reviews

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Encyclopedia of Biostatistics

Eds P Armitage, T Colton

John Wiley and Sons, £1495, pp 4898 (6 volumes)
ISBN 0 471 97576 1

Rating: ★★★★

Just amazing: how did they do it? Given that the task of organising academics has been likened to herding cats, how could anyone persuade so many to write so much, in such depth, and in so short a time? This was my initial impression of this monumental undertaking, a veritable tour de force comprising over 1200 articles written by more than 800 contributors worldwide from academia, government, and industry and supervised by about 20 section editors. All this initiated in 1995 and yet published within three years.

Editors in chief Peter Armitage and Ted Colton are characteristically modest in their preface, giving due credit to those who made the endeavour possible, notably the editorial board, authors, and the project motivator from Wiley, Helen Ramsey. Other factors, besides countless hours of labour, are professional respect for the editors and, ultimately, the nature of biostatisticians. As a breed, they tend to be obliging folk, only too happy to help clinical colleagues with their research projects, as encapsulated in that definition of medical statisticians as those in danger of spending their careers furthering the careers of others.

Simply put, the *Encyclopedia of Biostatistics* is a resource beyond compare. The subject index spans 96 pages, and the author index reads almost like a contemporary *Who's Who* of the subject. The fully cross referenced articles, most with extensive bibliographies, represent the collected thoughts of world renowned experts. The style is readily accessible to fellow statisticians, but how about to non-statisticians, as claimed in the advertising material? Is such a huge reference work justified, given the already successful *Encyclopedia of Statistical Sciences*? And what about its cost?

Reviews are rated on a 4 star scale (4=excellent)

Undoubtedly, many will consider the price prohibitive. Rare, though, is the book that can claim the product of its number of pages, articles, and contributors exceeds its ISBN code. Furthermore, the *Encyclopedia of Biostatistics* costs somewhat less per page than the institutional subscription rate of major journals—for example, its publisher's stable mate *Statistics in Medicine*.

Seeming at pains to justify the *Encyclopedia of Biostatistics* as distinct from the existing encyclopaedia, the editors in chief contrast their scopes very well. Interposed between "medical statistics" and "biometry," "biostatistics" is defined as "statistical methods in medicine and the health sciences." This encompasses laboratory studies, clinical medicine, genetics, epidemiology, public health, and more. The *Encyclopedia of Biostatistics* has several types of entry: broad overviews (about 100 of them); general methodological topics; biographies of past statisticians (those still alive being ineligible for inclusion); portraits of relevant journals, institutions, and professional societies; and articles pertaining to medical specialties. The focus is on applications of statistics to medicine, both in their broadest senses.

Listing the topics covered is superfluous for two reasons. Firstly, it is simpler to report that nothing within biostatistics is left uncovered. Secondly, the *Encyclopedia of Biostatistics* has its own website (www.wiley.co.uk/eob/) to which interested readers are referred. This gives the clearest impression, including full text of seven sample articles of various genres. That may not sound much, but the first, an overview of clinical trials, runs to 13 pages.

In terms of target audience, can a clinician glean as much from the *Encyclopedia of Biostatistics* as a professional statistician? No, not really. But, by the same token, one would not expect a statistician to gain as much by referring to a medical encyclopaedia, however well written. The *Encyclopedia of Biostatistics* will remain unsurpassed in quality and quantity, except possibly by a future electronic version. Planning for this is apparently under way, as evidenced by a website questionnaire and a registration card inside the front cover of volume 1.

Variability of writing style is inevitable in such an epic work. Some articles, despite the best intentions of the editors, remain firmly theoretical. Such is the nature of the subject. Most entries, however, are eminently readable and will prove informative to a wide audience. The editors acknowledge errors in content and typesetting as also inevitable, although I found few—another testimony to the hard work of those involved.

Experience alone will tell which types of article clinicians will most readily refer to. Gaining broad views of major topics will be more useful than reading life stories of (medically) obscure individuals, even if some are founding fathers of biostatistics. Individual clinicians are unlikely to be interested in statistical nuances outside their own specialty. Also, many methodological entries, by virtue of their length and depth, will not be so illuminating, especially if a rudimentary understanding is all that is needed. Having said that, even the most technical articles make genuine attempts to impart basic concepts within their early paragraphs.

