Risk Communication

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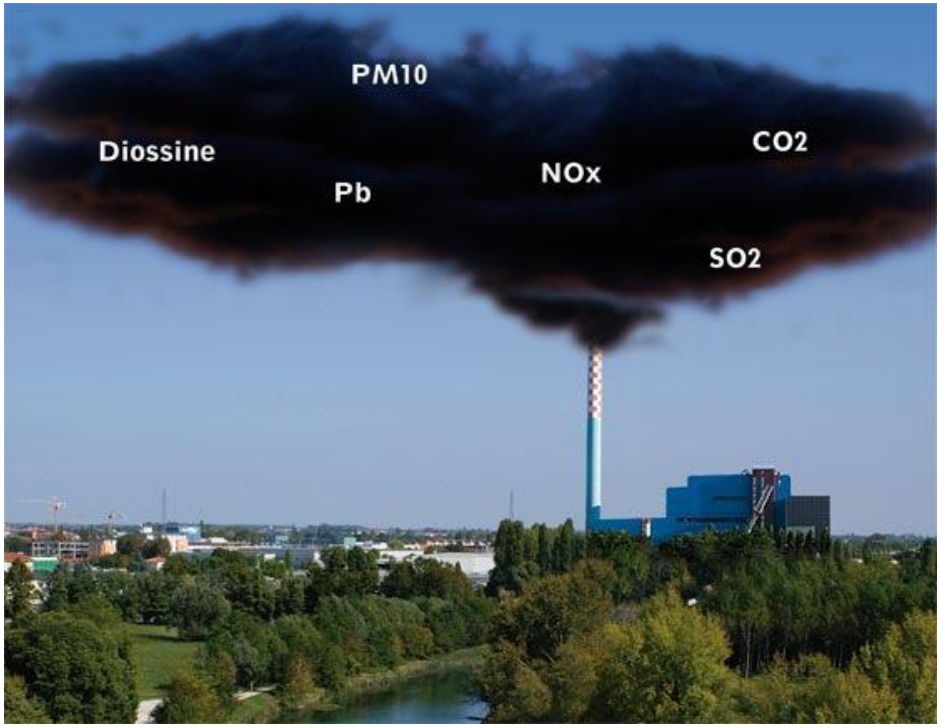

PM10
Diossine
CO2
NOx
Pb
SO2

The variability of Risk perception

"Public reaction to risk often appear to be at odds with scientific estimates. Although risk may technically be defined as 'probability *times* severity of harm', the suggestion that a hazard poses an annual risk of death of 'one chance in x' may cause anything from near panic to virtual indifference".

Bennet, 2010

Risk and the dread factor

$$\boldsymbol{R = H + O}$$

R = perceived risk

H (*hazard*) = the way a scientist measures the risk

O (*outrage*) = the so-called *outrage factor*, the emotional side of risk feeling

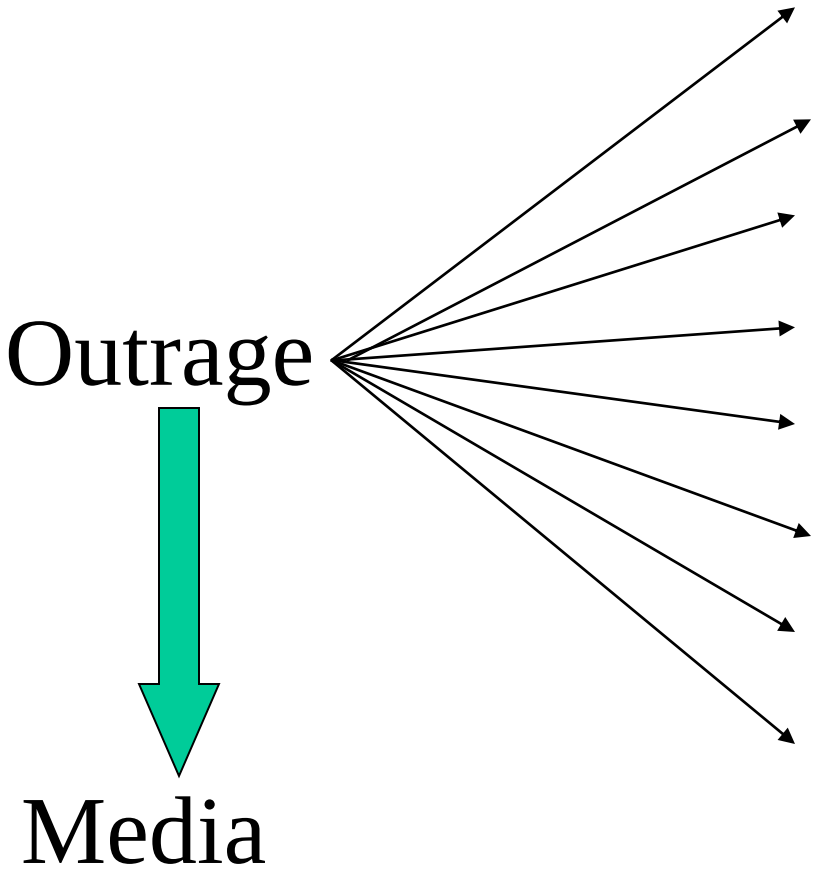
Sandman, 1987

The first law of risk communication

"The First Law (maybe the only law) of Risk Communication: **outrage, not hazard, drives reputation.** Even significant hazards are usually tolerated when outrage is low, and even insignificant hazards are usually rejected when outrage is high".

