

# DNA sequencing

By Pari Datta and Susan Watson

The publicly funded human genome project in 1990 cost \$3bn and took a decade to produce a rough draft sequence. Since then, new technologies have reduced both the time and cost of sequencing dramatically. By the end of 2010, industry experts predict it will be possible to obtain an individual's entire sequence for as little as \$500, a point at which it could become part of routine care. There is little dispute over its prospective value, the question is not so much if or when, but how and where will DNA sequencing and analysis be integrated into the professional and consumer healthcare market.

DNA profiling has already caused considerable public debate, despite it simply being a means of identifying an individual and not containing any real personal information. The issues raised by DNA sequencing and analysis are deeper and more complex. DNA sequences contain information about our genetic potential, our IQ, genetically-determined illnesses and personality traits. Therefore determining policy regarding security, ethics and legality concerning the storage and control of that data are paramount.

These issues aside, the use of genetic information has the potential to provide medical professionals and eventually individuals with an arsenal of life-impacting information. An example of a clinical

application is using genetics to enable drug treatments to be individualised, so called 'pharmacogenomics'. The influence of genetic make-up on the metabolism of drugs enables patients to be categorised; those who will respond to treatment, and those who will not, or more importantly, could suffer a life-threatening reaction. This is the key to personalised medicine and a long term healthcare goal; it ensures treatment is precise and adverse side effects are minimised. In the world of consumer healthcare, DNA sequencing could eventually lead to the ultimate personalisation of lifestyles, from diet modification to highly specific product selection based on genetics. For some consumers, such as the 'worried well', this information will signal empowerment, for others confusion.

In the future, DNA sequencing and genetic profiling is likely to have a far reaching impact on the healthcare system and its technology providers. If technology experts are correct – that cost will no longer be a barrier to uptake and the clinical value can be proven – the biggest questions arising are those relating to the impact on disease management and the integration into the healthcare system. These questions need to be tackled by key stakeholders now, enabling the outcomes to inform strategic planning and investment.

Healthcare providers need to understand how the standard of care could be changed for a disease and the subsequent impact on resources and infrastructure. The providers of technology must understand the risk of being disrupted if a disease is effectively managed through predictive or preventative medicine. Whilst routine clinical use of DNA sequencing and genetic profiling is probably still more than a decade away, the winners will be those who embrace the post-genomic future through strategic analysis and planning now.

Currently, Sagentia is closely watching the development of new genome technologies and the emerging business opportunities they present across the healthcare spectrum.

We have developed specific processes to analyse disease care pathways to identify the impact and likelihood of technology change on the current standards of care. We are also helping clients understand how technology can change the future landscape. Our projects are enabling clients to proactively plan for the future, enabling inclusion rather than exclusion when technology adoption occurs.

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