Overview of the Fukushima Health Management Survey(FHMS)

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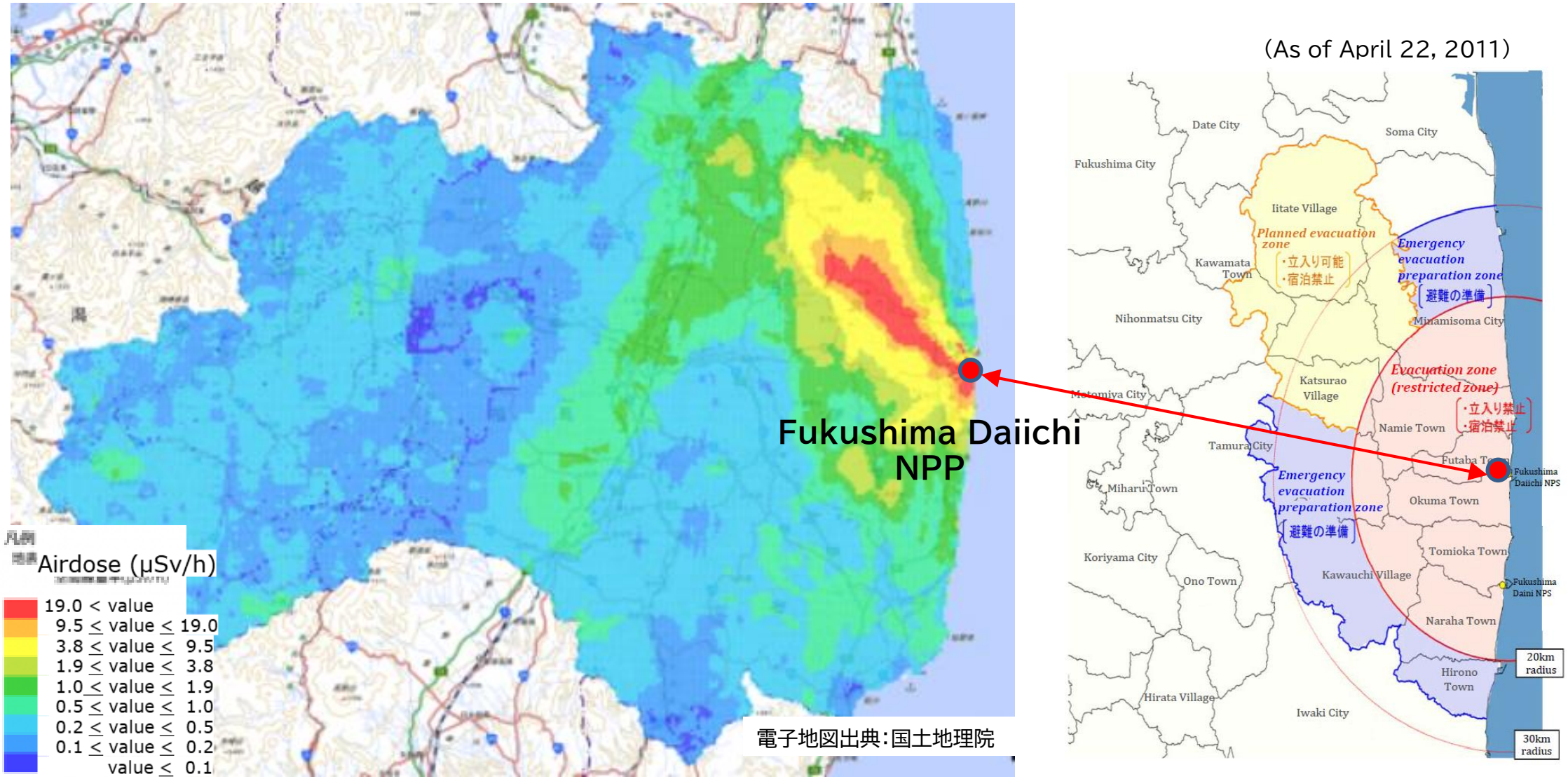
Today’s Topics

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



Time Course Map for all areas of 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　5,145 deceased (1,110 missing)
Miyagi 10,570 deceased (1,215 missing)　(As of Dec. 31, 2023)

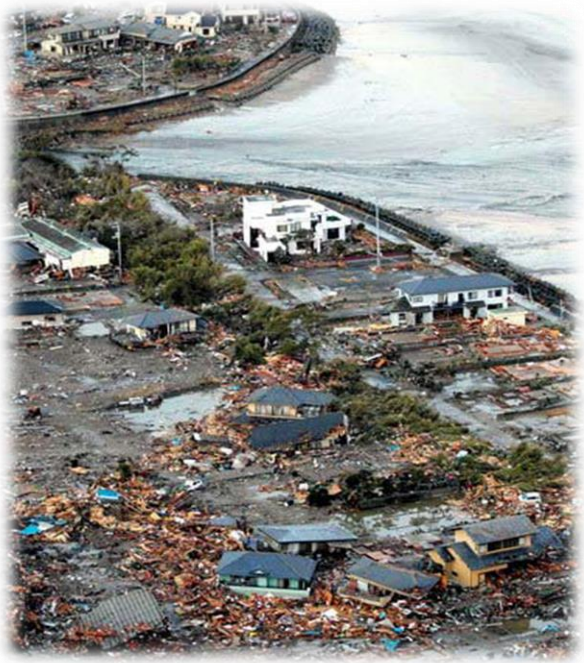
Fukushima 1,598 deceased (224 missing)
due to earthquake and/or tsunami

No deaths caused by radiation

Earthquake

Fukushima City

Tsunami



Minamisoma City

Nuclear Power Plant Accident as a man-made disaster

Fukushima Dai-ichi
Nuclear Power Plant

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

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

Prefectures	Total	Difference from the previous review	By age groups		
			Ages 20 and younger	Ages 21 to 65	Ages 66 and older
Iwate	471	(0)	1	65	405
Miyagi	932	(1)	2	120	810
Fukushima	2,343	(6)	4	234	2,105
Other prefectures	56	(0)	3	10	43
Total	3,802	(5)	10	429	3,363

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

1,598 persons of direct death

(As of Dec. 31, 2023)

