

# Effective Risk Communication about Food Safety

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# Food Safety and Risk Perception

## What determines consumer perceptions?

### Key questions

- How do people perceive food risks?
- How does this relate to technical risk estimates?
- To whom are the risks perceived the risks accrue?
  - *Industry?*
  - *The consumer?*
  - *Societal impacts (e.g. Food security and the planet).*



# Differences between expert and consumer/citizen perceptions of risk

- **Experts**

- Rely on technical risk assessments
- Use scientific argumentation which does not take account of socio-economic impacts
- In theory, balance risk against benefits (but it is not always clear how socio-economic benefits, or even technical benefits, are assessed).



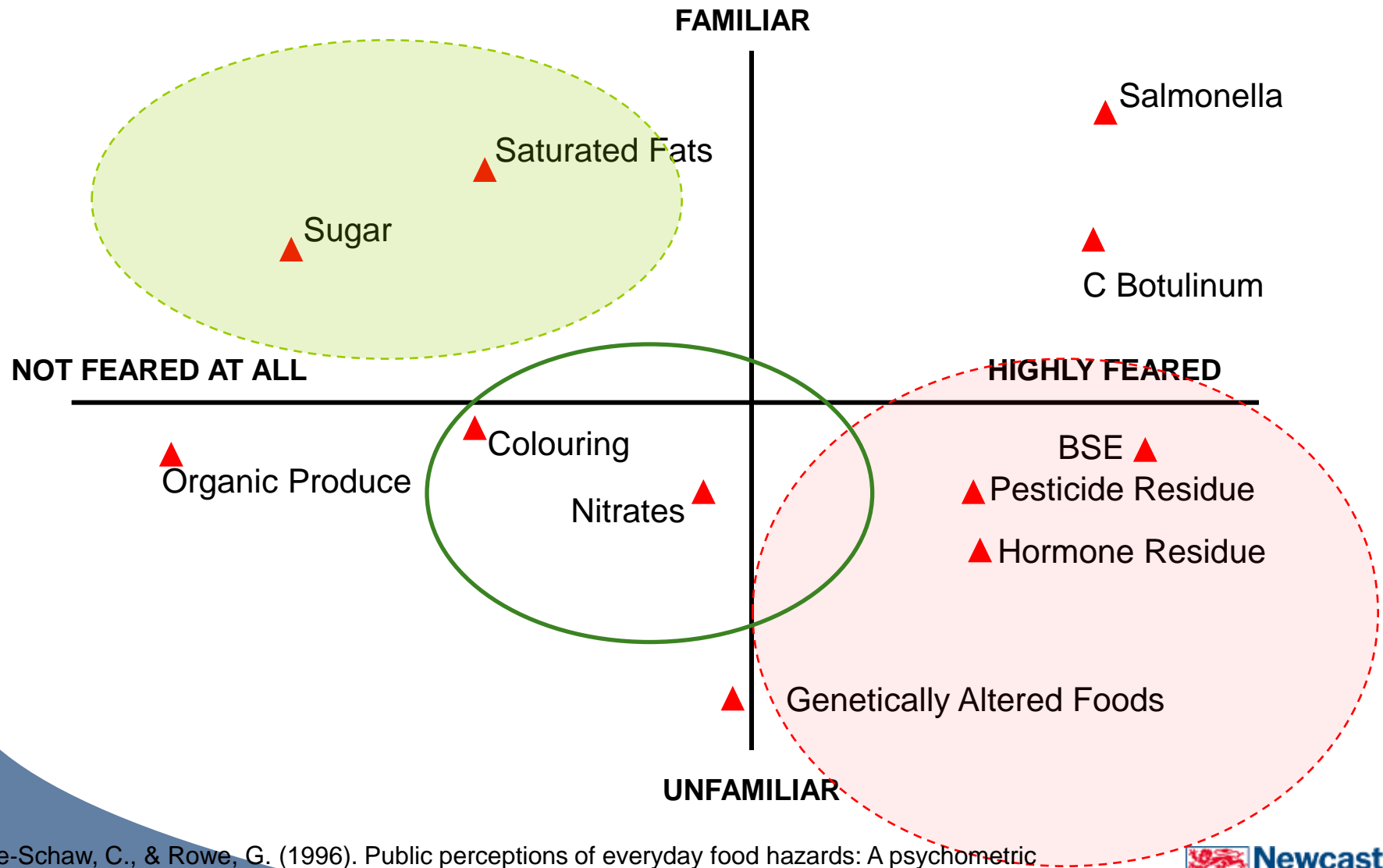
- **Public**

- Use their risk perceptions to make judgements about risk
- Require risk communication to take account of their concerns as well as technical risk estimates
- Emotional (or affective) responses are important.



