

infant death syndrome. This increase in risk was not significant, but this may have been due to a type II statistical error in view of the small numbers in the subgroup.

With only a small proportion of infants sleeping prone after the "back to sleep" campaign, Blair *et al* in the second paper (p 195) found parental smoking to be the major contributing factor to sudden infant death syndrome, accounting for 62% of cases.<sup>5</sup> This estimate is based on an unusual composite measure which records a positive exposure if the mother smoked during pregnancy or the father smokes in the household. Previous work supports the view that prenatal and postnatal smoking by the mother and probably postnatal smoking by others increase the risk of sudden infant death syndrome.<sup>11-13</sup> The findings of relative risks greater than three and a dose-response relation in these studies support the inference that this is causal. However, lingering doubts remain that the association may be due, in part, to the association of parental smoking with other infant care practices, which might vary by socioeconomic status.

Blair *et al* have not helped resolve to this issue, and the separate contributions to risk of prenatal and postnatal exposure to tobacco smoke from various sources are difficult to ascertain from their analysis. Importantly, the paper does not report estimates of risk due to maternal postnatal smoking after adjustment for maternal smoking during pregnancy. The dose-response patterns for postnatal exposure (table 4) are reported without adjustment for socioeconomic status, and the multivariate models used are not described in detail. Further analysis could provide an estimate of the population risk attributable to smoking, which could be more readily

evaluated and may contribute more to the already strong case for avoiding cigarette smoking during pregnancy or in the vicinity of babies.

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## Inappropriate treatment for dysentery

Supp 205

### *Perverse incentives and inadequate information may accelerate antibiotic resistance*

Keeping abreast of changing patterns of microbial resistance presents a formidable challenge to all those prescribing antibiotics. When national standards are developed for treating infectious diseases, recommendations must be transmitted to local practitioners and drug sellers. Even if there is an effective communications network this process takes time. Given that many recommended treatments are based on outdated texts or "common practices," it is perhaps not surprising that practice changes slowly, if at all. Common practices can often be traced to the influence of one or two influential physicians whose ideas have had a disproportionate effect on the literature. For example, the overuse of metronidazole and furazolidone to treat shigella infections in Bangladesh (and many other countries) almost certainly reflects overdiagnosis of amoebiasis that 25 years ago was mistakenly considered to be the commonest cause of bloody diarrhoea.

The short report by Ronsmans *et al* in this week's *BMJ* (p 205) reveals the extent of inappropriate treatment of dysentery in Bangladesh and raises issues that are relevant to both developing and developed countries.<sup>1</sup> The authors interviewed four groups of medical practitioners in Dhaka to assess how much their treatment of dysentery differed from the World Health Organisation's guidelines and in what way their knowledge was influenced by their training. Correct treatment for dysentery in children was recommended by about 10% of drug dispensers and 45% of doctors (with or without postgraduate training) and medical students. The most common treatment errors were in the use of multiple and inappropriate antimicrobial drugs and in the failure to recommend use of oral hydration solution.

Incorrect use of antibiotics has consequences beyond the wellbeing of the patient. Inappropriate drugs cost more because adequate treatment can often be achieved with fewer and less expensive drugs. These extra costs are typically borne by the patient's family, because few people in Bangladesh have health insurance. In addition, inappropriate use of antibiotics may accelerate the development of drug resistant strains of shigella wherever it occurs. For example, southern Africa is in the midst of an outbreak of *Shigella dysenteriae* type 1 that is sensitive only to nalidixic acid and other quinolones.

The authors and others refer to incorrect treatment as irrational rather than inappropriate. The term irrational is unfortunate because practitioners' choice of treatment may be rational given their knowledge of the subject or incentives to prescribe. The most up to date information available to health providers comes from drug company representatives, whose main aim is to sell their products. Textbooks are uncommon and usually outdated, and peer reviewed journals are rarely available. Obtaining correct information is not easy. Practitioners who are trying to increase their income may resort to polypharmacy or prescribe drugs that maximise profits. Physicians have suggested that they are only trying to maintain their customer base by responding to customer demands when they overprescribe or use the latest, most expensive drugs.

