SIR DAVID BRUCE LECTURE 1990

“Heads and Tales”

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David Bruce was born in Australia in 1855 but his family returned to their native Scotland when David was five years old. He went to medical school in Edinburgh and graduated in 1881 after which he spent a couple of years in general practice in Reigate before being commissioned in the Army Medical Service.

He was posted to Malta as what, today, would be called a general duties medical officer and it was whilst he was there that he isolated a micro-organism from the spleen of five soldiers who had died of Malta Fever. David Bruce described the organism he isolated as a coccus and named it *Micrococcus melitensis* – deriving the name from the old Roman name for Malta – Melitta (the Honey Isle). Later, in his honour, Malta (or undulant) fever was renamed brucellosis. The first report of his finding of the causative organism was in the “Practitioner” in 1887. It is thus highly appropriate that the work of David Bruce should be honoured by the Department of General Practice here at Millbank.

The Army recognised his skills in bacteriology and David Bruce was posted to Netley as Assistant Professor of Pathology and later went to Africa where he studied the tsetse fly and trypanosomiasis. The causative organism of that tropical disease was also named after him – *Trypanosoma brucei*: indeed, one variety – *Trypanosoma brucei brucei* has his name twice, though that particular variant does not affect humans.

During the First World War David Bruce made a study of trench fever. Honours in plenty – and all well deserved – came his way. In 1899 he was elected a Fellow of the Royal Society and twelve years later the Royal College of Physicians in London made him a Fellow. In 1908 he was Knighted and ten years later he was promoted to Knight Commander of the Order of the Bath. Sir David Bruce retired from the Army in 1919, in the rank of Major General.

In giving this lecture I honour a great physician and a great soldier. I am proud to join the ranks of those who have been asked to give the David Bruce Lecture. My brief for the lecture was the topic of audit which, in a medical context, often involves head counting. I shall embellish my account with a few stories. Hence the title I have chosen for the lecture: “Heads and Tales”.

The first question I have had to ask myself, because I suspect some of you will be asking the same question, is: “What is audit as applied to medicine?” To answer that question, I did what most lecturers are said to do when faced with a question of definition: I went to the

dictionary. The word “audit” is from the Latin “he hears”. Hence, audit came to be used to describe a hearing, or more specifically, an official examination of accounts – which were originally presented verbally. Subsequently, the term came into general use to describe the examination of balance sheets to confirm their veracity by reference to vouchers or other authority. Webster, the standard American dictionary of English (if that is not a contradiction in terms) extends the use of the word audit beyond the field of finance to cover the “examination of one’s actions”; and it is from this usage that the word entered medical parlance.

The concept of analysing the work done by physicians is not new. In 1840, Wakley, the first editor of the *Lancet*, wrote in one of his trenchant editorials:

“The evil has now taken too deep root to be eradicated by anything but an Act of Parliament. All public institutions must be compelled to keep case-books and registers, on an uniform plan. Annual abstract of the results must be published. The annual medical report of cases must embrace hospitals, lying-in hospitals, dispensaries, lunatic asylums and prisons.”

Note that not only were the three types of hospital – ordinary, maternity and mental – included in his stricture but also dispensaries and prisons. Dispensaries were the health centres of the 19th century so, clearly, had Wakley been writing today he would have extended medical audit to include general practice. It was another 150 years before Richard Smith, the present editor-elect of the *British Medical Journal* (which was first published in 1840, the year before Wakley wrote his editorial) again brought to public notice the need for reform in the prison medical service; and this reform, I suggest, would best start with an audit of that service.

Florence Nightingale, a name not unknown in military circles, was one of the greatest of all the reformers of medical care in the last century and, also, a staunch advocate of audit. In her “Notes on Nursing” – published in 1863 – she wrote:

“I am fain to sum up with an urgent appeal for adopting this or some uniform system of publishing the statistical records of hospitals. There is a growing conviction that in all hospitals, even in those which are best conducted, there is a great and unnecessary waste of life. In attempting to arrive at the truth, I have applied everywhere for information, but in scarcely an instance have I been able to obtain hospital records fit

for any purpose of comparison. If they could be obtained, they would enable us to decide many other questions besides the ones alluded to. They would show subscribers how their money was being spent, what amount of good was really being done with it, or whether the money was doing mischief rather than good."