Frewer, L. J., Bergmann, K., Brennan, M., Lion, R., Meertens, R., Rowe, G., ... & Vereijken, C. (2011). Consumer response to novel agri-food technologies: implications for predicting consumer acceptance of emerging food technologies. *Trends in Food Science & Technology*, 22(8), 442-456.

# Assessing perceptions of food risks - Results of survey research



Fife-Schaw, C., & Rowe, G. (1996). Public perceptions of everyday food hazards: A psychometric study. *Risk Analysis*, 16(4), 487-500.

# Risk Perception and food in foods

- The psychology of risk perception drives public risk attitudes  
*e.g. an **involuntary risk** over which people have no control is more threatening than one people choose to take*  
*Exposure to milk contaminated by melamine*  
*UNLABELLED food additives*
- Potentially **catastrophic** risks concern people most  
*BSE in cattle and new variant CJD*  
*Potentially **food additives**?*
- **Unnatural** (technological) risks are more threatening than natural ones  
*Application of **food technology** to agrifood production*  
*Dioxin contamination of the food chain (e.g. In Belgium and in Ireland)*
- **Ethical representations** and concerns are emerging as an important determinant of consumer decision making  
*Animal welfare,*  
*Environmental impact of agriculture*  
*Equity of distribution of **benefits and risks** of technological innovation*

# The “Sudan I” global recall

“More than 350 food products have been taken off shop shelves after they were contaminated with an illegal food dye”

– BBC, 2005

- The Sudan I dye, linked to an increased risk of cancer, was in chilli powder used by Premier Foods to make a Worcester sauce used in other products.
- The Food Standards Agency has issued a warning advising people not to eat the products but said there was "no need to panic" because of the "very low risk".
- Used for colouring solvents, oils, waxes, petrol, and shoe and floor polishes.
- Not permitted in food in the UK, EU and Australia and New Zealand due to concerns that the dyes may be carcinogenic in animals
- Legal in other parts of the world
- Impacts on human health uncertain

## Message

**“All food additives are potentially dangerous”**



# “Chemicals in food”

- One incident, or category of incidents, signals that all chemicals are bad...





# Food colourings and children

- Tantrum-linked additives in 132 new products - 13 May 2007
- Health experts described the findings as "worrying" and called for the removal of unnecessary additives in all new food and drink products.

*Prof Fergus Lowe - "It is common sense that if food and drink additives pose any risk at all to a child's health, they should not be used."*

Any potential risk involving children's food is therefore perceived to be unacceptable

- The “Southampton six”



CHRISTOPHER PLEDGER

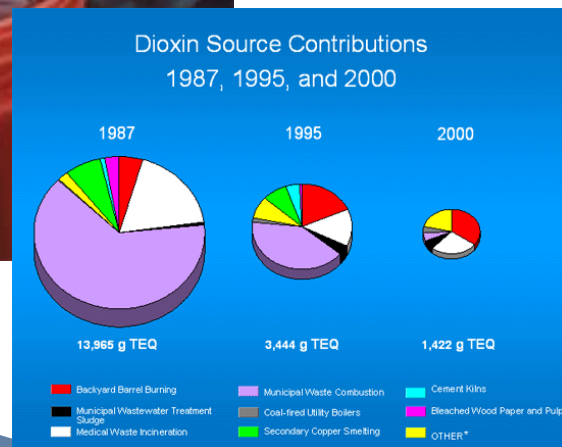
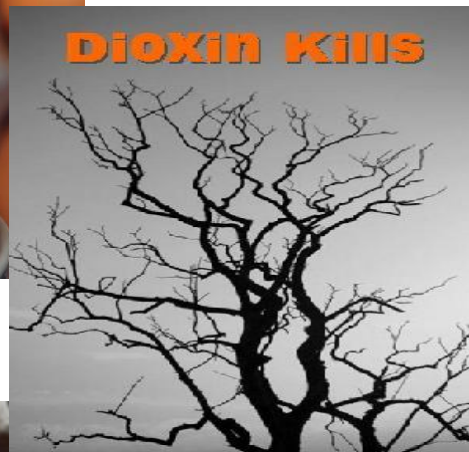


