

3D healthcare

Putting patients at the centre will transform healthcare

In modern healthcare, attacking waste, confusion and delay is key to ensuring that assets and skills are used to the best possible effect. At the same time, accurately targeting scarce resources is vital to delivering real benefits to patients. It's our opinion that the sector needs to adopt a shared, threedimensional thought model as a basis for change in the vital area of information systems: it's the only way to increase capacity while saving money, improving clinical performance and enhancing the patient experience.

Dr. Lester Russell

WHERE NEXT?

The National Health Service (NHS) in England is making great strides to improve the performance of its services by applying IT where patient benefits are immediately obvious: in the interventions that professionals make with individual patients and in support systems such as booking and procurement. But while

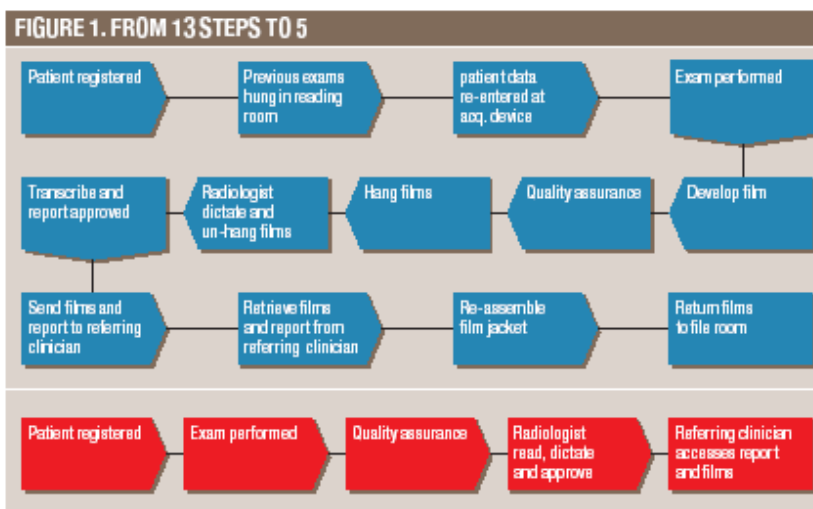
achieving benefits beyond these niches seems elusive, we believe that the power of IT to transform service delivery in healthcare is far from being exhausted: in many ways, we've barely begun to scratch the surface. The next significant steps forward

will not be in specialised areas of care, or in discrete business processes, but in the way technology can link healthcare services and put those services at the command of patients and their carers – when and where they need them.

CONNECTING THE DOTS

The health service is a large, complex and fluid organisation that unites many disciplines around a common aim: the prevention and cure of illness and the promotion of good health. The natural focus on patient needs and collaborative behaviour that such an enterprise inspires have historically faced obstacles and barriers rooted in organisational design and available methods. When the only delivery options you have are large general hospitals or small general practice surgeries, your support services naturally evolve to support those entities. Similarly, if patients are dealt with as bearers of isolated problems, then information systems evolve to support those problems and the situations in which patients present them.

However, modern healthcare, lifestyles and technology all challenge these rigid approaches to support. As specialisms in clinical practice multiply, so the need to build a holistic view of the patient grows. As people's expectations and habits change, so their needs for care, information and guidance regarding their options develop. And as the channels and venues through which people interact with the health service proliferate and change, so the need to relate events across different touch points grows. It's true that 'foreground' IT initiatives can bring impressive improvements to patient interventions. For example, the introduction of digital imaging technology in radiography has rapidly accelerated workflow in this area (see Figure 1). Accuracy of the interpreted images has been improved by voice recognition technology, while digital capture, storage and transmission greatly reduce the time taken to create, access and transfer images. Changes of this kind are to be welcomed – but if process transformation is restricted to discrete functions then bottlenecks and inefficiencies will simply migrate to other parts of the delivery chain; the most efficient radiography solution in the world has limited power unless the team using it can relate the images to the patient's life history.



