

# Risk Communication

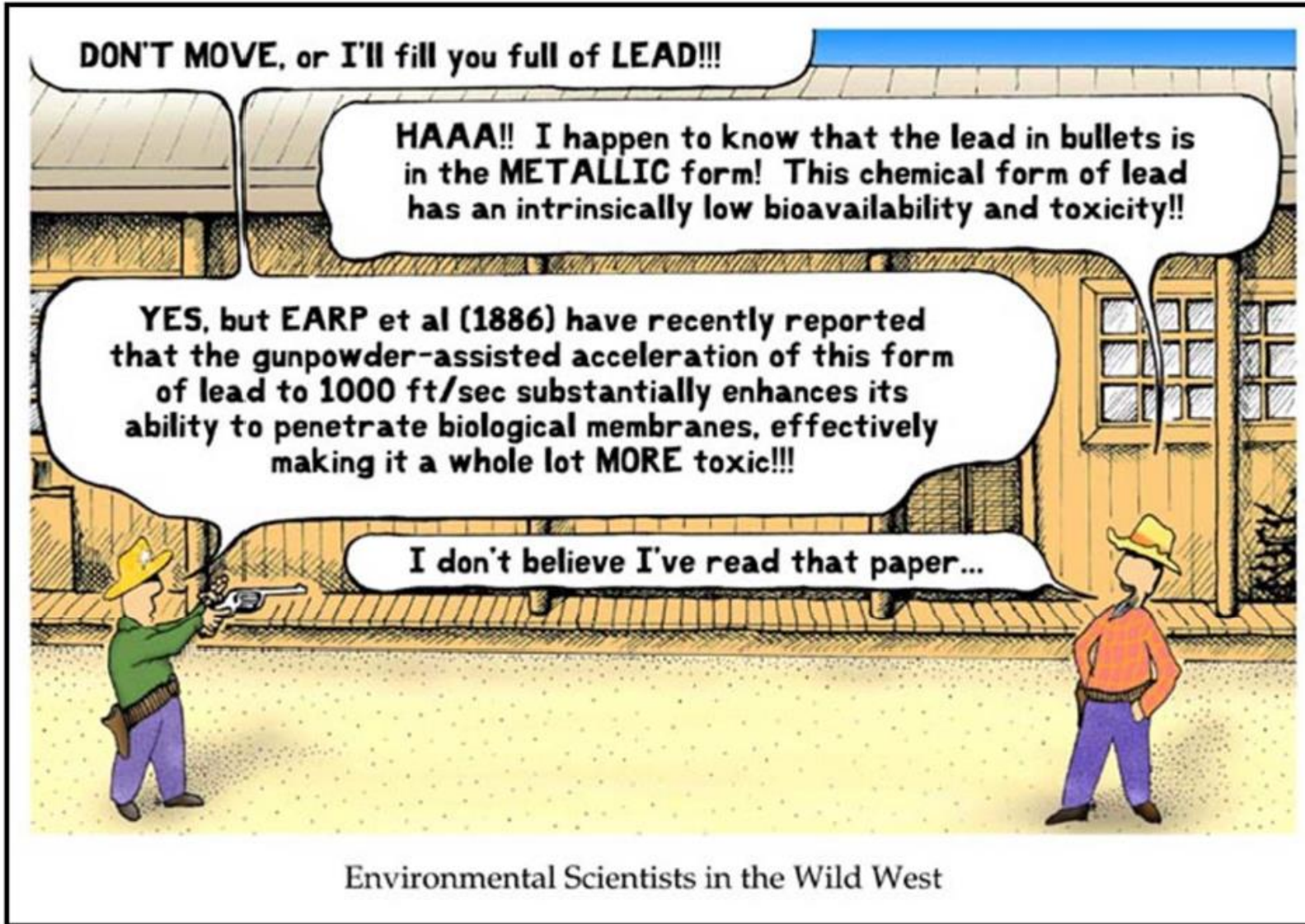
## Approaches for Discussing Hazards and Risks



Rich Hubner

December 13, 2018

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## Basic Terminology

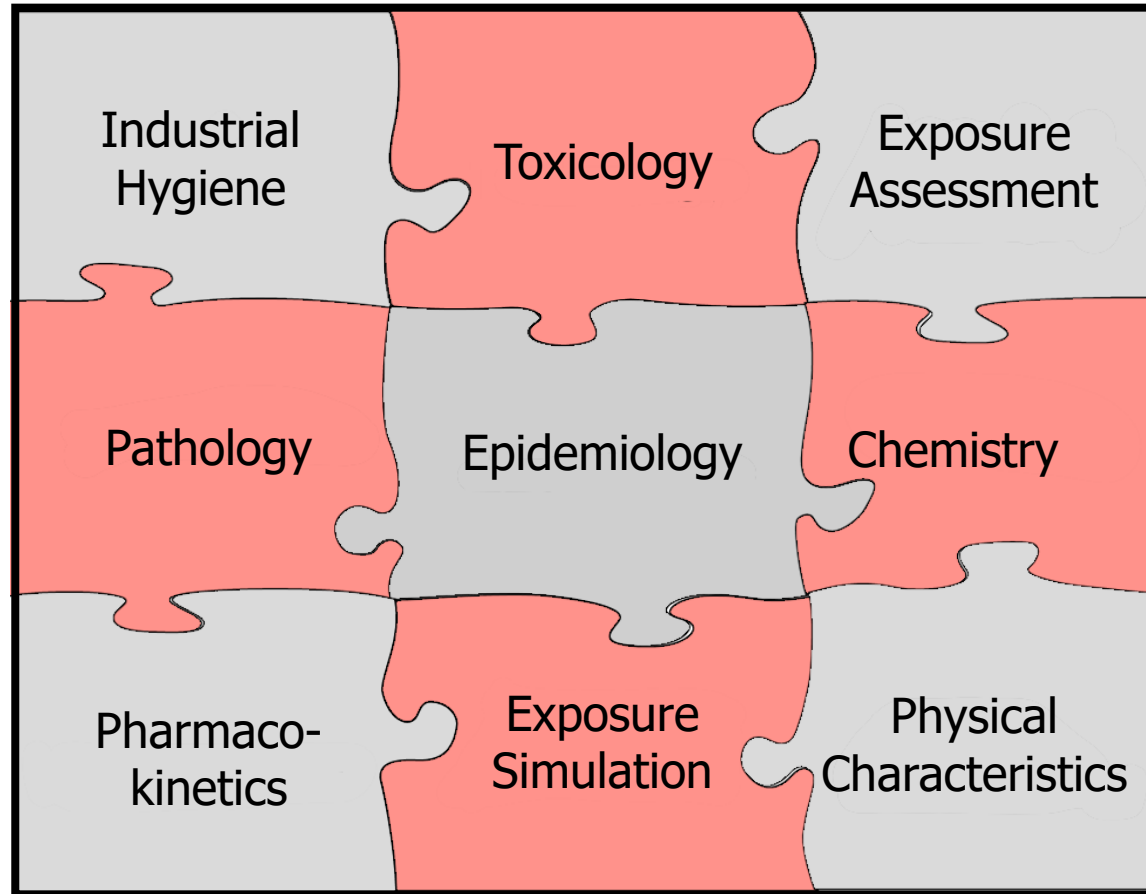
Hazard: Anything that can cause morbidity (injury) or mortality (death).

