

## Daily doses of multivitamin tablets

*Regular consumption will probably do you no good, with a few exceptions*

Some 20-30% of the population in developed countries take a daily vitamin supplement. Does it do them any good? Our current estimates of vitamin requirements are based on the amounts needed to prevent deficiency diseases; in most countries deficiency is no longer a major problem. The question is whether higher levels of intake provide health benefits. There are two ways to answer this question: to identify biomarkers of optimum nutritional status, rather than the absence of deficiency; or epidemiological studies to identify nutrients associated with a lower incidence of chronic diseases, followed by intervention studies. Neither approach has yet provided satisfactory answers, and a recent review finds little convincing evidence in favour of supplements.<sup>1</sup>

A number of promising suggestions for biomarkers exist, including metabolic markers of damage from radicals, immune responses, and damage to DNA. None is responsive to only a single nutrient, and all are affected by a plethora of non-nutritional factors.<sup>2-3</sup> To date we do not have any markers that can be used to determine optimum intakes.

The epidemiological approach has prompted a number of intervention trials, most of which have been disappointing. There is clear epidemiological evidence that people with a high plasma concentration of vitamin E are less at risk from cardiovascular disease. The Cambridge heart antioxidant study showed a reduction in non-fatal but not in fatal myocardial infarctions.<sup>4</sup> While the benefits from reducing non-fatal infarctions are obvious, this is hardly convincing evidence of the benefits of vitamin E supplementation.

Similarly, there is evidence that high intakes of  $\beta$  carotene are associated with lower incidence of lung, prostate, and other cancers, although  $\beta$  carotene may simply be a marker of fruit and vegetable consumption. Carotenes are antioxidants and might be expected to reduce the damage from radicals that underlies the development of cancer and cardiovascular disease. However, most compounds that act as antioxidants do so by forming stable radicals that persist long enough to undergo metabolism to non-radical compounds. By definition they therefore form radicals that can penetrate deeper into tissues and plasma lipoproteins, and potentially cause more damage than the oxygen radicals they have replaced. The results of two major intervention studies with  $\beta$  carotene, one in Finland among smokers and the other in the United States among people who had

been exposed to asbestos, yielded unexpected and unwanted results: more people receiving the supposedly protective supplements died from lung (and other) cancer than people receiving placebo.<sup>5-6</sup>

Vitamin C is an antioxidant, and it also inhibits the formation of carcinogenic nitrosamines from dietary amines and nitrites. It might therefore be expected to have protective action against the development of cancer and cardiovascular disease. The evidence with respect to cardiovascular disease is unconvincing.<sup>1</sup> The epidemiological evidence linking a high intake of vitamin C with reduced cancer incidence is confounded by the fact that the fruits and vegetables that are sources of vitamin C are also rich in a variety of other compounds that may be protective. There is a long held belief that vitamin C (perhaps in very large amounts) is protective against the common cold. A systematic review did not support this but did find some evidence of a modest benefit in reducing the duration of symptoms of colds.<sup>7</sup>

An intake of vitamin D above what can be obtained from normal diets (possibly in combination with supplementary calcium) delays the loss of bone with increasing age, so supplements may be advisable to prevent osteoporosis and osteomalacia.<sup>8</sup> For most people, increased exposure to sunlight is probably more effective than supplements, although we may have to balance the beneficial effects on bone health against the increased risk of skin cancer.

The benefits of folic acid supplements taken periconceptually in preventing neural tube defect have been shown convincingly.<sup>9</sup> High intakes of folic acid also reduce plasma homocysteine, a risk factor for cardiovascular disease independent of plasma lipids and other risk factors, and low intakes of folic acid are associated with increased risk of colorectal cancer.<sup>10-11</sup> This has led to mandatory fortification of cereal products in the United States and elsewhere. However, although folic acid lowers plasma homocysteine, there is no evidence yet from controlled trials whether or not this will reduce cardiovascular disease or cancer. Until the results of intervention trials in progress are available, the benefits of folic acid supplements other than to prevent neural tube defects remain unproved.<sup>12</sup>

The answer to the question of whether we should take a multivitamin tablet every day must be that unless our intake is inadequate as a result of a poor diet then supplements will probably do us no good—apart from

folic acid taken periconceptually and, possibly, vitamin D by elderly people.