(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 of Fukushima residents

1．Background

2．Purpose

Relieve anxiety after the nuclear accident

Protect and promote the long-term health of Fukushima residents

3．Implementation

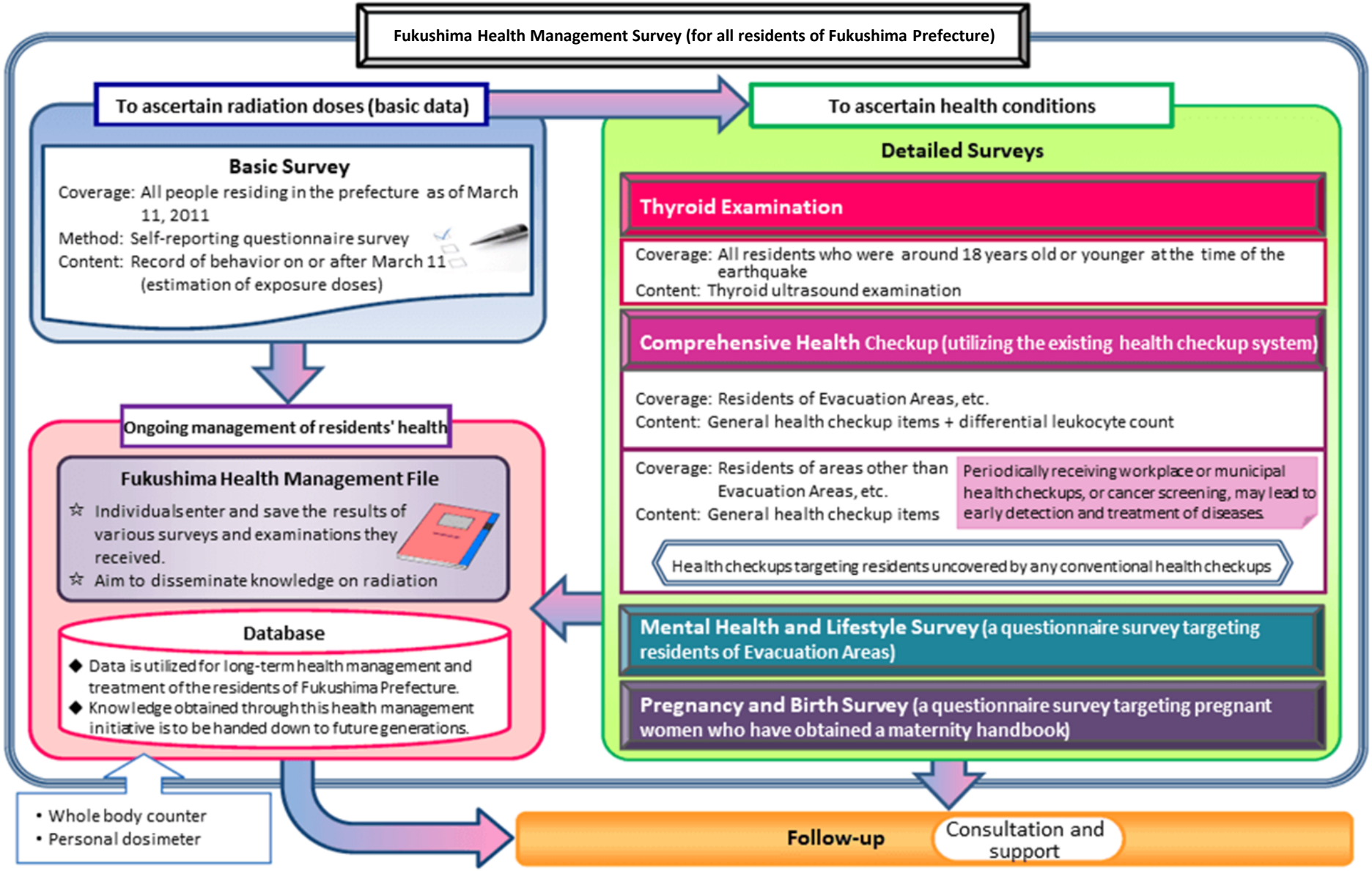
What is the FHMS?

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 the 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-kenkocyosa-gaiyo.html)

Outline of the Fukushima Health Management Survey

Fukushima Health Management Survey (Overview)



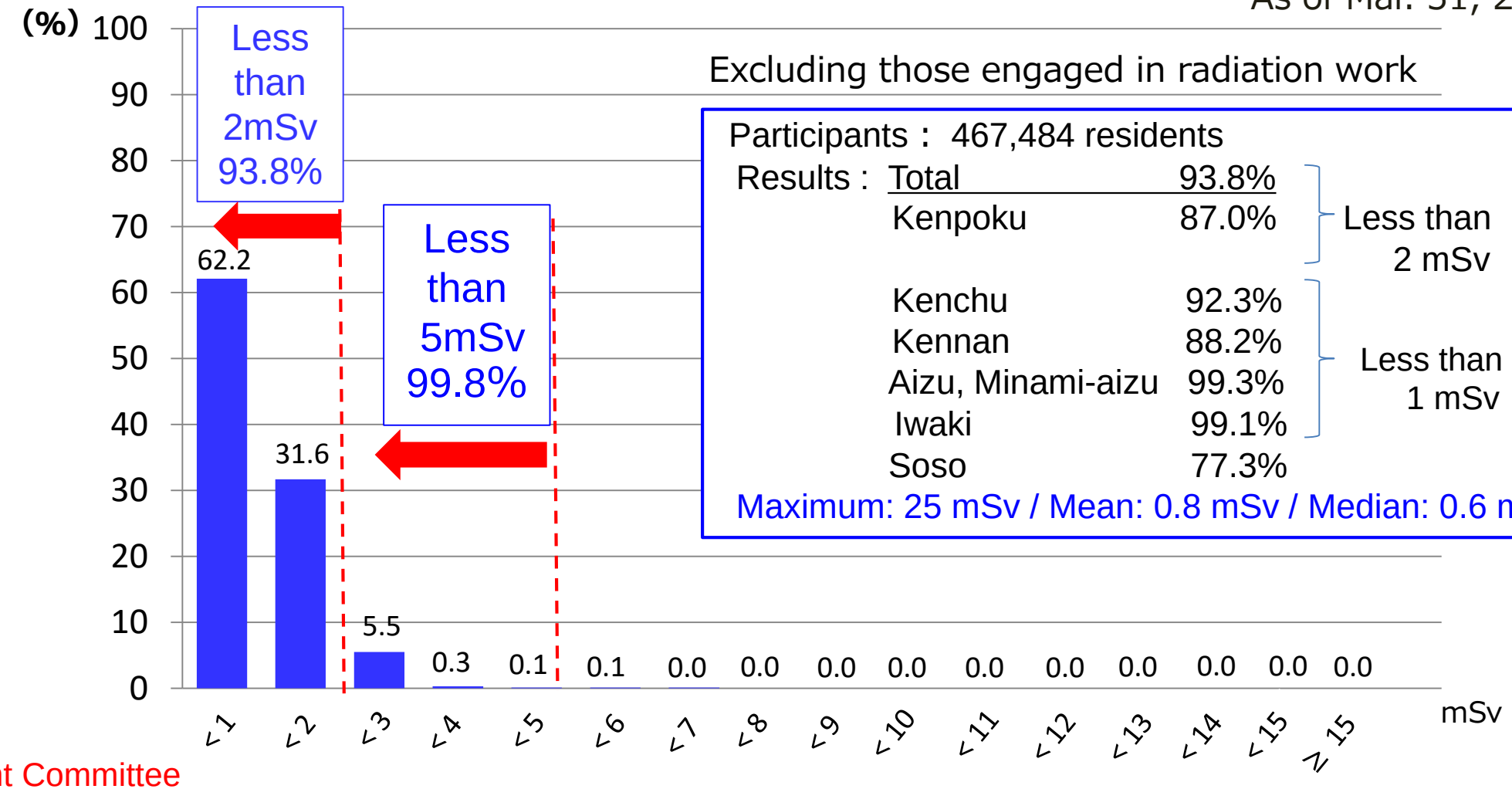
Prepared based on the outline of the "Fukushima Health Management Survey," Fukushima Prefecture

