

Bacon sandwiches and middle-class drinkers: the risk of communicating risk

Last year, Cambridge University created the new post of Winton Professor of the Public Understanding of Risk and appointed **David Spiegelhalter** to the role. With **Hauke Riesch** he reflects on some news stories that came up soon after he started in his job.

It is a familiar process that is repeated time after time. A scientific study about lifestyle risks is published; there is a press release and maybe even a press conference with juicy quotes from scientists saying we should change our behaviour; the newspapers write it all up in a sensationalist style. Then come the contradictory quotes from other scientists, complaints from columnists about the nanny-state and so on. And so, within a few days, a 600-page report on the causes of cancer, based on countless man-hours of skilled labour, can be reduced to a debate about bacon sandwiches (see Box, right).

One of the first culprits that can be identified in this process is the sexed-up press release. Any press officer will be trying to maximise coverage of their institution's work, of course, but this can be taken to extremes: in a recent case a report on alcohol consumption got minimal press coverage on its first release, but when the accompanying website was launched the new press release highlighted a completely spurious league-table of hazardous drinking areas in the UK, and so got the story on many front pages (see Box, page 32).

But the issues go beyond this form of manipulation, and were wonderfully illustrated by a recent conversation on the Radio 4 programme *More or Less* between the science editor of the Daily Mail and one of the epidemiologists behind the World Cancer Research Fund "bacon sandwiches" report (http://news.bbc.co.uk/1/hi/programmes/more_or_less/7124758.stm). The epidemiologist talked about the relative risks, then the journalist demanded to know what the absolute risks for his readers are, but the epidemiologist could not give an answer. A classic conflict between the population and individual perspective is being

The World Cancer Research Fund report and the dangers of bacon sandwiches

On October 31st, 2007, the World Cancer Research Fund (WCRF) issued a press release to advertise their comprehensive report by an international panel on the influences of nutrition and physical activity on cancer⁵, accompanied by a list of 10 recommendations for cancer prevention. One particular finding of the report, which the press would eventually focus on almost exclusively, was that there was "convincing evidence" that red and processed meat increases the chances of bowel cancer. The report itself did not give a numerical value for that risk and, although the panel agreed on the final recommendations, it admits that "specific public health and personal goals and recommendations do not automatically follow from the evidence, however strong and consistent" (p. 366). With this *caveat* explained, the recommendation with regard to the section on red and processed meat in the press release was that "people should not eat any more than 500g of red meat a week".

The press initially reported on the link the report found between obesity and cancer although, almost immediately, following *The Sun's* headline "Bacon butty cancer risk", the focus shifted towards red and processed meat, usually visualised through the iconic bacon sandwich. A lot of the subsequent commentary focused on complaints that scientists won't let us eat anything anymore, or that scientists keep giving us inconsistent advice on what is good and bad for us. *The Daily Mail*, for example, changed the initial headline about obesity and cancer to "Is anything safe to eat?".

The WCRF report, being a literature analysis, essentially produced no new evidence, nor did its conclusion regarding meat differ substantially from their earlier report. The finding that the WCRF found most newsworthy themselves, that cancer is linked to obesity, did not create the same amount of attention as the more trivial point about bacon sandwiches. The reason why this story escalated into the "not even bacon is safe to eat" panic is, at first sight, a typical press hype, misinterpreting the science and then blaming scientists for what they never said in the first place. However, in this case there was a certain amount of inconsistency from the WCRF concerning the advice that should follow from their meticulously researched evidence. As noted above, tucked away in its 600-odd pages report is the admission that the public health recommendations cannot follow directly from the evidence, and that, among the panel, there was considerable disagreement over what the advice really should be. In the press release, this nuance was lost, with a simple message about not eating more than a certain weekly amount. Added to that, one of the panel members is quoted on the "media centre" section of their website as saying that "we recommend that people should avoid eating processed meats altogether, and that if they do eat it then they should only do so very occasionally". This rather strong wording suggests an even stronger emphasis on abstinence, which is absent from both the report and the press release.



played out: although excess risks may be shown to be statistically significant and lead to a substantial excess of cases in the population, for an average person that relative risk may not be of practical significance.

