Risk Information in Decision-making

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Risk Analysis:

- Risk Assessment
- Risk Communication
- Risk Management
Outrage Factors

- Factor analysis of risk perceptions
- Outrage factors: anger, priority, action
- Relevance?
Outrage and Risk Assessment:

outrage → stress → illness
Outrage and Risk Communication:

- outrage
- doubt
- conflict
Outrage and Risk Management:

outrage

↓

perceptions

↓

decisions
Strategy

- outrage factors
- recommendations
- decision models
1. Coerced

- Voluntary: home
- Group: office

**Strategy:** give people a choice
2. Industrial

- **Natural:**
  - farms

- **Industrial:**
  - labs, manufacturing, offices

**Strategy:** avoid comparisons
3. Exotic

- **Familiar:**
  - heat, cold stress

- **Exotic:**
  - mycotoxins

**Strategy:** educate
4. Memorable

- **Positive:**
  - homes, farms

- **Negative:**
  - hospitals, prisons

**Strategy:** acknowledge
5. Dread

- **Minor:**
  - previous positive experiences

- **Major:**
  - previous negative experiences

**Strategy:** acknowledge
6. Catastrophic

- **Chronic:**
  one or two complaints

- **Catastrophic:**
  mass psychogenic illness

**Strategy:** use the same time frame
7. Unknowable

- Well known, understood:
  - common microbial pathogens

- Uncertain:
  - mycotoxins

**Strategy:** research
8. Outside control

- Individual controls:
  - home heating and ventilation

- Outside control:
  - office heating and ventilation

Strategy: empower
9. Unfair

- Less powerful groups:
  - clerical staff

- More powerful groups:
  - CEO’s, Deans, etc.

**Strategy:** study distribution
10. Immoral

- Moral:
  - church

- Immoral:
  - slum landlords

**Strategy:** examine ethical models
11. Suspicious source

- **Credible sources:**
  - T.V. stations, some scientists

- **Suspicious sources:**
  - government, industry

**Strategy:** enlist credible sources
12. Unresponsive process

- **Responsive process:** established mechanisms
- **Unresponsive process:** ignoring complaints

**Strategy:** training
13. Vulnerable populations

- Powerful populations: wealthy populations
- Vulnerable populations: children

**Strategy:** acknowledge and address
14. Delayed effects

- **Acute:**
  - heat, cold

- **Delayed:**
  - sensitized responses

**Strategy:** prepare contingencies
15. Affects future generations

- **Short term:** acute toxins
- **Long term:** asbestos, mutagens

**Strategy:** educate
16. Identifiable victims

- Anonymous:
  unidentified victims

- Identifiable:
  identified victims

Strategy: search for victims
17. Not preventable

- Preventable:
  - # of people allowed in buildings

- Not preventable:
  - unknown agents

**Strategy:** stress risk reduction

24
18. Few benefits

- **Benefits:**
  production, research, teaching

- **Few benefits:**
  storage, unsuitable in other ways

**Strategy:** Cost-Benefit Analysis
19. Media attention

- Positive attention:
  HVAC systems

- Negative attention:
  suspected outbreaks

**Strategy:** study other outrage factors
20. Opportunity for collective action

- **Individual:** small facilities
- **Collective:** large complexes

**Strategy:** minimize collective opportunities
Implications for Environmental Health Professionals:

- When hazards are high, cultivate outrage.
- When hazards are low, reduce outrage.
- Provide training throughout the organization.
Decision Models:

- Optimist’s model
- Pessimist’s model
- Minimization of Regret model
- Expected Value model
Optimist’s model:

- Room A: 2 - 8 *
- Room B: 3 - 7
- Room C: 4 - 6

Therefore, select Room A
Pessimist’s model:

- Room A: 2 - 8
- Room B: 3 - 7
- Room C: 4 - 6 *

Therefore, select Room C
Minimization of Regret model:

<table>
<thead>
<tr>
<th>Room</th>
<th>Range</th>
<th>Regret</th>
</tr>
</thead>
<tbody>
<tr>
<td>Room A</td>
<td>2 - 8</td>
<td>0 - 2</td>
</tr>
<tr>
<td>Room B</td>
<td>3 - 7</td>
<td>1 - 1</td>
</tr>
<tr>
<td>Room C</td>
<td>4 - 6</td>
<td>2 - 0</td>
</tr>
</tbody>
</table>

Therefore, select Room B.
Expected Value Model:

- Room A: 2 - 8 = 5
- Room B: 3 - 7 = 5
- Room C: 4 - 6 = 5

Therefore, all the options are of equal value.
Ethical systems:

- Utilitarian: maximize $U_y + U_z$
- Egalitarian: maximize the minimum of $U_y, U_z$
- Elitist: maximize the maximum of $U_y, U_z$
- Libertarian: increase both $U_y, U_z$
Economic Models

- Willingness to pay
- Equitable allocations
- Human Capital
- Environmentalism
Legal Models

- Market incentives
- Regulatory standards
- Advisories
- Technological controls