Where now with clinical computer systems?

IN the early 1990s many of us found the new generation of GP systems brilliant in supporting our quality agendas. These systems had good functionality for their time and the enthusiasts among us cajoled and bullied our partners and practice nurses into using their clunky interfaces. And we all got something back, from quality improvements to more money in our pockets. Unlike a lot of the world we implemented health informatics with real systems. But 10 years on, the support that computers provide to produce medical records, make clinical decisions and learn, has barely improved — this is, however, at odds with the improvements in our administration systems. The user interfaces have kept track from a look and feel perspective but they haven't levered much in the way of improved usability.

I believe that the reasons for this are complex. The marketplace became moribund with the lack of a clear customer (practice, health authority or government?) and not enough funding was provided to generate supplier research and development. The profession and government conflicted and pulled in many directions. Where a shared vision was achieved government failed to consistently produce a framework to achieve the goals. Meanwhile, academic research progressed but found no way of implementing the ideas and got trapped in reductionist trial methodologies that were bound to come up with half-hearted or negative findings. To make things worse these research methodologies failed to support the iterative development of common-sense tools. In addition, one could rarely see the health consumer/citizen involved in the development of their record or the tools to support their care. The agenda of shared records between healthcare professionals and health organisations has also remained a real barrier with continuing local and often professionally-centred records. And this within the context of too many initiatives and performance-related targets for health informatics.

Complex systems[1] such as healthcare[2] are characterised by having emergent properties that cannot be predicted (or understood) by analysis of the behaviour of individual components of the system. Perhaps this issue of the Journal, with its two interesting papers,[3,4] could attract some down a new path, or maybe it is part of the radical changes already afoot in clinical system contracting. In complexity theory-speak the national IT programme[5] is certainly an 'attractor' drawing our story in its direction, but is it a 'strange attractor' drawing us away from the chaos? Or, indeed, will it be a 'point attractor' unwilling enough to let the tools we need emerge from the bounds it places?

Holt and Ohno-Machado's paper proposing the role of adaptive predictive tools in critiquing care in coronary heart disease prevention is exciting.[3] Ever since *Information for Health*[7] proposed the electronic health record (a centrally accessible record) and the benefits that would ensue, tools such as Holt and Ohno-Machado describe have become real possibilities.[3] Barriers to the electronic health record have occurred. On one hand, the profession's fixation on record security is appropriate, but the health consumer/citizen needs to be more engaged. On the other hand, the security issues, whether technical or policy, of centrally accessible records do have solutions: after all, the banks manage it. Furthermore, who mentions the security risks of 10 000 barely secured, complicated general practice servers with inadequate in-house support? Professionally, let's be excited about tools for quality improvement, help manage the risks, and iteratively support their development.

Holt and Ohno-Machado's paper[3] also raises issues in my mind of 'moving goalposts' because the tool described can learn and dynamically reflect where we 'currently' are. It is great that we can reflect on where we are and where we could be, but this does not sit well with funding systems that will not adapt dynamically. It worries me that the sanctity of the record for direct patient care will be lost.[7]

Can these adaptive predictive tools help resolve the issues presented in the paper by Rogers *et al*[4] on the inadequacies of clinical system coding schemes, the inadequate coding maps for computable inferences and the idiosyncratic behaviour of clinicians in their selection of codes? Unfortunately, for the moment, no. Although they could work well, there is no way of validating the knowledge, except for careful training of the network. The risks of advising inappropriate clinical actions with a black box in charge are not worth taking. We often forget that we code our records because computers are too stupid to read them. We only need to code the information a computer needs to read for decision support or reports — don't forget the narrative!

Over the years the coded nomenclatures of health, such as Read codes, have expanded to cover the breadth and depth of language requirements for multiple disciplines. Their hierarchies have developed to help the human browse for appropriate terms. They have lost the pure parent–child hierarchies needed for a computer to understand meaning; for example, 'chest pain not present' as a child of 'chest pain'. In this respect it is possible that SNOMED Clinical Terms (CT)[8] may start to resolve the issue of inference, but this assertion needs further evaluation, as our work suggests that it is not yet possible.