What can be done to change this behaviour? Education programmes are necessary, but how the information is presented and reinforced is critical. In an attempt to change prescribing patterns for treating diarrhoea in a government hospital in Mexico, Gutierrez *et al* used two techniques.<sup>2</sup> Firstly, they

involved the physicians in developing a treatment algorithm. Secondly, they performed and publicised periodic audits of each physician. Use of antibiotics dropped from 80% to 30% of all cases of diarrhoea seen in the clinic, and use of oral rehydration salts increased from 30% to 70%. Moreover, these changes were sustained 18 months after starting the programme. In Indonesia, Santosa was able to demonstrate a highly significant reduction in antibiotic use for diarrhoea after a programme of small face to face interventions with prescribers.<sup>3</sup>

Such methods might be effective for physicians working as employees in hospitals or health maintenance organisations, where standards of case management can be maintained. But what of self employed physicians or independent drug sellers? These groups experience no independent audit and little peer pressure. Unlike in the United States and some other countries, there may be no requirement for continuing education. In addition, incentives may be totally different; the profit margin from drug sales may be of prime importance. If interventions are to modify inappropriate prescribing they "must touch all groups in the medication cycle (consumer, service provider, supplier, and manufacturer), in order to reinforce behaviour change."<sup>4</sup>

A better informed consumer is an important element in reducing the use of inappropriate drugs. Practitioners and drug sellers focus on the individual, not the group. The opinion and behaviour of the consumer is important in both com-

pliance with treatment and selection of the most appropriate drug. At a minimum, the public should know what constitutes the best treatment and that more expensive drugs are not necessarily more effective. Treatment programmes should be demystified, and the public should be informed of the benefits and risks of different forms of treatment.

Though we are beginning to understand how economics and practice based incentives influence prescribing practices, we are quite ignorant about how beliefs affect patient compliance. An interdisciplinary approach involving physicians, economists, behavioural scientists, communication specialists, manufacturers, and others will need to address the problem of inappropriate use of antibiotics if we are to avoid the increasingly alarming reports of worldwide resistance.

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## Preventing sports and leisure injuries

### *Britain can learn from Quebec*

Despite the British government's avowed commitment to accident prevention,<sup>1,2</sup> there seems to have been little progress towards developing effective programmes for preventing injuries sustained during leisure activities. This policy inertia may simply reflect a more general public indifference to leisure injuries, which many people (mistakenly) regard as unavoidable. But the media can generate interest in such injuries if the circumstances are sufficiently dramatic or if well known personalities are involved. Few in Scotland, for example, were left unaware of the recent deaths of the boxer James Murray, the climber Alison Hargreaves, and the skier Kirsteen McGibbon. Highly publicised incidents like these have drawn public attention to the serious casualties that can occur during sport and leisure activity.

How important are sports and leisure injuries as a public health problem? Few studies have been conducted,<sup>3-6</sup> so assessing the scale of the problem in Britain is a matter of informed speculation. A recent review estimated that in Scotland in 1991 there were about 285 000 new attendances at accident and emergency departments for leisure injuries and 82 000 attendances for sporting injuries.<sup>7</sup> Leisure injuries therefore result in about 5.7 new attendances per 100 population annually and account for 24% of all new accident and emergency attendances in Scotland. The direct costs associated with hospital inpatient and outpatient care for these injuries was estimated to lie between £305 000 and £550 000 per 100 000 population a year. Extrapolated to the whole of Britain, this amounts to an annual figure of between £168m and £303m, while the total costs (including lost productivity) may be over £0.5bn.<sup>8</sup>

Several agencies collect information on sports and leisure injuries. These include the NHS, the Department of Trade and Industry (which operates the Home and Leisure Accident

Surveillance System),<sup>5</sup> the Royal Society for the Prevention of Accidents,<sup>9</sup> and the Mountain Rescue Committee of Scotland.<sup>10</sup> There are three major problems with this information. Firstly, it is not collated to produce an overall picture of the pattern of sports and leisure injuries. Secondly, it is relatively inaccessible both to health professionals (who have to deal with changing patterns of sports and leisure injuries as new activities become popular) and to sporting organisations and accident prevention agencies (who could use the data to review the effectiveness of sports safety regulations and to develop new strategies for preventing injury). Thirdly, the development of effective prevention is hampered by the lack of sufficient detail on the incidence, causes, severity, outcome, and cost of these injuries.

The obstacles to progress in this field can be overcome when there is sufficient political will, as has been shown in Quebec.<sup>11</sup> In 1979 the National Assembly of the province passed the Act Respecting Safety in Sport, which led to the creation of the Quebec Sports Safety Board with the remit to supervise personal safety and integrity in the practice of sports. The board is empowered to gather, analyse, and disseminate information on sports safety; to conduct or commission research; and to develop safety standards with sports associations. In its first decade the board focused mainly on organised sports, but more recently it has extended its activities to include non-organised recreational pursuits such as skiing. Although a formal evaluation of the board's impact is difficult, two indicators of success are encouraging. Quebec had the lowest rate of sport and recreational injuries in Canada in 1990, and the rate of hospitalisation for such injuries declined by a quarter between 1986 and 1992.<sup>11</sup>

Other countries can learn from Quebec's experience. Britain needs a statutory body encompassing all the agencies