Qualitative expressions of probability: is there any real misunderstanding?

StR,—I have read with great interest the paper by Shaw and Dear.1 I think that this paper in fact addresses a very important and often neglected subject; I have however some misgivings about their results and their conclusions. The qualitative expressions of probability used in the paper are obviously vague, but in real life they can be better defined by the context in which they are used, by the way words are uttered, by gestures, by non-verbal language, prior and subsequent communications on the same subject, etc. I do not think that a physician, speaking to a mother, would say only 'Your baby is jaundiced, and will probably need phototherapy' (statement 1), and vanish. Judging an isolated statement is not representative of interpreting a real communication, so the conclusion that the use of these words can produce misunderstandings might stem from the rather artificial study context, and might not be warranted.

I am surprised that doctors differ in a systematic way from mothers in the interpretation of the same expressions of probability used. These expressions are taken from everyday language, and have no specialised meaning in medicine. The differences between doctors and mothers may be due to a number of factors: in particular, doctors could be more accustomed to the use of scales and to probability axioms. Using a 10 point scale as in the paper, it is natural to think that something having 0–3 (30%) probability to happen receives a '3' score, something having 0–8 probability an '8' score, etc. This requires a knowledge of the axiom that probability can assume values between 0 and 1 only, and this would not be 'natural' among most people. In fact, Shaw and Dear report that the more educated mothers behave more similarly to doctors than the less educated mothers do. So, the problem could not lie in different interpretation of the same expressions, but rather in different ability to use the scale (that is, an artefact).

Finally, although I agree that in important decisions verbal expressions are to be avoided, I am not convinced that using numerical expressions of probability per se would resolve the problem. In fact, both doctors2 and lay people3 are frequently in difficulty in giving numerical estimates of probability and important principles of quantitative inference.

After reading the Shaw and Dear paper, I carried out a small experiment: I asked 12 mothers of healthy neonates in our ward to answer the following written question: ‘If the probability that a neonate undergo phototherapy for jaundice is 45%, do you think it more likely that he will undergo phototherapy or not?’. I obtained only four correct answers. I’m not claiming that this small sample discredits the use of numerical probability expressions altogether, but it raises the possibility that also in numerical communication the context may be important, and the ‘message sent’ may differ from the ‘message received’.

So, in the absence of further evidence, I suspect that numerical expressions of probability also do not convey information unambiguously between doctors and mothers. The question remains open.

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Dr Shaw and Dear comment:
Dr Gagliardi has raised some valid points concerning our recent paper, which prompt us to make the following further observations.

The first point we wish to make is that we are in full agreement that verbal communication is a complex process which is sensitive to context and that rarely, if ever, does an entire message hang on a single word. Nevertheless, the communication of probabilistic information must inevitably make use of either qualitative or quantitative expressions of probability and we defy anyone to avoid them altogether. Our aim was to show that a single qualitative expression of probability may mean quite different things to different people and to suggest that the accuracy of communication might be increased by eliminating as far as possible these differences; we did not in any way encourage a pursuance of clarity by the use of other aids to communication and of repeated explanation, although the temptation to amplify the meaning of one vague term by the addition of another should be avoided. Making the parents to ‘play back’ what they have understood is a useful technique that many doctors employ.

Dr Gagliardi’s second point concerned the systematic difference in the interpretation of expressions between mothers and doctors. We think that his explanation for the difference is quite plausible, but whatever the cause of the difference it is its existence that matters in the present context and it is merely another reminder of the problems inherent in the use of qualitative expressions of probability.

Dr Gagliardi’s third point is supported by evidence from a small experiment. Perhaps it loses in the translation but the statement employs a relatively complex construction which could confuse. It also makes use of a percentage which we deliberately avoided because percentages are not as familiar to many people as those whom we use regularly might assume. The choice of numerical representation of probability statements is very important and the experience is that scores are more widely comprehended than percentages. If Dr Gagliardi had presented his subjects with the following statement he would surely have reported a higher level of comprehension: ‘Out of 20 jaundiced babies, nine will need treatment with phototherapy but the remaining 11 will not’.

Dr Jackson, Porton, Shortland et al comment: We acknowledge the queries raised in Dr Reid’s letter. First, while it is true that the total IgG fell to just significant concentrations in children with acute lymphoblastic leukaemia on maintenance chemotherapy, the total IgG concentration in children with acute lymphoblastic leukaemia as a whole were not significantly decreased. However, the specific antidiotocore glycolipid IgG was significantly reduced in this group of patients as a whole, and more significantly reduced in those on maintenance chemotherapy. Indeed, we also found total IgG was the least affected immunoglobulin class in children with acute lymphoblastic leukaemia.

Secondly, although there are variations in publications of total immunoglobulin concentrations in children with acute lymphoblastic leukaemia, the specific anti core glycolipid antibodies were consistently reduced in our study at diagnosis. Furthermore, concentrations of anticore glycolipid antibodies at...