Revolution or evolution? Putting the Flexner Report in context

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On 11 June 1910, an editorial in the Journal of the American Medical Association (JAMA) announced to those who had ‘been awaiting with eager interest’ that the Carnegie Foundation for the Advancement of Teaching had released its report on the status of medical education in the USA and Canada. The editorial suggested ‘that the Carnegie Foundation is in a position in which it may exert a powerful and growing influence for good on the development of medical education in this country’.1

One century later, the powerful influence of the Carnegie Foundation’s Bulletin Number Four – Medical Education in the United States and Canada2 is plain to see. Better known simply as the Flexner Report after its principal author, Abraham Flexner, the report ‘led to a revised model of education, the broad outlines of which are still in evidence’, as summarised in 2009 by Jordan Cohen, former president of the Association of American Medical Colleges (AAMC).3

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As part of the centenary celebration of the Report, authors in this edition of the journal describe changes taking place today in certain core aspects of medical education. These changes have been evolving over a period of years and will continue to do so in coming years. The publication of the Flexner Report is often seen as having instigated a fundamental revolution in medical education and medical practice in the USA and Canada. Do today’s evolutionary changes fundamentally differ from the changes attributed to the Flexner Report?

Examination of events preceding publication of the Report suggests that, rather than having triggered a revolution in medical education, the Report was instead part of a broader transition that had evolved over a period of decades, analogous to the transition we are experiencing today.

The transition of which the Flexner Report was a part is described metaphorically in Sinclair Lewis’ Nobel Prize-winning novel Arrow-smith.4 At the beginning of the story, Lewis introduces us to the medicine of the past in the person of Doc Vickerson:

‘A fat old man and dirty and unvirtuous was the Doc; his grammar was doubtful, his vocabulary alarming, and his references to his rival, good Dr Needham, were scandalous…’

The year was 1897. After an all-night vigil at the bedside of a dying woman he has been powerless to help, the Doc gets a bit drunk. He turns to his 14-year-old helper Martin Arrowsmith and advises:

‘You may become a great doctor…set a high goal. Don’t let things slide. Get training. Go to college before medical school…Training, that’s what you got t’ get. Fundamentals. Know chemistry. Biology. I nev’ did… don’t be a booze-hoister like me…get your basic science.’

The next time we see Martin, he is in college:

‘In 1904, Martin Arrowsmith was an Arts and Sciences Junior preparing for medical school… Doc Vickerson was dead and buried and forgotten; Martin’s father and mother were dead, leaving him only enough money for his arts and medical courses. The purpose of life was chemistry and physics and the prospect of biology next year.’

Investing heavily in the study of science, Martin comes to embody the new medicine, the medicine of science, a profession grounded in a rigorous, university-based education. Under the guidance of a German scientist, Dr Max Gottlieb, Martin becomes a bacteriologist and eventually discovers a cure for plague. As portrayed by Lewis, Martin represents the transition of medicine from the incompetence of Doc Vickerson to a profession grounded in the study of science.

The Flexner Report was part of a broader transition in medical education that had evolved over a period of decades prior to its release.

We often attribute the origins of this transition to the work of
Abraham Flexner. However, the view through a broader historical lens suggests otherwise. As Doc Vickerson’s comments from 1897 suggest, the transition for which Flexner called in his Report was already well underway before Flexner ever became involved in it.

In the 1870s a fundamental shift had begun to take place in how medical education was perceived in the USA. This shift was initiated by educators who, after graduating from American universities, had travelled to Europe to extend their study of science, often under the guidance of scientists from Germany. Two of the most influential of these were Charles Eliot of Harvard and Daniel Coit Gilman of Yale. Both were to come to lead major universities, Eliot as president of Harvard and Gilman as the first president of Johns Hopkins University. As university presidents, each used his influence to shift medical education at his institution towards the German model, which combined a rigorous preparation in the sciences with subsequent clinical training. By the 1890s, a number of other leading universities, including the Universities of Michigan, Pennsylvania and California, had adopted education models similar to that advocated by Eliot and Gilman.

Beyond the historical transition taking place in US medical education, a parallel shift was occurring among the institutions responsible for setting the standards of medical education in the USA. This transformation began in 1876 with the founding of two new organisations devoted to the reform of medical education: the American Medical College Association (in 1890 renamed the AAMC) and the American Academy of Medicine (AAM). In the early 1890s, these two organisations began to hold joint meetings, and in 1893 the Bulletin of the AAM became the official publication of the AAMC.5

By the 1890s, a number of leading universities in the USA had adopted education models similar to that Flexner would propose in 1910.

