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After 15 Years, into the Future ~Life after the Great East Japan Earthquake~

Overview of the Fukushima Health Management Survey



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COI Disclosure

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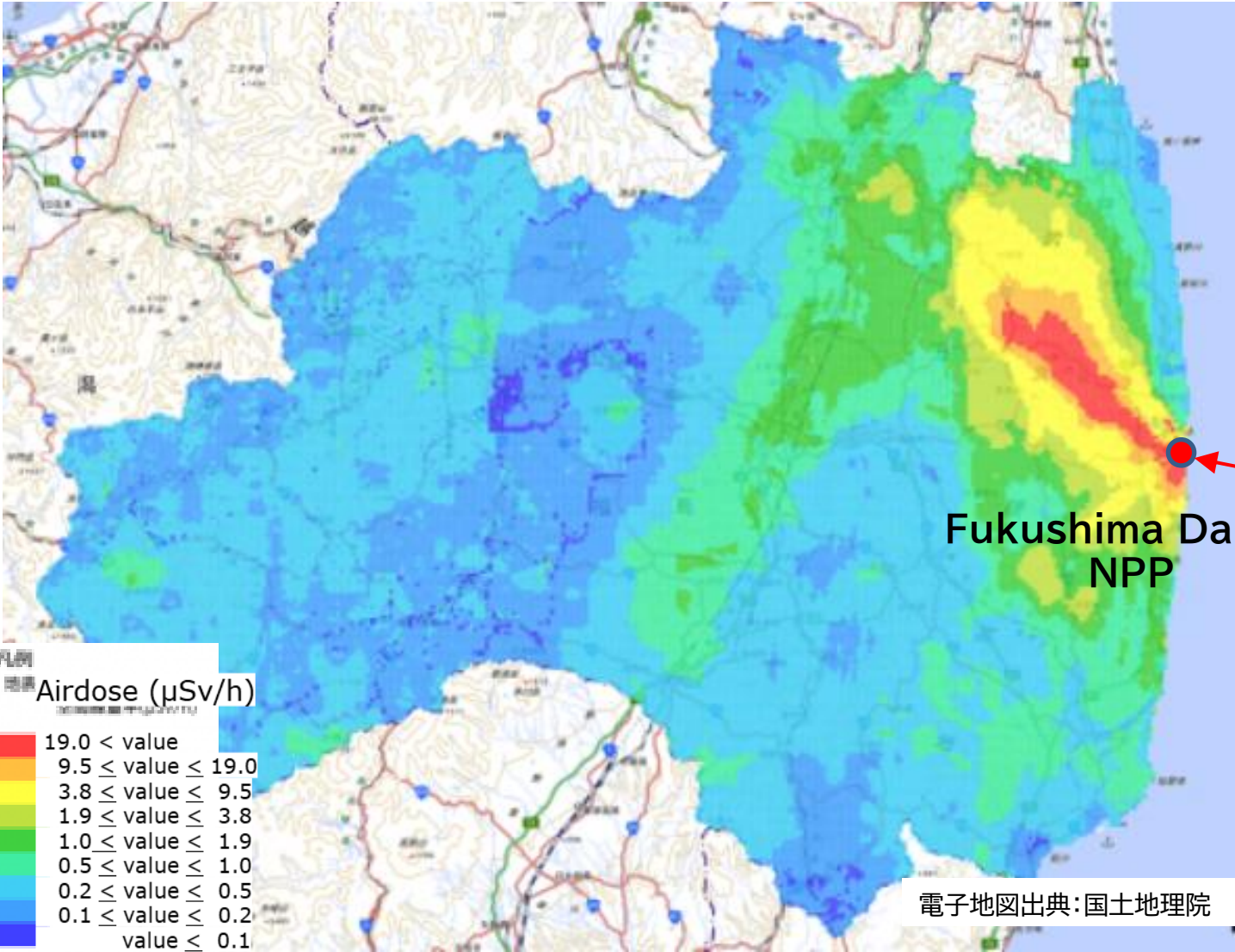
*The author has no financial conflicts of interest to disclose concerning this
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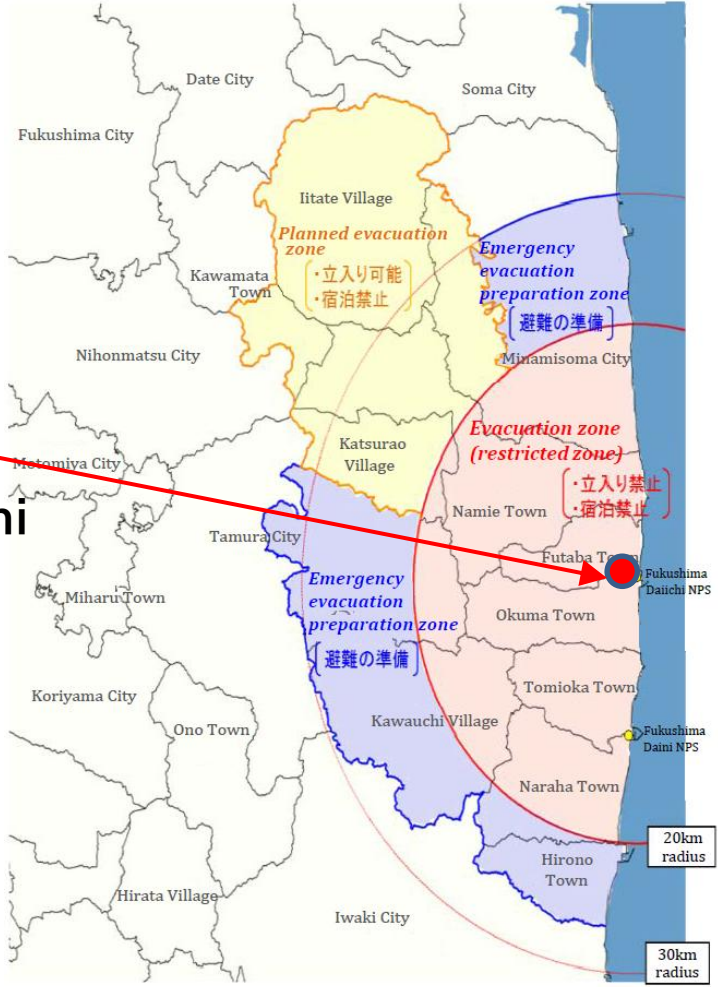
Today's Topics

1. Nuclear Disaster after the Great East Japan Earthquake and its impact on people
2. Overview of the Fukushima Health Management Survey (FHMS)
3. Health effects: evidence from the FHMS
4. Future focus

(As of April 22, 2011)



Fukushima Daiichi NPP



Airborne background radiation throughout Fukushima (as of May, 2011) and conceptual scheme of evacuation-designated zones (as of April 22, 2011)

(<https://www.pref.fukushima.lg.jp/sec/298/keijihenka-201105.html>)
 (Fukushima Prefectural Centre for Environmental Creation))

“Great East Japan Earthquake” Triple Disaster in Fukushima

By Prefecture:

Iwate 4,675 deceased (1,107 missing)*

Miyagi 9,639 deceased (1,215 missing)*

*As of Mar. 1, 2025

#As of Dec. 31, 2024

Fukushima Prefecture

1,600 died * # and 224 still “missing”
due to earthquake and/or tsunami

2,348 “disaster-related deaths.”
But no deaths due to radiation

Earthquake



Fukushima City

Tsunami



Minamisoma City

Nuclear Power
Plant Accident



Fukushima Dai-ichi
Nuclear Power Plant

Summary of disaster-related deaths from the Great East Japan Earthquake, by prefectures and age groups

Total deaths = Direct deaths (Earthquake/Tsunami)
+ Indirect deaths (Disaster-related deaths)

| Prefectures | Total disaster-related death | Difference from the previous review | By age groups | | |
|-------------------|------------------------------|-------------------------------------|---------------------|---------------|-------------------|
| | | | Ages 20 and younger | Ages 21 to 65 | Ages 66 and older |
| Iwate | 472 | (0) | 1 | 65 | 406 |
| Miyagi | 932 | (1) | 2 | 120 | 810 |
| Fukushima | 2,348 | (5) | 4 | 234 | 2,110 |
| Other prefectures | 56 | (0) | 3 | 10 | 43 |
| Total | 3,808 | (6) | 10 | 429 | 3,369 |

Fukushima has more disaster-related deaths, predominantly among older citizens.