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



Excluding those engaged in radiation work

Participants： 467,484 residents

Results :		
Total	93.8%	
Kenpoku	87.0%	Less than 2 mSv
Kenchu	92.3%	Less than 1 mSv
Kennan	88.2%	
Aizu, Minami-aizu	99.3%	
Iwaki	99.1%	
Soso	77.3%	

Maximum: 25 mSv / Mean: 0.8 mSv / Median: 0.6 mSv

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 a statistical significance in light of the scientific knowledge obtained to date.”

Thyroid Ultrasound Examination – Method

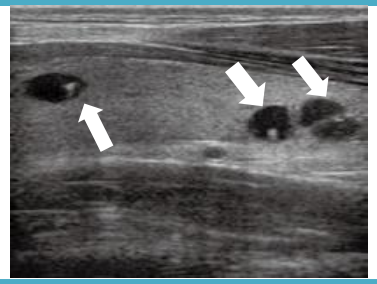
Preliminary baseline survey: Approx. 368,000
All residents aged 18 years or younger at the time of the disaster

Full-scale survey : Approx. 381,000
In addition, those who were born from April 2, 2011 to April 1, 2012

Procedure

Primary Examination（Ultrasonography）

Cyst



Nodule

Ultrasound imaging

Grade : A1,A2	Grade : B,C
■Cyst ≤20.0 mm ■Nodule ≤5.0 mm	■Cyst ≥20.1 mm ■Nodule ≥5.1 mm

Confirmatory Examination
Advanced ultrasonography, blood test, urine test and fine needle aspiration cytology (if needed)

Periodic examination

Medical follow-up or treatment

Advantages and Disadvantages of Thyroid Examinations

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.

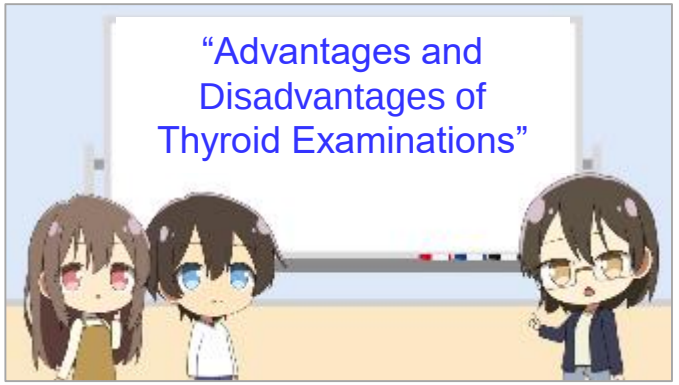
Disadvantages

- 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

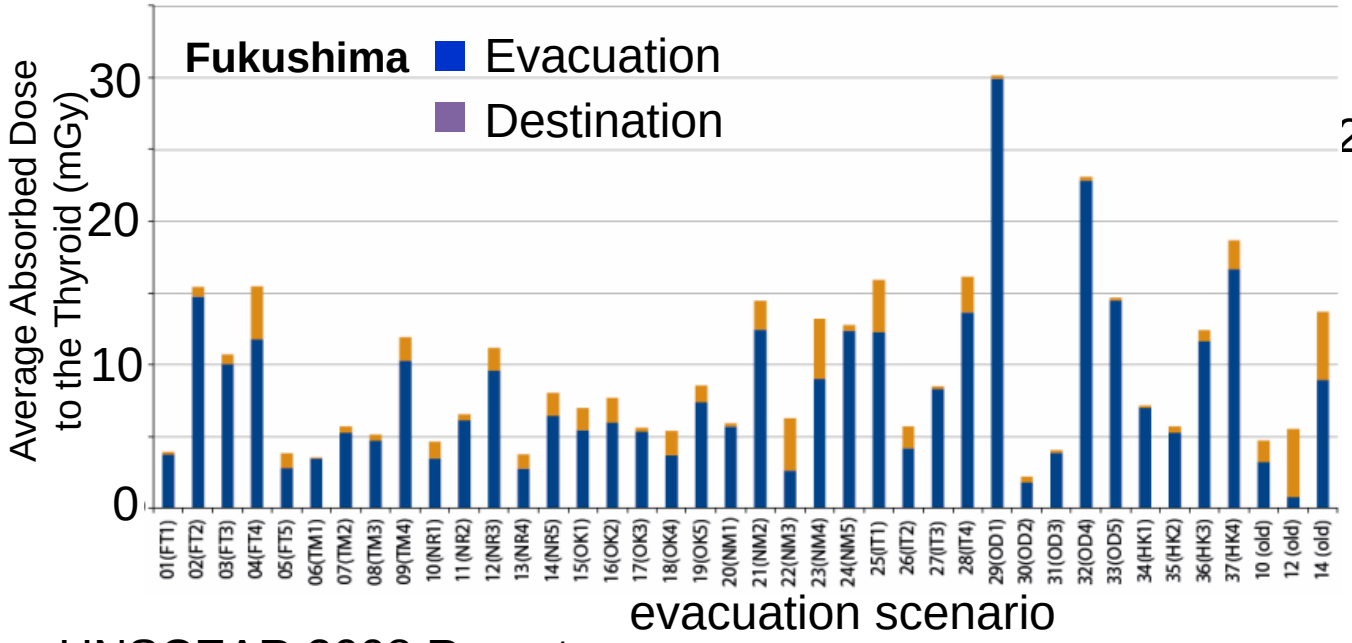


Explanatory Animation Video

UNSCEAR (United Nations Scientific Committee on the Effects of Atomic Radiation) Report