I emphasise the four points she makes:

1. There is a growing conviction that there is an unnecessary waste of life among patients in hospital.
2. It was virtually impossible to find any hospital records that were suitable for analysis.
3. Were such records obtainable, it would be possible to look at other issues as well.
4. Subscribers (in modern parlance, the Government) would know if their money was being spent wisely.

However, the origins of medical audit go even further back into history. In 1732 Dr Francis Clifton wrote:

"In order, therefore, to procure this valuable collection, I humbly propose, first of all, that three or four persons should be employed in the hospital (and that without any ways interfering with the gentleman now concerned), to set down the cases of the patients there from day to day, candidly and judiciously, without any regard to private opinions or public systems, and at the year's end publish these facts just as they are, leaving everyone to make the best use he can for himself. Would not some such method as this let us more into the nature of diseases in a few years than all the books of theories, or even the books of observations, hitherto published? Certainly it would; and yet if proper encouragement were given, it is not at all unlikely but that persons enow would soon be found every way qualified for such an undertaking; and even if good salaries were allowed them, and everything made as easy and agreeable to them as they could desire, the benefit the public would receive from them would vastly more than balance the expense."

Indeed, Clifton himself referred to the work of Francis Bacon who, writing 150 years earlier, in an appeal to the medical profession to analyse their cases, quoted no less an authority than Hippocrates who had reported on the outcome of the diseases in all the patients he saw sitting under that great tree of his on the island of Cos.

Incidentally, may I emphasise one point, which perhaps will find a sympathetic ear with this evening's audience: that those involved in organising audit need to be reimbursed – and that the benefit accrued from these activities would justify the cost.

Unlike many others who are vague about the changes they would like to see introduced, Clifton made specific recommendations about what was to be analysed.

- 1 Sexus, aetas, species, temeries, occupatio, et victus aegri
- 2 Dies morbi
- 3 Morbi phenomena

4 Dies mensis

5 Remedia

6 Effectus

For the benefit of those of you who are not general practitioners and don't understand Latin, may I translate:

1 Sex, age, type, temperament, occupation and diet

2 Duration of disease

3 The symptoms of the disease

4 The day of the month

5 Remedy (treatment)

6 Effect (of the treatment)

As I have shown, the concept of medical audit has been slow in coming to fruition. The next move emanated from the United States of America. Following Flexner's criticism of the quality – or, rather, lack of quality – in many American medical schools, Codman at Harvard Medical School began, in 1912, to record the outcome of all his own surgical procedures. He published the first report two years later. The idea encouraged others in North America – Canadians as well as Americans – to carry out the same kind of self analyses. The American College of Surgeons was attracted to the idea and began to set standards which hospitals had to attain if they were to be accredited. The further development was, nevertheless, still slow and remained confined to surgery – which in those days included obstetrics and gynaecology – until after the Second World War.

By the 1930s some surgeons were beginning to refer to the self-analyses they carried out as 'accounting' and, so, it is not surprising that someone began to describe the accounts of the outcome – the deaths and the complications that followed the surgical procedures – as an audit. It was G G Ward, a surgeon at Women's Hospital in New York who, in 1947, first used the term in his paper: "Audit Measures Our Results". In this country it was Colin Dollery – in his chapter in the book "Challenges for Change", published in 1971, who first used the word audit in relation to medicine. Audit is now an accepted part of medical practice but, like so much else in the world of politics, it has come to be used in a variety of different ways and to mean all things to all men.

There are a multitude of definitions of medical audit. Each author on the subject comes up with his own variation. In the United States, a definition of medical audit in common use is that proposed by Slee in 1967 when he described it as the "evaluation of the quality of medical care as reflected in medical records." I would agree with the first part of his definition but audit goes beyond an inspection of medical records – or charts, as our American colleagues call them. The performance of the physician – his manner and attitude, his communication skills (or, regrettably sometimes, a near complete lack of them) are at least as important as his record systems – without in any way denying the importance of the records.

Record systems are vital in setting standards: but we should not waste time and storage space on data we are never going to need. We must also remember the dictum that the more you write in the notes, the less you will subsequently read. Nor is it of any value to keep extensive records if they are illegible – particularly when even you, yourself, cannot read your own writing!