# Dioxins in the environment

Table 1. Documented Dioxin Contamination Incidents

- 1930s-onward Dow Chemical, Michigan
- 1962-1971 Operation Ranch Hand, Vietnam
- 1976 Factory emission, Seveso, Italy
- 1996 SE contamination of broiler flocks with ball clay added to soybean meal as an anti-caking agent, U.S.
- 1998 Milk contamination from citrus pulp imported from Brazil, EU
- 1999 Animal feed contamination with recycled industrial oil, Belgium and adjoining countries
- 2007 Guar gum from India in prepared foods, EU
- 2008 Contamination of hog feed with an ingredient containing industrial oil waste, Ireland

*Wattagnett.com, 2012*



# Recent dioxin-related food safety issues

- Belgium (poultry feed supply chain 1999)



- Ireland (pig feed supply chain 2008)



- Germany (animal feed supply chain 2011)



Harles und Jentzsch plant in northern Germany

# Attitudes to additives and sweeteners in SE Asia

## The views of experts

- Obesity is becoming problematic in the SE Asia Region
- What do Malaysian experts (nutrition and industry) think about use of artificial sweeteners?

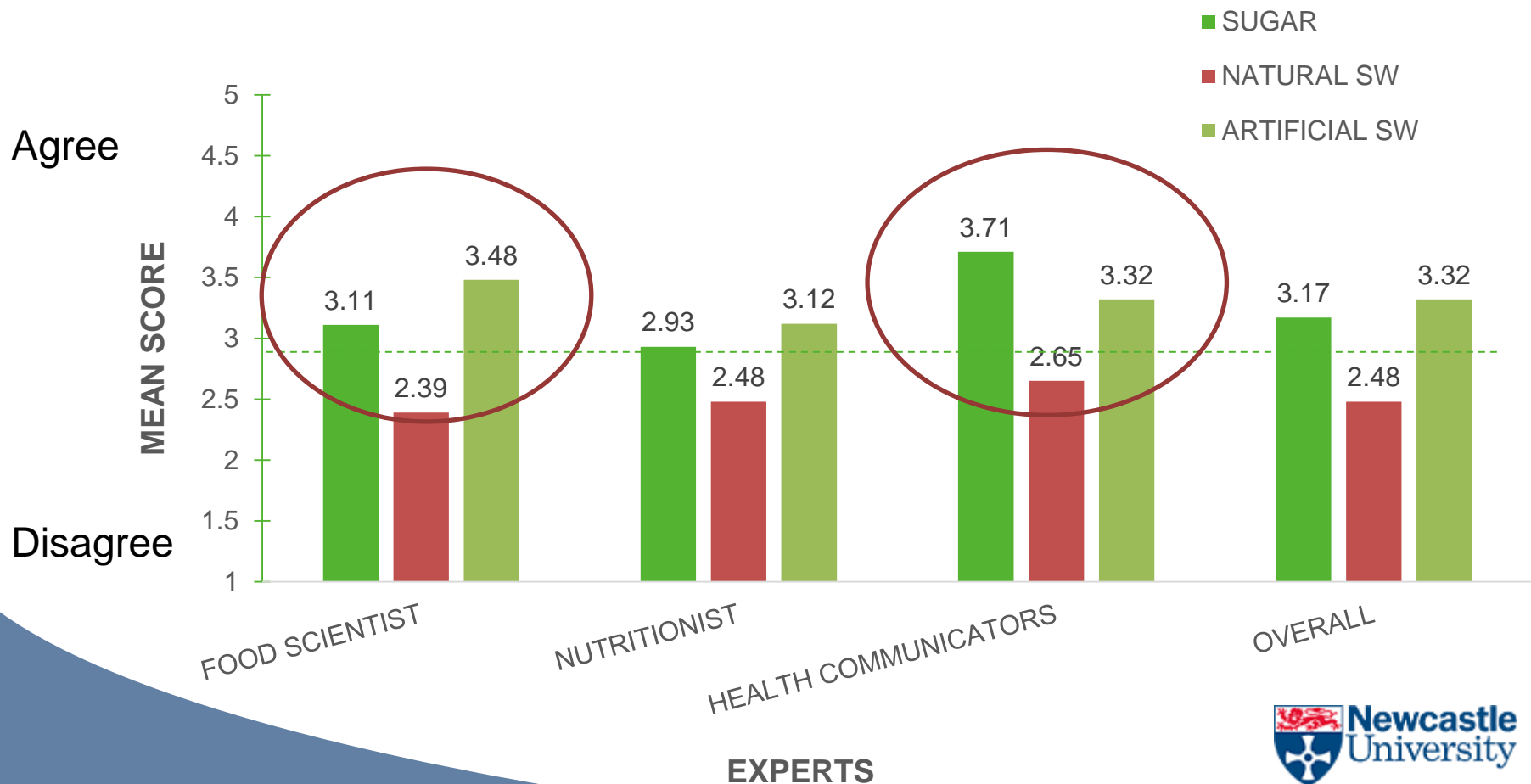
Amin, Hashim, Chan, Ngee, Richards, and Frewer (2015, and in preparation).