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## Banning smoking in the workplace

*Smoking bans work: so what is the government going to do about it?*

A teaching hospital not a million miles from where I work has, for some years, been considering beefing up its non-smoking policy. In the next year a new policy will come into force, which will remove dedicated smoking rooms and hopefully discourage smokers from lighting up around the entrances to buildings. Moving this far has not been easy. The hospital envisages in the next five years moving to a totally smoke free hospital of the kind which Fichtenberg and Glantz (p 188) claim leads some 15% of smokers to give up altogether and others to cut down.<sup>1</sup> Perhaps with these findings to hand it might manage it in less than five years—or perhaps not.

The figures from the review<sup>1</sup> are startling and would make workplace smoking bans by far the most effective short term smoking cessation strategy, barring outright prohibition, available to any government. In the United Kingdom, smoking prevalence is stuck at around 27% of the adult population.<sup>2</sup> Comprehensive workplace bans could reduce it to 23%. Achieving this effect with tax rises would require a doubling of the price of cigarettes.<sup>3</sup> The English national smoking cessation guidelines estimated that comprehensive general practitioner advice to stop, coupled with referral to smokers clinics and widespread use of medications such as nicotine replacement therapies, could reduce prevalence by perhaps 1% in a given year.<sup>4</sup>

Even as you read this, tobacco company researchers and lawyers are possibly seeking ways of picking holes in the review's findings. The studies that were considered did not randomly allocate some workplaces to be totally smoke free and others not to be—which admittedly would have been somewhat difficult. The review omitted some studies that involved only partial smoking bans and others that did not report "desired" outcomes. However, overall the evidence is as persuasive as it could be, given the limitations of this kind of real world research. Indeed, governments have mounted major and very costly initiatives on flimsier evidence.

In 1999 the UK Health and Safety Executive drafted an approved code of practice on smoking in the workplace,<sup>5</sup> which was endorsed by the health and safety

commission in September 2000, and 155 members of parliament signed a motion in support of it in May 2001. The code of practice focuses on the rights of workers to protection from environmental tobacco smoke but stops short of outright smoking bans. However, at present even this limited initiative seems to have stalled.

One might imagine that the major stumbling block to more effective action is concern over public opinion. Perhaps the public has had enough of restrictions on its freedoms and pleasures. However, the evidence is that the public is very much behind greater restrictions on smoking.<sup>6 7</sup>

Perhaps it is the moral argument that is staying the hand of politicians. Smokers should have the right to enjoy a perfectly legal activity and should not be hounded into abstinence. Against this argument is the fact that the large majority of smokers actually want to stop and have tried in the past but failed.<sup>8</sup> Indeed, each year some 30% of smokers attempt to stop.<sup>8</sup> Workplace bans can be seen not so much as restricting smokers' freedoms but providing an environment which is more conducive to their regaining control over their behaviour. Add to this the fact that environmental tobacco smoke is estimated to be killing more than 1000 non-smokers in the United Kingdom each year,<sup>9</sup> and the balance of the moral argument would seem to weigh heavily in favour of strictly enforced bans.

So where does this leave the teaching hospital trying to establish a strict no smoking policy? Certainly, it has the backing of the main professional bodies and other relevant agencies in their endorsement of the national smoking cessation guidelines.<sup>4</sup> It would also have the strong backing of the public.<sup>6</sup> However, in practice, it seems likely that central government will have to act to require such institutions to be smoke free—not because the managers are reluctant but so that employees, patients, and visitors know that the regulations are serious and nationally enforceable. If the government puts the wheels in motion now to require workplace smoking bans, our teaching hospital could well be smoke free in five years' time. If it does not, we can expect the sweet aroma of tobacco carcinogens to pervade the air for many more years.

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BMJ 2002;325:174-5