Peter Sandman, 1987

Outrage components



- to be involuntary (e.g. exposure to pollution) rather than voluntary (e.g. smoking)
- **to be inequitably distributed**
- to be inescapable even if personal precautions are taken
- to arise from unfamiliar or novel sources
- to cause hidden and irreversible damage, such as becoming sick many years after exposure to a risk factor
- to pose some particular danger to small children or pregnant women or more generally to future generations
- to be subject to **contradictory statements** from responsible sources

Risk comparison

•"Compare risks can seriously damage your credibility" (Covello, 1988)

•In any case, never compare non-homogeneous risks.

P. Sandman, 2011

Risk comparison

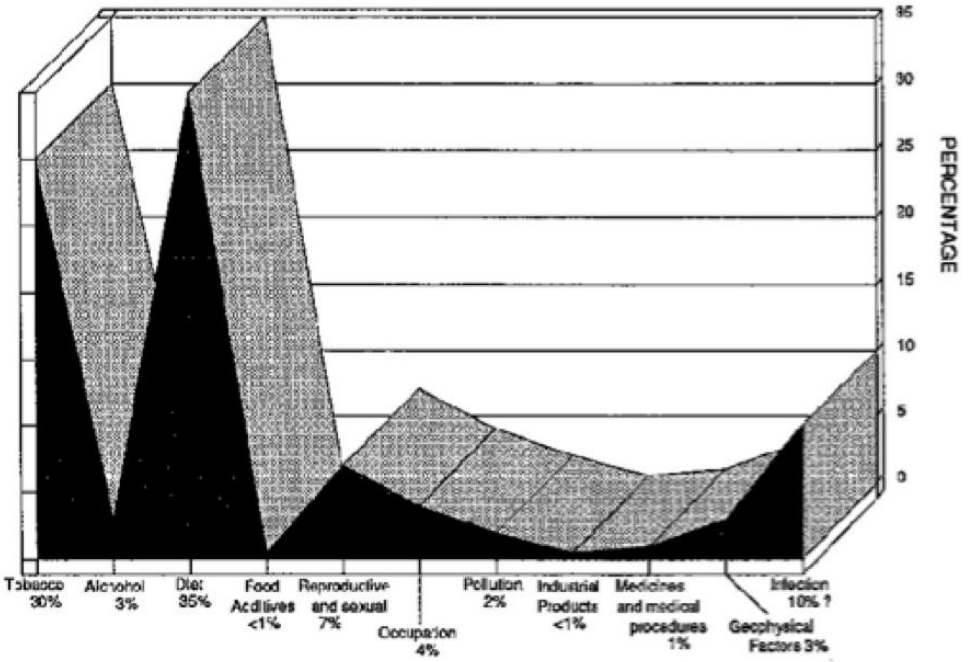
Table B.4
Estimated Loss of Life Expectancy Due to Various Causes

Cause	Days	Cause	Days
Cigarette smoking (male)	2250	Job with radiation exposure	40
Heart disease	2100	Falls	39
Being 30% overweight	1300	Accidents to Pedestrians	37
Being a coal miner	1100	Safest job (accidents)	30
Cancer	980	Fire (burns)	27
Being 20% Overweight	900	Generation of energy	24
Cigarette smoking (female)	800	Illicit drugs (U.S. average)	18
Stroke	520	Poison (solid, liquid)	17
Living in unfavorable state	500	Suffocation	13
Cigar smoking	330	Firearms accidents	11
Dangerous job (accidents)	300	Natural radiation	8
Pipe smoking	220	Poisonous gases	7
Increasing food intake 100 calories/day	210	Medical X rays	6
Motor vehicle accidents	207	Coffee	6
Pneumonia (influenza)	141	Oral contraceptives	5
Alcohol (U.S. average)	130	Accidents to bicycles	5
Accidents in home	95	All catastrophes combined	3.5
Suicide	95	Diet drinks	2
Diabetes	95	Reactor accidents (UCS)	2*
Being murdered (homicide)	90	Reactor accidents (NRC)	0.02*
Legal drug misuse	90	PAP test	-4
Average job (accidents)	74	Smoke alarm in home	-10
Drowning	41	Air bags in car	-50
		Mobile coronary care units	-125

Source: Nuclear Regulatory Commission, *Reactor Safety Study*, WASH–1400 (NUREG/74/104), Washington, D.C., 1975.

