

Finally, what of the suggestion that section 3 of the Health and Safety at Work Act might cover the care and treatment of patients? The report touches on the suggestion several times. A recurrent theme is that the inspectors may be interested if a patient "is injured as a result of mishandling when being lifted from a bed or trolley," "contracts sepsis as a result of surgery," "receives incorrect treatment/wrong blood or drug or wrong operation," or "suffers as a result of a professional mistake on the part of a surgeon or laboratory technician." Furthermore, supplying and administering anaesthetics or analgesic mixtures to patients are seen to pose new problems of considerable importance for the inspectors under section 3 of the Act.

While the health professions recognise the need to maintain and where necessary to raise the standards of the health and safety of those who work in the Health Service, hazards of this kind—essentially arising in a clinical context—are another matter. Inspection under a Health and Safety Act cannot be the most appropriate way to deal with risks to patients, whether caused by cross-infection, inappropriate medication, or wrong decisions. The inspectors who enforce the Act come from a background of factory inspection, while their medical colleagues in the Employment Medical Advisory Service come from occupational medicine. There is no evidence that either group has been trained, or has any special competence, to deal with these essentially clinical risks.

¹ *British Medical Journal*, 1978, 2, 136.

² *Working Conditions in the Medical Service*. London, Health and Safety Executive, 1978.

³ *British Medical Journal*, 1978, 2, 513.

⁴ *British Medical Journal*, 1978, 1, 871.

⁵ *Hansard*, House of Commons, 13 April 1978.

⁶ *British Medical Journal*, 1975, 1, 288.

⁷ *British Medical Journal*, 1976, 1, 1091.

⁸ *British Medical Journal*, 1976, 2, 382.

Asthma in children

Asthma never fails to generate controversy. In this tradition Speight¹ has recently suggested that childhood asthma tends to be both underdiagnosed and undertreated by general practitioners. The grains of truth which he assembled are best judged alongside other grains from our present knowledge so that the difficult problems which confront the general practitioner can be seen in perspective.

Few children who have asthma remain undiagnosed until late childhood, and when recognised it turns out to be mild. Asthma is undoubtedly underdiagnosed under the age of 5 years, but that is understandable given the possibilities of confusion with other causes of chronic respiratory disease, bronchiolitis, and wheeze associated with recurrent viral infections. Many and perhaps most of these wheezing children will prove to be asthmatics, but there must often be clinical doubt: the clinical evidence is not enough to make a clear distinction. Williams and McNicol² considered wheezy bronchitis to be part of the range of asthma. Lenney and Milner³ found that nearly all their patients over the age of 20 months had abnormal bronchial lability as indicated by a dilator response to salbutamol. Under that age, however, many infants did not respond for reasons which are not yet clear.

The clinical criteria for the diagnosis of asthma in older children are well established. In addition to the usual symptoms

a chronic persistent cough, often paroxysmal, always suggests continuing stimulation by allergens. When the diagnosis is in doubt (and because parents and doctors may be reluctant to use the word "asthma") referral to a respiratory unit is advisable for tests of abnormal bronchial lability based on exercise or histamine provocation.^{4 5} Tests at a younger age are more difficult but possible.⁶

Is asthma being undertreated? In fact, the nation probably spends enough on its drug bill for asthmatic children, yet it does not get value for money. Why? When a drug fails a frequent response is to add another. The parent comes to hospital with a plastic bag containing a pharmaceutical arsenal of drugs and says, "Nothing works." Bronchodilator inhalers have often been used with regularity and increasing frequency (as in the bad old days of the 1960s). These drugs should be reserved for treating specific attacks: if frequent use becomes necessary (several times daily) that is an indication for further investigation. By contrast, sodium cromoglycate and topical steroids have often been taken "when attacks occur" or irregularly, whereas they should be taken regularly as prophylactics, irrespective of the occurrence of attacks. If an oral steroid is found in the bag it has usually been overused. If it is not there it has been shunned as too dangerous to use at all. An occasional short course of steroids to treat an acute attack is harmless and effective at any age, and the drug may be given intramuscularly or intravenously when there is urgency. But, again, should such courses become a regular necessity, the time has come to refer the patient for a specialist opinion. Antibiotics are always to be found in the bag: yet they have no specific effect on asthma or on the viral infections which so often precipitate attacks under the age of 5 years.

Patients are not, then, being undertreated, but drugs are often used incorrectly and, more important, too much is demanded of them. There is a limit to what chemotherapy can achieve, and if the exposure to antigens (at home, in school, at relatives' or friends' houses) is too great, then the drug in use will fail and another one will be added or substituted. The parents with the plastic bag often come from a home containing pets, yet when tackled they hasten to explain that they have always had pets and the child never reacts to them. There is much confusion on this point. Peckham and Butler⁷ state that "a great deal can now be done to prevent chronic respiratory damage resulting from harmful allergens; for example, regular or intermittent medication with anti-spasmodics or disodium cromoglycate." There is no evidence that drugs will protect in this way, whereas removing or minimising contact with allergens will undoubtedly help. The absence of any history and negative results of skin tests are no excuse for introducing a cat into the home of an allergic child, exposing him to the risk of extending his existing range of sensitivity and thus reducing the chances of chemotherapeutic control of the disease. This is one way in which mild asthma becomes severe, and it may be a factor determining whether the child will "grow out of his asthma." Peckham and Butler⁷ found little evidence of remission in their survey: half of their children with a history of asthma at 7 were still suffering attacks four years later. A fall to less than half could hardly be expected by 11, for the usual age for remission is 10-15 years. Nevertheless, undoubtedly remission is much less frequent in the 20% of severe asthmatics with a broad range of sensitivity to allergens. No asthmatic child should live with animals in the same house and precautions against dust mites should always be rigorous. Such precautions are probably particularly important in the early years when the disease is first diagnosed and the range of sensitivity is still limited.

