

Communicating risk and uncertainty: the role of metaphor and analogy

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university of cambridge*

EFSA Meeting: 2012

With thanks to Mike Pearson

Running themes / ideology

- Quantified risks are constructed on the basis of current knowledge
- Inevitably also have (unquantified) uncertainty
- Any communication is a narrative/metaphor

Spiegelhalter DJ, Short I and Pearson MP (2011)

Visualisation of uncertainty about the future.

Science **333**, 1393-1400

Spiegelhalter DJ and Riesch H (2011)

Don't know, can't know: embracing deeper uncertainties when analysing risks.

Phil Trans Roy Soc A **369**, 4730-4750



European Food Safety Authority

EFSA Journal 2012;10(5):2664

SCIENTIFIC OPINION

Scientific Opinion on Risk Assessment Terminology¹

EFSA Scientific Committee^{2,3}

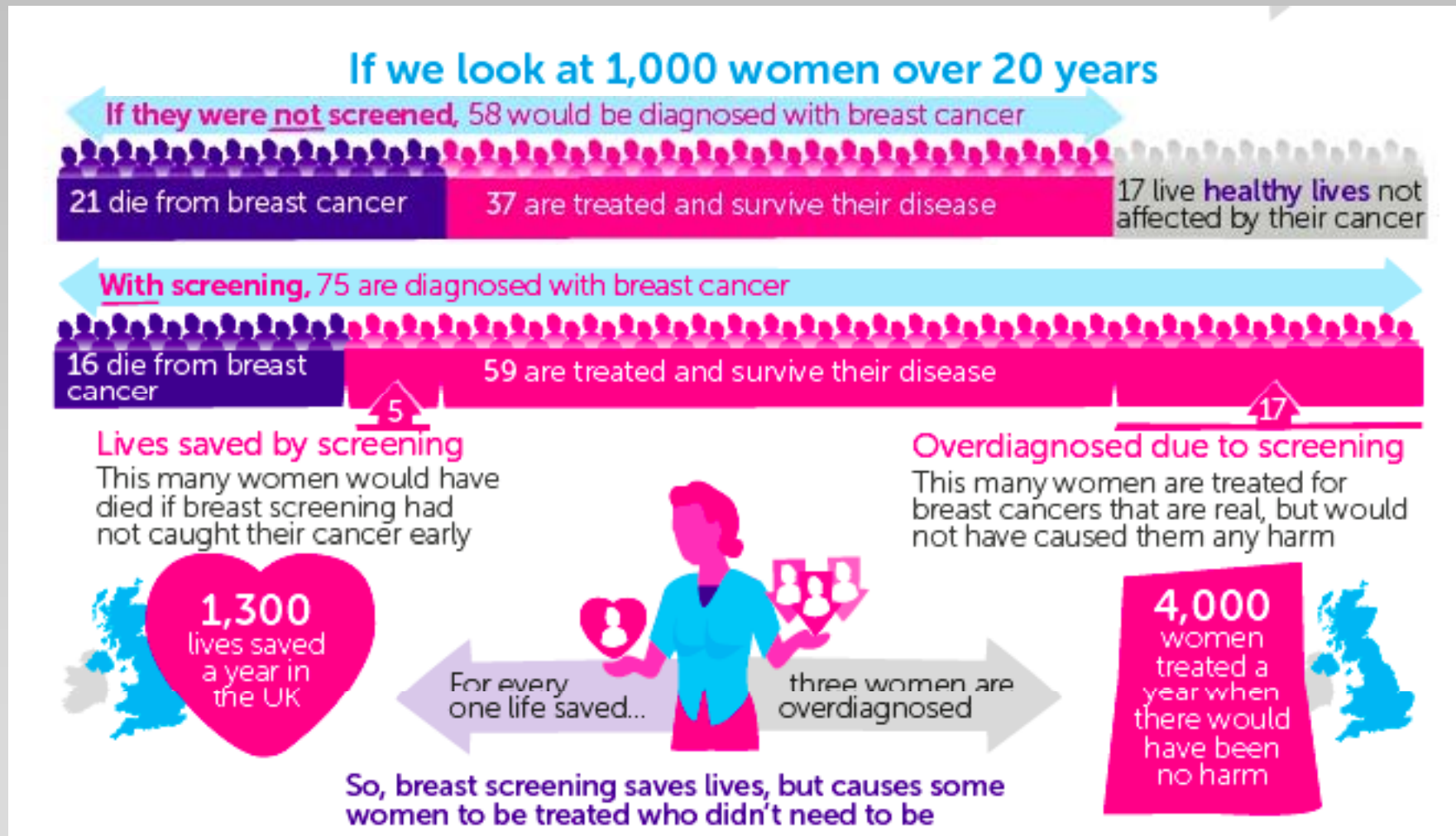
European Food Safety Authority (EFSA), Parma, Italy

Some ideas for language for risk and uncertainty

- "Out of 1000 people like you.."
- "In the country .."
- "Possible futures"
- "Chance of being wrong.."
- "How confident are you?"
- "About the same as.."
- "How fast are you ageing?"

'1,000 people like you'

Breast cancer screening controversy



“In the country..”



