Some reflections on Medical Education

Peter Lachmann
The founders of Western Medicine

Aesclapius

Hippocrates (460–377 BC)

Galen (c.130 – 200 AD)
Aesculapian snake, *Zamenis longissimus*
• *I SWEAR by Apollo the physician and Aesculapius, and Hygiea, and Panacea, and all the gods and goddesses, that, according to my ability and judgment, I will keep this Oath and this stipulation-- to reckon him who taught me this Art equally dear to me as my parents, to share my substance with him, and relieve his necessities if required; to look upon his offspring in the same footing as my own brothers, and to teach them this art, if they shall wish to learn it, without fee or stipulation; and that by precept, lecture, and every other mode of instruction, I will impart a knowledge of the Art to my own sons, and those of my teachers, and to disciples bound by a stipulation and oath according to the law of medicine, but to none others*

(from the Hippocratic Oath)

**Medicine remained, substantially, a sacred mystery until the internet age. The consequences of the general availability of medical knowledge – not all accurate – will have a growing impact on medical education**
The four humours
imbalance of which is the cause of disease

<table>
<thead>
<tr>
<th>Humour</th>
<th>Season</th>
<th>Element</th>
<th>Organ</th>
<th>Qualities</th>
<th>Ancient name</th>
<th>Modern</th>
<th>Ancient characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood</td>
<td>spring</td>
<td>air</td>
<td>liver</td>
<td>warm &amp; moist</td>
<td>sanguine</td>
<td>artisan</td>
<td>courageous, hopeful, amorous</td>
</tr>
<tr>
<td>Yellow bile</td>
<td>summer</td>
<td>fire</td>
<td>spleen</td>
<td>warm &amp; dry</td>
<td>choleric</td>
<td>idealist</td>
<td>easily angered, bad tempered</td>
</tr>
<tr>
<td>Black bile</td>
<td>autumn</td>
<td>earth</td>
<td>gall bladder</td>
<td>cold &amp; dry</td>
<td>melancholic</td>
<td>guardian</td>
<td>despondent, sleepless, irritable</td>
</tr>
<tr>
<td>Phlegm</td>
<td>winter</td>
<td>water</td>
<td>brain/lungs</td>
<td>cold &amp; moist</td>
<td>phlegmatic</td>
<td>rational</td>
<td>calm, unemotional</td>
</tr>
</tbody>
</table>

- Galen c. 130 AD
- **The Four Humours:**
  Sanguine (air) hot/moist
  Melancholic (earth) cold/dry
  Phlegmatic (water) cold/moist
  Choleric (fire) hot/dry
- Disease due to imbalance between humours
- Drugs used to restore balance
- Bleeding, cupping, purging and blistering used for same purpose
- Treatments can be harmful

- Samuel Hahnemann 1810
- **The Law of Likes** - drugs that produce a symptom at high doses will cure the same symptom at very low doses
- All diseases respond to this law
- Uses dilutions beyond Avogadro’s number; i.e diluent only given
- Treatments are harmless
- Effects due to placebo effect

Rational medicine developed only after the European Enlightenment and the growth of natural science
“Science is the great antidote to the poison of enthusiasm and superstition”

Adam Smith *The Wealth of Nations*, 1776
What is Rational Medicine

- Rational medicine aspires to be based \textit{(in so far as it is possible)} on knowledge of normal and abnormal structure and function.
- It is rooted in biological science and, in particular, in “pathology” – the study of disease processes.
- Rational medicine learns from its mistakes and is responsive to new science and to empirical data.
- Teaching rational medicine therefore evolves over time and should avoid being dogmatic.
The Achievements of Rational Medicine

• Public Health – reversing the damage done by the agricultural revolution of 10,000 years ago
• Vaccination
• Diagnosis by Imaging
• Diagnosis by Clinical Pathology
• Many more effective drugs
• Anaesthesia and Surgery
The Consequences of Rational Medicine

• The “squaring off” of the death curve – death from natural causes has become uncommon between the ages of 1 and 60 in the developed world. Life is healthier and disability is less

• ‘The Mirage of Health’ (Dubos) – it is unreasonable to expect total good health till the very end of life

• Medical Emphasis has moved more towards the care of the diseases of older age
Figure 1.6. Pattern of survival in seventeenth-century Breslau (which may have been typical for the times), nineteenth-century Liverpool which had the lowest survival for any city in nineteenth-century England (from Farr; see note 30), compared to that in modern England (or any other modern Western nation).
Medical Students need both Education and Training

- Education has no end product in mind. It is divergent

- Training has an end product in mind. It is convergent

- While Education and Training overlap in practice the difference is nevertheless fundamental
What does medical education aim at?

