

## Debate & Analysis

# RCGP William Pickles Lecture 2019:

Training tomorrow's doctors, 1851–2051



While researching William Pickles, famous for his 1939 book on epidemiology and for being the first president of the RCGP, I came across his article 'Trends of general practice: a hundred years in a Yorkshire dale' published in the *Practitioner*, 1951.<sup>1</sup> I thought it might be of interest to look at changes in medical education over those 100 years and, potentially, the subsequent 100 years.

### MEDICAL EDUCATION IN 1851

In 1851, medical education in the UK was in a mess. The training of a practitioner in Britain in 1850 could vary from university study, to a series of courses in a provincial hospital, to broom-and-apron apprenticeship in an apothecary's shop. The Victorian public were confused as to who was a doctor, a general practitioner (the term 'general practitioner' was unknown before 1800 but was firmly established by 1840), a physician, a surgeon, a barber surgeon, an apothecary, a druggist, or a snake oil merchant! The competing tensions between these conflicting practitioners are vividly drawn out in George Eliot's novel *Middlemarch*, set in 1832. Dr Tertius Lydgate, who has radical ideas about infectious diseases from his overseas education, manages to fall out with both the local practitioners and the physicians brought from London.

It took 16 bills and two select committees over 18 years for the 1858 Medical Act to be passed. Lord Cohen, writing in the *BMJ* in 1968, said that the 1858 act was the 'pivotal event in the history of medical education in Great Britain and Ireland'.<sup>2</sup> The act

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enabled the public to distinguish between qualified and unqualified practitioners, and every organisation that granted medical qualifications was represented on the new General Medical Council.

### MEDICAL EDUCATION, 1851–1951

Dr Pickles entered practice in Wensleydale in 1913 and practised there for 50 years. His 1951 article hints at the very comprehensive medical education two of his predecessors must have had:

*'Dr Alfred Baker [practising 1873–1903] had been taught good sound stuff at Mary's. He could set a broken limb with anybody. Now, a German [Roentgen] had invented a machine by which you could actually look through the flesh and see the bones.'*<sup>1</sup>

Working alongside a surgeon from Leeds:

*'with only a paraffin lamp for light and the kitchen table to operate on, the vermiform appendix was removed and the lad was now back at work.'*

*'Dr Edward Hime [practising 1903–1913] had imbibed much from his predecessor Dr Baker in their few years together and was a sound obstetrician. He was a useful surgeon, knowing his limitations, and he appears to have been a fine physician.'*<sup>1</sup>

Of his own period of practice 1913–1964, Pickles wrote:

*'The marvels of insulin brought us fresh hope and many a young life was snatched away from an early grave. It is not proposed to review in detail the romantic period of wonder drugs, beginning not so very long ago with the early sulphonamides. Suffice it to say that taking only acute lobar pneumonia as an instance, its terrors have departed.'*<sup>1</sup>

### THE 20TH-CENTURY REVOLUTION IN UK MEDICAL EDUCATION

Abraham Flexner had founded a boys' school and had radical ideas about education. He was invited by the Carnegie Foundation to review medical education in North America and his report published in 1910 called on American medical schools to incorporate the many advances in mainstream science over the 19th century into their teaching and research.<sup>3</sup> Many American medical schools fell short and nearly half of such schools merged or were closed outright.

This led to an invitation to Flexner to give evidence to the Haldane Commission into Medical Education in London, which published in 1913.<sup>4</sup> Haldane was a barrister, Liberal politician, and Lord Chancellor. Although he confined himself to the 12 London medical schools, this was in the context of only seven other clinical schools in England. Because of the intervention of the Great War, the reforms advocated by Haldane were not realised until much later in the UK.

Sir William Goodenough was a banker and it was his report of 1944 that led to a substantial overhaul of undergraduate training. Many of his recommendations still resonate today.<sup>5</sup> Students were to be properly trained to practise as family doctors. More attention should be paid to social medicine, the promotion of health, and prevention of disease. In modern parlance, children's and mental health should have parity of esteem. There should be co-educational medical schools, sex equality in hospital appointments, and compulsory hospital appointments after qualification before practising independently.

