removal of T cells. Monoclonal antibody technology and the humanising of rat monoclonals by genetic engineering offer many possibilities; over 50 different drugs based on monoclonal antibodies are under development for treatment of cancer, particularly colorectal and ovarian cancers. Similar products are being developed for the treatment of hepatitis and various refractory viral infections and even for attacking blood clots. Human gene treatment, so long a dream, now seems to be a genuine possibility. One form of combined immunodeficiency disease, due to adenosine deaminase deficiency, has been successfully treated by inserting the missing gene into patients' lymphocytes and reinfusing them.

Another promising therapeutic lead has developed from "antisense" technology, which is more promising than its name suggests. When genes are transcribed it is from one of the complementary strands of DNA, called the "sense" strand. The resulting messenger RNA is a mirror image of this strand. If an appropriate antisense sequence can be introduced into a cell it will bind to the messenger RNA and, in effect, inactivate the particular gene. So far the major tour de force of this technology has been the production of tomatoes with a longer shelf life. Though it is not envisaged that we increase our geriatric problems by prolonging our own shelf lives, this new approach holds out exciting possibilities for the treatment of cancer and viral disease. For example, by using short lengths of antisense DNA to shut off key genes in the development of malignant transformation it is hoped to control certain tumours.

The biotechnology industry has already developed over 400 clinical diagnostic systems, many of which are already in clinical use. They are based on a wide variety of new techniques, including monoclonal antibody, DNA probes, and the enzyme linked immunosorbent assay (ELISA), and have uses in almost every branch of diagnostic pathology.

Of course the new biotechnology era is not without its problems. The new report reviews the many monitoring and regulatory bodies that are springing up, both nationally and in the European Community. Collectors of acronyms are having a heyday; already the United Kingdom has spawned the Genetic Manipulation Advisory Group (GMAG), the Advisory Committee on Genetic Manipulation (ACGM), and now the Advisory Committee on Releases to the Environment (ACRE) to control new and potentially dangerous laboratory procedures, containment, the development of transgenic animals, and the release of genetically engineered micro-

organisms into the environment, and so on. There are still ethical concerns about patenting human DNA and human genetic engineering. The guidelines to regulate human gene therapy, which have been drawn up recently by the Clothier committee, will be published soon and should do much to reassure the public that this new departure does not open up any fundamentally new ethical problems.

Clearly, therefore, the new biotechnology is no longer an Orwellian dream but is now with us. As pointed out by the National Economic Development Council, this development has reached the point at which industry can no longer ignore it, and those companies that are not already participants must now ensure that they are fully aware of how it might affect them. Large technological change invariably leads to industrial casualties, and British companies must try to avoid being among them. No doubt our health service managers will view all this with their customary gloom. The products of biotechnology are expensive, but this is mainly because at this stage of its evolution the industry is working on a small scale. Biotechnology is no different from any other technology; the development of technological know how and the spreading of overheads over a greater volume of production will inevitably drive down unit costs.

All this is good news for British industry and for the medical world. The new biotechnology, however, will not revolutionise clinical practice overnight. In one sense the industry has tried to run before it can crawl. Perhaps it should not have been surprised to discover that one of the earliest forms of interferon to be produced by recombinant DNA technology was useful only for treating pharyngeal warts and a rare form of leukaemia. The real excitement of this field, and of molecular medicine as a whole, is that we now have the tools to tackle some of the intractable health problems of Western society. With a little patience and better collaboration between the industry and the medical profession it should be possible to exploit to the full the enormous potential of this extremely exciting new field.

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Restraint of children in cars

Education not just legislation

The introduction of seat belts in motor vehicles and laws to enforce their use have generally been accepted as reducing the severity of injuries sustained in motor accidents, and more and more countries are introducing legislation to improve their use. Nevertheless, seat belts themselves may cause injuries—potentially to most structures from the neck to the pelvis.¹⁻³ Now that the need for seat belts has been accepted, it is time to spare some effort to ensure that they are fitted and used properly. This applies particularly to the restraints used for small children.