- Basic level of understanding of normal and abnormal human structure and function. (Everyone needs this)
- Detailed knowledge of (e.g) genetics and molecular biology, biochemistry, microbiology, immunology, neurosciences, bioinformatics, engineering and medical physics, moral philosophy............
- These cannot all be taught to every student; they are taught to the population of medical students who choose their own special subject.
- There is great merit in following one subject to the limits of knowledge. That illuminates every other subject too and makes students less willing to accept the “received wisdom” of their teachers
What is the training “Product” for the newly qualified doctor?

- Traditionally - to be able to provide total medical care to an isolated population. This has become increasingly unrealistic as diagnosis and treatment become more dependent on technology – eg imaging and clinical pathology.

- Nevertheless this is the only time in a medical career when a doctor has an overview of the whole of Medicine
MEDICAL EDUCATION
IN THE
UNITED STATES AND CANADA

A REPORT TO
THE CARNEGIE FOUNDATION
FOR THE ADVANCEMENT OF TEACHING

BY
ABRAHAM FLEXNER

WITH AN INTRODUCTION BY
HENRY S. PRITCHETT
PRESIDENT OF THE FOUNDATION

BULLETIN NUMBER FOUR (1910)
The Flexner Report (1910)

Highly influential in reforming medical education in US and in Europe

Criticized apprenticeship system that lacked defined standards. In their stead proposed medical schools in the German tradition of strong biomedical sciences together with hands-on clinical training.

Medical schools should appoint full-time clinical professors who would become "true university teachers, barred from all but charity practice, in the interest of teaching".

Medical schools offering training in eclectic medicine, physiomedicalism, naturopathy and homeopathy were told to drop these courses

Abraham Flexner (1866-1959)
CHAPTER X
THE MEDICAL SECTS

The modern point of view may be restated as follows: medicine is a discipline, in which the effort is made to use knowledge procured in various ways in order to effect certain practical ends. With abstract general propositions it has nothing to do. It harbors no preconceptions as to diseases or their cure. Instead of starting with a finished and supposedly adequate dogma or principle, it has progressively become less cocksure and more modest. It distrusts general propositions, \textit{a priori} explanations, grandiose and comforting generalizations. It needs theories only as convenient summaries in which a number of ascertained facts may be used tentatively to define a course of action. It makes no effort to use its discoveries to substantiate a principle formulated before the facts were even suspected. For it has learned from the previous history of human thought that men possessed of vague preconceived ideas are strongly disposed to force facts to fit, defend, or explain them. And this tendency both interferes with the free search for truth and limits the good which can be extracted from such truth as is in its despite attained.

Modern medicine has therefore as little sympathy for allopathy as for homeopathy. It simply denies outright the relevancy or value of either doctrine. It wants not dogma, but facts. It countenances no presupposition that is not common to it with all the natural sciences, with all logical thinking.
The two models for medical education and training

1. Separate periods of preclinical education and clinical training
   3 preclinical years of which third can be taken in one of many subjects – to advanced level
   3 clinical years – can be at separate institution

2. Integrated 5 – 6 year course
   Involves clinical contact throughout.
   Can be popular because of “relevance” but intellectually illogical

Model 1 may be more Bologna friendly than Model 2 but there would be problems for both
<table>
<thead>
<tr>
<th>Year of Study</th>
<th>What you will study</th>
<th>Subjects and Courses</th>
<th>Qualifications Obtained</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1 – MVST 1A</td>
<td>Year of Study</td>
<td>What you will study</td>
<td>Subjects and Courses</td>
</tr>
<tr>
<td>Year 2 – MVST 1B</td>
<td>Year 1 – MVST 1A</td>
<td>Pre-clinical medical science</td>
<td>Medically relevant core scientific knowledge and skills, together with some optional specialisation.</td>
</tr>
<tr>
<td></td>
<td>Year 2 – MVST 1B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 3 - Part II</td>
<td>Year 3 - Part II</td>
<td>Part II course of specialised study</td>
<td>A wide range of courses and subjects ( &amp; other Tripos courses)</td>
</tr>
<tr>
<td>Years 4, 5 and 6</td>
<td>Years 4, 5 and 6</td>
<td>Clinical studies in Cambridge, Oxford or London Medical Schools</td>
<td>Clinical medicine leading to the development of clinical skills &amp; knowledge in a range of specialties.</td>
</tr>
</tbody>
</table>
Postgraduate Medical Education