Risk comparison

Figure B.4
The Causes of Cancer:
Quantitative Estimates of the
Avoidable Risk of Cancer in the U.S.



What's wrong with risk comparison?

The tables are often misleading, because they are neither clear nor consistent about the population used to calculate the risk.

A careful risk comparison requires a good deal of background information

Remember that a useful risk comparison must be accurate *and appropriate.*

Risk, people and values

Risk and values

The people who desire to be informed, want, in order of priority:

- how one is exposed to the risk,
- its consequences,
- whether it is controllable,
- other people's experience with the risk,
- who is responsible for the negative consequences,
- whether there are any advantages

Four different kinds of people

- **Egualitarians**, who think that nature is in fragile balance and that democratic participation is more important than expertise
- **Individualists**, who think that nature is indifferent to our decisions and that we are completely free to make our own decisions.
- **Hierarchists**, who want to establish rules and procedures for regulating risks
- **Fatalists**, who don't think that is possibile to control events and useless to focus on individual decision

System 1 and System 2

System 2 = conscious analytical way of thinking.

System 1 = much simpler way of reasoning, "intuition".

Risk and probability/1

The most common biases on probabilities are:

Availability bias: more memorable events are perceveid as been more frequent than others

Confirmation bias: people tend to pinpoint events that confirm their idea.

Overconfidence: we tend to think that our predictions/estimates are more correct than they really are.

The Asian disease

Imagine that the United States is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. Assume that the exact scientific estimates of the consequences of the programs are as follows:

If Program A is adopted, 200 people will be saved

If Program B is adopted, there is a one-third probability that 600 people will be saved and a two-thirds probability that no people will be saved

If Program A′ is adopted, 400 people will die

If Program B′ is adopted, there is a one-third probability that nobody will die and a two-thirds probability that 600 people will die

Risk and probability/3

Is it better to communicate by words or by numbers?

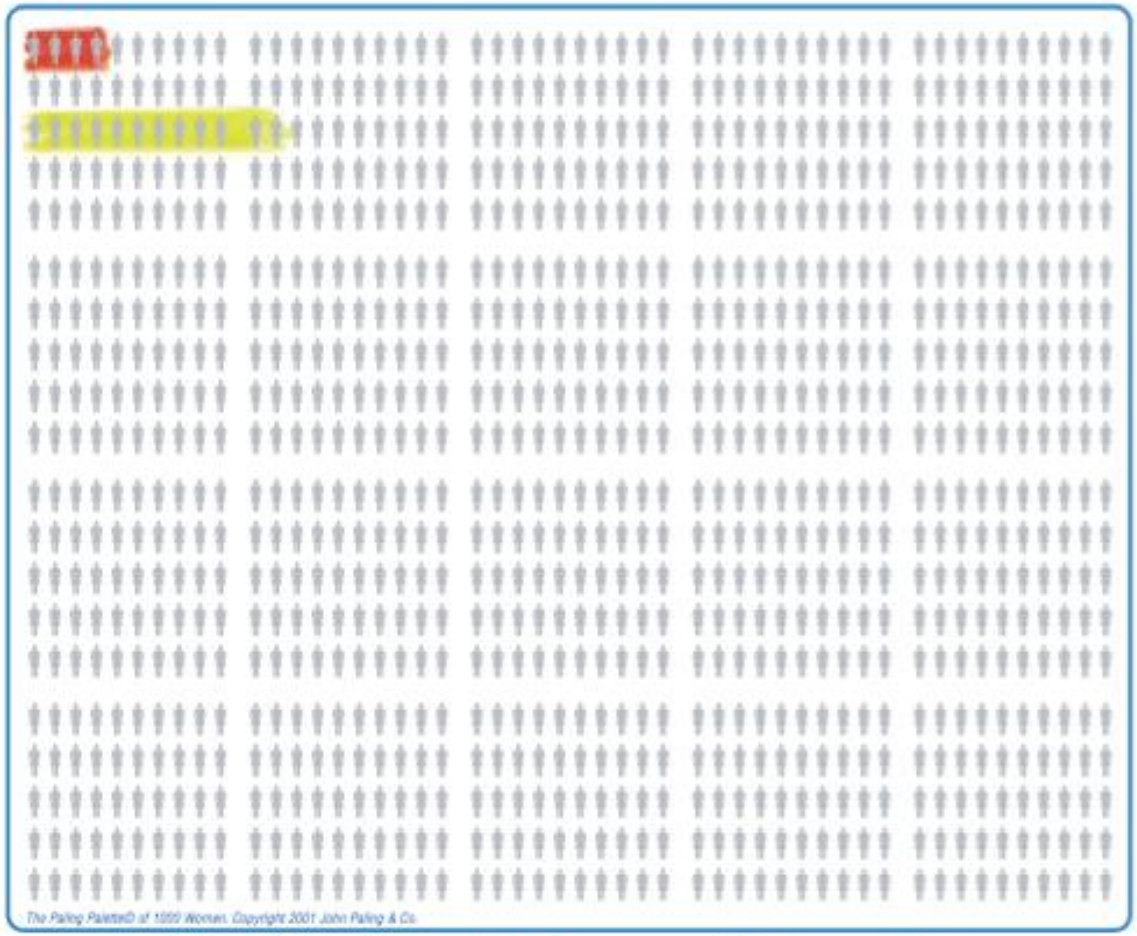
The European Union (EC Directive 92/27) chose particular words for classyfing the risk of medicines (side effects): from “very common” to “very rare”. But some studies showed that people don't interpret these words correctly: e.g. While “very rare” refers to a risk of 0,01%, the mean estimate given by people is 4%.

