Assistance to the IAEA Member States for Developing Effective Risk Communications throughout Integrating Perceived Risk and Actual Risk in Public Communications

RICOMET 2016

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International Atomic Energy Agency

Agenda / Outline

1. IAEA and Risk Communication Issues In General
2. Incorporating Risk Perception into Risk Communication
3. Why address Perceived and Actual Risks?
4. Complexity of the Risk Perception Factors
5. IPARSC Project
6. Conclusions

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Meeting Purpose

- To elaborate on the issue of public communications
  - In general and for the specific regulations
- To discuss recommendations for further assistance to the Member states on how to enhance public communications by integrating perceived and actual risk in stakeholder communications;
- Objective is to improve public acceptance of the “remediation initiatives” (including decontamination, waste management, monitoring and remediation) by addressing the concerns of the local residents
  - Concerns for factual information and addressing perceived risks.

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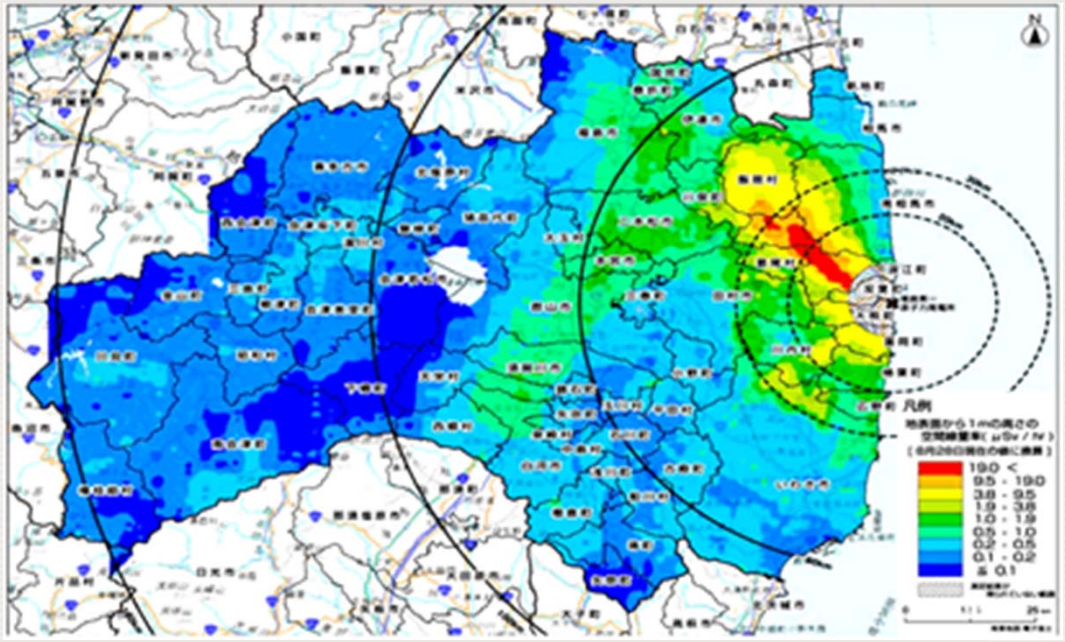
Risk Communication



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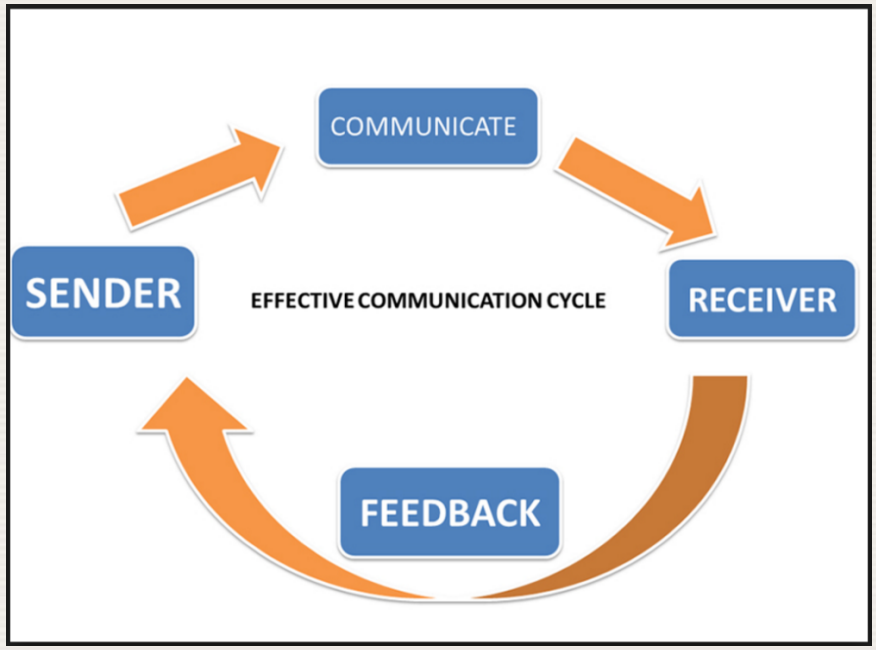
Communication