• In the UK was the responsibility of the (independent) Medical Royal Colleges.
• Government interference – “Modernising Medical Careers” (or “Murdering Medical Careers”) has not been a success.
• Reforms need to be properly trialled and not brought in to suit the electoral timetable
• Politicians tend to be more interested in the effects of announcing a reform than in whether it works.
Research in Postgraduate Education

• Two types of Research: Ortho and Meta

  • **Ortho** research is done to roll back the frontiers of science. It needs whole time training – usually for a PhD and is done by relatively few

  • Can be done as part of a MD.PhD programme incorporated into clinical years
    (Idea came from US but is now used in 3 UK universities)

• Or can be undertaken during postgraduate training –easier in knowledge-based than in skills-based specialties
Meta research

• Meta research is done primarily to make doctors better at their job
• Should be undertaken by all during postgraduate training and beyond
• Usually needs only part-time on the job training – but needs to be done properly
• Not to be undervalued
• *Knowledge does not always pass from lab to clinic. It also goes in the other direction!*
Education in Medical Ethics and Bioethics –

• From what sources are ethics taught?

• “Primum non nocere” (Hippocrates)
• “Humanity is an end in itself” (Kant)
• Religious prescriptions. These vary so greatly that, in multicultural societies, they are part of the problem rather than of the solution
• The Georgetown Mantra.
• “Declaratory Ethics” – this is right because we say it is – is to be avoided in bioethics committees
The Georgetown Mantra

- Benificence
- Non-Maleficence
- Equity
- Autonomy

Individual Autonomy
(Gerald Dworkin “The Theory and Practice of Autonomy” CUP 1988)

• Liberty (positive or negative)...dignity, integrity, individuality, independence, responsibility and self knowledge...self-assertion...critical reflection...freedom from obligation...absence of external causation... and knowledge of one’s own interests

• “The only features that held constant from one author to another are that autonomy is a feature of persons and that it is a desirable quality to have”
Principled Autonomy
(Onora O’Neill “Autonomy and Trust in Bioethics” CUP 2002)

• “Choose only in such a way that the maxims of your choice are also included as universal laws in the same volition” (Kant, The Formula of Autonomy)
• Applies to moral principles and not to individuals
• Emphasis on human obligations rather than rights
• Universal laws can be adopted by all others: They may not be subordinated to particular religious or other frameworks They therefore need to be “evidenced-based”
Medical Ethics and Public Health

• Doctor’s duty of care is focussed on individual patient.
  Essentially libertarian with great emphasis on consent and confidentiality and on individual autonomy

• Public health is concerned with health of populations
  Essentially utilitarian and may require compulsion and data sharing; and conflicts with individual autonomy
Consent

• The purpose of Consent is to ensure that patients are neither coerced nor deceived
• This should be the benchmark against which requirements for consent should be measured.
• The retention & use of blood samples or tissue sections for disease surveillance or research poses no question of coercion or deception and explicit consent should not be needed.
• Consent should not be allowed to become a fetish

Omission and Commission

• The Law recognises a distinction between harm caused by doing something as compared to doing nothing. (e.g. active and passive euthanasia; and litigation for vaccine damage)
• This is ethically highly contentious*
• In the context of a doctor’s duty of care to patients there is a strong case for denying any distinction

Among all forms of mistake, prophecy is the most gratuitous.

(George Eliot, Middlemarch)
What the future should hold

• Longer lifespan with less disability
• Dignified and humane death

• But there will still be illness
• And there will still be a need for medicine - to cure where possible (rather than to manage chronic disease) and to comfort always
Medicine at the end of life will become a larger part of medical training

- About 50% of people die suddenly
- About 20% need prolonged terminal care
- Remaining 30% in between
- It is estimated that some 30% - 50% of lifetime medical expenditure arise in last 6 months of life
- Treatment of terminal disease needs to accept outcome and to be humane
Americans’ Current Health Care Expenditures Are Concentrated in the Final Part of the Life Span

From J Lynn and DA Adamson (2003) “Living Well at the End of Life”
Rand Corporation White Paper
The Drowned Prince

"It seems such a pity, because as a frog he was a really terrific swimmer."

