

Information, EBM, and the art of general practice

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It is an exciting time for primary care; particularly for those of us who will be in Christchurch to celebrate the art of general practice. The story I want to tell is about the unlikely alliance between information technology, evidence-based medicine, and art. We see this alliance played out in the theatre of the general practitioner's consulting room. It is interesting to see the art of general practice as a kind of theatre where GPs are spectators of many 15-minute plays. It is a privileged position because these plays are better than any reality TV, the GP can switch from being a spectator to being an actor, and the GP gets paid for it. The art of being a spectator I think is quite easy – just sit back, watch, and listen. Patients appreciate the spectator role where the GP allows them to be the centre of attention. Switching to the art of being an actor is more difficult.

You cannot predict the kind of patients and their problems that will walk into the consulting room. This makes learning a script prior to consulting difficult. There are comedians who perform skits with texts that the audience supplies. This method of acting is the closest comparison I could find to GP consultations. On stage, this kind of acting is very hard to do, but when it is done well it can be very funny. It is being this kind of actor as a GP that I want to address in this paper.

Firstly I will talk about consultations using the example of a GP with whom I was a spectator over 20 years ago. Then I will describe how information technology and evidence-based medicine have encroached into the GP consultation. I will argue that the tech-

nology is enabling because it does allow the GP to have evidence rapidly available to consultations. I will describe what GPs need to do to cope with the information technology. But ultimately the GP has to improvise, and the work of the GP remains an art.

Consulting with Peter Anyon

Peter Anyon was my mentor in general practice. I spent about three months with him as a trainee intern sitting in his consulting room watching the myriad of patients come and go. He did not talk much, but he did laugh a lot with his patients. He wrote the scantiest of records. Otitis media was written up as 'OM, L ear, Amoxil'.

Occasionally, he looked at his *New Ethicals* when he could not remember a drug's details. At other times he would phone a consultant friend to sort out an issue he did not know about. He was not known to write long referral letters – famous for being cryptic but accurate. I observed all this in 1979. Thereafter I worked with him in the paediatric wards where he played out his role as a paediatrician, and later did research with him on clinical topics one finds useful in clinical general practice, such as working out the reliability of listening to a child's chest for wheezy breathing (it's moderately reliable!).

Peter thought that what happened in the consultation was fascinating and worthy of research. He encouraged me to read people like Balint² to get some idea of what occurs in the consultation, but ultimately he saw it as an art. He was sceptical that there was any theory that actually applied when

trying to understand what happens in the consultation.

As he said in one of the GP registrar seminars he ran: *'Once the door is shut, anything can happen. Probably any advice is acceptable, as long as you sound plausible to the patient.'*

Peter was arguing that almost any advice given by a GP is as good as any other doctor's advice.

Peter's experiences both as a paediatrician and as a general practitioner made him realise that evidence obtained in hospital consultations often had little applicability in general practice consultations. Once the door was shut, there was no script you could rely on. He had received little education about general practice from medical school. Peter's experience of moving between paediatric and general practice consulting rooms made him realise that the evidence supplied in the hospital context often did not seem to apply in the general practice context.

New intrusions into the consultation

I doubt if the kind of problems patients bring to their GP have changed very much in the years since I worked with Peter. What has changed is that medical technology and evidence-based medicine have advanced inexorably and intruded into consultations. There is much more information and technology out there. We have seen technology being applied despite limits on the resources available to the community. The arrival

of information technology on the GP's desktop had a profound effect on how GPs mastered information. In order to explain what I mean, I will first say a little about information theory, and then say how it relates to evidence-based medicine.

Information mastery is a new skill for the GP

A well-known model of the consultation is one that shows a triangular interaction between a patient, a GP, and the problem or illness the patient brings to the consultation. This interaction is the core of general practice. It involves listening to patients' stories and trying to reduce the amount of uncertainty patients have about their problems or illnesses. To do this, the GP might ask questions about symptoms and sometimes examine the patient's body to elicit signs in order to formulate a diagnosis, order investigations, and treat accordingly. This model of the consultation depends on a good flow of information between the patient and the GP. If there is not a good flow of information, the GP cannot do an effective job in the consultation.

