Outline

• Self-introduction
• Background (before the accident)
  – Status of local areas in Fukushima where the nuclear power plants existed
  – Status of knowledge on radioactivity and radiation risk prior to the accident and public perception of radiation risk
• Lessons learned through radiation risk communication after the accident
  – Conflicting advice from the experts on radiation risk
  – What was the effect on public perception of radiation risk
  – Mothers’ concerns
• Current status of risk communication
  – Gaps between radiation risk (scientific basis) and need for decontamination
  – What is the most common reason for evacuees not wanting to return to their homes?
• Challenging issues for the future
Background (before the accident) ①
- Status of local areas in Fukushima where nuclear power plants existed -

- Topography, demographics, infrastructure
- Urbanization – migration from local areas to population centers
- Japanese workplace – working away from home

Background (before the accident) ②
- Status of knowledge on radioactivity and radiation risk prior to the accident (1) -

- Status of (nuclear) energy knowledge in the education system
- Status of radiation knowledge and risk in the education system
  - Traumatic memories of Hiroshima & Nagasaki
    - Lack of correct and appropriate information on radiation risk
    - Instinctive concerns
Background (before the accident) ②
— Status of knowledge on radioactivity and radiation risk prior to the accident (2) —

Q: Better to have no additional exposure than minimum exposure?

<table>
<thead>
<tr>
<th>Incorrect</th>
<th>Correct</th>
<th>Don’t know</th>
<th>No answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>21%</td>
<td>59%</td>
<td>18%</td>
<td>2%</td>
</tr>
</tbody>
</table>

Lessons learned through radiation risk communication after the accident ①
- Conflicting advice from the experts on radiation risk -

① Japanese government

② Mass media

Twitter, SNS, e-mail, homepages, books, etc.

③ The experts (individuals and groups)
Lessons learned through radiation risk communication after the accident ①
— Who are the “experts”? —

- **Problem 1**: Comments beyond their expertise which have been subdivided into specific study fields

  - “No comments” are allowed?

- **Problem 2**: Gaps in knowledge and perception of radiation risk on the part of experts from different areas of expertise
  - Physical science
  - Nuclear engineering and science
  - Medical – biological sciences

Lessons learned through radiation risk communication after the accident ②
— What was the effect on public perception of radiation risk —

- Political statements made to the public on radiation risk
- Political approach to radiation risk and its effect on public trust and confidence
- Conflicting advice from the experts on radiation risk, some supportive of the government position
  - Effect of this on public perception
How did you perceive the situation?

There is no immediate impact

Effects of low dose exposure are not known
Lessons learned through radiation risk communication after the accident

- Mothers’ concerns -

Wish to protect children in any way

However, some actions were observed that were based on views that differed from the scientific understanding of radiation

After the earthquake, tolerance of mothers has decreased

Survey of mothers with a child under two years of age in metropolitan areas

November 2006: before the earthquake
Late May 2011: after the earthquake
Benesse Institute for the Development of the Next Generation

4th July, 2011

by the Nikkei Shimbun (evening paper)
Current status of risk communication ①
- Gaps between radiation risk (scientific basis) and needs for decontamination -

Although a target value for dose reduction through decontamination is not specified, it is necessary for radiological protection to implement measures to reduce individual exposure dose to meet the long-term objectives of radiation protection, such as additional dose to be less than 1 mSv/y
(from Decontamination Information Plaza Q&A)

Current status of risk communication ②
- What is the most common reason for evacuees not wanting to return to their homes? (1) -

Intention to return to hometown after clearance to return being given at the time which has been agreed with the country (n=1,366)

【Q3】If clearance to return is given 3 - 6 years after the occurrence of the accident, would you return to your hometown and live there?

I would like to return 15.8%
Will not return now, but maybe in future 49.5%
Will not return for ten years or more 11.4%
Will not return to hometown in the future 18.4%
No answer 4.8%
Current status of risk communication ②
- What is the most common reason for evacuees not wanting to return to their homes? (2) -

![Bar chart showing reasons for not wanting to return to homes]

Current status of risk communication ②
- What is the most common reason for evacuees not wanting to return to their homes? (3) -

【Q1】Can you return and live in a village after decontamination?

