

# Public perceptions of risk - implications the policy process associated with pharmaceuticals in the environment

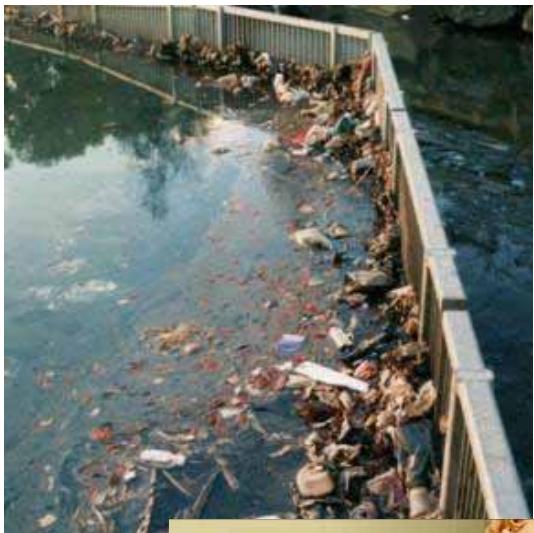
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# What are the consumer and/or societal issues?



# Media headlines...

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**Drugs Are in the Water. Does It Matter?**

New York Times 3<sup>rd</sup>, 2007

**Combined chemicals from toiletries 'affecting sex lives of river fish'**

Daily Mail, 5<sup>th</sup> March 2007

**Pollution 'changes sex of fish'**  
BBC 10th July, 2004

*India's Water Contains Highest Levels of Pharmaceuticals in World*  
Associated Press, 26<sup>th</sup> January, 2009

**No standards to test for drugs in water.**  
Fox News, 11<sup>TH</sup> March 11, 2008

# What are the consumer and societal issues?

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- How do the public perceive the risks of environmental pollution and pharmaceuticals?
- How does this relate to consumer behaviour? (For example, disposal of pharmaceuticals?)
- How might this relate to developing effective policy regarding risk assessment, management and communication?
- How might the public be involved in policy decision-making associated with pharmaceuticals and the environment?

# Research into public perception of environmental pollution from pharmaceuticals is limited ....

- Extrapolate from other areas
  - Chemical contamination of the environment
  - Genetic modification
  - Nanotechnology

# Public perceptions and attitudes – key questions

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- What is driving consumer **perceptions of risk and benefit**?
- Who **trusts** whom to inform and regulate? How does this relate to **consumer confidence** in regulatory activities and the associated science base?
- Are there **cross-cultural and intra-individual differences** in perceptions and information needs?

# The psychology of risk perception drives public risk attitudes

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- An **involuntary risk** over which people have no control is more threatening than one people choose to take
- Potentially **catastrophic risks** concern people most
- **Unnatural** (technological) risks are more threatening than natural ones
- People take more account of **risk information** than benefit information
- People prefer **avoiding losses** to acquiring benefits
  - Losing medical benefit *versus* environmental risk ?

# Pharmaceuticals and the environment....

Unnatural risk

Involuntary exposure

Unpredictable / Unknown impacts

- Human health
- Animal health
- The environment

Unintended (and potentially uncontrollable) effects

- Oestrogens in water and food chain
- Bioactive compounds

Risk-benefit trade-off

- Medical application
- Human health *versus* sustainability?