- Communication is simply the act of transferring information from one place to another.



- Exchange of information between an organization and its stakeholders

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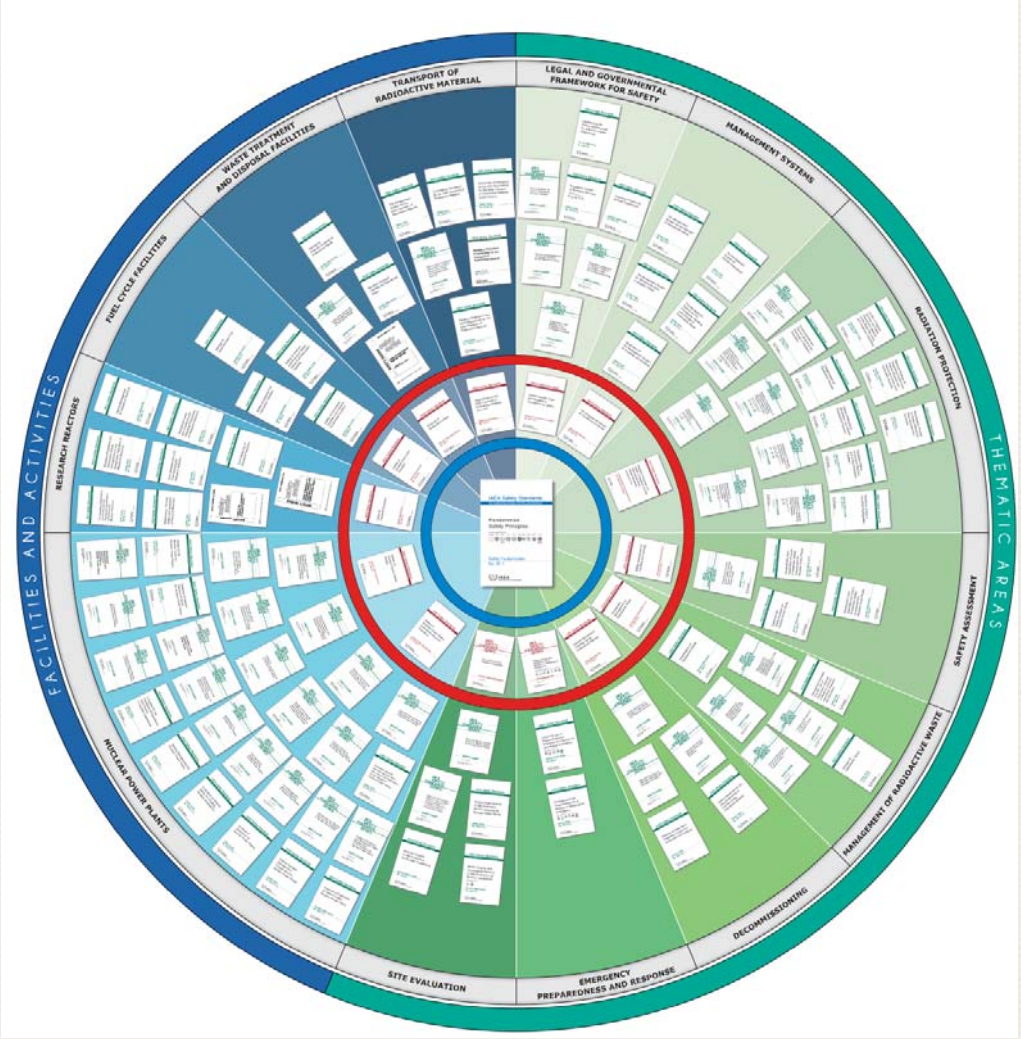
IAEA Safety Standards

- A process for public and stakeholder engagement is recommended or noted in many Standards.



