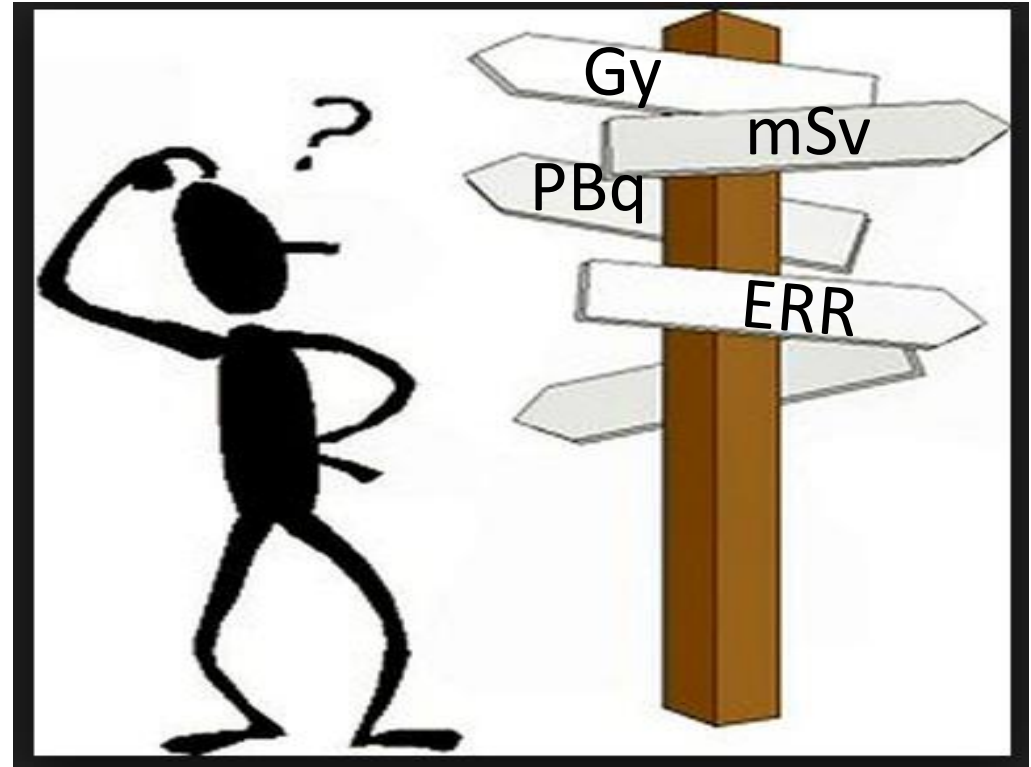


Science Communication – problems and solutions

Gerry Thomas, Imperial College London
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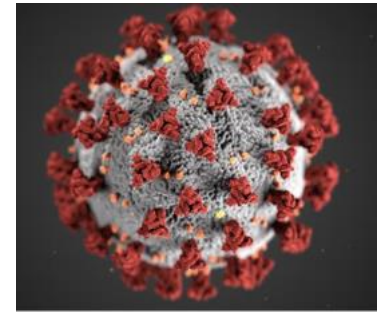
The problem with science communication

- Too much jargon
- Level of understanding
an unconscious biases
of audience
- Communication of
uncertainty