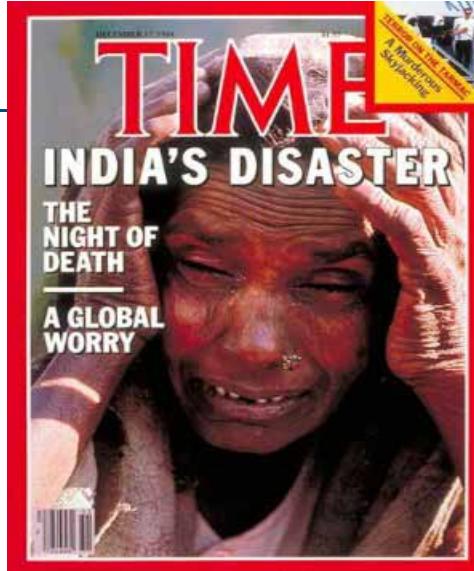
Citizen *versus* consumer  
Costs

- Environmental clean-up?
- Health services

# Pesticides and risk



Sveso



Bhopal



Pesticides

# GM animals and plants



Goats that produce pharmaceuticals in their milk

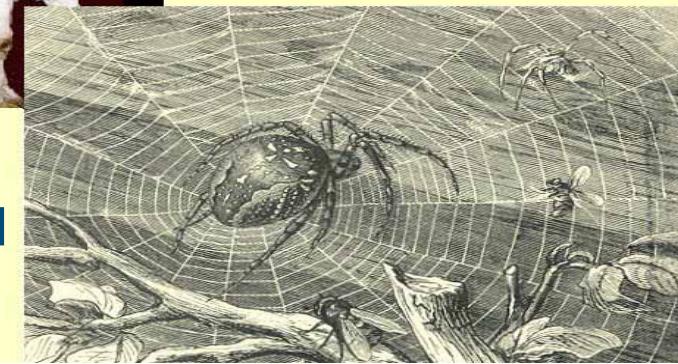


Plant made pharmaceuticals

The goat that produces spider silk in its milk (used for fabrics (not pharmaceutical, but....)



The Tobacco Plant as “biofactory”



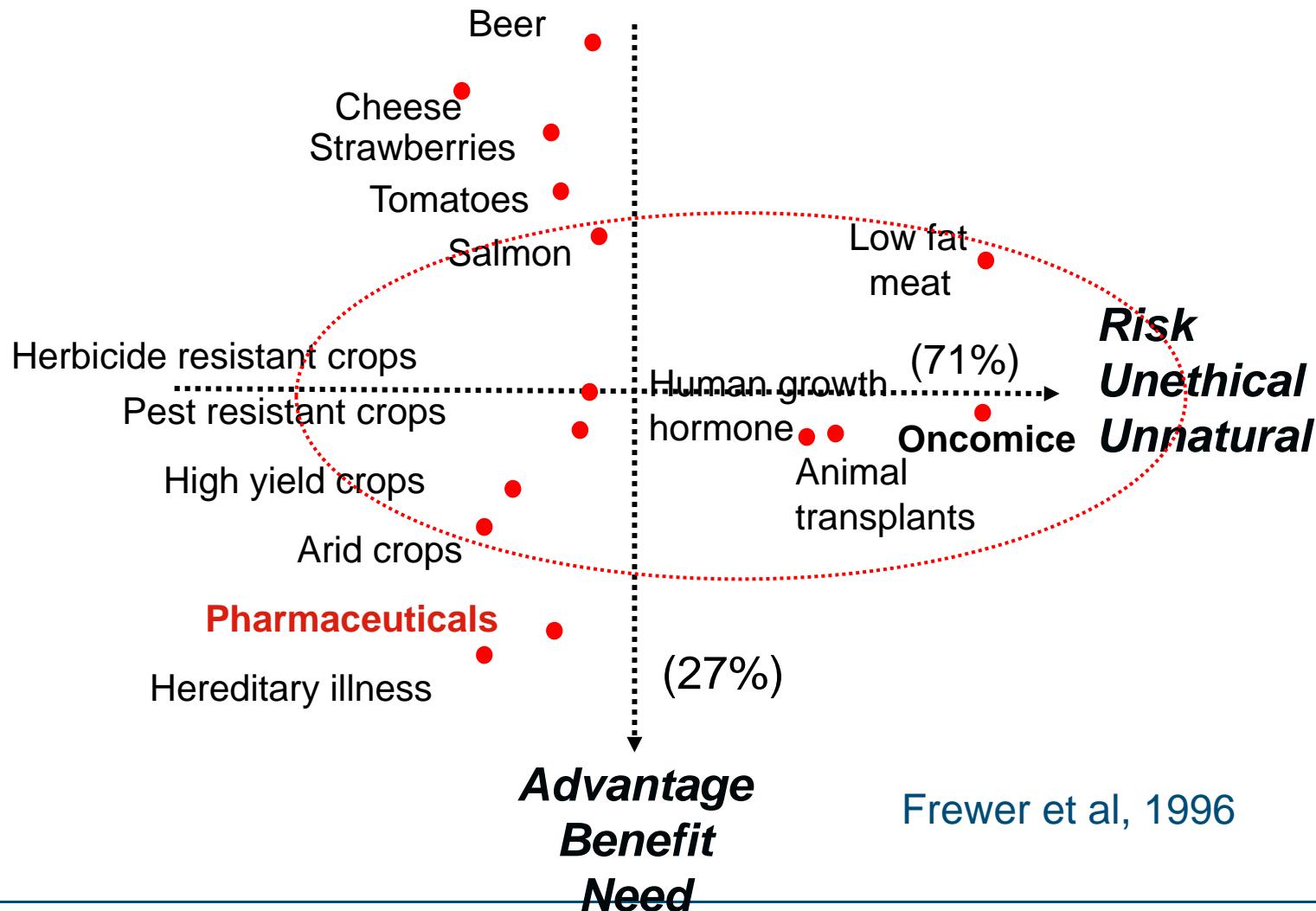
# The science and society debate.....

