UNIVERSITY OF CAMBRIDGE

Key Topics in Risk Communication

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Components of a risk communication

1. **Information about the health consequences of a particular behaviour**
   - **Risk/probability**
   - **Severity**
2. **Information about the recommended behaviour**
   - **What you can do to reduce risk/severity**

Two aims of risk communication

- **Inform people about the risks**
- **Persuade people to change their behaviour**

Relative risks more impressive than absolute risks e.g.

"If you participate in breast screening, you will reduce your chances of dying from breast cancer in the next 10 years by 24%"

"If you participate in breast screening, you will reduce your chances of dying from breast cancer in the next 10 years from 37 in 10,000 to 28 in 10,000"

[Figures from Goyder E et al. Telling people about screening programmes and screening test results: how can we do it better? *Journal of Medical Screening* 2000;7:123-126.]

Multiple reasons for behaviour change

Health risks, especially long-term risks, may not be the most important reasons for changing behaviour

e.g. being more physically active may make people feel better, look better and help with losing weight

Conveying numerical risk information

- **Risk information relates to *groups***
- **Low numeracy: 17 million adults in England have primary school level numeracy (Skills for Life Survey 2011)**
- **Particular problem with understanding probabilities and percentages**

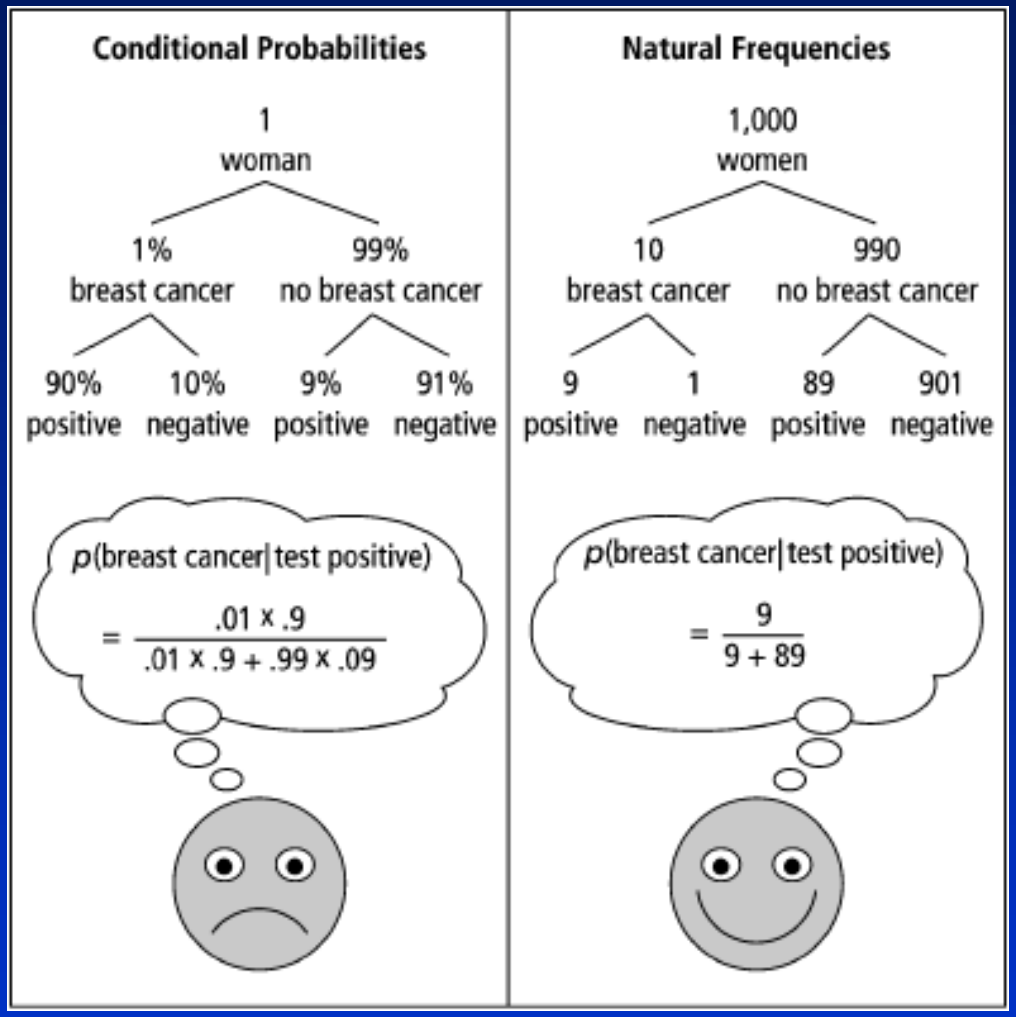
Use frequencies instead of probabilities

(a) Your risk of having a heart attack in the next 10 years is 15%.