Summing up, I believe this represents a colossal work of immense importance. Medical research institutions will find the *Encyclopedia of Biostatistics* a worthwhile investment. Those who seek to know more, about literally anything in the discipline, shall most likely find insight within its pages. This is especially true for practising statisticians, though, unsurprisingly, rather less so for health professionals. For medical researchers, referring to the *Encyclopedia of Biostatistics* is no substitute for an early consultation and collaboration with a statistician, but it would help build bridges of understanding between clinicians and statisticians.

C R Palmer, *medical statistician, Centre for Applied Medical Statistics, Department of Community Medicine, University of Cambridge, Institute of Public Health, Cambridge*

SOUNDBITES

"The Prime Minister is very strongly of the view that these products are safe. He has no hesitation about saying that and eating the products himself."

Downing Street's confidence in genetically modified foods

"It gets beyond a joke when you're frightening people. If we're going to start using the *Daily Mail* as the place for publishing our results, we might as well give up science altogether."

Colleague of controversial scientist Dr Arpad Pusztai

Learning from the NHS Internal Market: A Review of the Evidence

Julian Le Grand, Nicholas Mays, Jo-Ann Mulligan

King's Fund, £17.95, pp 196
ISBN 1 8571 7215 9

Rating: ★★★

The reforms introduced to the NHS in 1991 have attracted enormous attention from within the United Kingdom and outside. The attempt to make the NHS more responsive and efficient by requiring hospitals and other providers to compete for resources was one of the last acts of Margaret Thatcher before she was replaced by John Major. Researchers have investigated various aspects of the NHS internal market, and this book synthesises the results.

The most surprising conclusion is that the market seems to have had relatively little measurable impact. The authors use an evaluation framework based on criteria such as efficiency, equity, and choice, and they show that the research evidence indicates minimal change during this period. Furthermore, even when change can be detected, it is difficult to disentangle the effects of the market from other developments. In making these points, the authors emphasise that their conclusions are based on the research that has been done and that other kinds of change may have occurred but may not have been captured.

Learning from the NHS Internal Market can be read at two levels. Most obviously, it is a useful source of information about the research evidence on the reforms. As such, it is both thorough and clear, helping readers to make sense of the experience of fundholding, health authorities, and NHS trusts, and exploring implications for the future.

The book can also be read as an example of the difficulty of carrying out research into healthcare reform. Government policy is rarely introduced under conditions that allow comparisons to be made between interventions and control groups. In addition, the objectives of policy are often unclear, and assessing impact and outcome is beset with difficulties. The implication is that study design needs to reflect the complexity and messiness of the real world rather than seeking to emulate a traditional scientific model.

The question that arises is why did Margaret Thatcher's "big bang" have such a muted effect? One explanation, favoured by the authors, is that the incentives that were put in place to bring about change were too weak. Another possibility is that the reforms were based on a incomplete theory of human behaviour. Put simply, doctors, managers, and others may be self interested individuals who are influenced by the incentives they confront, but they may also be altruistic professionals who are alienated rather than motivated by healthcare markets. A policy that appeals to their inclination to cooperate and that recognises the role of altruism and trust may therefore have a greater impact than one based on competition. It is this insight that provides part of the rationale for the Labour government's much trumpeted "third way."

The eclectic mix of policy levers that make up the third way suggest a more complete understanding of what motivates doctors and managers than the theory that lay behind the internal market. The combination of cooperation, regulation, and a residue of competition will be used to bring about improvements in performance as part of the NHS modernisation programme. The next phase of healthcare reform offers an opportunity to test the value of these levers, possibly to destruction.

Chris Ham, *director, Health Services Management Centre, University of Birmingham*

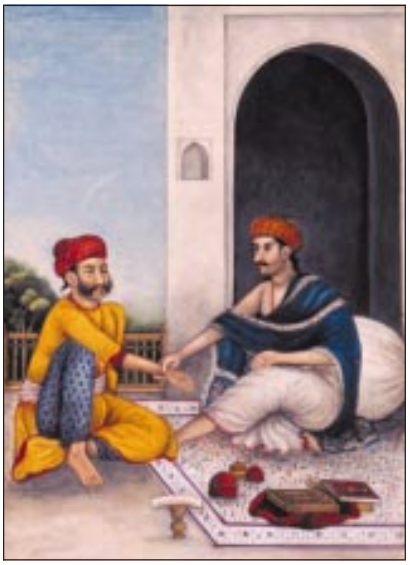
ART

East Meets West

Exhibition at the Science Museum, London, until 27 June

According to Robert Temple in his book *The Genius of China*, the Chinese were isolating sex and pituitary hormones from the urine by sublimation as early as the 2nd century BC and using them for medicinal purposes. The crystals they obtained were traditionally called "autumn mineral," being likened to the hoarfrost of the autumn and were said to be used by the Prince of Han in 125 BC.