Moreover, the user interface should be more 'controlling' with respect to the choice of terms from the coded vocabularies. The Sowerby Centre has discovered that for general practitioners to code clinical records you only need around 1500 condition codes, compared to 43 000 in Clinical Terms Version 2 (Read 5-byte set), and this increases to 73 000 in SNOMED CT. Of course, you need more for a limited set of findings and administration codes. The user interface should present a limited controlled term set for differing record slots; for example, problem, investigation request, sensitivity and family history. This should vary depending on the professional role of the user, such as a general practitioner or a urologist, and of course there needs to be a large reference set accessible behind it. The sensitivity and specificity of computer triggering, whether it be for prompts to label the indication of prescription in the record[4] or to present PRODIGY,[9] can, and must, be improved. Until clinical systems adopt one standard nomenclature (which the NHS has decided will be SNOMED CT), which includes subsets, then it is unlikely the intelligent user interface will develop and present the appropriate subset (with access if more depth is required). In this interregnum knowledge authors have a laborious task and require supportive tools. The synthesis of knowledge that the computer can intelligently present is possible but needs to be based on a robust funding model and with a defined innovation model.

Technically supporting multiprofessional, multiorganisational communication with the patient in 'control' is entirely possible now. In the near future, intelligent browsing of knowledge, within or without care pathways, with the addition of computerised review of clinical actions (to spot the bad habits and alert the clinician to potential mistakes or out-of-date activity) will also be a possibility.[10] These are all part of second release of PRODIGY when the 'Integrated Care Record Services' (ICRS) concept is ready to plug it in.[5] In addition, the National Electronic Library for Health is making great efforts in the integration of diverse knowledge sources to provide a National Knowledge Service. What is needed for progress is basic interoperability (i.e. for computers to be able to talk to each other), scalable knowledge bases, and intelligent interfaces that support what goes on in the consultation. The challenge is to align the technical, the social and the professional issues with the aim of supporting patient-centred systems that operate across the shifting organisational boundaries.

Will the new national IT programme's approach to procuring the ICRS succeed? For the first time in a number of years I believe the approach to the problems might succeed — although there are many who do not and I can understand some of their misgivings. ICRS success or not, be prepared! We need new interoperability standards, and converting what you code into your proprietary system data structures will lose some meaning when it is converted into the standard. For any practice that has moved clinical systems I don't need to tell you that this loss of meaning needs to stop. The more the systems communicate the more it will happen, and for any progress to be made we need these new standards. In addition, as the new market develops who knows who your supplier will be? I have learned over the years that political conflict rarely leaves you further forward. We need a sensibly paced journey that develops the tools while iteratively learning from the experience of the clinical users and patients.

Of course, clinical behaviour needs to adapt so we can continually learn, improve quality, and respond more to the patients' needs while using new tools that support us.[11] In addition, we need the time to consult with patients to reduce the more unhelpful short cuts we take, and spot the bad habits that can result. The tools of 'knowledge management' are more than a technical approach, they are also about human behaviours and mind-sets, and the language used is not just evidence-based: it is experience-based, too.

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Delayed prescriptions in primary care

THE concept of using time as a diagnostic tool is familiar to all those working in primary care; many complaints are self-limiting and will resolve without medical intervention. We are reasonably comfortable asking patients to come back if their condition has not improved, and it is logical to extend this to giving a delayed prescription for use if the symptoms of infection have not abated in a day or two. Two papers in this Journal consider the use of delayed prescriptions of antibiotics for respiratory tract infections.[1,2] The concept is not entirely new, but has not been widely studied until the last few years. The pioneer in this area was John Pitts, who published a case series reporting good outcomes with delayed antibiotics for children with acute otitis media as long ago as 1987.[3]

Rising levels of antibiotic resistance provide the main incentive to restrain antibiotic usage, and many respiratory tract infections are caused by viruses so will resolve spontaneously without antibiotics. Nevertheless, the suggestion of withholding antibiotics can trigger an immediate negative response. This is not entirely surprising, because if a previous infection has been treated with antibiotics and has improved, the natural conclusion is that the antibiotic is responsible for the improvement, and this reinforces the use of further antibiotics when the next episode occurs.