5th International Expert Symposium in Fukushima on Radiation and Health
Chernobyl+30, Fukushima+5: Lessons and Solutions for Fukushima's Thyroid Question

Challenges of "Thyroid Examination" of the Fukushima Health Management Survey

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The Celecton Fukushima

“Thyroid Examination” was launched after the radiation disaster

October 2011: “Thyroid examination” was started.
Residents and medical professionals concerned about radiation exposure and thyroid cancer

“Thyroid Examination” was launched in response to social demand.

In the confused situation---

- Many people underwent thyroid cancer screening
- It was difficult to explain to residents:
  about the ultrasound examination
  about the thyroid cancer etc.
- It took a long time to report exam results.
- We could not explain how the results were judged.

“To take care and support children's health”
vs
“Ultrasound thyroid cancer screening”

Guides to planning case-findings

10 Principles Wilson and Jungner 1968

Principles and practice of screening for disease. Geneva: WHO; 1968.

1. The condition sought should be an important health problem.
2. There should be an accepted treatment for patients with a recognized disease.
3. Facilities for diagnosis and treatment should be available.
4. There should be a recognizable latent or early symptomatic phase.
5. There should be a suitable test or examination.
6. The test should be acceptable to the population.
7. The natural history of the condition, including development from latent to declared disease, should be adequately understood.
8. There should be an agreed upon policy on whom to treat as patients.
9. The cost of case-finding (including diagnosis and treatment of patients diagnosed) should be economically balanced in relation to possible expenditure on medical care as a whole.
10. Case-finding should be a continuing process and not a “once and for all” project.

This is a warning about the notion that screening must always be the right thing to do.

Balanced approach to cancer screening

Potential Benefits

Probability of an adverse health outcome without screening

Degree to which the screening identifies all people who would suffer from an adverse health outcome

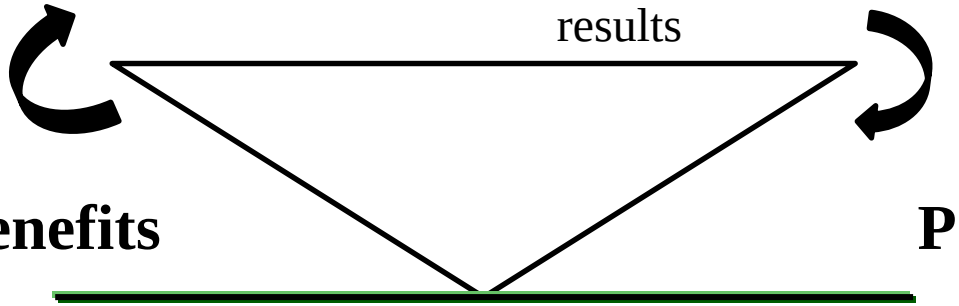
Magnitude of incremental health benefit of earlier vs. later treatment resulting from screening

Potential Harms

Frequency & severity of harms of diagnosis and treatment

Frequency of over diagnosis and experience of people who are over diagnosed

Frequency of false-positives and experience of people with false-positive results



It is important to balance potential benefits and potential harms for a suitable screening program.

Harris R et al. *Epidemiol Rev*. 2011;33:20-35.

Potential benefits of thyroid cancer screening

Probability of an adverse health outcome without screening

→ Excellent prognosis of thyroid cancer without screening

Low possibility for a benefit

Degree to which the screening identifies all people who would suffer the adverse health outcome

→ It is difficult to clinically determine whether thyroid cancer would advance or remain latent in a patient

Unknown, but maybe low for a benefit

Magnitude of incremental health benefit of earlier vs. later treatment resulting from screening

→ There is no evidence that cases diagnosed by screening have better prognosis

Unknown, but maybe small benefit

Potential harms of thyroid cancer screening

Frequency & severity of harms of diagnosis and treatment

Diagnosis: Not invasive except fine needle aspiration cytology; treatment (surgery) : not so invasive in most cases

Low and mild

Frequency of over diagnosis and experience of people who are over diagnosed

High frequency of overdiagnosis cancer psychological experience

High frequency

Frequency of false-positive screening tests and experience of people with false-positive results

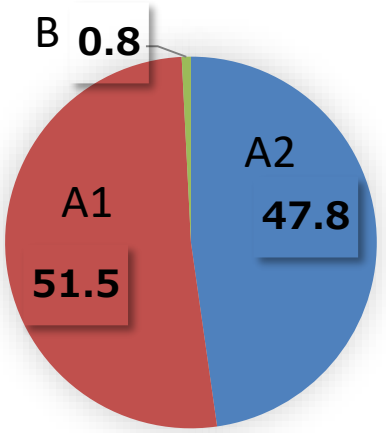
There are many benign nodules in thyroid gland.