→ **direct death of 1,600 persons**

(As of Dec. 31, 2024)

(Data from Reconstruction Agency: Tabulation by YASUMURA)

Purpose of the Fukushima Health Management Survey

From the 2nd Fukushima Prefectural Oversight Committee (June 18, 2011)

(Reference)

Framework of Health Management for Fukushima residents

1 . Background

2 . Purpose

Relieve anxiety after the nuclear accident

Protect and promote the long-term health of Fukushima residents

3 . Implementation

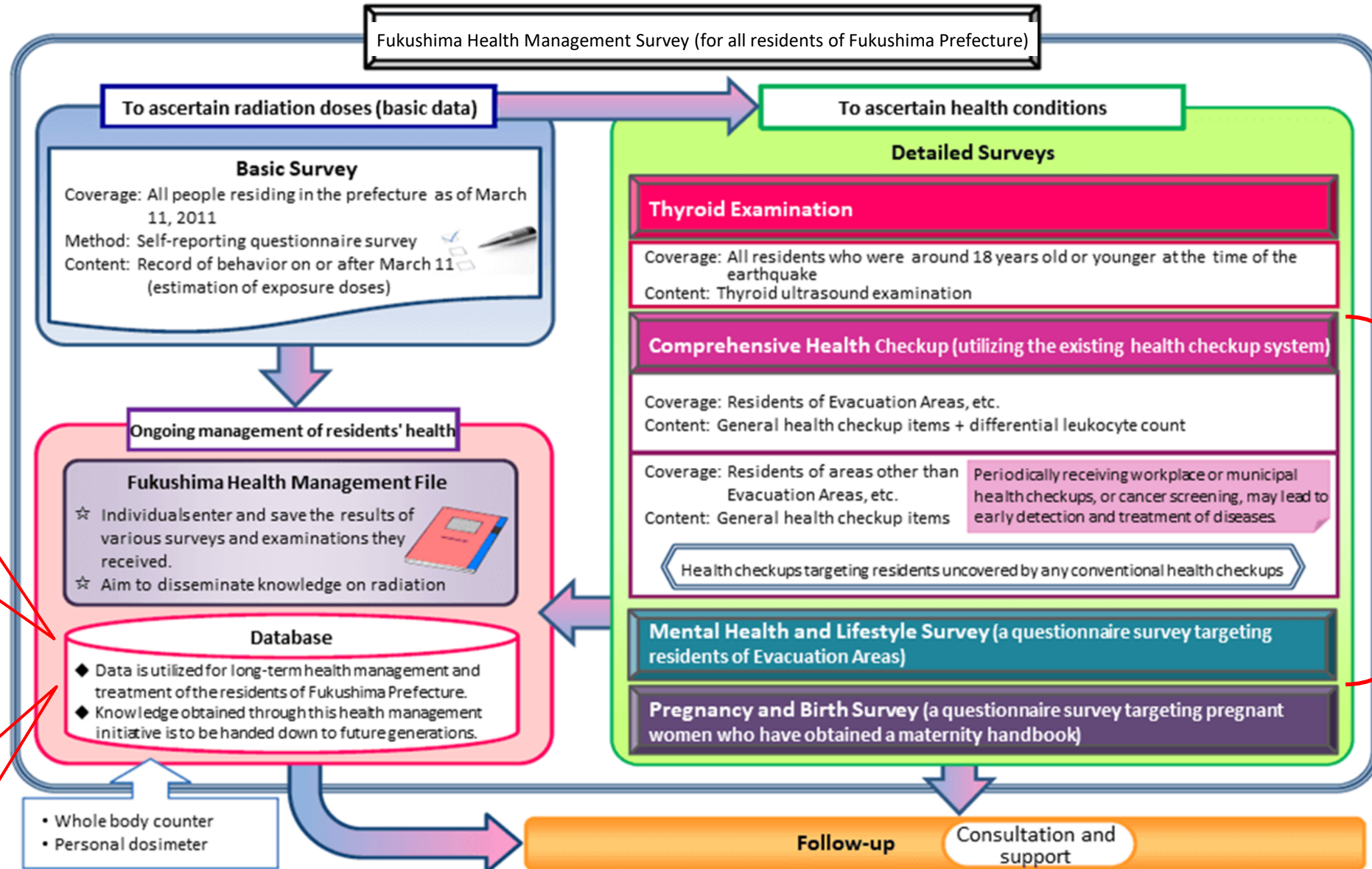


What is the FHMS?

Following the release of radioactive materials and evacuation of residents after the nuclear accident, Fukushima prefecture has implemented the 'Fukushima Health Management Survey' to estimate external exposure doses and to ascertain residents' health status, essential activities for prevention, early detection, and treatment of disease. The goal is to protect and promote the long-term health of Fukushima Residents.

(Fukushima prefecture HP:<https://www.pref.fukushima.lg.jp/sec/21045b/ps-kenkocoyosa-gaiyo.html>)

Fukushima Health Management Survey (Overview)



Mortality data has been included.

Cancer registration has been linked.

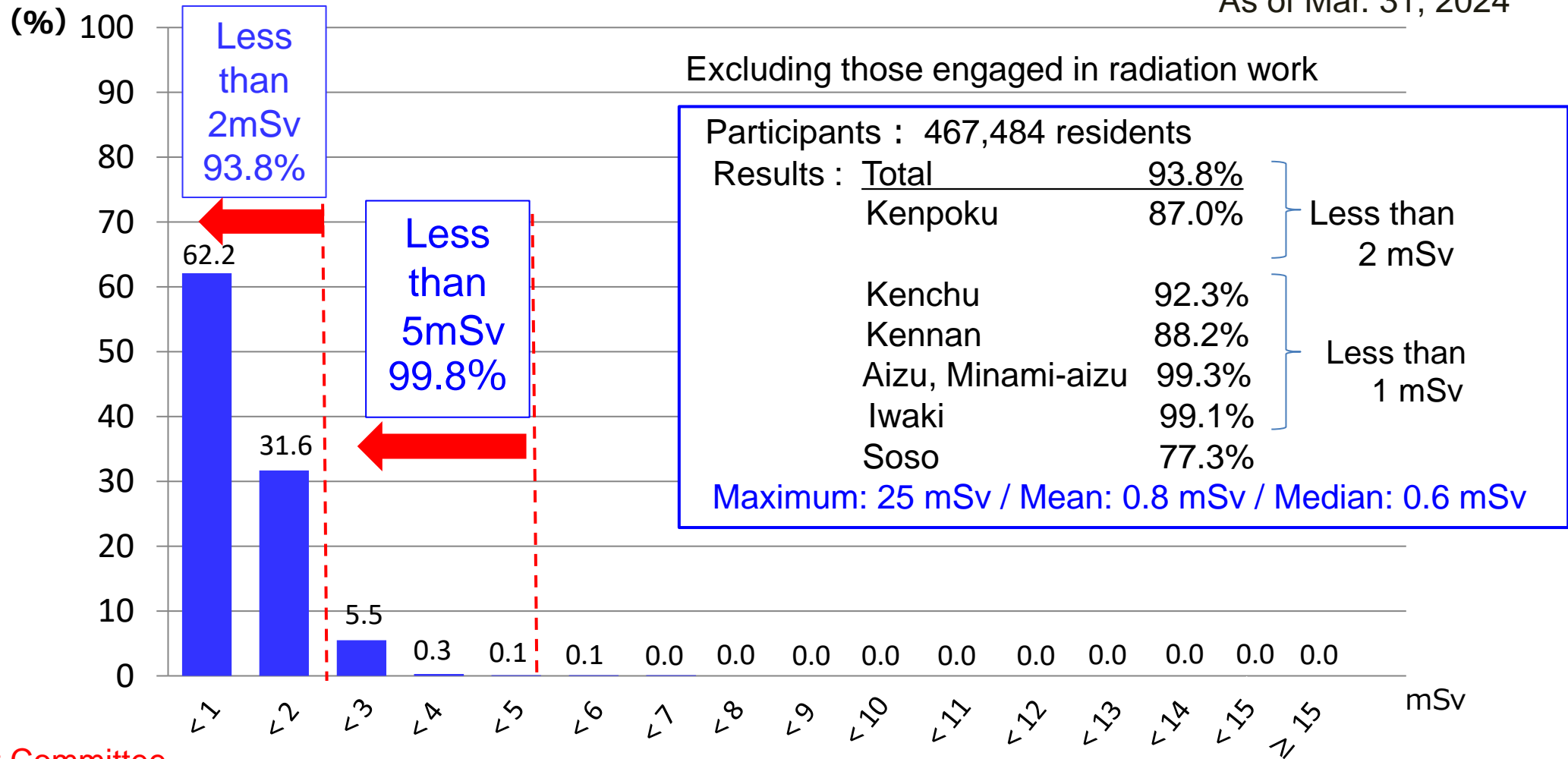
Eligible persons are the same.