One Thousand People

– Pictures to Help You

See Your Odds

We can only show you averages. It is impossible to predict whether your results will be positive or negative.



Odds for a 39 year old woman of producing a child with Downs Syndrome or other chromosome abnormality 12 out of 1000

Odds of a woman having a miscarriage as a result of amniocentesis (4 out of 1,000)

Data from Hook EB, Cross PK and Schreinemachers DM. Chromosome abnormality rates at amniocentesis and in live born infants. JAMA 249(15):2034-8

The dimensions of risk

Probability

Impact (severity of harm)

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Top 5 Global Risks in Terms of Likelihood

	2007	2008	2009	2010	2011	2012	2013	2014
1st	Breakdown of critical information infrastructure	Asset price collapse	Asset price collapse	Asset price collapse	Storms and cyclones	Severe income disparity	Severe income disparity	Income disparity
2nd	Chronic disease in developed countries	Middle East instability	Slowing Chinese economy (<6%)	Slowing Chinese economy (<6%)	Flooding	Chronic fiscal imbalances	Chronic fiscal imbalances	Extreme weather events
3rd	Oil price shock	Failed and failing states	Chronic disease	Chronic disease	Corruption	Rising greenhouse gas emissions	Rising greenhouse gas emissions	Unemployment and underemployment
4th	China economic hard landing	Oil and gas price spike	Global governance gaps	Fiscal crises	Biodiversity loss	Cyber attacks	Water supply crises	Climate change
5th	Asset price collapse	Chronic disease, developed world	Retrenchment from globalization (emerging)	Global governance gaps	Climate change	Water supply crises	Mismanagement of population ageing	Cyber attacks

Top 5 Global Risks in Terms of Impact

	2007	2008	2009	2010	2011	2012	2013	2014
1st	Asset price collapse	Asset price collapse	Asset price collapse	Asset price collapse	Fiscal crises	Major systemic financial failure	Major systemic financial failure	Fiscal crises
2nd	Retrenchment from globalization	Retrenchment from globalization (developed)	Retrenchment from globalization (developed)	Retrenchment from globalization (developed)	Climate change	Water supply crises	Water supply crises	Climate change
3rd	Interstate and civil wars	Slowing Chinese economy (<6%)	Oil and gas price spike	Oil price spikes	Geopolitical conflict	Food shortage crises	Chronic fiscal imbalances	Water crises
4th	Pandemics	Oil and gas price spike	Chronic disease	Chronic disease	Asset price collapse	Chronic fiscal imbalances	Diffusion of weapons of mass destruction	Unemployment and underemployment
5th	Oil price shock	Pandemics	Fiscal crises	Fiscal crises	Extreme energy price volatility	Extreme volatility in energy and agriculture prices	Failure of climate change adaptation	Critical information infrastructure breakdown