We need a theory in order to help us master information. It just so happens there is one. It was developed in the 1940s by telephone engineers to facilitate the description and design of information networks.³ Information theory helps us understand how information actually works in a consultation.

Sources, receivers, signals, and noise

According to information theory, a source is thought of as a generator of information. A receiver is related to a source by the flow of information between them. For example, a general practitioner states a diagnosis and the patient hears the words 'You have asthma'. Here, the general practitioner is the source, and the patient is the receiver. A basic tenet of information theory is that information is a reduction of uncertainty between a source and a receiver. The 'information' in this example is the diagnosis of asthma,

which reduced the uncertainty for the patient (let us assume this patient has no idea what caused their problem).

The signal in this example is the doctor saying the words 'You have asthma'. The signal is what carries information. It reduces the uncertainties the receiver might have about events occurring at the source. Another basic tenet of information theory is that a signal carries information if, and only if, it reduces the receiver's uncertainty about events that occurred at the source. So the signal in this example could be a letter written by the general practitioner, or a conversation with the general practitioner, as long as the patient was receiving what the general practitioner intended.

The virtue of information theory is that it provides a theoretical framework to examine the flow of information in the consultation both in a qualitative and a quantitative manner. We could study the various sources, receivers, and signals. For example, we might wonder why a signal did not flow in a consultation. It turns out that one of the major limits on the quality of any signal is the problem of noise.

The technical definition of noise in this theory is information the patient receives which does not tell the patient anything about the message arising at the source of the signal.

For example, let us imagine a general practitioner saying to a patient:

*'You have a disorder where the autonomic physiological response to dysfunction in the pulmonary airways occurred during which respiratory effort was increased and some degree of hyperventilation occurred.'*⁴

The doctor might know that this is a definition of asthma, but the patient merely hears a lot of technical words. So *noise* is information that the patient receives but does not want. The patient probably wants to hear words along the following lines: 'You have asthma. This means there is a

lot of thick mucous produced in the lungs which affects your breathing.'

General practice has too much noise

If we look at information from a GP's perspective, we soon realise that a lot of noise accumulates over a GP's working lifetime. If we multiply the volume of patients over time, the number of problems that patients bring, the number of contacts with local health professionals and the length of time a GP stays in a practice, it all adds up to a lot of noise. The sheer volume of the information creates problems and makes it harder to reduce either the patient's or the GP's uncertainty.

Perhaps the psychological advantage of having specific biases is that it helps the GP filter the massive volume of information. GPs select what is coherent with their biases, and reject the other information as noise.

Most GPs work in suburbs where they are busy with the quiet routine of consulting patients – it is only when the dramatic, the unexpected,

or the fearful consultation arises that the GP is reminded of the new. When a patient drops dead in the middle of a consultation, the shock of that new experience affects the GP profoundly. Whatever caused that death will

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influence how that GP manages similar patients in the future. Psychologists call the GP's new frame of mind as being unrepresentatively biased. The fact that one patient dies in the consulting room with asthma, for example, does not mean that all future patients who consult with asthma will die of the disease, but the shocking, dramatic, moment of watching someone die of asthma does indeed create a profound bias.

The skilful execution of the general practitioner's art requires that general practitioners know what biases they have, the influence of those biases on their behaviour, and how

to deal with those biases in order to say the right words at the right time.

The arrival of evidence-based medicine into the consultation

GPs are seen as the source of medical information by millions of patients a year. Patients continue to receive information just as they did when I observed Peter's consultations. However, the greater amount of information available has changed how GPs process information. A doctor's brain is just not good enough to hold all the information. There are millions of research articles and books out there and the quantity is growing all the time. We can be fairly certain that no individual can be a master of all the information in their field of expertise. Instead, GPs need to know how to access and use information better. EBM seemed to be the answer.

