unconvincing and therefore called for raising the price and limiting availability.[1] The prime minister's strategy unit, with access to the same evidence, concluded that controlling average consumption through the mechanism of raising the price and limiting access would have unwanted side effects and was not a viable option. They therefore called for education, more policing, improved treatment, and the alcohol industry entering into voluntary agreements to behave reasonably.[7] The academy working group would agree that all of these actions were necessary. But they took the view, based on evidence, that such actions should complement measures to control overall level of consumption.

Two reports, same evidence, and yet such different conclusions. As scientists, steeped in alcohol (as it were), we who prepared the academy's report no doubt came to the issue with our own set of prejudices. The prime minister's strategy unit had a different set. It is reasonable to surmise that they found the prospect of raising the tax on alcohol unattractive, as they did reversing the trend of making it ever easier to buy alcohol. The policy implications of the science may well have influenced their view of the evidence.

This leads me, naively perhaps, to want to separate two issues: what the science shows and its policy implications. It is perfectly reasonable for governments to balance a number of interests in forming policies. Scientific evidence on dose response relations between exposure and risk is only one consideration. Others include analysis of costs and benefits, risk analysis, and appreciation of the degree to which policies fit with public values.[8] It is helpful, however, to keep these distinct.

Public values are important. There is much discussion now of individual responsibility for behaviour. This informs the government's call for consultation as it develops a white paper on public health. A healthy tension exists in a democratic society between individual responsibility and the role of government. Smoking is a matter of individual responsibility but successive British governments have taken beneficial action by raising the price for health reasons, restricting advertising and promotion, and restricting smoking in public places. Unlike smoking, the healthiest amount of alcohol is not zero. Nevertheless, the 50% rise in alcohol consumption in Britain means that as a population we are drinking well above the optimal level for health. As it develops its white paper on public health the government has another opportunity to look at the evidence linking harm with average alcohol consumption and consider that government has a responsibility alongside that of individual citizens.

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Competing interests: MM chaired the working group that produced the Academy of Medical Sciences' report, *Calling Time*, and was a member of the Scientific Advisory Group of the Acheson committee.

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Growth hormone: uses and abuses

It has anabolic effects, but its use in ageing and other conditions is not established

The therapeutic use of human growth hormone was first shown 45 years ago.[1] In these years the number of approved and proposed uses of human growth hormone has grown from one to more than a dozen, and the number of patients being treated with it has increased from a handful to tens of thousands worldwide. The officially approved uses of human growth hormone vary from country to country, but it is commonly used for children with growth hormone deficiency or insufficiency, poor growth due to renal failure, Turner syndrome (girls with a missing or defective X chromosome), Prader-Willi syndrome (usually due to uniparental disomy in chromosome 15), and children born small for gestational age with poor growth past 2 years of age (table). Recently the Food and Drug Administration in the United States has also approved the use of human growth hormone for short children with idiopathic short stature who are more than 2.5 standard deviations below the mean or the shortest 1.2% of children. In adults the approved uses include AIDS related wasting and growth hormone deficiency (usually due to a pituitary tumour). The evidence supporting these uses of human growth hormone comes from double blind controlled studies, clinical observations, and systematic meta-analyses.[2 3]

In addition to the generally accepted therapeutic uses of human growth hormone, many proposed uses have not been established. Human growth hormone is undisputedly a potent hormone with a wide variety of biological effects. The anabolic actions of human growth hormone have made it attractive as a potential agent for catabolic problems in a wide range of clinical conditions, including severely catabolic patients in an intensive care environment, burns, cystic fibrosis, inflammatory bowel disease, fertility problems, osteoporosis, and Down's syndrome, and also for people wishing to reverse the effects of ageing and promote athletic prowess. These last two potential uses have received the most attention as abuse of growth hormone.

