Health Risks and Values: Support for Evidence- and Norm-Based Decisions

Michio Murakami
Department of Health Risk Communication
Fukushima Medical University

* This presentation reflects the presenter’s opinions and does not represent the official view of any organization.
Risk science and risk concept

◆ Risk science (The Encyclopedia of Risk Research, p.4)
“Risk science can be defined as aggregate of various academics related to individual and social decision-making regarding risk.”

◆ Common point in risk concept (The Encyclopedia of Risk Research, p.6)

[Diagram showing the relationship between threat, hazard, cause, and results]

- Threat
- Hazard
- Cause
  - How much
  - How often
- Results
  - How much
  - How often
- What to protect
  - Human health
  - Ecosystems
  - Sub-group

Comparing risks

◆ There are various types of risks in the world. Avoidance of one risk may increase other risks (i.e., risk trade-off).

◆ Under limitations of time, money and measures, we hope to reduce various risk as much as possible. (This does not mean that we should discuss only cost-effectiveness.)

◆ Risk science enables us to compare various types of risks. In particular, an important technique for individual and societal decision-making is multiple-risk comparison using the same indicator.
Effective dose estimation in UNSCEAR

<table>
<thead>
<tr>
<th>Settlement Type</th>
<th>1-year Exposure (mSv)</th>
<th>Lifetime Exposure (mSv)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precautionary-evacuated settlements</td>
<td>1.6~9.3</td>
<td>—</td>
</tr>
<tr>
<td>Deliberately-evacuated settlements</td>
<td>7.1~13</td>
<td>—</td>
</tr>
<tr>
<td>Other Fukushima Pref.</td>
<td>2.0~7.5</td>
<td>2.1~18</td>
</tr>
</tbody>
</table>

*Natural background radiation (lifetime): approx. 170 ±80 mSv

No discernible increases in heritable effects and cancer incidence.

Other effects: nursing home evacuation

Participants: nursing home residents in Minamisoma City

Mortality rates among nursing home residents increased to 2.7-fold after evacuation. (NOT direct death due to disaster or radiation)

Other effects: diabetes

Participants: participants who have public health checkups in Minamisoma City and Soma City

Diabetes increased to 1.6-fold among evacuees after the disaster, possibly due to changes of lifestyle etc. (NOT direct effect of radiation)

Nomura et al. (2016) BMJ Open, 6:e010080.
Other effects: psychological distress

Participants: citizens in 13 municipalities including evacuation order areas

Psychological distress increased after the disaster. (NOT direct effects of radiation)

K6 items (Kessler et al., 2003)

0: never ~ 4: all the time

"During the past 30 days, about how often did you feel
1. Nervous
2. Hopeless
3. restless or fidgety
4. so depressed that nothing could cheer you up
5. that everything was an effort
6. worthless?"

A cutoff score of K6 ≥ 13 was regarded as psychological distress

Which indicators be applied

◆ Mortality rate

...It may be a social consensus that “low morality rate” is a good thing. This does not reflect length of lifetime (e.g., “10% mortality rate in 1 year” vs “30% mortality rate in 30 years”).

◆ Loss of life expectancy

...This can be supported from “health-maximization ageism (efficiency)” and “fair-innings ageism (equity).”

◆ Loss of happy life expectancy

...This aims “maximization of lifelong happiness.” This is based on belief that it is important to build a happier society.

A question “which indicators should be used?” ultimately corresponds to social values of “what kind of a world we want to live in*.”
**Comparison of risks after the disaster**

Nursing home evacuation, diabetes and distress are more serious risks than direct effects of radiation, from the view point of life expectancy and happiness.

Human dimension risk: stigma

Distress strongly associated with genetic risk perception. High anxiety has been reducing, but still exceeds 30%. Likely linked to a feeling of remorse and discrimination.