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IAEA publications

Who are stakeholders?

- Stakeholder: Anyone who holds an interest in an issue and to which the organization has an obligation to acknowledge:
  - Members of “the public”, as groups or individuals, holding an vested interest in an issue or decision-making process;
  - Commercial / business interests, trade unions, and suppliers;
  - Governmental authorities at the national, regional and local level;
  - News media, professional and academic organizations (scientific community);
  - National and local NGOs;
  - Different stakeholders have different degrees of influence on decision-making processes (from opinion seeking to controlling influence).

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What are actual and perceived risks?

- **Actual Risk:** the *objective* assessment of the probability of a hazard (radiation) and its consequences (dose and effect on health)
  - dose calculations, dose maps, risk assessments, etc.

- **Perceived Risk:** the *subjective* assessment of the probability of a hazard (radiation) and its effect on what we feel about the consequences

- Risk perception are rooted in complex psychometric questions of risk acceptance and tolerance.

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Risk Communication

- Communication with the purpose to develop a common understanding of factual information, and to influence decisions or behaviours by addressing stakeholder interests.
  - Need to address both intellectual needs (information) and emotional needs (feelings);

- Risk communication plays an integral role in shaping individual risk perceptions as well as behaviours for risk aversion, reduction, or acceptance.

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Relevance to WES/RSM

- Each CA or FP Cooperation project (Remediation and Decontamination, Management of Waste from Remediation Activities, and, Assistance in the Use of Radiation Monitoring Data) includes effectively communicating results with the local residents and other stakeholders.

- Key consideration is given to assisting the MS Authorities with ensuring the output of the technical work is widely disseminated, and enhances understanding of the technical phenomena and physical properties by using plain language.

- The effectiveness of knowledge sharing (maps, reports, data results) with the public of the actual risk is strongly influenced by perceived risks (dread, trust, volition, familiarity, etc.).

- Thus effective communication of actual risk must be factual and understandable, as well as responsive to the perceived risk held by the audience.

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INCORPORATING RISK PERCEPTION INTO RISK COMMUNICATIONS

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Why Address Perceived Risk?

- Communicating actual risk by sharing scientific results is necessary but not sufficient to secure public acceptance or to assuage public concerns;
- Understandable data (maps, reports, analyses) address intellectual needs for information;
- Communications need to address emotional needs (fear, dread, stress, anxiety).

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Risks and Risk Communications

- **Actual risk** (reality) is quantified, usually by dose calculations and/or probabilities;
- **Perceived risk** (belief, attitude, judgement and feelings) is subjective for the individuals and quantifiable in a population and individuals;
- The study of actual vs. perceived risk, especially regarding ‘nuclear’ is well established (e.g. Slovic, et. al.), but the utilization of perceived risk for public communications in RWM situations is lacking.

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Figure 2 - Location of 81 hazards on Factors 1 and 2 derived from the interrelationships among 15 risk characteristics. Each factor is made up of a combination of characteristics, as indicated by the lower diagram. Source: Slovic et al. (1985)

- Controllable
- Not dread
- Not global catastrophic
- Not fatal consequence
- Low risk to future generations
- Voluntary

- Observable
- Known to those exposed
- Immediate effect
- Old risks
- Risks known to science

- Not observable
- Unknown to those exposed
- Effect delayed
- New Risks
- Risk unknown to science

- Uncontrollable
- Dread
- Global catastrophic
- Fatal consequence
- High risk to future generations
- Involuntary

Risk Communications without Addressing Risk Perception

EXAMPLES

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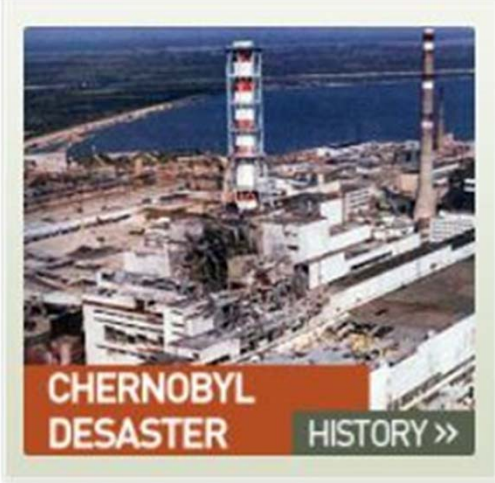
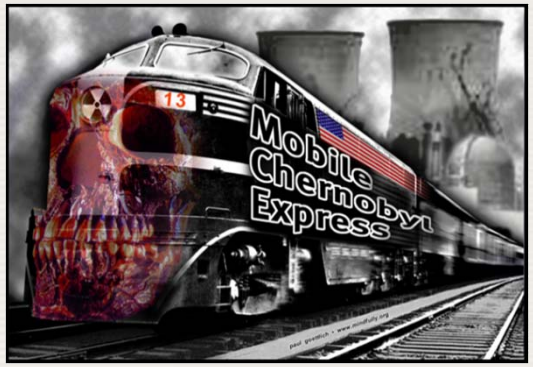
Well known problems in public communication from Chernobyl experience