Western interest in Chinese and other Eastern medicines has a long history, extending back to classical times. In 1669, the great philosopher Leibniz regarded Chinese medicine as "at least as good as that of Europe." *East Meets West*, an exhibition at the Science Museum, shows that the influence of traditional eastern medicines has extended far beyond the realms of endocrinology. Methods of diagnosis such as the reading of the pulse and preventing disease through vaccination were brought back to the West by Christian missionaries and foreign doctors from China.



SCIENCE MUSEUM

Equally, many ideas on treatment have originated from the traditional Indian medical systems of Ayurveda and Unani, including the technique of facial repair advocated in the Ayurveda text *Sushruta Samhita*, which fostered the discipline of plastic surgery.

Medical discoveries and technologies have passed both ways over the centuries. The exhibition explores how medicine evolved in Greek and Islamic cultures led to a renaissance in Western culture; the harmony of Islamic and Indian medical traditions in India, with a subsequent exchange of practices with the West through Britain's colonisation of the subcontinent; the transfer of medical ideas between Chinese doctors and Christian missionaries; and the origins of smallpox inoculation, conceived in the East but refined in the West.

The exhibition also displays other traditional Eastern medical practices that have not been incorporated so readily into the Western model of medicine—such as acupuncture and moxibustion, the application of burning leaves of the mugwort to acupuncture sites in an effort to restore harmony of yin and yang. These examples hint at the fundamental differences in culture and ideology that have formed and moulded traditional as well as modern medicine, a reason for their uneasy coexistence in many societies today.

Uy Hoang, *Clegg scholar, BMJ*

Meningitis in Wales

Meningococcal infection is a frightening disease for doctors and parents alike. Symptoms can evolve rapidly, and, despite improvements in antibiotic treatment and intensive care, about 10% of patients still die, sometimes within hours of onset. Over 200 people die from acute meningococcal infection in Britain every year; it is now the single most common infectious cause of death in children.

These are some of the factors that make meningococcal infection such a high profile issue with the media. In general, public health risks that seem to strike suddenly and unpredictably are triggers for intense media interest, particularly when the rapid progression of the infection and the need for early diagnosis and treatment increase the sense of vulnerability. It is therefore not surprising that the recent outbreak in Pontypridd, south Wales, captured the media's attention. The story was further fuelled by a political dimension, with the announcement last week in parliament by the Welsh health minister of an inquiry into the whole issue of meningitis in Wales. The high profile given to the story was predictable, given the size of the outbreak (13 cases, one of the largest in recent years), the fact that it occurred in a closely knit rural community against the background of a national increase, and that three people died (including a schoolboy and a teacher).

Beneath the rather sensationalist headlines the media reports were, on the whole, reasonably accurate, although many stories gave the impression that a new, more virulent strain of meningococcus had appeared for the first time. In fact, infections due to *Neisseria meningitidis* serogroup C type 2a (the strain responsible for the outbreak in Wales) are common in Britain, accounting for about 70% of all serogroup C meningococcal infections since the mid-1990s. This early misunderstanding of the microbiology highlights the importance of presenting complex public health issues as accurate and accessible "take home" messages for a non-specialist audience. Even with careful media management, early misunderstandings are difficult to correct later.

Inevitably, some journalists blamed the health authority for delaying the implementation of a vaccination programme and for not extending the programme to other, unaffected schools in the area. The reaction of parents in this situation is understandable, but there were good reasons why the health authority, following national guidelines, chose not to extend the vaccination programme: the currently available polysaccharide vaccines provide only suboptimal, short lived immunity, and they are ineffective in younger children (the group at greatest overall risk from disease).