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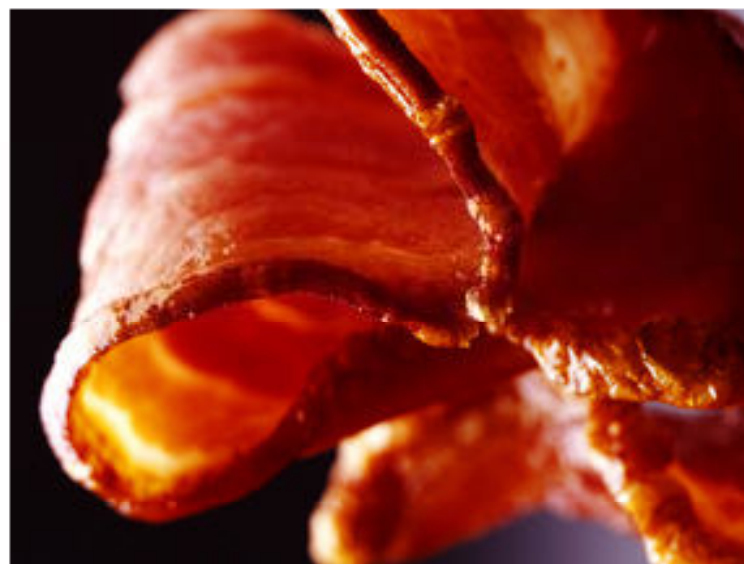
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UK NEWS

DAILY FRY-UP BOOSTS CANCER RISK BY 20 PER CENT



We may love a fry-up but there are serious health risks

Friday January 13, 2012

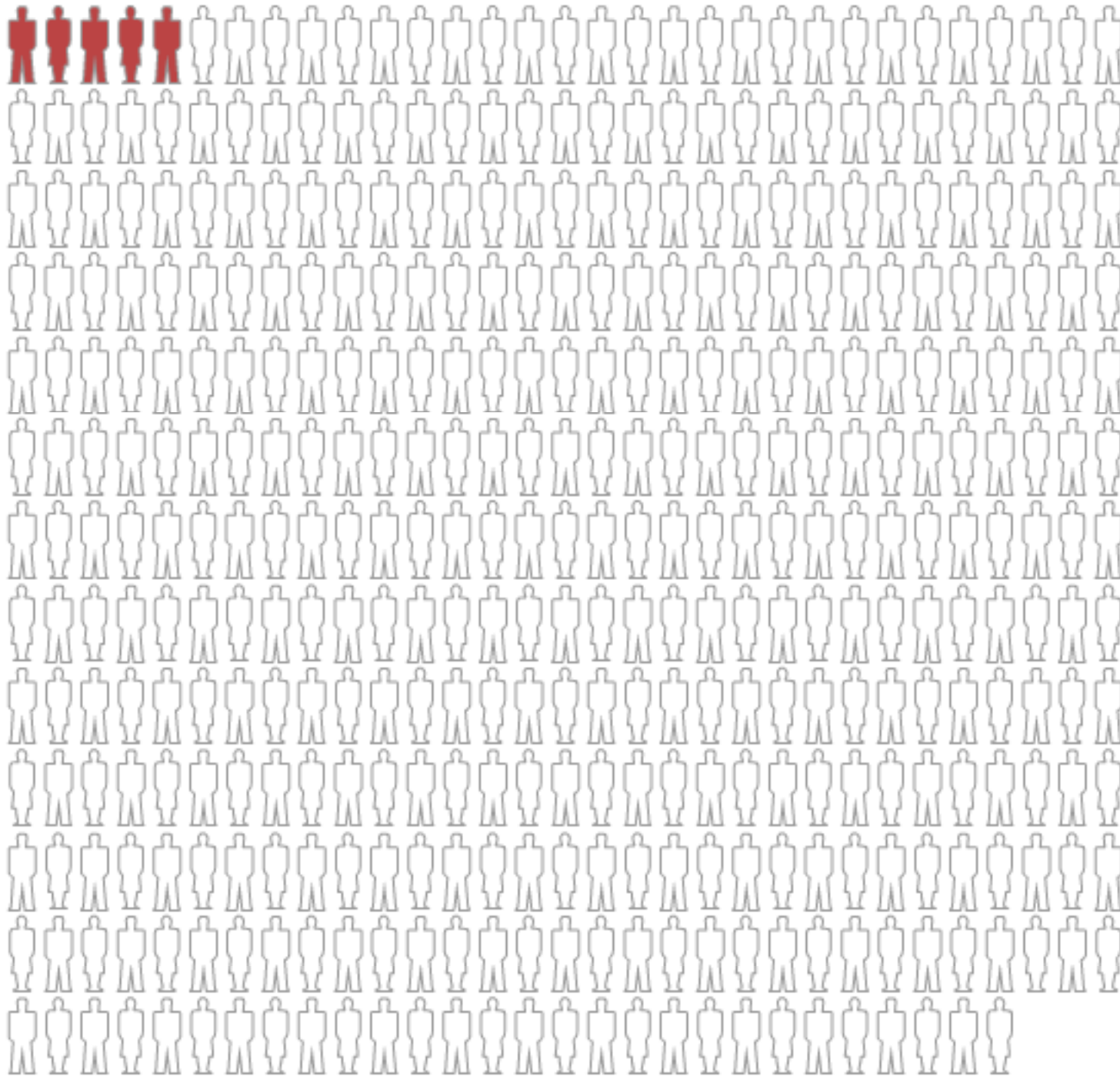
By Jo Willey, Health Correspondent

Have your say(5)

