37 such injuries in the four preceding seasons, owing mainly to a 33% reduction in the incidence of spinal cord injuries in schoolboys after rules were changed for under 19 rugby at the start of the 1990 season. Hence the evidence from South Africa is that the incidence of spinal cord injuries has altered recently only in schoolboy rugby players.

Assessment of the effects of rule changes in Australian rugby depends on follow up data to Taylor and Coolican's study,¹¹ which have yet to be published. An official publication of the Australian Rugby Football Union, however, notes that since the introduction of rule changes to schoolboy rugby, no serious spinal cord injuries have been reported in Australian schoolboy rugby players in the past eight seasons (1985-92).¹²

Awareness is now growing of the lack of data on "near miss" injuries, in which serious cervical injury occurs without damage to the spinal cord. Calcinai found that whereas his method of analysis identified only one spinal cord injury in New Zealand rugby players in 1991 there were at least 10 "near miss" injuries.⁷ Similarly, in a prospective one year study of rugby injuries at 25 high schools in the Cape Province of South Africa, cervical ligament injuries were reported, seven of which were associated with cervical fracture or dislocation but none of which caused cervical injury.¹³ Analysing only those injuries that cause spinal cord injury therefore identifies only a small fraction of the total number of cervical injuries in rugby players. The mechanisms causing near miss injuries are similar to those causing spinal cord damage^{7,13}; hence effective interventions to prevent paralysing injuries would also reduce the incidence of these injuries.

Nearly 20 years after the *BMJ* first drew attention to the issue we still do not know the true incidence of either spinal

cord or all cervical injuries in rugby players in any rugby playing country. This unacceptable situation will continue until accurate data are collected, an idea that editorials in this and other journals have been promoting for years.^{1,14,15} The international community of doctors involved in rugby must convince rugby administrators in all countries to set up epidemiologically valid surveys of injuries. Until they do so there will not be enough accurate data to support change.

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Primary care at last for Brazil?

Much training is needed

Brazil has one of the most unequal distributions of income in the world.¹ Its health system is dominated by hospital care, and around 80% of hospital admissions paid for by public funds are to hospitals in the private sector.² Because pay is so poor in the public sector many doctors are forced to have two or more appointments to earn a reasonable income. Although the country produces more doctors per capita than many other comparable middle income countries, most are "specialists" with limited training, and few want to work in primary care. Community nurses are also in short supply. There are only two sizeable programmes for training primary care doctors, both based in the southern city of Porto Alegre. These train about 50 doctors a year.

The Ministry of Health in Brasilia recognises the impossibility of developing a national health system without investing in primary care and is creating a family health programme. This programme intended to establish 2500 primary care teams nationwide in the first year.³ It was proposed that nearly half would be in the impoverished north east. Nine months after the programme was launched in March 1994, 765 teams were working in 66 cities—just over half in the north east. Each team has a minimum of a doctor, a nurse, a nurse auxiliary, and several community health agents recruited from the local community and trained to undertake not only curative work but also prevention, health promotion, and, in some cases, basic epidemiological monitoring. It is responsible for 800-1000 families. Staff will be paid much more than current rates in the public sector and

will be required to work full time in the programme.

Since a change in the national constitution in 1988 the health system is being decentralised. Municipalities (the equivalent of local authorities) are now responsible for organising much of the health care for local populations. The system has problems. Some state governments are reluctant to pass the money from the federal ministry on to the municipalities for political reasons, and some local authorities are not ready to administer the money. Nevertheless, the process offers an important opportunity for primary care to take root because of the need to develop locally accountable services. The experience of some of the well organised municipalities, such as those in Ceara in the north east of the country, show that it is possible to develop cost effective services that have a real impact on public health and a considerable input from the local community.⁴

There is always a danger that proposals put forward in an election year (the elections were on 3 October last year) may turn out to be cosmetic. But it seems likely that some concrete progress will be made in the family health programme, although at a slower rate than originally intended because local authorities increasingly need primary care. The major omission so far is the training needs of the new teams. With few general practitioners or community trained nurses in Brazil, the teams will have to use health professionals trained mainly in hospitals, at least in the early years. Inappropriately trained specialists (many with only two years' specialist training) and nurses with purely hospital experience will be

transplanted into primary care after a brief introductory course. Continuing education will therefore be crucial if the teams are to deliver a reasonable standard of care, integrating health promotion and treatment of common diseases. If such a programme cannot be developed quickly there is a danger that teams will function poorly, provide perfunctory care, and rapidly become demoralised.