Audit and research are sometimes used synonymously; but that only confuses the issue. Research has been defined by a working party of the Royal College of General Practitioners as: “a careful search: a systematic investigation towards increasing the sum of knowledge”; or, as others have put it, research can be regarded as both “a critical enquiry” and “organised curiosity”.

Some research – notably that which includes head counting – involves auditing the work done, but a great deal of research – for example the discovery by David Bruce of the cause of Malta fever – is clearly not audit. Similarly, some audits – by identifying knowledge not previously recognised – can be called research; particularly when different outcomes are being compared. But much audit is not research, in that the sum of universal knowledge is not advanced.

It is also important to differentiate between external and internal audit. “External audit” is the inspection and verification of the books of account by an outside body which conducts a systematic check of the medical records and the statements of services rendered, including prescriptions issued and so on. “Internal audit” is that check on their activities carried out by individual GPs or practices. This definition of internal audit is usually extended to include analyses by others in the same field who have been undertaking a similar review of their own work: what we now call peer review.

Latterly, self-audit and peer review have collectively come to be called “educational audit”; while external audit is described as “contractual or managerial audit”. The main difference is that, with educational audit, the doctor should be willing to admit error. A necessary prerequisite is that the audit must be confidential – as, for example, it is with the Confidential Enquiry into Maternal Deaths. With contractual audit, on the other hand, the data becomes public knowledge; it is known to those managing the service – hence the term “managerial audit”. The doctor can be – and no doubt will be – brought to task for any error discovered.

Jane Hughes and Charlotte Humphrey, working with the Kings Fund Centre, propose that we restrict the term “medical audit” to that which is done by doctors; and when the audit involves the whole of the practice team – including nurses, health visitors and receptionists – we should call it “clinical audit”. Whilst agreeing with most of what Hughes and Humphrey have said, I would disagree with them on this issue. I hope they will not take it amiss if I comment that most of those who vary previously accepted definitions can be likened to Humpty Dumpty.

“When I use a word,” Humpty Dumpty said in a rather scornful tone, “it means just what I choose it to mean, – neither more nor less.”

Quality in relation to health care tended to be taken for granted, at least by the medical profession but, as I showed a few minutes ago, Florence Nightingale and others were less sure that all that was being done to our patients was necessarily beneficial. However, once the profession began to audit its work, quality of care was brought into the spotlight and, in 1966, Avedis Donabedian published his seminal paper on the subject. It was Donabedian who introduced the concept of audit based on analyses of structure, process and outcome. “Structure” is the equipment we use, including the premises we work in and the record systems. In the practice I took over in 1957, the consulting room was 8 ft by 8 ft in size. When Stephen Taylor – the author of “Good General Practice” – came to visit me he said it was the smallest consulting room he had ever seen. There was, when I arrived there, no examination couch, not even a couch hidden from sight by stacks of BMJs! – a situation I am told is still not unknown. However good a doctor may like to think he is, I expect you will agree that absence of a vital piece of equipment like an examination couch makes it virtually impossible to justify that claim. “Process” covers the myriad of activities we perform, such as the frequency of referrals or the number and type of prescriptions we issue. It also covers the number and proportion of patients who have had their blood pressure recorded; and the number of women who have had a cervical smear in the last 3 to 5 years. “Outcome”, I think speaks for itself.

Donabedian also related audit, the analysis of the work being done, to the need to identify failures in the quality of care provided – whether these are failures in structure, process or outcome, or failures in all three; and to identify ways of improving the quality of care. To do this it is necessary for the physician to identify, firstly what he is trying to achieve; and, secondly, how he should go about doing it.

More recently the term quality assurance has come to be used in relation to the services which medical practitioners ought to be providing; that is medical care of the highest possible quality at the lowest possible cost. The service provided must be cost-effective. Cost is important, but quality comes first.

The issue has become somewhat confused because “quality assurance” is all too often used synonymously with “medical audit”. Medical audit is, however, only one component of quality assurance. Audit is the measurement of that which is being done – as opposed to what the doctor says or believes he is doing. Audit can tell you where you have been or where you are at the present moment: it cannot tell you in which direction you should be going. Let me offer an analogy: the engine is an essential component of a motor car – but it is not the car itself. So, too, audit is only one component of quality assurance – albeit a major component. And, if I

may extend the analogy: a car needs a driver: and the driver needs to know where he is going.