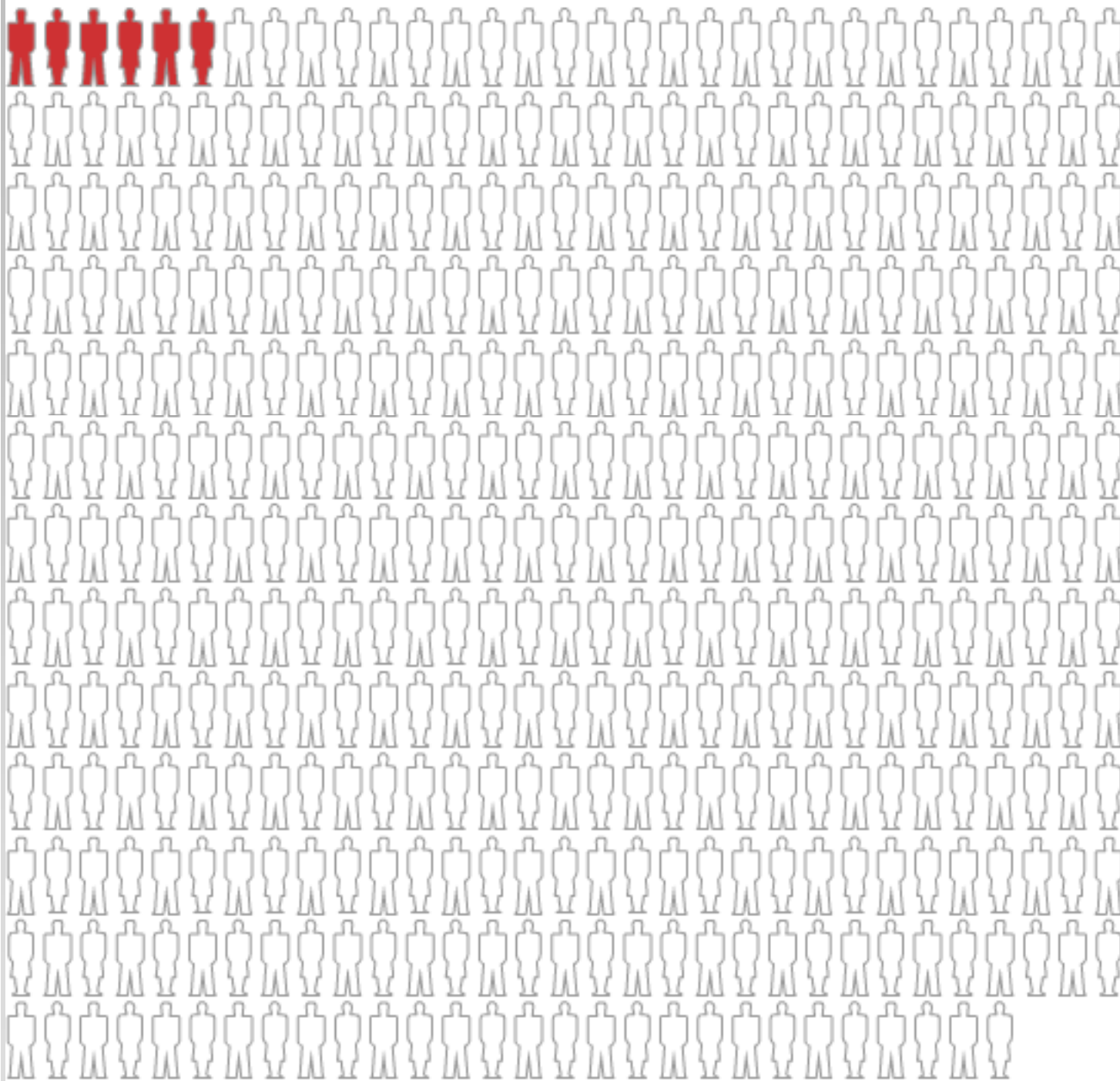
A DAILY breakfast fry-up can significantly increase the risk of developing one of the most deadly cancers.

It is enjoyed by millions every day. But the traditional meal raises the chances of pancreatic cancer by almost a fifth, according to a new study.

