monitoring not achievable by any other means. It thus offers an increased margin of safety that patients should not be denied. There is a strong case for hospital committees to give priority to requests for these new instruments, and operating departments should probably have the first claim.

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entering a nursing home and spending \$11 000. This is a large amount to a single person, but, as in the young, the distribution of costs is very skewed—13% of the elderly consume 90% of the resources. If the costs are spread across the whole elderly population they are quite affordable by groups such as employers and unions backed by state funds. Meanwhile, in Japan it has been estimated that by 2020 the total public cost of providing institutional and domiciliary nursing care services for their elderly population will be only one fifth of that spent on compulsory education.

Much remains to be learnt about how the problems associated with old age can be prevented or ameliorated, and, as the population ages, research to answer these questions should be given higher priority than in the past. In Britain the Department of Health and Social Security is said to be considering spending money on research into aging. The United States, meanwhile, already has a National Institute of Ageing, whose 1986 budget was over \$156m. There is no comparable organisation in Britain, and in 1986-7 the Medical Research Council spent only £591 000 (0.48% of its total budget) on research related to the elderly. The Americans are thus spending for each person something like 50 times as much as the British on research into aging. The message seems clear enough.

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Research into aging: exploding myths

Neither doctors nor research workers have given aging the attention it deserves, especially considering that the number of those expected to live to 80 in Britain is forecast to rise by a quarter over the next 10 years. "What else can you expect at your age, dear?" is a not uncommon platitude delivered by doctors to patients whose symptoms are attributed to old age, whereas those patients thought to have "diseases" attract genuine interest and concern. These contrasting attitudes are most apparent with senile dementia, which attracted little interest among either research workers or doctors until it became Alzheimer's disease. One result of this ignorance about aging is that myths have flourished, and an aim of a recent Ciba Foundation symposium on research and the aging population (now available as a book¹) was to shatter those myths.

The first myth is that what happens to people in Britain and other developed countries as they grow older is normal aging; and the second myth, which is interwoven with the first, is that advancing age inevitably brings progressive disability. A glance at comparative morbidity data shows these not to be true—for example, although aging commonly brings high tone deafness and a progressive rise in blood pressure in Britain, elderly inhabitants of the Easter Islands show neither of these changes. And osteoporosis, which is associated with about 1.2 million hip fractures a year in the United States, is rare among elderly Chinese women. Such examples suggest that much of aging is a consequence of environmental factors and so may be amenable to modification. Individuals can improve their quality of life in old age by maintaining healthy lifestyles. Particularly important is regular exercise to maintain muscle bulk: even a trivial illness in someone with minimum muscular reserve may tip the balance and render him or her bed bound.

A third myth, and arguably "one of the greatest obstacles to improving the system of financing and delivering long term care to the elderly," is that the elderly's needs for care are limitless. In fact many studies have shown that the elderly can be cared for within reasonable budgets. In the United States, for example, a 65 year old has a 43% chance of

Physical exercise and mental health

The importance of exercise in the prevention and rehabilitation of coronary heart disease is well known.¹ Less well known are the psychiatric implications of regular exercising.²

There are three types of physical exercise: aerobic (or cardiorespiratory)—for example, distance running; anaerobic (or muscular strength) endurance—for example, weight lifting; and flexibility-coordination-relaxation—for example, yoga.³ We know most about the psychological effects of aerobic exercise. Normal people rate themselves as less anxious, depressed, or angry after vigorous exercise,^{4,5} although some studies have found little effect on mood.⁶ Furthermore, regular aerobic exercising may reduce stress related autonomic responses in normal people⁷; this effect may, however, be small.⁸

Attempts have been made to use exercise regimens in treating anxiety and depression. Some authors have ascribed an anxiety relieving effect to exercising,^{4,5} but others have used physical exercise to provoke anxiety attacks in the laboratory.⁹ Running has been used successfully to alleviate the severe anxiety accompanying phobias,¹⁰⁻¹² but there has been no systematic study of treating anxiety with exercise.

Physical exercise has been tried as a treatment for depression in controlled studies. It is difficult to compare these studies because of differences in defining the patient groups treated, the exercise regimen applied, and the assessment of the outcome.¹³ In most studies only patients who were mildly or moderately depressed were included; control groups received relaxation treatment, psychotherapy, or no treatment; and different self rating measures (Beck depression

inventory, depressed adjective check list) were used to evaluate depression. In general patients in all groups improved during the trials and patients in the exercise groups did either better than those receiving no treatment,^{14 15} or as well as those receiving different forms of psychotherapy.^{16 17} There has been no trial of using exercise treatment either alone or in conjunction with antidepressant drugs or electroconvulsive treatment in more severely depressed patients.

Exercise may also sometimes be bad for mental health. Patients have been identified ("obligatory runners") in whom strenuous physical exercising is a means of losing weight, and it has been argued that excessive exercising may be an "analogue of anorexia nervosa."¹⁸⁻²¹ The term "exercise dependence" has been proposed to describe the psychopathology of this group of patients. They show many psychological symptoms common to other dependence states including a withdrawal syndrome characterised by dysphoria on stopping the exercise schedule.²²

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Regular Review

Iron and infection

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Because iron is needed in essential biochemical reactions and in oxygen transport living organisms have developed efficient mechanisms for its acquisition, transport, and storage. In man, transferrin and lactoferrin are responsible for binding ferric iron and transporting it in plasma and secretions, whereas non-functional iron is stored in the cells as ferric oxohydroxy crystals within ferritin molecules.¹ To compete with these powerful iron conserving systems microorganisms have developed their own chelating compounds, the siderophores, which enable them to make iron soluble and assimilate it from their environment.^{2 3} This function is closely related to their virulence.

Hypoferraemia is one of the most constant features of infectious disease, and since iron deprivation in bacterial cultures is regularly associated with inhibition of growth it has been suggested that hypoferraemia may be an important host defence mechanism. The term "nutritional immunity" was coined by Kochan in 1973 to underline the importance of iron deprivation in limiting the growth of invading organisms.⁴ The relation between infection and iron availability has now been studied intensively,⁵⁻¹⁴ and, although some evidence favours the nutritional immunity hypothesis,

few clinical data support the importance of iron deficiency or overload in determining the severity or prevalence of infectious disease in man.

Plans for adding iron to diets in many developing countries are currently being formulated for nutritional reasons, but because recent studies have again highlighted the potential deleterious effects of iron supplementation^{14 15} we have examined the possibility that such policies may result in an increased risk of infection. In particular we have reviewed the clinical evidence that suggests that iron state is associated with the incidence and severity of microbial infection.

Chronic iron overload

If iron is an important limiting factor in infection—as proposed by the "nutritional immunity" theory—then chronic iron overload should lead to a severe impairment of protection against infection. Transferrin saturation in primary and secondary haemochromatosis is high. In some patients transferrin is completely saturated and some of the