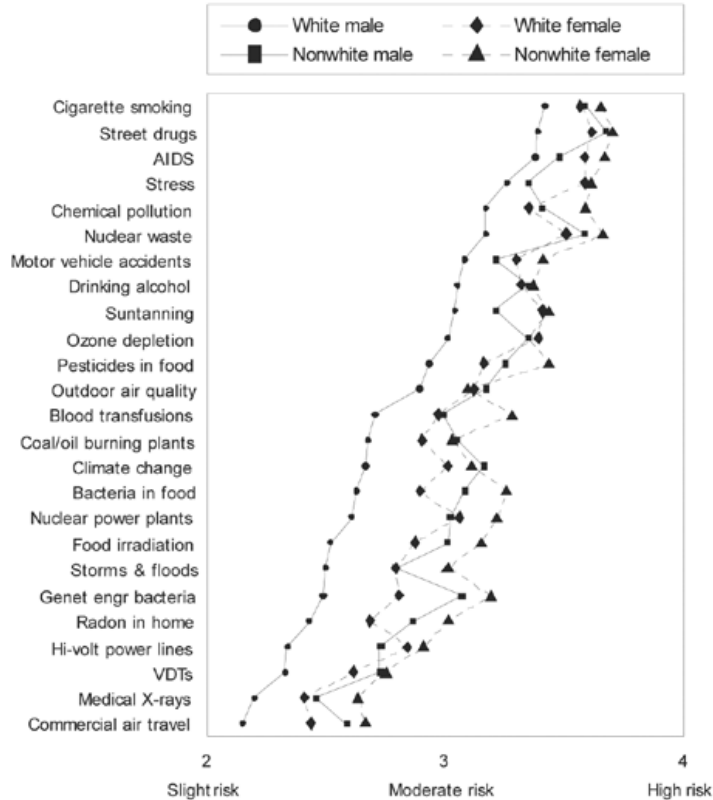
Public Perception of Risk – Fear Factors

- Uncontrollable
- Having catastrophic potential
- Having fatal or dread consequences
- Bearing an inequitable distribution of risks and benefits
- Not understood
- Novel
- Delayed in their manifestation of harm



Slovic P. 1987. Perception of risk. Science 236:280–85

Communication of risk and uncertainty – with whom



FLYNN, J.; SLOVIC, P.; MERTZ, C. K. Gender, race, and perception of environmental health risks. *Risk Analysis*, New Jersey, v. 14, n. 6, p. 1101-1108, 1994.



