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only if symptoms persist, are other strategies safer? These might include policies to always or never prescribe antibiotics in upper respiratory infection, to ask patients to return to the doctor for further assessment if they feel worse, and to prescribe only for patients at high risk of complications. Universal prescribing would be unsafe in the long term, given the clear relation between antibiotic prescribing and resistance<sup>11</sup> and the fact that, in the short term, antibiotics can occasionally have severe side effects.<sup>12</sup> Not prescribing antibiotics at all is likely to have even higher rates of complications.<sup>9 13</sup>

**When to return**

Advising patients to return if they are getting worse may be an acceptable alternative, and one that provides the prescriber with more (arguably spurious) control. But evidence suggests this strategy would result in higher reconsultation rates for the acute illness,<sup>3</sup> and it is not clearly preferable to delayed prescribing with clear instructions. Nevertheless, doctors should advise patients clearly about returning for antibiotics and further assessment if there are signs of complications

developing in any upper respiratory tract infection, such as inability to swallow, worsening shortness of breath, and worsening systemic features such as fever or vomiting. Reserving antibiotics for patients at higher risk of complications might be a sensible strategy, but it depends more on clinical opinion than on evidence: there are few good prospective clinical studies in upper respiratory tract infection to confirm who is at risk of severe or prolonged symptoms or of complications.<sup>14</sup>

On current evidence, as long as patients have clear and specific information about when to use antibiotics and when to return for reassessment, delayed prescribing of antibiotics for upper respiratory tract infection is probably as safe or safer than other strategies and is acceptable to patients.

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Competing interests: PL has received consultancy fees for two half day meetings about the complications of respiratory infections from Abbott Pharmaceuticals.

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## The patient safety story

*Has been told; now it is time to make practice safer*

Investigating and improving patient safety in health care is now an international phenomenon. The establishment of the National Patient Safety Agency in the United Kingdom<sup>1</sup> and of the Center for Quality Improvement and Patient Safety in the United States<sup>2</sup> are prime examples of the prominence given to safety within the wider concept of healthcare quality. No longer can there be any doubt that the most fundamental ethical principle in medicine—first, do no harm—is being taken seriously by a wide constituency. The next step is to embed safe practice into everyday clinical behaviour.

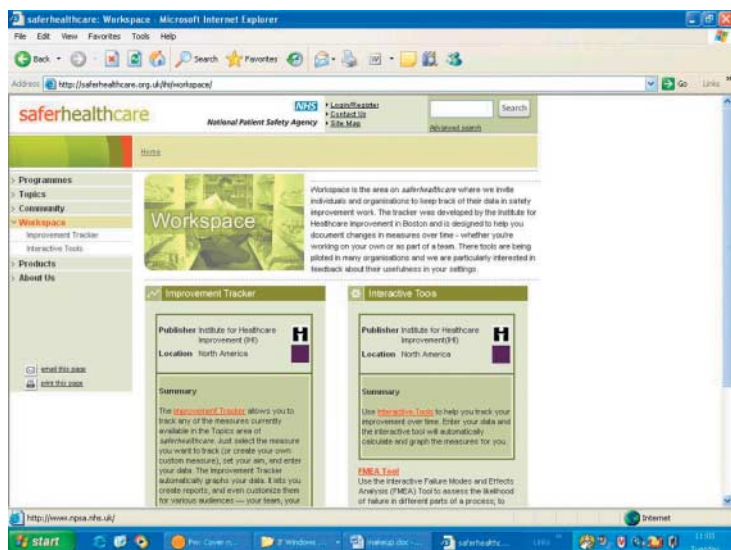
Why is there so much interest in patient safety? Why now? Data have been available on error rates in medicine for at least a decade. Although there had been earlier work in the 1970s, the landmark Harvard

Medical Practice study of hospital inpatients was published in 1991.<sup>3</sup> Additional studies followed from Australia and other contexts.<sup>4</sup> This research points to an adverse event rate in secondary care close to 10%. The error rate in primary care is less well studied.