MORAL: Not every change that seems a good idea at the time turns out well in the end.
Appeasement is being nice to a crocodile in the hope that it will eat you last.

(Attributed to Winston Churchill)
The Precautionary Principle

• Has no generally agreed definition
• Usually quoted as the justification for inaction while there is any uncertainty about safety of action - i.e. “when in doubt do nowt”
• Also used in precisely the opposite sense, for example re food safety and climate change
• In medicine and public health, moral distinctions between action and inaction are highly dubious & the precautionary principle is no alternative to proper risk/benefit assessment.
The Charter of Fundamental Human Rights

• **Article II-2: Right to Life**
  1 *Everyone has the right to Life*

• It will be argued that this can be held to prohibit:
  Contraception techniques that prevent implantation
  Abortion for any reason
  Doctor assisted suicide whether active or passive
  Embryo research
  and possibly much else

• Is this really what the EU wants?
The Charter of Fundamental Human Rights

• Article II-3 Right to the Integrity of the Person
  2b the prohibition of eugenic practices, in particular those aiming at the selection of persons

• It will be argued that this can be held to prohibit:
  Antenatal diagnosis and abortion to prevent serious genetic disease
  e.g programmes to eradicate thalassaemia in Cyprus and Sardinia; prevention of Duchenne muscular dystrophy, haemophilia, cystic fibrosis............

• NB Down’s syndrome is not – in most cases – genetic and does not strictly speak fall into the prohibition – however eugenics is not defined in the Charter.
Eugenics

• The term was coined by Galton in 1884 and (later) defined as: “the study of agencies under social control that may improve or impair the racial qualities of future generations either physically or mentally”

• Sterilisation of the mentally defective or of the “racially undesirable” as a eugenic strategy was a moral aberration as well as a failure to understand genetics.

• Eugenics is now used either to describe strategies to reduce the gene pool of alleles giving serious inherited disease; or as a term for undefined abuses of human dignity.

• The former describes important medical interventions. The latter seems to be used in the Charter.

• The word eugenics should not appear in the Charter at all.
Regulation from Europe

• The Data Protection Directive (and the Data Protection Act (1998))
  Attempts to exclude medical data failed
  Effects on infectious and genetic disease surveillance and on cancer registries likely to be very negative
  Use of anonymised data - The Source Informatics case

• The Clinical Trials Directive
  Came from DG Enterprise with wish to harmonise pharmaceutical industry
  Extension to non-commercial trials seems to have been an accident
  Strong opposition from European Academies
Libertarianism v Utilitarianism

• On the right (so to speak) are the libertarians – epitomised by Mrs Thatcher’s much quoted view that "there's no such thing as society. There are individual men and women, there are families. And no government can do anything except through people, and people must look after themselves first". Hard line libertarians believe that consent is not only necessary but also sufficient for almost all activities not actually forbidden by law.

• At the other pole are the utilitarians who believe that actions should be guided by what produces the greatest good for the greatest number. Utilitarianism is very much an “Anglo Saxon attitude”. This is not just because Jeremy Bentham was a Briton! Utilitarianism presupposes a basic confidence in the benevolence of one’s Government. For entirely understandable reasons the Germans and others are suspicious of utilitarian ethics because they can be, and have been, comprehensively abused by regimes now universally regarded as malevolent.

The Hippocratic Oath

• I swear by Apollo, the healer, Asclepius, Hygieia, and Panacea, and I take to witness all the gods, all the goddesses, to keep according to my ability and my judgment, the following Oath and agreement:

• To consider dear to me, as my parents, him who taught me this art; to live in common with him and, if necessary, to share my goods with him; To look upon his children as my own brothers, to teach them this art.

• I will prescribe regimens for the good of my patients according to my ability and my judgment and never do harm to anyone.

• I will not give a lethal drug to anyone if I am asked, nor will I advise such a plan; and similarly I will not give a woman a pessary to cause an abortion.

• But I will preserve the purity of my life and my arts.

• I will not cut for stone, even for patients in whom the disease is manifest; I will leave this operation to be performed by practitioners, specialists in this art.

• In every house where I come I will enter only for the good of my patients, keeping myself far from all intentional ill-doing and all seduction and especially from the pleasures of love with women or with men, be they free or slaves.

