

Commentary

Archie Cochrane and his legacy

An internal challenge to physicians' autonomy?[☆]

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Abstract

Archibald L. (Archie) Cochrane was born in 1909 into a wealthy Scottish family, from which he inherited the advantage of a private income and the disadvantage of porphyria. Though a brilliant student, his medical training was interrupted by a lengthy psychoanalysis in Europe, and by service in a field ambulance unit in the Spanish Civil War. Eventually Cochrane qualified in medicine in 1938 and joined the R.A.M.C. in 1939. He was taken prisoner in Crete in 1941 and served the rest of the war as medical officer in various POW camps. Cochrane's post-war career with the Medical Research Council as a field epidemiologist in South Wales earned him the respect and admiration of a generation of British epidemiologists. However, Cochrane's international reputation is not based on his achievements as an epidemiologist, but on his 1971 monograph "Effectiveness and Efficiency. Random Reflections on Health Services," a biting scientific critique of medical practice. Cochrane died in 1988, but his name lives on in the Cochrane Collaboration, a network of researchers devoted to clinical trials, and the torch which he lit had been carried forward by the groups promoting evidence-based medicine. Some have looked askance at these developments, regarding them as a threat to the autonomy of physicians. © 2000 Elsevier Science Inc. All rights reserved.

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The British National Health Service (NHS) was introduced in July 1948. The socialist Minister of Health, Aneurin Bevan, made the following promise to the doctors: "My job is to give you all the facilities, resources, and help I can, and then to leave you alone . . . to use your skill and judgment without hindrance" [1]. Bevan, and his successors, kept the second part of this promise, if not the first. However, in the same year the results of the first randomized controlled trial (RCT) of the treatment of tuberculosis was published by the Medical Research Council [2]. The trial, led by Bradford Hill, initiated the intrusion by medical statisticians (later known as clinical epidemiologists in North America) into the clinical decisions of individual physicians. Immediately prior to these events, a physician, recently discharged from military service and interested in tuberculosis research, sat at the feet of Bradford Hill. This commentary summarizes the career of this man and the impact of his ideas.

Archibald L. (Archie) Cochrane was a brilliant, charismatic figure in post-war British epidemiology. He established a population laboratory in a Welsh valley and attracted many young epidemiologists to work with him.

However, Cochrane's international reputation was not related directly to his epidemiological work, but to the publication of a short monograph entitled "Effectiveness and Efficiency. Random Reflections on Health Services" [3]. This book has become a classic text for those who wish to place health care on a more rational and equitable footing.

The details of Cochrane's life (summarized in Table 1) are easily obtained from his autobiography "One Man's Medicine" [4], written in collaboration with Max Blythe. It is a fascinating book, easy to read and very difficult to put down.

Archie Cochrane was a lowland Scot. He was born in Galashiels, a cloth manufacturing town 30 miles south of Edinburgh. His paternal grandfather was a rich millowner, and from him Cochrane inherited a private income. From his maternal grandfather he inherited porphyria, though this did not become evident until late in his life.

Archie was a brilliant scholar. He won scholarships to Uppingham and King's College Cambridge. He was also a gifted athlete and remained so all his life. He was a keen gardener and art collector.

Cochrane developed an interest in biology at school which he pursued at Cambridge, obtaining a first in both parts of the Natural Sciences Tripos. With a fellowship in mind he began research studies in tissue culture, first in

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Table 1
Archibald Leman Cochrane: a brief curriculum vitae

1909	Born in Galashiels, Scotland
1916–30	Educated at Rhos-on-Sea, Uppingham and Cambridge
1931	Laboratory research in Cambridge and Toronto
1931–38	Medical studies in Vienna, Leiden and London (including voluntary service in Spain, 1936–37)
1939–46	Royal Army Medical Corps (prisoner of war, 1941–45)
1946–48	Post-graduate studies in London and Philadelphia
1948–60	Medical Research Council Pneumoconiosis Research Unit, Cardiff
1960–69	Professor, Welsh National School of Medicine, Cardiff
1969–86	Medical Research Council Epidemiology Unit, Cardiff
1988	Died in Dorset, England

Source: [4].

Cambridge and later in Toronto, but he became disenchanted with laboratory work. He was also plagued by a sexual problem, possibly due to his porphyria, for which he sought help from psychoanalysis, under a German analyst, Theodor Reik. This began in Berlin, but Reik, a Jew, had to leave Berlin, first to Vienna, and later to Holland. Cochrane followed him to continue his analysis, and in addition began his medical studies. Psychoanalysis did not help, and Cochrane returned to London disillusioned with Freud. However, he had become a fluent German speaker, an accomplishment which later became very important.