A pragmatic definition of EBM sounds very plausible

*'EBM is the explicit, judicious, and conscientious use of a set of tools and resources for finding and applying current best evidence from research for the care of individual patients.'*⁵

In the early 1990s the advocates of EBM thought that EBM might replace the traditional method of practising medicine. They succeeded in so far as now EBM is a serious component of medical education. But two major problems emerged.

The first relates to the nature of medical evidence. The actual application of evidence from research into clinical practice has not been straightforward. There are many examples in which it is difficult to transfer research findings into clinical practice because of the incompleteness of the evidence. This is particularly so for those studies carried out on selected groups of people who experience a marginal benefit from an expensive technology.⁵

The second problem relates to the nature of GPs. There is little evidence to date that those GPs whose practice

is based on an understanding of evidence directly obtained from research will provide superior patient care, compared with GPs who rely on an understanding of basic mechanisms and their own clinical experience.⁵ In one survey that I carried out on the influence of individual cases on clinical care, almost all GPs and hospital doctors thought that the results from an individual case have more impact on their practice than the result from a trial. I doubt if any research study on sudden death would have quite the same impact as a case experienced in the consulting room.

A qualitative study of how GPs moved from asking a question to applying the evidence described 59 obstacles in the process.⁶ The obstacles ranged from not being aware that evidence was needed, to finding that the evidence was outdated or irrelevant once discovered. A GP who was explicit, judicious, and conscientious with obtaining the evidence for the majority of patients consulted in a day would be paralysed with all the work required because of these obstacles.

So how does the GP proceed? How does the GP learn to be the source of information? The answer lies in the art of embracing information technology and mastering evidence to augment the consultation.

Embracing information technology

GPs and hospital doctors manage information differently. We carried out a survey last year on computer use and found that most Wellington GPs had been using their computer for many years and were irritated by their hospital colleagues who were more distant from computer systems.⁷ New Zealand GPs buy their own information systems, whereas management bought the hospital information systems for their doctors. It is interesting that the unit of measure of GP work is the doctor-patient encounter, whereas the unit of measure in the hospital is number of bed days,

or the volume of diagnostic categories managed in the ward. This difference reflects a difference in how GPs and consultants master their information. GPs like to make their information system work so that it enhances the doctor-patient encounter. For example, the flow of laboratory information is very focused on the needs of individual patients and their GP because it is easily accessible within the consultation.

In contrast, in the hospital system clinicians must deal with complex information systems that are not geared to managing one-to-one encounters with patients. Instead, they need to embrace a large number of health providers and ever specialised technology. For example, robotic surgery is being considered in Canberra Hospital in the ACT, Australia. This means that not only the surgeon but also the whole operating theatre – including an onsite information technician – need to embrace the technology. The technology is directed at the whole team, rather than only the needs of one-to-one encounters with patients.

The rapid development of computer technology means that it has become much easier for GPs to embrace it. The handheld Palm™ and the newer mobile phones, for example, reduce the distance between the GP and information management even further. A GP can use a Palm™ handheld computer to record a consultation at a house call, take a photo of the relevant pathology, and have the results beamed to the surgery or, more radically, to the patient's smart card. If the GP can use such technology to reduce the uncertainty in the patient receiving the signal, then everyone is happy. GPs are already using new technology in ways that are well suited to meet patients' and GPs' information needs.

There is room for improvement. Some of my non-medical colleagues are stunned by the lack of access to GPs via email or internet consulting. I am not sure if the young would even bother trying to send a text message

to the average GP. Despite these criticisms, information technology is present in most general practices in New Zealand and Australia. More and more GPs are using computers to record their clinical notes, create libraries for patient information and have rapid access to Internet websites in order to particularise information for specific patients. GPs are getting to grips with the technology. It is becoming a necessary condition. But it is not sufficient to acquire the whole art of mastering evidence.