For example, recent results from the Million Women study received substantial coverage when they reported an increased risk of cancer in overweight and obese women, and the researchers were quoted as saying

“we estimate that being overweight or obese accounts for around 6000 out of a total 120000 new cases of cancer each year among middle-aged and older women in the UK” (<http://news.bbc.co.uk/1/hi/health/7079799.stm>).

But the estimated relative risk for all cancers turns out to be 1.12 per 10 units difference in Body Mass Index, corresponding, for example, to a 12% increase in cancer risk between a woman of 5' 3" (1.6 m) weighing 10 stone (65 kg) and another of the same height weighing 14 stone (90 kg)—a rather small increase in risk for a very large difference in weight. Even if all this excess risk could be eliminated by weight loss or avoiding weight gain, the benefits for an individual are likely to be very small indeed.

Rose¹ perfectly summed up this classic problem as a “prevention paradox”: “a preventive measure that brings large benefits to the community offers little to each participating individual”. More benefit to the overall public health is gained if large numbers of low-risk individuals change their exposure than by focussing attention on the identifiably “high-risk” cases. This insight, quite rational from a societal point of view, means that public health messages tend to be aimed at “average” people who then, quite reasonably, object to being singled out for this paternalistic, and apparently unnecessary, advice. Taken even further, a “precautionary principle” approach can lead, for example, to advice by the Department of Health for pregnant women to avoid all alcohol, in spite of the lack of direct evidence for harm caused at low levels of exposure as well as conflicting advice from another government agency (see Box, page 33).

It is important to note that nobody is “right” or “wrong” in this debate. Those deemed responsible for the health of the public will give advice based on a societal perceptive, while individuals receiving that advice may, equally reasonably, choose to ignore it. This is most clearly illustrated by introducing the idea of “discounting” future experiences. For example, when the National Institute for Clinical Excellence (NICE) considers

the cost-effectiveness of new technologies, both costs and benefits are discounted at a base rate of 3.5% per year²: this generates a “net present

A 20-year-old man who drinks 4 units a day can expect to lose around 20 seconds of life for every pint of beer consumed.

cost” and, similarly, a “net present benefit” allowing for future years to be successively less important than current experience. This is used to decide which treatments should be reimbursed under the NHS, but NICE public health guidelines are supposed to allow for discounting. (One can imagine the “net present bacon sandwich” as a novel unit of cost.)

Consider advice to reduce alcohol consumption. Using an established model for the excess risks of drinking³, we can estimate that a 20-year-old man who consumes four units a day (classified as “hazardous” drinking) has a shorter life expectancy, by around 6 months,

Cheers to Harrogate?

On October 16th, 2007, *The Guardian* (<http://www.guardian.co.uk/society/2007/oct/16/drugsandalcohol.health>) ran a story that claimed “Scale of harmful middle class drinking revealed”, and the front page of *The Times* carried a league table of “Areas of excess” headed by Runcy and Harrogate; the BBC sent a team to Harrogate, presumably hoping to find someone sober enough to interview. The people of Harrogate have certainly been slurred, but only in the sense that there is no evidence that they drink any more than expected.

The reports were based on a press release from the North Western Public Health Observatory, which highlighted areas with the highest rates of “hazardous” drinking, i.e. between 22 and 50 units per week for men or between 15 and 35 units a week for women: 10 units is around a bottle of wine or 4 pints of beer. Five out of the top six listed areas were in Surrey, with around 25% of the over-16s claimed to be drinking “hazardously”. But the original data published online clarifies that these are “synthetic” estimates: at the local authority level there is no reliable data for drinking, so the expected consumption has to be imputed from data on age, sex, ethnicity, deprivation and so on. So we might expect the rates for Harrogate to be as quoted, but this is purely a prediction. It is like creating a league table of schools based purely on the family income of their intake, since we would expect good exam results from such people. Fair enough as a prediction, but no basis for a judgment. And apart from this spurious and misleading league table, *The Guardian’s* headline claim about harmful drinking is wrong too—“harmful” means drinking more than hazardous levels, and is most common in deprived, not middle-class, areas.