Medical studies in London were interrupted a second time by voluntary service with a field ambulance unit in the Spanish Civil War. Cochrane, like many intellectuals in that period, had been attracted by Marx as well as Freud during his undergraduate studies. His experience in Spain turned him against communism, but he remained a man of the left throughout his life. He became a firm supporter of the NHS, and forgave Aneurin Bevan for bribing the consultants with secret merit awards. He thought epidemiologists should have them too!

Cochrane found much to interest him during his clinical studies at University College Hospital, but he was frustrated by the lack of evidence to support the treatments recommended by his teachers, a critical attitude which remained with him throughout his life. Soon after qualifying, Cochrane joined the Royal Army Medical Corps and was sent to the Middle East. He was taken prisoner on Crete in 1941 and served the rest of the war in prisoner of war (POW) camps first in Greece, and later in Germany. Because of his fluent German, Cochrane became the medical director in these camps. His description of this episode in his life is the most vivid and moving part of Cochrane's autobiography, but I have not time to do justice to it. I shall focus on two events which seem to be most relevant to his later career.

Edema of the legs became a problem in a camp in Salonica. Cochrane hit on the hypothesis that it was wet beriberi due to vitamin B deficiency. He decided to test the hypothesis by a clinical trial along the lines of that used by Lind to test oranges and lemons in the treatment of scurvy. He split the cases into two wards and supplemented the diet of one ward with yeast, which he smuggled in from outside, using

his own money. The trial was a success and he wrote up the results and showed them to the Germans. They were very impressed and supplied him with a large amount of yeast, which quashed the epidemic. Despite this result Cochrane downplays the trial in his memoirs, referring to it as his "first, worst, and most successful trial."

In the later stages of his captivity Cochrane was much involved in the care of prisoners with tuberculosis. As in his student days, he was disturbed by the absence of evidence on the effectiveness of treatment:

What I decided I could not continue doing was making decisions about intervening (for example pneumothorax and thoracoplasty) when I had not idea whether I was doing more harm than good. I remember reading a pamphlet (I think from the BMA) extolling the advantages of the freedom of British doctors to do whatever they thought best for their patients. I found it ridiculous. I would willingly have sacrificed all my medical freedom for some hard evidence telling me when to do a pneumothorax . . . This was certainly the birth of an idea which culminated in Effectiveness and Efficiency.

The war ended and Cochrane returned to London. He was decorated for his contribution to the care of POWs. He applied for and received a Rockefeller fellowship in preventive medicine. This included a year at the London School of Hygiene and Tropical Medicine, where he was taught statistics by Bradford Hill, and a year at the Phipps Institute in Philadelphia, where he studied the reliability and prognostic validity of chest X-rays in tuberculosis.

Back in England, Cochrane began his career in epidemiological research. He was recruited by Charles Fletcher, the Director of the MRC Pneumoconiosis Research Unit in Cardiff, the mandate of which was to study pneumoconiosis in coal miners. Cochrane became interested in the progression of this disease from the initial stage of simple pneumoconiosis to the later, disabling stage of progressive massive fibrosis (PMF). Gough, a Cardiff professor of pathology, had proposed that the progression to PMF was due to tuberculosis, and Cochrane determined to test this hypothesis experimentally. He chose two adjacent coal-mining valleys. The miners in both valleys were X-rayed to determine the prevalence of simple pneumoconiosis. In one of the valleys the whole population was screened for tuberculosis and cases were isolated and treated. The second valley was left as a control. The miners in both valleys were followed up to determine the incidence of PMF.

This use of whole populations in a controlled experiment was, I believe, the first of its type. Logistically it was a tremendous success, with response rates close to 100%. However, the experiment failed because the prevalence of tuberculosis fell spontaneously in the control population [5–7].

In 1960 Cochrane left the MRC unit to become professor of tuberculosis at Cardiff. He continued to use the Two Valley Study population as a laboratory for epidemiological studies of several diseases. He also became involved in

RCTs of screening and treatment, with varying degrees of success and frustration. Cochrane retired from his chair at Cardiff in 1969 to direct a new MRC unit. It was during this period that he was invited by the Nuffield Provincial Hospitals Trust to write a book about evaluating the NHS. This was published with the title “Effectiveness and Efficiency. Random Reflections on Health Services” [3].