- **Nanotechnology applied to pharmaceutical production:**
  - Does this necessitate the need for novel assessment, management and communication paradigms in the context of environmental protection?
- **Plant-made pharmaceuticals produced using genetic modification.**
  - Accidental contamination of the foods chain?
  - Horizontal gene transfer
- **Genetic modification of animals to produce pharmaceuticals**
  - Accidental contamination of the food chain?
  - Environmental impact?
  - Animal welfare issues

# Consumer protests against GM crops (1998)



# Specific Applications of Genetic Modification



# Winners of Nano-Hazard Symbol Contest Announced at World Social Forum, Nairobi, Kenya (2007)



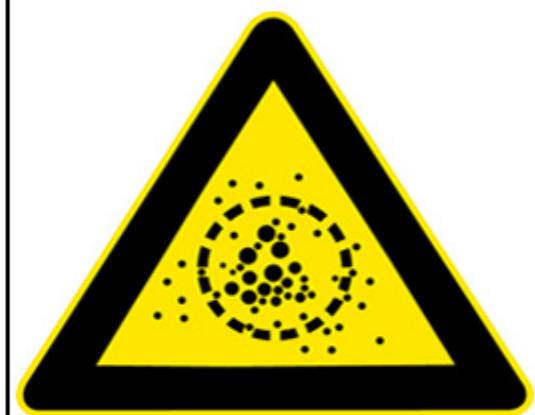
**NANOHAZARD**

Dimitris Deligiannis, Greece



**NANO HAZARD**

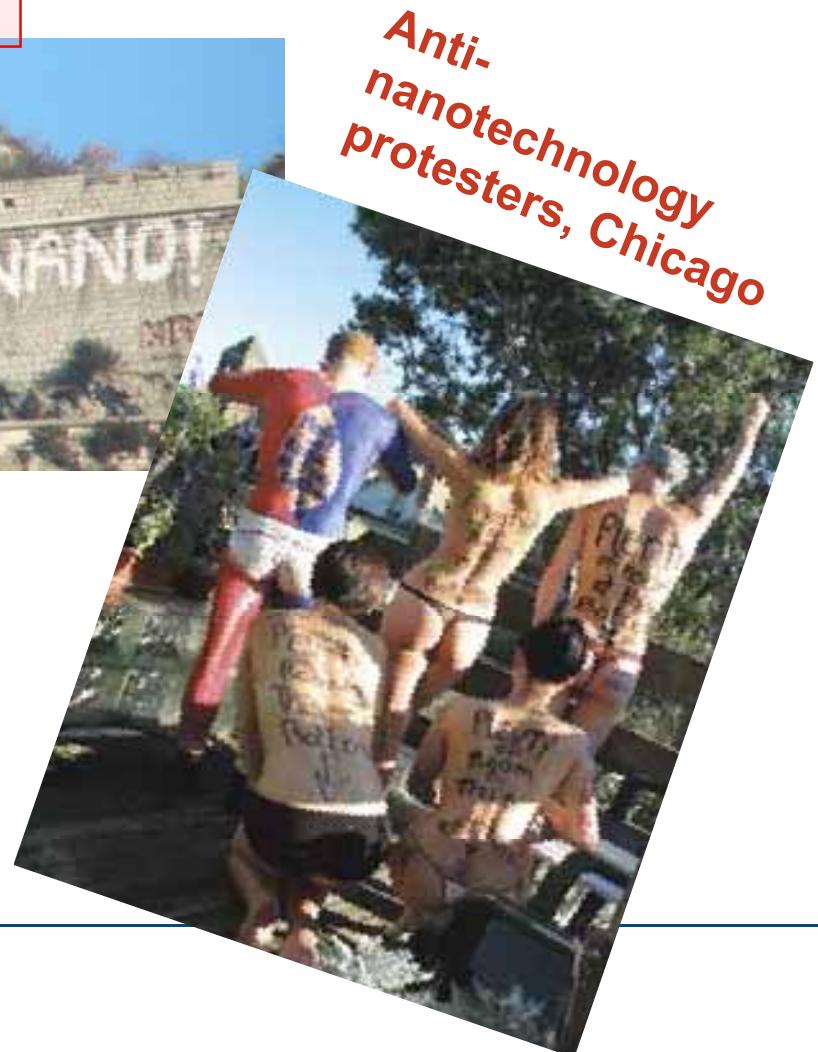
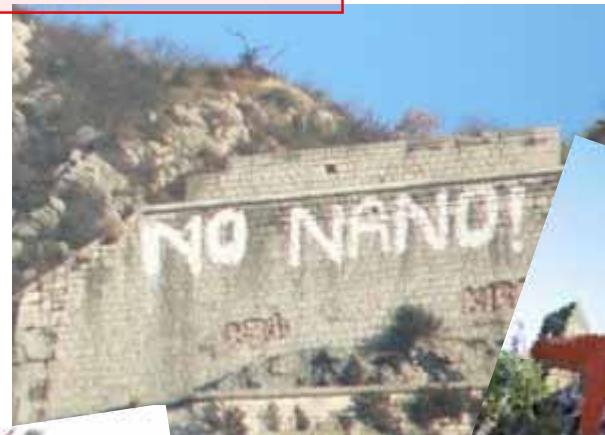
Shirley Gibson, Scotland