- People need information linked to their own lives.
- People need clear messages **from sources they trust on:**
  - **Health effects of radiation;**
  - **Living with radiation; and**
  - **Healthy lifestyles in general.**
- People want Yes/No answers, not probabilities like “5,5·10-7”.
- Perceived risk of an activity is greater when the activity is seen as evoking fear, terror, or anxiety, or irreversible adverse effects
- **People need a clear message from their governments on the future of local economies and national social protection systems.**
- **People ignore information if it does not correlate with their concerns or beliefs.**





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ICRIN PROJECT

Examples of Multiple Consequences of the Nuclear Accident:

- Fear of cancer and other medical complications;
- Rumours and anecdotal reports;
- Intelligible communications about radiation;
- Contradictory information from “reliable sources”;
- Distrust in authority;
- Ecological and socioeconomic disruption (unemployment, etc.);
- Social stigma;
- Media coverage (not always fair and balanced);
- Psychological consequences

- After accidents involving radiation, fears start early and the emotional toll goes on for years.

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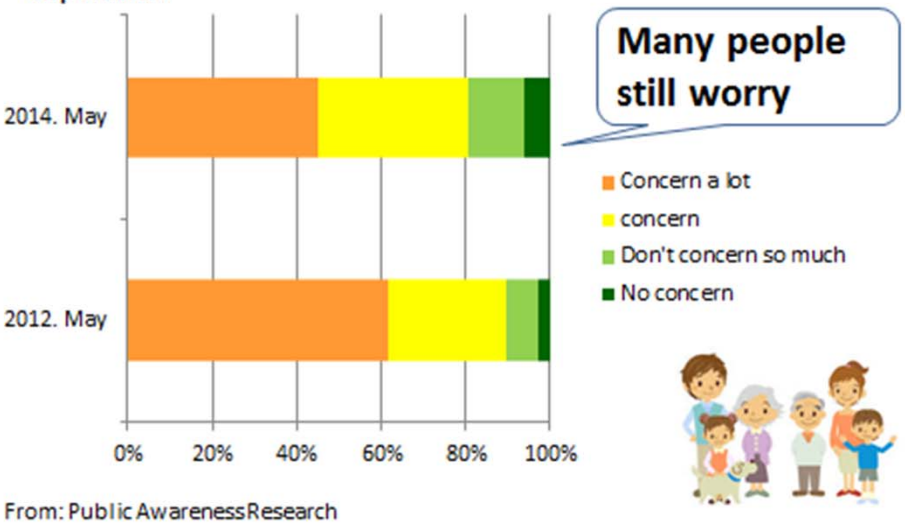
Perceived Risk Remain high in Japan

Fukushima Public Opinion

Do you worry about your family's health due to external exposure?

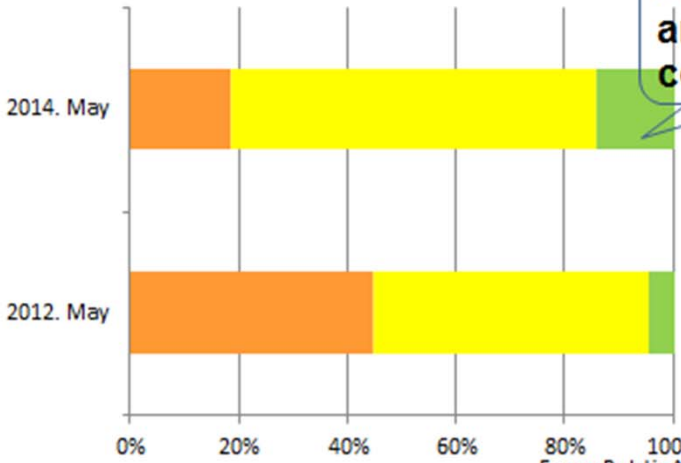


Many people still worry

From: Public Awareness Research

Fukushima Public Opinion

Has your concern about health issues due to internal exposure changed?