A lively debate is growing between those who see primary care professionals as having a mainly clinical role similar to that of the American family physician and those who have a broader vision. Under this broader vision primary care teams would be responsible for the health of the population, epidemiological surveillance, and an active programme of collaboration with the community to try to solve basic health problems such as sanitation and malnutrition. It seems clear that this latter approach is more appropriate for the most needy communities in Brazil.

Because of the size of Brazil some parts of the programme may have to be delivered by means of a distance learning approach. Others, particularly in the larger cities, could be based on existing or developing training programmes. There is also a need to develop vocational training programmes for doctors and nurses who wish to make a career in primary care.

At a recent conference at Santarem discussions were held about collaboration between Brazil and Britain in training people for this ambitious programme. The British Council in Brazil has already sponsored exchange programmes in health care⁵—for instance, between Porto Alegre and University College London Medical School and between Natal and the Institute of Child Health in Bristol. It is keen for more collaboration to help the development of the family health programme. Clearly, it would be inappropriate to transplant the British experience to Brazil. Nevertheless, some experience of British general practice may be relevant, particularly postgraduate training, the multidisciplinary team approach, and the strong role of the general practitioner as gatekeeper to hospital services. The development of an appropriate referral system in Brazil will be a key factor in determining the success of primary care and in curbing the excessive

expenditure on hospitals. At the same time no collaborative programme should be one way, and Britain can learn much from the emphasis on community involvement and community diagnosis in some of the better established Brazilian primary care programmes.

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Corneal transplantation in Britain

Organisation is good; clinical outcome should get better

Over 3000 corneal transplant operations are performed each year in Britain, making this the commonest type of allografting. In most procedures a full thickness corneal button, about 8 mm in diameter, is removed and replaced. The change from using fresh tissue (within 24 hours of death) to stored tissue during the 1980s converted keratoplasty from an out of hours procedure to a mainly planned, routine operation. Cold storage (for up to 8 days at 4°C) and organ culture (for up to 30 days at 34°C) both allow for planned surgery. Organ culture allows a reserve of tissue for genuine emergencies and affords ample time for the required routine screening of donors for hepatitis B and C viruses and HIV. Extra advantages may follow the more widespread matching for HLA types.

After initiatives in the United States, Denmark, and the Netherlands, Britain's Corneal Transplant Service, based on banks in Bristol and Manchester, began in 1986. It now offers to accept, store, and issue material throughout Britain and the Republic of Ireland. Other banks, including those at Moorfields Eye Hospital and the corneoplastic unit at East

Grinstead, send surplus tissue to the service, where longer storage times avoid wastage of tissue. In 1994 the Corneal Transplant Service attracted central funding from the Department of Health; it is administered by the United Kingdom Transplant Support Service Authority.

The coordination of activity has allowed collation of data on over 3000 grafts transplanted between 1987 and 1991 and followed up for one year. This first analysis of activity in Britain not only emphasised the impact of irregular corneal curvature (astigmatism) on visual acuity¹ but is a timely contribution to the international debate on tissue matching² fuelled by the results of other large studies in North America,³ Australia,⁴ and continental Europe.

Although results are best in patients with keratoconus (about 90% of grafts survive five years), nearly half the grafts in heavily vascularised recipients will fail within five years.⁵ The comfortable notion of full "immunological privilege" for the cornea was dispelled some years ago; topical immunosuppression has significantly improved outcome in high risk recipients, but the influence of tissue matching remains controversial.²