**Kypros Kyprianou, England**

“Soil Association bans nanomaterials from organic products (Guardian January 2008)

Protest against Minatec,  
Grenoble, France



# Other issues

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- **Ethical** concerns are emerging as an important determinant of consumer decision making.
- The citizen *versus* consumer divide
  - “Citizens” support sustainable behaviour
  - “Consumers” rarely act in a sustainable way, in particular if the benefit of behaving “unsustainably” is perceived to be high.
- Perceptions that the “**truth** **is being hidden** increases both risk perception and distrust in regulators and communicators

# Risk (benefit) assessment and emerging societal concerns

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## What do we need to think about?

- Human health?
- Impact on the environment?
- Ethical concerns (integrity of nature)?
- Trust
  - in industry?
  - in risk regulators?
  - in scientists ?

# What determines good risk management?

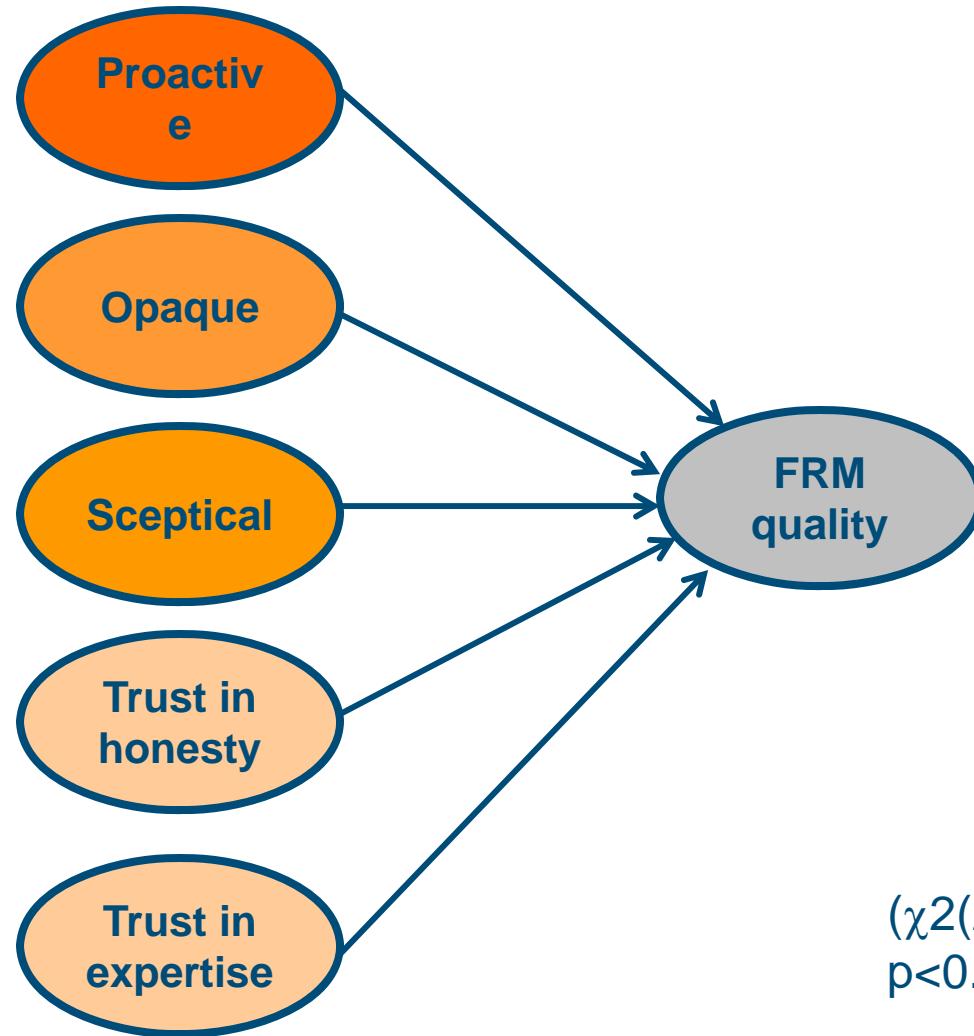
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- Proactive consumer protection
- Transparent risk management
- Consumer skepticism regarding risk assessment and risk communication practices
- Trust in expertise of risk managers
  - You know what you are doing
- Trust in honesty of risk managers
  - You are truthful about what you know

(derived from lay-expert focus groups and quantitative research, van Kleef et al, 2008)

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# Structural model – Risk management quality



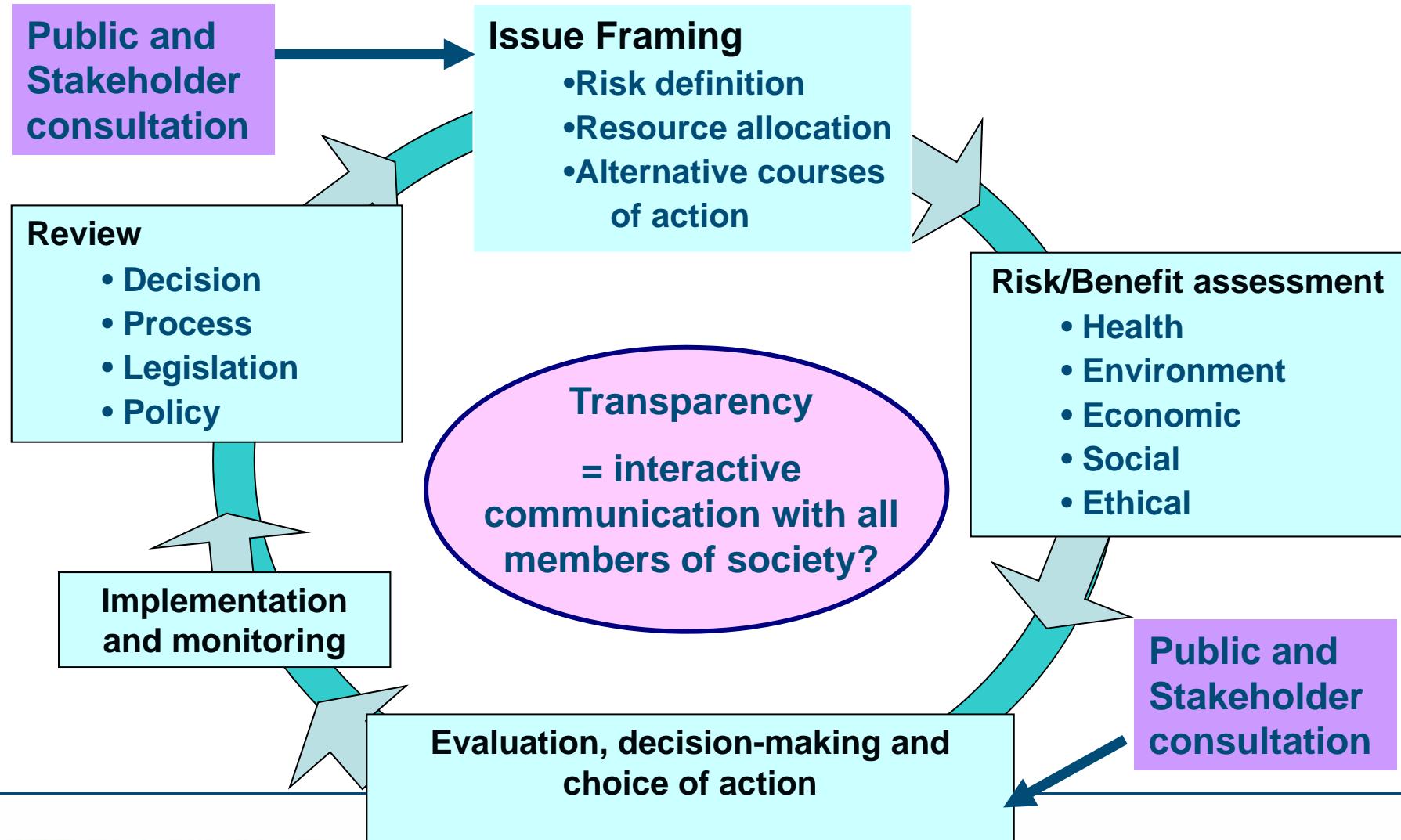
$(\chi^2(2420)=8429,$   
 $p<0.01; RMSEA=0.07).$