High frequency

Screening in the aftermath of the radiation disaster

1. Potential benefits specific to “thyroid examination”

Anxiety would be relieved when the individual’s result was normal.



→Even though the result was not problem such as A2 (thyroid cyst), anxiety is not necessarily relieved.

It is possible to obtain scientific evidence regarding radiation exposure and health risks

→its benefit would arise in the future as a lesson, but not so directly for the examinees in the screening.

Screening in the aftermath of the radiation disaster

2. Experience of over diagnosis and experience of false positives

Almost all of the thyroid cancer cases would not have been found without ultrasound screening

Overdiagnosis?

95% of cases of category B have not been diagnosed as thyroid cancer, and were thus “false positives”.

False-positive?

Experience of overdiagnosis

Residents tend to associate thyroid cancer with radiation exposure, even though it is difficult to clinically determine whether radiation exposure is related to thyroid cancer in any particular patient.

Thyroid patients of thyroid cancer would be troubled with various matters of radiation exposure in their long-term future, and their families (especially mothers) would feel guilt for a long time.

Experience of false positives

In category B cases, the examinees and their parents are deeply concerned about the confirmatory examination results.

Even in the benign cases, examinees and their families would worry about the cause of disease, the course of disease, the results of the next examination and the relationship with radiation exposure.

Screening in the aftermath of the radiation disaster

3. Fear of thyroid cancer based on the screening result

The number of cases of thyroid cancer has been much higher than the data reported in cancer registries in Japan.
The possible relationship with radiation exposure…

Considered very unlikely because of radiation doses, age, geographical distribution, and pathological and genetic features

has been reported in newspapers and on the Internet. Such information in mass media tends to generate confusion about radiation risks

Overdiagnosis?

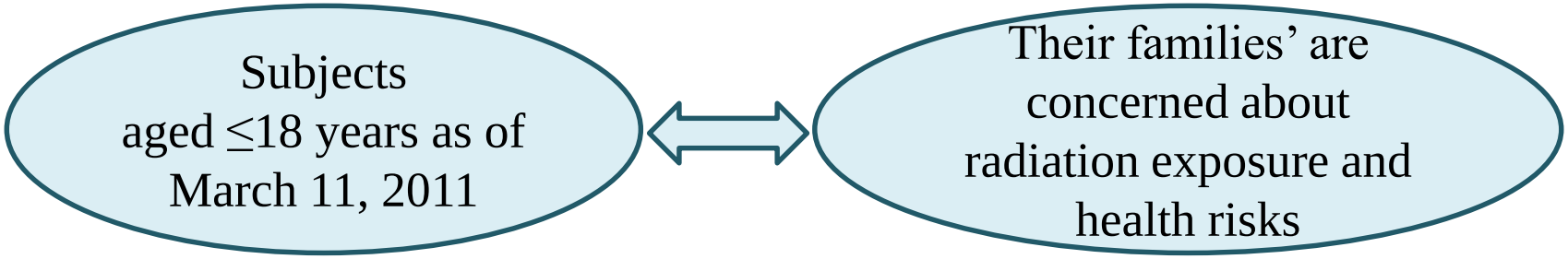
Radiation exposure?

It is difficult to judge this information scientifically for the residents
→Rendering them susceptible to misplaced anxiety or fear
→Fear of thyroid cancer based on the screening results

Screening in the aftermath of the radiation disaster

4. The difficulty was to confirm consent of participation

The participation rate in school children was > 90%



It is unclear how children perceive their health risks from radiation exposure and the thyroid examination. The children hardly know why they are examined by US.

Parents, in most cases, want to allow their children to have thyroid examinations, owing to their anxiety about radiation exposure.

Decision-making by minors is generally respected if they have precognitive maturity. Many children are likely to have undergone the examination based on parental decisions.
They would be diagnosed with thyroid cancer even if they underwent the examination without knowing its significance.

Challenges for future screening in Fukushima

How to balance potential harms and benefits

Substantial explanations about screening results

-to be easily understood

-to be acceptable

-to be considered “after radiation disaster”

Confirming willingness to undergo screening

-by providing the meaning of screening and potential harms and benefits,

-by respecting children’s thoughts

Efforts to minimize potential harms

-Overdiagnosis and residents’ experience of overdiagnosis

-False-positives and residents’ experience of false-positives

To address these problems

1) Communication with mothers (explanatory meetings)
2) Immediate post-examination individual counseling
3) Classroom dialogue in schools
4) Confirming the consent to participate