Risk: The *probability* of morbidity or mortality associated with a specific hazard.

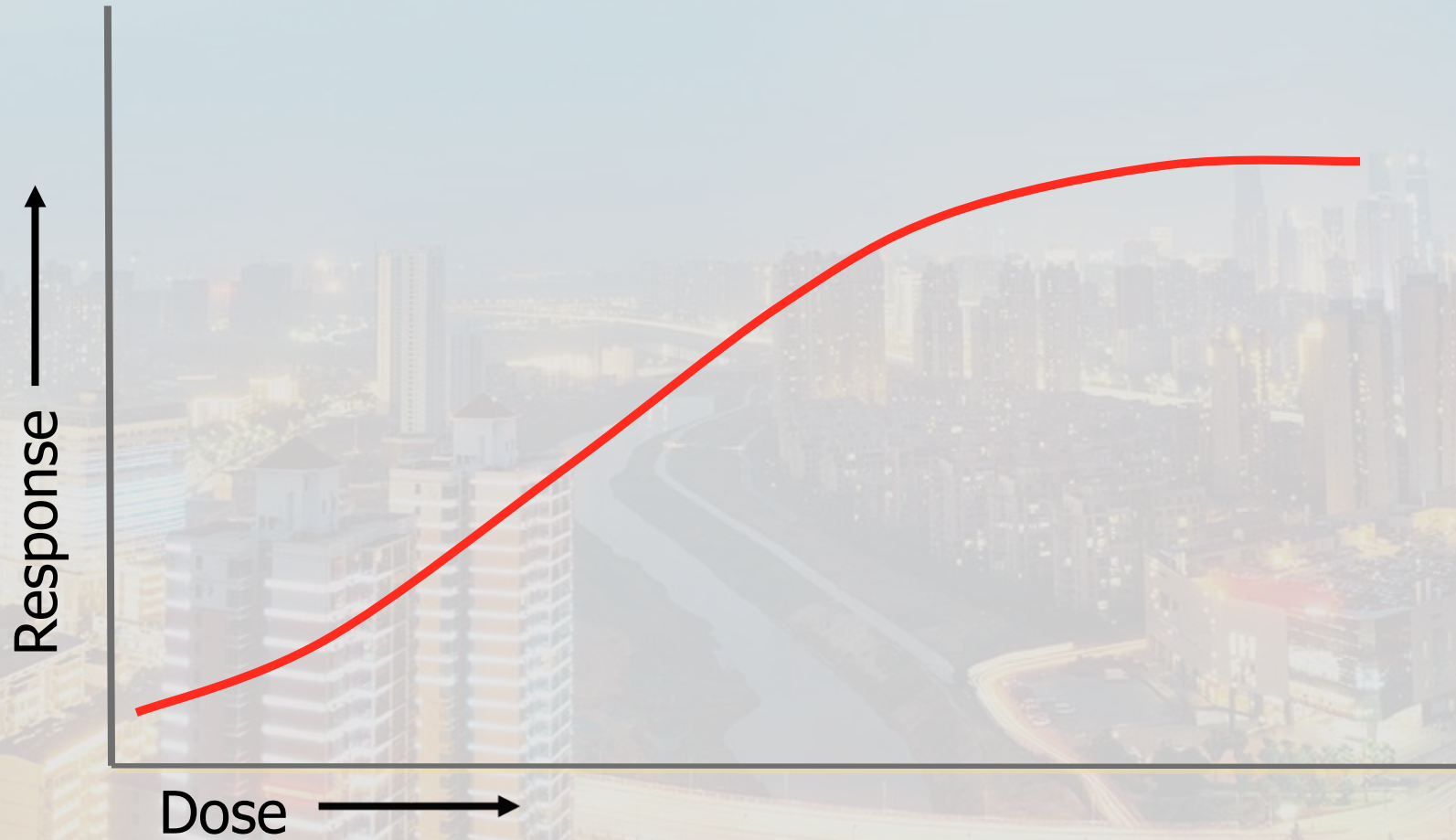
# Health Risk Assessment



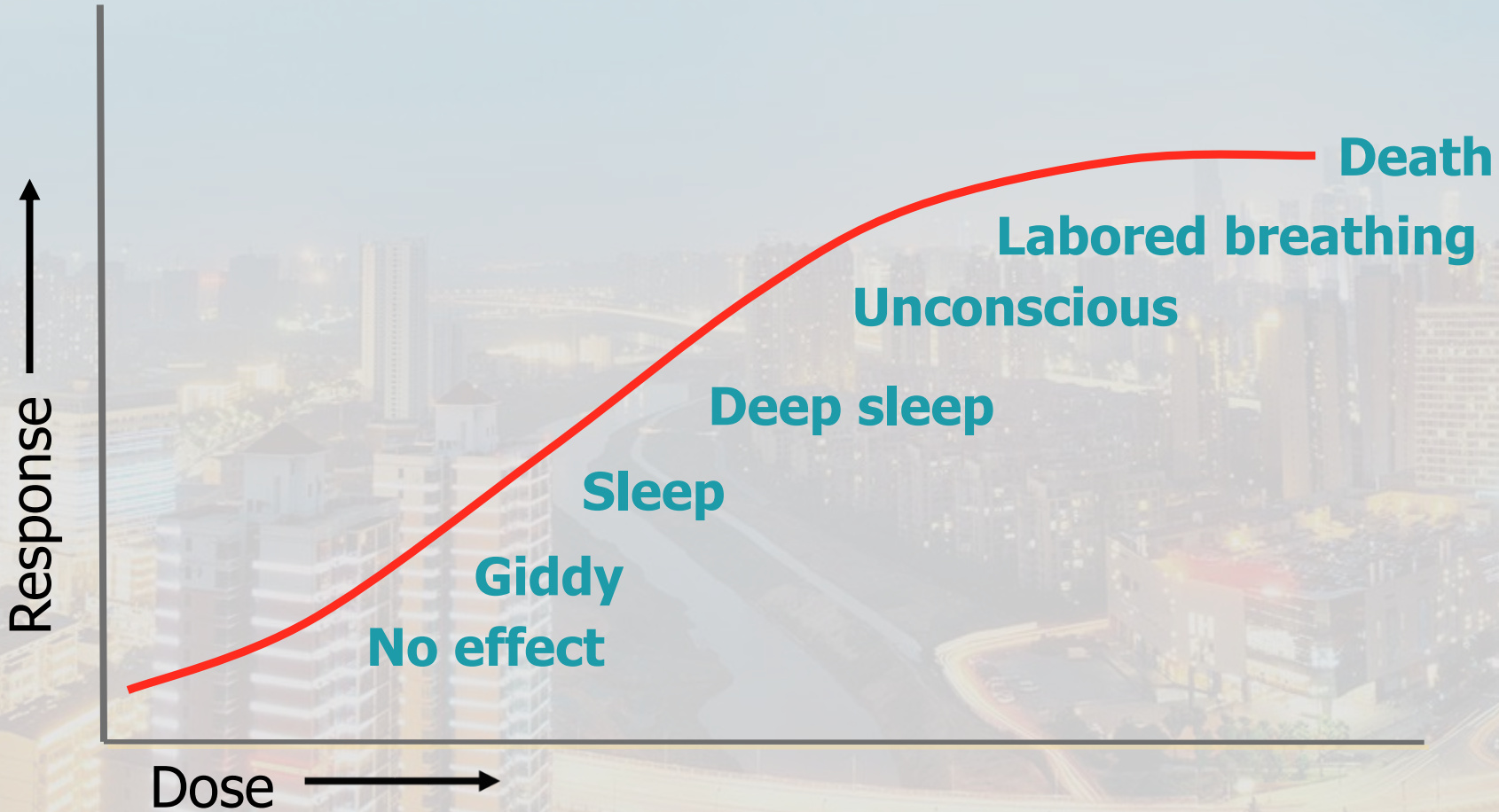
# Hazard Identification



# General Dose-Response Curve



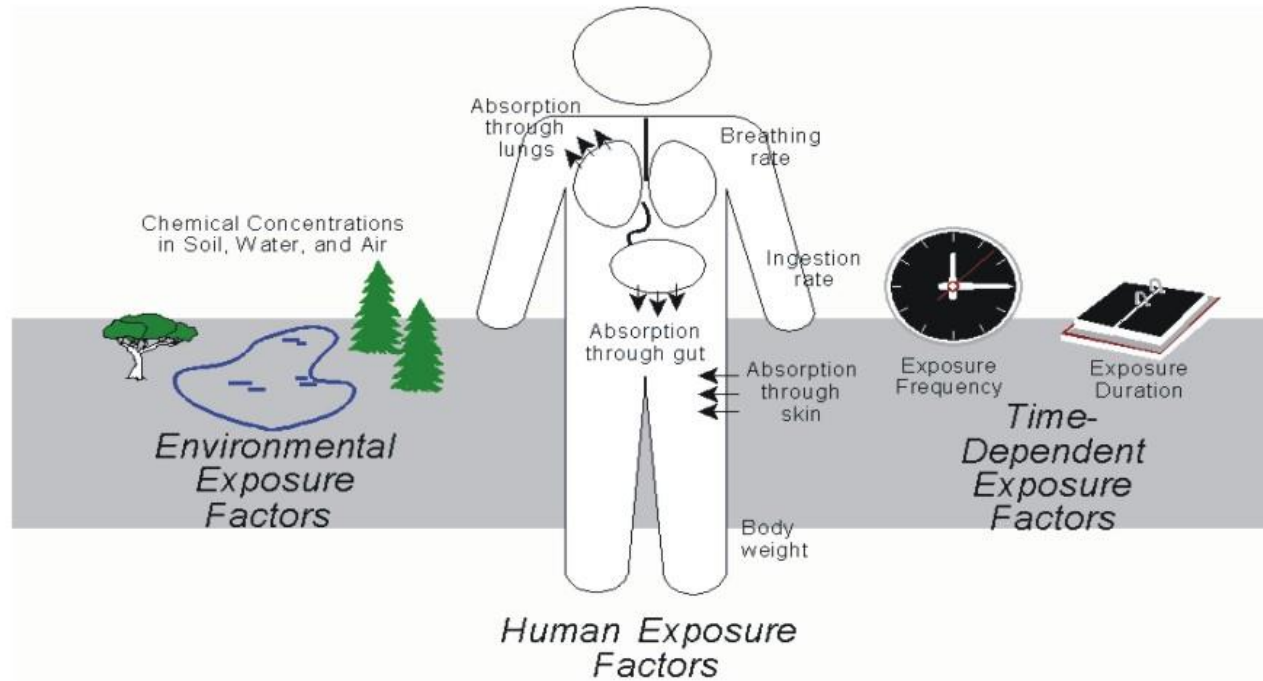
# Dose-Response Curve for Alcohol



# Exposure Assessment

The process of estimating the magnitude, frequency, and duration of an exposure, along with the characteristics of the targets exposed

Ideally, describes the sources, pathways, routes, and uncertainties





# The Concept of Risk

- It cannot be objectively measured.
- Assumptions and subjective judgments are used.
- Most risk perception is determined by fast intuitive feelings.
- The risk(s) cannot be separated from the benefit(s)
- Understanding risk perception is critical for effective communication.

# Risk Communication is different from all other models

## Traditional Communication

- 'We tell them'
- Controls flow of information
- 'Who says what to whom via which channel with what effect?'
- Assumes 'misinterpretation' is the result of 'noise'

## Risk Communication

- Fosters multi-directional conversations
- Takes risk perception into account
- Supports the response
- Works before, during and after a crisis
- Empowers its publics




## Results of Failed Risk Communication

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Frustrated scientists, regulators, and industrialists think the public makes irrational or ignorant judgments.