3 people recommend this Be the



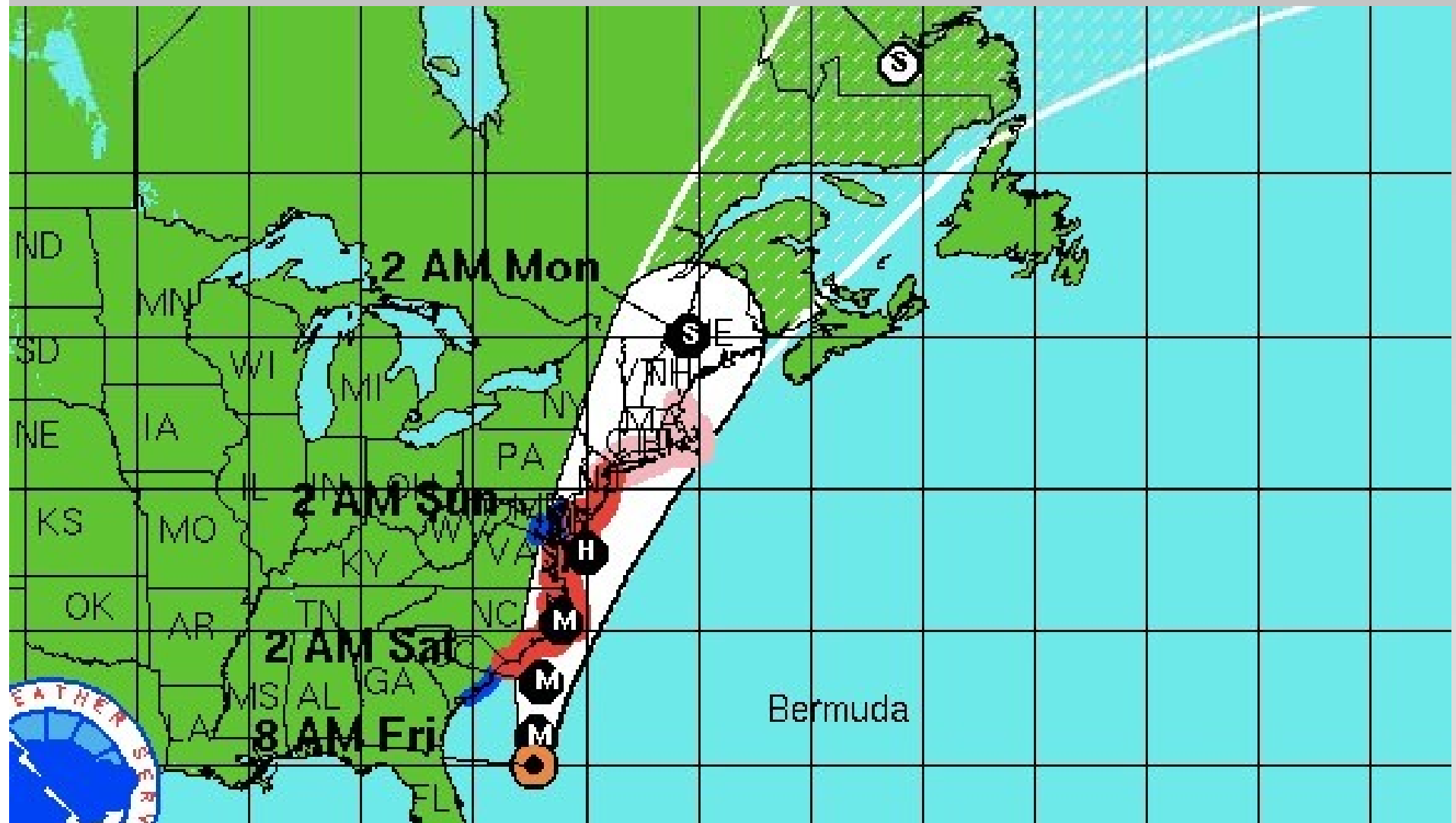
400 people
NOT eating a
bacon
sandwich
each day



400 people
eating a
bacon
sandwich
each day

'Possible futures metaphor'

2011: Hurricane Irene

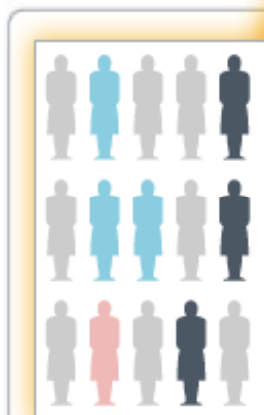
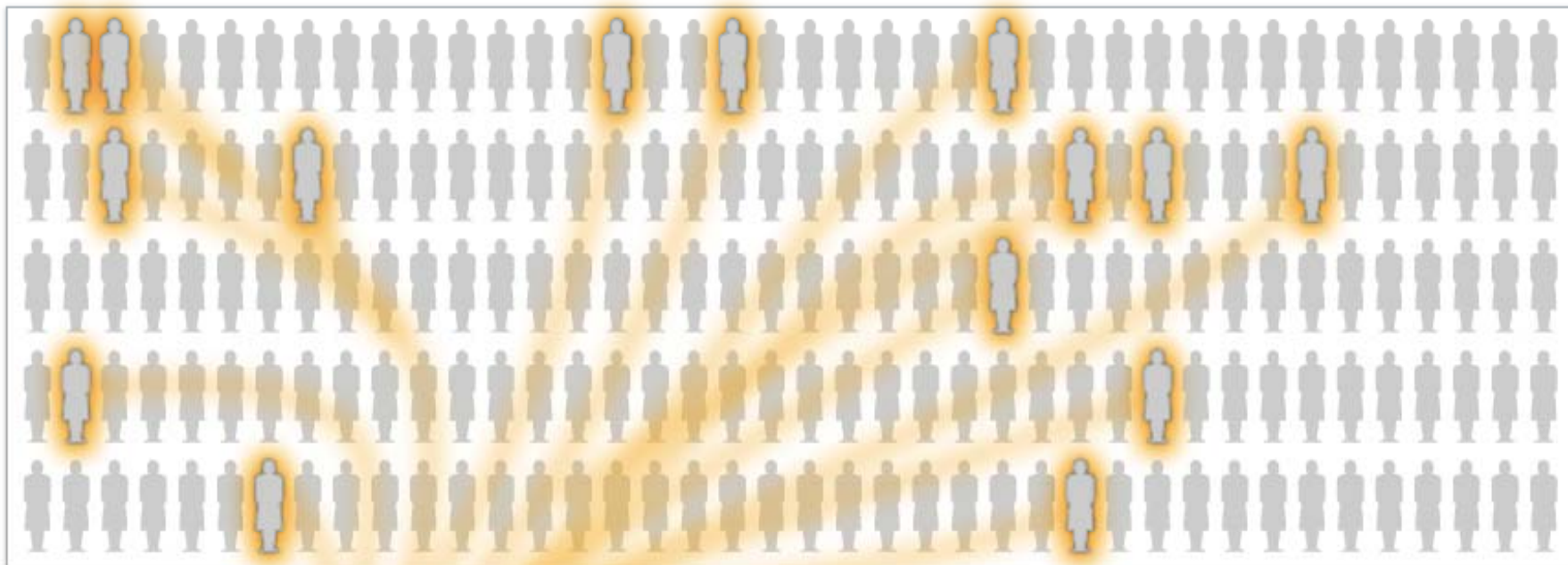


2011: NBC News for Hurricane Irene



'Possible
futures'
metaphor

200 ways things might turn out for you



15 receive
treatment
for cancer



3 would never have needed
treatment if not screened



1 would have died
if not screened



3 die early from cancer

"Chance of being wrong"

On Monday, I thought Obama would win the election.

