informed consent requires doctors to give patients full information in all cases of significant risk, even if there is only one treatment possibility. After all, there is still a decision to be made because the patient has to choose between two courses of action: to accept or reject the treatment. McNutt argued that doctors should never make choices for patients;[13] instead, they should play the role of navigator, communicating risk and outcome probabilities and helping patients to make informed decisions for themselves.

The latest version of *Good Medical Practice* says doctors should listen to patients and respect their preferences, give patients the information they want or need in a way they can understand, and respect patients' right to reach decisions with the doctor about their treatment and care.[14] This does not imply you should force patients to take responsibility for decision making against their will, but it does suggest that you should make serious efforts to provide information about the treatment or management options, explain it, elicit their preferences, and support them in weighing up the alternatives unless they tell you they don't want to be involved. How far you should go in persuading them to play an active role if they are hesitant about doing so, must remain a matter for debate.

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Antimicrobial resistance: increasing concerns

Were Charles Darwin alive today he would rapidly understand many of the issues surrounding antimicrobial resistance. They represent 'survival of the fittest' at their most dynamic. Darwin drew upon examples from the Galapagos (finches and tortoises), as well as fossil records, and realised that evolution had occurred over millennia (at the least). This brought him into conflict with conservative elements in the church (with the argument still rumbling on today in the Creationist versus Evolutionist debate).

In the interaction between pathogen and antimicrobial, evolution occurs over a very short period of time. As is well known, remarkably soon after the introduction of penicillin, staphylococcal resistance was reported and now resistance rates exceed 90% in *Staphylococcus aureus*. Similarly, staphylococcal resistance to the fluoroquinolones was reported during the pre-marketing clinical trials[1] and has continued to rise.

The reasons for this telescoping of time are not difficult to understand. The selection of a genetic characteristic depends upon the interplay of a number of variables. While the Galapagos tortoises were relatively few, vast numbers of bacteria are in the gastrointestinal tract and on the skin, say 10^{11} or 10^{12}. Secondly, many bacteria can reproduce, double in number in 20 minutes, although the tortoise generates only few offspring in a long life. Finally, bacteria have a variety of means of passing genetic information to future generations in addition to simple division; these include conjugation (where bacteria exchange DNA via contact), bacteriophage transduction, and the direct uptake of DNA (transformation). Only the sexual method is available to tortoises. Add to this a very potent selection pressure, an antimicrobial, and resistance will readily emerge in bacteria.

For example, it is possible to select for fluoroquinolone resistance *in vitro* by overnight exposure of a *Staphylococcus* or *Escherichia coli* to the compound. These laboratory experiments may not represent the *in vivo* conditions, but they do underline just how readily resistance

can emerge. I have heard it said that antimicrobial resistance is a hospital issue and not a problem in general practice. Indeed, surveillance systems which depend upon, in the main part, hospital-derived data will give resistance rates greater than those in general practice,[2] but outside hospital, resistance rates are considerable for common pathogens.[3]

In this issue Butler *et al*[4] suggest that 80% of all antibiotic prescribing occurs in general practice with at least 50% of this for respiratory infections, the majority of which do not require treatment. The bulk of the remainder are prescribed for skin and urinary tract infections where placebo effects may be greater than 50%.[5–7] Resistance is only noticed when there is treatment failure. In primary care, with so much background noise of high rates of antibiotic prescribing for non-bacterial infections, and of spontaneous resolution of others, it is not surprising that little resistance is thought to occur.

This is a time of rapid change among many bacterial pathogens. New mechanisms of resistance are appearing, but where the hospital was once the setting for the more resistant organisms, there are signs that this is changing. The common Gram negative organisms such as *E. coli* and *Klebsiella* species are increasingly reported as resistant to the β-lactam antibiotics as they have acquired plasmids conferring the ability to generate antibiotic-destroying hydrolysing enzymes (β-lactamases). There are already high rates of resistance to earlier compounds such as ampicillin and amoxicillin. It is of concern that recently there have been clusters of cases in the UK of community urinary tract infections where the therapeutic options have been considerably curtailed because new β-lactamases (known as extended spectrum β-lactamases) have appeared and spread.[8] These enzymes can inactivate the cephalosporins. It would not be a surprise if the majority of such organisms became resistant to the oral and injectable cephalosporins in the near future. The other worrying development is among the staphylococci. Meticillin-resistant *S. aureus* (MRSA) is constantly in the news and linked (at times unfairly) to dirty hospitals. In the last few years there have been increasing reports of MRSA in the community. Undoubtedly, some of these are a 'spill over' from hospitals (in family members, for example), or elderly care homes. It is interesting to note that GPs in West Ireland also have an increased incidence of nasal carriage of MRSA.[9] It would be of interest to know the carriage rates in both the general population and those served by 'positive GPs'.