Basic Survey – Results

Source: 52nd meeting of the Oversight Committee for the Fukushima Health Management Survey (July. 20, 2023)

Summary of external exposure (effective dose) during the first 4 months after the disaster

As of Mar. 31, 2024



Oversight Committee

The dose estimation results obtained from this survey were considered as “not being at a level where health effects can be confirmed with statistical significance in light of the scientific knowledge obtained to date.”

Thyroid Ultrasound Examination – Method

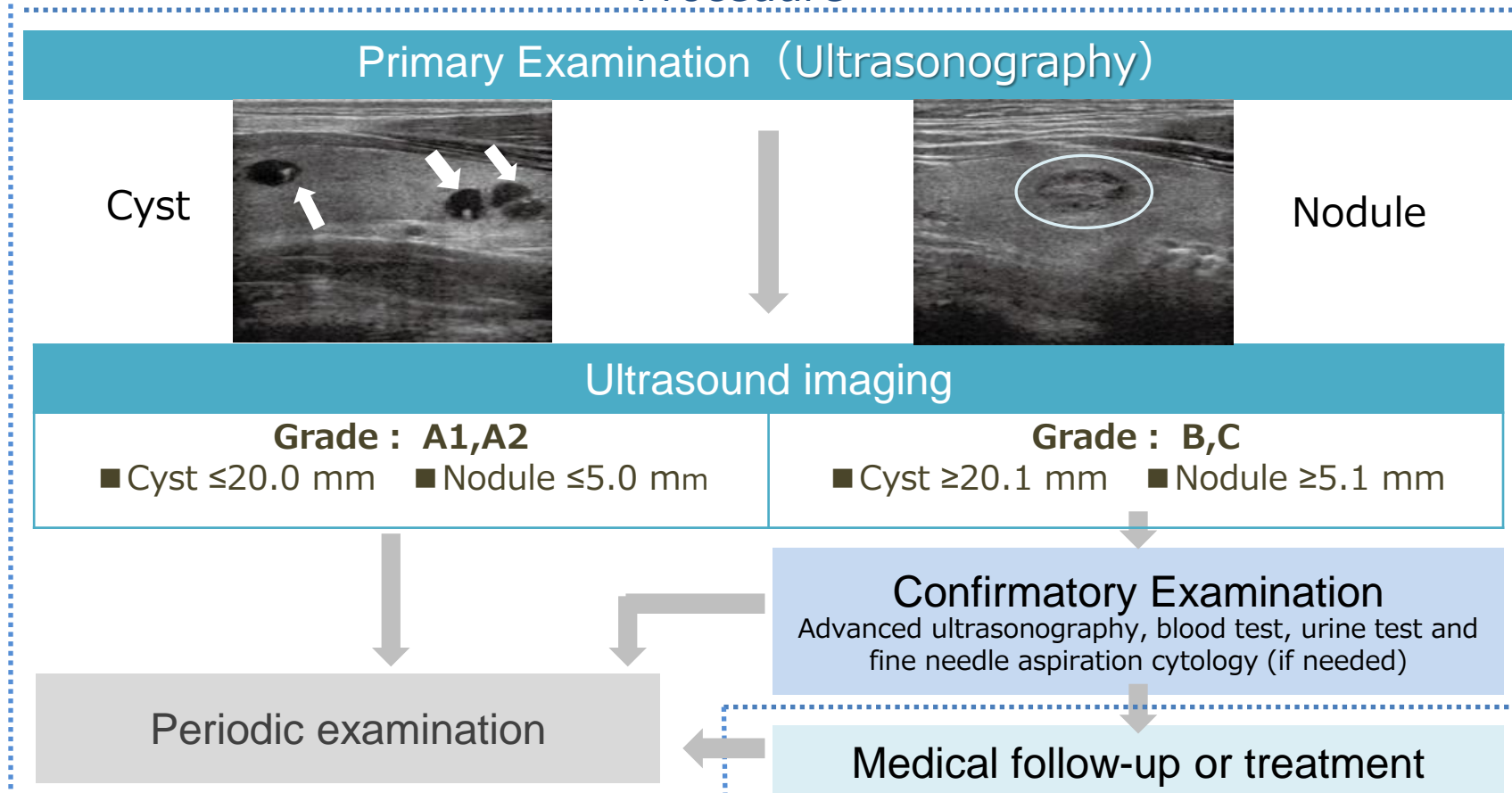
Preliminary baseline survey: Approx. 368,000

All residents aged 18 years or younger at the time of the disaster

Full-scale survey : Approx. 381,000

In addition, those who were born from April 2, 2011 to April 1, 2012

Procedure



Advantages and Disadvantages of Thyroid Ultrasound Examination

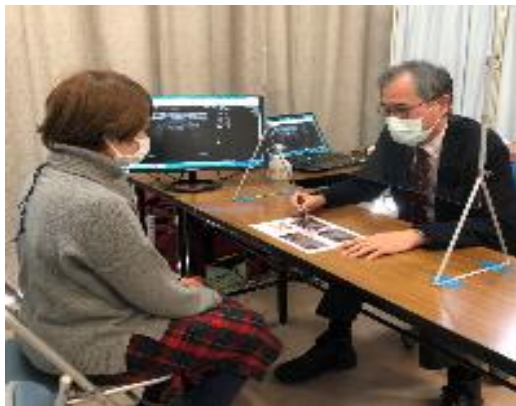
Advantages

- Analysis of results provide information regarding radiation effects in Fukushima Prefecture
- If no irregularities are found, it may bring peace of mind.
- Early diagnosis reduces the risk of recurrence and complications.

Disadvantages

- Participants may have anxieties regarding the examination results.
- Burdens may increase from thyroid cancer treatment and/or follow-ups.
- Extremely low-risk cancer may be overdiagnosed.

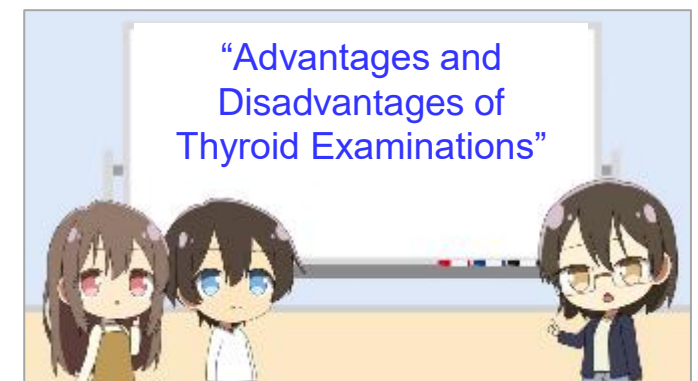
Efforts to promote understandings of thyroid examinations