(b) Out of a 100 people like you, 15 of them will have a heart attack in the next 10 years.

(c) Out of a 100 people like you, 15 of them will have a heart attack in the next 10 years and 85 won't. (We don't know whether you will be among the 15 who do or the 85 who don't)

- **Many studies have shown improved understanding and performance when risk information is presented in frequency format**
- **People are natural frequentists. Good at estimating and remembering frequencies of events and at using information presented in frequencies (Gigerenzer)**



Gigerenzer G et al. Helping doctors and patients make sense of health statistics. *Psychological Science in the Public Interest* 2008;8:53-96

Alternative measures of risk

“Microlife” = 30 minutes of life expectancy

Lose 1 microlife by

- **Smoking 2 cigarettes**
- **Eating a portion of red meat per day**
- **Being 5kg overweight**

Gain 1 microlife by

- **Taking a statin daily**
- **Having just one alcoholic drink a day**
- **Doing 10 minutes of moderate exercise daily**

Spiegelhalter D. Using speed of ageing and “microlives” to communicate the effects of lifetime habits and environment. *BMJ* 2012;345:e8223.

Alternative measures of risk

“Micromort” = 1 in a million chance of death

Experience 1 micromort by

- Driving 230 miles by car
- Riding 6 miles on a motorbike
- Travelling 1500 miles by train
- Taking 3 flights
- Taking ecstasy once
- Going horse riding twice

Hang-gliding (8 micromorts every time you go up)

Scuba-diving (5 micromorts for each trip down)

Graphical presentation of risk

- **Experts in risk communication recommend the use of visual representations of risk to aid understanding and recall**

  Edwards A et al . Explaining risks: turning numerical data into meaningful pictures. *BMJ* 2001:324:827-830

- **Evidence is mixed**

Psychology Experiment - Health Risk Communication - Tiscali 10.0

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So, the blue people represent the number of people who have cardiac events among 100 average 23 year-old females, and the red people that you are to add to the diagram will represent the extra people who would have cardiac events if they all had the same risk as you.

Feedback

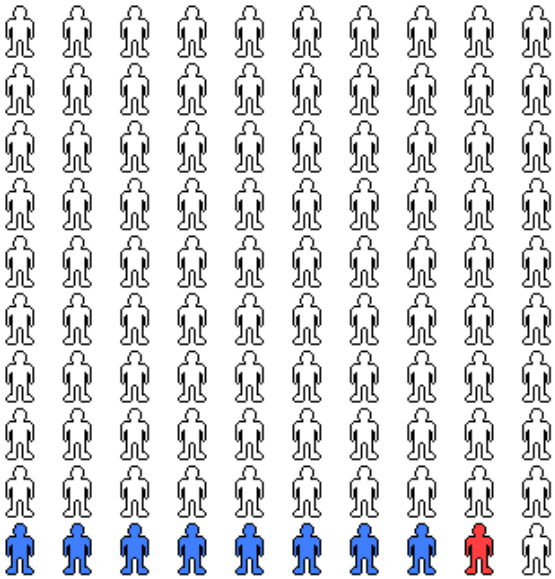
The diagram currently shows an average risk of 8%, and a personal risk of 9%.