The public thinks that risks are underestimated to serve someone else's purposes, not their own.

The background of the slide features a blurred financial market data display. At the top, there are statistics: 'High 1000.76', 'Vol 7,582,160k', 'Low 1000.30', and 'Open 1,523.53'. Below this is a candlestick chart with several colored lines (green, blue, red) overlaid, representing different technical indicators or price movements. The overall theme is financial performance and risk management.

What's your return on investment in risk communication?

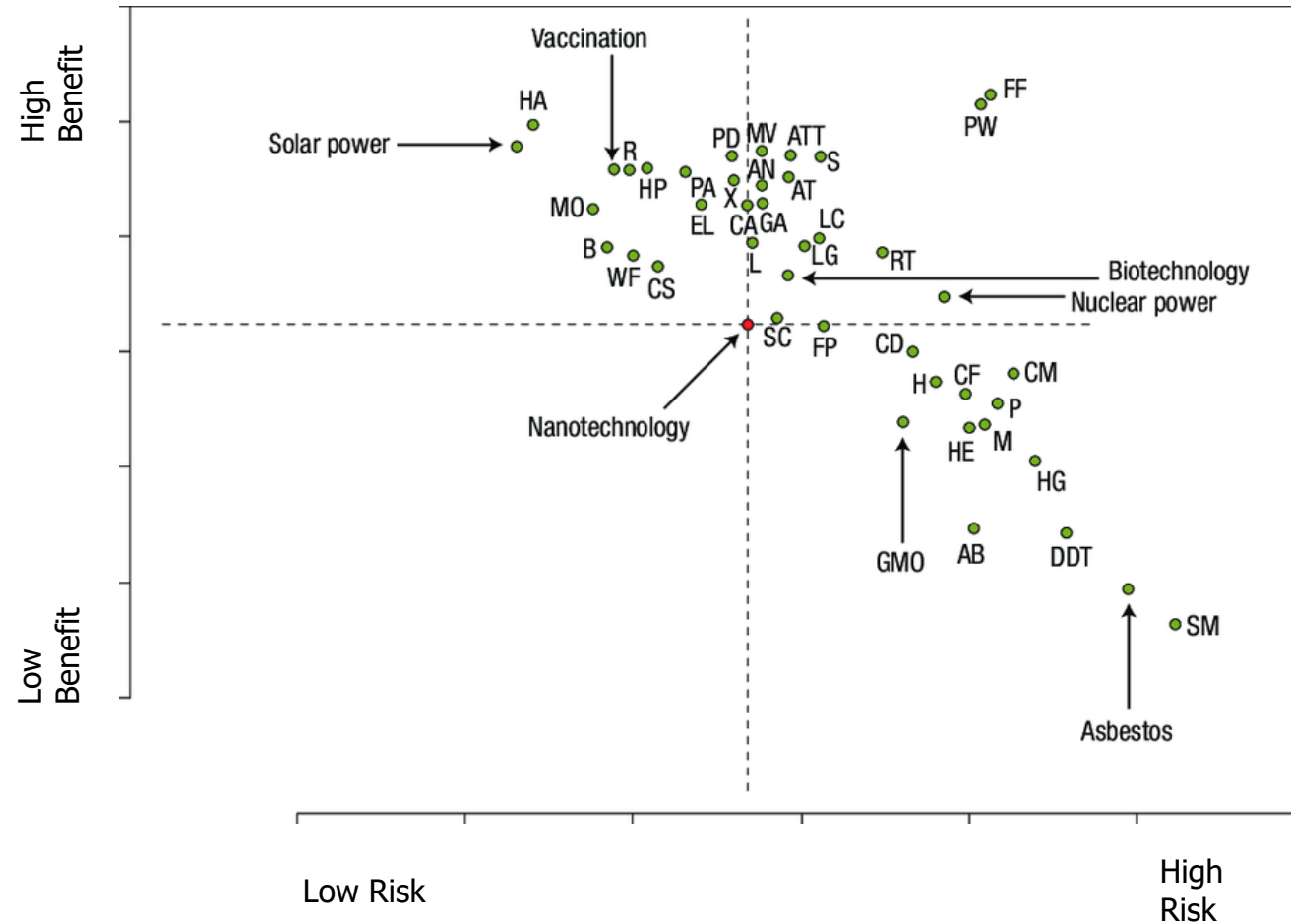
- Fewer injuries, illnesses and deaths
- Fewer wasted resources
- Fewer and less damaging rumors
- More support for your plans
- Increased goodwill
- Better relations with decision makers

# Risk Perception: A Matter of Perspective

- Who benefits? How much?
- Who defines the way we measure the risk?
- Gut feelings, 'probability neglect'
- Other 'outrage factors' (dread, voluntary, etc.)?
- Risk seems worse if:
  - *Involuntary*
  - *Uncontrolled*
  - *Unfamiliar*
  - *Not beneficial*

# Perceived risks and benefits Various Technologies

The acronyms are: alcoholic beverages (AB), anesthetics (AN), air travel (AT), automobile travel (ATT), bicycles (B), commercial aviation (CA), chemical disinfectants (CD), chemical fertilizers (CF), chemical manufacturing plants (CM), computer display screens (CS), dichloro-diphenyl trichloroethane (DDT), electric power (EL), fire fighting (FF), food preservatives (FP), general aviation (GA), herbicides (H), home appliances (HA), human genetic engineering (HE), handguns (HG), hydroelectric power (HP), lasers (L), large construction (LC), liquid natural gas (LG), motorcycles (M), microwave ovens (MO), motor vehicles (MV), pesticides (P), prescription antibiotics (PA), prescription drugs (PD), police work (PW), railroad (R), radiation therapy (RT), surgery (S), stem-cell research (SC), smoking (SM), water fluoridation (WF), X-rays (X).