Explanation about the examination at primary examination venues

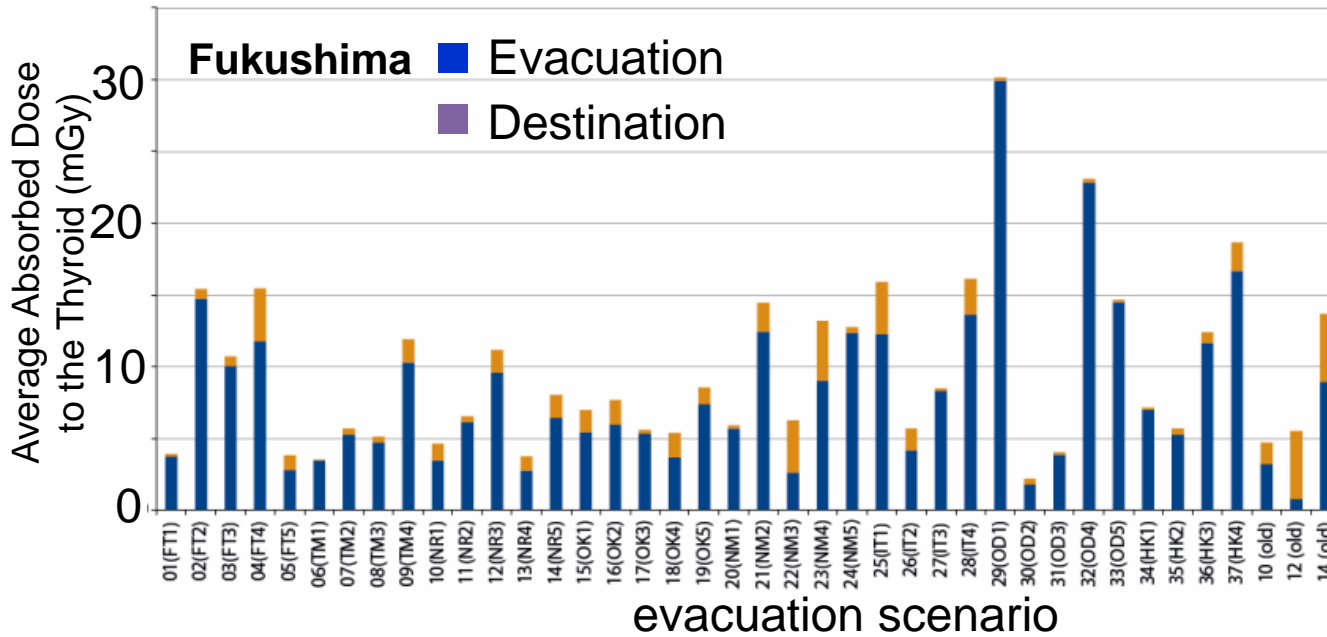


Visiting lectures for students



Explanatory Animation Video

Average absorbed dose to the thyroids of infants in the first year, for each evacuation scenario



UNSCEAR
2020/2021 Report, page 150

Average absorbed dose to the thyroid in the first year to infants
About 2mGy-30mGy

UNSCEAR 2008 Report

| Chernobyl Accident | # of people (x1,000) | Mean effective dose (mSv) | | Mean Thyroid dose (mGy) |
|--------------------|----------------------|---------------------------|----------|-------------------------|
| | | External | Internal | |
| Belarus | 25 | 30 | 6 | 1,100 |
| Russia | 0.19 | 25 | 10 | 440 |
| Ukraine | 90 | 20 | 10 | 330 |

Thyroid Ultrasound Examination –

Prefectural Oversight Committee's view on results

1st round Based on a comprehensive evaluation of the results of the Preliminary Baseline Survey, thyroid cancers found thus far cannot be attributed to radiation from the Fukushima accident.

Because...

From "Interim Report on the Fukushima Health Management Survey"

- Exposure doses in the Fukushima accident were generally lower.
- Latent period of thyroid cancers is short (approximately one to four years).
- Cancers have not been found in those aged five and younger.
- There are no significant regional differences in detection rates.

2nd round Oversight Committee confirmed its subcommittee's view that no causal relationship could be established between radiation exposure and prevalence of thyroid cancer found in the 2nd-round survey.

Because...

From "Documents 1-1 & 1-2 of the 36th Oversight Committee Meeting."

- Analyses of an association between thyroid cancer detection rates and thyroid doses estimated by UNSCEAR revealed no dose-effect relationship.
- The age distribution of thyroid cancers in Fukushima is different from that of Chernobyl.

Up to the 4th round Analyses classified into quartiles based on the distribution of estimated doses by UNSCEAR among the thyroid examination participants showed no significant association and no dose-response relationship. (The 21st Thyroid Examination Evaluation Subcommittee)



Up to the 5th round "Consequently, the Preliminary Baseline Survey to the Fifth-round Survey did not reveal any association between thyroid cancer and radiation exposure.
(July, 4, 2025. The 25th Thyroid Examination Evaluation Subcommittee)

Thyroid Ultrasound Examination – Support

○ Support for Primary Examination

The Diagnosis Explanation Booth

- Set up at public locations/facilities
- Provisional explanation by a doctor showing the scanned image



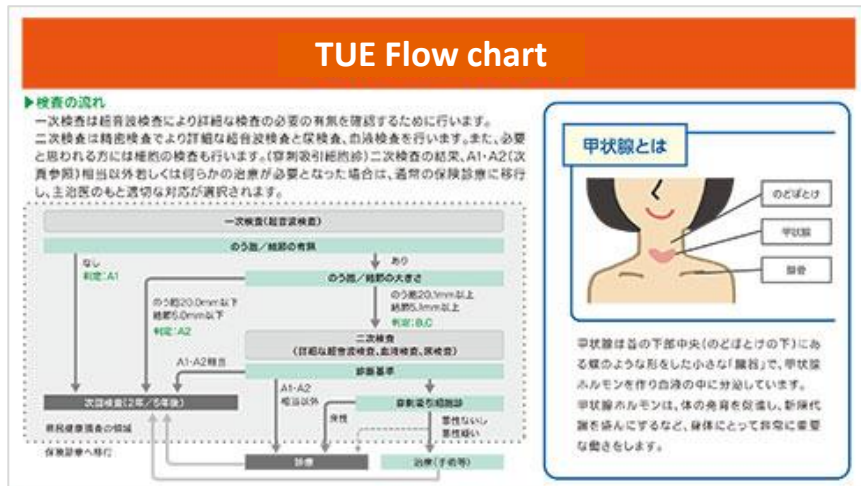
In the booth (image)

Provided explanation to **34,696** people since FY2015

(The figure as of the end of Sep. 2023)

○ Leaflet

- Distribution at the examination venues
- Explanation of nodules & cysts, diagnostic criteria, follow-up exams, etc.

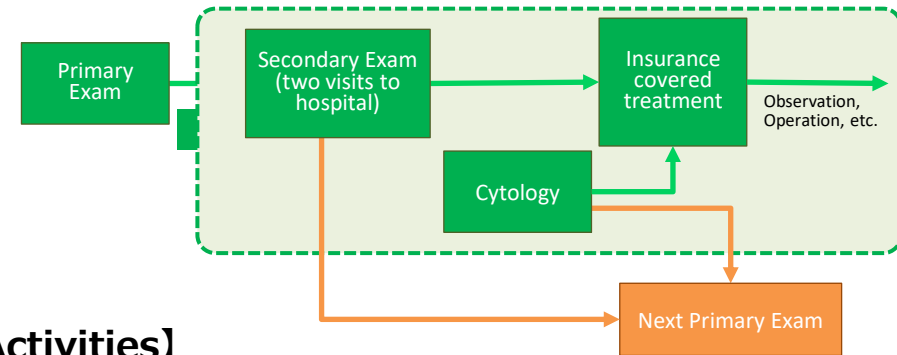


○ Support for Confirmatory Examination

Thyroid Support Team

【Members】

Nurse, Psychiatric Social Worker, Clinical Psychologist, Medical Social Worker, etc.



【Activities】

Psychosocial support for the confirmatory examination examinees and their families

Supported **2,511** people (**5,098** times) since FY2013

(Figures as of the end of Sep. 2023)

○ Dedicated Medical Call Center

【Coverage】

Thyroid exam patients and their families

452 calls since FY2016

(The figure as of the end of March 2023)

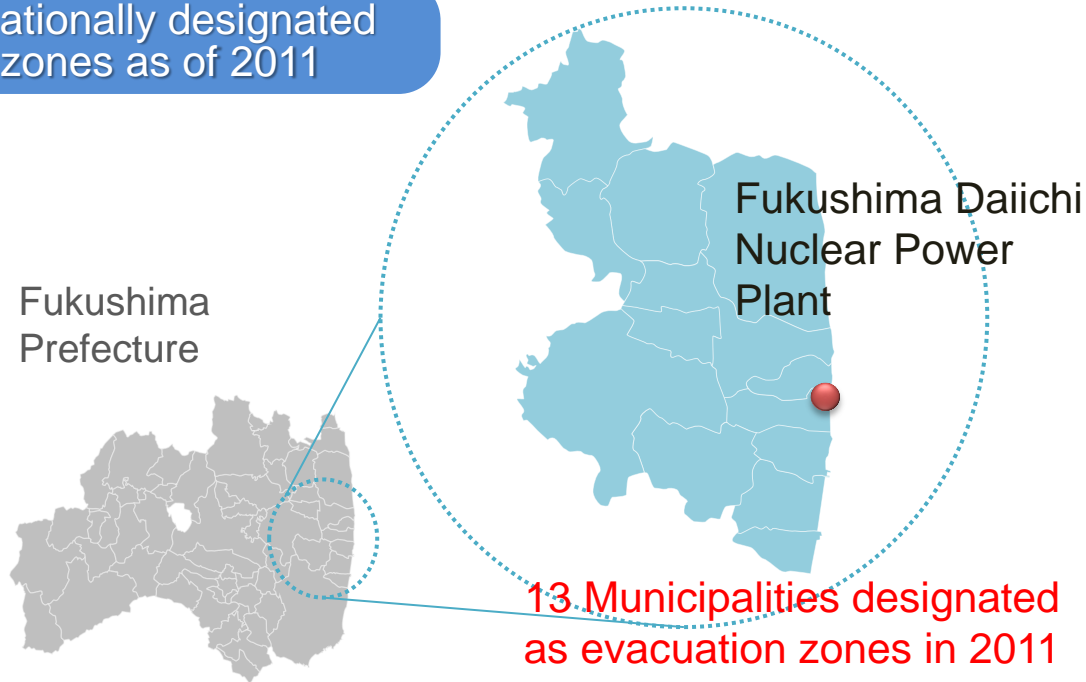
【Activities】

- Medical consultation on diagnoses and thyroid diseases, etc.
- Doctors respond while checking the result and scan.