The art of mastering evidence

The bigger obstacle seems to be GPs' ability to manipulate evidence. There is a large body of literature lamenting the gap between the available evidence and the use of this evidence by all health professionals.⁸ I am not surprised that there is this gap. The first randomised controlled trial was done in 1948. The culture of thinking in statistical and population-based terms does not combine easily with the culture of thinking in anecdotal terms. There has been only 50 years to allow a culture change which accepts the art of combining these two ways of thinking within the medical consultation.

Today we find variation in how health professionals take various positions towards evidence. At one end of the scale, there are the few health professionals who completely ignore evidence. An ethnographic study has found that some GPs ignore explicit evidence and rely more on tacit evidence obtained by brief reading and discussions with their colleagues or pharmaceutical representatives.⁹ At the other end of the scale, there are the few health professionals who explicitly do research and actually generate evidence. Some health professionals, such as medical librarians and guideline groups, collect and disseminate evidence. Fortunately the majority of health professionals use evidence in some form. For example, about eighty per cent of consultations in general practice manage-

ment actions have some kind of evidence attributable to them.¹⁰

Slawson and Shaugnessy developed an interesting equation¹¹ that states the most useful information for doctors is information that is relevant to their practice, valid, and does not take too much work to access. Library information systems already allow quick access to the sort of patient-oriented evidence needed in a consultation via telephones. This can be done as rapidly as accessing laboratory information in consultation.

Assessing the validity of evidence is a job the GP needs to do. This can be learnt through EBM courses or by just reading some of the many EBM sites or books on the topic. The method of assessing the validity of evidence is in itself an art form, but one that does not appeal to many health practitioners. This art requires learning to play with statistical or qualitative methods in order to see if the evidence from a study is valid for the patient. Many GPs choose to not dabble in the art of assessing the validity of evidence because of the 59 obstacles I mentioned previously. They just do not have the time. There are an increasing number of organisations, such as the New Zealand Guidelines Group, who spend their time assessing the validity of evidence, but they have a long way to go because there are millions of research publications out there.

Once the majority of GPs obtain evidence, they use it. Qualitative studies suggest GPs are skilled at being manipulators of evidence, at least the evidence they present to their patients. For example, a group of British GPs would refer to 'rat poison' when describing warfarin if they felt its use would be difficult, or describe the drug as 'having been shown to keep the heart young' when they wanted the patient to agree to treatment. The GPs in that study said patients' acceptance of evidence depended on how the GP framed the evidence. Call it rat poison and the

patient is less excited than if you call it an anticoagulant.¹²

Another qualitative project found that GPs would manipulate the uncertainty inherent in medical evidence in a variety of ways.¹³ For example when GPs were discussing various women's health issues, some would give a coherent account of the medical risks and benefits, but blur the fact that evidence was inherently uncertain and give the impression of certainty. Others would acknowledge uncertainty and give the patient more freedom of choice by negotiating provisional decisions.

A culture change

I cannot quantify the number of GPs who are masters of EBM or are cunning about evidence in the manner I have just outlined. GPs have a range of attitudes to EBM and information technology. At one end of the spectrum, GPs are behaving in a manner similar to Peter Anyon in that they write their notes by pen and prefer to telephone their colleagues rather than seek evidence by computer. At the other end of the spectrum GPs embrace technology and master EBM. The movement towards EBM is inevitable. It just takes time to see a culture change.

By the time we have completed that cultural change, EBM will probably have changed as well, so that it is necessary and vital to help GPs to process the overwhelming noise of information. Even when we are all masters of evidence, Peter will still be right. When the consulting door shuts, we still have to persuade the patient and allay their uncertainty. Millions of people consult GPs wanting to have their uncertainties allayed. The sheer volume of this uncertainty puts pressure on GPs to reduce the worry. We need to tell stories to allay uncertainty and persuade. GPs who actually reduce uncertainty in patients are acting according to Peter's advice: They sound plausible to the patient because they are sending the right signals. That is, and always will be, an art.

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