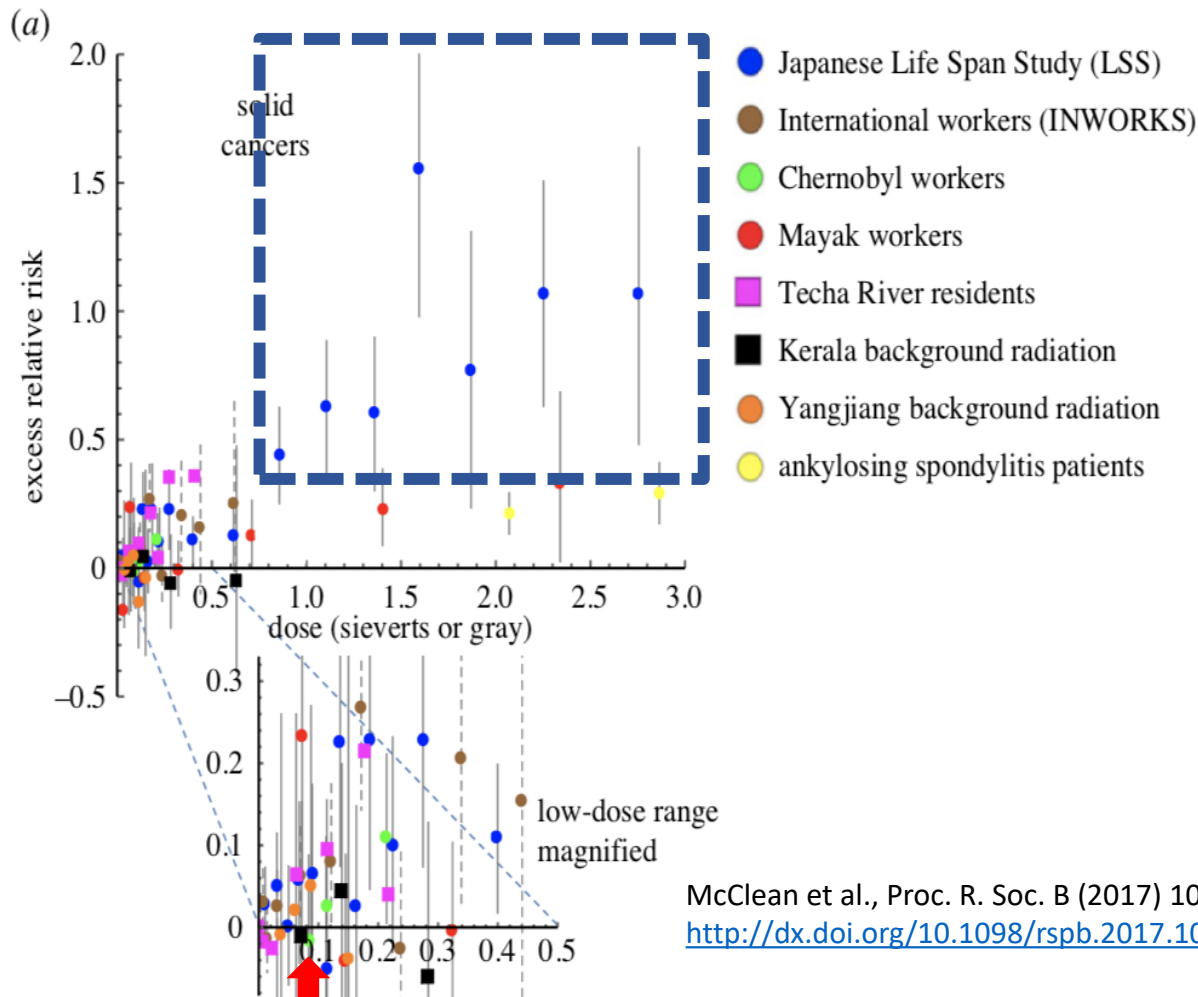
x 2



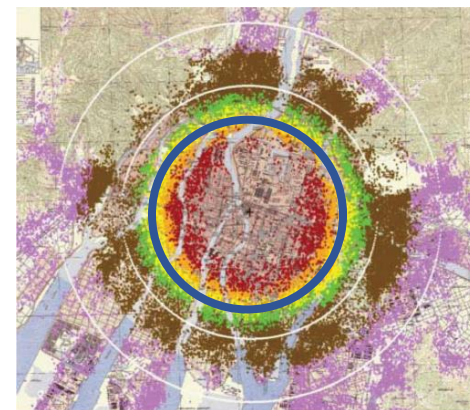
x 1

Communication of risk and uncertainty – by whom





McClellan et al., Proc. R. Soc. B (2017) 1070.
<http://dx.doi.org/10.1098/rspb.2017.1070>



Rings represent 2 and 3 km
 from epicenter

Red >1000mGy 5%
Orange 500-1000mGy
 Yellow 200-500mGy
 Green 100-200 mGy
Brown 5-100 mGy
Pink <5 mGy 84%

Douple et al., doi:
 10.1001/dmp.2011.21

What does this mean?



Health Risks from Exposure to Low Levels of Ionizing Radiation: BEIR VII Phase 2. Washington, DC: National Research Council; 2005. National Research Council, Committee to Assess Health Risks from Exposure to Low Levels of Ionizing Radiation.

Radiation risk in context



Megacity versus small town living **2.8%**

Passive smoking **1.7%**

Exposure of 250mSv (Chernobyl Liquidator) **1.0%**

Exposure of 100mSv (Chernobyl Liquidator) **0.4%**

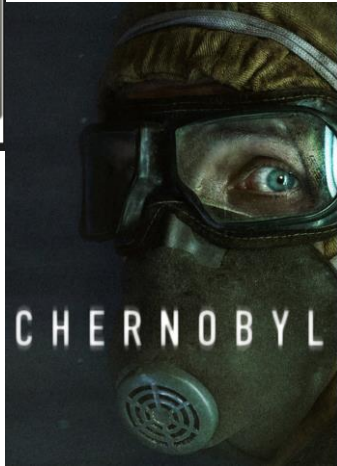
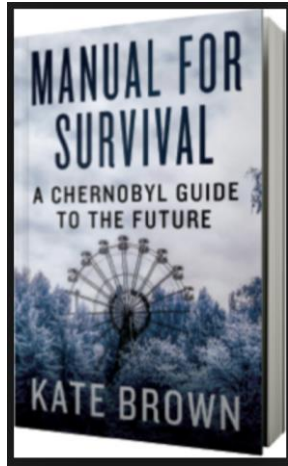
Source: Smith J BMC Public Health 2007 7:49