A lot of people are still concerned

From: Public Awareness Research

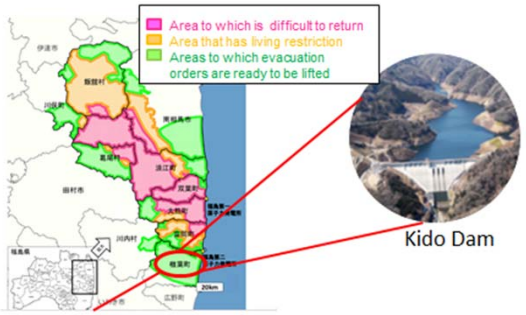
4.Current Situation in Fukushima ~Kido Dam~

The mud is 13,300 Bq/kg
But radiation was "NOT DETECTED" in tap water
So it's **SAFE**

Government

Citizens

Current Situation in Fukushima ~Kido Dam~



Naraha town

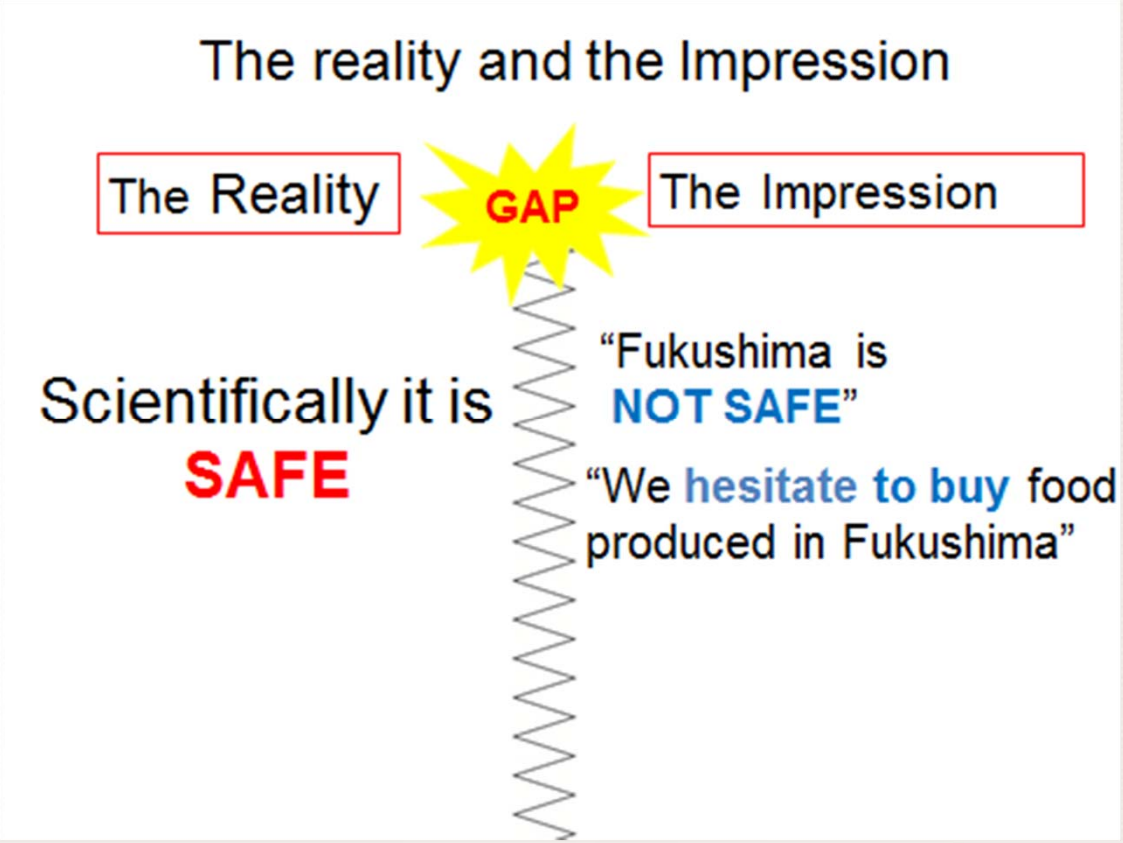
Reference: Ministry of Economy, Trade and Industry

Question

If you were one of the citizens, would you drink that water?