Economic Environmental Geopolitical Societal Technological

Other dimensions

Uncertainty

Ubiquity

Persistence

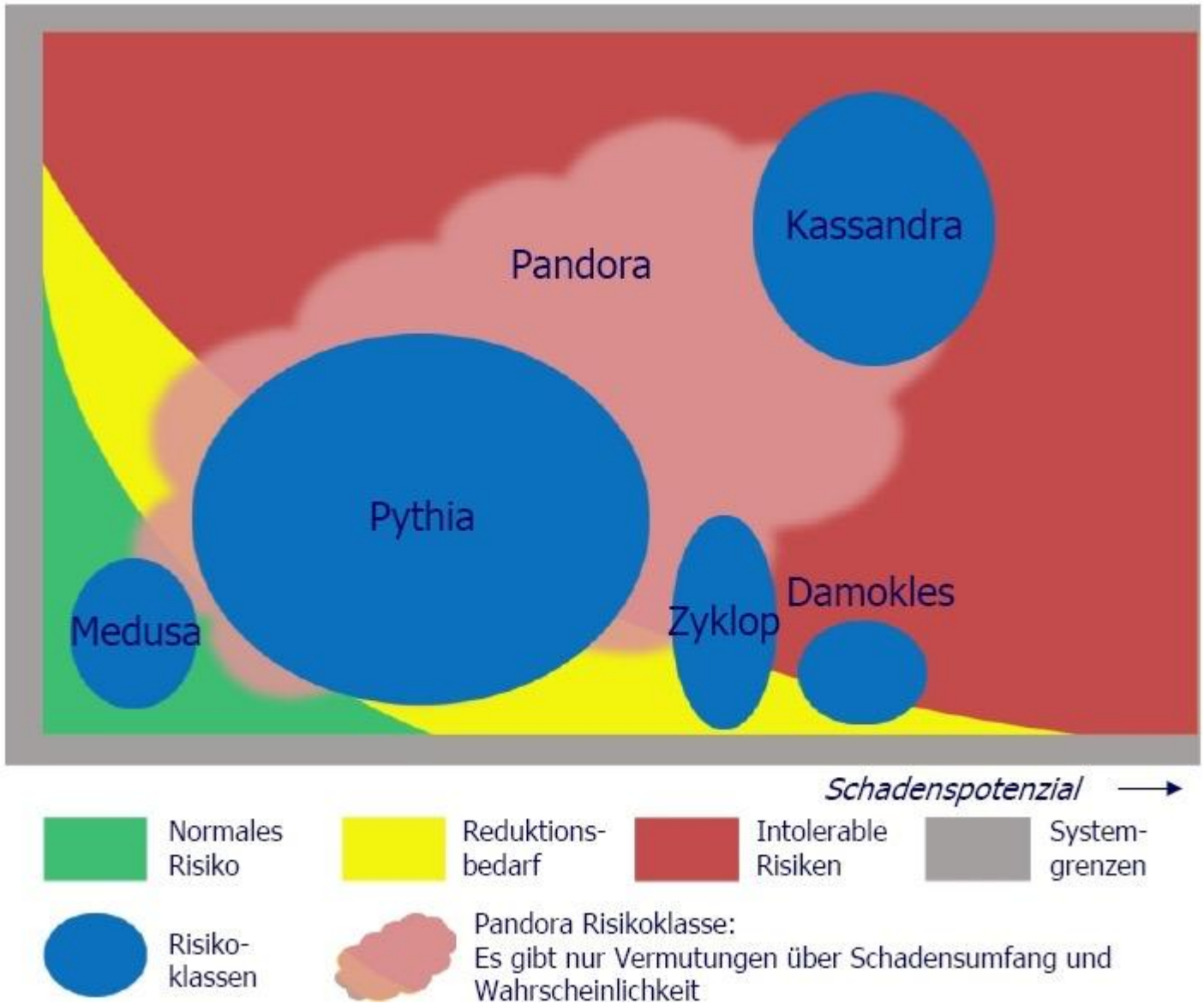
Irreversibility

Delated effect

Potential of social mobilisation (equity violation)

Council on Global Environmental Change (Germania, 1998),

Types of risk



different risks > different management

Management	Risk class	Extent of damage	Probability of occurrence	Strategies for action	TYPICAL EXAMPLES
Science-based	*Damocles*	• high	• low	• Reducing disaster potential • Ascertaining probability • Increasing resilience • Preventing surprises • Emergency management	nuclear energy, dams, large-scale chemical facilities
	Cyclops	• high	• uncertain		nuclear early warning systems, earthquakes, volcanic eruptions, AIDS
Precautionary	*Pythia*	• uncertain	• uncertain	• Implementing precautionary principle • Developing substitutes • Improving knowledge • Reduction and containment • Emergency management	greenhouse effect, BSE, genetic engineering
	Pandora	• uncertain	• uncertain		POPs, endocrine disruptors
Discursive	*Cassandra*	• high	• high	• Consciousness-building • Confidence-building • Public participation • Risk communication • Contingency management	anthropogenic climate change, destabilization of terrestric ecosystems
	Medusa	• low	• low		electromagnetic fields

Risk and the media

media > political system

"Media coverage of risk events revereberates through the political system, forcing responses from politicians. By calling public attention to an issue, the media may affect the nature of regulation, the course of litigation or the direction of research and development".

Dorothy Nelkin

Risk and the media

What matters in (traditional) media are stories… and faces, not evidence or data

We are overly susceptible to anedoctal evidence. Anectotes make good reading and we are right to use them.. Ut we often forget to remind our readers - and ourseleves - of the folly of generalizing from a new a few interesting cases… The statistic is hard to remember. The stories are not".

Philip Meyer, reporter

"I quickly learnt to drop the classic who, what, when, where and why. That's not what reporters want. They want to tell good stories. So they need human faces, people, the picture, family portrait."