Risk scenario	Average Years of Life Lost (YOLL)
Smoking Male doctor who is a lifetime smoker compared to non-smoker.	10
Obesity White male aged 35 who is obese (BMI = 30.0–39.9) or severely obese (BMI >40): risk relative to BMI = 24.	Obese: 1–4 ^a Severely obese: 4–10 ^a
Radiation Atomic bomb survivor who was in the most exposed group: within 1500 metres of the hypocentre. Shielded whole body kerma > 1 Gy, mean 2.25 Gy.	2.6 (1.3–5.2) ^a

Source: Smith J BMC Pubic Health 2007 7:49

NB Radiation doses from nuclear accidents much lower than from A-bomb, so risk even lower

Consequences of public myth versus scientific evidence



Dos and Don'ts when communicating science

Category	Do's	Don'ts
Truthfulness	Tell the truth	Do not lie or avoid the truth
Absolutes	Avoid absolutes – nothing is absolute	Do not use the terms 'never' or 'always'
Jargon	Define all terms and acronyms	Do not use standard medical terminology
Negative	Use positive or neutral terms	Do not use negative terms or negative associations
Temper	Remain calm	Do not let your feelings interfere with your ability to communicate
Clarity	Ask whether you are being understood	Do not assume understanding
Abstraction	Use examples, metaphors, and analogies to aid understanding	Do not talk of theoretical concepts without using clear, non-technical justification
Attack	Only attack the issue	Do not attack the person or organization that may have made incorrect statements
Promise	Promise only what you are certain will occur	Do not make promises that you cannot back up and follow through on to ensure they occur
Speculation	Provide information only on what is being done and what you know	Do not discuss worst-case scenarios and unintended possible outcomes, unless required by protocol
Risk/Benefit comparison	Make risk and benefit statements separately	Do not discuss the risk relative to the benefit
Risk comparisons	Use tested comparison messages, cite trustworthy data/groups	Do not compare unrelated risks
*adapted from EPA Workbook on Risk Communication in Action (2007)		

Art of Science Communication



- Stick to what you know – consider a multi-disciplinary approach if communication involves a subject area that you are not an expert in
- Know your audience and use appropriate language
- Check that your audience understands you – ask them what they want to know
- Use pictograms to explain risks – don't blind them with graphs
- Be engaging – a conversation is better than an academic lecture

Art of Science Communication – getting the balance right



- Express risks clearly – but don't cause alarm
- enables people to make their own decision
- Fear may be useful for ensuring compliance with rules for the societal good
- When fear becomes a phobia, it brings its own health risks with it



Prof David Spiegelhalter, Winton Professor for the Public Understanding of Risk at the University of Cambridge, said:

“According to data provided by the authors but not published in the paper, to suffer one extra alcohol-related health problem, around 1,600 people would need to drink two drinks totalling 20g (2.5 units) of alcohol a day for a year. This is equivalent to around 32 standard 70cl bottles of gin over a year, so a total of 50,000 bottles of gin among these 1,600 people is associated with one extra health problem. This indicates a very low level of harm in moderate drinkers, and suggests UK guidelines of an average of 16g a day (2 units) are very low-risk indeed.

“Given the pleasure presumably associated with moderate drinking, claiming there is no ‘safe’ level does not seem an argument for abstention. There is no safe level of driving, but government do not recommend that people avoid driving. Come to think of it, there is no safe level of living, but nobody would recommend abstention.”

<http://www.sciencemediacentre.org/expert-reaction-to-systematic-analysis-of-the-health-impacts-of-alcohol/>