Source: Curral *et al.* 2006

# Perceived risks and benefits Various Technologies

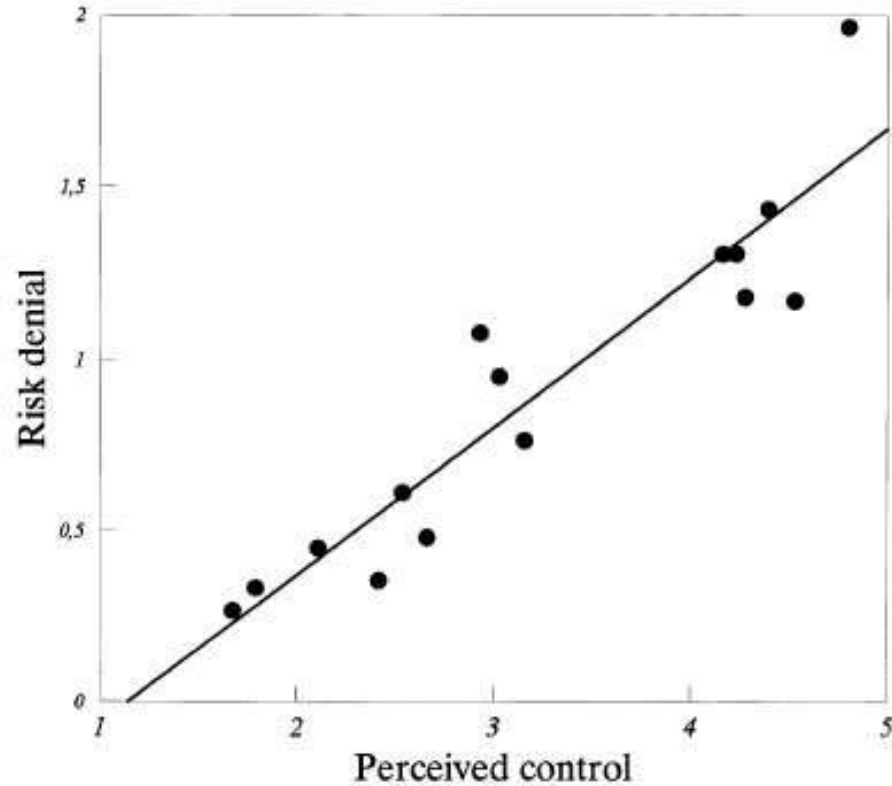


Fig. 2. Risk denial (general minus personal risk) plotted against perceived control over risks. Each point corresponds to one hazard; mean ratings are plotted.

Sjoberg, L. Factors in Risk Perception. 2000. *Risk Analysis* 20:1 (pp1-11)

# Risk Perceptions

Process of Stigmatization Affects:

Technologies: nuclear, chemical,  
bioengineering

Places: Chernobyl, Love Canal

Products:

- Alar – \$100 million
- Tylenol – \$1.4 billion
- Three Mile Island – \$10 billion

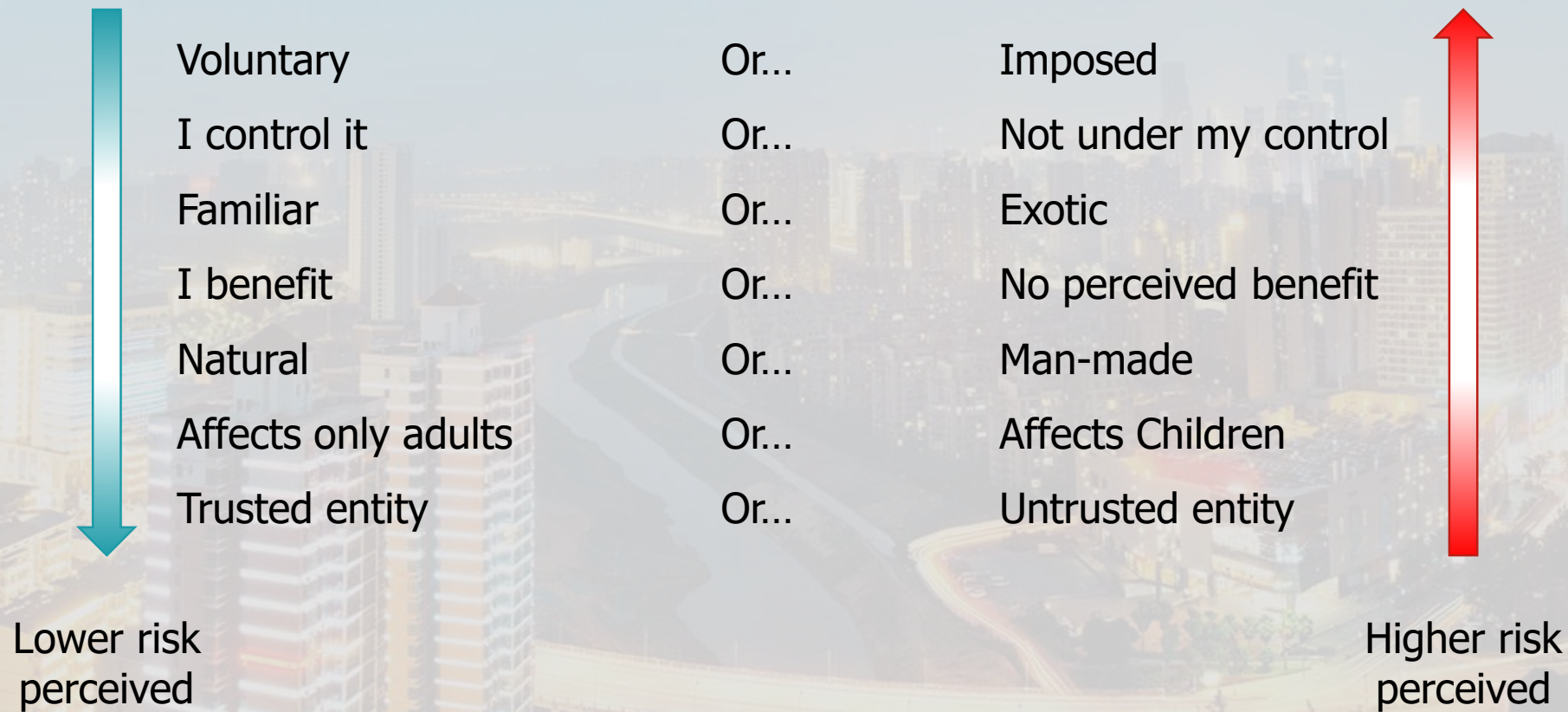
Today: Ground Beef (Pink Slime); GMO  
foods, Water re-use