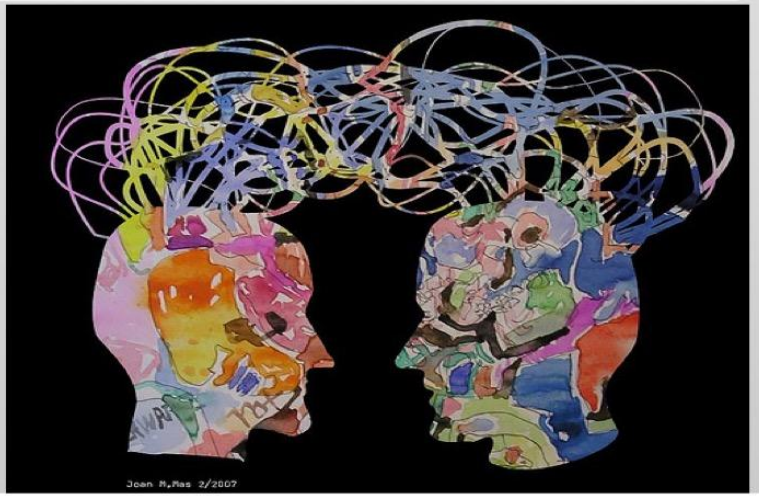
Mark Stuart, PR director, Hill and Knowlton

Risk and the media

The main media triggers, that can fuel outrage factor, are the following:

1. Questions of *blame*
2. Alleged *secrets* and attempted *cover-ups*
3. *Human interest* through identifiable heroes, villains, dupes, etc.
4. Links with existing high-profile issues or *personalities*
5. *Conflict*
6. *Signal value:* the story as a portent of further ills ("What next?")
7. *Many people exposed* ("It could be you!")
8. Strong *visual impact*
9. Links to *sex* and/or *crime*

Good communication practice




Communication
STRATEGY

Lessons from Fukushima/1

Fukushima Daiichi nuclear disaster taught us a lot of useful lessons on communication. Among these are:

- You can't avoid communicating. You are communicating even if you don't want to (and this is the worst form of communication).
- Don't underestimate people's concerns because they are a sign that some improvement is needed.
- Be more cautious than not cautious enough, because if you make a mistake and the situation deteriorates, it is worse.

Lessons from Fukushima/2

- “Don't lie, and don't tell half-truths. This elicits terrible suspicion of cover-up and manipulation by public opinion”. (Sandman)
- Communication should not be in the hands of one person; it should be integrated throughout an organization. If there is only one spokesperson, journalists normally search for other sources of information.

Some basic rules/1

1. Start with a **statement** in which you keep a consistent stream of information relevant to what is of concern for the public.
2. Mark a clear difference between **harm** (all possible types of damage) and **risks** (meaning the *chances* individuals will be affected by the damage).
3. Establish if the risk can potentially create **outrage**/ specific fears. You have to be aware of these fears **-** you have to take them into account when communicating.

Some basic rules/2

4. Specify what is know as per the exposure - or whether some groups (e.g.children) are especially exposed/ **vulnerable**.
5. State the **quality of knowledge** on the topic and how that knowledge can progress / improve (who is in charge of this progress?)
6. Explain what degree of **uncertainty** exists within that knowledge (how can this uncertainty decrease?).
7. Provide details both in terms of quality and quantity as per the **statistics / the probability** of certain events (are the stats available? If not - when will they become so?).

Some basic rules/3

8. Justify what is reckoned as acceptable in terms of risk levels. Evaluate the risk - risk / risk - benefit. Or both! Try to convey the message that **alternative views** are to be explored in order to strike a balance between risks and benefits.
9. Explain how the **potential targets** of risk can **defend** themselves against the known and/or potential risk and how the latter can be kept in check.
10. Provide **contact** details of a reference person / source that can provide feedback/ answers to all questions.

Designing the message/1

1. Be **clear** in your intentions and keep these intentions as the core/ main focus of your communication effort.
2. **Simplify** your message **-** keep it accurate but to the point. It is a hard task: you need to develop this by editing; facts and figures must be as clear as possible; yet the decision making process must be explained **-** the values to do with a trade off must be there; doubts must be stated. This enacts credibility and trust.

Designing the message/2

3. Never take **technical knowledge** for granted **-** unless the audience is made up of technical experts. Stir clear of jargon. Explain everything.

4. Start with **basic concepts**. Then build up...adding more complex ideas.

5. **Anticipate topics of interest for your audience -** build your communication around these interests. This is something awfully overlooked in scientific risk communication that usually starts with long technical parts and only at the end talks about the essential. What is essential for people is usually learning about the consequences of exposure; the circumstances leading to risk; how to mitigate it; what institutions are doing to counter it.