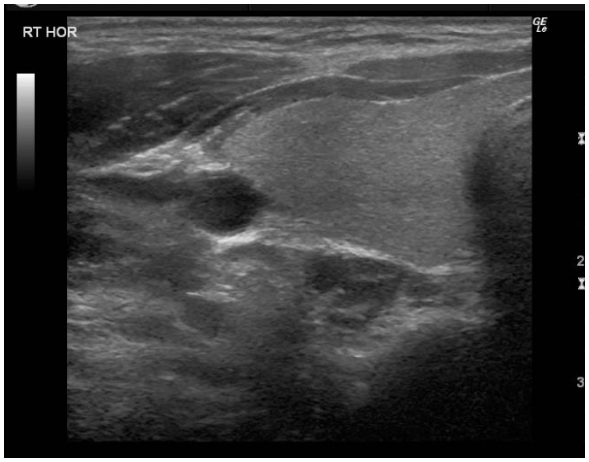
Making “thyroid examinations” well-balanced and acceptable to the residents

1) Communication with mothers (explanatory meetings)

Understandable > 90%
Decreased anxiety around 70%
（Hino et al., Tohoku J Exp Med 2016)

172 times, Total participants 7578
(From 2013 to 2015)

2) Immediate post-examination individual counseling



Showing ultrasound images, explaining the meaning of the findings, and answering the questions regarding radiation exposure and health risks

Total users 11653
(From April 2015 to March 2016)

It is insufficient for all subjects (~380,000) and their parents.
Many people still have doubts and anxiety regarding the meaning of the “thyroid examination,” health risks by radiation exposure, and interpretation of the thyroid cancer screening results.

Making “thyroid examinations” well-balanced and acceptable to the residents

3) Classroom dialogue in school

Providing a better understanding of the meaning of the thyroid examinations and interpretation of the examination results.
38 times, total participants 2792 in 2015

There are more than 200,000 students in 826 schools in Fukushima.

4) Confirming the consent to participate

Information letter → Return of consent form →

Post-school age	
YES	about 20%
No	<5%
No return	about 75%

Participants who did not return their consent form might not want to take the examination.
It is impossible to confirm their consent after explaining about the examination.

How to balance potential harms and benefits in the "Thyroid Examinations" for the children in Fukushima

1) Sufficient explanations about
   screening:individual results and epidemiologic results
2) Confirming willingness to undergo screening

It is insufficient to reduce harms only by strategies that address psychosocial issues.

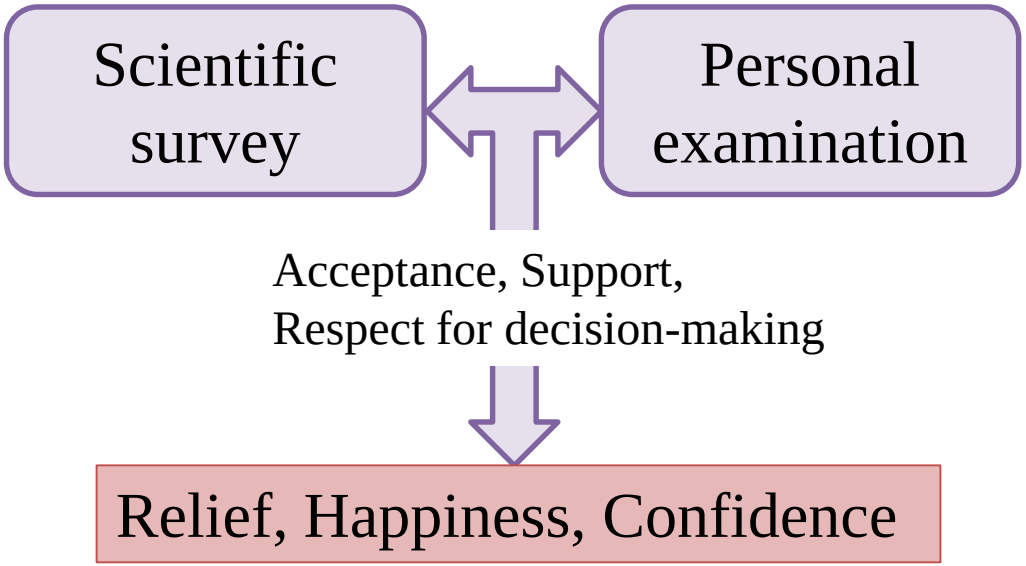
3) Efforts to minimize potential harms
   Reducing overdiagnosis and false-positives

Challenges of "Thyroid examination"

1) It is required to reconsider
   -targeting screening subjects based on individual estimation of thyroid equivalent dose
   -screening intervals, screening periods,
   -screening criteria, and cytology indication criteria
2) Promotion of voluntary participation in the survey based on sufficient provision of information
3) Strategies to address psychosocial issues, especially personal experience of overdiagnosis, must be developed and continuously improved

Acknowledgments

For the children in Fukushima



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