IT has a less glamorous 'background' role that promises to surpass the combined benefits of point solutions in healthcare. By connecting information with patients and the professionals who help them, healthcare providers can make better use of their expensive resources while increasing their throughput. A simple, comprehensive and patient-centred information model will enable information to precede patients as they make their journeys through the healthcare system, triggering relevant services as and when they are needed, and turning healthcare delivery into an uninterrupted flow.

A DOSE OF TECHNOLOGY

Poor IT performance is an important source of waste in the health service. The high costs of running systems designed to automate individual departments or healthcare locations, and the difficulty of getting those systems to work together, are accepted as inevitable overheads. Since these overheads are dispersed, their aggregate effects are rarely considered. And even when estimates for the costs of IT are proposed, the figures can seem insignificant in comparison to costs elsewhere in the system. Perhaps more importantly, raw cost figures disguise both the actual and the potential contribution that IT can make to patient outcomes and service productivity. Organisations in other service sectors have learned – often painfully – that IT is far from trivial as a factor in their success. The ability to respond rapidly to customer needs across a growing range of channels has become a key differentiator. The continued shift from monolithic, vertically-integrated organisations to extended and virtual enterprises, where groups of companies work together to satisfy customer needs, has also prompted investment in information connectivity. Commercial organisations now expect to trade information with each other on a regular basis and to collaborate around customers' requirements in real time. Technology has become the lifeblood of these businesses. It's no longer a case of throwing computers at clerical departments: IT is now the principal enabler of organisations' responses to their opportunities and threats. Government is beginning to follow the example set by commercial organisations by re-ordering public services around the needs of the individual citizen. Departments and agencies are using technology to simplify their processes and to collaborate with each other as a matter of course, rather than exception. Perhaps it's time for the healthcare sector to pick up the baton of 'customer centricity': to learn from the discoveries that have been made in other sectors, and to exploit the solutions that others have developed. We'll need to adapt these proven tools and methods to the healthcare environment but in doing so we'll be making the leap forward that healthcare so urgently needs. We'll be reorienting the service around the patient – and unlocking the concerted power of the NHS.

THE WATERSIDE MEDICAL CENTRE

We can use these developments positively to transform the way the healthcare sector deals with patients. One example is the Waterside Medical Centre in Portsmouth.

At the Waterside, patients can choose to be seen on a "walk-in" basis. Rather than being seen by a Gp or nurse in a consulting room, with the professional turning away to use a deskbound PC or leaving the room to consult other sources, the staff move around the patients. Using handheld tablet PCs or laptops, doctors and nurses can engage with patients with complete concentration, knowing that all the information they need is at hand. The secure wireless network at the centre ensures that patient information meets patient at the time and place of need. According to Dr Matthew Davis, "A consultation is best when it's a continuous, uninterrupted flow of information. I can hear what they're saying, I can explain what's happening, and I can get on and treat them."

Productivity in the walk-in clinic has risen sharply, with more than 80 patients being seen in a typical day.

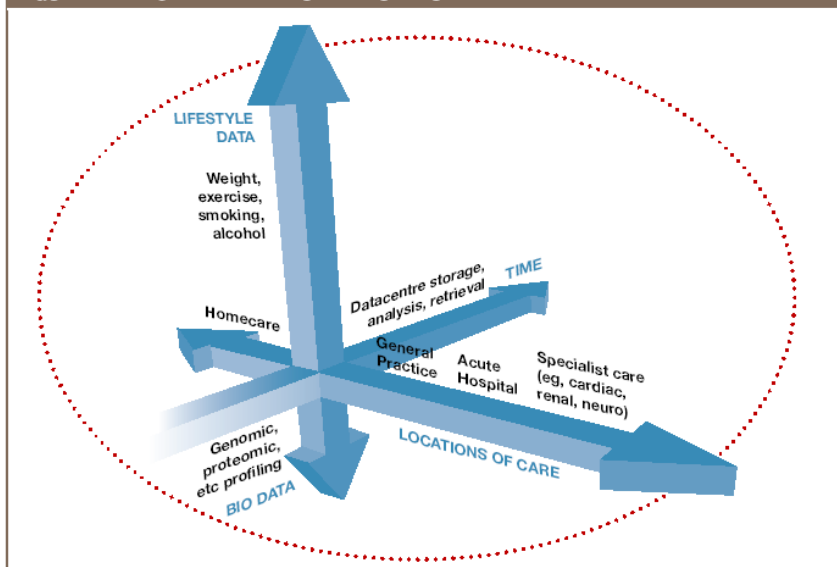
Patients say that they like being able to see all their information on the doctor's device: it's much easier for patients and professionals to work together and for patients to retain a sense of personal ownership of their care. The centre's approach facilitates the team-based approach to care by enabling its staff to work around the needs of patients. It also responds to people's lifestyles by making the walk-in option a normal means of access. And it's exploiting IT to create a responsive information environment that works reliably in the background to put patient needs first.

