DOI:10.1111/j.1365-2125.2006.02739.x

Editors' view

Risk perception in drug therapy

J. K. Aronson, Chairman of the Editorial Board, British Journal of Clinical Pharmacology
University Department of Clinical Pharmacology, Radcliffe Infirmary, Woodstock Road, Oxford OX2 6HE, UK;
jeffrey.aronson@clinpharm.ox.ac.uk

If the doors of perception were cleansed every thing would appear to man as it is, infinite.
For man has closed himself up, till he sees all things thro' narrow chinks of his cavern.
William Blake, 'The Marriage of Heaven and Hell', Plate 14.

The Latin word percipere originally meant to take in the harvest; later it came to mean to take something in to the mind. In English, since it was first recorded, the word perceive has always meant 'to take in or apprehend with the mind or senses', the earliest citation in the *Oxford English Dictionary* being from about 1300; and the first citation in which it was used to mean 'to grasp the meaning of, comprehend, understand' dates from 1387. All of these meanings imply that what we perceive is an accurate reflection of what is. However, when we talk about risk perception there is an implication that what we perceive does not necessarily accord with reality. It is as if risk was a sort of optical illusion, which we need to scrutinize carefully if we are going to interpret it properly.

The late Bill Inman once wrote that 'perception of risk is based less on statistics than on fear' [1], and there is little evidence that knowing what the actual risks are affects how the general public perceives and responds to them [2]. Many factors affect the perception of risk and the fear that it engenders [1, 2] (see Table 1). In addition to these factors, the ways in which risks are presented can also affect the ways in which they are perceived [3].

Difficulties in appreciating risk also arise from unfamiliarity with the numbers that are used to express risk and their verbal equivalents. For example, I would interpret 'never' as indicated a zero risk and 'always' a 100% risk, but not everyone interprets these words in that way. In seven studies of what people mean when they use such words, some interpreted 'never' as meaning as often as 2% and 'always' as infrequently as 91% of the time [4], and although words such as 'occasionally', 'infrequently', and 'seldom' all mean roughly the same thing, the percentages frequencies that were attached to them were widely different (17–21%, 12–14%, and 7–8% respectively).

There is also a misconception among some that the risk of, say, an adverse drug reaction in an individual is the same as its frequency in the population. However, it is possible for an individual, because of some susceptibility, to have a high risk of an adverse reaction that has a low frequency in the population. It is therefore best to separate notions of individual risk and population risk or frequency.

Patients do not always have the same perceptions about the risks of using drugs as health professionals. In a study of 400 health professionals (278 general practitioners, 76 pharmacists, and 46 pharmacovigilance professionals) and 153 non-health professionals, the health professionals ranked anticoagulants and anti-inflammatory drugs as carrying the highest risk in a list of 13 categories; psychotropic drugs ('sleeping pills' and 'tranquillisers') were next. In contrast, the non-health professionals ranked the psychotropic drugs ('sleeping pills', 'tranquillisers', and 'antidepressants') highest, followed by anticoagulants [5]. More striking were the differences in perceptions of the risks of using

Table 1
Factors that affect individual perception of risk

Factors	Greatest fear*	Least fear*
The source of information	Poorly trusted source	Well trusted source
Relevance of the information to everyday life and decision making	Relevant	Irrelevant
Relation to other perceived risks	Associated with other risks	Not associated with other risks
Experience	Not previously experienced	Previously experienced
The difficulty and importance of the choices and decisions	Difficult important decisions	Easy unimportant decisions
Visibility	A major disaster (e.g. a plane crash)	A minor incident (e.g. a car accident†)
Immediacy	Acute events	Chronic events
Freakishness	Unusual risks	Commonplace risks
Distance	Risks near home	Distant risks
Individuals affected	Healthy people	Sick people
Knowledge	Involuntary risks	Voluntary risks

**Independent of the actual risk.*
†Even though more people die in car accidents than in plane crashes.

aspirin, which was ranked sixth by the health professionals but thirteenth by the non-health professionals. The data from a UK study show that aspirin and non-steroidal anti-inflammatory drugs (NSAIDs) are together the drugs that are most commonly associated with admission to hospital (aspirin on its own being second only to diuretics) [6].

The factors that lead to mistaken perceptions about the risks of using particular medicines have not been thoroughly explored, although some are known. For example, in a random sample of 500 consumers aged 18 years and over in Wisconsin, 14–54% thought that generic prescription drugs were riskier than brand-name products, depending on the medical condition being treated, although financial incentives would have mitigated this view [7]. There is also evidence that the more information consumers receive about the safety (or otherwise) of a medicine through direct-to-consumer prescription drug advertising in the USA the more risky they are likely to think it is [8]. Media reporting is also thought to be important [9].