By 1894 the constitutions of both organisations had specified that medical education must include a minimum of 4 years of study, the first year of which should cover the introductory sciences of chemistry, biology and physics.6,7 During the 1890s, the AAM and the AAMC collaborated actively with the National Confederation of State Medical Examining and Licensing Boards (NCSMELB) in an effort to get the medical education standards adopted by both organisations enacted into the medical licensure laws of the various states. This collaboration had substantial success, as illustrated by the enactment in 1901 of a new law in California that specified that no doctor could be granted a licence to practise medicine unless he possessed ‘a diploma issued by some legally chartered medical school, the requirements of which medical school shall have been at the time of granting such diploma, in no particular less than those prescribed by the Association of American Medical Colleges for that year’.8

At its annual meeting in April 1905 in Chicago, the AAMC adopted as a minimum standard of medical education a 4-year curriculum, the first 2 years of which were to be spent in laboratory-based science instruction and the final 2 years spent in a clinical setting, the minimum entrance requirement was 1 year of college-based study of chemistry, biology and physics.9 At that same meeting, the NCSMELB announced that it had adopted the AAMC’s standard as the minimum basis for granting licences for the practice of medicine, although not all states had passed laws enacting that standard.10 (Note that this 1905 standard is the same standard Flexner used in 1910 to evaluate medical schools.)

In the early 1900s, the American Medical Association (AMA) was to join the AAMC in its efforts to reform medical education through both the power of persuasion and the force of law. In 1901 the AMA underwent a fundamental reorganisation involving the creation of its House of Delegates and Board of Trustees. One of the first actions of the Trustees was to establish a committee on medical education, chaired by Dr Arthur D Bevan of Chicago. By 1904 Bevan’s committee had recommended to the House of Delegates that it establish a Council on Medical Education (CME) ‘to act as the agent of the American Medical Association’ in the area of medical education.11 At its meeting that year, the AMA’s House of Delegates approved Bevan’s recommendation and appointed him chair.12 The close collaboration between the AMA and the AAMC is reflected in the fact that, of the other four members of the CME, one (Victor C Vaughan) had been president of the AAMC in 1902 and one (John A Witherspoon) would become its president in 1910.

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Ten days after the AAMC’s 1905 meeting, the CME held its first national conference, also in Chicago. Representatives of the AAMC and the NCSMELB were in attendance. As chairman of the CME, Arthur Bevan recommended that the AMA adopt the same standard of medical and pre-medical education that had just been
enacted by the AAMC and the NCSMELB. At its own meeting 3 months later, the AMA House of Delegates approved the adoption of that standard and set 1 January 1908 as the target date for gaining broader national adherence to the new standard.

At its meeting in 1905, the AMA also authorised the CME to conduct a national study of medical schools to determine the extent to which schools were meeting the new standard. Led by N P Colwell, the CME conducted its study tour in 1906. In 1907 the CME reported the findings from that study, determining that of the 160 medical schools Colwell had visited, only 82 (51%) were rated as ‘acceptable’. However, the AMA’s report gained relatively little national attention and accomplished little towards its goal of closing down medical schools that failed to meet the new national standard set by the AMA and the AAMC. Speaking in 1928, Bevan described the current strategy of the CME: ‘...it occurred to some of the members of the Council that, if we could obtain the publication and approval of our work by the Carnegie Foundation for the Advancement of Teaching, it would assist materially in securing the results we were attempting to bring about. With this in mind we approached President Henry S Pritchett of the Carnegie Foundation, presented to him the evidence we had accumulated and asked him to make it the subject of a special report on medical education by the Carnegie Foundation. He enthusiastically agreed to this proposition.’

With no prior experience in medical education, Flexner chose first to travel to Chicago ‘for two reasons: first, to confer on the general situation in medical education with Dr George Simmons, secretary of the American Medical Association...; second, to read the reports prepared for the Council on Medical Education of the association by Dr N P Colwell’. He then travelled to Baltimore to learn more about the approach to medical education initially proposed by Daniel Coit Gilman and subsequently adopted by Johns Hopkins University.