Human dimension risk: right to freedom

Royal Society Report (referred as a basis of 20 mSv/y)
“The imposition of a continuing annual risk of death to the individual of $10^{-2}$ seems unacceptable. At $10^{-3}$ it may not be totally unacceptable if

- the individual knows of the situation
- enjoys some commensurate benefit
- and everything reasonable has been done to reduce the risk.”

◆ This was established from a paternalistic perspective and justified from the balance between freedom and unacceptable risk.

◆ Some people emphasize avoidance of radiation risk and others prefer to benefit by returning home (in fact, some returnees' health may be improved). Society should respect both value systems.

Many surveys and studies have been implemented. Most aims to promote physical, mental, or social health among the affected people.

Regrettably, surveys/studies themselves have partly injured affected people.

Surveys/studies after disasters should serve for affected people.

Surveys/studies should be carefully and ethically designed to provide benefits to affected people.

Society must share aims of surveys/studies.

Such ethical issues are still present and the recognition is not well shared in society.
## A case: thyroid examination screening

<table>
<thead>
<tr>
<th>Mortality</th>
<th>Physical aspects</th>
<th>Socio-psychological aspects</th>
<th>Evaluation of radiological effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screening is not effective for reducing mortality.</td>
<td>Early diagnosis may reduce disease complications, despite lack of evidence.</td>
<td>Screening can pose social disadvantages in employment, insurance, and marriage.</td>
<td>The information may be expected in public.</td>
</tr>
<tr>
<td>+ Early diagnosis may reduce an insignificant level of mortality.</td>
<td>+ Patients cannot experience advances of medical treatments.</td>
<td>+ Some subjects may reduce anxiety, and others may increase distress.</td>
<td>+ This is not a benefit for subjects.</td>
</tr>
<tr>
<td>+ Suicide rate may increase after the diagnosis.</td>
<td>+ Screening can increase a sickness- or disability period in lifetime.</td>
<td>+ Individual monitoring (not as recommended) can support subjects with strong anxiety.</td>
<td>+ Screening can disturb or mask the radiological effects on cancer.</td>
</tr>
</tbody>
</table>

Judgements of the balance between benefits and harm depend on their values and norms.

IARC Expert Group on Thyroid Health Monitoring after Nuclear Accidents (2018) IARC Technical Publication No. 46
### Issues after disasters

<table>
<thead>
<tr>
<th>Radiation</th>
<th>Decontamination waste</th>
<th>Economic loss</th>
<th>Dis-employment</th>
<th>Diet</th>
<th>Physical activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety</td>
<td>Family separation</td>
<td>Community disruption crisis</td>
<td></td>
<td>Obesity</td>
<td></td>
</tr>
<tr>
<td>Remorse</td>
<td>Discrimination</td>
<td>Distress</td>
<td>Lifestyle disease</td>
<td>Nursing care</td>
<td></td>
</tr>
<tr>
<td>Life plan</td>
<td>Right to freedom</td>
<td>Happiness</td>
<td>Pride</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Disasters totally affect life and well-being. Not only “radiation”, “physical or mental health” but also “social health” issues.

How to face risks

- What we expect is not a society just with low mortality or low disability.
- We have fundamental beliefs that we want to live in a society with high well-being and prides.

“They are not about safety as such, but about much larger questions of what kind of a world we want to live in.” (Select Committee on Science and Technology, 2000)

- How to manage or face risks is a problem of values and norms.
- Here, we should always pursue “what we want to protect” and “what kind of evidence and norm can support decisions.”
Toward evidence- and norm-based decisions

- Revision/prioritization of surveys/studies
- Confirmation of ethics and share of values
- Revisiting roots of norms
- Accumulation of case surveys/studies regarding dialogues and co-creation

**Society**

**Surveys/studies**

- Residents
- Experts
- Company
- Government

**Dialogues/co-creation**

- Share of aims of surveys/studies
- Implementation of evidence- and norm-based measures
- Advancement of measures involving various stakeholders
- Engagement in a world we want to live in