However there are *de novo* cases in otherwise fit people (in the US, in sports teams, for example). Such strains differ from those found in hospitals and, worryingly they may possess a virulence gene (the Panton Valentine leucocidin [PVL]) which has been associated with a greatly increased mortality.[10] Experience elsewhere may suggest that we are likely to see an expansion of such strains. It is difficult to predict; however, I believe that if we do not control MRSA in hospitals then, in addition to these PVL-producers, we will see more staphylococcal resistance in the community.

In a time when great advances are being made in therapeutics and numerous bacterial genomes have been elucidated (revealing potential targets for antibacterials), it is a puzzle to many that there is a dearth of new agents under development. The reasons are allied to the very problem of resistance itself. In the effort to control resistance, the profession is exhorted to be prudent in their prescribing and not use antibiotics for trivial, self-limiting viral infections. Similarly, there are now clinical trials proving that treatment duration for many bacterial infections can be shortened without risk, the best example of which being a 3-day course for uncomplicated urinary tract infections. Antibacterials have traditionally been considered cheap, costing at most a few pounds for a course. One does not have to be a financial wizard to realise that research in this field does not appeal to pharmaceutical companies that commonly need to expend upwards of a billion dollars to develop a new compound. In addition, since resistance can emerge early in the life of a new antimicrobial, enthusiasm to invest in innovation in this field is considerably dampened. It is a controversial view but I believe that antibacterials are too cheap. The possibility of better financial returns could well encourage the industry to reverse its current position.

Therefore, if we cannot expect the pharmaceutical industry to produce new agents, what can be done to at least slow down the progress of increasing resistance? Somewhat frighteningly, the answers are limited. We can attempt to prevent the spread of organisms and we can reduce the selection pressures, that is, reduce antibiotic use. A possible third ploy could be to develop vaccines. However, as many of the pathogens are also our commensals, I have little hope that this line of attack will be fruitful against anything other than a limited range of pathogens.

Preventing the spread of micro-organisms in hospitals has been shown to be extremely difficult, but not impossible. This is likely to be much more burdensome in a community setting. Infection control in long-term care homes and child-care/day schools is often very difficult. Somewhat exaggerated claims are made for surface disinfectants and impregnated clothing material. I have even seen advertisements for antibacterial toilet seats. These are only scratching the surface of the problem.

Prudent antimicrobial prescribing has to be the way forward. There are many facets of this. The need to educate both the prescribers and their patients is all important. Occasional drives, such as the 'Andybiotic' campaign of 1999[11] with the message 'Don't wear me out', are a good start but need to be regularly repeated (and audited to assess usefulness), and adequate funding is needed. Both undergraduate and postgraduate medical education on the use of antimicrobials need to be greatly enhanced.[12] We also need to alter current prescribing practices for, as mentioned before, it can be said that the majority of antimicrobial prescribing is inappropriate, which is a dire indictment. We do not have time on our side to wait for a new generation of doctors. Widening prescribing to other healthcare professionals is a personal concern of mine. Other EU countries are attempting to rein in prescribing, whereas we in the UK are moving in the opposite direction. Although I have no evidence to

support my view I am concerned that the increasing numbers of prescribers will inevitably lead to more antibiotic use.

Reducing diagnostic uncertainty would be of great benefit for, as Fleming says, 'both individual patient management and for surveillance'.[13] The cost and time implications have been discussed for many years, but it remains an important potential way forward.

Finally, so much of our information on the related issues of resistance and prescribing is based on less than perfect surveillance, especially in general practice. The Royal College of General Practitioners and the Health Protection Agency undertake useful programmes but they have acknowledged limitations. A truly 'National' Health Service should be able to develop a more comprehensive policy that is robust and encompasses both hospital and primary care — but that is another can of worms.

Antimicrobial resistance has been described as a 'major threat to public health'.[14] Antimicrobials are a limited resource. Conservation is of paramount importance if we are not to allow, as Pasteur is said to have stated, that 'the microbes have the last word'.

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Safety and achieving equality amid diversity in health care

'I am becoming rather tired of endless advice as to how and why GPs should make adjustments for patients from ethnic minorities'.

So writes a GP in response to a recent special series on ethnic diversity in a well respected educational publication for family physicians. Her view typifies how equality and diversity continue to create polarised perspectives. For example, witness the rather shrill debate about interpreting services in the UK at present. Alarm at their cost to public sector has provoked a review of language services at the request of the Secretary of State for Communities no less. Our corresponding GP expresses a popular concern that 'assimilation is the most important aspect of integrating immigrants, but many patients never seem to learn English'.

Promoting safe health care requires that everyone should be able to access the care they need. Achieving equality of care amid diversity is one part of this. Many with limited English in the UK and US are among the most disempowered and disadvantaged of our patients and experience inequalities in care, mortality, and morbidity.[1,2] The case that any safe health system will always need some form of appropriate interpreting services is surely irresistible given the reality of global migration. On the other hand, there is a perfectly cogent argument for people to learn — and be supported to learn — the major language of the country in which they choose to settle and live if they are to benefit most from the systems and opportunities they encounter as citizens.

Such divergence stimulates thought and debate. It certainly makes good copy for the tabloid and general medical press.[3] However, and with the danger of casual