The definitions of the word abuse include "improper or excessive use." The classic form of "abuse" of human growth hormone are athletes or bodybuilders who use it as a way to gain an unfair advantage over their competitors. No good evidence

BMJ 2004;328:907–8

exists that human growth hormone actually works in this setting.[4] The lay bodybuilding literature is full of testimonials, but as human growth hormone is as least as potent as an anabolic agent no doubt is left that growth hormone should be banned in sport. The use of human growth hormone in sport is promoted by the fact that as yet no practical method exists to detect that is in use in competition at the Olympic level.[5] Several tests currently under study will hopefully be sufficiently robust for use at the Olympic games.

The use of human growth hormone to increase the height of children who are already of normal height should also be considered abuse. Another common form of use of human growth hormone outside the established indication is in its alleged action of reversing or slowing the effects of ageing.[6] The quest for a "fountain of youth" is an age old dream, advertisements in print media and on the internet promote the use of human growth hormone or agents touted as increasing human growth hormone levels. Many of these agents are not growth hormone and do not lead to a sustained increase in concentrations of growth hormone. Although anabolic effects and changes in body composition have clearly been associated with the use of human growth hormone, in elderly people little or no evidence exists of an important positive functional effect on the processes of ageing.[7 8]

In addition to the lack of evidence for effectiveness of human growth hormone in these proposed uses, it causes side effects such as diabetes, carpal tunnel syndrome, fluid retention, joint and muscle pain, and high blood pressure. Many of these side effects were seen in studies that used much higher doses of human growth hormone than are now used in elderly people, so there is hope that studies using lower doses alone or in combination with modest doses of anabolic steroids may show a positive ratio of benefits to side effects. Well controlled clinical studies are needed to explore the potential uses of human growth hormone in elderly people and of its other potential uses as an anabolic agent.

Officially approved therapeutic uses of human growth hormone in selected countries

Indication	United Kingdom	European Union	United States	Japan	Australia
Growth hormone deficiency:					
In childhood	X	X	X	X	X
In adulthood	X	X	X		X
AIDS wasting			X	X	
Renal failure	X	X	X	X	X
Turner syndrome	X	X	X	X	X
Achondroplasia				X	
Prader-Willi syndrome	X	X	X	X	
Poor growth in children small for gestational age		X	X		
Idiopathic short stature			X		

However, the use of human growth hormone for indications that are not established is a waste of health funds and amounts to exploiting people and exposing them to unnecessary risk.

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Competing interests: RLH has been a consultant to Eli Lilly and has received fees for speaking.

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Refeeding syndrome

Is underdiagnosed and undertreated, but treatable

Refeeding syndrome was first described in Far East prisoners of war after the second world war.[1] Starting to eat again after a period of prolonged starvation seemed to precipitate cardiac failure. The pathophysiology of refeeding syndrome has now been established.[2] In starvation the secretion of insulin is decreased in response to a reduced intake of carbohydrates. Instead fat and protein stores are catabolised to produce energy. This results in an intracellular loss of electrolytes, in particular phosphate. Malnourished patients' intracellular phosphate stores can be depleted despite normal serum phosphate concentrations. When they start to feed a sudden shift from fat to carbohydrate metabolism occurs and secretion of insulin increases. This stimulates cellular uptake of phosphate, which can lead to profound hypophosphataemia.[3] This phenomenon usually occurs within four days of starting to feed again.

Phosphate is necessary for the generation of adenosine triphosphate from adenosine diphosphate and adenosine monophosphate and other crucial phosphorylation reactions. Serum phosphate concentrations of less than 0.50 mmol/l (normal range 0.85-1.40 mmol/l) can produce the clinical features of refeeding syndrome, which include rhabdomyolysis, leucocyte dysfunction, respiratory failure, cardiac failure, hypotension, arrhythmias, seizures, coma, and sudden death.[4 5] Importantly, the early clinical features of refeeding syndrome are non-specific and may go unrecognised.

Refeeding syndrome can occur with parenteral as well as enteral feeding. In the United Kingdom patients with anorexia nervosa, cancer, alcoholism, and some patients after operations are known to be at risk of refeeding syndrome.[6] However, other groups, such as patients with neurological dysphagia who are being

BMJ 2004;328:908–9