

What will doctor's be doing by 2050?

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In this essay I intend to develop the following ideas:

- how technology will progress to assist and promote a doctor's work
- how traditional and modern medicine can be combined to provide the best possible treatment for all patients
- how advances in the developing world differ from those of the developed and how best to meet the developing world's needs

- how the face of epidemiology is changing and the consequential effects of this on doctors' work
- how organisation and doctors' roles in the health service may change.

The practice of medicine is rapidly developing almost from day-to-day, so it is impossible to accurately forecast what will transpire fifty years from now. To support this supposition, we must firstly glance at the dramatic changes that have revolutionised the practice of both medicine and surgery over the past fifty years. The Salk Polio Vaccine which has eradicated Polio and open-heart surgery which has cured tens of thousands of people are but two examples of these transformations. Today key-hole surgery commonly replaces invasive surgery. The first organ transplant was performed in 1970, whereas currently scientists are pioneering organ growth using stem cells. The discovery of Penicillin in 1928 and other antibiotics have treated millions of illnesses globally. The 1950's saw "Commando Surgery" as the primary treatment utilised in the fight against cancer but by the 1970's radiation and chemotherapy had been developed and progress in the latter continued throughout the eighties and nineties.

I believe that the future of medicine holds exceptionally exciting advances which appear to be inexhaustible. Innumerable changes to doctors' practices have occurred, so much so that procedures implemented in 1950 now appear barbaric to the 21st Century medic. So I muse, what will present techniques look like to the doctors and their beneficiaries of 2050?

Medical technology will inevitably continue to develop, becoming more essential to the habitual procedures of medicine. For instance, presently there are glimpses of electronic communication between doctors and patients which enable patients to be triaged via video screens. By 2050 doctors will utilise this technology on a daily basis, putting an end to the days of waiting room queues. This will also permit specialists from around the globe to treat patients irrespective of their location. This technology will promote the international exchange of ideas. For example, doctors on the other side of the world can partake in pioneering conferences and evaluate ground-breaking medicine and surgery as it occurs. I also anticipate that

everyone will receive routine full-body scans which will indicate any physiological problems allowing medical intervention to occur more quickly. In the future, any involvement is less likely to be a surgical one, as there is evidence to suggest this is declining in terms of incidence of surgical interventions. Key-hole and catheter surgery are already replacing invasive surgery and this will continue with the use of nanotechnology eventually eradicating the need for invasive procedures altogether before 2050. By this date, doctors' use of nanotechnology will be commonplace.

The genesis of nanotechnology dates back to Norio Taniguchi's work at the University of Tokyo in 1974. Albert Franks, an early promoter of the industrial applications of nanotechnology, defined it as "science and technology where dimensions and tolerances in the range of 0.1nm to 100nm play a critical role." (1992) Highly sophisticated and intelligent nano-scale computers will be extensively used for intricate procedures such as targeting specific tissues and cells, for example, destroying only oncocytes, bacteria, viruses or cholesterol or if there were a narrowing in a blood vessel deep within the brain, doctors could employ an excavating device inserted into the bloodstream to open the blockage. Although there are many ethical, social, legal, philosophical and political considerations to be made concerning the global implications of such technology being unregulated, nanotechnology will undoubtedly save millions of lives. There will be a virtual end to illness and ageing; doctors will treat cancer with an extremely high degree of success and heart attacks and strokes will be a rare occurrence.

Nanotechnology will be a useful mechanism available to doctors in order to remedy many ailments once they are identified, but much of the future of this identification lies in genetic and tissue manipulation. Simply by taking a blood sample, a person's entire DNA sequence will be mapped and any genetically predetermined diseases such as Cystic Fibrosis or diseases that have a genetic component such as diabetes, will be curable at source by altering genetic data within the body cells to prevent the disease burgeoning. Also, it may be evident that severe problems may arise in a particular organ further on in life. In this case stem cells may be employed to grow the particular organ to replace the damaged one, perfectly matching the original without the use of transplants from deceased donors.

In addition to pioneering technological advances, I believe that traditional holistic medicine will be fully integrated with modern medicine by 2050. The World Health Organisation (WHO) says "The philosophy of holistic medicine states that the

practitioner must use safe methods of diagnosis and treatment while emphasizing the care of the whole person, including the physical, mental, emotional and spiritual aspects.” (2000) “Complementary/Alternative Medicine (CAM)” is often the label applied to traditional medicine by modern medicinal practitioners, the implication being that modern medicine is the primary treatment source and holistic medicine an accessory therapy. Presently many doctors in the UK mirror this response as they may suggest patients receive traditional remedial healing such as acupuncture to complement drugs or surgery, but rarely advise traditional medicine as an alternative to allopathic care. Yet, globally this is not the case, as many western countries who previously rejected CAM are now embracing it as a valid and valuable tool. WHO (2002) estimates that 40% of all health care delivered in China and Hong Kong and 80% in Africa is Traditional Medicine and 75% of the population of France has received CAM at least once. It also estimates that the USA spent \$2700 million on CAM in 1997 and the annual Malaysian spending on CAM is \$500 million contrasted to merely \$300 million on Allopathic care. In 2000 the WHO launched a campaign called “Traditional and Modern Medicine: Harmonizing the two approaches”. This meeting encouraged evidence-based research using randomized control trials so that traditional medicine could be reliably integrated into mainstream western medicine.