# RESPONDENTS

CATEGORY	OPINION LEADER*	n
EXPERT	FOOD SCIENTISTS / TECH.	65
	NUTRITIONISTS / DIETITIANS	57
	HEALTH COMMUNICATORS	34
	TOTAL	156
ORGANIZATION	ACADEMIC / RESEARCH	56
	FOOD INDUSTRIES	25
	FOOD SAFETY & REGULATORY	28
	PUBLIC HEALTH AGENCY	47
	TOTAL	156

The use of the following sweeteners in food and beverage products is **harmful** to human health



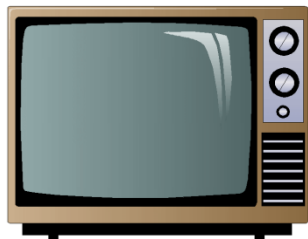
- Overall, all groups of respondents perceived **natural** intense sweeteners as the **least harmful** compared to sugar and **artificial intense sweeteners**
- All organizations and experts believed that **artificial intense sweeteners** were the most harmful, except Health Communicators and Public Health Agency who claim Sugar as the most harmful
- Are the risks perceived by Malaysian opinion leaders associated artificial sweeteners ***outweighing the potential benefits to health?***



# A systematic review of the food risk communication literature

## We are not that good at risk –benefit communication about food issues

- Fifty four papers identified
- Certain food issues were of greater interest to researchers (and *research sponsors*) than others
  - reflecting the occurrence of a crisis, or policy concern.
- Three broad themes relevant to the development of best practice in risk (benefit) communication identified
  - **The characteristics of the target population (CONCERNS)**
  - **The contents of the information (ACCURACY)**
  - **The characteristics of the information sources (TRUST)**





# Inappropriate Pesticide Use

## The issues.....

- Most pesticides are ***toxic to non-target species*** especially if not used in accordance with safety advice
- Occupational exposure occurs either through acute intoxication due to accidents while ***mixing, loading or applying pesticides*** or through ***contact with treated crops***
- Exposure risk increases when operators and workers ***ignore safety instructions*** on how to properly use pesticides
- Little is known about exposure risks to ***residents and bystanders***









Exposure to pesticides above the safe levels represent a significant source of mortality and morbidity worldwide (WHO 2003)



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# Stakeholders, surveys & gender issues

- The literature on the risk perceptions, knowledge levels, and attitudes of operators, workers, and residents in relation to non-dietary exposure to agricultural pesticides was reviewed.
  - No literature was identified in relation to **bystander exposure**
  - Research has primarily been conducted on participants in **developing countries** and **migrant workers in the United States**
  - For operators and workers, **illiteracy, poverty, and a perception that exposure to pesticides is an inevitable part of their work** results in limited adoption of safety precautions while using and storing pesticides.