Climate change: how hot will it get in my lifetime? - interactive

The UN is to publish the most exhaustive examination of climate change science to date, predicting dangerous temperature rises. How hot will it get in your lifetime? Find out with our interactive guide, which shows projections based on the report

Duncan Clark
theguardian.com, Friday 27 September 2013 09.01 BST

Emitter BETA

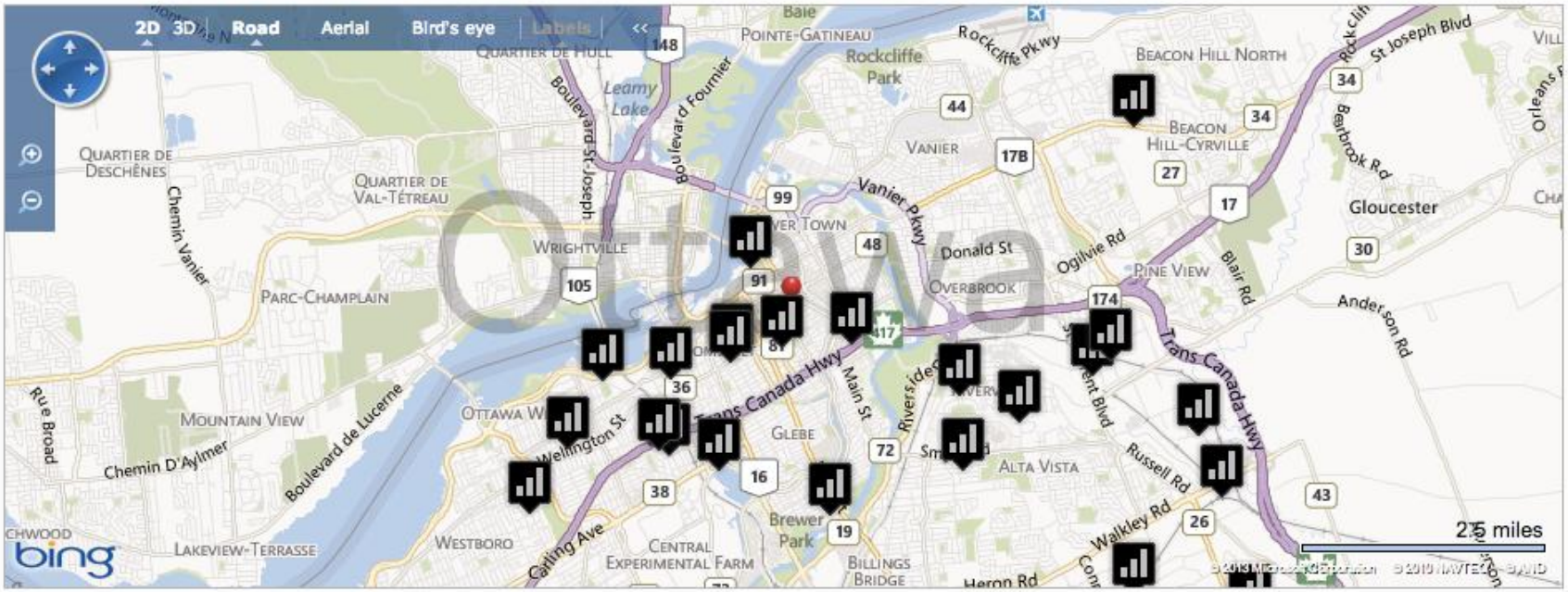
Tracking pollution in your neighbourhood

Tweet 238

ABOUT METHODOLOGY DEVELOPER

NEARBY CITY RIDING

Ottawa Search



51 Results found while Searching

SEARCH:

Sources: Howard Mielke, US Census

Mother Jones

Sources: Howard Mielke, US Census

Mother Jones

Trust and participation

Why we don't trust?

Risk and the dread factor

R = H + O

R = perceived risk

H (*hazard*) = the way a scientist measures the risk

O (*outrage*) = the so-called *outrage factor*, the emotional side of risk feeling

Sandman, 1987

How to manage risk communication?