Comprehensive Health Check (CHC) – Outline

Covered Population: About 210,000
 = same as the Mental Health and Lifestyle Survey

Residents of nationally designated evacuation zones as of 2011



13 Municipalities designated as evacuation zones in 2011

Those who were recommended to have a follow-up based on the results of the Basic Survey

Age groups and check items

| Age groups | Check items |
|--|--|
| 0 – 6 (Preschool) | Height, weight [Additional items on request] CBC (complete blood count: red cell count, differential white cell count, platelet count, hematocrit, hemoglobin) |
| 7 - 15 (Elementary school Grade 1 – Junior high school Grade 3) | Height, weight, blood pressure, CBC [Additional items on request] Blood biochemistry (AST, ALT, γ GT, TG, HDL-C, LDL-C, HbA1c, plasma glucose, serum creatinine, uric acid) |
| 16 or older | Height, weight, abdominal circumference or BMI, blood pressure, <u>CBC</u> , urine protein, urine sugar, <u>urine occult blood</u> , blood biochemistry (AST, ALT, γ GT, TG, HDL-C, LDL-C, HbA1c, plasma glucose, <u>serum creatinine</u> , <u>estimated glomerular filtration rate [eGFR]</u> , <u>uric acid</u>) |

※The underlined items are not usually performed in Specific Health Checkups.

Comprehensive Health Check (CHC) – Results

41st, 44th, 48th, and 50th Oversight Committee for the Fukushima Health Management Survey

No findings indicating radiation effects were found in the results of the CHC

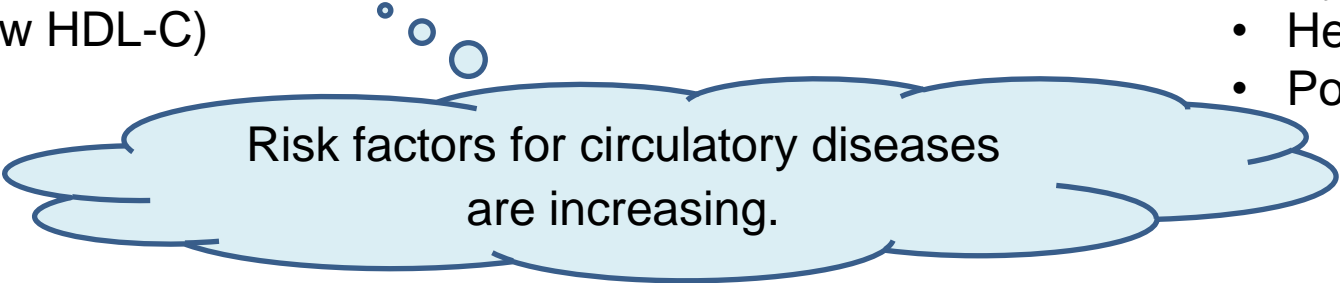
Health status after the 3.11 Great East Japan Earthquake (ages 15 years old or younger)

- Obesity has improved, but dyslipidemia has persisted.

Diseases that are considered as being attributable to changes in lifestyle including evacuation due to the disaster (ages 16 years old or older)

- Obesity
- Hypertension
- Dyslipidemia (low HDL-C)
- Diabetes

- Renal dysfunction
- Hyperuricemia
- Hepatic dysfunction
- Polycythemia



Risk factors for circulatory diseases
are increasing.

Diseases that had increased after the disaster but reduced thereafter (aged 16 years and older)

- Blood pressure, LDL-C: Improved treatment rate
- Hepatobiliary system enzyme abnormality (hepatic dysfunction): Daily exercise and eating breakfast

Comprehensive Health Check (CHC) – Support

FMU Radiation Medical Science Center

13 municipalities designated as evacuation zones



Explanation/
proposal to
local gov't



Report at briefing sessions with
13 municipalities

Conducted **342** times
From FY2013 to FY2022

- Results by each municipality
- Health promotion suiting the needs of each municipality, etc.

Residents



Used for promotional
activities and health advice
etc.

“Health Seminars” at health check
results reporting meetings, etc.

Deepening
understanding and
raising awareness of
health conditions

Participation



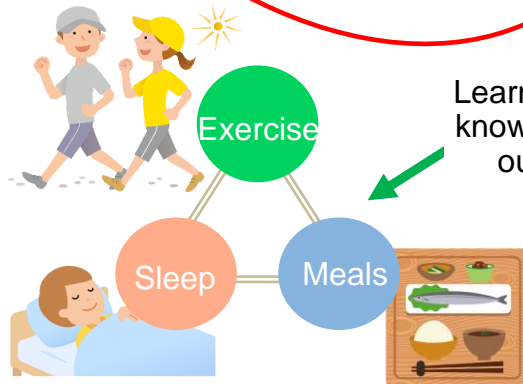
(Health lecture by a doctor)

(Blood glucose measurement)