"Radiation Exposure Dose among Evacuation Groups from the Chornobyl and Fukushima Nuclear Accidents"

Average absorbed dose to the thyroid in the first year to infants for each evacuation scenario



UNSCEAR
2020/2021Report page 150

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

UNSCEAR 2008 Report

Chornobyl 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

(2023 FHMS 5th International Symposium, presented by Dr. KAMIYA Kenji)

Study of the association between radiation dose and the development of malignant/suspected malignant thyroid tumors

Exposure Doses

External Exposure Doses from FHMS

↓

UNSCEAR Absorbed Thyroid Dose by the Region

↓

Individual Equivalent Thyroid Doses Resulting from the Sum of External and Internal Exposure Doses

Eligible Persons

Thyroid Examination (TUE) Examinees

↓

TUE Participants

＋

Registrants in the Cancer Registry

Analytical Method

Ecological Study

↓

Dose-based Cross-sectional Surveys

↓

Full-scale survey accumulation based on effective dose

↓

Full-scale survey accumulation

（nested case-control study）

Nested case-control study

The 21st Thyroid Examination Evaluation Subcommittee

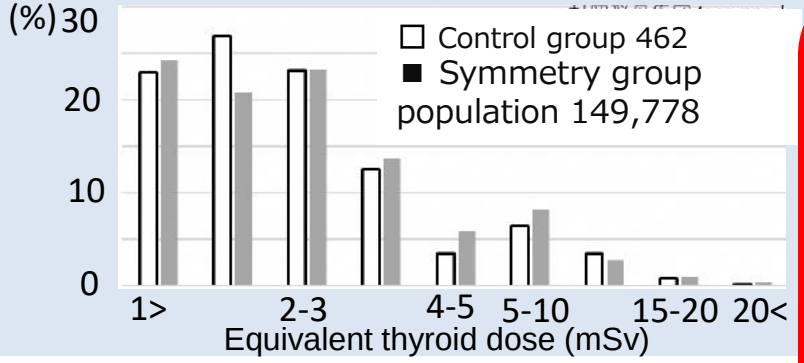
Matching Model 1

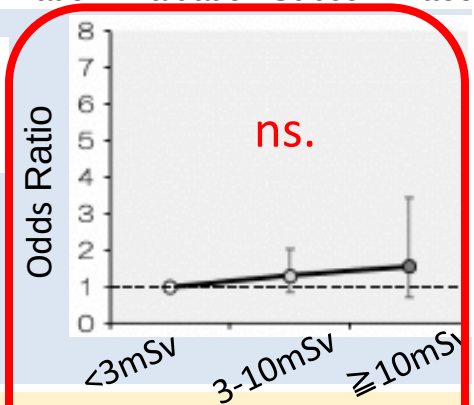
Case group 154 people

Control group 462 people

Matching Items

* Sex, Age
* Examination status at the time of diagnosis





Matching Model 2

Case group 154 people

Control group 462 people

Matching Items

* Matching Modei1

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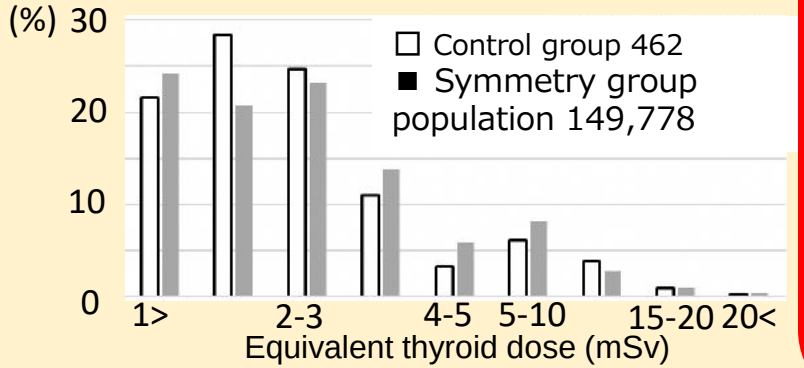
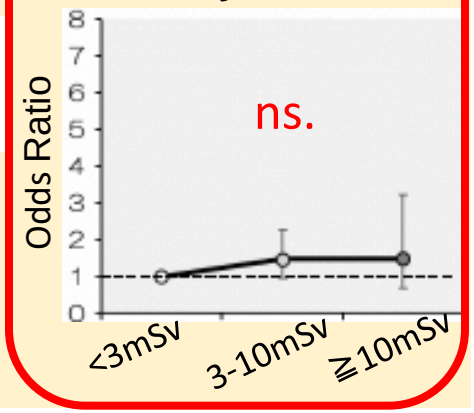
* Pattern of Thyroid Examination (TUE)





(2023 FHMS 5th International Symposium, presented by Dr. KAMIYA Kenji)

Thyroid Ultrasound Examination – Prefectural Oversight Committee's view on results

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

From "Interim Report on the Fukushima Health Management Survey"

Because…

- 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.**

(Documents for the 36th Oversight Committee meeting)

Because…

- 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 Chornobyl.

Through the 4th round **The evaluation has concluded that there is no evidence of an association between thyroid cancer and radiation exposure found from the Preliminary Baseline Survey through the fourth-round survey.**

(The 21st Thyroid Examination Evaluation Subcommittee)

Because…

- No association (dose-effect relationship) is observed in the analysis of the estimated exposure doses by region or the estimated exposure doses for individuals and the detection rate of malignant or suspected malignancy.