• All that may come to my knowledge in the exercise of my profession or in daily commerce with men, which ought not to be spread abroad, I will keep secret and will never reveal.

• If I keep this oath faithfully, may I enjoy my life and practice my art, respected by all men and in all times; but if I swerve from it or violate it, may the reverse be my lot.
Hippocratic Oath – “modern” PC version

• I swear to fulfil, to the best of my ability and judgment, this covenant: I will respect the hard-won scientific gains of those physicians in whose steps I walk, and gladly share such knowledge as is mine with those who are to follow.

• I will apply, for the benefit of the sick, all measures [that] are required, avoiding those twin traps of overtreatment and therapeutic nihilism.

• I will remember that there is art to medicine as well as science, and that warmth, sympathy, and understanding may outweigh the surgeon's knife or the chemist's drug.

• I will not be ashamed to say "I know not," nor will I fail to call in my colleagues when the skills of another are needed for a patient's recovery.

• I will respect the privacy of my patients, for their problems are not disclosed to me that the world may know. Most especially must I tread with care in matters of life and death. If it is given me to save a life, all thanks. But it may also be within my power to take a life; this awesome responsibility must be faced with great humbleness and awareness of my own frailty. Above all, I must not play at God.

• I will remember that I do not treat a fever chart, a cancerous growth, but a sick human being, whose illness may affect the person's family and economic stability. My responsibility includes these related problems, if I am to care adequately for the sick.

• I will prevent disease whenever I can, for prevention is preferable to cure.

• I will remember that I remain a member of society, with special obligations to all my fellow human beings, those sound of mind and body as well as the infirm.

• If I do not violate this oath, may I enjoy life and art, respected while I live and remembered with affection thereafter. May I always act so as to preserve the finest traditions of my calling and may I long experience the joy of healing those who seek my help.
The Precautionary principle

• "When an activity raises threats of serious or irreversible harm to human health or the environment, precautionary measures that prevent the possibility of harm (for example, moratorium, prohibition) shall be taken even if the causal link between the activity and the possible harm has not been proven or the causal link is weak and the harm is unlikely to occur."
The anti-rational movement focuses *inter-alia* on:

- Reproductive technology
  
  IVF, ante-natal diagnosis, embryo research, stem cells......

- Genetic Modification of plants, animals and humans

- Scientific Medicine
  
  including vaccine scares etc and a vocal preference for alternative medicine
Omission and Commission

• The Law recognises a distinction between harm caused by doing something as compared to doing nothing. (egs active and passive euthanasia; and litigation for vaccine damage)
• This is ethically highly contentious*
• In the context of a doctor’s duty of care to patients there is a strong case for denying any distinction

Thou shalt not kill; but needst not strive
Officiously to keep alive

Thou shalt not steal; an empty feat
When it’s so lucrative to cheat

Thou shalt not covet; but tradition
Approves all forms of competition

from “The Latest Decalogue”
by AH Clough (1819-1861)
First Year Courses
Medical Sciences Tripos Cambridge

• *Three courses are assessed for Second MB and Tripos. They cover the following topics:

• *the overall layout of the structures of the body in *Functional Architecture of the Body

• *the chemical and molecular mechanisms underlying the functions of the body and the mechanisms that govern inheritance in *Molecules in Medical Science

• *the mechanisms that underlie communication within the body, and the maintenance of the stability of the internal environment in Homeostasis and Histology.

• *Three other courses are assessed only for Second MB, and during these you will:
  • be introduced to the broader cultural aspects of healthcare and the medical profession in the *Social Context of Health and Illness (SCHI)
  • and *epidemiology and basic statistics in *Introduction to the Scientific Basis of Medicine (ISBM).
  • encounter patients in the community in *Preparing for Patients A. *This is a patient contact strand, where you will begin to acquire the skills of listening and talking with patients, and it runs through the first three years of your course.
The Law of Unintended Effects (or Consequences)

• The law of unintended consequences, often cited but rarely defined, is that actions of people—and especially of government—always have effects that are unanticipated or "unintended."

• Five sources of unanticipated consequences.
  Ignorance
  Error
  The imperious immediacy of interest.
  Basic values
  Self-defeating prediction

(Robert K. Merton (1936), The Unanticipated Consequences of Purposive Social Action. American Sociological Review 1, 894-904.)