# Stakeholders, surveys & gender issues

- Risk communication activities aimed at **operator and workers** need to take account of the wider ***socioeconomic and cultural conditions*** in which workers and operators are working and living
- Women workers may be particularly disadvantaged
  - (lack of) education
  - Types of work
  - Genotoxic effects and pregnancy



The lack of European data in general, and residents' and bystanders' data in particular, represents a knowledge gap that is pertinent to emerging EU legislation



# Sampling of operator, worker, resident and bystanders in three European countries



- Red line: Grapevine
- Green line: Greenhouses
- Yellow line: Table grape

Arable crops



# Results

- Low levels of adoption of protective measures by ***residents and bystanders***
  - **Male residents** have lower risk perceptions than female residents
  - **Male residents** are less likely to reduce their exposure to pesticides through behavioural measures
  - **Higher adoption of protective measures by Greek residents** (relative to UK) and bystanders (relative to UK and Italy)
  - *Research is needed into effective risk communication targeting residents and bystanders at risk from pesticide exposure*
- The majority of operators and workers appear ***to engage in self-protective activities***
- Differences within these groups
- Operators who perceived that their health was being ***negatively affected*** by the use of pesticides were found to be ***more likely to take protective measures***



## Results of survey research (2)

- The results are less helpful in addressing some of the other **cultural and linguistic barriers** to pesticide protection
  - *Migrant and illegal workers* excluded from survey
  - *Tourists* excluded from bystander group
- **The problem of language remains**
  - Many of those exposed to the risks associated with pesticides many not be able to understand the dominant language in a particular country
- **Communicating these risks is difficult**
  - Messages communicated using pictograms?



# Risk Communication in the Risk Analysis Process



**Risk assessment** is the process that is used to quantitatively or qualitatively estimate and characterize risk.

**Risk management** is the weighing and selecting of options and implementing controls as appropriate to assure an appropriate level of protection.

**Risk communication** is the exchange of information and opinions concerning risk and risk-related factors among risk assessors, risk managers, consumers and other interested parties.

# Risk Communication applied to food safety handbook

<http://www.fao.org/3/a-i5863e.pdf>

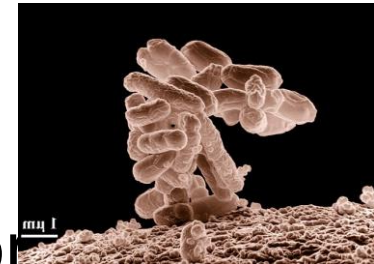


## Principles of Food Safety Risk Communication

- Openness
- Transparency
- Timeliness
- Responsiveness
- All are essential to *establishing* and *maintaining* trust, and contribute to *rebuilding* trust when it is low.

# The Importance of Trust

- Trust is essential for risk communication
  - Many food safety risks are invisible
    - Bacteria
    - Viruses
    - Chemical contaminants
  - Information is often incomplete or uncertain
  - Much of the public cannot understand available information themselves



# The Importance of Trust

- People who distrust food safety risk messages are unlikely to believe or act upon the information.
  - This can have severe health, environmental, agri-food, trade, and economic implications.





# Trust Components

- **Credibility** - The extent to which a source or institution is perceived to have the knowledge and expertise to assess, manage and communicate about a risk.
- **Honesty** - The extent to which a source or institution conveys information about a risk in an open, truthful and transparent way.
- **Care** - Care for the interests of the other party and that the source or institution shares the same values and concerns.

# Openness

- The opportunity for dialogue and engagement with all food stakeholders:
  - Those affected by the food safety problem.
  - Those who may have caused the problem.
  - Those who have the responsibility for solving the problem.

# Transparency

- Policies, practices, and procedures that enable people to understand how decisions on risk assessment, management, and communication have been made.
- Make information accessible (e.g. on websites, available on request, observers):
  - Information on which decisions are made (research reports, data).
  - Documentation about the decision-making process (minutes of meetings).