Thyroid Ultrasound Examination – Support

○ Support for Primary Examination

The Diagnosis Explanation Booth

- Set up at public location/facility
- Provisional explanation by a doctor showing the scanned image

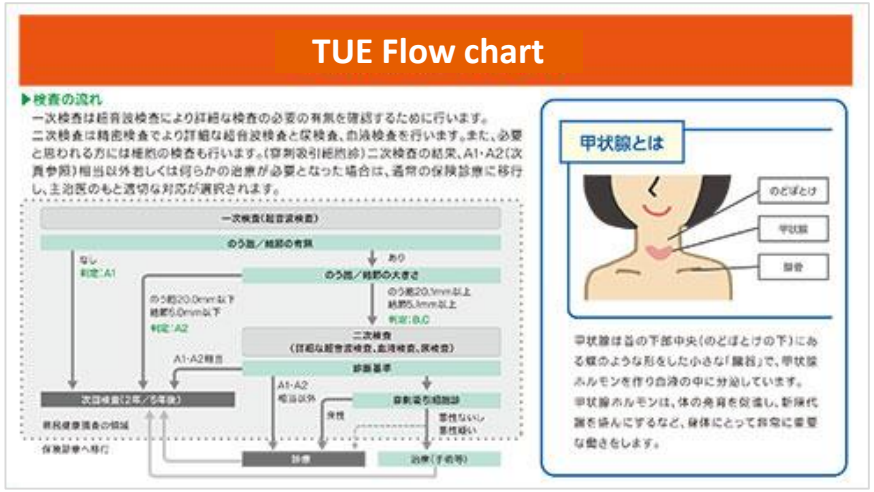
Provided explanation to 34,696 people since FY2015

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

In the booth (image)

○ Leaflet

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

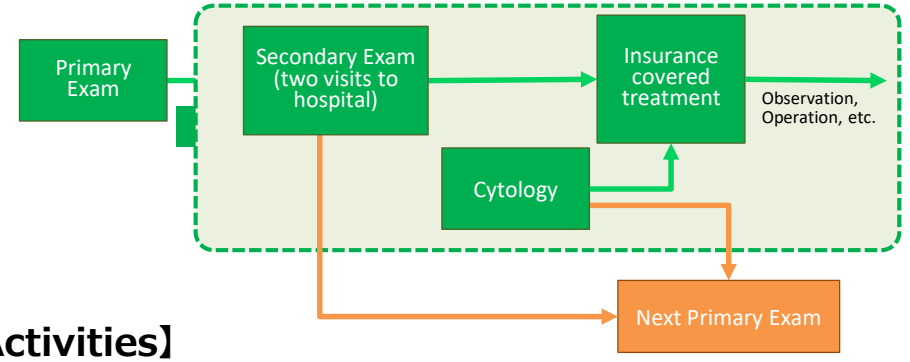


○ Support for Confirmatory Examination

Thyroid Support Team

【Members】

Nurses, Psychiatric Social Workers, Clinical Phycologisst, Medical Social Workers, 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)

○ Exclusive Medical Call Center

【Coverage】

Thyroid exam patients and their families

452 calls since FY2016

(The figure as of the end of March 2023)

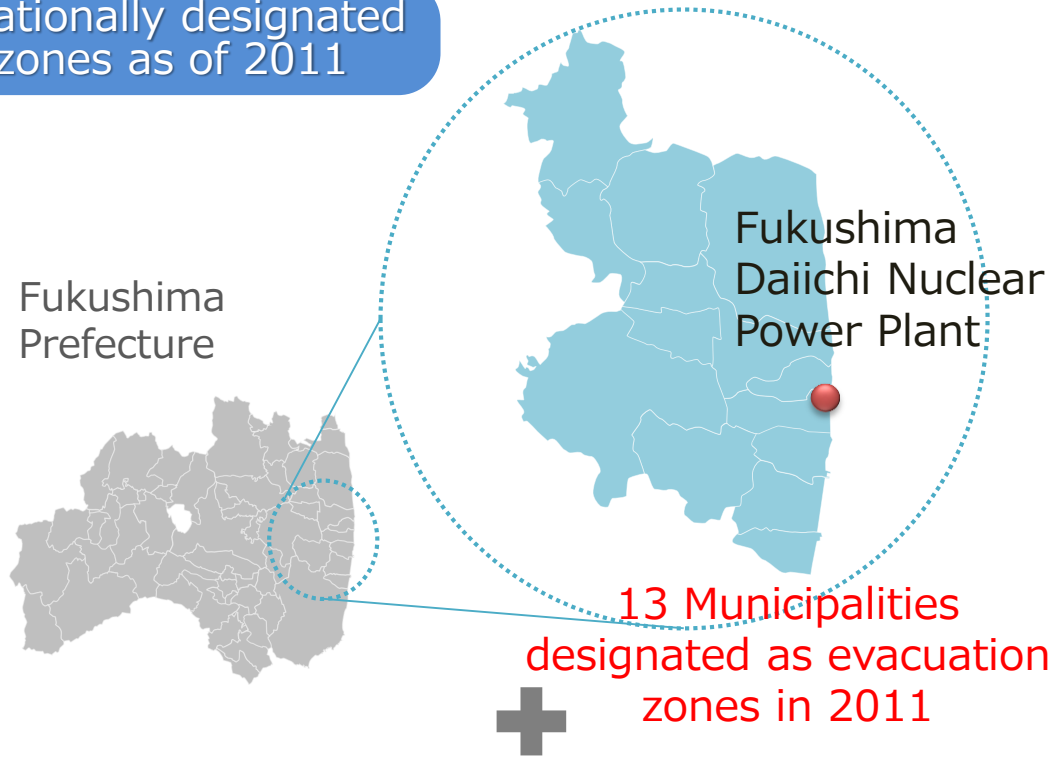
【Activities】

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

Comprehensive Health Check (CHC) – Outline

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

Residents of nationally designated evacuation zones as of 2011



Those who were recommended to have 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, γGT, TG, HDL-C, LDL-C, HbA1c, plasma glucose, serum creatinine, uric acid)
16 or older	Height, weight, abdominal circumference or BMI, blood pressure, CBC, urine protein, urine sugar, urine occult blood), blood biochemistry (AST, ALT, γGT, TG, HDL-C, LDL-C, HbA1c, plasma glucose, serum creatinine, estimated glomerular filtration rate [eGFR], uric acid) ※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 yeas 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 (ages 16 years or older)

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

Comprehensive Health Check (CHC) – Support

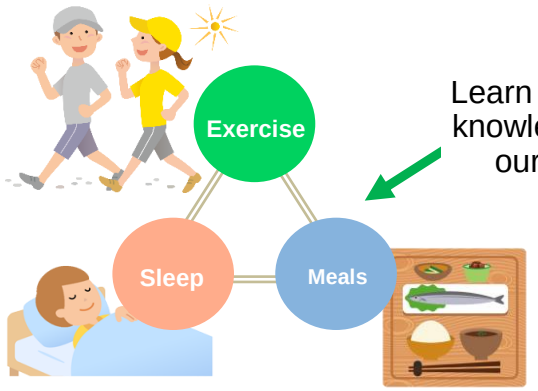
Radiation Medical Science Center

Results Report

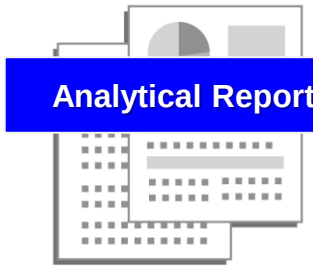
Leaflet

“Health Check is Your Body's Report Card.”