Audit and quality assurance are nevertheless, closely related. Audit is an essential pre-requisite of quality assurance. Unless we know whether what we are actually doing corresponds to what we say or what we believe we are doing, how can we assess the quality?

It is in this context that there has been introduced the concept of the audit cycle. There are three stages to that cycle:

1. The systematic analysis of an activity within the practice: for example, repeat prescribing, or the monitoring of the blood pressure in asymptomatic patients.
2. Comparison of the results of that analysis with a predetermined set of data to identify deficiencies in the services provided.
3. The introduction of changes in the practice to remedy such deficiencies as have been identified.

And then continuing the cycle by analysing what happens in the practice after the changes have been introduced, to see whether the original objectives have been achieved.

However, I have a couple of difficulties with the audit cycle. Firstly, a minor criticism of detail: at what stage are the standards to be set? In practice, what most often is done is to set the standard before commencing the audit.

My major difficulty is with the question of who is to set the standards. The standards to which a practitioner should be aiming have been defined by Donabedian as being either normative or empirical. "Normative" standards are those derived from the published literature. However, normative standards tend to be set by academics working in ivory towers – and, all too often, are found to be inappropriate for everyday practice. "Empirical" standards are based on the performance of an average group of doctors working in the same field and under approximately similar conditions. Empirical standards have sometimes been criticised for using the lowest common denominator as the objective. It has been said – with some justification – that those who aim at nothing are likely to hit their target every time.

The alternative approach which I believe is most likely to prove successful is first to determine what is already being achieved: in other words, to follow the original audit cycle. From this data consensus standards can be set. If we set the right targets, any changes which are found to be necessary are more likely to be introduced. I have little sympathy with those who keep asking: "why can't the status quo be the way forward?". I would remind such as are of this belief of the recently discovered Chinese proverb: "Mind like parachute: best when open".

On the other hand we must not rush change, I do have some sympathy for those who are complaining that they are so busy setting standards, they have no time left to

maintain their existing standards. Such changes as are necessary must be introduced in a way that is likely to be acceptable.

In establishing our standards we always have to remember that medicine is in a constant state of flux. Indeed, many of today's problems were yesterday's solutions. None of our standards should, therefore, be cast in tablets of stone. Whilst on the metaphor, I am minded to extend the point. Moses, when he came down from Mt Sinai, brought 10 commandments, not 10 guidelines, recommendations or suggestions. But commandments are rarely appropriate for the delivery of medical care. We have to differentiate between standards which all should aim to achieve; guidelines which should generally be followed; and options which include innovations.

We also have to be cautious in our choice of the data we choose to collect. Because a system is measurable, it does not follow that it is worth measuring. If, like me, you sometimes have difficulty in remembering lists, you may find mnemonics helpful.

BEER: best ever end results.

ALE: assessment, learning and evaluation.

In assessing the quality of the delivery of medical care it is usual nowadays to speak of the two groups represented: the purchasers – that is the government; and the providers – the medical and other health care professions. But there is also a third group: the consumers – the patients. You cannot talk about the patient's problems without considering the patient.

Each group has its own criteria of quality and, somehow, these criteria have to be matched – which is not easy, as we know from the reaction to the present review of the National Health Service.

There is, as Enoch Powell pointed out over thirty years ago, virtually no limit to the quantity of health care which could be provided. As an example, we only have to think of the nursing care the elderly and the handicapped could consume or the possible expenditure on the drug bill if, as I suspect some in the pharmaceutical industry would wish, the most expensive rather than the most cost-effective medicaments were chosen.

All too often in most analyses of health care delivery, it is the actions of a relatively small number of health care professionals – described in American literature as the outliers, or the tail of the quality distribution – who are responsible for a large proportion of the examples given of poor quality of care. What are their sins? Firstly: they are accused by the government (or by the medical insurance funds) of over-using the resources available by initiating unnecessary – and often expensive – procedures. In the USA, the number of CT scanners is vastly greater than the number in this country; but is the outcome of the health care provided in the USA any better than that provided in the UK? This is a topic which could easily consume a lecture of its own.