For Cochrane a medical intervention is considered “effective” only if it has been demonstrated, preferably by a RCT, that the intervention does more good than harm. This criterion should be applied, not only to new treatments, but to old treatments, the use of diagnostic tests and screening procedures. A health care system is “efficient” if it uses available resources to maximize the delivery of effective interventions. In his book Cochrane spells out the way in which this rationalization should take place.

There is a third “E” in Cochrane’s book, though not in its title, namely “equality.” As a staunch supporter of the concept of the NHS, Cochrane believed that its introduction had solved the problem of access to care, but he identified areas of inequity within the system, especially with regard to the share of resources devoted to cure versus care. Strangely he did not think that the effectiveness criterion could be applied to the care sector, primarily because of the absence of suitable outcome measures.

As mentioned, the little book on the NHS brought Cochrane international renown. He travelled widely and received many honors. He also became the first president of the new Faculty of Community Medicine of the Royal College of Physicians. His health failed in the mid-1980s and he died at the home of relatives in Dorset in June 1988.

I turn now to a brief outline of developments which might be broadly construed as the legacy of Cochrane’s book. I do so under its three themes: effectiveness, efficiency, and equality. Much of this development, at least as I shall describe it, has derived from the work of academic centers in Britain and Canada, in particular the Universities of Oxford and York in Britain and McMaster University in Canada.

Cochrane’s theme of effectiveness was taken up in Canada in the 1970s by David Sackett at McMaster University, who organized a series of Health Care Evaluation Seminars at most of the Canadian Health Science Centres. The aim of the seminars was to encourage the development of evaluation of health interventions, emphasizing the use of randomized studies to improve the effectiveness of the newly created national medicare program [8].

A second Canadian initiative in this context was the creation of the Task Force on the Periodic Health Examination, chaired by Walter Spitzer, also from McMaster (later at McGill), which reviewed the evidence for preventive interventions in primary care. The evidence that a given intervention does more good than harm was graded, with the evidence from RCTs being the most persuasive [9]. During the 1980s Iain Chalmers, an obstetrician at the University of Oxford, had created an electronic database of RCTs in obstetrics and perinatal care. Chalmers developed contacts

with the McMaster group and eventually the Cochrane Collaboration was formed [10]. The aim of the Collaboration is to prepare, maintain and disseminate up-to-date reviews of RCTs of health care. The efforts are coordinated by Cochrane Centres. Currently there are 15 centres in 13 countries [11]. The work of collating and summarizing the trials is done by Review Groups, which focus on the treatment of specific diseases, and Review Fields which are concerned with broader areas of health care such as primary care, the care of the elderly, nursing and public health. There are also Methods Working Groups which serve to standardize methods of searching and meta-analysis, and create the necessary software. The product of the Collaboration is disseminated electronically as the Cochrane Library.

Evidence-based medicine (EBM) is a parallel development to the Cochrane Collaboration. Also initiated by Sackett and his colleagues at McMaster University, the emphasis here is on implementation into the physicians’ training and practice. The ideas were promulgated in a textbook published in 1985 [12], and in a new journal in 1995 [13]. It is interesting to note that although the creation of the Cochrane Collaboration had been favorably reviewed in an editorial in the *Lancet* [14], the concept of EBM was decried by the *Lancet* as an internal threat to the autonomy of the physician [15]. Similar fears were expressed by Feinstein and Horwitz in their extensive critique of EBM: “A new form of dogmatic authoritarianism may . . . be revived in modern medicine, but the pronouncements will come from Cochranian Oxford rather than Galenic Rome” [16].

Cochrane’s plea for tools with which to assess the efficiency of health care has been pursued by collaboration between economists and epidemiologists. Major contributions came from McMaster University with the development of cost-utility analysis by George Torrance and David Sackett [17], and the use of cost-effectiveness techniques by Alan Williams at York [18], with whom Cochrane had many contacts.

The third of Cochrane’s themes is equality. The NHS in Britain and Medicare in Canada removed poverty as a barrier to medical care, but this has not changed the social class differential in health status. In Britain this was documented by the report of a committee chaired by Sir Douglas Black [19], the scientific advisor to the Ministry of Health, whose appointment, incidentally, Cochrane viewed with some disfavor. A similar rediscovery of the social class differential in health occurred in Canada, under the aegis of the Canadian Institute for Advanced Research, spearheaded by Fraser Mustard, a physician from McMaster. This developed into the Population Health Model [20], which was adopted by federal and provincial health departments. Both the Black Report and the Population Health Model recommend sociopolitical interventions rather than increased medical care.