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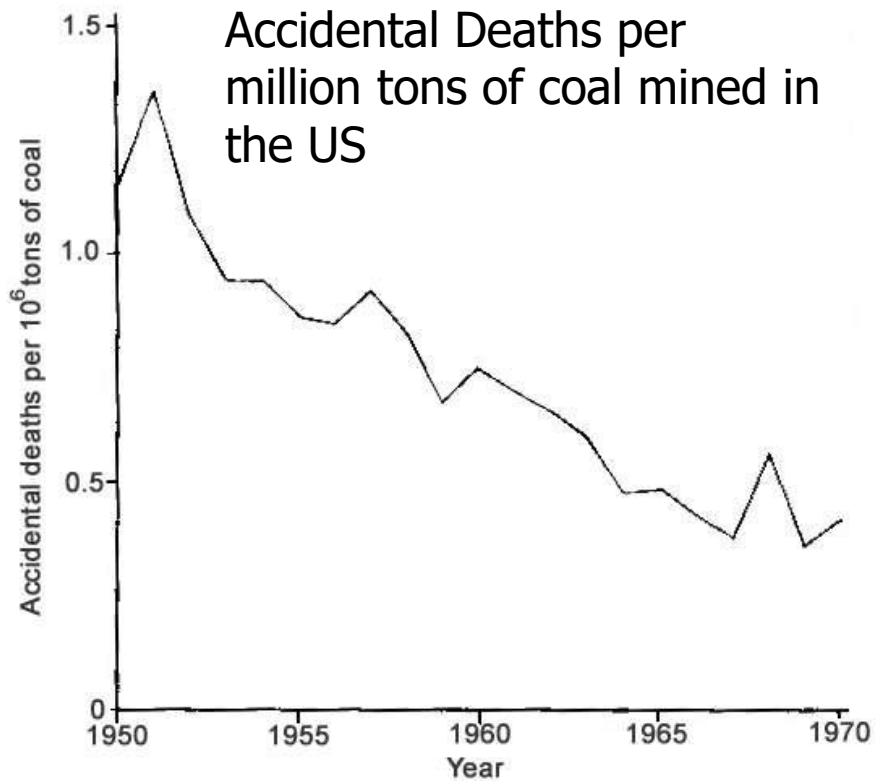


# Risk Perception: A Matter of Perspective



# How is risk defined and by whom?

## Is Coal Mining Getting Safer?



# Defining Risk is an Act of Control

Counting fatalities gives equal weight to:

- Young and old
- Painful and painless deaths
- Voluntary and involuntary exposure(s)
- Fair (beneficial) and unfair (no benefit)

Whoever controls the definition of risk is in control:

- If you define risk one way, no action may be needed.
- If you define risk another way, major actions may be in order.

# Gut Feelings

- Feelings about *outcomes* and feelings about *probabilities* are often confused.
- When strong emotions are involved, there is 'probability neglect.'
- "People are prone to . . . probability neglect, especially when their emotions are intensely engaged. When probability neglect is at work, people's attention is focused on the bad outcome itself, and they are inattentive to the fact that it is unlikely to occur.
- Probability neglect is highly likely in the aftermath of terrorism. People fall victim to probability neglect when the intensity of their reaction does not change much, even with large differences in the likelihood of harm."

Cass R. Sunstein *The Journal of Risk and Uncertainty*, 26(2/3); 2003

# Frame as "Risk" rather than "Safety"

## Safety

- Yes or No
- No precautions necessary
- Safe is safe for everyone
- Easy to explain

## Risks

- More risky-----Less Risky
- Precautions reduce risks
- Risk is higher for certain people
- Harder to explain

# Imagine you ask your doctor about a new medication-Is it safe?

Which response inspires the most trust?

Yes

Trust me

Which response inspires the most trust?

Yes, as long as...

- You tell me about all of your current medications, allergies, and symptoms.
- We watch for signs like (this) and (that), which might mean that we should adjust the dose
- We do not add other medications without talking about it together

# Now imagine someone asked about a pesticide application-Is it safe?

Which response inspires the most trust?

Yes

Trust me

Which response inspires the most trust?

Yes, as long as...


- You tell me about all of your pest problems, previous treatments and sensitive sites/individuals
- You wait X hours to return, and ventilate right away
- You check the bait stations periodically to make sure they're secure
- You do not add other treatments without talking about it together

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# Reframing the “safe” question

- Is it safe?
- The risk is low, but tell me about your concerns...
- Listen
- Consider tailored approaches
- Quickly explain why “safe” isn’t the right word or mindset
- Discuss risk level and things that affect it





## Reframing the “safe” question

Is it safe?

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# Communicating Likelihood

- A patient – Mr. Jones – was evaluated for discharge from a mental health facility. A psychologist whose professional opinion you respect has evaluated Mr. Jones. Her conclusions, stated differently:
- EITHER: Patients similar to Mr. Jones have a 20% probability of committing an act of violence during the first several months after discharge.
- OR: Of every 100 patients similar to Mr. Jones, 20 may commit an act of violence during the first several months after discharge.



**20%**

20% is pretty low, he probably won't hurt anyone

**20 out of 100**

He could be one of those 20

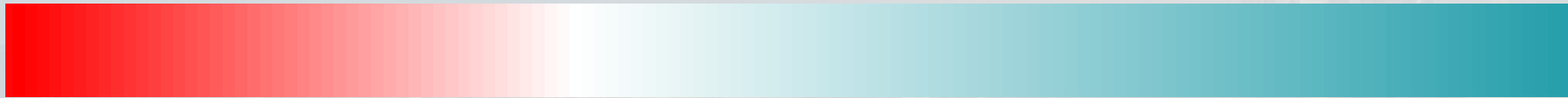
# What neuroscience tells us

- The brain wanders about 30% of the time.
- When people experience social pain (embarrassment, shame, disappointment, anger), their IQ is decreased by up to 20%.
- People tend to internalize the most dominant emotion in the room.
- Reading trumps listening, even if you try to do both.
- People learn best in 20-minute chunks.
- To maximize learning, use stories that are tangible, relatable, and emotional. This strategy turns information into a life **experience**.

# Know your audience trigger points

Threat/danger

Reward/benefit



Norepinephrine  
On alert

Dopamine  
Relaxed

If the focus is too much on 'threat', learning shuts down.