I would, however, offer by way of defence of my American colleagues, the comment that what they do –

no less than what we do, or don't do – is determined by local custom and usage, and also by the availability of a facility. If you have easy access to a CT scanner you may come to believe that it is an essential part of your diagnostic armamentarium. Equally, if the hospital where you work has purchased that item of equipment, sufficient use has to be generated in order to justify the capital expenditure.

However, I do believe that the medical profession does have a duty to ask itself how cost-effective are the procedures they initiate. Clinical freedom is not a licence to spend someone else's money.

Equally, we have to ask whether the under-users are depriving their patients of aspects of care which the patients have the right to expect. That, I suspect, is going to be a very difficult question to answer.

Much play has been made of the considerable range in the number of patients referred to hospitals for specialist advice and treatment. Is there an optimum rate for referral? My own studies have shown that part of the variation in the rates of referral relate to the expectations of the patient. There are some patients who believe that medical care can only be provided by specialists: notable in this group are a number of members of the medical and nursing professions. They are aided in their view by the attitude of those GPs who refer to hospital virtually everything but the most minor of problems.

There are also the relatives and neighbours who, for a variety of reasons, demand that specialist care be provided. Every experienced GP will know what I mean when I describe the patient whose migraine is being more than adequately dealt with but is advised by a man he meets in the pub to get his doctor to give him a letter for the hospital. But perhaps the friend is right: perhaps every patient with migraine should see a specialist. But who is the specialist? Who treats most headaches?

Next we have the visiting relatives. Usually they phone me at the weekend – presumably because they believe that I would be more likely to be free to talk to them at that time. "This is Mrs Hyphen-Jones. I've been to see my aunt, Mrs Brown who is on your NHS list. She tells me her bowels have been giving her trouble for the past twenty years and I have told her you have got to send her to see a specialist."

Not that we in general practice are blame-free. Some of my colleagues suffer from what I call the dumping syndrome. The "Dear Sir, Please see and treat" type of referral letter is alive and still flourishing in some parts of the country: though, I am pleased to say much less so than when I was a medical student forty years ago.

Also worthy of a mention is the "Puppy Dog Syndrome".

"Dear Sir, I attended your lecture at the Postgraduate Medical Centre last month when you spoke to us about phaeochromocytoma. You told us about the three patients you had seen in the past 25 years with this disease and said that one presented with intermittent

headaches. Mrs Angst, who lives in the local tower block, has been complaining of headaches ever since she moved there. Has she got a phaeochromocytoma?"

Before we criticise those doctors too hastily might we not first ask ourselves: who was it who gave the lecture in the first place? And which GP Regional Adviser approved the course for a Postgraduate Education Allowance?

Over and under-use of resources are fairly easy to audit, be it an audit of investigations, referrals, prescriptions or whatever. Measuring a doctor's technical competence is not so easy although part of it can be done by auditing outcome. Deaths in general practice are, fortunately, relatively few and I would not, therefore give high priority to an audit of this aspect of care, however important it is. Nevertheless, I would suggest as a topic for research by those with sufficient interest, an analysis of the medical history – the frequency of consultations and the reasons for each, together with the investigations and other actions taken by the GP – of patients who are found later to have a malignant disease; for from such a study we might – I emphasise might – identify some early warning symptoms and signs. I would, nevertheless, stress the need to avoid extending the agony of the sufferer by the early identification of what might be an incurable disease. All too often, in such studies, we have not prolonged the life of the patient; what we have done is lengthen the time during which he is aware of the fatal disease because, in many cancers the outcome is, regrettably, predetermined.

A good doctor has to balance the need for beneficence with that for non-maleficence – the duty to do good while doing no harm.

What is particularly difficult to monitor is the interpersonal and communication skills of the physician. No one physician can expect to provide a service which is satisfactory for every patient. People differ in their preferences for types of health care. To give but one example: there are some who want "a pill for every ill" and there are others who only want "natural remedies" – whatever that term might mean. Each individual has the right to a say in what forms of treatment he is willing to accept. Equally, our duty as professionals includes the need to make our patients as fully informed as they need to be to make that decision. We also have to respect the religious beliefs and cultural expectations of our patients. To a devout Catholic, the last rites are more important than the last dose of morphine. As doctors we have to respect the autonomy of our patients – the right possessed by every individual to self determination. But equally we have to balance the wishes of the individual patient against the resources of the community to meet those wishes.