Conducted **177** times
from FY2016 to FY2022

Learn and apply
knowledge from
our leaflet

Health checks

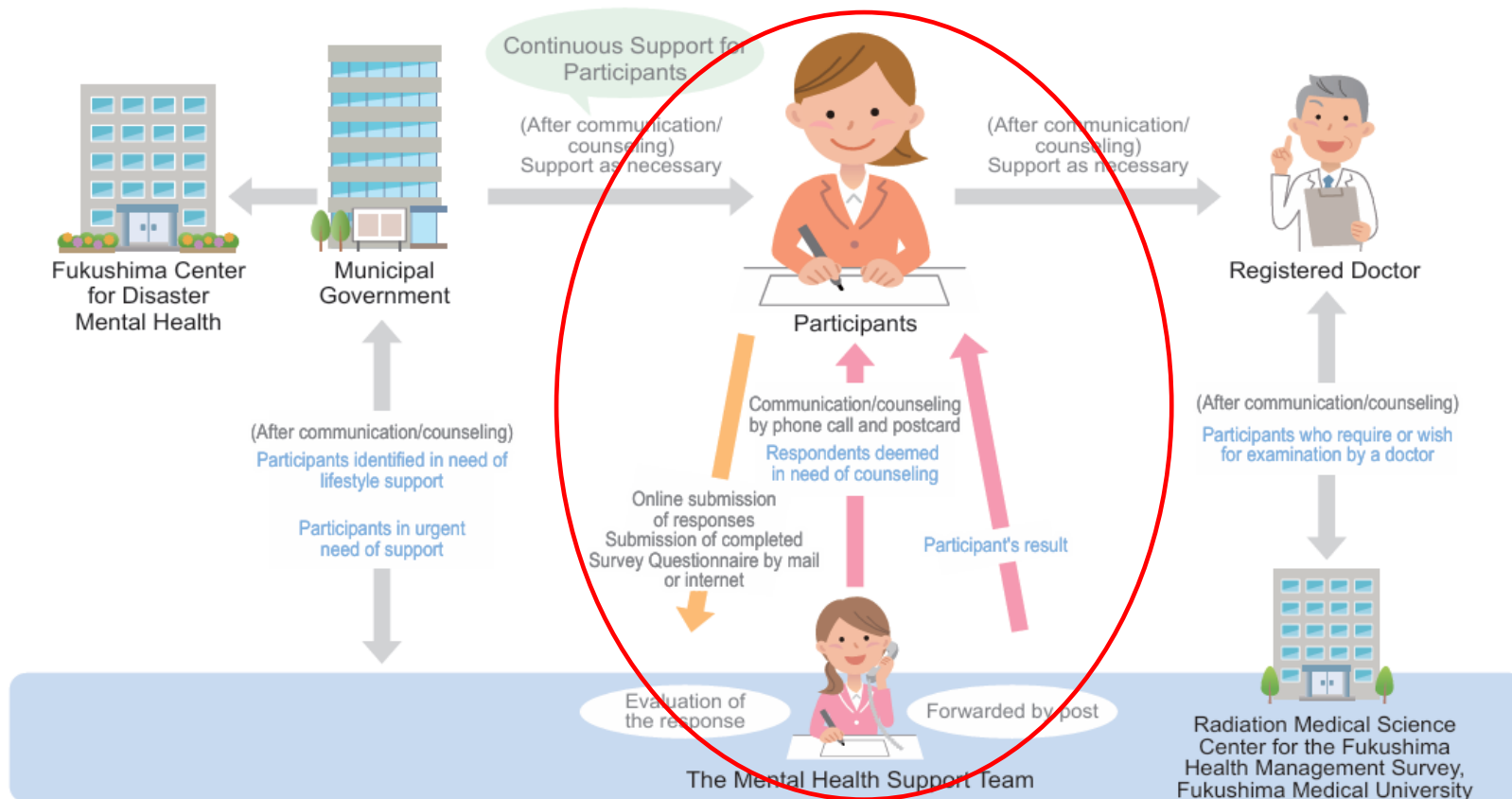


Mental Health and Lifestyle Survey (KOKOKARA Survey) – Outline

Covered Population = same as Comprehensive Health Check, those who resided in the 13 municipalities designated as evacuation zones by Japanese government.

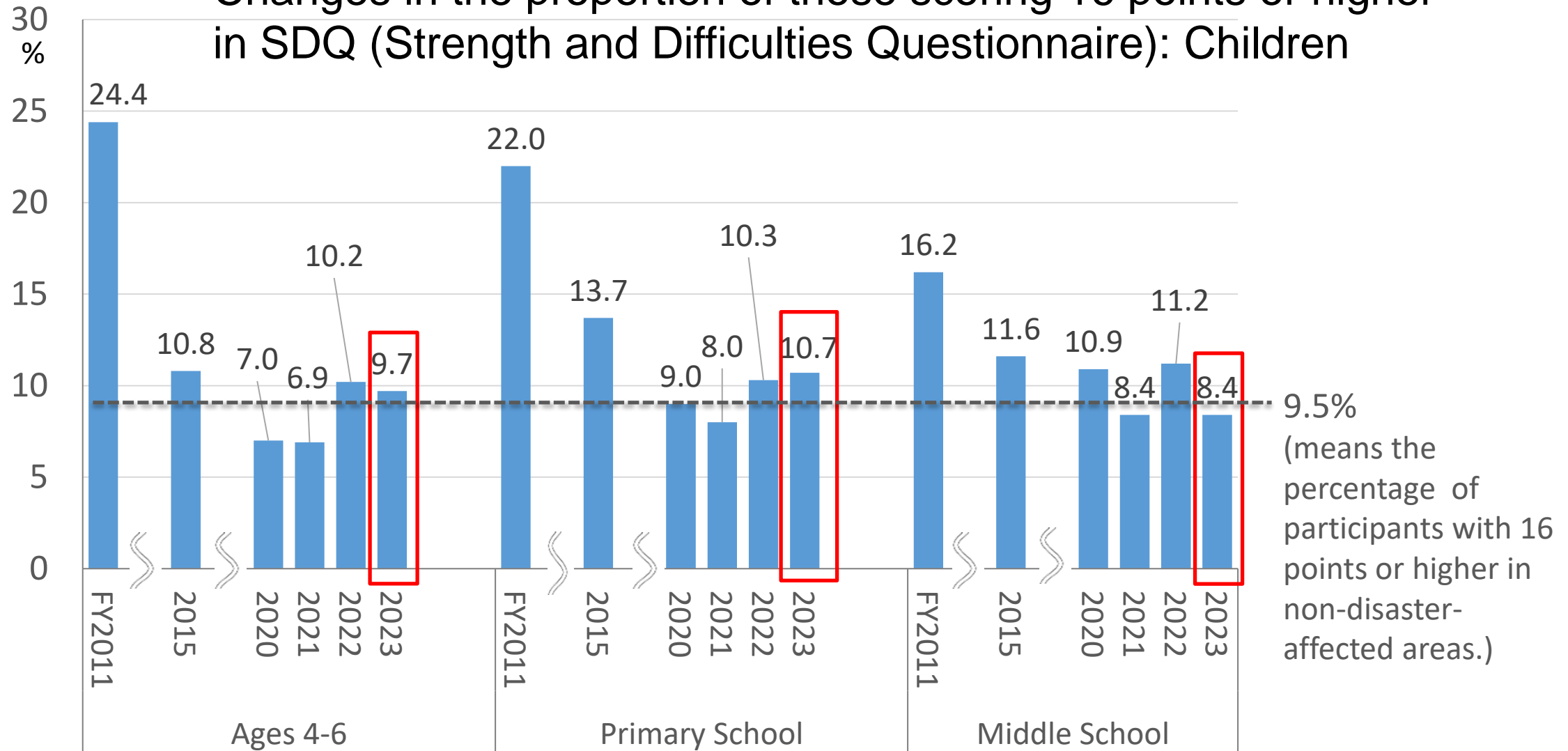
Eligible participants: 210,000 people. These people are divided into 5 age groups (ages 0-3, 4-6, 7-12, 13-15, 16+ years).

Procedures from Submission of Survey Questionnaire to Receipt of Support and Care in Collaboration with Relevant Organizations and Doctors



Mental Health and Lifestyle Survey – Results <Children>

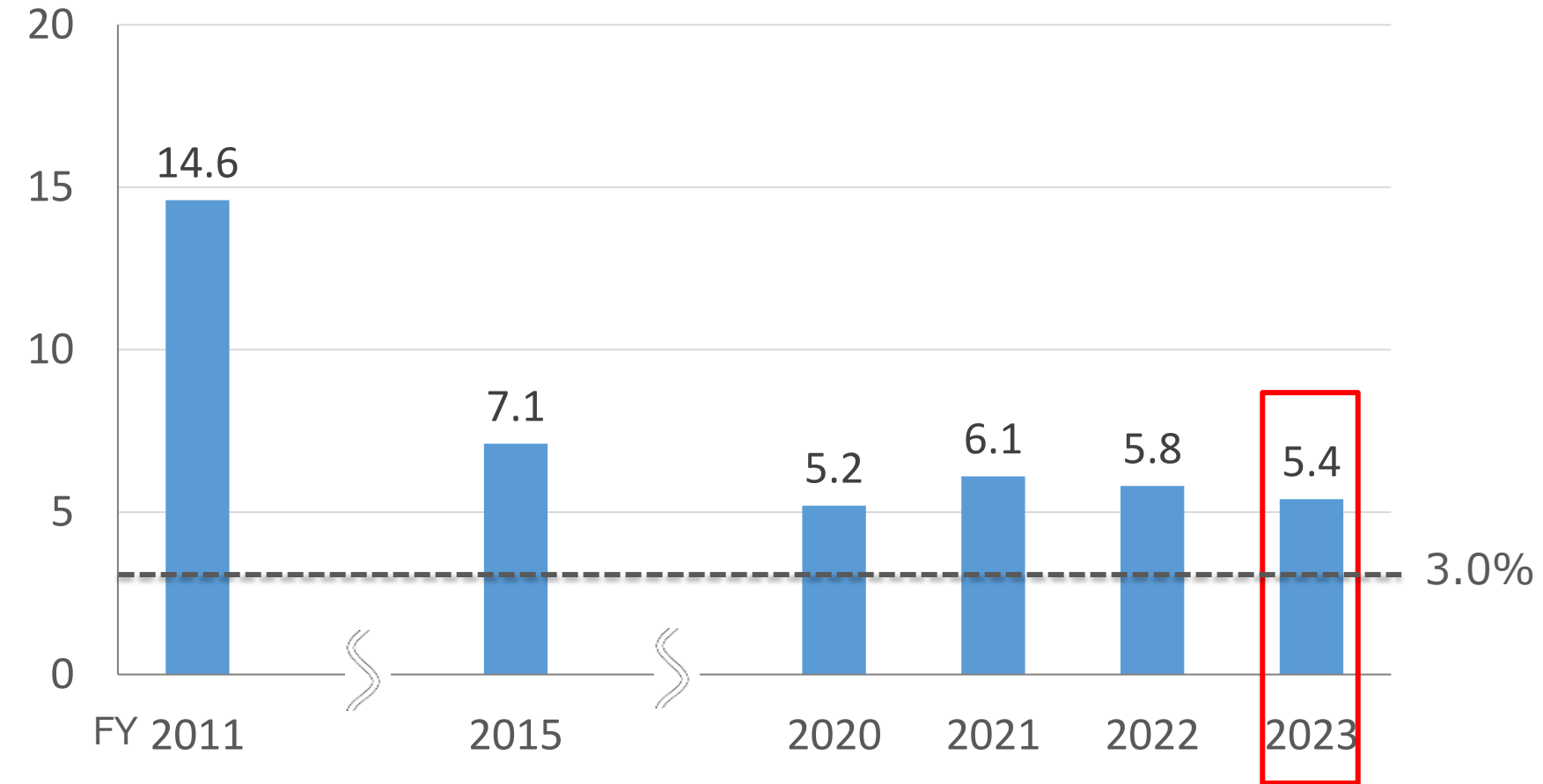
Changes in the proportion of those scoring 16 points or higher in SDQ (Strength and Difficulties Questionnaire): Children



