butions being made to promote a better understanding of physiology and knowledge about the importance of regular physical activity to health.

My own area of interest is in the epidemiology of physical activity as it relates to health, and in the application of this information to improve public health. Pioneering investigations on the role of sedentary habits in the development of heart disease by Professor Jerry Morris in the United Kingdom nearly 40 years ago led the way in establishing inactivity as an important risk factor for disease. We now have substantial evidence that lack of exercise leads to the development of heart disease, some cancers, type II diabetes, stroke, and certain musculoskeletal disorders. It is becoming increasingly clear that a physically active way of life enhances feelings of general wellbeing and generally improved psychosocial health.

The impressive body of evidence on physical activity and health led many organisations around the world to develop initiatives and statements on this topic. Organisations such as the World Health Organisation, International Federation of Sports Medicine, American Heart Association, and American College of Sports Medicine issued statements on this topic within the past few years.

We made enormous progress in sports medicine and exercise science over the past 40 years, but what does the future hold?

Physical activity and health – I think that we will make important additional advances in understanding the role of sedentary living in disease development. Exciting new work on exercise and immune function, and how this relates to risk of cancer and other diseases, is one prominent example. I think we can now conclude that physical inactivity does indeed increase risk of colon cancer, and probably has a role in the development of breast and prostate cancer as well. In fact, I predict that over the next decade or two we will learn that the population attributable risk of physical activity for cancer is greater than the attributable risk of diet for this outcome.

Physical activity dose-response – We now know that physical activity has many health benefits, but we still do not have enough information about the specific type, intensity, and total amount of activity that is required for protection. It is clear that there is a dose-response gradient of health benefits across physical activity and physical fitness strata, and we need to learn much more about the specific shape of these curves for different endpoints. One of the current major research issues is in regard to the relation of different exercise intensities to health and functional outcomes. Many talented scientists are working on this issue, and I am confident that answers will be forthcoming.

Physical activity and behavioural science – The roots of exercise science are in the physiological disciplines. The great British physiologist A V Hill won the Nobel Prize for his research in exercise physiology in the early part of this century. As indicated earlier, much important current investigation is underway in exercise physiology, and these efforts will undoubtedly continue to produce important results. From a public health perspective, one of the most significant issues is how to get more people more active more of the time. We do not have enough information on successful physical interventions. Fortunately, in recent years psychologists and other behavioural scientists turned their attention to issues in physical activity. Much of the current work in this area is based on well developed theories of behaviour change, and much new information is being generated. I think that the next few years will produce tremendous advances in our understanding of how to implement successful physical activity interventions.

A major unresolved issue relating to physical inactivity and public health is the effect of the social and physical environments in which those of us in industrialised societies live. We have spent the past 50 or more years systematically engineering the need for human energy expenditure to minimal levels. Professor James estimates that the average decline in daily energy expenditure in the United Kingdom is 800 kcal over the past 20 years.¹ This trend is likely to continue. What can be done? Our citizens in industrialised societies are not likely to shun sedentary recreational activities such as television viewing and surfing the internet, nor is it reasonable that they will give up most labour saving devices at home and at work. If Professor James is correct, the average individual in the UK would have to add a daily walk of eight miles to compensate for the decrease in average energy expenditure. It does not seem probable that any intervention programme is likely to produce an increase of activity of this magnitude in the population.

Thus, although we have made much progress in exercise science and sports medicine, and exciting new discoveries are constantly made, major challenges are ahead in terms of physical activity and health. Humans evolved to be active animals, and we may be physiologically unsuited to life in modern society. I believe that the high prevalence of physical inactivity in many countries around the world is one of the most serious threats to health we face. Let us hope that by working together we can learn to surmount this problem.

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1 James WPT. A public health approach to the problem of obesity. *Int J Obes* 1995;19(suppl 3):S37–45.

Sport and exercise medicine

The recognition of sport and exercise medicine in Britain as a substantive specialist interest for medical graduates is facing a critical period in its development.

The Prime Minister, a great lover of sport at all levels, personally launched the government's sports policy paper "Sport: Raising the Game" in July 1995.¹ This paper makes it clear that the Government would like to promote a British Academy of Sport. A subsequent consultative

document entitled "The British Academy of Sport" was released by the Sports Council early in December 1995.² As with all such documents, the consultative period was disappointingly brief, closing on 31 January 1996.

The development of an infrastructure to support and promote excellence in sport is a key section in the consultative document. The importance of quality sports medicine and sports science is clearly identified. These

services would be provided at a British headquarters facility as well as regional centres. Quality sports medicine would cover all aspects of service provision as well as promoting research and development. Improving standings in sports medicine would benefit all sport, but particularly the rising star.

These two documents confirm that the government, as well as the public at large, having rising expectations requiring standards of excellence in sport and exercise medicine.

The leaders of the medical profession in Britain – the royal colleges and their faculties – are starting to grapple with this challenge. Who sets the standards of education, training and assessment in sports and exercise medicine? Who advises the government and reassures the public with regard to professional standards in this developing area of clinical practice?