But I reckon there was a 14% chance I would be wrong.

FiveThirtyEight Forecast

Updated 1:26 AM ET on Nov. 5

President
Nov. 6 Forecast

President
Now-cast

Senate
Nov. 6 Forecast

Barack Obama

Mitt Romney

307.2

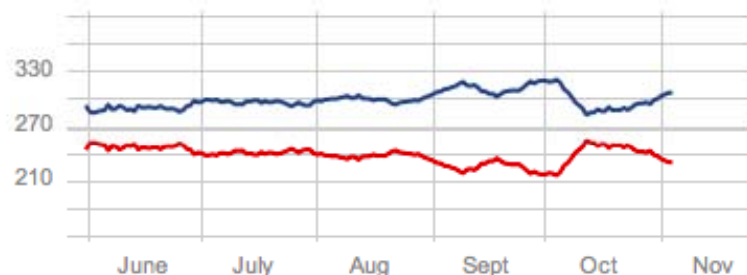
+10.6 since Oct. 28

Electoral
vote

230.8

-10.6 since Oct. 28

270 to win



86.3%

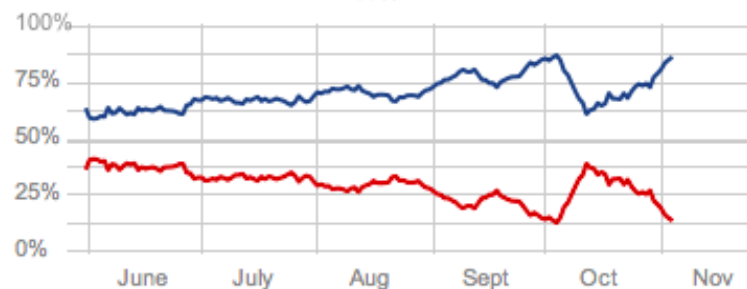
+11.7 since Oct. 28

Chance of
Winning

13.7%

-11.7 since Oct. 28

50%



FiveThirtyEight Forecast

Updated 4:00 AM ET on Nov. 6

President
Nov. 6 Forecast

President
Now-cast

Senate
Nov. 6 Forecast

Barack Obama

Mitt Romney

314.6

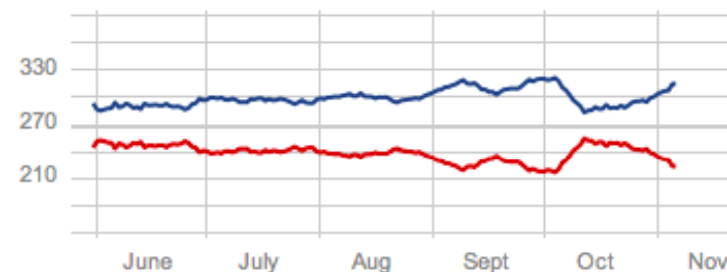
+15.6 since Oct. 30

Electoral
vote

223.4

-15.6 since Oct. 30

270 to win



91.6%

+14.2 since Oct. 30

Chance of
Winning

8.4%

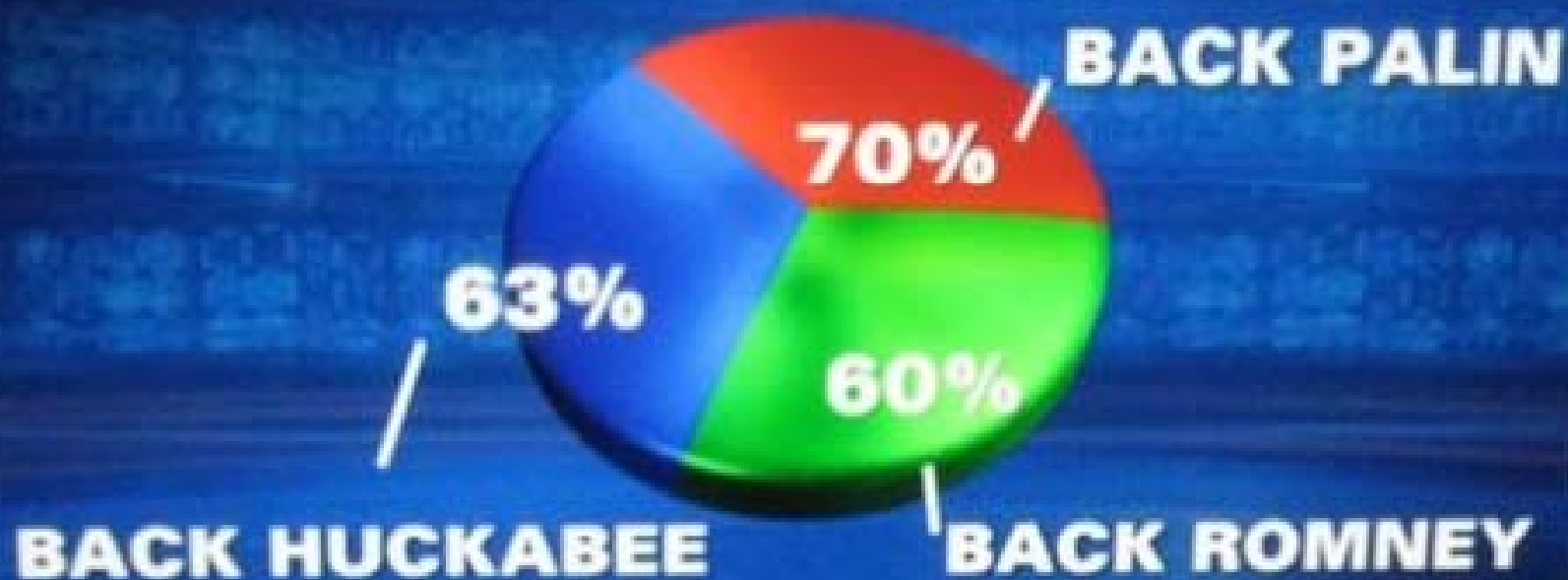
-14.2 since Oct. 30

50%



2012 PRESIDENTIAL RUN

GOP CANDIDATES



FOX

47'

SOURCE: OPINIONS

DYNAMIC

"How confident are you?"

Guidance Note for Lead Authors of the IPCC Fifth Assessment Report on Consistent Treatment of Uncertainties