Fukushima Prefecture Actual and Perceived Risk

- Risk perceptions are still prevalent and recognized in FP
- We are addressing actual risk
- We should also address perceived risk



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Measuring Risk Perception

- It can be quantified on a standardized framework;
- Existence and strength of perceived risks can be assessed and correlated to specific demographics;
- Risk Perception Factors are well vetted

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Complexity of the Risk Perception Factors:

Risk perception factor	Perceived risk of an activity will be greater when the activity is seen as:
Volition	Involuntary or imposed
Controllability	Under the control of others
Familiarity	Unfamiliar
Equity	Unevenly and inequitably distributed
Benefits	Having unclear or questionable benefits
Understanding	Poorly understood
Uncertainty	Relatively unknown or having highly uncertainty
Dread	Evoking fear, terror, or anxiety
Reversibility	Having potentially irreversible adverse effects
Trust	Requiring credibility
Personal stake	Placing people personally and directly at risk
Ethical/moral nature	Ethically objectionable or morally wrong

Measuring Perceived Risk

Which of these perceptions exist?

How strong are the perceptions?

What subgroup demographics exist?

How should messages be framed for the public, through which channels?

Should they be captured in the Regulatory documents?

What can we do to help?

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What could we do for the MS?

IPARSC PROJECT

Prime goal of the IPARSC

- Provide support to the MS in securing public acceptance of remediation measures by addressing and integrating public risk perception with actual risk assessment of the population in the regions;
- Foster trust and acceptance (between stakeholders, operator and the affected population leaving in the affected areas);
- Ensure transparency through well documented professional judgments and with tailored risk communication based on perception of risk.

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Background

- Massive amounts of monitoring data is available:
  - Multiple sources, multiple types of data
- Supports expert determination of actual risk i.e. “doses are within safe levels”
- Used for reporting doses (µSv/h) as safe and/or comparable to other places:
  - Intended to convince people there is no health concern
  - Websites
  - Communications for perceived risks are limited
- **Is this approach effectively improving public acceptance?**
- **Is it aiding MS to make progress?**
- **Does it help MS to gain public confidence?**

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Examples

theguardian

'Everyone associates the dumps with death': the Kyrgyz town built on nuclear waste

Residents of Mailuu-Suu, one of the most polluted places on the planet, complain that officials are doing little to protect them from health hazards. reports

David Trilling in Mailuu-Suu for EurasiaNet, part of the New East network

Monday 3 August 2015 07.00 BST

On the ground floor of Mailuu-Suu's central hospital, pharmacist Ainagul Parpibaeva says she's had enough.

"We're full of illness. Many people have cancer, leukaemia. I think this is because of the uranium, but the government never tells us anything," she says. People continuously come to her complaining of the same symptoms over and over, "like children who are nauseous and vomit", she explains.

Almost everyone in this mining town in southern Kyrgyzstan can recount tales of recent deaths amongst family and friends, often related to cancer. But despite being consistently rated one of the world's most polluted places thanks to nearby Soviet-era radioactive waste dumps, cleanup measures have been limited.

The town was once closed to outsiders, with workers getting handsome salaries to perform dangerous work. They produced 10,000 metric tonnes of radioactive uranium between 1946 and 1967, providing much of the fuel for the Soviet Union's first nuclear weapons and atomic energy plants.

But they also buried millions of tonnes of waste from the milling of the radioactive metal along the river that runs through it. At the time, the wellbeing of workers was not a priority and little thought was given to future health hazards.

However, since the collapse of the Soviet Union in 1991, locals say there has been little monitoring or maintenance of the dumps: "Production targets usually took precedent over environmental, health and safety standards," the International Atomic Energy Agency wrote in a 2010 report, which warned that Mailuu-Suu was in urgent need of a cleanup.

The anti-pollution thinktank Blacksmith Institute still reports high cancer rates and poor immune systems among adolescents.

EPIDEMIC OF FEAR

A bumper crop of thyroid abnormalities in Fukushima children, including cancer, has perplexed scientists and alarmed locals

By Dennis Normile

The March 2011 meltdowns at the Fukushima Daiichi Nuclear Power Plant caused extensive human suffering—evacuations, emotional trauma and premature deaths, disrupted jobs and schooling. What they have not caused, so far, is radiation-related illness among the general public, and few specialists expect dramatic increases in cancers or other ailments. The reactors spewed just a tenth of the radiation emitted by the Chernobyl disaster, winds blew much of that out to sea, and evacuations were swift. Yet one wave of illness has been linked to the disaster—the ironic result of a well-intentioned screening program.