Now thoroughly familiar with the methodology and results of the 1906 CME study and with the model of medical education promulgated by Johns Hopkins and the AAMC, Flexner began what he described as ‘a swift tour of medical schools in the USA and Canada – 155 in number, every one of which I visited’. In his autobiography Flexner described how he conducted his inspections: ‘In half an hour or less I could sample the credentials of the students... A single question elicited the income of the medical school... A stroll through the laboratories disclosed the presence or absence of apparatus, museum specimens, library, and students... Finally, the situation as respects clinical facilities was readily clarified by a few questions... In the course of a few hours a reliable estimate could be made respecting the possibilities of teaching modern medicine in almost any one of the 155 schools I visited...’

Flexner was not alone on his tour, however. The same 1910 issue of JAMA that reported the release of the Flexner Report also reported on the address given to the AMA House of Delegates 5 days earlier by Dr Arthur Bevan, chair of the CME. The CME had decided to replicate its 1906 study by having Colwell accompany Flexner on his visits to the various medical schools.

In 1905, the year the AAMC and CME adopted their standards for medical education, Flexner was a high school teacher in Kentucky.

In 1907 the CME reported its finding that, of the 160 medical schools visited, only 82 were rated as ‘acceptable’
By conducting their inspection tours jointly, the Carnegie Foundation and the CME were acting in close collaboration in their efforts to publicise the weaknesses inherent in medical education in many parts of the country. Flexner had developed his own methodology based on that used by Colwell and had ample opportunity to compare notes with Colwell on the strengths and weaknesses of the various schools they inspected together.

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The CME’s inspections of 1906 and Flexner’s 1909 inspections used nearly identical criteria in evaluating the medical schools inspected, including: entrance requirements; teaching staff; financial background, and learning and medical facilities (for further details, see Table S1). Not surprisingly, the two studies came up with nearly identical results. Of the 160 schools inspected by the CME in 1906, 81 (51%) were deemed to be ‘acceptable’. Flexner provided only a qualitative description of the schools he inspected, without assigning schools to a specific quality category. However, a careful reading of those descriptions suggests that he found 69 of the 155 schools he inspected (45%) to be of acceptable quality. (The CME never published its results for individual schools, so it is not possible to make a school-by-school comparison of its evaluations with those of Flexner.)

By his use of the previous work of the CME and the AAMC to develop his perspective on medical education, by his adoption of evaluation criteria similar to those used by the CME, by his decision to conduct his study tour in the company of N P Colwell of the CME, and by his scheduling the release of his report to occur simultaneously with that of the CME’s follow-up report, it should be apparent that Flexner’s study broke little new ground. Rather, it rode the momentum that had been created in the years leading up to it. As Ludmerer wrote: ‘There comes a point in any successful movement when it is certain that the movement will achieve its goals. In medical education, that point was reached around 1905. The final steps after 1910 would have occurred without the Flexner Report, although probably not as dramatically or as suddenly... Although the report was not original... it had a galvanising effect on public sentiment, making the achievement of the ideal much more attainable.’

For both Henry Pritchett of the Carnegie Foundation and the CME, the Flexner Report was intended to enhance the perceived validity of the reforms previously proposed by the AMA and the AAMC. Although politicians and the general public might pay relatively little attention to a report compiled by one group of doctors criticising other doctors and their medical schools, a report by an organisation as prestigious and seemingly unbiased as the Carnegie Foundation could be expected to have substantially greater impact nationally.

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Just how powerful an impact the Carnegie Foundation’s report had is reflected in a New York Times story from 24 July 1910, with full-page headlines announcing ‘Factories for the Making of Ignorant Doctors’ and reporting that ‘The Carnegie Foundation for the Advancement of Teaching has undertaken the gigantic task of reconstructing the education systems of the United States and Canada’. The story reported the recent release of the Foundation’s Report and quoted extensively from Pritchett’s introduction to it. Nowhere did the story mention the CME’s role in developing the Report.

From that point on, the Flexner Report became a focus of a vibrant and ongoing discussion of the need to reform medical education in the USA. By 1913 the Carnegie Foundation had committed millions of dollars to ‘a crusade against the worthless medical schools throughout the country’. By that time the General Education Board, a philanthropic organisation established by John D Rockefeller in support of broad educational goals, had also begun to commit millions of dollars in support of efforts to reform medical education along the lines recommended by the Flexner Report. The efforts of these foundations, in close collaboration with the AMA, the AAMC and state medical licensing boards, were strikingly successful. The number of medical schools in the USA decreased from more than 160 in 1910 to 85 in 1920.