But is “hazardous” drinking really hazardous? In Australia⁶ they are trying to base their drinking guidelines on all the international evidence, and propose “low-risk” drinking levels of 17.5 UK units a week, for both men and women, equivalent to a pint of beer or a quarter of a bottle of wine daily. They estimate that if 100 people steadily consumed this amount every day for their whole lives, then we would expect that the alcohol would cause, at most, one death in an accident and one of disease. Back in 1987 the UK “safe” guidelines were set at 21 units a week for men and 14 a week for women—values that have recently been admitted to have been “plucked from the air”. It is a testament to this air-plucking that the evidence-based and gender-neutral Australian guidelines fall slap in the middle.

These low-risk levels at first seem rather miserly, and we can guess what Australians will think. But it all adds up: an eager youth of 18 can expect to have 60 years steady drinking—at these “low-risk” levels it comes to 5400 bottles of wine, weighing about 7 tonnes. A truckload in fact. Maybe this would make an ideal 18th birthday present? Maybe not.

compared with someone who only consumes one unit a day. Assuming all this difference can be made up by reducing consumption, discounting this benefit by 3.5% leads to an expected gain of only 73 discounted days, at a cost of 26 000 discounted units of alcohol, or around 20 seconds gained per pint not drunk. This may seem a poor return for the perceived cost of pleasure foregone. We are not suggesting that individuals consciously go through this type of calculation when processing health advice, but that they may be entirely internally rational

when ignoring long-term consequences of their behaviour.

In a recent talk to the Royal Statistical Society, Julian Le Grand acknowledged that people’s behaviour was not likely to be influenced by small gains in long-term health outcomes: in the forthright words of *The Sun* health columnist, Dr Keith Hopcroft, “I’d rather shave a few years off my life with the occasional bacon sarnie than be 110 and dribbling into my All Bran” (<http://www.thesun.co.uk/sol/homepage/woman/health/article438471.ece>). Le Grand argued that short-term costs and benefits of behaviour could be manipulated, in a “libertarian paternalistic” style, through taxation and licenses, making people opt out of rather than opt in to healthier behaviour.

Even when communicating the impacts of behaviour on survival, it may be possible to bring the focus of attention to the present moment rather than concentrating on adding years at the end of life. Consider the effects of stopping smoking, as estimated by Doll and Peto⁴ and summa-

risied in Table 1 (we have added the final column). Whatever age you are, every day you carry on smoking loses you around 6 hours of future life. This could be thought of as rushing towards your

Every day that a smoker carries on smoking loses him some six hours of his life

death at 30 hours per day, an image that may bring the hazards of smoking into the immediate present: *The Sun* used this analysis in their recent discussion of New Year’s Resolutions (<http://www.thesun.co.uk/sol/homepage/woman/health/article621749.ece>).

Finally, the case studies shown here suggest that the epidemiologists who do the research may not be the best people to formulate the ad-



Table 1. The expected effects of stopping smoking

Current age of smoker	Expected age at death if continue smoking	Lost years in life expectancy if continue smoking	Hours of future life lost per day spent smoking
30	69	10	6.2
40	70	9	7.3
50	70	6	7.1
60	73	3	5.7

Alcohol during pregnancy: what should be the official advice?

In October 2007 several newspapers reported on the National Institute for Clinical Excellence (NICE) draft guidelines, which advised that pregnant women should drink less than 1.5 units of alcohol a day, and avoid it completely during the first 3 months. These new guidelines are essentially the same as those from the previous 2003 advice⁷ in that they advise caution but not complete abstinence.

