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MHealth: Mobile technology brings healthcare home

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"I think the monitor was easy for me, because I don't have to go to the hospital every day to do my exercises, and at home I feel better, much much better."
Nativo Mira Esplugues is an active 85-year-old from Delta del Ebro, near Barcelona in Spain. He is recovering after having had a total knee replacement.

This is serious surgery, with a long recovery time. Nevertheless the wound is healing nicely, and he was discharged from hospital after just a week.

Normally Mr Esplugues would attend daily physiotherapy sessions. Instead, he is being monitored remotely through an interactive terminal at home.

He accesses the service through a touch screen interface, which shows him what to do.

"The application is no problem, you have only to touch the screen and that's all. The machine says to you what you have to do," he says.

It is connected to the internet by 3G, meaning the unit is not only portable, but accessible to people without broadband - which accounts for 85% of over-75s in Spain.

He straps on sensors containing accelerometers - devices which help ensure he is exercising correctly. They send data on his progress through the telemonitoring unit to his health care professionals.

Mr Esplugues is pleased with the system.

"Somebody has to take me to the hospital and back to my home. Here at home I feel better because I can choose my time, I can make my exercises at seven o'clock or eight o'clock or nine o'clock."

Challenging times

The technology has been developed by telecoms giant Telefonica.

An ageing - and expanding - population is presenting health care providers and governments with a budgetary crisis. In Europe about 7% of GDP is spent on healthcare, and in the US that figure rises to 15%.

Telecoms companies are also facing challenging times, with traditional markets reaching saturation, forcing them to explore other revenue streams.

Vodafone, Orange, AT&T Wireless, Turkey's Avea, and Japan's NTT DoCoMo are all investing in mobile healthcare.

At the Institut Municipal d'Investigació Mèdica (IMIM), attached to Barcelona's Hospital del Mar, cardiologist Dr Josep Comín is talking to one of his chronic heart patients at home, using video conferencing.

The patient is being followed through the remote monitoring terminal. The device tracks weight and heart rate, with scales and a blood pressure cuff using bluetooth technology. If a test is missed, a nurse contacts the patient to find out why.

Dr Comín is leading a study evaluating the system.

He has worked with Telefonica since 2008, refining the software and hardware.

The patients come from an existing programme monitoring those with high-risk chronic heart failure through out-patient appointments.

This has seen mortality rates fall from 45% in the first year after admission to 8%, and Dr Comín hopes remote monitoring will continue this.

A third of patients are unable to attend appointments, due to infirmity or distance, he says.

"[Patients] can reach professionals very quickly and easily, so there's no need to transfer patients to other hospitals. At the same time the tool enhances self-care behaviour, because the patient takes care of his own condition.

"In terms of cost-effectiveness, most of the interventions are made by nurses who have back up from cardiologists, it saves time as one nurse can take care of many patients at the same time."

"In the pilot study we've had patients without any literacy at all who have been using these systems."

Telefonica's investment in eHealth has been considerable, with a dedicated research and development facility in Granada.

Other innovations include a system to monitor elderly people, who are tracked through their mobile phone and a web interface. If they stray from a defined area, or have a fall, a text message is dispatched to two designated numbers. For doctors, a video conferencing application allows them to share video and images.

Director of the eHealth unit, Álvaro Fernández de Araoz, feels that Telefonica's position as an integrated telecoms provider - both landline and mobile - is vital.

"One of the opportunities we have seen in the market is that patients are starting to be more aware of their diseases, there's more information," he says.

"People are growing older. About 16% of the population of Europe is above 65 and people have more chronic diseases, which at the end of the day is about 75% of the cost of healthcare."

Breathe of life

It's not just telecoms companies that are finding innovative ways of using mobile technology in the sector.

Dr Victor Higgs is the managing director of UK-based Applied Nanodetectors, which has developed a way to use mobile phones to monitor the health of asthma patients.

The condition affects one in 20 people worldwide and costs 40bn euros ($52.5bn; £34bn) a year to treat, says Dr Higgs.

"If you think about your street, one in four houses, there'll be a family that suffers from asthma."

A chip that contains a nanosenor 100 million times more sensitive than a breathalyser is housed in an ordinary handset.

Each day, the patient breathes on the chip, which reads the gases in their breath, and sends the data to a healthcare professional for analysis. It is looking for nitric oxide, which is produced when the lungs are inflamed.

Once the analysis is complete the patient receives the results by text message - although they can choose email, a voice call or even messages through social media platforms such as Twitter and Facebook.

If there is a problem, the message may tell them to adjust their medication or visit their GP.

Dr Higgs says both patients and healthcare providers benefit.

"The aim is to give the patient a tool to more effectively manage their chronic condition, so this will minimise the number of times they visit their GP, hopefully minimise the number of times they become quite ill, and also of course the direct benefit of this is reduced visits to the healthcare practitioners, reduced costs and fewer expensive drugs."

The chip is being trialled, and Dr Higgs is working with companies and hospitals to bring the product to scale, and possibly use it for other diseases including lung cancer.

Medical phone apps, are also booming. James Sherwin Smith is the chief executive officer of non-profit organisation d4, which recently partnered with medical app store Happtique.

"MHealth is a huge enabler for technology and healthcare. What's important is to make it portable and available, at point of care if you're a health care professional, or at home if you're a patient."

Developing mobile medicine

Sophie Powell, the editor of the Mobile Healthcare Summit, says that in 2010, the global healthcare market was worth $50bn to $60bn (38bn to 48bn euros; £39bn-£32.5bn).

"Mobile health care is really starting to take traction and if you consider the high penetration of mobiles globally then they really are the future."

For the developing world, the implications of mobile healthcare are huge. In sub-Saharan Africa, 70% of people have a mobile phone.

Joel Selianko is a former Wall Street computer expert turned paediatrician and in 2004 he set up Datadyne with former Red Cross IT expert Rose Donna.

Their Episurveyor application enables public health data collection in developing world countries.

Initially the software worked on palm pilots, but Dr Selianko began to realise there was a more cost-effective option.

"I was thinking to myself how can we raise enough money to buy a palm pilot, and maybe a spare palm pilot, for every single health worker in sub-Saharan Africa.

"What saved me from going down that wrong path was slowly realising that every one of the workers I was looking at buying one for was increasingly likely to be walking around with a mobile phone on their hip."

Rather than software that needs to be installed, the Episurveyor app is available online. There are about 3,000 users in 150 countries.

"We put it online so there was no installation. We made it free so there was no barrier to adoption. And we made it simple - and this is super important - we made is so simple that no one needs to hire any consultants or programmers to operate it."

The charity Unicef also has a data collection app called Rapid SMS.

In Rwanda it has cut the death rate among pregnant women and babies by 50%, by offering access to emergency care.

Erica Kochi is co-lead at Unicef's New York-based Innovations Unit. The NGO is keen to partner with telecommunications companies to develop their offering.

"I think the mobile platform is incredibly important for the work of NGOs and development in general. It allows us to expand the reach of the programmes we have and create efficiencies within them."

David Bull, executive director of Unicef UK, is equally enthusiastic.

"We're able to raise money through text messaging, to spend saving children's lives and mothers lives through the application of text messaging. It's a fantastic virtuous circle."

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