Exercise interventions for health: time to focus on dimensions, delivery, and dollars

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The importance of physical activity is proven, and methods of implementing exercise programmes should be urgently researched

"It is tragically ironic that major legislative actions have been implemented to protect society against all other forms of preventable deaths except those resulting from physical inactivity." Booth, 2000

It is very likely that the reader of the *British Journal of Sports Medicine* will agree that "exercise has preventive and therapeutic health benefits". Yet the vast majority of people in the developed world choose to remain inactive. The prevalence of chronic diseases contributed to by physical inactivity is escalating so rapidly that their costs will exceed \$1 trillion in the United States in the next decade.¹ More alarming, there are 250 000 deaths annually in the United States directly attributable to physical inactivity.¹ Despite these distressing data, most physicians and health providers miss many opportunities to prescribe exercise when treating chronic diseases such as obesity, diabetes, and cardiovascular disease. What lies behind this striking paradox, this dissonance between knowledge and practice? How do we create, implement, and sustain programmes of physical activity in a culture that actively encourages overeating and sedentary behaviour?² This leader suggests strategies for bringing practice (physically active behaviour) into line with the evidence that treatment of physical inactivity provides enormous health benefits.¹

FACT: MOST PEOPLE CHOOSE INACTIVITY DESPITE ITS DELETERIOUS EFFECTS ON HEALTH

The reasons behind an inactive, rather than an active, lifestyle, have been discussed at length elsewhere³⁻⁵ and will not be iterated here. We emphasise that millions, if not billions, of dollars have been spent to encourage increased "voluntary" physical activity. Although many

of these studies have reported short term benefits in surrogate measures of health, such as reduced blood pressure, we do not know of any that have been powered to show benefits in end stage outcome measures—for example, stroke, myocardial infarction. Therefore, the "exercise sceptics" could run a strong campaign arguing that physical activity interventions have not proven their worth. This may be because physical activity interventions are usually of a defined length, and it may require continuing funding to realise continuing, and long term, benefits. Further, programmes introduced on a population basis are often not evaluated as to their effectiveness. Although absence of evidence for the long term effectiveness of short term intervention studies does not equal absence of effect, we feel that additional data are urgently required using appropriate study designs to address the clinically relevant end points mentioned above.

FACT: MOST HEALTH PROVIDERS WOULD BENEFIT FROM GREATER TRAINING AND EXPERIENCE IN EXERCISE PRESCRIPTION FOR CHRONIC DISEASE

Before addressing how it may be possible to obtain novel data to test the effectiveness of exercise interventions we acknowledge the need for healthcare providers to (a) improve their understanding of the theoretical basis for exercise prescription in chronic diseases such as diabetes and osteoporosis, (b) have more time available to provide specific exercise prescription to patients, and (c) have a resource of trained professionals to whom appropriate patients can be referred for exercise. Whether exercise prescription should be the sole responsibility of doctors or other healthcare providers such as physiotherapists could be debated. In the ideal world, specialist sports physicians, rehabilitation specialists in the United Kingdom, and their US counterparts (physiatrists) would be ideally placed to fill this void.

FACT: THERE IS A NEED TO AUGMENT THE EVIDENCE BASE FOR SPECIFIC EXERCISE PRESCRIPTION IN TREATABLE MEDICAL CONDITIONS

The evidence base for specific exercise prescriptions to optimise the care of patients with certain chronic diseases needs to be improved, and we discuss how this can be done below. Furthermore, delivery of exercise programmes is generally a major obstacle to doctor and patient action. Let us consider strategic approaches to improve patients' chances of receiving appropriate exercise therapy.

A NEW PARADIGM: ACTIVE LIVING FOR ALL—NOT JUST THE FORTUNATE

(1) Governments must recognise physical activity as an essential programme. Physical activity must become a core item in national and state budgets, not an optional extra. This can be argued on fiscal grounds¹ without resorting to moral or emotional arguments. Many governments—for example, Norway, Australia, provinces of Canada—are recognising the importance of physical activity in various ways and reversing the trend of recent decades that saw declines in attention to physical activity. Organisations such as the British Association of Sport and Exercise Medicine (BASEM) and The American College of Sports Medicine (ACSM) now lobby government so that spending is directed to physical activity programmes from health, education, and seniors' care. Consumer groups lobbying for certain diseases—for example, arthritis societies in various countries—must also advocate for access to appropriate physical activity if the evidence exists—and it does for many chronic diseases.^{6,7} Specifically, governments must support novel programmes of physical activity delivery that have measurable outcomes (see below). Governments must work to develop community based (school programmes, seniors' centres) and workplace programmes. Special attention must be paid to sustainability and to overcoming barriers that limit access by geography or socioeconomic strata.