Continue

Java Applet Window

Average 23 year-old female's 10-year risk: 8%

Your 10-year risk: 10%



Up Down Check Values

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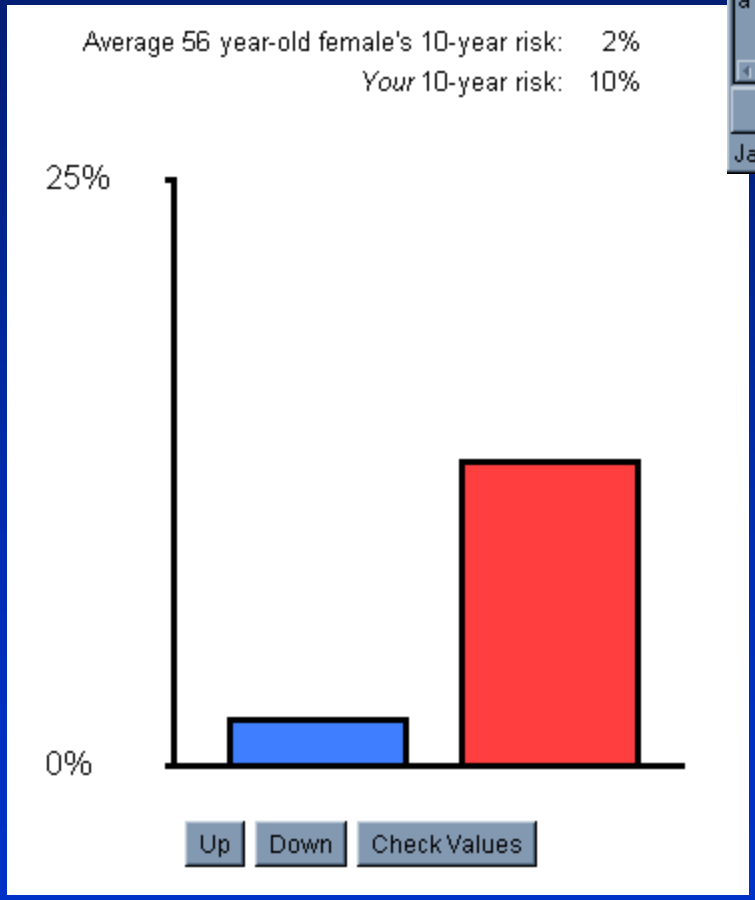
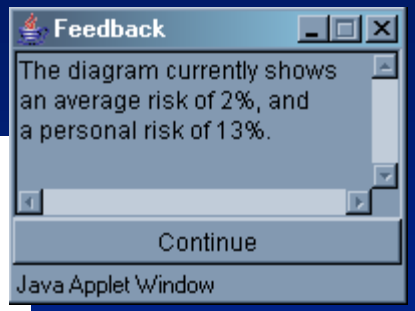

Average 56 year-old female's 10-year risk: 2%
Your 10-year risk: 10%
25%
0%
Up
Down
Check Values


Feedback
The diagram currently shows an average risk of 2%, and a personal risk of 13%.
Continue
Java Applet Window

Please read the text below. Try to pay close attention to the information and imagine that the person in the story is you. In a moment you will be asked some questions about how well you understood the information.

We would like you to **IMAGINE VIVIDLY** that you are at a consultation with your family doctor. The doctor conducts some tests, including assessments of:

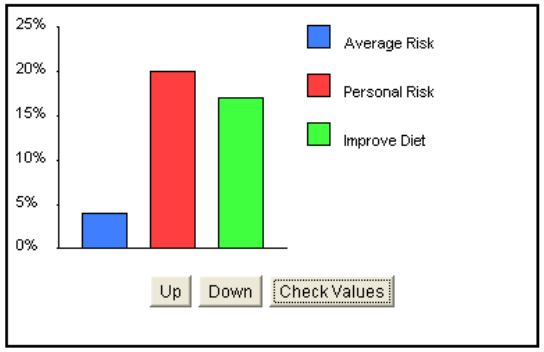
- Your diet;
- How much exercise you get;
- Your blood pressure;
- Whether or not and how much you smoke.

On the basis of this your doctor tells you that your risk of having a cardiac event (such as a heart attack, angina, heart failure) in the next 10 years is 20%. Your doctor also tells you that, on average, a year-old female has a 4% risk of having a cardiac event in the next 10 years.

You and your doctor discuss ways in which you could reduce your risk of having a cardiac event. Your doctor tells you that if you improved your diet, you could reduce your risk of having a cardiac event in the next 10 years to 16%. Or, if you got more exercise, you could reduce your risk of having a cardiac event in the next 10 years to 12%. Finally, if you improved your diet *and* got more exercise, you could reduce your risk of having a cardiac event in the next 10 years to 8%.

Your doctor presents this information to you using the following three diagrams on a computer screen. In each case the diagram shows part of the information and your doctor invites you to use the buttons provided to fill in the missing information.