Months after the disaster, Fukushima Prefecture set about examining the thyroids of hundreds of thousands of children and teens for signs of radiation-related cancers. The screening effort was unprecedented, and no one knew what to expect. So when the first round of exams started turning up thyroid abnormalities in nearly half of the kids, of whom more than 100 were later diagnosed with thyroid cancer, a firestorm erupted.

One result, says Kenji Ishikawa, a public health specialist at University of Tokyo, was "overdiagnosis and overtreatment," leading dozens of children to have their thyroids removed, perhaps unnecessarily. Activists trumpeted the findings as evidence of the dangers of nuclear power. The large number of abnormalities appearing so soon after the accident "would indicate that these children almost certainly received a very high dose of thyroid radiation from inhaled and ingested radioactive iodine," antinuclear crusader Helen Caldicott wrote in a post on her homepage.

Scientists emphatically disagree. "The evidence suggests that the great majority and perhaps all of the cases so far discovered are not due to radiation," says Dillwyn Williams, a thyroid cancer specialist at University of Cambridge in the United Kingdom. In journal papers and in a series of letters published last month in *Epidemiology*, scientists have attacked the alarmist interpretations. Many acknowledge that baseline data from noncontaminated areas were needed from the outset and that the public should have been better educated to understand results and, perhaps, to accept watchful waiting as an alternative to immediate surgery. But most also say the findings hint at a medical puzzle: Why are thyroid abnormalities so common in children? The "surprising" results of the screening, Ishikawa says, show that "many more thyroid carcinomas than were previously realized start originate in early life."

SOMEKIDS OF CHERNOBYL got Japanese authorities worrying about thyroid cancer. The fallout from that April 1986 accident included radioactive iodine, which settled across swathes of Belarus, Russia, and Ukraine, contaminating pastures grazed by dairy cows. Children who drank the tainted milk accumulated the radioactive iodine in their thyroids. (Adult thyroids absorb less iodine.) A 2006 World Health Organization (WHO) study found that in the most contaminated areas, there had been about 1000 thyroid cancer cases among those who were under 18 at the time of the accident, though the report noted that more cases could emerge over time. The United Nations in 2005 attributed 15 childhood thyroid cancer deaths to Chernobyl. Caught early, the cancer is almost always cured by removal of the thyroid gland.

With that in mind, Japanese authorities set out to screen the thyroids of all 368,611 Fukushima residents who were 18 and under at the time of the accident (*Science*, 5 August 2011, p. 686). Most experts were not anticipating a bumper crop of thyroid problems. For starters, the potential radiation exposure of Fukushima residents was slight compared with Chernobyl victims. Moreover, the day after the meltdowns, Japanese authorities evacuated some 160,000 people living within 20 kilometers of the plant, and a week later they started screening for contaminated food. In addition, Fukushima residents were offered iodine tablets after the accident to block absorption of any radioactive iodine that managed to find its way into the food supply.

In 2013, WHO estimated that the 13 to 25 millisieverts (mSv) of exposure in the first year after the accident in the hardest hit areas might result in miniscule increases in cancer rates. (Worldwide, people receive on average 2.4 mSv per year from background radiation; a medical chest x-ray delivers about 0.1 mSv.) WHO noted that females have a 0.35% lifetime risk of developing thyroid cancer; it estimated that the highest exposures in the Fukushima area raised that risk by an additional 0.5%.

300,476

Number of Fukushima residents 18 and under whose thyroid screening results were available as *Science* went to press.

50%

Approximate fraction of those screened with solid nodules or fluid-filled cysts on their thyroids.

110

Number of thyroid cancer cases identified by December 2014 as a result of the screening.

The initial round of thyroid screening, started in late 2011, was simply to provide baseline data, as any radiation-induced tumors were not expected to emerge for at least 4 years. Children with nodules larger than 5.0 mm or cysts bigger than 20.1 mm underwent a second, more detailed examination and, if necessary, fine needle aspiration. After the initial screening, children will have their thyroids examined every 2 years until age 20 and every 5 years after that.

Results were released as screening progressed, and right from the start there were surprisingly high rates of abnormalities. Findings from the initial round of screening, completed in April 2013 and released in August 2013, showed that nearly 50% of the 300,476 subjects had solid nodules or fluid-filled cysts on their thyroids. Smaller studies elsewhere had hinted that tiny thyroid cysts and nodules were common in all ages. But "specialists

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Which of the risk perception factors might be relevant to the sub-populations of the Fukushima Prefecture?