As the author of the Carnegie Foundation’s Report, Flexner received substantial personal credit for helping to bring this change about. The headline of a 1928 New York Times story hailed Flexner as ‘An Educational Knight Errant’ and his 1910 report ‘as one of the paramount influences of that period of reform in medical education’.23
In June 2010 we celebrated the centennial of the release of Bulletin Number Four, and we continue to benefit from the powerful transition in medical education of which it was an important part. That the Flexner Report also reflected earlier efforts of the AAM, the AAMC and the AMA, that the inspection tour leading to the Report replicated an earlier study conducted by the CME, and that Flexner’s own tour was conducted in close collaboration with the CME are often forgotten. Abraham Flexner deserves recognition for the years he dedicated to the process of education reform. It is important, though, to appreciate that he was only one part of a broad transition in medical education that took place over the span of several decades.

At the centenary of the issuance of the Flexner Report, we find ourselves in the midst of another transition in medical education that is equally broad. Just as the education available to Doc Vickerson and his 19th century colleagues was no longer appropriate for medical students at the opening of the 20th century, the education model promulgated by Flexner and his predecessors is becoming increasingly inappropriate for those training as doctors for the 21st century. Several papers in this centenary issue address how we need to adapt medical education to the changing nature of medical practice.

Westerman and Teunissen describe how the highly structured medical curriculum called for by Flexner, in which students spend 2 years in laboratory-based study of science before transitioning to 2 years of clinical training, is undergoing fundamental reassessment and revision. They propose that we instead view medical education as a continuum, and that we extend our study of this continuum to include graduate specialty training and the transition to independent clinical practice. By gaining a better understanding of the psychological aspects as well as the educational aspects of this continuum, we can better prepare doctors for their professional role.

Similarly, Holmboe et al. describe how the traditional fragmentation of clinical instruction into discrete, time-delimited, discipline-specific rotations reflects a view of medical science consistent with the views of Flexner, but inappropriate for contemporary clinical practice. These authors propose that we shift clinical education to a model that integrates disciplines and focuses on team-based learning “so that health care professionals can come to a better understanding of their interdependence.”

Problem-based learning and the integration of pre-clinical and clinical education are evolving as new models for medical education. Social and behavioural sciences are supplementing the natural sciences in laying down a foundation for clinical knowledge. As Karen Mann suggests, rather than simply teaching science, ‘medical education has emerged as a complex transformative process of socialisation into the culture and profession of medicine.’ Medical education is in the process of transitioning into the new century, in much the same way as it did in the opening years of the last century.

The evolution in medical education that began in the late 19th century was clearly strengthened by the publication of the Flexner Report and the attention it generated. An important lesson we can draw today from the success of the Report is that today’s process of reform in medical education will be strengthened and hastened by broader public awareness and support. Just as Flexner’s Report and the reports of the CME provided crucial momentum to the process of change, the innovations in medical education described in this centenary edition will augment the momentum of and support for the ongoing transition of medical education into the 21st century. No doubt Doc Vickerson would have been proud.

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SUPPORTING INFORMATION

Additional Supporting Information may be found in the online version of this article at http://online library.wiley.com/doi/10.1111/j.1365-2923.2010.03850.x/suppinfo.

Table S1. Comparing the inspection criteria used by the Flexner Report of 1910 with those used in the 1907 Report of the Council on Medical Education.

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Medical education in the 21st century: what would Flexner ask?

Vanessa C Burch

The last comprehensive review of medical education in North America was undertaken by Abraham Flexner 100 years ago.1 Since then, the world has changed dramatically and the need to revisit medical education on a global scale in the 21st century has become apparent. In order to place the medical education priorities of this century in perspective, it is essential to review current global health care needs. The World Health Organization (WHO) estimates a current global shortage of 4.3 million health care workers. Developing countries have the greatest need and sub-Saharan Africa is the world region worst affected.2 It is estimated that Africa will need 167 000 additional doctors by 2015,3 the target date for achieving the Millennium Development Goals.

Not only is there a critical shortage of health care workers in low-income states, but the wealthiest nations of the world derive up to a quarter of their health care workforce from these countries.4 More than 50% of African-born doctors from certain countries (e.g. Mozambique, Angola, Tanzania, Zambia, Ghana, Kenya) currently work abroad5 and almost one in 10 doctors working in the UK are from Africa.6 The impact of the brain

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The World Health Organization estimates a current global shortage of 4.3 million health care workers

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