Underdiagnosis and undertreatment¹ are matters which demand the attention of the hospital doctor no less than the family doctor. Respiratory function, drug effectiveness, and the immunological state must all be assessed in the difficult case. Social, educational, and psychological services may have to be called upon to tackle problems in the home and at school. Intractable asthma demands team work and co-ordination between the family doctor and hospital services—and above all a personal service which generates trust—but this is a counsel of perfection when both inside and outside hospital the rota system will ensure that at times the patient and parents are going to feel let down.

¹ Speight, A N P, *British Medical Journal*, 1978, **2**, 331.

² Williams, H E, and McNicol, K N, *British Medical Journal*, 1969, **4**, 321.

³ Lenney, W, and Milner, A D, *Archives of Disease in Childhood*, 1978, **53**, 532.

⁴ Jones, R S, *British Medical Journal*, 1966, **2**, 972.

⁵ Mellis, C M, et al, *American Review of Respiratory Diseases*, 1978, **117**, 911.

⁶ Lenney, W, and Milner, A D, *Archives of Disease in Childhood*, 1978, **53**, 468.

⁷ Peckham, C, and Butler, N, *Journal of Epidemiology and Community Health*, 1978, **32**, 79.

Paediatric anaesthesia

Unlike anaesthesia for cardiac surgery or neurosurgery, paediatric anaesthesia is difficult to define. The term could include anaesthesia for all types of surgery in children up to about 15 years, but there are many similarities between anaesthesia for older children and for adults. Most paediatric anaesthetists in Britain would agree that "paediatric anaesthesia" applies to children up to about 3. Under this age the differences between the child and the adult—and, indeed, the differences between the young child and the older child—are considerable.

The most obvious difference is that an average adult is about 20 times heavier than an average newborn infant. The adult's surface area is only about nine times that of the newborn; so that a newborn infant's surface area is over twice the adult's per unit body weight. This accounts for the much greater heat loss in infants. Furthermore, the oxygen consumption per unit of body weight is about twice that of the adult—as is shown dramatically by the rate at which an infant under anaesthesia becomes cyanosed if ventilatory problems arise. In young children the narrowest part of the upper respiratory tract is at the cricoid ring, and, since the ring is circular, cuffed tracheal tubes are not necessary either for anaesthesia or for ventilatory support after operation. Young children have a high rate of intake and elimination of fluid, which results in rapid dehydration when intake is impaired (as, for example, in acute appendicitis), and fluid balance needs careful supervision.

The difference in size is the problem causing the greatest anxiety to the anaesthetist unaccustomed to dealing with small children. Theory is no substitute for the confidence and skill acquired by anaesthetising young children frequently. Other differences in anaesthetic practice can be quickly learnt, even without experience, though (as in any specialised subject) this knowledge is best acquired practically. In young children most surgery is performed to correct congenital abnormalities. Diseases due to infection have greatly diminished, and trauma due to burns has decreased as central heating has become commonplace. Nevertheless, the incidence of congenital

anomalies is low: per 1000 births, tracheo-oesophageal fistula occurs in about 0.2, Hirschsprung's disease in 0.5, and congenital heart disease in 6-9. Clearly, the current DHSS policy of concentrating paediatric surgery in large centres, either in children's hospitals or in large paediatric departments in adult hospitals, is correct. This objective has yet to be achieved throughout the country, however, and emergencies such as appendicitis, intussusception, or trauma will always arise outside such centres in hospitals with anaesthetists inexperienced in paediatric anaesthesia.

There is, therefore, a dual problem in training in paediatric anaesthesia. Firstly, a few trainees need considerable experience to enable them to undertake paediatric anaesthesia in large centres. Such trainees will require a minimum of six months' and preferably 12 months' paediatric anaesthetic training, so that they may eventually work as consultants. Secondly, very many trainees who will ultimately work in adult anaesthesia need to become reasonably proficient in dealing with the paediatric emergencies that may confront them from time to time. Ideally this group ought to have about three months' paediatric anaesthetic experience.

The small numbers of young children coming to surgery make it extremely difficult to satisfy these different requirements, particularly the second. There is a danger that the training of each individual may be so diluted as to be of little value. Since it seems impossible to train everyone in paediatric anaesthetics we should aim at training perhaps two consultants at each district general hospital to deal with young children. Most large paediatric centres in Britain and abroad attempt to cater for both types of trainee, with a rotational arrangement, often at registrar level, giving three months at a children's centre. In the same paediatric centres there will usually be some training for up to 12 months to take up consultant posts with a large content of paediatrics.

For the future the DHSS policy of concentrating paediatric surgery in children's departments or children's hospitals should continue. At the same time we should aim at training fewer paediatric anaesthetists to ensure that those who are trained are competent. Once we have achieved these objectives the hazard of the occasional paediatric emergency confronting the anaesthetist unused to paediatric anaesthesia should become far less common.

Myocardial imaging

Though radioactive materials have been employed for many years in studying the circulation, their use in elucidating coronary artery disease is a recent development. They may be used dynamically (like a contrast material) to provide information about the size of the heart chambers, the ventricular ejection fraction, the motion of the heart wall, or regional perfusion. The isotope is injected rapidly intravenously and its passage through the heart is recorded with a scintillation (gamma) camera. Alternatively, radionuclides may be used for static imaging, where time is allowed after the injection and the intracellular uptake of radioactivity is then assessed. In this way the gamma camera may display areas of normal, infarcted, or ischaemic myocardium. Both techniques avoid cardiac catheterisation, and if a mobile gamma camera is used the investigation can be done at the bedside.