A level of *confidence* is expressed using five qualifiers: "very low," "low," "medium," "high," and "very high." It synthesizes the author teams' judgments about the validity of findings as determined through evaluation of evidence and agreement. Figure 1 depicts summary statements

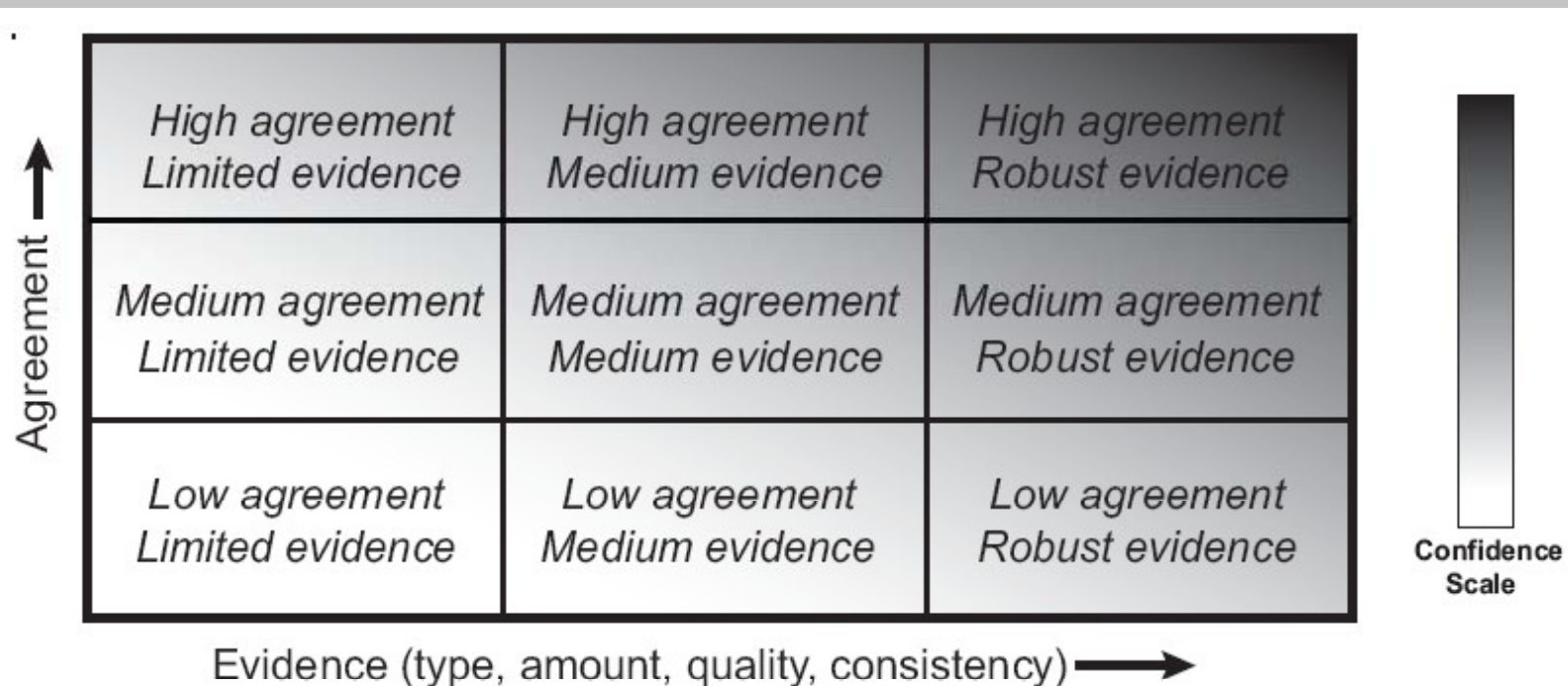


Figure 1: A depiction of evidence and agreement statements and their relationship to confidence. Confidence increases towards the top-right corner as suggested by the increasing strength of shading. Generally, evidence is most robust when there are multiple, consistent independent lines of high-quality evidence.

Table 1. Likelihood Scale

Term*	Likelihood of the Outcome
<i>Virtually certain</i>	99-100% probability
<i>Very likely</i>	90-100% probability
<i>Likely</i>	66-100% probability
<i>About as likely as not</i>	33 to 66% probability
<i>Unlikely</i>	0-33% probability
<i>Very unlikely</i>	0-10% probability
<i>Exceptionally unlikely</i>	0-1% probability

Match precision of reporting to expression of uncertainty , e.g.

