

itioner 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 record⁴ 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of computerised review of clinical actions (to spot the bad habits and alert the clinician to potential mistakes or out-of-date activity) will also be a possibility.¹⁰ These are all part of second release of PRODIGY when the 'Integrated Care Record Services' (ICRS) concept is ready to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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References

1. Stacey R. *Complex responsive processes in organizations: learning and knowledge creation*. London: Routledge. 2001.
2. Wilson T, Holt T, Greenhalgh T. Complexity science: complexity and clinical care. *BMJ* 2001; **323**: 685-688.
3. Holt TA, Ohno-Machado L. A nationwide adaptive prediction tool for coronary heart disease prevention. *Br J Gen Pract* 2003; **53**: 866-870.
4. Rogers JE, Wroe CJ, Roberts A, *et al*. Automated quality checks on repeat prescribing. *Br J Gen Pract* 2003; **53**: 838-844.
5. Department of Health. National IT programme. <http://www.doh.gov.uk/ipu/programme/> (accessed on 1 October 2003)
6. NHS Executive. *Information for health*. Wetherby: Department of Health Publications, 1998.
7. Kay S, Purves I. Medical records and other stories: a narratological framework. *Methods Inf Med* 1996; **35**: 72-88.
8. NHS Information Authority. SNOMED clinical terms. <http://www.nhsia.nhs.uk/snomed/> (accessed on 19 September 2003)
9. Purves IN. PRODIGY: implementing clinical guidance using computers. *Br J Gen Pract* 1998; **48**: 1552-1553.
10. Robinson P, Purves I. Learning support for the consultation: information support and decision support should be placed in an educational framework. *Med Educ* 2003; **37**: 429-433.
11. Purves IN. The changing consultation. In: van Zwanberg T, Harrison JGP, eds. *Tomorrow — living with uncertainty*. London: Radcliffe Press, 1999: 31-49.

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.

Empowering change

In order to break this cycle all parties need to be convinced that it is safe to try the experiment of withholding an antibiotic in order to see if a swift resolution will still occur. In acute otitis media the collected data from all identified randomised trials supports this experiment.⁴ At 24 hours there was no significant difference in ear pain between those given antibiotics and those given a placebo; in both groups 39% of children were pain free at this stage. A few days later the proportion of patients in pain had fallen further, and a small benefit accrued with antibiotics, but the use of an antibiotic only reduced the residual proportion of patients in pain from 21% to 15%. This translates into about 15 patients needing to be given antibiotics for one extra to be free from pain (number needed to treat = 15, 95% confidence interval = 11 to 25).

Delayed (or deferred) prescriptions can be used as a safety net to allow patients, or parents of children, to fall back on the use of an antibiotic if spontaneous resolution of the symptoms of infection has not occurred. In theory, if parents of children with acute otitis media give adequate analgesia for a day or two, the symptoms should resolve in the majority of cases without needing to resort to the use of antibiotics.

Theory and practice

We need to know if the theory is supported by experimental evidence. The review by Arroll *et al*¹ suggests that this approach can reduce antibiotic consumption for respiratory infections (acute cough, sore throat and otitis media), and the combined results of the controlled clinical trials included in this review showed that substantial reductions in antibiotic consumption can be achieved. Of course, in real life, the patients given a prescription can go to the chemist immediately and start the course of antibiotics, ignoring the advice to delay taking the treatment. The paper by Edwards *et al*² indicates that, in the patients who returned their questionnaires, 47% of the delayed prescriptions for antibiotics were actually consumed. We do not know how many patients would have taken their antibiotics if no instruction to delay had been given, as there was no control group, but nevertheless it is useful to show that half of those who were asked to delay did not need to consume the antibiotic. Similar usage of delayed prescriptions was found by Siegel *et al* in a recent paper from the United States reporting the use of delayed prescriptions for children with otitis media.⁵

In 1998 we started withholding immediate antibiotics for children with acute otitis media in our practice,⁶ and continue this policy now. We still offer antibiotics straight away for children who are toxic, a definition deliberately left to the clinician but now supported by published data that the outlook for fast resolution is less likely in children with high fever and vomiting.⁷ Initially, we gave a handout to patients explaining the evidence upon which we based our change of policy, but this is increasingly not required as most parents are now familiar with our 'new' approach.⁸

In 1999 we published the initial results of this change in comparison to a neighbouring practice, and showed a reduction of 32% in cashed amoxicillin prescriptions in com-

parison to a 12% fall in the other local practice that had not implemented the change.⁶ Since then we have not been swamped with mastoiditis (one case has occurred in 5 years, and it was in a patient given immediate antibiotics). Also, the neighbouring practice has adopted the deferred prescribing approach (but have not used the handout), and both practices have now reduced amoxicillin suspension prescribing by about 50%. Moreover, there has been a noticeable reduction in phone calls asking for immediate appointments for children with earache, and the majority of children are now being brought in after a couple of days if their symptoms persist.

Patient expectations

One of the surprises in the early stages was the number of mothers who responded to the suggestion that their child might not need antibiotics with the words 'Oh good!'. A reminder, perhaps, that we should not take for granted the patient's expectations, as there is ample evidence that we often get it wrong if we guess whether an antibiotic is expected or not.⁹ Has this made an impact on antibiotic resistance? I do not know for sure, but as half of all antibiotics given to children in the practice were given for acute otitis media in 1998, there are certainly less children in Bushey (the practice area) on antibiotics as a consequence, and there is evidence to link lower antibiotic prescribing with less resistance.¹⁰

We often bemoan the difficulties of using the results of published research to change practice. Perhaps deferred antibiotic prescriptions in selected respiratory infections represent one practical way of empowering patients to find out for themselves if their infection will resolve without an immediate antibiotic.

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References

1. Arroll B, Kenealy T, Kerse N. Do delayed prescriptions reduce antibiotic use in respiratory tract infections? A systematic review. *Br J Gen Pract* 2003; **53**: 871-877.
2. Edwards M, Dennison J, Sedgwick P. Patients' responses to delayed antibiotic prescription for acute upper respiratory tract infections. *Br J Gen Pract* 2003; **53**: 845-850.
3. Pitts J. Shared decision-making in the informed treatment of acute otitis media. *Practitioner* 1987; **231**: 1232-1233.
4. Glasziou P, Del Mar C, Sanders S, Hayem M. Antibiotics for acute otitis media in children (Cochrane Review). In: *The Cochrane Library*, Issue 3, 2003. Oxford: Update Software.
5. Siegel RM, Kiely M, Bien JP, *et al*. Treatment of otitis media with observation and a safety-net antibiotic prescription. *Pediatrics* 2003; **112**(3): 527-531.
6. Cates C. Reducing antibiotic use in children with acute otitis media. *BMJ* 1999; **319**(7202): 124.
7. Little P, Gould C, Moore M, *et al*. Predictors of poor outcome and benefits from antibiotics in children with acute otitis media: pragmatic randomised trial. *BMJ* 2002; **325**(7354): 22-28.
8. <http://bmj.com/cgi/content/full/318/7185/715/DC1> (accessed 30 September 2003).
9. Mangione-Smith R, McGlynn EA, Elliott MN, *et al*. The relationship between perceived parental expectations and pediatrician antimicrobial prescribing behavior. *Pediatrics* 1999; **103**(4 Pt 1): 711-718.
10. Nasrin D, Collignon PJ, Roberts L, *et al*. Effect of beta lactam antibiotic use in children on pneumococcal resistance to penicillin: prospective cohort study. *BMJ* 2002; **324**(7328): 28-30.