Interestingly, medicine in the UK has moved full-circle, as merely two-hundred years ago traditional remedies were the singular form of medicinal treatment available. However, only twenty years ago it was often difficult to access such therapies as doubts were cast over their effectiveness and much of the public opted for state-of-the-art drugs and technology. More recently holistic medicine such as homeopathy, neurodevelopmental therapy, ayurvedic medicine and reflexology have significantly risen in popularity and by 2050 this will work in conjunction with modern medicine to provide the most effective healthcare service possible.

Traditional Medicine is customarily used in many developing countries as it is often cheaper and more accessible to many of the world’s population. For example, in Uganda the ratio of Traditional Medical Practitioners to population number is approximately 1:300, conversely the ratio of Allopathic Practitioners to population is 1:20,000. Often the geographic location of Allopathic Practitioners is uneven, usually being only situated in cities. This is problematic for the world’s most deprived people.

When developed countries contemplate medicinal advances it often overlooks the developing world. The pace of change in the latter is inevitably slower due to

financial constraints. However, I believe that by 2050 doctors in developing countries will be providing a similar treatment to that of the developed world. Although the research and preliminary stages of, for instance, nanotechnology may be costly in monetary terms, the continual application of many treatments is predicted to be relatively inexpensive. Consequently developing countries will reap the benefits of the research and production of nanotechnological devices from the developed world.

Although globalisation is often associated with corporate monopolisation and global consumption, it must be credited with providing opportunities within the field of medicine to share and cultivate pioneering practices and techniques which promote the convergence of medicine between developed and developing countries. I believe that Less Economically Developed Countries (LEDC's) and More Economically Developed Countries (MEDC's) will work in a mutual fashion to impart expertise in both traditional and modern medicine respectively which will ensure the global integration of these distinct practices.

Many LEDC's however, have numerous apprehensions that necessitate urgent attention, such as the AIDS pandemic that currently affects 35 million people worldwide, particularly in many Sub-Saharan states. It is fundamental to global health that funding is poured into vaccine distribution and research into infectious diseases. Many of these, for example Tuberculosis (TB) were epidemics in developed countries such as the USA in the previous century and there it was almost eradicated by the rigorous use of antibiotics. In 1900 85% of North Americans tested positive for TB exposure but by 1960 this fell dramatically to only 5% and is presently less than 0.5%. However between 1987 and 1993 the incidence of TB rose to 12%, and in San Antonio TB has risen in prevalence by 30% since 1984. (WHO, 2004) Many urban societies across the world have suffered in a less discernible but similar way, therefore it is essential to ensure new campaigns are devised to eradicate these diseases by systematic vaccination such as the BCG or formulation of new vaccines if one does not already exist.

Research into an AIDS and HIV vaccine is currently proceeding and by 2050 I speculate that a cure will be found. In the absence of increased precautions and intervention, it is approximated that by 2010 a supplementary 45 million people will be infected with HIV/AIDS. If safety measures are adopted it is estimated that 29 million of these occurrences could be averted. The application of a cure will

eventually halt the present AIDS pandemic, so it, in addition to many existing infectious diseases such as TB, measles, mumps and malaria, will be eradicated.

Inevitably as diseases are eradicated new diseases will occur in their stead. Recently SARS (Severe Acute Respiratory Syndrome) was demonstrative of this. Prior to 1998 it was unheard of, yet in 2003 there was a pandemic that concerned the world.

By 2050 the entire face of endemics, epidemics and pandemics will have transformed. New diseases will arise, particularly those that impinge on the extremities of the age spectra of the population due to the simultaneous increase in life span and increases in premature births. Current specialised technology has enabled babies as premature as 24 weeks to survive outside the womb. By 2050 what will doctors accept as the age of foetal viability and how near to conception will the embryo be able to survive with the aid of technology? These questions along with their answers will create a new, highly specialised occupation for doctors.

Presently, premature babies are susceptible to many medical complications which in turn give rise to an augmented prospect of disease. At the opposite end of the age spectrum, the boundaries of life expectancy will continue to increase. In 1901 the average life expectancy of women in the UK was 49 years, whereas in 2002 it rose to 81 years. The furtherance of this trend amplifies the prevalence of degenerative diseases such as osteoarthritis and in particular mental illnesses, for instance Alzheimers. However, it is possible that cryogenics could circumvent the onset of such diseases, as it attempts to postpone individuals' exit from life until a cure has been found. As the population continues to age, doctors of the future will be spending more time renewing body parts and attending to cosmetic needs.

Continual advances have transpired in every field of medicine bar one; mental health issues. These will become an increasing component of a doctor's work load as the population ages and the stresses of western life increases. In addition the entire structure of the health service may change as many people opt for private healthcare. However, I believe that by 2050 Britain will still be predominantly serviced by state run health care but dramatic changes will occur in its administration infrastructure. Downsizing and redistribution is already predominant in general practice with "out of hours" care, underscoring the initiative that doctors head a team consisting of district nurses, paramedics and social services. The redeployment and organization of doctors and PAMs (Professionals Allied to Medicine) such as physiotherapists and nurses,

will allow some pressure to be removed from doctors as other professionals assume a number of their responsibilities. This will prove to be a cost-cutting yet effective way for the health service to continue, and any savings made will be redirected to subsidize research into many of the areas I have previously mentioned.

The advances I have predicted will improve global health and the period ahead will see vast modifications for doctors. I foresee that future doctors will play a greater precautionary and preventative role in medicine, but irrespective of their position, they will remain at the vanguard of exciting developments within the medical field. Consequently, it is necessary for doctors to be flexible and accommodating and to embrace this inspiring episode of progress.

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