Amid all this uncertainty it is not therefore surprising to read, in a paper by Cullen et al. in this issue of the *Journal*, that when 100 patients were asked to rank the most dangerous medicines from a list of five – warfarin, corticosteroids, proton pump inhibitors, NSAIDs, and aspirin – they ranked corticosteroids as being the most dangerous and NSAIDs (including aspirin) as being of low risk and no more dangerous than proton pump inhibitors [10]. The medical staff (non-consultant hospital doctors) correctly ranked NSAIDs as being the most risky, with warfarin not far behind.

It is a little surprising, however, to read elsewhere in this issue of the *Journal* that although Irish doctors consider that generic prescribing is an index of optimum prescribing quality, generic prescribing only accounted for 18% of all prescribing in a study of 86 Dublin doctors [11]. This was despite that fact that they adhered to most of the other quality indicators that they thought reflected optimum prescribing quality, particularly when they were evidence based. Could it be that they too believe that the risks of adverse effects are greater with generic than with brand-name products?

The idea that 'the patient is always right' has been criticized [12], and where perception of the risks of medicines is concerned there is clearly a long way to go to correct mistaken impressions. Various methods of communicating risk to patients have been identified [13], but none to my knowledge has been used to communicate the risk of an adverse drug reaction or a drug interaction. A simple visual signalling system could help [14]. Certainly, the doors of perception are not as clean in this case as William Blake would have liked them to be in a more ethereal sense. They need to be cleansed.

References

1 Inman WHW. Risks in medical intervention. In: Cooper MG (editor). Risk: man-made hazards to man. Oxford: Clarendon Press, 1985: 35–53.

2 Alaszewski A, Horlick-Jones T. How can doctors communicate information about risk more effectively? BMJ 2003; 327: 728–31.
3 Harrabin R, Coote A, Allen J. Health in the News. London: King's Fund, 2003.
4 Aronson JK, Ferner RE. Clarification of terminology in drug safety. Drug Saf 2005; 28: 851–70.
5 Bongard V, Menard-Tache S, Bagheri H, Kabiri K, Lapeyre-Mestre M, Montastruc JL. Perception of the risk of adverse drug reactions: differences between health professionals and non health professionals. Br J Clin Pharmacol 2002; 54: 433–6.
6 Pirmohamed M, James S, Meakin S, Green C, Scott AK, Walley TJ, Farrar K, Park BK, Breckenridge AM. Adverse drug reactions as cause of admission to hospital: prospective analysis of 18 820 patients. BMJ 2004; 329: 15–19.
7 Ganther JM, Kreling DH. Consumer perceptions of risk and required cost savings for generic prescription drugs. J Am Pharm Assoc (Wash) 2000; 40: 378–83.
8 Davis JJ. Riskier than we think? The relationship between risk statement completeness and perceptions of direct to consumer advertised prescription drugs. J Health Commun 2000; 5: 349–69.
9 Mebane FE. The importance of news media in pharmaceutical risk communication: proceedings of a workshop. Pharmacoepidemiol Drug Saf 2005; 14: 297–306.
10 Cullen G, Kelly E, Murray FE. Patients' knowledge of adverse reactions to current medications. Br J Clin Pharmacol 2006; 62: 232–6.
11 Okechukwu I, Bennett K, Felly J. General practitioners' ranking of evidence-based prescribing quality indicators: a comparative study with a prescription database. Br J Clin Pharmacol 2006; 62: 218–24.
12 Rees T. The doctor's always wrong. Prescriber 2006; 19 June: 59.
13 Edwards A, Elwyn G, Mulley A. Explaining risks: turning numerical data into meaningful pictures. BMJ 2002; 324: 827–30.
14 Ferner RE, Aronson JK. Communicating information about drug safety. BMJ 2006; in press.

Erratum

The picture of the flower shown in Dr Elisabeth Hsu's article in the June issue of the *Journal* and on the front cover of that issue was not *Artemisia annua* but one of the Saxifragaceae, probably *Saxifraga granulata* (meadow saxifrage, dry cuckoo, or pretty maids), which was used to treat kidney stones (French casse-pierre) and, according to Gerard, is 'singular against the strangurie and all other griefes and imperfections in the raines [kidneys]'. We apologise to Dr Hsu for the error and to our readers for any confusion that this may have caused.