A REAL-LIFE *STAR TREK* MEDICAL SCANNER

Everything is going digital, including healthcare. Artificial intelligence (AI) and robotics are trending just as much in the medical field as anywhere else – from the ubiquitous wearable health monitors to the more extraordinary robotic surgery. Now, take a giant leap into the future and meet the medical tricorder.

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The futuristic medical tricorder, the DxtER, is the result of extensive work done by some uber-smart engineers and doctors. The tricorder is based on the sci-fi device used by Dr McCoy in *Star Trek* to scan patients within the ship and beyond. The DxtER, however, is the *real* 'McCoy'. It has the multifunctionality of a Swiss Army knife, but is AI with a hyperdrive. No blood tests, X-rays, genetic sequencing or CAT scans required; the doctor can determine instantly if you have a common cold or even the Ebola virus.

The medical tricorder has been referred to as the 'democratisation' of medicine. Globally, access to proper healthcare is a problem, and service, efficiency and quality are out of reach of many of the people for whom the system is intended. A working tricorder could bring about a new era in medicine, especially in underdeveloped countries. When it comes to diseases like TB, malaria, and AIDS the application of smart technology is imperative. In fact, this year a cough-analysis app is being tested in Mozambique and could become the standard screening tool for TB across Africa and other developing countries.

Scientific breakthroughs like the medical tricorder don't happen overnight, however, and groups of scientists and engineers have been working for years to perfect it. Its development arose from a competition run by the non-profit Qualcomm XPRISE Foundation, which organises global contests to spark leaps in innovation. The final product was required to diagnose 13 medical conditions and monitor five vital signs.

Final Frontier Medical Devices, a team led by the founders of Basil Leaf Technologies, brothers Dr Basil Harris, an ER physician, and George Harris, a network engineer, were the overall winners. Their prototype, which earned them U$2.6 million from a total pot of U$10 million (the remainder will fund further research), can presently detect 34 conditions. However, Harris believes it will need to detect more than 100 conditions to be really useful.

So what can DxtER do? It currently detects conditions such as stroke, anaemia, diabetes, tuberculosis and hepatitis A. And, if your vital signs reach dangerous levels, a warning will be provided of the risk of an imminent stroke or heart attack. If you're the kind of person who keels over at the sight of blood or needles, the good news is that your glucose, haemoglobin and white blood cell count can be measured without drawing any blood. It's cheaper, more efficient and the results are instant.

The device's sensors are attached to your fingertips, and shine infrared light into your fingers to detect blood flow, white blood cell count and heart rate. The ECG function is through a sensor strapped to your side, with the data sent via Bluetooth to your smartphone. Future plans include condensing the tricorder into a smart watch.

With the years of research, the advanced technology, and the expense involved, one would expect such a watch to have the price tag of a Patek Philippe or Paul Newman Rolex, but Harris is targeting it at around $200.

As the great minds of the world collaborate to develop the closest thing to Star Trek's tricorder, they do all agree on one thing: it will never replace a doctor. But imagine being able to tell your patient, 'I have compared your bloodwork, checked your kidney, liver and heart functions and there is no sign of any cancer cells.' And do so instantly. It's efficient, accurate and productive.

And, aside from managing consultants' workloads better, tricorders could potentially make a much more significant contribution to medicine. Imagine an area – in rural Europe or Africa, for example – where population density is lower and medical care is less accessible, a tricorder at the local clinic could be used to quickly diagnose a condition and refer a patient.

The quartet of objectives for any successful innovative and disruptive medical innovation is that it has to work better for doctors, be easy for patients to use, produce better health outcomes and cost less than the current standard of care.

The tricorder of the future ticks all four boxes. ∎