# Transparency and Openness

- Transparency and openness are not interchangeable
- To ensure best practice in risk communication, both openness and transparency are essential



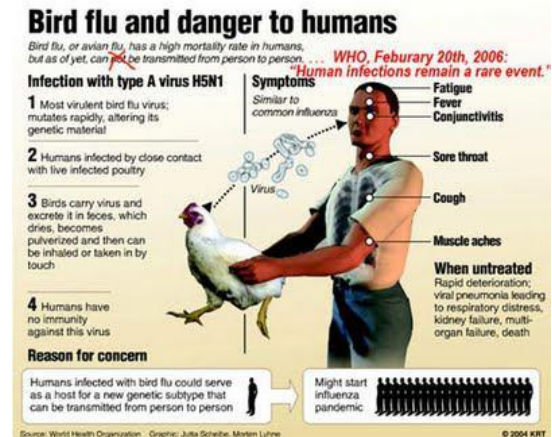
# Timeliness

- Rapid communication:
  - Can prevent or reduce the risks of significant harm to public health.
  - Builds and maintains trust (credibility and care) if it appropriately informs the public.

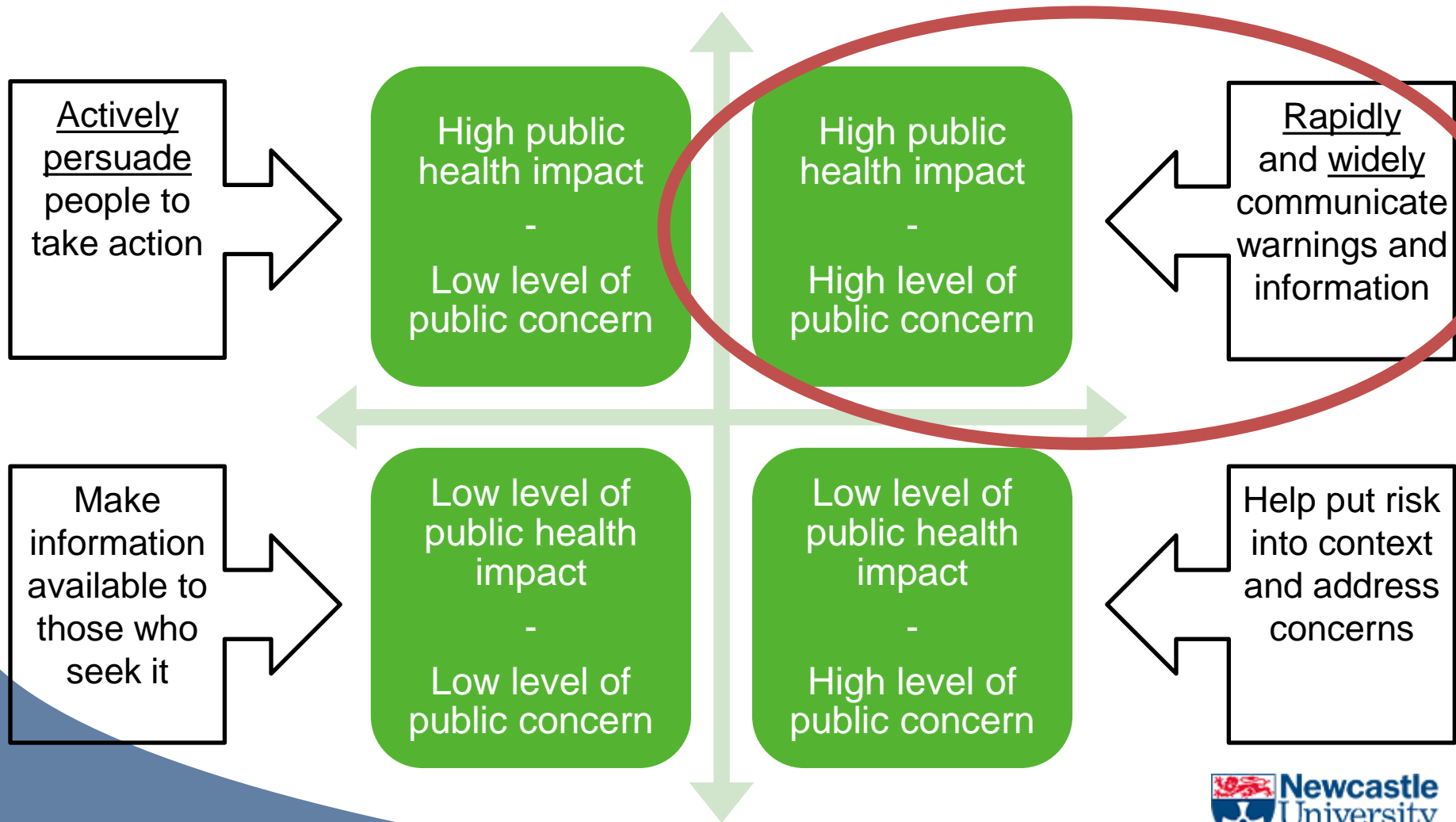
# Case study: The characteristics of Avian Influenza which are relevant to risk communication