Deepening understanding and raising awareness of health condition



Learn and apply knowledge from our leaflet



Analytical Report

Explanation/proposal to local gov’t

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

13 municipalities designated as evacuation zones

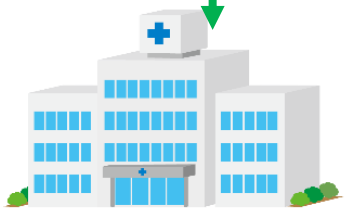
Report at briefing sessions with 13 municipalities

Conducted 342 times From FY2013 to FY2022

Residents

Used for promotional activities and health advice etc.

Health checks



Participation

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

（Health lecture by a doctor）

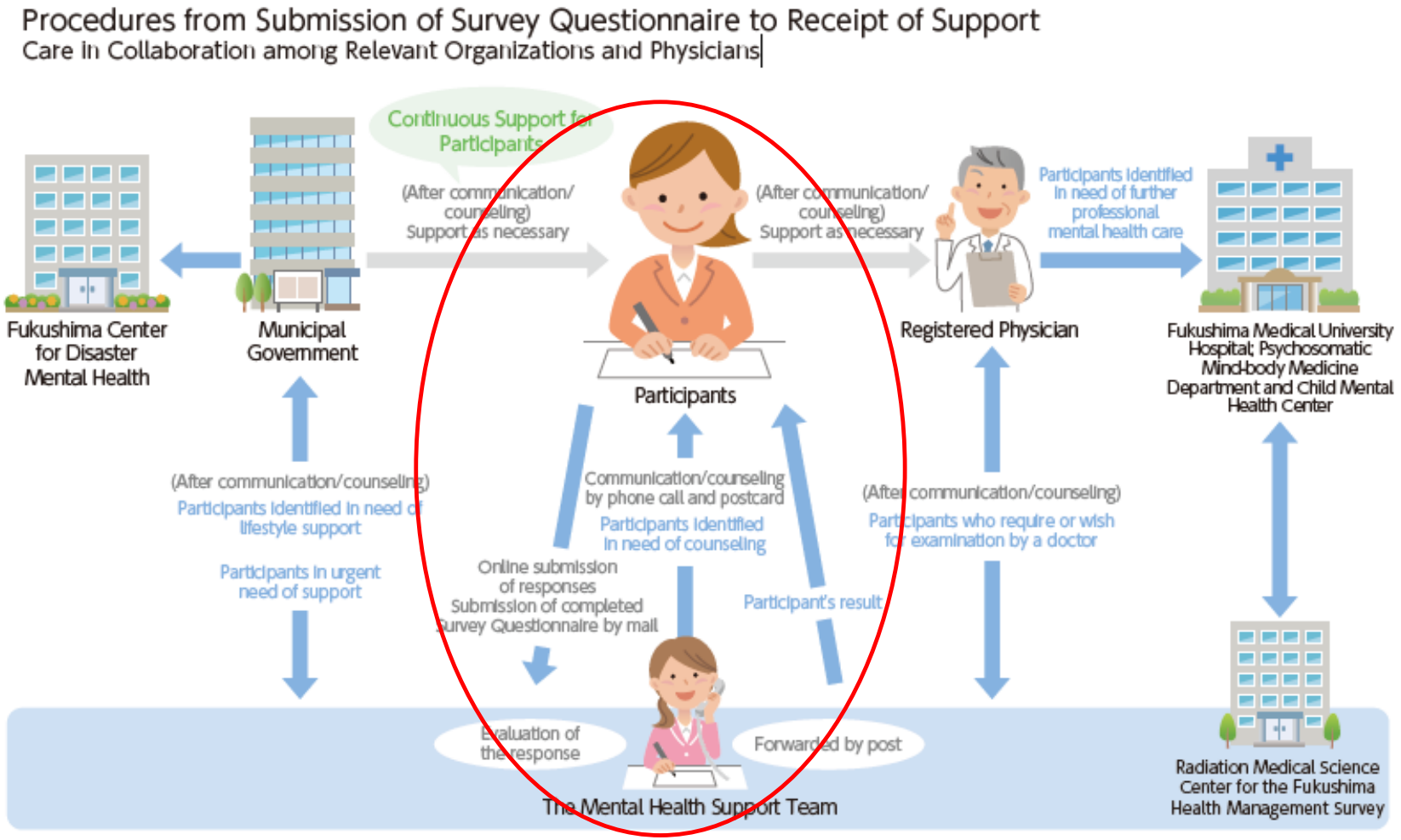
（Blood glucose measurement）