D) A range can be given for a variable, based on quantitative analysis or expert judgment: Assign likelihood or probability for that range when possible; otherwise only assign confidence (see Paragraphs

Explaining and Proclaiming Uncertainty:
Risk Communication Lessons from
Germany's Deadly *E. coli* Outbreak

by Peter M. Sandman and Jody Lanard

Home News Health News

Killer cucumber bug is mutant E. coli strain

by Mike Swain, Daily Mirror 3/06/2011

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Sandman's 4 conclusions

1. Don't just acknowledge the uncertainty, proclaim it

1. Proclaim how uncertain you are – from
– *"I'm taking a shot in the dark here"* to
– *"I'm almost certain but there are still a few remaining doubts to clear up."*

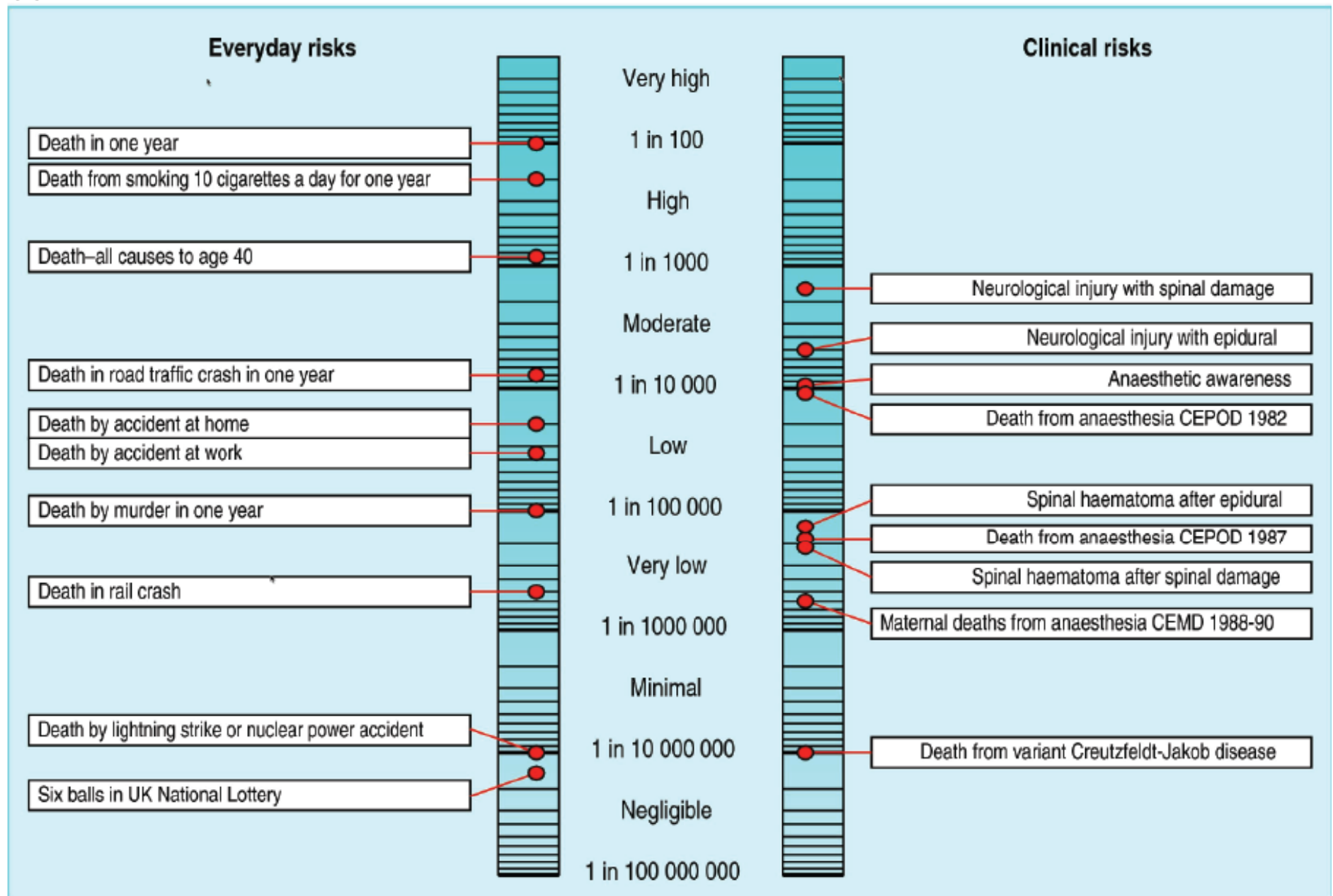
2. Distinguish your level of uncertainty now from the level of uncertainty earlier

1. Come across as human

"About the same as.."