The same kind of thinking is taking hold in secondary care and acute services.

AN INFORMATION MODEL FOR GREATER CONNECTIVITY

While connectivity initiatives are gathering pace, there's still a long way to go. For example, if every consultant's outpatient clinic had automatic read-only access to GPs' records then they would save between 30 per cent and 50 per cent of their time. These are the estimates that consultants give us, based on their experience. Simple access of this kind would radically improve throughput. As an investment in healthcare capacity, this facility compares more than favourably with initiatives in recruitment, training or flexible hours.

FIGURE 2. THE 3D HEALTH INFORMATION MODEL



We advocate an approach that we call the 3D Health Information Model (3DHIM). This is a basic ground-plan for the development, procurement and tool for making decisions – and demonstrating the rationality of those decisions. It's not a template for any type of system, nor is it a set of rules about how systems should work or work together. It simply specifies how IT initiatives contribute to the business goals of the health system and ensures that every investment can be assessed for its relevance to patient and provider needs. The horizontal axis of the model represents locations of care. These are the places where patient and health system meet, either physically or virtually. The spectrum runs from the home, through primary care and secondary care into specialist care. The entry and delivery points of care are expanding all the time, and it's important that our systems recognise the different requirements of each point while making information available across all of them. This is also the dimension where the foreground attributes of technology are most apparent; because it's here that we're considering devices, access routes and usability options. The vertical axis represents a range of patient data. This is the domain of 'patient records' as we have come to understand them and encompasses the full medical history of the individual. But this dimension also incorporates data from investigations and, increasingly, relevant genomic information.

Any model runs the risk of looking like a solution rather than a tool. The 3D-HIM is not a point solution but a readily usable way of articulating information flows, IT requirements and process redesign. It's a means of debating priorities and directing investment, and a framework for planning confident, stepwise, targeted change.

As the number of investigatory techniques continues to expand, the range of attributes covered by this dimension will grow, particularly as the costs of various kinds of imaging fall. Similarly, the availability and utility of genomic data will grow in line with increasing clinical knowledge. Information about the patient's lifestyle choices – such as smoking or alcohol use – is also represented here. The third axis represents time. All the information in the model can be expressed in terms of a timeline following the individual from birth to death. Using this model, any individual record will tell the patient and his or her carer how he or she was cared for during a particular event at a specific time and place. Continuity of care across different locations of care is easily audited, as is the evolution of a treatment plan over time. Every salient piece of information has a home in this model and is available to every process that needs to take it into account.