# Active Listening

## Do not:

- Problem solve
- Plan your response
- Give advice
- Be or appear rushed

## Do:

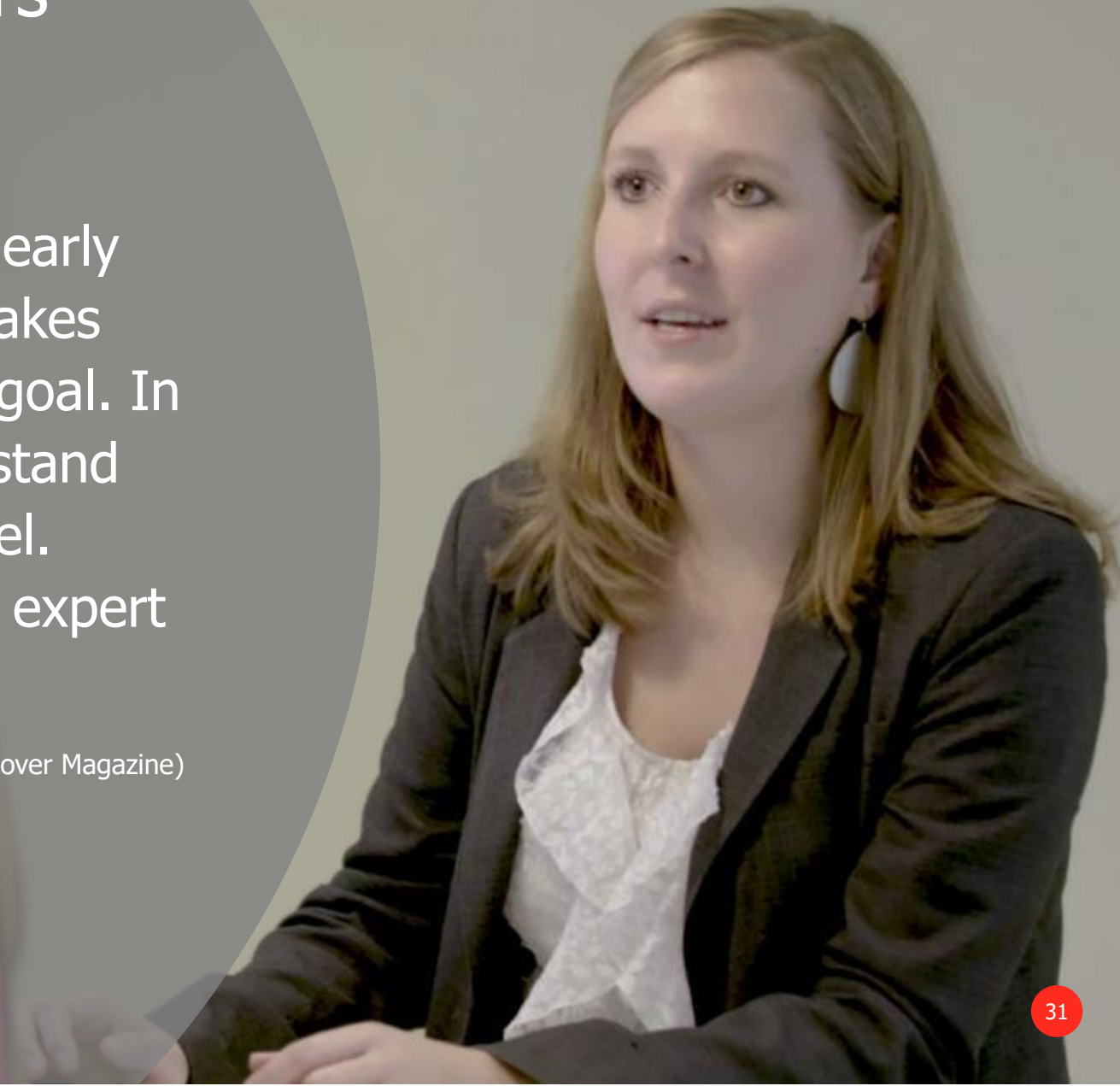
- Be attentive
- Be respectful
- Withhold judgement
- Ask brief questions
- **Clearly describe what you can/cannot do**

# When writing expertise matters

Don't dumb down...

"This is easier said than done. Writing clearly without dumbing down is an art and it takes time to master, but that should be your goal. In order to achieve it, you'll need to understand what you're writing about on a deep level. Anyone can dumb down, but it takes an expert not to."

Neuroskeptic (a blogger for Discover Magazine)



# Some helpful tips

## Sacrifice detail, not accuracy

- In a 300-word piece, use a few words to express uncertainty. For example, say “very unlikely.”
- In a 3000-word piece... you can describe the reasons for the uncertainty in accessible, clear terms.

## Say the most important things first

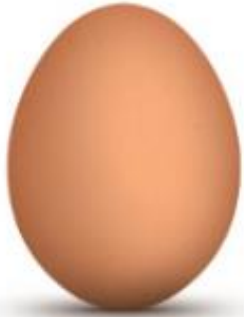
- Our top priority is protecting people/the environment.
- By following the procedures below, you can keep the risk low
- Background: There was a situation, here are the details, we are charged with responding... etc.



# I'm from the internet and I'm here to help...

- Vani Hari, a.k.a. 'The Food Babe': "There is just no acceptable level of any chemical to ingest, ever."
- SaferChemicals.org attempt to ban supposedly "hazardous" products.
- Anti-vaxxers like to point to the formaldehyde content in vaccines and deem this harmful.