- Need great caution in risk comparisons
- But multiple comparisons can help tell a story

(A)



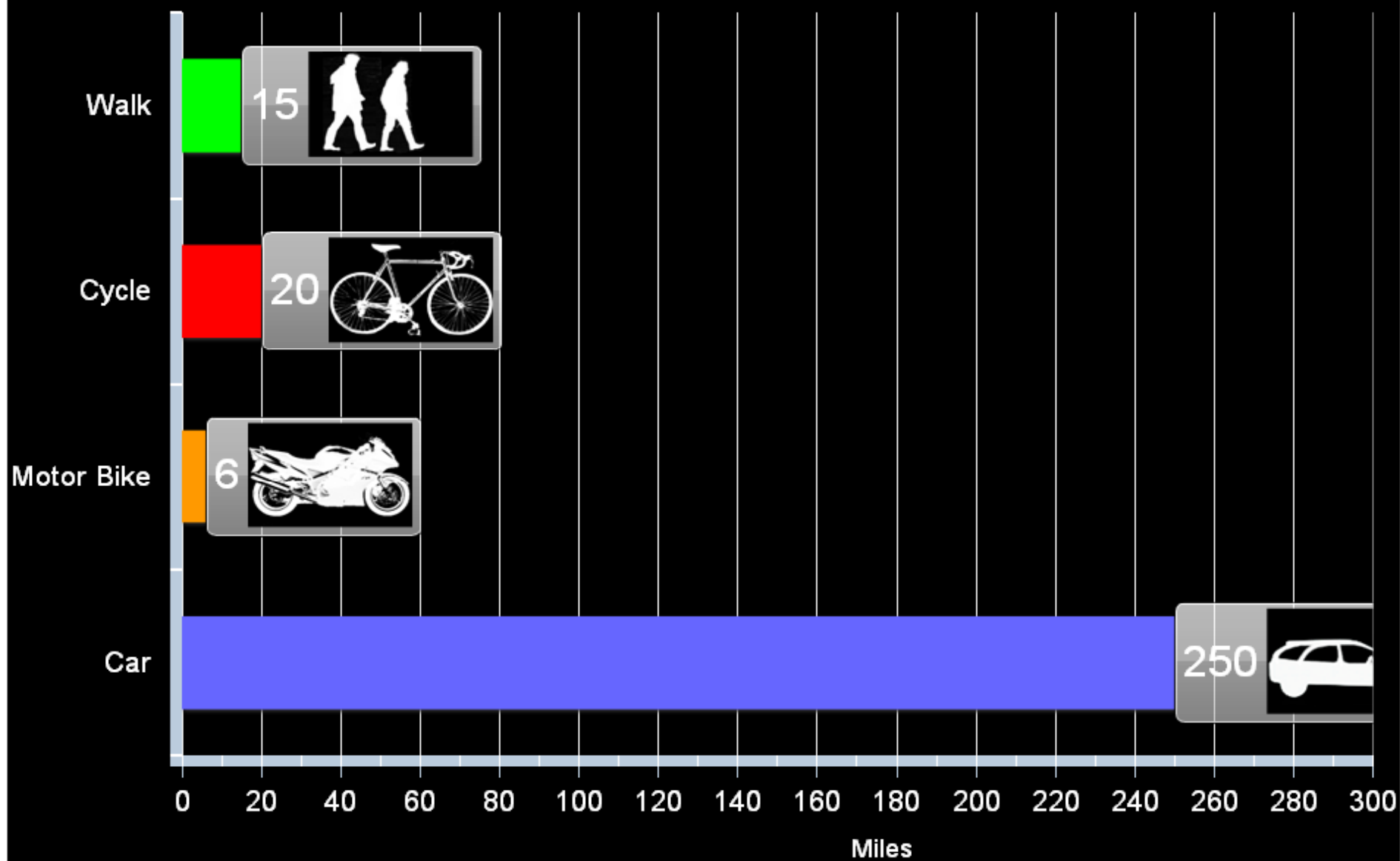
Acute risks

A

Micromort

is a 1-in-a-million chance of dying

How far can you travel per micromort?



Chronic risks



'Life expectancy'

'13% increase on hazard per daily portion of red meat'



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Red meat dram death from heart scientists claim

But replacing meat with nu



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UK NEWS

LESS MEAT, MORE VEG IS THE SECRET FOR LONGER LIFE



Tuesday March 13, 2012

By Jo Willey, Health Correspondent

Have your say(2)

A DIET packed with fish, chicken, fruit and vegetables, rather than red meat, can help you live longer and ward off a host of chronic diseases, researchers claim.

Scientists say the secret to a long and healthy life is slashing the amount of red meat we eat and replacing it with fish, chicken, nuts, beans, low-fat dairy and whole grains.

Scientists say the secret to a long and healthy life is slashing the amount of red meat we eat and replacing it with fish, chicken, nuts, beans, low-fat dairy and whole grains.

If people cut down the amount of red meat they eat – such as steak or beefburgers – to less than half a serving a day, 10 per cent of all deaths could be avoided, they say.

Recommend 23 people recommend this. Be the first of your friends.

Daily portion of red meat increases annual risk of death by 13% ...

40-year old man's lunch



He expects to live another **40** years

Similar 40-year old man's lunch



He expects to live another **39** years

**live longer
than your
friends.**

froosh
fruit: bottled

'How fast are you ageing?'

Life-expectancy reduced by 1 year

= about 30 minutes off your life expectancy for each day with the habit

= 1 *Microlife*

On
average, 1
microlife
lost from

...



Conclusions

- Analogies and metaphors are powerful tools
- Need to be used carefully
- Multiple narratives/images
- Need both positive and negative framing
- Evaluate impact



1990: John Gummer –
'beef is safe'

1992: three cows in
every 1,000 in Britain
had BSE

1996: government
admits link between
BSE and the human
form of the disease,
new variant CJD



Summary of Sandman

Explain

- that the risk is uncertain
- what you think the probabilities are, and how much confidence you have in your opinion
- what evidence you have to support your view, and what additional evidence you wish you had but don't
- what other experts think, the extent to which they agree or disagree, and the basis for any disagreement
- what you are doing to reduce your uncertainty, and when you might have more information.