PRESS ASSOCIATION

Mobile information

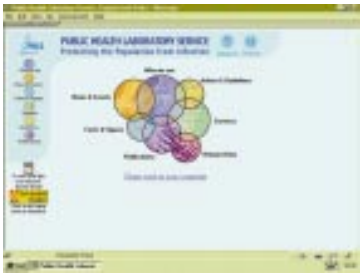
The media both reflect and shape public opinion of events, and we must recognise the value of the media in communicating important public health messages to a wider audience. It is interesting to compare the media reaction to this outbreak with the recent furore over the measles, mumps, rubella (MMR) vaccine. It illustrates the public's different perceptions of diseases such as measles, which has almost been eliminated, and meningococcal infection, for which no effective vaccine yet exists. When a new vaccine is first introduced and the disease incidence is high, concern about vaccine safety is low. As vaccine coverage increases, so inevitably do temporally (although not necessarily causally) associated adverse events after vaccination. As the disease incidence declines, attention shifts from the disease to the safety of the vaccine. Loss of confidence in the vaccine may occur at this stage, with a drop in vaccine coverage. This is followed by an outbreak, whereupon confidence in the vaccine is restored. This is exactly what happened with pertussis vaccine in the 1970s and is now happening with MMR vaccine.

For meningococcal vaccines, we are at the beginning of the cycle. Improved vaccines against serogroup C meningococcal disease are undergoing clinical trials, and if found to be safe and effective should be introduced to the childhood routine immunisation schedule within a few years. No doubt they will be greeted with great enthusiasm all round. We must address these sorts of issues up front with the media and with the public if we are to reinforce the importance of vaccination and break the cycle of fluctuating vaccine coverage. Correctly addressed, the media can help reinstall confidence in MMR vaccine by reminding the public of its extraordinary safety record and also of the potential for the return of epidemics. In 1965, three years before measles vaccine was introduced, 115 children died during a measles epidemic. The outbreak in Pontypridd is a sad but timely reminder of the potential for infectious diseases to kill young children.

Norman Begg, *consultant epidemiologist,*
Simon Gregor, *press officer, Public Health Laboratory Service, London*

WEBSITE OF THE WEEK

www.soton.ac.uk/men.html If the function of information is to reduce uncertainty, how much has to be prescribed and in what form in order to treat the anxiety of a "health scare"? The current strategy for controlling the transmission of meningococcal meningitis depends on immunising contacts of cases rather than the entire population, but as the media reports each tragedy it becomes increasingly necessary to explain and justify that strategy to the wider public.



The internet ought to be an ideal medium for this, allowing precise and specific information to be accessed by the widest possible readership, but how reliable is the information and how easy is it to find? The site on Southampton University's server (www.soton.ac.uk/men.html) is educational. It was put up by the university's department of public affairs during the outbreak in Southampton in 1997 and reported the progress of the affected students. It is a useful model of the way in which a community can be kept informed. Web television is not far away: public health departments will want to ensure that their HTML skills are sufficient to communicate with the populations that they care for.

There are no links from Southampton University's site to that of the Public Health Laboratory Service (www.phls.co.uk/), but if you make your way there you will find that, centrally at least, Britain's public health physicians are rising to the challenge. Although the site's designers have been unable to resist a heavily graphical front end that downloads slowly, the site is well organised and provides high quality information from the laboratory's bulletins and *Communicable Disease Reports*. This illustrates the point that, as the web matures, trusted institutions publishing their own information provide a viable strategy for tackling the well recognised problem of unreliable information on the net.

Douglas Carnall
www.carnall.demon.co.uk

PERSONAL VIEW

Breast feeding and my brain

I've got my brain back. I have finally weaned the youngest, the hormones are almost back to prepregnancy levels, and there is a distinct feeling of the fog clearing after three and a half years.

As a junior doctor, I had messianically and rather glibly extolled the virtues of breast feeding. When my own turn came, I found that the reality was indeed rewarding, but it proved to be an unexpectedly major undertaking. Never mind the cracked nipples, mastitis, and leaks—it was the sheer time involved. Over the past 40 months I have breast fed for around 3600 hours. That is an average of three hours a day (range one to six hours; case definition: time directly feeding and commuting time to get to baby during lunch breaks). This is the equivalent of a 40 month half time job if you adjust for a five day week and take into account holidays.

The first time round was free of major problems but still challenging. The second time round I had a baby with reflux (at least that was the label), who screamed nightly for over a year. I got postnatal depression (at least that was the label).

As a nursing mother choosing to work full time, my reality included bringing baby and sometimes toddler, too, all round Australia, England, Ireland, Bosnia, and Serbia. It meant feeding the baby at the computer, on field trips, while teaching classes, in research meetings, and at conferences. On the side, I donated milk to a friend's sick newborn baby, and occasionally fed my sister's child. I encountered no childcare options at conferences run by organisations that purported to encourage the inclusion of women, hospitals with no place for working staff to express and store breast milk or on site crèches, and tired mothers covertly expressing milk in the toilets.

