European countries that are free from rabies and are geographically isolated (for example, Scandinavia, the Republic of Ireland, and the United Kingdom) have chosen the first solution; the others make do with the second. In practice, over the past 40 years only very few cases of rabies have occurred in areas declared to be free from rabies, found far from the infected zones. Animals imported from Africa have usually been responsible. Such outbreaks have always been controlled immediately by creating a vaccination barrier (for example as occurred in western France, Spain, or Portugal).

Because of the difficulties in applying quarantine and the desire to harmonise animal health regulations, particularly within the European Community, the current trend is to favour vaccination. This requires guarantees that imported animals have been effectively immunised. For this reason the international organisations, notably the World Health Organisation and the Office International des Epizooties, recommend not only the unfalsifiable identification of individual animals but also the testing for rabies antibodies. In its international animal health code the Office International des Epizooties will propose that a satisfactory antibody titre shall be at least twice the titre capable of protecting all animals against fatal experimental infection. Such a titre shows that the animal is immunocompetent and was protected against infection before importation.

Better knowledge of the epidemiology and immunology of rabies, coupled with better vaccines, antibody assays, and veterinary controls make it possible to confine rabies to certain regions. From such regions rabies can be eliminated step by step by giving oral vaccine to foxes.

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On site medical services at major incidents

Training still the black spot

Although major incidents (entailing injury and death) are not new in Britain, they were brought into clearer public focus in the 1970s. The terrorist bomb explosion at the Old Bailey[1] and the crash at Moorgate tube station[2] received massive and graphic media coverage, partly because of their proximity to Fleet Street.

These incidents also generated much medical interest. Over 150 casualties converged on the accident and emergency department of St Bartholomew's Hospital within 10 minutes of the explosion at the Old Bailey. The fact that the hospital was not overwhelmed remains something of a bench mark in the management of mass casualties and showed that hospital staff working within a familiar environment invariably triumph over potential chaos. The crash at Moorgate established the medical importance of on site care. The last live victim was not released for some 12 hours after the accident—without the use of mobile teams several casualties would have died still trapped.

Making use of these and other experiences, the Department of Health issued a directive formalising arrangements for dealing with major incidents.[3] Many of the problems these incidents present, however, remain unresolved. Although mobile teams are now accepted, a great gulf persists between the medical skill available on site and in hospital. A major incident is usually a "once in a lifetime" experience for the medical staff—which makes preplanning so important and yet so difficult. Relatively few hospital doctors have any experience of on site work, and expecting adequate performance without adequate training is unrealistic. The emergency services regularly meet and train together; frequently the medical service is missing. This creates problems at a real disaster because unfamiliarity between key staff hampers easy communications.

It would seem sensible, therefore, for the mobile team's site medical officer to meet regularly with his or her counterparts in the emergency services. Unfortunately, it can be taken for granted that if the site medical officer is a named person then when the next disaster occurs he or she will be on annual leave. All key posts for mobile teams should therefore fulfil a role rather than be delegated to specific people. This makes planning extremely difficult, not least because of the constant changes in hospital staff.

Good preparation is essential for on site care. Hospital preplanning can greatly help by introducing staff to the equipment that they will have to use, which should be carefully selected and of manageable quantity. Knowing where to find and how to don the distinctive protective overalls will save valuable time on the day. Personal injury to medical staff at the scene of an accident is common. This takes the form of cuts and abrasions from tangled wreckage and, with the current dangers of HIV infection, gloves and eye protection should be worn. Even these simple measures may produce difficulties with, for example, the setting up of an intravenous infusion if the operator is not familiar with wearing gloves.

Participants need to accept an almost complete reversal of the criteria for medical care in hospital. At an accident the most seriously injured may be of low priority until those casualties who would probably survive with simple measures—such as maintenance of the airway or control of

bleeding—have been treated. Without training in this aspect of care (triage) the first casualty encountered may receive five star treatment while several others deteriorate because of simple airway obstruction. Although the training of mobile teams is obviously an essential part of the preparation for major incidents, it varies in quantity and quality across the country—as shown by a short report in this week's journal (p 748).[4] Considering the difficulties it is little short of miraculous that the doctors inexperienced in this type of care cope so well.