Source: 56th meeting of the Oversight Committee for the Fukushima Health Management Survey (July. 25, 2025)

Mental Health and Lifestyle Survey – Results <Adults>

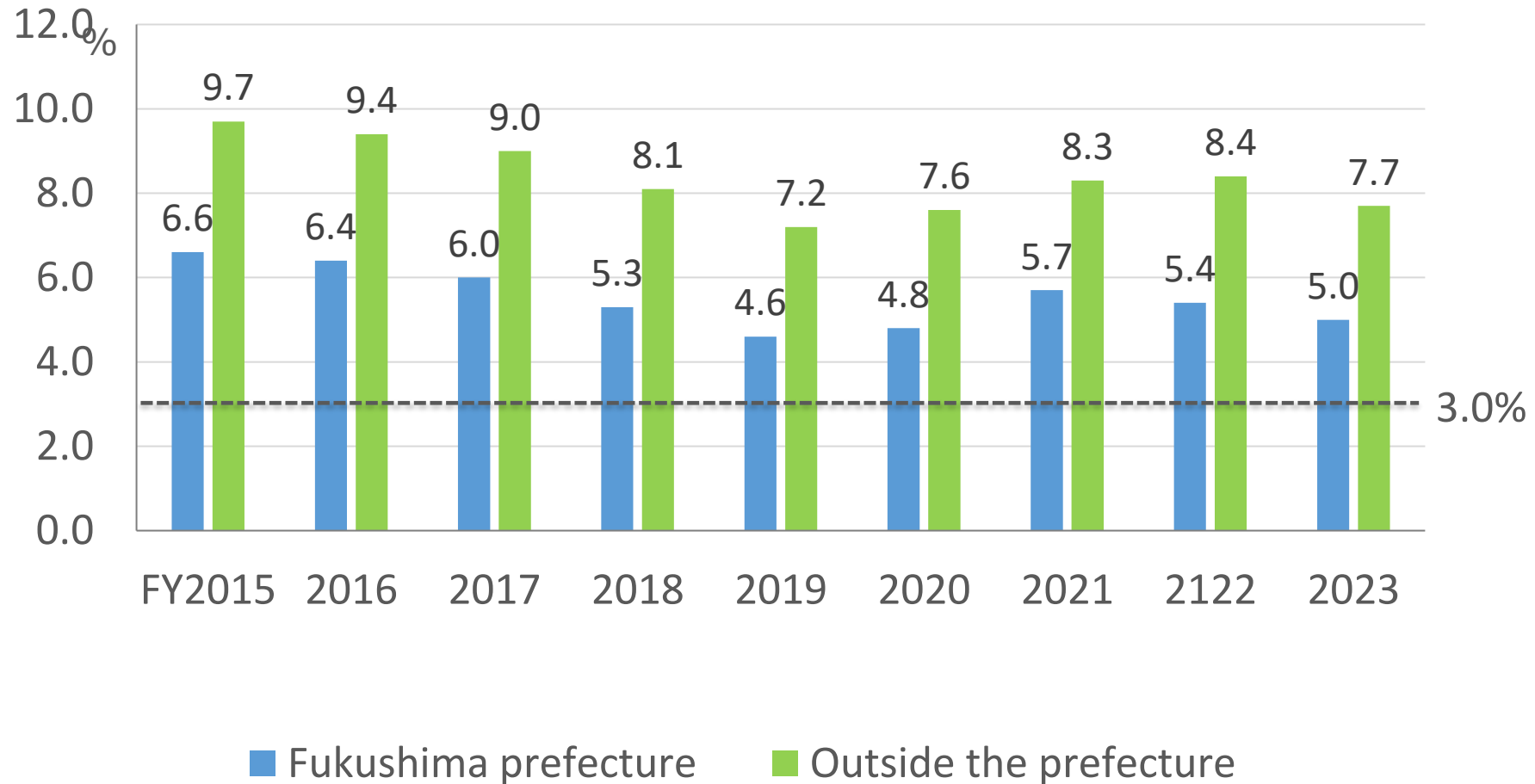
Changes in the proportion of those scoring 13 or higher
K6 (Kessler Psychological Distress Scale): Adults 16 and older



※The percentage of those scoring 13 points or higher among general Japanese population unaffected by any disaster is 3.0% (Kawakami, 2007)

Mental Health and Lifestyle Survey – Results

The proportion of those scoring 13 points or higher on K6, by location of residence at the time of the survey



Source: 31th, 35th, 38th, 42th, 45th, 48th, 53th, and 56th meetings of the Oversight Committee for the Fukushima Health Management Survey

Mental Health and Lifestyle Survey – Support

Addressing People with High Risk



Brochure



- Health information
- Referring to a medical facility or a consultation center

Telephone Support



- Physical and mental health check
- Identifying needs
- Professional advice

Approaching populations to Reduce Risk



Feedback of knowledge



Exhibiting at health events

- Dialogue with residents
- Information dissemination

Visiting Covered Municipalities

- Briefing sessions with 13 municipalities
- Advice based on the results (health workers and health & welfare officials)

Organizing Symposiums

- Providing information useful for support activities (specialists, teachers, students, etc.)