Is Cochrane’s legacy an internal threat to physicians’ autonomy, as has been claimed? The possibility that the medical profession is losing its grip on health care has been the subject of much debate among sociologists [21]. Over the last century the practice of medicine has undergone major changes. Physicians no longer diagnose with their eyes, ears

and hands and treat with recipes compounded from botanical extracts. They are now the purveyors of commodities: drugs and diagnostic techniques produced by industrial capitalism. Surgeons no longer rely on the knife and a few instruments. Their services, too, have been commodified by the introduction of lasers, implants and the like. However the important point is that the profession still has a monopoly on the provision of these commodities. It has come to terms with them, and has established a symbiotic relationship with the industries which produce them.

Will the Cochrane legacy threaten this monopoly? I think not. For the monopoly was granted to the profession in recognition of the specialized knowledge which it possessed. Certainly there are external threats to the profession, from other health disciplines and from those who deny the value of positivist science, but the increased rationality implicit in the Cochrane legacy will, I believe, strengthen the profession against these challenges.

What would Archie Cochrane have to say? Certainly he would be delighted with the Cochrane Collaboration and EBM. I am not so sure about the Black Report and the Population Health Model. His comments would certainly have been interesting and incisive. And, iconoclast that he was, physician's autonomy would have been the last of his concerns.

Archie Cochrane wrote his own obituary and I will close by quoting the last sentence: "He was a man with severe porphyria who smoked too much and was without consolation of a wife, a religious belief, or a merit award—but he didn't do so badly."

References

- [1] Bruce M. *The coming of the welfare state*. London: B.T. Batsford, 1968.
- [2] Medical Research Council. Streptomycin treatment of tuberculosis. *BMJ* 1948;ii:769–82.
- [3] Cochrane AL. *Effectiveness and efficiency. Random reflections on health services*. London: Nuffield Hospitals Trust, 1972.
- [4] Cochrane AL, Blythe M. *One man's medicine. An autobiography of Professor Archie Cochrane*. London: The British Medical Journal, 1989.
- [5] Cochrane AL, Cox JG, Jarman TF. Pulmonary tuberculosis in the Rhondda Fach: an interim report of a survey of a mining community. *BMJ* 1952;i:843–53.
- [6] Cochrane AL, Miall WE, Clarke WG, Jarman TF, Jonathan G, Moore F. Factors influencing the radiological attack rate of progressive massive fibrosis. *BMJ* 1956;ii:1193–9.
- [7] Cochrane AL. The attack rate of progressive massive fibrosis. *Br J Ind Med* 1962;19:52–64.
- [8] Sackett D, Baskin M, (editors). *Health care evaluation*. Hamilton, Ontario: McMaster University, 1973.
- [9] Canadian Task Force on the Periodic Health Examination. The periodic health examination. *Can Med Assoc J* 1979;121:1193–254.
- [10] Chalmers I, Dickerson K, Chalmers TC. Getting to grips with Archie Cochrane's agenda. *BMJ* 1992;305:786–8.
- [11] Cochrane Brochure, 1999. <http://www.cochrane.org/cochrane/cc-broch.htm>
- [12] Sackett DL, Haynes RB, Tugwell P. *Clinical epidemiology: a basic science for clinical medicine*. Boston: Little, Brown and Company, 1985.
- [13] Davidoff F, Haynes B, Sackett D, Smith R. Evidence based medicine. A new journal to help doctors identify the information they need. *BMJ* 1995;310:1085–6.
- [14] Anon. Cochrane's legacy. *Lancet* 1992;340:1131–2.
- [15] Anon. Evidence-based medicine, in its place. *Lancet* 1995;346:785.
- [16] Feinstein AR, Horwitz RI. Problems in the "evidence" of "evidence-based medicine." *Am J Med* 1997;103:529–35.
- [17] Torrance GW, Thomas WH, Sackett DL. A utility maximization model for evaluation of health care programs. *Health Services Research* 1972;7:118–33.
- [18] Williams A. Economics of coronary artery bypass grafting. *BMJ* 1985;291:326–9.
- [19] Working Group on Inequalities in Health. *Inequalities in health*. London: Department of Health and Social Security, 1980.
- [20] Evans RG, Barer ML, Marmor TR, (editors). *Why are some people healthy and others not? The determinants of health of populations*. New York: Aldine de Gruyter, 1994.
- [21] McKinlay JB, (editor). *The changing character of the medical profession*. *Milbank Quarterly* 1988;66(suppl 2):1–225.