

# **WHAT WILL DOCTORS BE DOING BY 2050?**

## **FIVE BULLET POINTS TO SUMMARISE THE ESSAY**

- The overall theme of the essay is to argue that, in spite of great medical advancements, the actions of doctors will change relatively little by 2050.

- The overall theme is initially introduced by looking back over the last fifty years to get an insight into the rate of change in medicine and how this has influenced doctors.
- It is then explained that the likely developments in genetics will affect the scientific methods of doctors and give them more ethical issues to consider, but ultimately this will not affect the fundamental practises of a doctor.
- The rise of new technology and the implications it has on doctors is brought up, for example whether robotic surgery will replace the need for doctors in the operation theatre.
- Finally, the essay adopts a global perspective and attempts to predict what doctors will be doing in developing countries in 2050 by looking at issues like poverty and demographic changes.

### **WHAT WILL DOCTORS BE DOING BY 2050?**

Robots cutting with pin point accuracy; microscopic machines relaying information to beeping computers; digital signals filling the air. Is such a scenario science fiction or science fact? This futuristic description may evoke

images of Star Trek but it is likely to be the face of medicine by 2050. Although it seems light years away, we only have to look at the progress of medicine in the 20<sup>th</sup> Century to realise that, as technology improves, the role of doctors will evolve accordingly. This can be demonstrated by examining the predicted medical advancements in genetics, as well as by looking at technology aimed to cure illnesses caused by environmental influences. However, a sense of perspective is required for there are strong arguments that, in spite of medical development, the fundamental activities of doctors will remain the same by 2050. Furthermore, it is important to look at the role of doctors in both developed and developing countries.

In imagining what doctors will be doing in 50 years time my thoughts immediately turned to the situation in medicine 50 years ago. I wonder what would have happened in years gone by to my family members who have recently undergone heart bypasses, cataract surgery and hip replacements. Searching through the *Textbook of Medicine*<sup>1</sup>, published in 1950, for words like angioplasty, heart bypass, CAT scan and MMR would prove to be a futile task, for these words simply did not exist at the time. Just as the techniques of today have resulted in doctors having vastly different skills to the ones they had fifty years ago, the way in which doctors practise medicine by 2050 will have changed once again. Indeed, James Le Fanu's twelve definitive moments in modern medicine<sup>2</sup>, including open heart surgery in 1955 and the first 'test-tube' baby in 1978, are likely to be greatly overshadowed by the new technology currently offering so much promise to the medical world. As each new technique is unveiled, doctors will gradually move away from their old practises and adopt the improved methods into their daily routines.

Alongside terrorism, the Internet and David Beckham, the topic of genetics appears to dominate most conversations these days. There are scarcely enough bones in the body to count how many newspaper and magazine articles have begun: "Genetic Breakthrough In...". With its seemingly endless medical potential, genetics promises to revolutionise many of the tried and trusted methods of doctors by improving the detection and prevention of diseases, as well as treatments offered to patients.

It is easy to imagine that hot summer's morning in 2050 when the rings around our grandchild's eyes will be as black as coal. The sheer excitement will have kept them up all night and their anticipation won't relinquish until the postman finally delivers to them a CD which contains a copy of their entire genome<sup>3</sup>; from the very first base pair right up to the three billionth<sup>4</sup>. The significance of such an event transcends the feeling of Christmas having come twice, for possessing a copy of a patient's genome will allow doctors in 2050 to predict if people are likely to get any of the 5,000 known inherited illnesses such as Alzheimer's disease, breast cancer and heart disease. This will allow medicine to move from a "treatment-based to prevention-based discipline", as predicted by William Gilbert who is involved in the Human Genome Project.

Mapping genomes will clearly shape the daily routines of doctors who may end up spending less time in direct contact with patients and more time

determining what diseases they may inherit. However, despite this slight alteration to their current jobs, it will still be doctors who ultimately decide the best treatment for a patient in 2050. Currently, the vast majority of diagnoses are made by looking at a patient's history as this reveals their medical condition. Knowing a patient's genetic make-up will simply supplement this information enabling future doctors to make more accurate diagnoses.