Risk perception factor	Perceived risk of an activity <u>will be greater</u> when the activity is seen as:
Volition	Involuntary or imposed
Controllability	Under the control of others
Familiarity	Unfamiliar
Equity	Unevenly and inequitably distributed
Benefits	Having unclear or questionable benefits
Understanding	Poorly understood
Uncertainty	Relatively unknown or having highly uncertainty
Dread	Evoking fear, terror, or anxiety
Reversibility	Having potentially irreversible adverse effects
Trust	Requiring credibility
Personal stake	Placing people personally and directly at risk
Ethical/moral nature	Ethically objectionable or morally wrong

Understanding and uncertainty

Perceived risks of an activity is greater when the activity is seen as poorly understood, unknown and uncertain

Risk perception factor	Perceived risk of an activity will be greater when the activity is seen as:
Volition	Involuntary or imposed
Controllability	Under the control of others
Familiarity	Unfamiliar
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Which of these perceptions exist?

How strong are the perceptions?

What subgroup demographics exist?

How should messages be framed for the public, through which channels?

Should they be captured in the Regulatory documents?

What can we do to help?

What could help?

With an assessment of perceived risks and understanding which risk perceptions are prevalent, we can better shape and tailor the FP risk communications so they are both factual (actual risk from existing safety assessments) and responsive to public concerns (perceived risks).

Actual Risk Assessment Data

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Perceived Risk Assessment Data

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Risk Communication that are factual and responsive to concerns ⇨ IPARSC Project

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IPARSC Objective

- IAEA is intending to develop, after several case studies and integration of previous work, more formal guidance on how to approach such public risk perceptions involving 'back end' or legacy waste management situations, and to elaborate on how to **apply** the understanding of perceived risk to risk communication (as you know, education of what is "dose" is not enough; authorities need to respond to the emotional context as well).

- Team of IAEA staff and international experts will assist counterparts in the assessment of risk perceptions held by residents, and provide guidance on developing risk communications that both describe actual risk conditions and are responsive to public risk perceptions;

- At least two Local expert will be always involved in the effort to ensure MS sensitivities are addressed and to build capacity for future risk communication needs.

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Planned activities

1. Collect and analyse experience from other countries;
2. Develop the MS specific framework for acquiring the risk perception data;
3. Acquire and develop risk perception survey by one or more methods;
4. Conduct Risk perception survey and analyse data;
5. Incorporation the RPF results, into the final communication products.

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Expected Outcome

1. Knowledge enhancement (a better understanding of, and context for, the technical data related to the remediation and waste management),

2. Informed decision-making (the incorporation of new data and understanding into more rational decision basis regarding the remediation and waste management initiatives),

3. Behavioural change (enabling choice and comfort with personal decisions affecting the return to normal life by resident and returning evacuees),

4. Consensus building (stronger cohesion and agreement among groups holding influence on the progress or direction of the remediation and waste management initiatives),

5. Public acceptance (improved regard and support for the role of the FP Authorities in the priorities and approaches to the remediation and waste management efforts).

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Conclusions

- Population-based estimates of risk (dose) are difficult to convert into precise statements of individual risk:
  - The individual bases opinion and action on *perceived* risks;
  - Perceived risks are usually expressed through emotions (fears, anxiety, etc.) of consequential effect(s), not a given dose:
    - Latent cancers, childhood health, food and water safety, social stigma, economic security, etc.
- Monitoring data and dose reports are factual and necessary to assess actual risk, but insufficient to address perceived risk;
- Knowledge campaigns rarely convince people of the lack of concern…(experts lament “if the public just understood…”)
- If perceived risks go unaddressed, then the public remains unconvinced of the safety, and public confidence in the authorities is lost.

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Take Away Message

Improving public communication by addressing the perceived risks and actual risks of local residents of the affected communities will improve public acceptance for existing remediation and waste management measures, foster a return to normal life by residents and returning evacuees by reducing fears, stress and anxiety, and help to build mutual understanding and trust that will contribute to future success of the revitalizing efforts related to remediation and waste management.

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Thank you for attention!

The risk management is a two-way street: just as the public should take experts' assessments of risk into account, so should experts respect the various factors, from cultural to emotional, that result in the public's perception of risk (Paul Slovic).

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