Having said which, I have long held the view that the majority of patients want their doctor to make most of their medical decisions for them. They want a paternalistic GP. I was therefore pleased to read in the

British Medical Journal a couple of weeks ago, the results of the study by Dick Savage in South London (funded by the Royal College of General Practitioners) in which he confirmed this view.

In improving the quality of care we should look a little less at the poor performers and, instead, try to identify the better practices. The problem is that the identification of good practices is held by those not so identified as being a form of advertisement.

Equally, we have to remember that, taken overall, improving the quality of care delivered by 50% of practices would be more beneficial to society as a whole than targeting our efforts at the best 10% – who will, anyway, constantly be seeking to improve their already high standards of quality of care. We need to shift the quality of care curve to the right, rather than strengthen the tail. To do this we are going to have to alter the attitude of many members of the medical profession to the quality of the service they provide. Perhaps we can learn a lesson from the Japanese. In Japan, in every industry there is a commitment to a continuous improvement in the quality of all the goods manufactured. Those of you who use Japanese cameras and drive Japanese cars will know what I mean. The commitment starts on the shop floor: managers and workers share the same objectives.

The philosophy of total commitment to quality assurance is known in Japan as kaizen. It is the reverse of the bad apple theory: the concept that you set about improving the quality of medical care by identifying the poor performers – the bad apples – and eradicating them. In the system of kaizen you assume that all those involved in the activity are already trying hard to perform well. You then set about identifying relatively minor – and non-threatening – changes which will improve the quality, albeit only to a limited extent. By continuously introducing improvements, each of them in turn non-threatening, the long-term benefits will be considerable.

The philosophy of kaizen has an application to medicine. Most bad doctors perform poorly because no-one has shown them that there is a better way to practice. Indeed, the better way is usually more rewarding – both spiritually and financially. If we believe in managerial-contractual audit, we will encourage doctors to say: "What is the least work I can do to protect myself from attacks by my managers?" But if we follow the Japanese philosophy of kaizen, we will encourage each other to say: "I am prepared to improve myself".

Which approach is most likely to be successful? None of us is so perfect his services cannot be improved. Kaizen applies to us all.

I would like to give you an example from my personal experience. The Grove Health Centre where I work was opened in 1967. I was then in a partnership of three GPs and the Health Centre had space for four. The vacant suite was allocated to an elderly single-handed GP. His reputation at the time was poor. He had no ancillary staff; kept no records; never used open-access X-ray or pathology facilities; and wrote "Dear Sir, Please see and treat" letters. His attitude did not change when he first came to the Health Centre. He did not see why he should use the appointment system that we used, nor that there was any need for his referral letters to be typed.

It happened in that year none of us in our partnership wanted a holiday in August and I approached him to see whether he would like to take a holiday during that month. He replied that he could not afford a locum and so he did not take summer holidays. I said that we would cover him if he wanted to take August. He made no reply but clearly spoke to his wife over lunch because he came to me that afternoon and asked if the offer was still open. I assured him that it was.

When he returned from his holiday he was somewhat surprised to see notes about his patients; and also enclosed in the record envelopes were some X-ray and pathology reports. What he then did is interesting. He went to the practice secretary and asked her how this was done.

It happened that a few months later we were visited in the Health Centre by Andrew Semple, Professor of Public Health in Liverpool. As he was leaving, Andrew Semple asked me if he could borrow the elderly GP and take him back to Liverpool for a few days to show the doctors there how much better life could be if GPs kept up with the practice times.

There are some who will resist any change and want no truck with medical audit. They have as their motto: "we know what we believe, don't muddle us with facts!".

I have a little – but only a little – sympathy for those who are opposed to the contractual or managerial element of audit: I have none for those opposed to the educational component.

"As an educational experience, a good system of medical audit is worth any number of postgraduate courses."

McWhinney, BMJ 1792, vol 2, p279.