The increasing numbers of immediate care schemes and the extended role of paramedics in the ambulance service give rise to optimism. Advanced trauma life support courses are now established and provide an excellent format for training and coordinating the medical and paramedical staff.[5] The most important criterion for inclusion in the mobile team is specialist training but if this has not been possible anaesthetists probably possess many of the skills necessary for on site care.

Local needs and logistics will affect the organisation of accident planning. With the emergence of trauma centres and the greater use of intervention vehicles and helicopters training may become more centralised. The resources necessary for every hospital to support and maintain a satisfactory mobile team are formidable, and disasters occur so rarely that maintaining a satisfactory level of motivation and skill is difficult. Mobile teams based on few large centres but with good communications and logistical support may be the way forward.

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Radioiodine for hyperthyroidism

Perhaps the best option

Thyrotoxicosis is common, affecting an estimated 2.7% of women in Britain.[1] The antithyroid drugs carbimazole and propylthiouracil effectively control thyrotoxicosis in the short term, rapidly relieving symptoms and reducing plasma concentration of thyroid hormones. In Graves' disease (hyperthyroidism due to stimulating antibodies directed against the receptor for thyroid stimulating hormone), however, these drugs produce long term remission in only about half of cases depending on the length of treatment,[2] although improved results have recently been reported when thyroxine was added to carbimazole.[3]

In those patients with solitary toxic nodules or toxic multinodular goitre such drugs probably never produce long term remission. This failure of antithyroid drugs to cure thyrotoxicosis in the majority of patients, together with the need for repeated monitoring and adjustment of such treatment, means that most patients eventually need definitive treatment, the therapeutic options being partial thyroidectomy and radioiodine.

In Europe, the United States, and Japan thyrotoxicosis is now rarely considered an indication for partial thyroidectomy.[4] This is because surgery is associated with greater short term morbidity, mortality, and cost than treatment with radioiodine. The operation carries the risks of recurrent laryngeal nerve palsy and hypoparathyroidism even in the best surgical hands. In addition, recurrent thyrotoxicosis occurs in about 10% of patients treated by partial thyroidectomy, and those with recurrent disease usually require radioiodine because a second operation is more hazardous than the first.

The main long term complication of both partial thyroidectomy and radioiodine is hypothyroidism, which occurs in up to 40% of patients 25 years after treatment.[5] (The risks of hypothyroidism are similar after both forms of treatment.) The prevalence of hypothyroidism after radioiodine varies with the dose given, although attempts to identify factors in individual patients that might predict the cure of thyrotoxicosis and avoidance of thyroid failure have been unsuccessful.[6] Whether treating Graves' disease with radioiodine increases the risk or severity of ophthalmopathy remains controversial. Evidence from a large retrospective study that the type of antithyroid treatment does not affect the course of ophthalmopathy[7] provides support for the recommendation that hyperthyroidism should be treated as if ophthalmopathy was not present.[8]

As well as irradiating the thyroid gland therapeutic doses of radioiodine irradiate the gastrointestinal tract and, as radioiodine is excreted in the urine, the bladder and gonads (the gonadal dose is usually less than 30 mSv). This gives rise to concerns about possible long term effects such as carcinogenesis, teratogenesis, and infertility.

The question of carcinogenesis has been examined in most detail in the United States, where radioiodine has been given routinely for over 50 years. A few cases of thyroid cancer occurring in patients previously treated with radioiodine for thyrotoxicosis have been reported, although a review of 25 such cases suggested that they did not have the characteristics of radiation induced tumours (in particular a long latency from the time of radiation exposure, the mean latent period being only 7·3 years).[9] In several other studies, with follow up data of more than 50 000 patient years, no relation was found between radioiodine treatment and the development of thyroid cancer.[10]

Several large studies, with 400 000 years of patient follow up, have found no increased incidence of leukaemia[11] and no difference in the dose of radioiodine given to those who developed leukaemia and those who did not.[12] Likewise no firm evidence links radioiodine treatment with tumours at other sites, although a non-significant increase in breast cancer has been described after 30 years of observation.[13] These findings, together with recognition that long term follow up studies have included relatively few patients treated in adolescence (in whom no increased risk of malignancy has been identified[14]), indicate the importance of collecting long term data.

Less direct information is available on the risks of congenital abnormality and infertility. Pregnancy is itself an absolute contraindication to radioiodine treatment; given inadvert-