

## DEBATE ARTICLE

## System Change and the Management of Skin Cancer

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It is almost a century since Sinclair Lewis wrote his Pulitzer winning prize account of medical discovery: Arrowsmith (1). But the philosophy behind the book – it was written soon after the Flexner report demanded a greater role for science in medical education – is still shared by the dominant biomedical paradigm of today (2). In Arrowsmith, and most contemporary medical science writing, a single revolutionary discovery is quickly transferred from lab to clinic (you thought translational medicine was new?). A flash of insight, coupled with hard work with long hours spent in the lab, is followed by a decisive N of 1 clinical demonstration, and the subsequent speedy adoption of whatever technology has been brought to life (2). All without the mention of money, or resource.

Sadly, little medical advance is like this. Single, highly penetrant (to use an analogy from genetics) discoveries are rare. With the exception of cures for some infectious disease, most advance tends to slow the onward march of disease, rather than abort it. Acute disease becomes chronic disease. Often, imagined savings are not met, but rather, in contrast to definitions of advance in other industries, innovation increases, rather than decreases costs. Not always, but all too often. And although many researchers pretend to shy away from this topic, it is not just the third world that is now struggling to pay for health care costs. Health care costs have risen steeper than those in virtually any other area of the economy, with the exception of the costs of higher education in countries such as the US and the UK (3).

Against this background, it is hardly surprising that attention has focussed on whether techniques and approaches that have found favour in industry (and the service sector in particular) might help to control costs, and allow more and better health care for a given unit of expenditure (4–6). This system re-design embraces a number of different strands of thinking. These include explicit attempts to model activity, including defining inputs and outputs; a sharp focus on how different components of a system fit together to ensure speedy patient throughput; and a focus on how skill mix can be manipulated to allow the most efficient care at unit cost. Much of this philosophy assumes that it is indeed possible to disaggregate episodes of care, and that a reductionist approach can accurately both describe health care, and more importantly, be used as a template on which to organise care. Not all would accept these assumptions.

The paper by Rijsingen and colleagues (7) from the Netherlands can be read against this theoretical background. At one level, the paper is a straightforward attempt to look at patterns of diagnostic accuracy for skin tumours amongst GPs and dermatologists. The findings are perhaps not a total surprise. Those who spend most time within a particular clinical area (i.e. dermatology) perform better than those who do not. Some tumours (e.g. basal cell carcinomas) are more accurately diagnosed than others. Communication between different practitioners is often inadequate: in 40% of referrals the lesion was referred to as a ‘spot’. And doctors still do not examine patients properly, and hence miss diagnoses (8). All of this we could anticipate based on what we know about high level expertise acquisition (9). The authors consider whether the high levels of referral of benign lesions is appropriate (they seem to think not), debate whether biopsy of lesions in primary care should be encouraged, and wonder whether some GPs might specialise in dermatology in order to cope with the burden of skin cancer (they quote the example of Australia, but similar strategies have been tried in the UK).

If we were to adopt a systems level approach to this issue, and ignore whether we might upset our colleagues – either those based in hospital or those in primary care – what might we think? Let me put my head above the parapet.

Whatever we plan, we have to work within the limits of human capabilities. In most domains of high level practice (and examples would include professional chefs, musicians as well as physicians) expertise is acquired through extensive training, with structured feedback under supervision (10). Critically however, continued high frequency exposure needs to occur if skills are to be maintained. Nobody wants to be the first patient of the surgeon who has just returned to clinical practice, following his sabbatical in the cell biology lab. Nor do we want to be seen by the doctor who last saw a melanoma as an undergraduate – if indeed they did then (11).

Specialisation in general leads to higher technical skills. In some situations – think of providing medical care in the Antarctic or on an ocean liner – we have to sacrifice depth for coverage. With respect to dermatology this is probably seldom the case. Most patients recognise they have a skin problem, and are quite capable of directing themselves to the appropriate specialist. Most dermatology consultations do not take place at

2 am: life for a dermatologist is usually a little more leisured than it is for the obstetrician. When people get toothache, they usually have the time to choose a dentist over a general medical practitioner (12). If the unit cost of seeing a generalist is the same as a specialist (as it probably is in the UK) then a convincing argument needs to be made as to why people cannot choose who they consult with. Of course, many may prefer to see the same doctor who deals with all their other problems. This is a choice, but a choice they may bear on overall health care expenditure. If, a generalist only sees one melanoma every 10 years, one cannot expect the same diagnostic accuracy as those who see the same number each day. We therefore pay for this 'patient choice' in terms of multiple visits and episodes for the same condition when a patient is referred on. Nor in this context should we be persuaded by the dogma that specialists investigate more than generalists, and consequently specialists increase health care costs due to over-investigation in comparison with family doctors. A moment's thought about dermatological practice suggests this is simply untrue.