# What does this mean...

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- Not all citizens are interested in “scientific facts”
- It is important to communicate
  - What regulators and the industry are doing to protect consumers and the environment from risks
  - That consumer concerns are being considered, as well as technical risk estimates
  - That communicators are knowledgeable **and** truthful when communicating about risks
  - That communicators are open and do not keep any information “hidden”

# Emerging governance models?



# A typology of different societal engagement mechanisms

<b><i>Who is involved?</i></b>	<b><i>Consultation</i></b>	<b><i>Participation</i></b>	<b><i>Communication</i></b>
Citizens	Citizens panel	Action planning workshop	Cable TV
Public	Consultation document	Citizens jury	Drop in centres
Consumers	Electronic consultation	Consensus conference	Hotline
Stakeholders	Focus group	Deliberative opinion poll	Information Broadcasts
Experts	Opinion poll	Negotiated rule making	Internet information
	Referendum	Planning cell	Public hearings / Inquiry
	Survey	Technology Assessment	Public meeting
	Telepolling		
	Delphi		

(Adapted from Rowe and Frewer, 2004)

# Criteria for evaluating public participation (1)

## Acceptance (fairness) criteria

- *Representativeness*
  - Participants should comprise a broadly representative sample of the affected public.
- *Independence*
  - The participation process should be conducted in an independent, unbiased way.
- *Early Involvement*
  - The public should be involved as early as possible in the process as soon as value judgments become salient.
- *Transparency*
  - The process should be transparent so that the public can see what is going on and how decisions are being made.
- *Influence*
  - The output of the procedure should have a genuine impact on policy.

# Criteria for evaluating public participation (1)

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## Process (competence) criteria

- *Task definition*
  - The nature and scope of the task should be clearly defined, so that participants understand what is required of them, and why.
- *Resources*
  - Participants should have access to the appropriate and sufficient resources (e.g. in terms of time and information) to enable them to fulfill their designated role.
- *Structured dialogue*
  - The exercise should use appropriate mechanisms for structuring dialogue to ensure fair and accurate information exchange.

# Conclusions and research needs

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- Effective communication about pharmaceuticals in the environment must take account of public concerns
  - What are these?
  - How do risk and benefit perceptions “trade-off” against each other?
  - What about public concerns regarding production technologies (genetic modification or nanotechnology?)
  - What about communication interventions? (For example, consumer disposal of pharmaceuticals).

# Conclusions and research needs

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- How should the public and other stakeholders be involved in risk governance associated with pharmaceuticals and the environment?
- How should risk/benefit assessments and management decisions be made explicit, transparent and communicated?

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*Any questions or  
comments?*