- Some Avian Influenza viruses, e.g. A(H5N1) and A(H7N9), have caused serious infections in people
- Outbreaks of Avian Influenza in poultry raise global public health concerns due to their:
  - effect on poultry populations
  - potential to cause serious disease in people
  - pandemic potential

Source: [http://www.who.int/mediacentre/factsheets/avian\\_influenza/en/](http://www.who.int/mediacentre/factsheets/avian_influenza/en/)



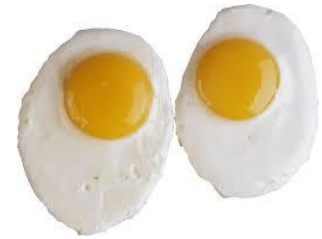
# Communicator's Responsibilities for Public Health Risk Communication







# Implications for Risk Communication



- **Risk communication needs to go beyond the risks identified in the risk assessment, and address people's perceptions and concerns**
  - Information may be discounted
    - If people are worried about eating cooked eggs and they are told they are irrational...
  - Perception that concerns are not considered in risk assessment and/or risk management may decrease confidence in risk analysis
    - The public perceive they are being ignored by decision-makers....

Public health risk communication should not be used to convince or persuade people to adopt the values of the communicator.

Public health risk communication should not be used to convince or persuade people to adopt the values of the communicator.

- It is not enough to adopt a “Public Understanding of Science” approach
  - i.e. to try to educate people and tell them that their perceptions are wrong.

What is needed is explanation of how ***their*** concerns will be addressed

# Risk perception and Avian Influenza

- Reports of highly pathogenic Avian Influenza epidemics in poultry, such as A(H5N1), can seriously impact local and global economies and international trade.
  - Socioeconomic as well as health impacts
  - Socio-economic and human health implications need to be addressed in risk communication
- The majority of human cases of A(H5N1) and A(H7N9) infection have been associated with direct or indirect contact with infected live or dead poultry
  - Controlling the disease in animals is the first step in decreasing risks to humans
  - Risk communication needs to focus on changing behaviour through the supply chain
    - Primary producers, including domestic producers
    - Consumers e.g. in live animal markets
    - Optimistic bias “My behaviour will not make a difference”

**Target communication to needs of different groups (e.g. language, achievable behaviours) while ensuring consistency in message contents across groups**

# Conclusions

- Perceptions of the risks (and benefits) of food safety (and nutrition) issues may vary considerably according to culture and area of application
- Risk /Benefit trade-off in perceptions
  - Chemicals generally perceived negatively
  - “natural” food hazards are perceived less negatively
- Communication must focus on what people want to know as well as technical assessments of risks and benefits



Thank you!

Questions or comments?

## How is exposure to pesticides measured?

e.g. In the group of “Operator”, adoption has been measured through an “Exposure Reduction Index” (ERI) calculated as:

$$\text{ERI} = 100 \cdot \frac{(\text{Potential Exposure} - \text{Actual Exposure})}{\text{Potential exposure}}$$

### Regression Analysis

*Perceptions and attitudes as predictor of exposure behaviours*





# Risk communication through pictograms?



# Some Pictograms are poorly understood...

- The storage pictogram, which the FAO recommends be included on all pesticide labels, was correctly understood by
  - **21%** of South African workers
  - **15%** of Ivorian farmers
  - **0%** of Brazilian farmers