**What we know**

The catalyst came from the United States. By 1998 some opinion leaders in health care were frustrated by the lack of attention given to addressing serious quality challenges. An extensive review of the literature on quality, conducted by RAND Health, documented shortcomings in both safety and effectiveness.<sup>5</sup> Expert panels, one convened by the Institute of Medicine and

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another established by the President of the United States, recommended that improving healthcare quality should become a national priority.<sup>6,7</sup> But despite the strong, convincing evidence and recommendations from expert panels, the “quality problem” never made it on to the national agenda.

In another effort to bring the issues to the forefront, the Institute of Medicine established its quality of care in America committee. In late 1999 the committee's first report, *To Err is Human*, was released.<sup>8</sup> Unlike previous reports on quality, which had been directed at elected representatives, healthcare leaders, and professionals, the key audience for this report was the lay public. In effect, it was direct marketing to patients about medical errors. The impact was tangible, with near saturation coverage in the media for almost three days. The United Kingdom responded with its own analysis, *An Organisation with a Memory*.<sup>9</sup>

There are many lessons here. Firstly, targeting the public made the issue visible and widened the debate. Secondly, and just as important, was the clarity of the message. Errors are something that everyone can understand. People are familiar with “accidents” and efforts to avoid them. There are parallels in air and road transport; indeed in these services there are institutions to protect the public. Thirdly, the report focused primarily on errors of execution—events that no one intended to happen and where there is wide agreement that something went wrong.<sup>8</sup> This level of consensus is qualitatively different from discussions about other quality issues, such as medical effectiveness, where there is often disagreement about what constitutes evidence based practice, or the applicability of the evidence to particular patients and circumstances. Fourthly, the report made it clear that more people die as a result of medical errors than from other common causes of death including motor vehicle crashes, breast cancer, and AIDS. The case was therefore made for giving attention and resources commensurate with the scale of the problem.

### The epidemiology of error

Five years have passed since *To Err is Human* was released, and a clearer picture of the epidemiology of error is emerging. As each new report arrives, there is

a growing realisation that error in medicine is on a different scale from error tolerated elsewhere and has different consequences from error in other service sectors. Ideas about solutions are also arriving from disciplines outside medicine, including systems engineering, psychology, human factors, and informatics.

It's becoming clear that providing safe and effective care requires not only expert clinicians, but also well designed care processes and organisational supports. Industrial processes have long since developed the concept of zero tolerance for error, building quality into production. To better understand why errors occur, health care is now taking advantage of tools such as root cause analysis and failure mode effects analysis, tools already in use in fields such as aviation. Perhaps even more important, many countries are investing significant resources in electronic health record systems that provide clinicians, and hopefully patients, with improved access to relevant data and decision support. When used effectively by care teams these systems will be a powerful tool for preventing many types of errors. Equally important are efforts to promote a culture of safety: a recognition that errors are most often the result of poorly designed systems, while at the same time encouraging everyone to identify and learn from errors.<sup>10</sup>

As we entered a new millennium, we saw that medicine had arrived at a tipping point.<sup>11</sup> The patient safety story coincided with the long awaited arrival of credible patient centred health care. Patients had, as never before, access to credible online information. Clinicians became interested in the concepts of sharing decisions and communicating risk,<sup>12</sup> and it became obvious that medical paternalism was on borrowed time.

### A new website

The World Health Organization's Patient Safety Alliance is yet another signal of this shift. In the UK not only has the National Patient Safety Agency been formed within the NHS,<sup>1</sup> a research programme has also been established and a patient safety initiative supported by the Health Foundation. As a contribution to this activity, a new website has also been created. saferhealthcare ([www.saferhealthcare.org.uk](http://www.saferhealthcare.org.uk)) is run by a partnership of the National Patient Safety Agency, the BMJ Publishing Group, and the Boston based Institute for Healthcare Improvement. Its aim is to be a valued source of peer reviewed tools and information to help practitioners make changes in their organisations. You are invited to register, find colleagues with similar interests, discuss, debate, and take up the offer to write about your work—in short, to be part of the patient safety story.