In the first diagram, the red bar shows *your* risk of having a cardiac event in the next 10 years, and the blue bar shows the risk for the average year-old female. You should use the buttons provided to change the height of the green bar so that it shows what you could reduce your risk to if you improved your diet (16%). Use the *Up* and *Down* buttons to change the height of the bar. You can use the *Check values* button to get feedback about what values the diagram is displaying at any point. When you are satisfied that the diagram is showing the correct information, move on to the next diagram, below.



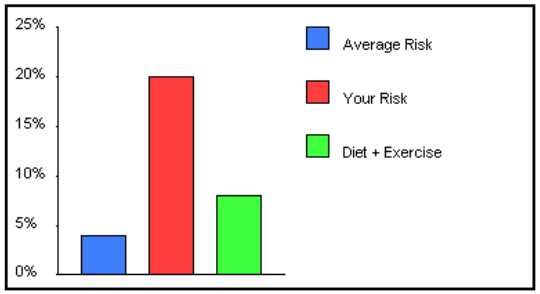
In the second diagram, as before, the red bar shows *your* risk of having a cardiac event in the next 10 years, and the blue bar shows the average risk. This time you should use the buttons provided to change the height of the green bar so that it shows what you could reduce your risk to if you got more exercise (12%). When you are satisfied that the diagram is showing the correct information, move on to the next diagram, below.

- How much exercise you get;
- Your blood pressure;
- Whether or not and how much you smoke.

On the basis of this your doctor tells you that your risk of having a cardiac event (such as a heart attack, angina, heart failure) in the next 10 years is 20%. Your doctor also tells you that, on average, a 56 year-old female has a 4% risk of having a cardiac event in the next 10 years.

You and your doctor discuss ways in which you could reduce your risk of having a cardiac event. Your doctor tells you that if you improved your diet, you could reduce your risk of having a cardiac event in the next 10 years to 16%. Or, if you got more exercise, you could reduce your risk of having a cardiac event in the next 10 years to 12%. Finally, if you improved your diet *and* got more exercise, you could reduce your risk of having a cardiac event in the next 10 years to 8%.

Your doctor summarises this information for you using the diagram below on a computer screen. In the diagram, the red bar shows *your* risk of having a cardiac event in the next 10 years, and the blue bar shows the risk for the average 56 year-old female. The green bar shows what you could reduce your risk to if you took the various courses of action you discussed with your doctor. Your doctor invites you to use the buttons below the diagram to select the various courses of action and see the effect they have on your risk level. You are free to use the buttons to browse through the various options in whatever way and for however long you wish.



○ No Action | ○ Diet | ○ Exercise | ◉ Diet + Exercise

Once you have **VIVIDLY IMAGINED** this situation, and you are satisfied that you understand the information presented, please click the button below and complete the questions on the next page.

Note: you will not be able to return to this information once you proceed to the questions, so please make sure you have read it, understood it and vividly imagined it before continuing.

Start answering questions

Graphical presentation of risk

- **Series of web-based experiments on participants aged 40-65 recruited by a research agency.**

- **Measured numeracy and varied format of risk information. Outcome measure: recall of risk information one week later – "gist" measure: % who correctly recalled a personal risk value that was higher than the average risk value**

- **Overall correct recall was 50-60%. Numerate participants did better. In most cases graphics didn't help. Where they did help, they only benefited the most numerate participants**

Mason D et al. One-week recall of health risk information and individual differences in attention to bar charts. *Health, Risk & Society* 2014;16:136-153.

Alternative approach: avoid numbers

- **Describe risk in qualitative terms e.g.**

  "Very likely", "higher than average", "low risk" etc.

- **Use visualisations to show risk in qualitative terms e.g. traffic light system**

Unrealistic optimism (optimistic bias)

Many studies have used *comparative* risk measures e.g.

Compared with other people of your age in Britain, do you think your own chances of getting heart disease are...

Much lower Lower A bit lower About the same A bit higher Higher Much higher

Typical finding is that, on average, people rate their risk as lower than that of other people.

But the methods have been criticised by Harris & Hahn (2011), who argue that, although the idea is plausible, unrealistic optimism has not yet been definitely demonstrated.

Harris AJL, Hahn U. Unrealistic optimism about future life events: A cautionary note. *Psychological Review* 2011;118:135-154.

Risk perceptions and behaviour

If we change people's risk perceptions, will this lead to behaviour change?

A recent meta-analysis identified experimental studies that produced a significant increase in risk appraisals and measured subsequent intention or behaviour.