Two additional factors gave the Goodenough Report teeth. First, there were greatly increased exchequer grants for medical education and research. He who pays the piper calls the tune. Second, William Beveridge had published *Social Insurance and Allied Services* in 1942<sup>6</sup> and, with the foundation of a National Health

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Service in 1948, all clinical training was now conducted in government-funded public hospitals rather than autonomous, private institutions. Beveridge studied mathematics and classics, became a lawyer, and then an economist. None of these four giants of health reform were medically qualified.

The pre-registration year that Goodenough had alluded to was introduced from 1953 (Medical Act 1950) and followed by vocational training for GPs (NHS Vocational Training Act 1976). New medical schools sprang up from 1970 onwards and with them new educational initiatives such as Problem-Based Learning, Graduate Entry Medicine, increased recognition of primary care for undergraduates, and formalisation of postgraduate training.

### TRAINING DOCTORS FOR 2051?

Among the potential influencers that will drive change in how we train doctors will be changes in the population and in disease patterns. There will also be technological changes and I want to focus on these because if we believed everything in the popular press, doctors are soon to be replaced by robots and artificial intelligence (AI). I took a year out of medical school in 1979 to study computing and we have seen an amazing digital revolution since then. In the UK, 80% of adults own a smartphone and 89% of UK adults use the internet at least weekly. Changes like these will indeed have an impact on how medicine will be practised in the future.

Medical education for doctors practising in 2051 (that is, those at university now) will also need to embrace advances in genomics, big data, artificial intelligence, machine learning, robotics, and online medicine. The 100 000 Genomes Project is already making medicine more predictive, preventive, personalised, and participatory. This project has not only increased the diagnostic yield for 7000 rare diseases but also predicts risk of bowel and breast cancer predisposition. In principle, antisense oligonucleotides may alter the natural history of muscular dystrophy. Treatment of cystic fibrosis depends on which gene mutation is responsible.

Fifty petabytes of NHS data are currently stored in the UK (one petabyte of music would take 2000 years to play on an MP3 player) and 90% of the world's stored data was generated in the last 2 years. Each optical coherence tomogram has 65 million datapoints and 10 times the resolution of an MRI scan. It is hardly surprising then that AI is as accurate and many times faster at reading scans like this than expert clinicians. But AI has made a much greater impact on image pattern recognition than on diagnosis.

William Osler taught that history is 95% of the diagnosis and to *'listen to the patient, they are telling you the diagnosis'*. While services like 111 do rely on algorithms, these are written and interpreted by humans. Eric Topol published a report for the Department of Health on the rise of digital technology,<sup>7</sup> arguing that automation of diagnosis will mean that routine care will no longer need a doctor at all as nurses or even receptionists equipped with computers can do just as well. However, although it is straightforward for 'Dr Google' to diagnose that a child with developmental delay and who is always smiling and waving their hands has Angelman's syndrome, it is much harder to recognise that the carer of a baby not wearing socks in November may have depression. Doctors are more aware than before that health is a *'state of complete physical, mental and social wellbeing, not just the absence of disease or infirmity'*.<sup>8</sup>

Likewise the impact of robotics to date is often overstated. *The Times* headline in the wake of the Topol Report in February 2019 was *'Robots to hasten the demise of grumpy doctors'*.<sup>9</sup> A robot is defined as a machine capable of carrying out a complex series of actions automatically, meaning it acts instead of a person. The most famous surgical robot, the da Vinci Surgical System, still requires a surgeon to drive it.

Predicting the future is difficult but I suspect that technology will help more with the drudgery (for example, triage of scans, semi-automated reporting, quality assurance) than with face-to-face consultations. For thousands of years, humans in distress have turned to other humans for solace — priests and shamans in ancient cultures and latterly

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doctors and other health professionals. We are heading for a global workforce crisis in health care. It is estimated that the world will need an extra 18 million health workers by 2030 as the population grows and ages. Telemedicine, 'digital first', AI, and robotics can mitigate this workforce deficit but I don't think human doctors and nurses will be redundant any time soon!

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### Provenance

Freely submitted; not externally peer reviewed.

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