The Scottish medical royal colleges (The Royal College of Surgeons of Edinburgh, The Royal College of Physicians of Edinburgh, and The Royal College of Physicians and Surgeons of Glasgow) recognised the need to assess standards of basic clinical practice in sport and exercise medicine following the XIIIth Commonwealth Games in Edinburgh, Scotland, in 1986. The Colleges agreed that a passing or hobby interest, goodwill, and availability should not be the basis on which sport and exercise medicine should develop in Britain.

The Scottish Royal Colleges established a Board in Sports Medicine with the remit to agree a definition of sports medicine, draw up a syllabus covering the relevant basic sciences and standards of clinical practice and, finally, establish a diploma examination to assess basic knowledge and clinical expertise in sport and exercise medicine.³ This examination parallels similar diplomas in child health, community child health, anaesthetics, obstetrics, etc.

Higher degrees in sports medicine are awarded by the Universities of Nottingham and Glasgow and two very different diploma examinations are awarded by the Royal London Hospital and the Worshipful Society of Apothecaries. Extensive educational programmes are conducted by the British Association of Sports Medicine, the University of Bath Distant Learning Programme, the Scottish Institute for Sports Medicine and Sports Science, and the National Sports Medicine Institute, as well as meetings and courses arranged by General Practice and Postgraduate Medical Education Committees, the royal colleges, and the governing bodies of sport throughout Britain.

Lancet lived up to its reputation as a far sighted journal in 1988 when it published a leading article entitled "Sports medicine – is there lack of control."⁴ The leader recommended that... "sports medicine should be brought under the umbrella of a recognised body with an accredited higher trainer programme..."

Accident and emergency medicine developed in Britain as a speciality following the founding of the Casualty Surgeons Association in 1967 and the subsequent agreement of the Department of Health and Social Security to appoint consultants in accident and emergency departments. Formal training programmes for senior registrars were introduced in 1976.

The Royal College of Surgeons of Edinburgh introduced a standard-setting fellowship examination in accident and emergency medicine and surgery in 1983. The final logical outcome of this period of development was the formal establishment of the Faculty of Accident and Emergency Medicine of The Royal College of

Physicians and Surgeons and the Royal College of Anaesthetics of the United Kingdom.⁵

In Australia, where sports medicine has been defined as "the total care of the exercising individual," the Australian College of Sports Physicians (ACSP) was formed in 1985 along the lines of the traditional specialist medical colleges. The primary aims of the Australian College were to establish a curriculum, provide an academic standard through formal examination, and start a training programme for medical practitioners wishing to practice full time sports medicine. A leading article in the *Medical Journal of Australia* confirmed that these ambitions had been achieved by 1993.⁶

The time is now right in Britain to follow the advice offered in 1988 that sports medicine should be brought under the umbrella of a recognised body with an accredited higher training programme. Any such programme should meet the charter on training of medical specialities in the European community and parallel education and training standards in other British specialities, such as primary care, accident and emergency medicine, and occupational health. The bulk of sports medicine practice will be related to aspects of exercise physiology designed to maximise performance while ensuring safety of all participants in sport and exercise programmes. The management of common soft tissue injuries and their rehabilitation back to full fitness without the risk of long term disability will again be a major aspect of clinical practice. Subspecialty care of specialist injuries and medical problems will lie in the province of hospital medicine. The bulk of sport and exercise medicine will be practised outside the hospital environment. Practitioners in sport and exercise medicine will relate closely to many of their clinical colleagues in other specialty groups but they will also have to relate closely with the sports sciences and the professions allied to medicine.

Interested royal colleges and their faculties should recognise the existence of public expectations and the need for quality control in sports medicine on the basis of wide ranging and high standard educational programmes. Many medical graduates practice sports medicine on a part time basis with a small courageous band who have committed themselves full time to the specialty. The development of a British Academy of Sports with appropriate regional centres will significantly increase the availability of full time posts in the specialty. It is therefore of paramount importance that the royal colleges and their faculties recognise and promote the development of an accredited body to supervise training in sport and exercise medicine, building on the Joint Scottish Royal Medical Colleges Diploma examination in sports medicine. The time has come to establish a faculty or association of sport and exercise medicine for medical graduates with an appropriate group of royal colleges and their faculties acting as patron.

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- 1 Sport: raising the game. HM Government Sports Policy Paper, July 1995.
- 2 The British Academy of Sport: a consultative paper. London: The Sports Council, 1995.
- 3 Diploma in Sports Medicine Regulations. Edinburgh: The Royal College of Surgeons of Edinburgh, 1990.
- 4 Sports Medicine – is there lack of control? *Lancet* 1988;ii:612.
- 5 Faculty of Accident & Emergency Medicine of the Royal Colleges of Physicians and Surgeons and the Royal College of Anaesthetics in the United Kingdom – Standing Orders, 1995.
- 6 Sports medicine in Australia. *Med J Aust* 1993;158:511.