Used a broad definition of risk appraisal:

***Risk perceptions*: "How likely are you to become obese in the future?"**

***Anticipatory emotions*: "The possibility of becoming obese in the future makes me feel anxious"**

***Anticipated emotions*: "I would feel ashamed if I became obese in the future"**

***Perceived severity*: "The consequences of becoming obese in the future would be *not at all serious-extremely serious*"**

Sheeran P et al. Does heightening risk appraisals change people's intentions and behavior? A meta-analysis of experimental studies. *Psychological Bulletin* 2014;140:511-543.

Risk perceptions and behaviour

Heightening risk appraisals had effects of 0.31 on intention and 0.23 on behaviour.

Heightening risk perceptions had larger effects on outcomes when anticipatory emotions or perceived severity was also increased.

There were also larger effects on outcomes when response efficacy and self-efficacy were also increased.

Message framing

***Gain frame*: benefits of engaging in a behaviour**

***Loss frame*: costs of failing to engage in a behaviour**

"Protecting yourself from the sun is the surest way to prevent skin cancer"

"Exposing yourself to the sun is the surest way to get skin cancer"

[Detweiler JB et al. Message framing and sunscreen use: Gain-framed messages motivate beach-goers. *Health Psychology* 1999;18:189-196.]

Recent meta-analysis of experimental studies showed that gain frame was more effective than loss frame for prevention behaviours (r = .083)

Gallagher KM, Updegraff JA. Health message framing effects on attitudes, intentions, and behavior: A meta-analytic review. *Annals of Behavioral Medicine* 2012;43:101-116.

‘Scare tactics’ or fear appeals

Emphasise the negative consequences of a given behaviour (particularly severity), using text and/or graphics

e.g. depicting the adverse health effects of smoking

Common objections to fear appeals

- They are unethical
- They don’t work
- They are counter-productive

Evidence from campaign evaluations

Australian National Tobacco Campaign (1997)

- Tried to convey the health risks in new ways
- Campaign was comprehensively evaluated and seemed to be effective

Scare tactics cut smoking rates in Australia to all time low

Simon Chapman, *Sydney*

Australia's smoking rate, which was stalled throughout the 1990s with around 25% of adults found in several surveys to be smoking, has recommenced its downward slide. The national prevalence of adult smoking has now fallen to 22%, the lowest figure ever recorded.

Australia, like the United Kingdom, Canada, and the United States had experienced a decade long lull in its decline in the prevalence of smoking.

On World No Tobacco Day this week, health minister Michael Wooldridge announced the results of the evaluation of the controversial "Every cigarette is doing you damage" national media campaign which ran from June to November 1997, and which cost $A7m (£2.9m; $4.6m).

The campaign has run sporadically since 1997. The television advertisements took viewers inside the bodies of smokers in their 30s to see the damage caused by smoking.

The advertisement found to be most motivating to smokers showed a surgeon's gloved hand squeezing a yellow atheroma out of an aorta at necropsy. Described by smokers as something you "see once and never forget," the advertisements have renewed debate about the conventional wisdom that scare tactics "don't work" in health promotion.

Scare campaigns have also been used to spearhead the public awareness component of Australia's road safety campaign, which has similarly seen the toll of road deaths reach its lowest point.

All of the antismoking television advertisements gave viewers a telephone number on quitting smoking; the evaluation of the campaign reports that 1 in 4 callers continued to abstain from smoking one year later.

Although the campaign was targeted at adult smokers, evidence emerged that it had also had a powerful effect on teenagers. The campaign is now being run in Massachusetts, United States; Singapore; New Zealand; and British Columbia.

In September last year, deregulation of nicotine replacement treatment saw two pharmaceutical companies, Pharmacia Upjohn and SmithKline Beecham, together spend more than the government on advertising directly to consumers. Sales of nicotine replacement therapy aids rose spectacularly as a result. □

Further information can be found at www.quitnow.info.au.

Experimental evidence

- **"A persuader should promote high levels of threat and high levels of efficacy to promote attitude, intention, and behavior changes."**
- **"Fear appeals motivate attitude, intention, and behavior change – especially fear appeals accompanied by high-efficacy messages. Therefore they can be quite useful to practitioners…..practitioners can easily make their fear appeals effective by providing high-efficacy messages."**
- **Conclusions consistent with Sheeran et al (2014) review**

Witte K, Allen M. A meta-analysis of fear appeals: Implications for effective public health campaigns. *Health Education & Behavior* 2000;27:591-615.