Conducted 177 times from FY2016 to FY2022

Mental Health and Lifestyle Survey – Outline

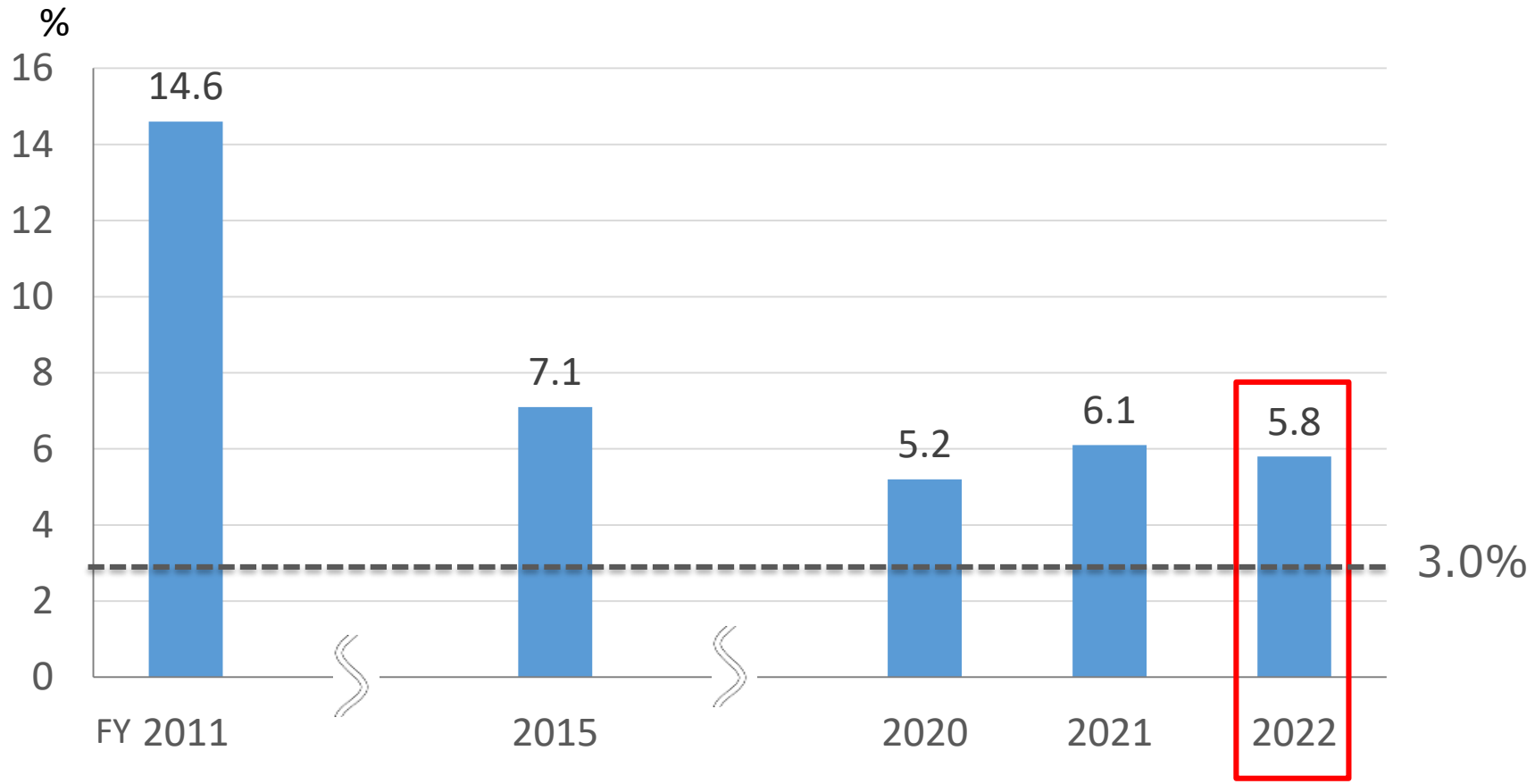
Covered Population（FY2021） ＝same as Comprehensive Health Check

196,569 people who resided in 13 municipalities designated as evacuation zones by Japanese government. These people are divided into 5 age groups (ages 0-3, 4-6, 7-12, 13-15, 16+ years).



Mental Health and Lifestyle Survey – Results

General mental health measured by K6 (Adults: 16 or older)
Trends in K6 score of 13 or higher

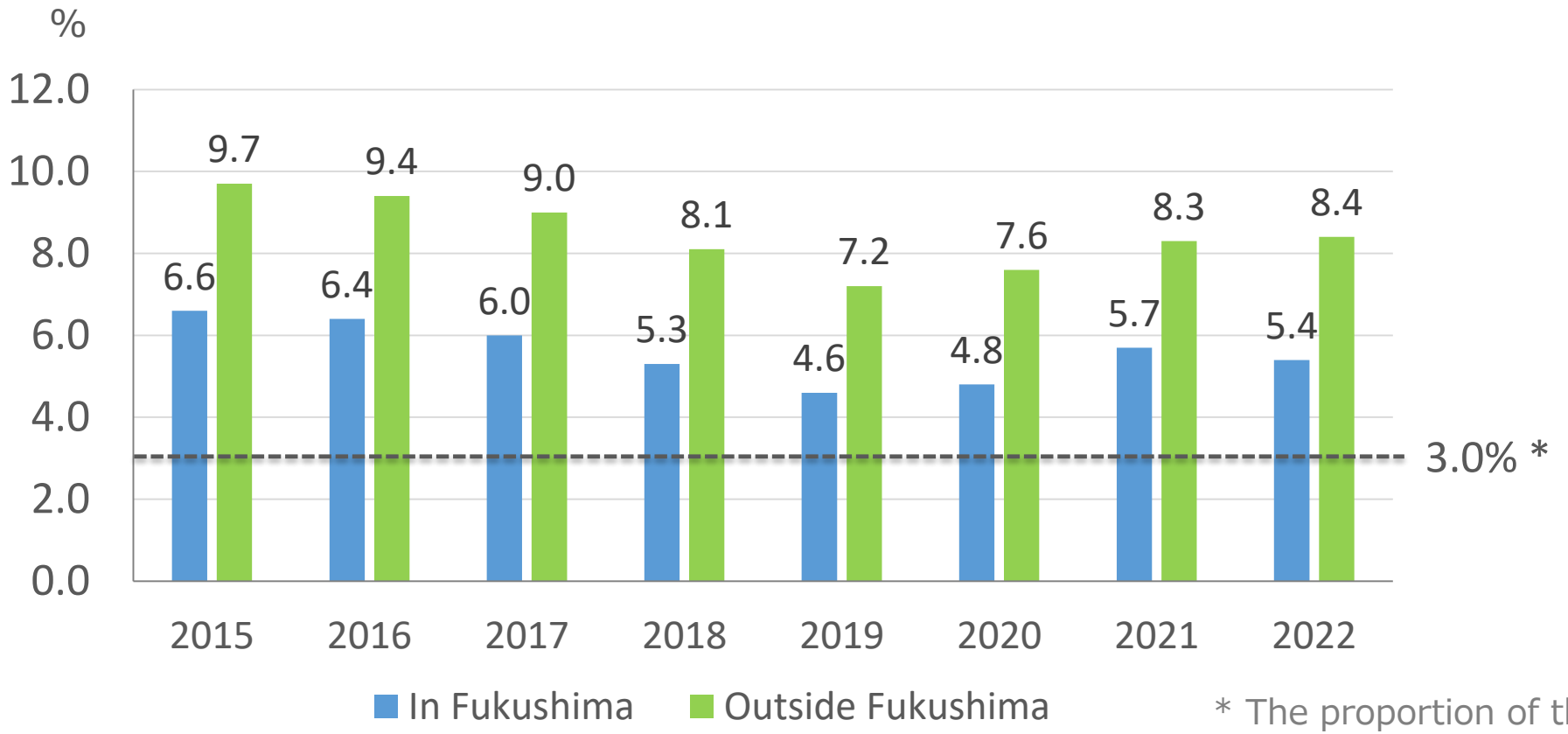


※The percentage of those scoring 13 points or higher among general Japanese population unaffected by any disaster is 3.0%（Kawakami, 2007）