Research into genetics promises to alter the treatments offered by doctors, with the main examples being gene therapy, pharmacogenetics and designer babies. Gene therapy operates on the simple principle that a genetic condition can be cured by replacing the defective, disease-causing gene with a normal copy of the gene. The activity which had been controlled by the defective gene would then be restored to normal and thus the effects of the disease are not expressed<sup>5</sup>. A common example is the use of the tumour-suppressor gene, p53, to arrest the reproduction and induce the suicide of cancerous cells<sup>6</sup>. The Chinese Government have already approved the manufacture of Gendicine<sup>7</sup>, which involves the use of a virus as a vector to integrate the p53 gene into a patient's genome. Pharmacogenetics, the study of how a person's genome affects the way they respond to different medicines<sup>8</sup>, and the demand for designer babies will also affect the actions of doctors.

There is little doubt that the promise of genetics will eventually come to fruition, though the debatable issues are centred around where this will leave doctors. By 2050 doctors will be using conventional treatments for diseases, like radiotherapy for cancer, far less because of the new techniques available to them. However, even if this leads to more patients recovering from diseases, there are still many potential pitfalls for doctors. Failures of gene therapy, for example the boys treated for X-SKID who unexpectedly developed leukaemia in 2003<sup>9</sup>, will pave the way for criticism of doctors because they will always be the ones controlling the new technology and making the critical decisions. As the genetics bandwagon rolls on, the jobs of doctors will become increasingly harder. Take for example the situation where a couple ask their doctor for an abortion simply because they discover their unborn child will not reach a certain height. This ethical dilemma is just one of hundreds that may arise. In the era when diseases were blamed on evil spirits<sup>10</sup>, doctors had to be as spiritual as they were scientific in their approach to medicine. Similarly, the doctors of 2050 may be forced to dedicate less time to actual biological matters, for ethical issues will begin to consume their time.

As long as people are overeating, getting overly-intoxicated and continuing other bad habits, environmental influences will still greatly affect medicine, which is why research into technology outside the realm of genetics is important. By 2050 microscopic machines will be flowing through our bodies and Erkki Ruoslahti, a professor involved in this development, believes such "nanodevices can potentially do more than current drugs and diagnostic tests". These microscopic machines will locate target cells, bind to them and then deliver genes or drugs<sup>11</sup>. Robotic surgery, as futuristic as it sounds, is likely to have a greater impact on medicine than even key-hole surgery because it will gradually reduce the need for humans in the operating theatre<sup>12</sup>. The logic behind such technology<sup>12</sup> is that robots have the potential

to perform operations with more precision and adaptability than even the best surgeon in the world.

There is clearly a strong argument here that the rise of such efficient and accurate equipment will force doctors into more passive roles. People will not accept conventional human medical care if superior methods exist. However, surgery is one of the few departments where machines will be able to overtake the tasks of doctors, and because of this doctors in 2050 will continue the fundamental work they have been doing for decades. Technological advancements can not solve every medical problem, contrary to popular belief. The French philosopher Voltaire stated that "The role of the physician is to entertain his patient while the nature takes its course". This illustrates the point that technology can not control everything in nature; for example it won't prevent footballers from breaking their legs and it won't stop their bones from healing in their own good time. Similarly, there are various tasks undertaken by doctors that even the most advanced computers will not be able to carry out. One such example is the fact when someone dies in hospital only a human doctor can exercise the compassion and tact needed to break the tragic news to friends and relatives.

Unsurprisingly, the paths of public health and the Internet have already crossed, with many websites promoting self-diagnosis. There are many ways this could take the burden off doctors as, in theory, fewer people will need to visit them. However, the notion of divulging the intimate details of our symptoms to anything other than a real person is as disconcerting as it is impractical because doctors understand human emotions and are empathetic to the needs of individuals. Consequently, as the majority of people would rather be diagnosed by a doctor than a computer, it is unlikely that the Internet will reduce much of the workload or pressure on doctors by 2050.

The provision of amenities, availability of housing and the access to education are just three indicators of the division between the rich and poor of this world. Quality of medical care is another such indicator, as is illustrated by the inequalities in medical aid received by people in developed and developing countries. Although more wealthy countries will benefit most from new developments in genetics and technology, it is just as important to consider what doctors in less developed countries will be doing by 2050.