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## Vitamin and mineral supplements for preventing infections in older people

*May have a place for some, but improved diet and physical activity will do more good*

The number of older people is growing rapidly worldwide. In England alone the number of people older than 65 has more than doubled since the 1930s, and one fifth of the population is now aged 60 or more.<sup>1</sup> Ageing, disease, lifestyle, and environmental factors may all impair in older people the acquisition of food and its intake, processing, and metabolism, all leading to poor nutritional status.<sup>2</sup> Ageing is also associated with decreases in physical activity and lean body mass and an increase in body fat. The accompanying reductions in energy requirements and intake of food lead to lower intakes of macronutrients and micronutrients.<sup>2</sup>

Many older people exhibit poor immune responses and are at a high risk of infection.<sup>3</sup> Although the mechanisms leading to the age related decline in innate and adaptive immunity are poorly understood, several studies have shown a beneficial effect on the immune system of supplementing vitamins A, C, and E, and zinc and selenium, singly and as multinutrient supplements.<sup>3</sup>

Yet most prospective trials have found no beneficial effects of multivitamin supplements on infection among healthy older people,<sup>4,5</sup> and a recent meta-analysis of randomised controlled trials found the evidence for multivitamins and mineral supplements on risk of infections in older people to be weak and conflicting.<sup>6</sup> Nevertheless, Girodon et al reported that supplementation with trace elements and vitamins reduced infections in institutionalised older people.<sup>7</sup> Last year Meydani et al reported a protective effect of vitamin E supplementation over one year against infections of the upper respiratory tract, particularly the common cold, in elderly residents of nursing homes.<sup>8</sup>

### Limitations

In this week's *BMJ*, Avenell et al report the results of a pragmatic, randomised, double blind, placebo controlled trial of daily supplements of multivitamins and minerals on morbidity from infections in people aged 65 and older (p 324).<sup>9</sup> This study found that, in older people living at home, daily supplementation with multivitamins and multiminerals over one year had no beneficial effects on self reported infections, use of health services, or quality of life.

This was a robust study overall, and it largely confirms previous research. Having said that, all studies have their limitations, and the simplicity of the assessments in this trial by Avenell et al may have led to confounding and measurement biases. For example, neither the researchers nor participants collected data on dietary intake or physical activity during the study period. And, although the trial design included a check of compliance with the supplements in a random 10% sample of participants, it did not include outcome data on biochemical status of vitamin and minerals. Two other important limitations, which the authors acknowledge, are the low doses of multivitamins and minerals used and the relatively healthy study population.

If trials of low dose supplementation show little or no benefit, might higher doses be more effective? Perhaps, but higher doses of such supplements in older people are not without risks. For instance higher doses of zinc and vitamin A supplements impair cellular immunity and the health of bones, respectively, among older people with vitamin D deficiency.<sup>2,10</sup> Furthermore, the results of studies using doses that exceed recommended daily requirements for micronutrients cannot be readily translated into dietary guidelines. Few studies have attempted to modulate immune status in older people using foods or doses of nutrients that are realistically achievable through changing diet.<sup>11</sup>

### Holistic approach to diet

Diets of poor quality and quantity underlie and exacerbate many causes of major disease in older people and society as a whole including hypertension, type 2 diabetes, obesity, heart disease, stroke, cancer, mental ill health, and infections.<sup>12</sup> Evidence is increasing for a holistic approach to improving diet rather than focusing too closely on the effects of individual nutrients on risk factors and preventing disease. If combined with physical activity, which can increase appetite and enable a diet of marginal nutrient density to become adequate,<sup>12</sup> a better diet can make a substantial impact on population health, particularly of older people.

Supplements of vitamins and minerals might still benefit older people with increased risk of infections and those with evidence of vitamin deficiencies. But we

Primary care p 324