![Pie chart showing reasons for not returning to villages]

The Iitate-mura adult questionnaire result news flash about the refuge life actual condition of Iitate-mura, and revival (January, 2013)
Current status of risk perception communication② - What is the most common reason for evacuees not wanting to return to their homes? (2a) -

Reasons both real and official

Current status of risk communication② - What is the most common reason for evacuees not wanting to return to their homes? (4) Yamakoshi village -

The house was lost 52.2%
Host town life convenient 29.9%
The workshop was lost 19.4%
House reconstruction is economically difficult 17.9%
Uneasy in a disaster prevention area 17.9%
Shopping is inconvenient 16.4%
(Comparing Yamakoshi with Nagaoka refuge)
New workplace is too far 10.4%
Problem of children’s schools 6.0%

Notes: There were many elderly people among respondents
Current status of risk communication

— What is the most common reason for evacuees not wanting to return to their homes? (5) Yamakoshi village —

Conclusive factors for return to a village (multiple answers allowed) ※ Rate of return to Yamakoshi village: about 70%

Challenging issues for the future — Supposing 3.11 happens again, what do we do (1)? —

The impact on the human body due to radiation: What is known

- Atomic bomb: Hiroshima • Nagasaki
- Nuclear bomb experiments: Marshall archipelago (Bikini Atoll), Nevada (USA), Semipalatinsk (Soviet Union), UK, France, China, India, Pakistan
- Accident during atomic bomb manufacture: Hanford (USA), South Urals (Soviet Union)
- Nuclear power plant disaster: Three Mile Island (USA), Chernobyl (Soviet Union), JCO (Japan, Tokai village)
- Occupational contamination: Uranium mine, fluorescent paint contractor, nuclear power plant staff
- Medical contamination: Diagnosis, medical treatment
- Medical accident: Every corner of the earth (IAEA, reports to WHO)
- Residents in high natural radiation areas: Brazil, China, etc.
Challenging issues for the future
— Supposing it returns to 3.11 once again, what does it do (2)? —

The degree and the cause of carcinogenic of carcinogenic probability: It dies, living

The threshold of the sudden sexual disorder by radiation

<table>
<thead>
<tr>
<th>Dose (mSv)</th>
<th>Effect</th>
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<tbody>
<tr>
<td>50,000</td>
<td>Death within two days, general convulsion</td>
</tr>
<tr>
<td>10,000</td>
<td>Death from digestive trouble within two weeks</td>
</tr>
<tr>
<td>7000</td>
<td>100% death from hematopoiesis within 60 days</td>
</tr>
<tr>
<td>4000</td>
<td>50% death from hematopoiesis within 50 days</td>
</tr>
<tr>
<td>24</td>
<td>Temporary hair loss, IRYTHEMA, Permanent infertility</td>
</tr>
<tr>
<td>10</td>
<td>Cataract</td>
</tr>
<tr>
<td>2.4</td>
<td>Nausea, Fatigue (Radiation disease)</td>
</tr>
<tr>
<td>Safe</td>
<td>Temporary lymphopenia</td>
</tr>
<tr>
<td>Perfectly safe</td>
<td>Mental retardation (within 8〜15 weeks after fertilization)</td>
</tr>
<tr>
<td></td>
<td>Abortion, fetal malformation (till 8 weeks after fertilization)</td>
</tr>
<tr>
<td></td>
<td>Medical exposure (CT scan etc.)</td>
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<tr>
<td></td>
<td>Natural radiation</td>
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</tbody>
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Unit: mSv

Challenging issues for the future
— Supposing 3.11 happens again, what do we do (3)? —

What is agreed about exposure under 100 mSv?

Concept of risk of low radiation

Reference: discourse document by Prof. Y. Matsumoto at Tokyo Institute of Technology
Challenging issues for the future
— Supposing 3.11 happens again, what do we do (4)? —

Description of the magnitude of the numbers: What is milli and micro ??

Challenging issues for the future

Do experts take steps to communicate?
Step: 1 Understand the background (other side + its purpose)
Step: 2 Convey
- feelings
- situation
- knowledge and background

Society

Expert

(purpose)
scientific data