BEYOND THE THIRD DIMENSION

The 3D Health Information Model is a key tool for moving the sector forward but it can also be expanded to serve wider societal needs. In the first place, organisations that interact with the healthcare sector could be included in the model. So, for example social services could be triggered to carry out an assessment of the need for help of a non-therapeutic nature – such as meals on wheels. The increased attention being paid to connectivity between healthcare, education and social services in the care of individuals is also relevant here. From the point of view of public policy, the growth of databases organised around the 3D-HIM principle will provide insights into social trends, performance variations in the system and the emergence of effective new therapies. This kind of accurate planning information does not exist at present and so, today, future services have to be decided on a combination of forecast needs, professional opinion and citizen pressure. The 3D-HIM will make real information about real outcomes in real cases available on a truly comparable basis, exposing, for example, which channels generate the speediest and most effective resolutions of patient needs. Supermarkets have been able to abandon theorising about what might sell if it's piled high enough at a cheap enough price, turning instead to gleaning insights into what customers want and making those goods and services available to them just in time. This is the kind of lesson that the healthcare profession can take from commercial practice. It's not about trying to standardise patient care, or 'dumbing down' professional practice: it's simply about matching skills and resources to real needs. If this principle is grasped at the strategic level then, as a community, we will be able to transcend the seemingly depressing economics of healthcare, improving performance without piling on new infrastructure. Imagine, for example, an analysis of 3D-HIM information that exposes which channels, therapies or advice have the biggest impact in limiting the development of type II diabetes. Such a discovery would almost make blanket screening programmes redundant, saving enormous amounts of time and money – and improving patient care.

The key to the really meaningful future enhancements in healthcare may not lie in molecules, or surgical techniques, or lifestyle modification advice, but in the objective analysis of the combinations of activity which produce the best outcomes in practice. Healthcare management will then become truly scientific, economically transparent, and politically accountable.

COMMUNICATING THE MODEL

Any model runs the risk of looking like a solution rather than a tool. The 3D-HIM is not a point solution but a readily usable way of articulating information flows, IT requirements and process redesign. It's a means of debating priorities and directing investment, and a framework for planning confident, stepwise, targeted change. If it is adopted by the healthcare sector, it will provide for the first time a solid management connection between the contribution of IT and health outcomes. Above all, the model is a neutral and objective platform for facilitating discussion that keeps healthcare professionals in control of the development agenda. The IT industry produces great products and services: but it shouldn't be put in charge of healthcare. The collaborating disciplines that make up modern healthcare, jointly focused on the welfare of the individual patient, are best placed to decide how and where money is spent on developing the system of care. The 3D-HIM puts the healthcare community firmly in charge. There's no room in it for technical obfuscation, or inflated claims. It's also a model that IT suppliers can work with, applying their strengths without having to conform to a rigid, low-level architecture but denying them the opportunity to force self-interested proprietary products into the market. The model can make a difference – right now. It provides an excellent basis for assessing the contribution of existing systems or planned initiatives. It creates a context in which different interest groups can discuss their goals and negotiate their collaborative activities. It also provides a baseline against which supplier claims can be challenged or verified. But perhaps most importantly, the 3D-HIM provides a lens through which anyone involved in healthcare can re-imagine the system working around the patient. The patient becomes the focus of the system's concern rather than a burden on the system. People are no longer seen as packages of symptoms being shunted around a complex factory or supplicants who must be crudely graded as to need so that budgets are not blown. Instead, the healthcare system becomes a flexible care environment that reconfigures itself in real time according to the needs presented to it by patients. Once this perspective is enabled, it becomes less easy to implement systems or design processes that meet institutional needs without also meeting patient needs. Patient-centred thinking becomes the default behaviour in information systems – just as it has always been in the caring professions.

Whose **OPINION?**

DR. LESTER RUSSELL



Lester is our chief medical officer, responsible for all clinical matters relating to our work with the nHs and the wider health economy. He graduated from Southampton university Medical school in 1983 and worked in a variety of hospital specialities until 1990, when he became a partner in general practice. He was awarded an MBA in 1997 and left full-time general practice in 2001 to pursue a broader business career, including a post as medical advisor to nHs Direct, expert witness in personal injury claims and medical advisor in clinical negligence cases. He also originated and co-founded a medical consultation website, e-gp.com, which provided advice and information online. Lester remains a practising Gp, working part-time in a busy south-coast general practice.

YOUR OPINION

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