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Elite athletes' survival advantage: Could be shared by all through physical activity

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It was the lay public, not doctors, who put pressure on politicians to call a halt to dirty hospitals and uncontrolled cross infection

led to a similar dreadful outbreak at Stoke Mandeville in 2005-6.⁸

With such practices, antibiotic resistant bacteria flourish and hospital infections soar. By 2003, English hospitals reported more than 7000 meticillin resistant *Staphylococcus aureus* (MRSA) bacteraemias a year.⁹ Although not all resulted from poor hygiene practice, many of them did. Around 70000 serious MRSA infections, 700 000 colonisations, and perhaps seven million failures of infection control must have occurred that year. In 2007, hospitals reported more than 55 000 cases of *C difficile* infection,¹⁰ most of which probably resulted from poor infection control and imprudent antibiotic prescribing.

In the end, it was the lay public, not doctors, who put pressure on politicians to call a halt to dirty hospitals and uncontrolled cross infection. Hospitals were required to publish their rates of infection, audit practice, and cleanliness ratings, and to continually reduce their infection rates or face the threat of sackings and fines. For the first time, the 2006 Health Act required healthcare institutions to have appropriate infection prevention and control in place, compliant with a code of practice.

Where decades of education and exhortation had failed, legal strictures had a dramatic impact, even on sceptical doc-

tors, just as they had done on sceptical smokers and drivers. Doctors and nurses were effectively forced to behave, and by 2011 MRSA bacteraemias in English hospitals had fallen by around 86% (from 7700 in 2003-04 to 1114 in 2011-12) and *C difficile* infections by 68% (from 55 498 in 2007-08 to 18005 in 2011-12),^{9, 10} with associated reductions in mortality.^{11, 12} This is one of the most dramatic demonstrations of the effectiveness of good infection control practice (or just good clinical practice) in the medical literature, and it seems to have produced a genuine change in culture. Just as drivers now always use their seat belts and smokers never light up indoors, many doctors now decontaminate their hands between patients without thinking and chastise their colleagues who forget.

However, there are still dirty wards, patients who should be isolated, imprudent antibiotic prescribing, unwashed hands, and many avoidable infections. Some doctors remain sceptical and, like Semmelweis's colleagues all those years ago, still refuse to accept that they may themselves be part of the problem. Christmas is coming with its judgment of the naughty and nice: time to believe and be good.

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Two linked papers examine longevity in former Olympic athletes and reach different conclusions.^{1, 2} Clark and colleagues analysed data on 15 174 Olympic medallists from nine countries that have enjoyed success in Olympic Games. The athletes had participated in at least one Olympic Games between 1896 and 2010.¹ The study found that Olympic medallists had a relative survival advantage of 8% compared with matched controls, which translates into 2.8 extra years of life. The second and smaller study by Zwiers and colleagues examined data on 9989 people who competed in Olympic Games between 1896 and 1936.² They reported no increase in survival among those who competed in aerobic sports and higher mortality in those who participated in collision and contact sports, including power sports. Indeed, mixed epidemiological evidence pervades this literature, with many studies identifying a lower risk of mortality in previously elite athletes, especially those competing in aerobic events.³ By contrast, those who compete in power events tend to show less evidence of a survival advantage.³ What drives these differences?

The differences in the findings of the two current studies could be attributed to different mortality datasets, different study periods, differential loss to follow-up (or different statistical methods being used to deal with loss to follow-up¹), or differences in the characteristics of athletes (for example, Zwiers and colleagues examined all Olympic participants, not just medal winners).²

Some elite sportspeople may be influenced by fame and glory, which could confer longevity through increased affluence unless undermined by excessive partying and hazardous risk taking behaviours.⁴

Nonetheless, the epidemiological research shows a slight survival advantage in elite athletes compared with the general

population.³ However, more than four decades of epidemiological data show that people who do at least 150 minutes a week of moderate to vigorous intensity physical activity also have a survival advantage compared with the inactive general population. Conservative estimates put the survival advantage at just under a year,⁵ but the range extends to several years of added survival for physically active people.⁶ Interestingly, the upper threshold for benefit seems to be around 300 minutes of exercise a week (about an hour a day), beyond which negligible additional benefit is accrued.⁷ Furthermore, recent reviews suggest that excessive endurance training may be associated with harms, particularly in terms of cardiac structure, function, and biomarkers.^{6, 8}

The athletes' survival advantage may not be due only to their elite athletic performance. Epidemiological studies have shown that US college alumni were protected only if they maintained their physical activity for decades after their time of sporting prowess.⁹ Other researchers have found that Finnish Olympians maintained their physical activity and other aspects of a healthy lifestyle, and that this extended their lives by as much as five years.¹⁰ This health advantage is similar to the life years gained by those in the general population who maintain a healthy



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active lifestyle,¹¹ with physical activity being the most important health enhancing habit in older people.

Meeting recommended levels of physical activity is as important to global health as not smoking, and inactivity contributes to more than five million deaths a year, more than obesity.⁵ Compared with the successes that have been achieved in tobacco control, our inability to improve physical activity is a public health failure, and it is not yet taken seriously enough by many in government and in the medical establishment.¹²

The direct population effect of Olympic medal winners is small—the 448 medal winners in London 2012 studied by Clarke and colleagues comprise about 0.00008% of the adult populations of their countries. Community-wide participation in physical activity needs to be fostered. Olympic athletes could act as role models in organised and integrated efforts to increase physical activity before and after Olympic Games. However, rhetoric and not action abounds. In 2002, planners proposed that the London Olympics might increase the proportion of adults meeting the current guidelines of 150 minutes of physical activity a week from 35% to 70%,

an anticipated population effect large on enthusiasm but well beyond credibility.¹³ Studies of previous Olympic Games have found no effect on physical activity levels in the general population,^{14 15} probably because of insufficient investment and non-sustained policy and programmatic efforts aimed at tackling inactivity.

Paffenbarger and colleagues cautioned against the mesmerising effects of celebrity athleticism in 2004, suggesting that “Today’s interest in sport is more often vicarious than participatory. We idolize the elite athlete who performs for us, rather than the everyday athlete we could and should become.”¹⁶ Even Hippocrates recognised that “Everything in excess is opposed to nature” and observed that “Walking is man’s best medicine.” Although the evidence points to a small survival effect of being an Olympian, careful reflection suggests that similar health benefits and longevity could be achieved by all of us through regular physical activity. We could and should all award ourselves that personal “gold medal.”

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BMJ CHRISTMAS APPEAL 2012



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That’s the reality for Tom Okwel, a nurse anaesthetist in northern Uganda (pictured left).

“There comes a situation—in most cases at night—when we are forced to run two theatres at once, because of the overwhelming number of procedures,” he admitted when we met him at a Lifebox training workshop. “There can be three or more emergencies at once.”

International standards for safe anaesthesia require that the provider never leave the patient. But as Uganda has just over 300 anaesthesia providers for a population of 35 million, they

get double-booked. We can’t instantly make surgery safer for patients in Uganda and other low-resource countries. But we can do something to make a terrible situation much less worse.

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Sarah Kessler, project manager, Lifebox

▶ Atul Gawande answers questions about the Lifebox pulse oximeter www.bmj.com/content/345/bmj.e8407

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