What about looking at the problem from a systems perspective? It is tempting to hive off activity according to traditional work patterns, generalist versus specialist, plastic surgeon versus dermatologist etc. But skin cancer is, as the authors make clear, such a large clinical area, that perhaps it makes more sense to think about a 'service' rather than a historical hand-me-down cluster of units that often seems to resemble a pinball machine, with the patient being the ball that gets bounced around a system of departmental silos (13). Here, instead of the patient consulting an individual doctor (the corner shop model), before being passed to a series of other practitioners (first the GP, then the dermatologist, then the plastic surgeon, then the oncologist etc), we might think in terms of central factories that process large number of patients, but use a variety of staff (nurses, technicians) to deliver high-throughput coordinated care that is, at least according to many criteria, superior to much conventional care (13). Examples of this large-scale approach would be some of the large cardiac surgery centres or ophthalmological surgery centres operation in India (14). Attempts to model care this way are also underway in the US (15). For instance, I continue to be amazed by why primary care physicians continue to undertake so-called minor skin surgery in the UK. Lack of diagnostic accuracy means that more surgery than necessary is carried out, and it is in any case possible to provide this sort of surgery using para-medical staff in centres that possess economies of scale, and can audit surgical care and skill levels more appropriately. Of course, the use of bigger centres might mean more travel, but here is a personal observation: many of my patients seem to travel further to get their hair done, than they do to receive medical care.

What of attempts to improve skin cancer diagnostic skills in primary care, or to develop GP specialists as seen in Australia or the UK? There are various points to make here, and perhaps a lot of wishful thinking about how the problem could be solved if only 'GPs' knew more about this or that subdomain of medical knowledge. In truth, such blandishments, must be frustrating to many GPs: there are only so many hours in the day. There are studies showing that it is possible to improve diagnostic skills over the short term following organised tuition (cited in Rees (16)). To find anything else would of course be surprising: if we expose intelligent people to formal tuition or learning, we expect short-term performance to improve. But, the critical point is whether this improvement is maintained, and what aspects of performance suffer because they have been replaced by training in another domain (16). There is no free lunch. If we run a course on skin cancer, then the rheumatologists, cardiologists etc. will all want to run courses. And much of what we know about such one off tuition is that in the absence of consolidation and feedback, the benefits are short lived only. How many of us remember all the history and geography we learned at school?

What of the special interest GPs? Well, given what I have argued above this seems even more of a fudge. Let us revisit the example of a single doctor on a cruise ship or a single doctor providing care to staff at an Antarctic research camp. In this particular context, we might expect that sub-specialist expertise in say anaesthetics/acute care might be particularly useful but, given the more leisurely timeframe of skin cancer care, if a patient can see a full specialist, why see a half-baked one? Unless of course geography dictates that only a limited number of practitioners can work in a particular area or population unit.

Some of the above arguments will arouse hostility in some. GPs in some countries, are proudly protective of the philosophy of generalism and 'holistic' patient care. Similarly, those trained as general dermatologists, may be none too fond of attempts to rewrite the boundaries of what a dermatologist does, and create new skin cancer centres that might embrace physicians and paramedical staff who come from non-dermatological backgrounds. But, as health care costs rise, as attempts to limit spending come to the fore, more and more attention will be placed on how the various pieces that make up a health care system might play together more efficiently. Pace Arrowsmith, most of us find the flash of personal insight that leads to scientific advance more attractive than the gradual accrual of knowledge from giant research teams. Most of us prefer the idiosyncrasies of the quixotic Sherlock Holmes to the giant team-based logistic-rich police forces that are said to be more efficient in dealing with modern crime. Most of us prefer the idea of the personal physician to the medical production line.

But, most of us would, I suspect, choose a production line Volkswagen or Toyota than a car made by a single craftsman, however skilful the latter (17).

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