In addition, government must create transportation and urban planning incentive packages that encourage the development of bike paths, recreation centres, parks, sidewalks, and safe neighbourhoods. They must consider removing sales tax on exercise related equipment and provide tax incentives to individuals and employers. Finally they must work globally to develop a coordinated implementation and evaluation plan to create and disseminate policies and programmes related to physical activity as it relates to health.²

(2) Business must recognise physical activity as an essential programme. The

next level of support for society wide physical activity must come from business, and this will only come by making work site promotion of physical activity financially attractive. Many studies of work place physical activity programmes have shown mixed results.⁸⁻¹⁰ Do the positive outcomes vindicate the programme and provide impetus for studies into the determinants of successful and unsuccessful programmes? We note that seat belts were generally not worn until legislation made their use compulsory. If the legislation were now removed, most people would continue to wear them. Although we do not condone making physical activity compulsory, we believe a government that understood the costs of physical inactivity would see business as a partner in promoting healthy living.

(3) Strategic partnerships must be developed to promote a physically active lifestyle. Governments in partnership with business, universities, non-government organisations, urban planners, and community groups must collaborate to use existing programmes and facilities in new ways and to develop novel environments and sustainable programmes of physical activity with a specific health focus (bone health, cardiovascular health, etc).

(4) Research in exercise interventions must become more focused. Researchers have provided excellent evidence that some form of physical activity provides health benefits—in the short term, in selected populations, and generally using end points that serve as surrogates for the major medical end points—for example, cardiovascular risk factors as surrogates for myocardial events or death. If we accept the veracity of these data, the next step is to (a) further refine the dimensions of exercise that provide benefits (frequency, intensity, type, duration), (b) more precisely identify the people that do, and do not, benefit from the exercise prescription, (c) power studies to measure the most clinically relevant end points where this has not yet been done, and (d) focus on populations who do not traditionally adopt exercise behaviours to try to overcome the barriers they perceive to physical activity. In short, we feel there is no longer any justification for studies of convenience samples of white, college aged healthy populations undertaking exercise.

Examples of the type of study that we believe warrants funding include: (a) factorial studies of resistance training and/or endurance training in older patients with type 2 diabetes; (b) resistance versus agility training studies aimed at preventing falls in older people; (c) studies comparing the effect of exercise in patients with various levels of dyslipidaemias; (d) studies of exercise in bone

health powered to detect differences between groups in fractures, not just in bone mineral density; (e) studies in cultures and populations who are generally low adopters of physical activity, to discover what the barriers are; (f) studies within schools powered to assess multiple health outcomes; (g) studies that address policy change related to physical activity across schools, communities, and levels of government. Most importantly, the biological mechanisms whereby physical inactivity compromises health—and physical activity promotes it—must continue to be examined at the laboratory level.¹ These data would add substantially to arguments for funding of exercise in public programmes such as schools and seniors' centres. Illustrating the biological basis for beneficial effects of activity ensures that physical activity research is not relegated to the field of "fringe" therapy alongside crystal therapy.

Another crucial exercise question relates to delivery methods. How do home programmes compare with community programmes in effectiveness? How do tele-health interventions compare with traditional formats? The relative cost-benefits of such interventions need to be tested.

Thus, we propose to modify van Mechelen's classic prevention model by adding government support as a priming pump and health economic evaluations as a primary outcome measure. The type of studies outlined above require budgets that are generally beyond the capacity of traditional exercise physiology granting agencies in many countries, but as the study outcomes directly impact the health of society, it is appropriate that the much larger health budget contribute to these studies.

Unfortunately, some granting agencies have relegated exercise research to the realm of "alternative" health care. This is a short sighted, potential disaster that must be contested vigorously.

We also iterate Frank Booth's point that we need to address the problem of physical inactivity as a disease, rather than advocate exercise as a treatment. "Physical inactivity" is unarguably an epidemic that burdens society to the cost of 2.1 billion dollars annually, in the United States alone. Unfortunately, sceptics can see exercise as the domain of few, a lifestyle choice akin to drinking martinis or ocean sailing.

SUMMARY AND CONCLUSION

In summary, the evidence for the health benefits of physical activity is firmly established, but people remain inactive. Given the increased prevalence of chronic disease associated with physical inactivity, a renewed and comprehensive

effort is essential. Thus, we contend that research must focus particularly on discovering (a) precise exercise prescriptions (to make exercise more palatable) and (b) methods of delivering exercise cost-effectively (so that it is accessible and sustainable). If this is done in special populations that consume significant proportions of the healthcare budget—for example, patients with diabetes, obesity, osteoporosis—it will behoove government to fund such interventions beyond a traditional commitment to "health research" budgets. This partnership of government with research and the private sector will be essential to provide the amount of funding needed to answer the question: can physical activity interventions deliver cost-effective health care in a sustainable fashion?

Governments can no longer avoid this question, as they may be missing their best opportunity to promote health and increase productivity. Given the annual cost of physical inactivity, the programmes and research needed to test activity interventions seem a blue-chip investment.

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