$$R = \frac{H + O}{M + T + P}$$

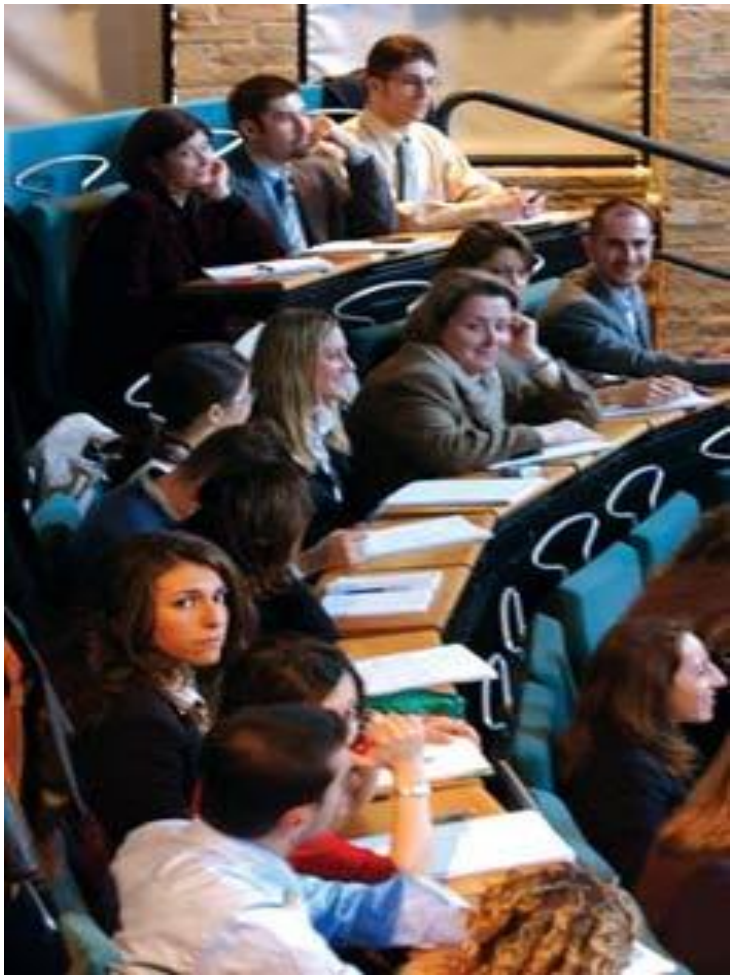
where:
M = Monitoring capacity
T = openness, Trasparent communication
P = Participation of the stakeholders

First step: Trust and data accessibility

Trust in institutions is central for a successful risk communication. It is built upon a sincere and open exchange of information. Few rules in this regard are:

1. **Share technical information, lab results, data etc**…with the citizens and the stakeholders. We have nothing to hide. Be open even though this might expose you to the risk of data manipulation.
2. **Publish data on newspapers or magazines that the citizens actually read**. This increases the credibility.
3. If labels or other graphic information about the risk are required, avoid using a 7-point scale… **Make the message highly visible** and accessible.

Second step: invest on participation



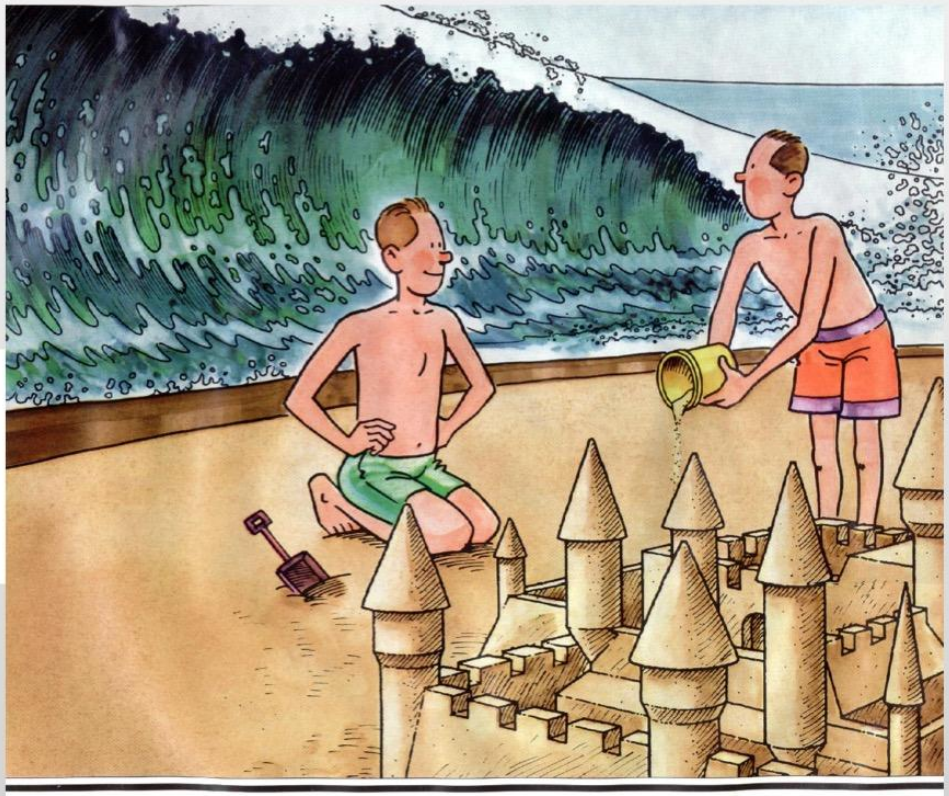
The way of dialogue and negotiation

Looking for a **consensual solution**, **with method,** involving citizens. It is a costly and long way, but it is necessary in case of high outrage. Interesting experiences have been carried out in the US, Switzerland and Germany.

Benefits: increase of trust, empowerment and sharing within the community, growth of scientific culture.

Difficulties: balancing-integrating technical expertise, laws and citizens' values.

Thank you!



Anytime things appear to be going well, you have overlooked something.