Although studies have reported on the effectiveness and the complications of seat belt use by adults,^{4,5} few have examined the effectiveness of restraints in children.⁶⁻⁸ In 1989 legislation was introduced in the United Kingdom that required the

restraint of children in rear seats of cars when suitable equipment was fitted. Following the introduction of such legislation, in both the United Kingdom and elsewhere, there have been an increasing number of reports of injuries, in particular to the spine,⁹⁻¹¹ to children restrained in cars involved in road traffic accidents. Such injuries will probably become more common in the United Kingdom as child restraints are increasingly used, both correctly and on occasions incorrectly. We have recently been aware of a number of spinal injuries in children who were improperly restrained. In one particularly sad case an infant sustained a "hangman's" fracture of his upper cervical spine, and permanent tetraplegia, after improper restraint during a road traffic accident.

So far the introduction of legislation and the plethora of commercially available seats and restraints have not been matched by public education. Evidence from the United Kingdom and elsewhere shows that although legislation increases the use of restraints, it does not necessarily improve the frequency of correct restraint. Indeed, use of restraints in the United Kingdom^{12,13} would appear to be following the pattern of widespread misuse identified previously in the United States and Sweden.^{14,15}

Errors in restraint fall into four broad categories: firstly, the child is placed in a restraint that is not designed to give protection in a crash; secondly, the child is placed in a restraint not designed for his or her size or weight; thirdly, the child restraint is not properly anchored to the car; finally, the restraint is not correctly applied to the child.

The confusion generated by the many available child restraints is self evident to any parent who tries to find the "best" restraint for any particular child. In practice such restraints may need to be used by several children of differing heights and weights. Current devices are not universally easy to fit, and adjustment to fit an individual child is often difficult and unnecessarily time consuming. A recent survey reported a high proportion of incorrectly fitted and adjusted restraints.¹³ The legislation in the United Kingdom itself offers only guidelines, but useful interpretation in the form of leaflets and booklets is available from the British Standards Institution (Education, Linford Wood, Milton Keynes MK14 6LE) and the Child Accident Prevention Trust (28 Portland Place, London W1N 4DE).

The incidence of injuries sustained by correctly restrained children can be reduced only by improving car and seat design—for example, rear facing seats for older children—or legislation related to accident prevention. The incidence

among those incorrectly restrained should be reduced by educating adults how to fit and use these devices properly. Car manufacturers should be encouraged to recommend certain restraints as suitable for their vehicles and include instructions in the car handbook. Similarly, manufacturers of restraints and retailers should be able to provide accurate and detailed advice both orally and in writing. Finally, sound research is needed to determine the type of restraint best suited to children of different sizes and weights.

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Joining Europe

Closer links with Europe may improve standards of health care in Britain

Whatever may eventually be agreed at the European summit meeting at Maastricht next month, the tide of history is pushing Britain into ever closer contact with its geographical neighbours. There is already growing pressure on Britain to agree to measures on issues such as employment law that are designed to achieve uniform standards and practices throughout the community.

Part of the resistance to closer integration into Europe is a continuing belief that the British way is best. Certainly Britain is different, but many of the differences should be causes for shame rather than chauvinistic pride. The widening gaps between the rich and the poor in Britain have been described recently in the *BMJ*.¹ The French and the Germans must find other features of life here perplexing—and especially our conviction that they are assets.

For example, Britain is the only country in the European Community that has one education system for the mass of its population while the professional middle classes and the business community send their children to fee paying schools in the private sector. The excellence of some of those schools should be seen as aggravating the grounds for disquiet.

The relevance of these comments to health is that health care seems to be moving in the same direction as education. The "opting out" we should be worrying about is not the change of some NHS hospitals into NHS trusts: it is the decision by ever more people to look to the private health

sector to provide much if not all of the medical care for their families. In the 1980s the number of beds in independent hospitals rose from around 8000 to 11 000.² By the end of 1989 around 13% of the British population was covered by private health insurance, and the number of policy holders rose by 9% between 1988 and 1989.³ We already have two nations in education; do we want two nations in health?

The move towards Europe may, possibly, offer a chance of escape from this grim vision. Health has had little mention in the run up to Maastricht, and there are no really controversial proposals on the horizon. Nevertheless, many aspects of health care are becoming Europeanised, and this week the *BMJ* begins a series of articles explaining how far that process has gone and some of the plans for the future—covering topics such as medical manpower, nursing, drugs, and the law as it applies to medicine and providing some data on the differences in the health of the different countries. Already health professionals may move freely to work in any nation in the community; the time will surely come when patients throughout the community will have guaranteed rights to treatment of guaranteed standards.

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