In countries with extreme poverty the changes in medicine by 2050 will be so marginal that doctors will essentially be practising in the same way they do today. Such pessimism, however, does not apply to all developing countries especially as many have undergone radical medical advancements<sup>13</sup>. One theory suggests that these improvements will lead to developing countries following mortality patterns resembling those of the developed nations. With improved medical care, like vaccinations against malaria and polio, the biggest killers will no longer be contagious infections but cancers and cardiovascular diseases. Their future doctors will therefore practice medicine in similar ways to the Western doctors of today. Not only will techniques like heart bypasses, radiotherapy and chemotherapy become prominent, but

doctors will also begin to educate people about the benefits of leading healthier lifestyles.

As the demographics of a country change the impact on doctors is usually large. By 2050 improved medical aid in developing countries will cause a population explosion; characteristic of countries in stages 2 and 3 of the Demographic Transition Model. This leads to problems for doctors because insufficient supplies of food and basic amenities results in famine and the spread of diseases<sup>14</sup>. In developed countries better health care often leads to an ageing population which places a greater burden on doctors. Such a predicament will be worsened if the predictions of British scientist Aubrey de Grey are true<sup>15</sup>, for he claims doctors will be able to prevent the seven steps of ageing; leading to people living up to the age of 200 years<sup>16</sup>.

Hard work, delicate situations, split second decisions, working in a team. Maybe this is how the opening line of this essay should have read because it accurately describes what doctors will be doing in 2050. It is true that new technology will change the face of medicine but what lies beneath the surface of this is the fact that the fundamental practises of a doctor will always remain the same. This is not to say that the new scientific methods and medical advancements should be underestimated because in fifty years time doctors will be using new technology to the benefit of the patients. Furthermore, some technological developments, like those in robotic surgery, may actually replace the work usually done by doctors. However, such occurrences, will be few and far between. In the main, doctors will continue to act as the bridge that links society and science. The overriding and all-important point is that by 2050 no matter what technology or treatments are available to people across the world, it will always be the hand of a doctor that delivers it to them.

### **Bibliography**

---

<sup>1</sup> *Text Book Of Medicine*, Edited by Sir John Conybeare. Published by Livingstone Of Edinburgh 1950

- 
- <sup>2</sup> *The Rise & Fall Of Modern Medicine* by James Le Fanu. Published by Abacus Book 1999.
- <sup>3</sup> Website: <http://www.alternative-healthzine.com>. Issue , Article 1, July 2000.
- <sup>4</sup> Website: <http://library.thinkquest.org/28281/index2.htm>. Under section "Genetic Diseases".
- <sup>5</sup> Website: <http://library.thinkquest.org/28281/index2.htm>. Under section "Promise of Medicine".  
*DNA: The Secret Of Life* by James Watson. Published by Knopf 2003.
- <sup>6</sup> *Genome* by Matt Ridley. Published by Perennial, October 2000.
- <sup>7</sup> Website: [www.telegraph.co.uk](http://www.telegraph.co.uk). Article written by Adam Luck, entitled "Chinese gene therapy offers hope to terminally ill cancer patients". July 4<sup>th</sup> 2004.
- <sup>8</sup> <http://www.dartmouth.edu/~dmsheart/genetics/pharm/pharm.html>
- <sup>9</sup> *New Scientists* magazine. Article written by Shaoni Bhattacharya, entitled "Gene therapy to treat deadly cancer". June 2<sup>nd</sup> 2004.
- <sup>10</sup> Website: <http://library.thinkquest.org/28281/index2.htm>. Under section "Science in Medicine".
- <sup>11</sup> Website: <http://www.materialstoday.com/nanotoday/Ruoslahti.pdf>. Article written by Erkki Ruoslahti, entitled "The Future of Medicine". December 2003.
- <sup>12</sup> Website: <http://library.thinkquest.org/28281/index2.htm>. Under section "Robosurgery".
- <sup>13</sup> Website: <http://library.thinkquest.org/28281/index2.htm>. Under section "Fears of the Rich and Poor".
- <sup>14</sup> Website: [www.people.bath.ac.uk](http://www.people.bath.ac.uk)
- <sup>15</sup> *Time* magazine. Article written by David Stipp, entitled "This man would have you live a really, really, really, really long time". June 21<sup>st</sup> 2004.
- <sup>16</sup> *Sunday Times* newspaper. Article written by Roger Dobson and Nina Goswami, entitled "Soon they may live for 200 years". June 6<sup>th</sup> 2004.