## INGREDIENTS OF AN ALL-NATURAL EGG



**INGREDIENTS:** AQUA (75.8%), **AMINO ACIDS (12.6%)** (GLUTAMIC ACID (14%), ASPARTIC ACID (11%), VALINE (9%), ARGININE (8%), LEUCINE (8%), LYSINE (7%), SERINE (7%), PHENYLALANINE (6%), ALANINE (5%), ISOLEUCINE (5%), PROLINE (4%), TYROSINE (3%), THREONINE (3%), GLYCINE (3%), HISTIDINE (2%), METHIONINE (3%), CYSTINE (2%), TRYPTOPHAN (1%)); **FATTY ACIDS (9.9%)** (OCTADECENOIC ACID (45%), HEXADECANOIC ACID (32%), OCTADECANOIC ACID (12%), EICOSATETRAENOIC ACID (3%), EICOSANOIC ACID (2%), DOCOSANOIC ACID (1%), TETRACOSANOIC ACID (1%), OCTANOIC ACID (<1%), DECANOIC ACID (<1%), DODECANOIC ACID (<1%), TETRADECANOIC ACID (<1%), PENTADECANOIC ACID (<1%), HEPTADECANOIC ACID (<1%), TETRADECENOIC ACID (<1%), HEXADECENOIC ACID (<1%), EICOSENOIC ACID (<1%), DOCOSENOIC ACID (<1%), OMEGA-6 FATTY ACID: OCTADECADIENOIC ACID (12%), OMEGA-3 FATTY ACID: OCTADECATRIENOIC ACID (<1%), EICOSAPENTAENOIC ACID (EPA) (<1%), OMEGA-3 FATTY ACID: DOCOSAHEXAENOIC ACID (DHA) (<1%); **SUGARS (0.8%)** (GLUCOSE (30%), SUCROSE (15%), FRUCTOSE (15%), LACTOSE (15%), MALTOSE (15%), GALACTOSE (15%)); **COLOUR** (E160c, E160a), E306, E101; **FLAVOURS** (PHENYLACETALDEHYDE, DODECA-2-ENAL, HEPTA-2-ENAL, HEXADECANAL, OCTADECANAL, PENTAN-2-ONE, BUTAN-2-ONE, ACETALDEHYDE, FORMALDEHYDE, ACETONE); **SHELL** (E170), ALSO CONTAINS BENZENE & BENZENE DERIVATIVES, ESTERS, FURANS, SULFUR-CONTAINING COMPOUNDS AND TERPENES.

## AN ALL-NATURAL BANANA



**INGREDIENTS:** WATER (75%), **SUGARS (12%)** (GLUCOSE (48%), FRUCTOSE (40%), SUCROSE (2%), MALTOSE (<1%)), STARCH (5%), **FIBRE (3%)** (E460, E461, E462, E464, E466, E467) **AMINO ACIDS** (GLUTAMIC ACID (19%), ASPARTIC ACID (16%), HISTIDINE (11%), LEUCINE (7%), LYSINE (5%), PHENYLALANINE (4%), ARGININE (4%), VALINE (4%), ALANINE (4%), SERINE (4%), GLYCINE (3%), THREONINE (3%), ISOLEUCINE (3%), PROLINE (3%), TRYPTOPHAN (1%), CYSTINE (1%), TYROSINE (1%), METHIONINE (1%)), **FATTY ACIDS (1%)** (PALMITIC ACID (30%), OMEGA-6 FATTY ACID: LINOLEIC ACID (14%), OMEGA-3 FATTY ACID: LINOLENIC ACID (8%), OLEIC ACID (7%), PALMITOLEIC ACID (3%), STEARIC ACID (2%), LAURIC ACID (1%), MYRISTIC ACID (1%), CAPRIC ACID (<1%)), ASH (<1%), PHYTOSTEROLS, E515, OXALIC ACID, E300, E306 (TOCOPHEROL), PHYLLUQUINONE, THIAMIN, **COLOURS** (YELLOW-ORANGE E101 (RIBOFLAVIN), YELLOW-BROWN E160a), **FLAVOURS** (ETHYL HEXANOATE, ETHYL BUTANOATE, 3-METHYLBUT-1-YL ETHANOATE, PENTYL ACETATE), E1510, NATURAL RIPENING AGENT (ETHENE GAS).

## INGREDIENTS OF ALL-NATURAL BLUEBERRIES



**INGREDIENTS:** AQUA (84%), **SUGARS (10%)** (FRUCTOSE (48%), GLUCOSE (40%), SUCROSE (2%)), **FIBRE (2.4%)** (E460, E461, E462, E464, E466, E467) **AMINO ACIDS** (GLUTAMIC ACID (23%), ASPARTIC ACID (18%), LEUCINE (17%), ARGININE (8%), ALANINE (4%), VALINE (4%), GLYCINE (4%), PROLINE (4%), ISOLEUCINE (3%), SERINE (3%), THREONINE (3%), PHENYLALANINE (2%), LYSINE (2%), METHIONINE (2%), TYROSINE (1%), HISTIDINE (1%), CYSTINE (1%), TRYPTOPHAN (<1%)), **FATTY ACIDS (<1%)** (OMEGA-6 FATTY ACID: LINOLEIC ACID (30%), OMEGA-3 FATTY ACID: LINOLENIC ACID (19%), OLEIC ACID (18%), PALMITIC ACID (6%), STEARIC ACID (2%), PALMITOLEIC ACID (<1%)), ASH (<1%), PHYTOSTEROLS, OXALIC ACID, E300, E306 (TOCOPHEROL), THIAMIN, **COLOURS** (E163a, E163b, E163e, E163i, E160a) **FLAVOURS** (ETHYL ETHANOATE, 3-METHYL BUTYRALDEHYDE, 2-METHYL BUTYRALDEHYDE, PENTANAL, METHYLBUTYRATE, OCTENE, HEXANAL, STYRENE, NONANE, NON-1-ENE, LINALOOL, CITRAL, BENZALDEHYDE, BUTYLATED HYDROXYTOLUENE (E321)), METHYLPARABEN, E1510, E300, E440, E421 and **FRESH AIR** (E941, E948, E290).

# Writing for the internet

- Visitors to web pages spend 2-4 seconds, on average, deciding whether to leave or stay.
- People with limited literacy skills tend to skip whole paragraphs if they have more than 3 lines.
- Links and content on the right margin are often ignored, mistaken for advertisements.

# Some helpful tips

- Write in plain language. Use your own voice.
- Put the most important information first.
- Describe the desirable outcome – just the basics.
- Stay positive and realistic.
- Provide specific action steps.
- Display content clearly
  - Limit paragraph size. Use bullets or short lists.
  - Use meaningful headings with action words
  - Use white space, avoid clutter
  - Keep content in the center, above the fold

# Ugly words, and their replacements

utilize – use

currently – now

possess - have

however – but

for the purpose

initiate – start

terminate – end

of – for

interface – meet?

relocate - move

facilitate – help

retain – keep

And never say: **Safe, Zero, Clean**

# Risk communication resources

- **CDC Risk Communication Series**  
[https://emergency.cdc.gov/cerc/ppt/CERC\\_Spokesperson.pdf](https://emergency.cdc.gov/cerc/ppt/CERC_Spokesperson.pdf) ow  
your stakeholders
- **OSHA QuickCards**  
(<https://www.osha.gov/pls/publications/publication.athruz?pType=Types&pID=6>)
- **Training, certification, and degree programs are available at many universities**

Thank you!  
Any questions?



Rich Hubner

December 13, 2018

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