Promotional activities

Pregnancy and Birth Survey – Outline

Main Survey: Covered population 12,000 - 16,000

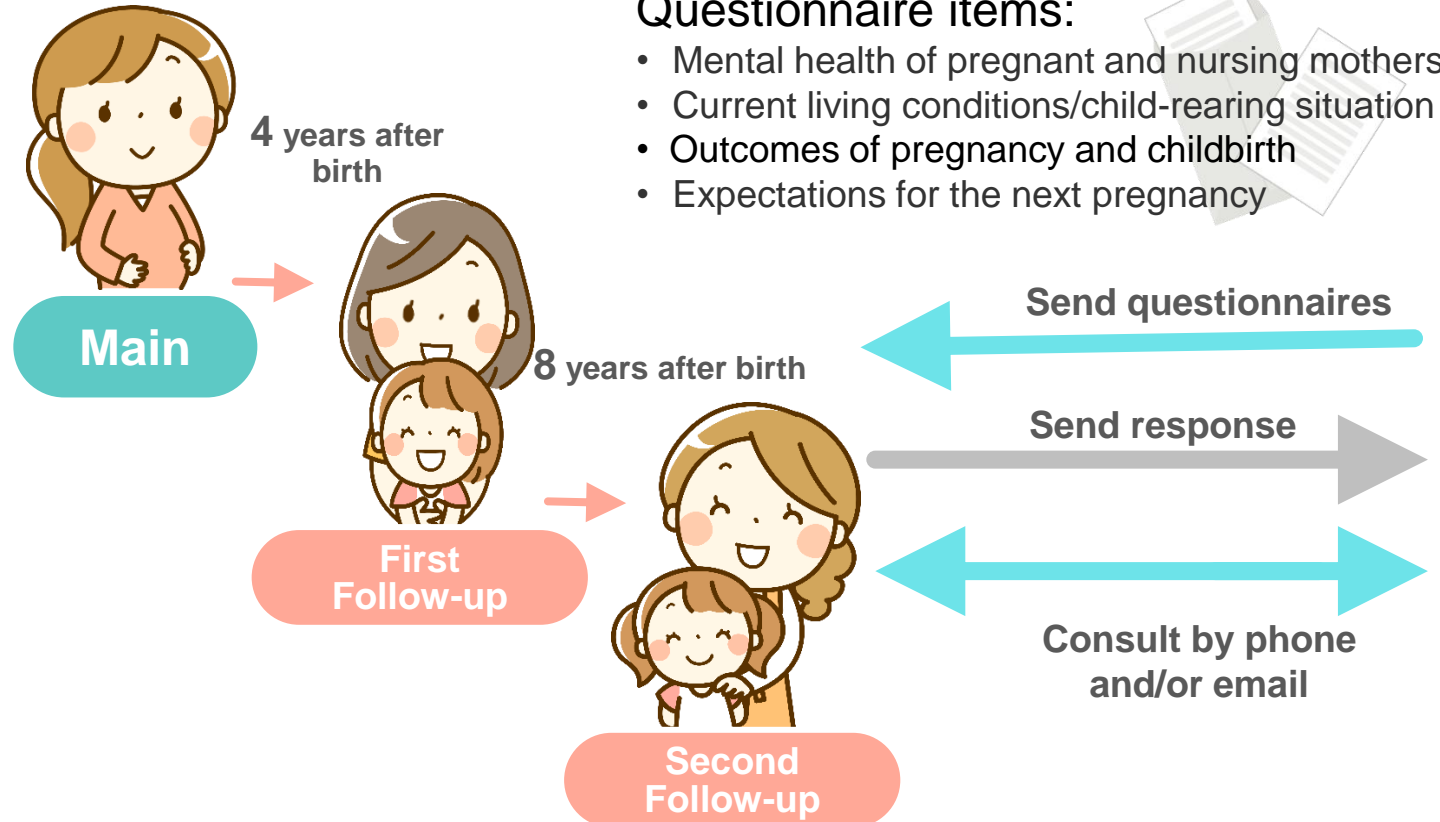
- Those who were pregnant and gave birth in Fukushima Pref. from FY2011 to FY2020

Follow-up Survey: Covered population 5,200 - 7,300

- Those who responded to the Main Survey from FY2011 to FY2014



Midwives, public health nurses, and certified public psychologists provide consultation for anxieties and/or worries



Questionnaire items:

- Mental health of pregnant and nursing mothers
- Current living conditions/child-rearing situation
- Outcomes of pregnancy and childbirth
- Expectations for the next pregnancy



Radiation Medical Science Center for the Fukushima Health Management Survey, FMU

Pregnancy and Birth Survey – Results

44th Oversight Committee for the Fukushima Health Management Survey

| | Preterm deliveries (%) | | Low birth weight infants (%) | | Congenital anomalies (%) | |
|---------|------------------------|-----------|------------------------------|-----------|--------------------------|-------------------|
| | Fukushima | National* | Fukushima | National* | Fukushima | General Incidence |
| FY 2011 | 4.6 | 5.7 | 8.6 | 9.6 | 2.85 | 2-3** |
| FY 2012 | 5.6 | 5.7 | 9.2 | 9.6 | 2.39 | |
| FY 2013 | 5.2 | 5.8 | 9.6 | 9.6 | 2.35 | |
| FY 2014 | 5.3 | 5.7 | 9.8 | 9.5 | 2.30 | |
| FY 2015 | 5.6 | 5.6 | 9.4 | 9.5 | 2.24 | |
| FY 2016 | 5.3 | 5.6 | 9.2 | 9.4 | 2.55 | |
| FY 2017 | 5.3 | 5.7 | 9.2 | 9.4 | 2.38 | |
| FY2018 | 5.2 | 5.6 | 9.0 | 9.4 | 2.19 | |
| FY2019 | 5.1 | 5.6 | 9.1 | 9.4 | 2.71 | |
| FY2020 | 4.4 | 5.5 | 8.1 | 9.2 | 2.21 | |

* Vital Statistics (Ministry of Health, Labor and Welfare) ** Guidelines for Obstetrical Practice in Japan 2023

Summary

Radiation Medical Science Center for the Fukushima Health Management Survey

KAMIYA Kenji, OHTO Hitoshi, YASUMURA Seiji

[For the future]

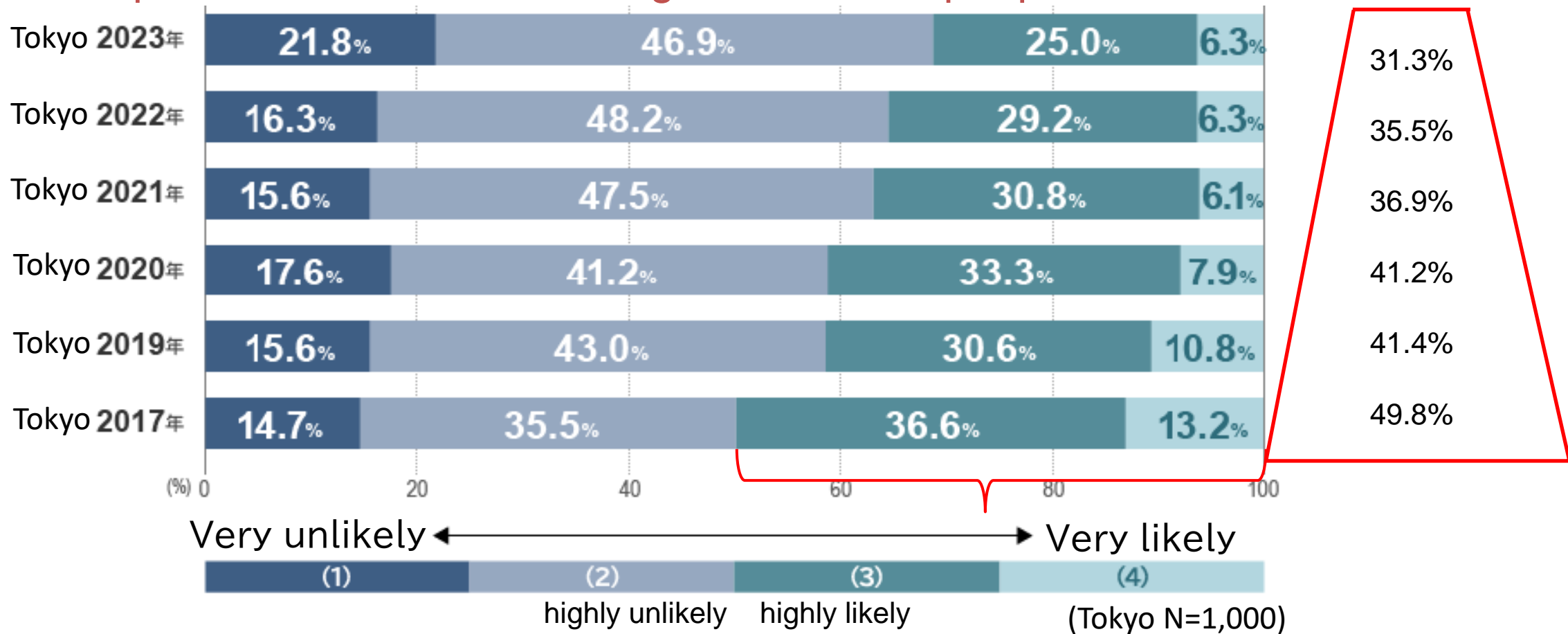
As we approach the 10-year anniversary of the earthquake and the start of the survey, it is necessary to establish a new framework to understand the needs that have become increasingly diverse over time and to provide information, while conducting public relations activities in an engaging way, by utilizing various media and human resources for communication with the people of Fukushima.

In addition, it is necessary to continue international collaboration activities in order to obtain cooperation and support from international organizations related to radiation, and scientific advice and support from overseas experts, etc., in order to elucidate health effects related to the nuclear accident and to address people's anxieties.

(Report of the Fukushima Health Management Survey 2011-2020)

Figure: Attitude toward health effects on the next generation in Fukushima among Tokyo residents (2017-2023)

Q: “How much of a health impact do you think the current radiation exposure will have on future generations of people in Fukushima?”



Fukushima's lessons for the future: After 15 Years, into the Future

-Life after the Great East Japan Earthquake



FMU's Radiation Medical Science Center for the Fukushima Health Management Survey will continue activities to protect the lives and health of Fukushima residents.

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