

Providing Widely-Understandable Perspective for Risks Reported in Studies

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Common mistake:

Go from "there is a health hazard" to "we should do something to avoid it" without further consideration.

What else do you need to know?

Cost of reducing the risk.

Benefit of reducing the risk.

Particularly need to understand the aggregate absolute level of injury resulting from the exposure.

The numbers we usually report do not provide information about that absolute level, and so are fairly useless, even to experts.

People react to risk numbers in irrational (but predictable) ways.

Dichotomization into "safe vs. dangerous".

Probabilities between 0 and 1% are all about the same (Tversky & Kahneman, Viscusi).

When people don't understand the numbers, they focus their concern on risks that are novel, spooky, or externally-imposed (Slovic, T&K, etc.).

Implications and Examples

Simple warnings can easily cause net harm.

For people who know the list of risks, their concerns about eating beef are roughly the same for CHD, colon cancer, *E. coli* O157:H7, nitrosamines, and BSE.

"I would move to California, but I worry about earthquakes" (which are much less likely to kill you, ever, than the trip there).

Radon vs. industrial chemical pollution.

When all small risks are the same, the risk from driving with a seatbelt is the same as the risk from driving without a seatbelt.

Why does this matter to arcane scientific research?

Scientific research is increasingly consumed in raw forms.

It is disingenuous to claim that research results are not intended for popular consumption.

Health research is

- very popular in newspapers, tv news, women's magazines.
- the top information gathering use of the Internet.

Almost no processing of information:

- C passing straight through the abstracts or press releases,
- C almost no science reporter understands it much better than their readers,
- C Internet searches turn up raw published reports,
- C even readers with some sophistication (e.g., MDs, researchers with other areas of expertise, very well-read lay people) can make little sense of how important the findings are.

Therefore, researchers have an obligation to put risks in perspective

Only the researchers have

- C sufficient motivation to delve into the subject,
- C certain topical expertise,
(more appropriate for them to learn about communication than nonspecialists to learn about all technical fields)
- C the resources to do it for the thousands of studies that come out.

This should be done particularly when:

- C publication is likely to capture attention of nonspecialists (big-name journal, hot topic),
- C research is being pushed into popular arena (press releases),
- C findings can lead directly to action (especially behavior, but also clinical options).

What is useful perspective?

Not easy. Needs a lot more serious consideration from different perspectives.

"Truth is insufficient. Whole truth is impossible."
-Amartya Sen

But some truths are definitely more misleading than others, and we can act accordingly.

A few starting suggestions:

Absolute numbers (not ratios).

Comparisons to familiar risks.

Useful metric ("deaths").

(/ 20 YPLL? restrict to \$10 YPLL?)

Realistic change in exposure (moving one quintile, not four).

Some Potentially Useful Death Statistics

(all figures for U.S.)

Travel in passenger cars.

Familiar, behavioral, controllable, useful order of magnitude.

Death rate = 1 / 6000 people per year
= 1 / 3 million per 20 mile trip

Could just convert every risk to a number of miles in a car.

Changing lanes on an urban freeway = ???

Cardiovascular Disease

The thing people should really be worrying most about. But complicated, substantially non-controllable, hard to isolate attributable delta.

Death rate = 1 / 500 people per year

Could create personalized rules of thumb if target population is reasonably heterogenous.

E.g., 50 y.o. male nonsmoker, b.p. 140, chol 200
= 1 / 250 per year.

Reduced by 1 / 2600 per year by lowering cholesterol 10 points.

Which amounts to (e.g.) 500 times as much as the *lifetime* risk from environmental chemical exposure E.

Could calculate based on averages for a target population.

Hit by Lightning

Well understood to be rare. But not controllable (except with inappropriately large lifestyle changes), so only useful as a foil, rather than as an "or you could...."

Death rate = 1 / 3 million people per year

Some risks in perspective

Phenylpropanolamine (PPA)

If a young woman doubles risk of hemorrhagic stroke by using PPA regularly (once every 2 days or so)

- = 10% of annual death risk from driving for middle aged woman,
- = risk from 1000 miles of driving,
- = 4% of CHD risk for average (i.e., not terribly healthy) 49 y.o. woman nonsmoker.

Cell phones

If (hypothetically) exposure level L increases lifetime brain cancer death risk by 10%

- = half of average lifetime risk from lightning.
(= very small)

If (based on one study) talking while driving quadruples rate of auto accident (assume doubles death risk). Talking on the phone all the time you drive

- = 10 points higher cholesterol.
(pretty substantial)

Conclusions

Few people (at any level of expertise) can really understand raw research findings based on intuition alone.

Increasingly journal articles and abstracts (or press releases that summarize the abstracts) flow straight to the consumer, clinician, or other non-expert decision maker.

The only apparent method for improving this for researchers to bundle useful perspectives into their findings.

It is not clear exactly what the right comparisons would be, but if we don't start doing it, we are not likely to ever get better at it.

Side effect: Might slow down outpouring of new raw results.

- could be seen as a good thing,

- might even help divert researchers' attention toward those same things that consumers should be paying more attention to.