And I spoke out. In my research, writing, speaking at conferences (often while carrying a baby). I got baby changing facilities put in in several places and am now working on Queensland's first statewide breastfeeding strategy. Impassioned by how hard it was in practice I wanted to change the system. In some small ways I did.

For some colleagues I was superwoman, for others just the "pest with the breasts." A particular feature I experienced having babies late in life and while peaking in my career was the precipitous transformation from golden haired girl to milk stained mess.

Reading recently published work on the effects of lactational hormones on behaviour—oxytocin makes you both more passive and more open to social engagement—I began to see how breast feeding itself might affect the way that I interacted with my working environment. Although I continued to swim with the sharks I no longer wanted to spend ridiculous amounts of time engaged in endless territorial circling activities.

I got back my brain but with a reformatted hard disk—enlarged and irrevocably changed by the experience of breast feeding. The secondhand "expert" understanding of child rearing and feeding is gone. In its place is a broader understanding of putting things into practice, an ability to juggle several things at once, a way of getting the most important things done first, and a new direction in my research.

Impassioned by how hard it was in practice I wanted to change the system

My current and previous employers (the University of Queensland and the World Health Organisation's European Regional Office) both have policies that encourage women in senior roles and extol the benefits to society of breast feeding. In practice they were not interested in how I fed my child or how I was integrating this into my working life.

Integrating work and personal life and finding a balance is the only way that people can stay sane, and employers have a direct and active part to play. Nursing mothers need supportive working environments so we do not just drop off the face of the working planet when it all gets too much, but we stay there and ultimately add our newly acquired skills and understanding to build the kind of diverse workforce that our world must have. But do not leave us to construct workplace support systems on our own—we are far too busy.

Mouthing the mantra of WHO and Unicef policies and passing on "breast is best" advice without any idea of the costs or consequences is not enough. Check that the hospitals, surgeries, and other places where you work and the communities where you live do not have a gap between rhetoric and reality. Baby changing facilities, good childcare, and flexible employment practices are a start. But above all, mothers who choose to nurse and work must be acknowledged and valued, and mothers who choose to take a full or partial break from paid employment should be welcomed back when they are ready.

If you would like to submit a personal view please send no more than 850 words to the Editor, BMJ, BMA House, Tavistock Square, London WC1H 9JR or e-mail **editor@bmj.com**

Mary E Black, *foundation professor of public health, North Queensland Clinical School, University of Queensland*

SOUNDINGS

Guest faculty

Southern California is often portrayed as being on another planet, so it came as a surprise, at a meeting there recently, to find that the doctors did not arrive on roller blades, wearing fluorescent shades.

Lecturing abroad is straightforward if you have invented a new technique like transspecies fertilisation or minimal access caesarean section. If, however, the purpose of the meeting is local postgraduate education the guest faculty becomes uneasy and asks itself thoughtful questions.

Just how international is medicine? Global journals and research networks would have us believe it is universal and that the results of trials conducted in South America or Africa are applicable in London or Yorkshire. I am unconvinced, but I find it hard to explain why. It is not just my concerns about informed consent given by people who cannot read but more a feeling that there may be confounding factors which I cannot discern from a distance.

Colleagues overseas could apply the latter reservation to research here, so is British experience useful to doctors abroad? Are results in our hospital system of trainee based medicine relevant to places where senior obstetricians sleep near the delivery suite? American speakers on the faculty seemed to think so. They cited United Kingdom studies with gratifying frequency, though with a bit more emphasis on our mavericks than on our mainstream opinions. The "gee whizz" attitude is hard to avoid, whichever direction you look across the Atlantic.

I thought that my postgraduate education was benefiting more than my hosts' was. I had not known that obstetricians on the east coast of the United States use forceps while those on the west coast dare not for fear of litigation. Nor had I realised how much pressure they all feel to reduce caesarean section rates, sometimes against their clinical judgment. Or that many American women use their gynaecologist as their primary care doctor.

Some of the differences between Leeds and Los Angeles were more spectacular. Our menopause clinic does not as yet offer complementary therapy by a robed and turbaned doctor with a waist length beard. Experience in Beverly Hills suggests that this would be hugely successful and that the practitioner could be caucasian. Whether or not therapeutic efficacy would be altered by a Scottish accent remains to be tested.

James Owen Drife, *professor of obstetrics and gynaecology, Leeds*