In contrast, the Department of Health's *Pregnancy Book*, updated in March 2007, has changed its advice from a position fairly similar to the one advocated by NICE to a message of complete abstinence, i.e. that pregnant women should avoid drinking alcohol, and that if they do drink they should limit their intake to no more than one or two units a day⁸ (page 14).

Most media coverage of the NICE draft guidelines focused on this apparent difference in the advice from two different government agencies, with *The Guardian* report, for example, titled: "Confusion over advice for pregnant women" (<http://www.guardian.co.uk/society/2007/oct/11/health.science>). The discussion moved quickly away from the evaluation of the (extremely limited) evidence regarding the actual risks involved and instead reflected different social priorities and attitudes, with the two sides perhaps best represented in a debate in the *British Medical Journal*^{9,10}.

On one side there is the, almost moral, argument, which suggests that drinking alcohol is at best a dispensable pleasure and at worst a sin. In the absence of evidence for a safe limit, this argument advocates the *precautionary principle*: whatever the actual value and merit of the scientific evidence we have, no alcohol means no alcohol-related risk to the child. On the other side of the discussion people argue that as there is no direct evidence of harm, any blanket ban of alcohol amounts to bullying and patronising pregnant women. Coupled to that there is the argument that the kind of person who would listen to government advice is precisely the type of person who knows she should not drink excessively anyway.

The arguments surrounding the risk stories of alcohol during pregnancy are therefore only loosely coupled with the scientific evidence at its heart. Interpreting that evidence and drawing conclusions about appropriate behaviour is influenced at least as much by moral and societal concerns and social scientific evidence about how people react to such advice as it is about the scientific facts underlying that advice.



Zéro alcool pendant la grossesse

How pregnant Frenchwomen are urged not to drink Source: French government's anti-drugs website www.drogues.gouv.fr

vice. Advising the public on their behaviour is an intervention that is not cost-free—every time advice is given and ignored it may make it more difficult to promote future recommendations.

References

1. Rose, G. (1992) *The Strategy of Preventive Medicine*. Oxford: Oxford Scientific Publications.
2. National Institute for Clinical Excellence (2004) *Guide to the Methods of Technology Appraisal*. (Available from http://www.nice.org.uk/niceMedia/pdf/TAP_Methods.pdf.)
3. White, I. R., Altmann, D. R. and Nanchahal, K. (2002) Alcohol consumption and mortality: modelling risks for mean and women at different ages. *British Medical Journal*, **325**, 191–197.

4. Doll, R., Peto, R., Boreham, J. and Sutherland, I. (2004) Mortality in relation to smoking: 50 years' observations on male British doctors. *British Medical Journal*, **328**, 1519–1527.

5. World Cancer Research Fund (2007) *Food, Nutrition, Physical Activity and the Prevention of Cancer: a Global Perspective*. (Available from <http://www.dietandcancerreport.org/>.)

6. National Health and Medical Research Council (2007) Australian alcohol guidelines for low-risk drinking. (Available from <http://www.nhmrc.gov.au/consult/archived.htm>.)

7. National Institute for Clinical Excellence (2003) *Antenatal Care*. (Available from <http://www.nice.org.uk/CG006>.)

8. Department of Health (2007) *The Pregnancy Book*. (Available from:

http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_074920.)

9. Nathanson, V. (2007) Is it all right for women to drink small amounts of alcohol in pregnancy? No. *British Medical Journal*, **335**, 857.

10. O'Brien, P. (2007) Is it all right for women to drink small amounts of alcohol in pregnancy? Yes. *British Medical Journal*, **335**, 856.

David Spiegelhalter is Winton Professor of the Public Understanding of Risk, while continuing to work at the Medical Research Council Biostatistics Unit in Cambridge. He works with Hauke Riesche at the Statistical Laboratory of the University of Cambridge.