Action Plan key initiatives

- **Complete a Green Paper on eHealth and wellbeing applications**
  - **By 2014**

- **Check on progress and assess cost benefits, productivity gains and business models**
  - **By 2015**

- **Create digital instruments to integrate healthcare and social care systems, and support health promotion and prevention that strongly involve users**
  - **By 2016**

- **Propose an eHealth Interoperability Framework including methods for testing, labelling and certifying eHealth systems**

- **Develop innovative instruments, tools and methods to improve the analysis of patient data and assist with decision making**

- **Use the Connecting Europe Facility and the European Regional Development Fund to deploy innovative tools**
  - **By 2020**

**ANALYSIS**

WWW.RESEARCHMEDIA.EU
devices to track their health in their own homes and send the data by phone, computer or television to a medical centre for a professional to examine.

Take a patient who has suffered heart damage as an example. Traditionally, such a patient would be required to attend several appointments after suffering a heart issue and would need to undergo an electrocardiogram (ECG), which is a sticky, uncomfortable and cumbersome procedure. Instead, healthcare systems using eHealth technology are beginning to exploit other options available, such as the QardioCore. The device wraps around the patient's chest and wirelessly transmits relevant health data such as heart rate, levels of physical activity and variations in body temperature to a mobile application and secure cloud database. The physician can access the data on that patient whenever convenient, saving time and money for both parties involved. Moreover, the doctor can contact the patient immediately upon noticing unusual readings from the device.

AN UNFORESEEN CONSEQUENCE?
The benefits of eHealth to the patient and doctor are numerous and obvious. Not so obvious however, are the benefits eHealth could bring to scientists facilitating medical breakthroughs, procedures and medicines on which this new era of care is based.

One great potential benefit is an opportunity for more research. Devices like the QardioCore collect vast amounts of data from the patients who use them. These electronic records offer real potential to improve healthcare and advance biomedical research, particularly if records can be anonymised and linked to other sources. To such an end, in 2007, the Wellcome Trust in the UK led a partnership of funders to support work to develop and use electronic resources in health research. And in 2012, the Trust joined a consortium to award £19 million to establish four eHealth research centres across the UK.

With access to such health information in the UK and the rest of mainland Europe, scientists could hone their research or spark ideas for new experiments and treatments. For example, huge datasets can be developed for areas such as pharmaceutical research with the aim of vastly improving drug effectiveness. Disease researchers could use health records to help tackle conditions such as diabetes and cancer. Moreover, the data could be used to create and improve personalised medicine, as it will exist for a patient in real time and across time, indicating the types of diseases and healthcare issues that person is liable to contract. The possibilities for how to use the data are vast and far-reaching.

Another important aspect of eHealth data for scientists is that the information directly relates to the subject of their medical inquisitions: humans. Without having to worry about accidently crossing ethical lines or use mice as test subjects, scientists now have data at their fingertips generated by people in real time. Researchers can use this information for many applications, such as creating better-educated hypotheses before proceeding into a testing stage. This and similar practices are likely to have a rippling effect, saving time and money in designing experiments and improving the accuracy, validation and justification of conducting them.

When examined properly, eHealth technologies, and the data they produce, could create a closed loop between doctors, patients and scientists of all disciplines. Provided patient data stay anonymous and the patients' identities are protected, the ability to explore and experiment with these datasets can improve, adapt and further the science that makes eHealth possible.

When examined properly, eHealth technologies, and the data they produce, could create a closed loop between scientists, doctors and patients.