

# DO YOU HEAR WHAT I HEAR?

## Overcoming Literacy, Numeracy and Perception Barriers in Communicating Environmental and Public Health Risk



Science Forum on Brownfields Redevelopment



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April 5, 2006 – Halifax, Nova Scotia

# Overview

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- **Context for Communicating Risk**
- **Realities and Implications**
  - Literacy
  - Numeracy
  - Perception
- **Overcoming the Barriers**

# Context: Risk Communication

- High concern-low trust situations
  - “*Culture of Fear*”: risk messages in the media daily; “new” threats
    - Pandemic, drug side-effects, (bio)terrorism, tainted water...and the list goes on
    - People aren’t sure who to trust, and whether to trust you
- Stakeholder capacity
  - *Literacy and numeracy* are central to *understanding* complex information
    - ‘Capacity’ varies between (and within) communities, and over time
- Trust and credibility
  - For spokespeople, information sources, and processes
    - *Perception* influences responses to risk information

# Literacy Levels

- **Level 1 (LOW):** ...difficulty with printed materials and identify themselves as unable to read.
- **Level 2 (BASIC):** ...can use printed materials for limited purposes such as finding a familiar word in a simple text.
- **Level 3:** ...can use reading materials in a variety of situations providing it is simple, clearly laid out and the tasks involved are not too complex.
- **Level 4:** ...can use a wide range of reading materials and meet most every day reading demands.

*ABC Canada Literacy Foundation,  
[www.abc-canada.org/literacy\\_facts/](http://www.abc-canada.org/literacy_facts/)*

# Literacy in Canada

- “2 of 5 Canadians (40%) would have difficulty reading this sentence, or following the instructions on a prescription bottle...”

*Canadian Education Association, 1984*

- “The Adult Literacy and Life Skills Survey [2003]... found that the average literacy score for Canadians had not changed significantly ... since the last major survey was conducted in 1994.”

*Statistics Canada, “The Daily”, May 11, 2005*

[www.statcan.ca/Daily/English/050511/d050511b.htm](http://www.statcan.ca/Daily/English/050511/d050511b.htm)

# Literacy and Understanding

- > 90 million adults (U.S.) had 'LOW' or 'BASIC' scores
  - Many of them described themselves as being able to read or write English "well" or "very well"

Level 1 (LOW):	66 to 75 %
Level 2 (BASIC):	93 to 97 %
- Relevant literacy skills (English) do not always correspond to level of knowledge or education
  - Non-English stakeholders
  - Non-scientists
  - Non-specialists

# Numeracy Terminology

## Numeracy:

“The knowledge and skills required to apply arithmetic operations, either alone or sequentially, using numbers embedded in printed material, such as balancing a chequebook, figuring out a tip, completing an order form or determining the amount of interest on a loan.”

*International Adult Literacy Survey, 2003*

## Math Anxiety:

“...a state of uncertainty; disturbance of the mind regarding the subject of mathematics.”

*Ohio Mathematical Planning Committee, 1996*

# Numeracy in Canada

- **>40% of Canadians have basic or low numeracy**
  - Difficulty with everyday tasks
  - Examples: measuring distance or volume in household chores
- **Numeracy in Canada varies regionally**
- **“Math anxiety affects 50% of the population in any occupation”**

*Ohio Mathematical Planning Committee, 1996*

# Numeracy in Canada

- Age differences in Canadian numeracy measures
- Gender differences
  - Men are less likely to ask for an explanation if they don't understand the math

Age Group	Basic/Low Numeracy
16-25	39%
26-35	38%
36-45	34%
46-55	56%
56-65	62%
Over 65	80%

# Numeracy and Statistics

**Outcomes** are understood better...

- “2,730 Canadians died in car accidents in 2004”

*CTV News, [ctv.ca](http://ctv.ca), Jan. 8, 2006*

...than **probabilities**

- “There’s about a 1-in-4 or 1-in-3 chance of getting cancer”
- $10^{-6}$  risk
- 95<sup>th</sup> percentile

# Perception Influencers

- Strongly influenced by word-of-mouth, credibility of victims, spokespeople and information sources
- Risk professionals and laypeople often think very differently about health and environmental risk:
  - Numbers vs. words
  - Probabilities vs. outcomes
  - Models vs. real world
  - Data vs. feelings, memories, and local experiences
  - Evolving understanding vs. absolute knowledge

# Perception Influencers

- **When trust is low and concern is high, non-verbal cues**
  - provide most of the message content
  - can be seen at a distance
  - are intensely noticed
  - are likely to be negatively interpreted
- **Non-verbal messages win**
  - When the words and the picture don't match, the picture will have more impact
- **Distractions**
  - Fidgeting, lip licking, hand position, defensive or protective posture, shifty eyes, gulping air, playing with keys, hands in pockets

*If you can be seen you can be heard*

# Perception and Understanding

- Words can create barriers to understanding and can influence perception of risk
- Variable or poorly understood meaning
  - Contaminant
  - Toxic
  - Above (or below) the standard
- Jargon and acronyms
  - SVE
  - Hypothetical receptor
  - De minimus risk

# (Mis)perceptions About Cancer

- **American Cancer Society survey assessed cancer knowledge** (of Americans who never had cancer)
- **Common misconceptions:**
  - Surgical treatment can cause cancer to spread throughout the body (41%)
  - The medical industry is withholding a cure for cancer in order to increase profits (27%)
- **Little correlation between respondents' self-assessment of their cancer knowledge and accuracy of responses**  
**...yet cancer is relatively familiar to most people**

# Putting it Together

- Literacy, numeracy and perception challenges create obstacles to understanding
- People form opinions based on what (and who) they see, how they feel, and what they understand
  - These may have more impact than the facts
- Some people think they understand, even if they don't
  - True for cancer knowledge; what about less familiar issues?
  - Messages can be distorted when passed by word-of-mouth
- Information from a credible source is likely to be believed, **even if it is inaccurate**

# Overcoming the Barriers

- **Set goals:**
  - Help people understand, but let them form their own opinions
  - Plan, then implement, check with your audience, and refine
  - Steadily build spokesperson, organization and process credibility
- **Assess and build stakeholder capacity:**
  - Know your audience's values, fears, priorities, info needs
  - Regularly benchmark understanding, social and cultural factors and other influencers
  - Start capacity building early and finish late

# Overcoming the Barriers

- Prepare for emotional questions
  - Are my children at risk?
  - How will you deal with those who get sick?
  - Is this thing being contained?
  - What can we expect?
  - Why aren't you doing something about it?
  - Can you guarantee my safety?
  - What else can go wrong?
  - When were you first notified about this?
  - What bad things aren't you telling us?

# Overcoming the Barriers

- **Simple visuals help convey complex information**
  - Use simple maps and photos rather than graphs, charts and cluttered diagrams
- **Information is more useful than data – know the difference**
  - Lead with information; back up with data
  - Explain key concepts in plain language
  - Choose “risk-neutral” terms where they give the same factual information

*Communication is a process, not an event*

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