Source: 53th meeting of the Oversight Committee for the Fukushima Health Management Survey (November. 12, 2024)

Mental Health and Lifestyle Survey – Results

General mental health measured by K6 (Adults: 16 or older)
Trends in K6 score of 13 or higher, by place of residence at the time of this survey

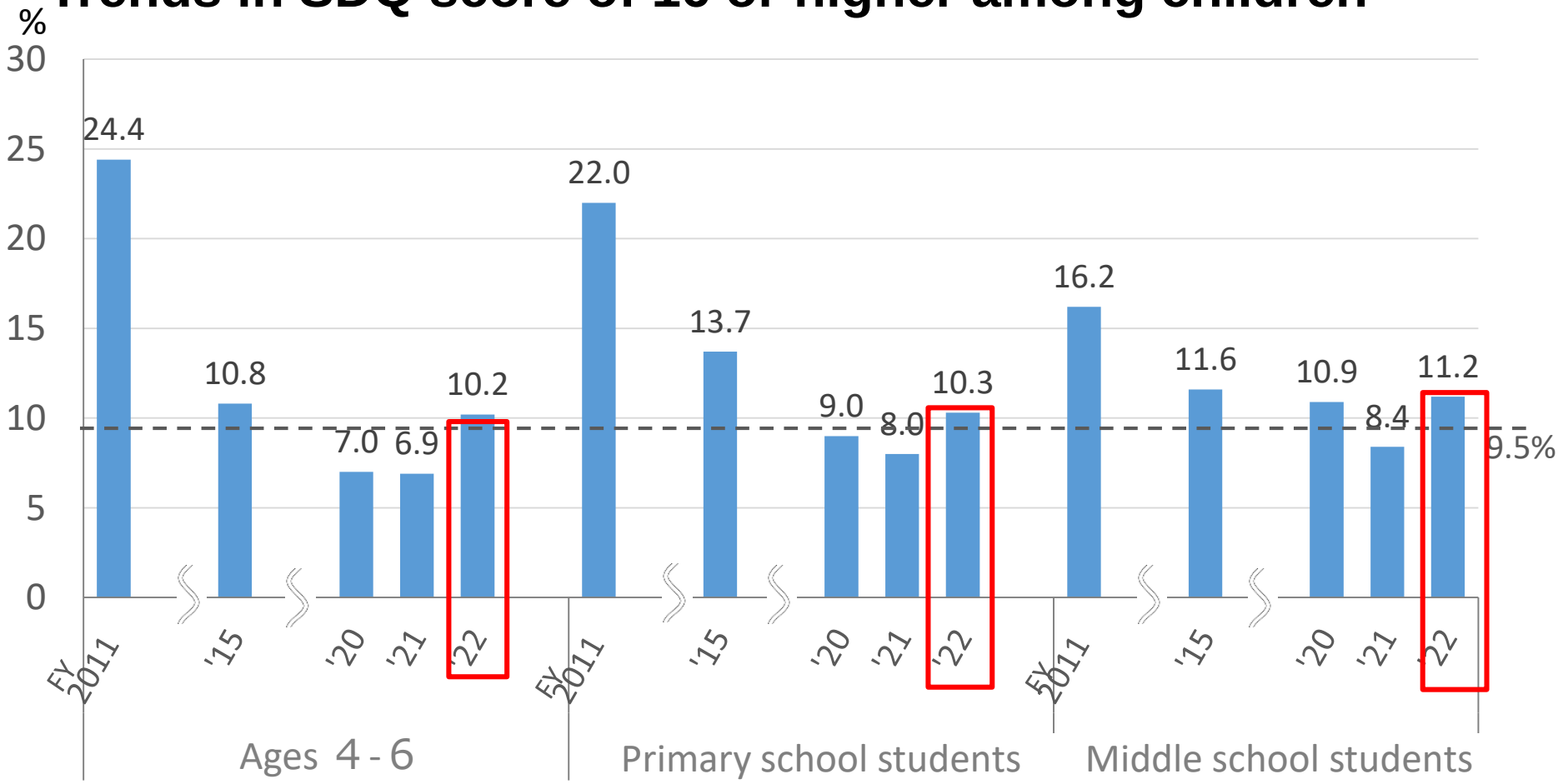


* The proportion of the general population in Japan with 13 points or more is 3.0%. (Kawakami, 2007)

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

Mental Health and Lifestyle Survey – Results

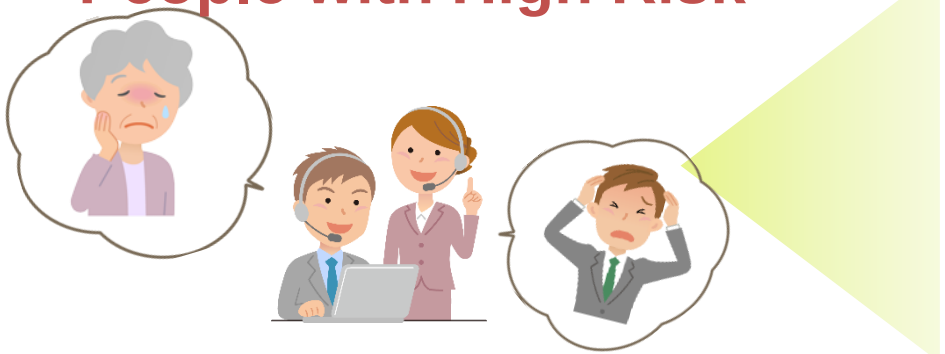
Trends in SDQ score of 16 or higher among children



Source: 53th meeting of the Oversight Committee for the Fukushima Health Management Survey (November. 12, 2024)

Mental Health and Lifestyle Survey – Support

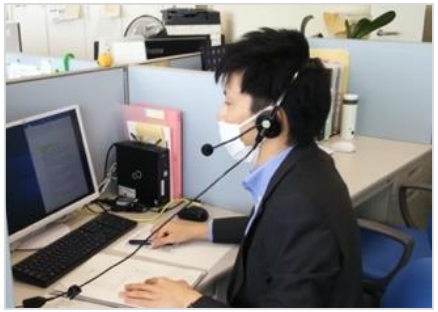
Addressing the People with High Risk



Brochure

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

Telephone Support



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

Approaching to Groups to Reduce Risk

Feedback of knowledge

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.)

Exhibiting at health events

- Dialogue with residents
- Information dissemination

Promotional activities

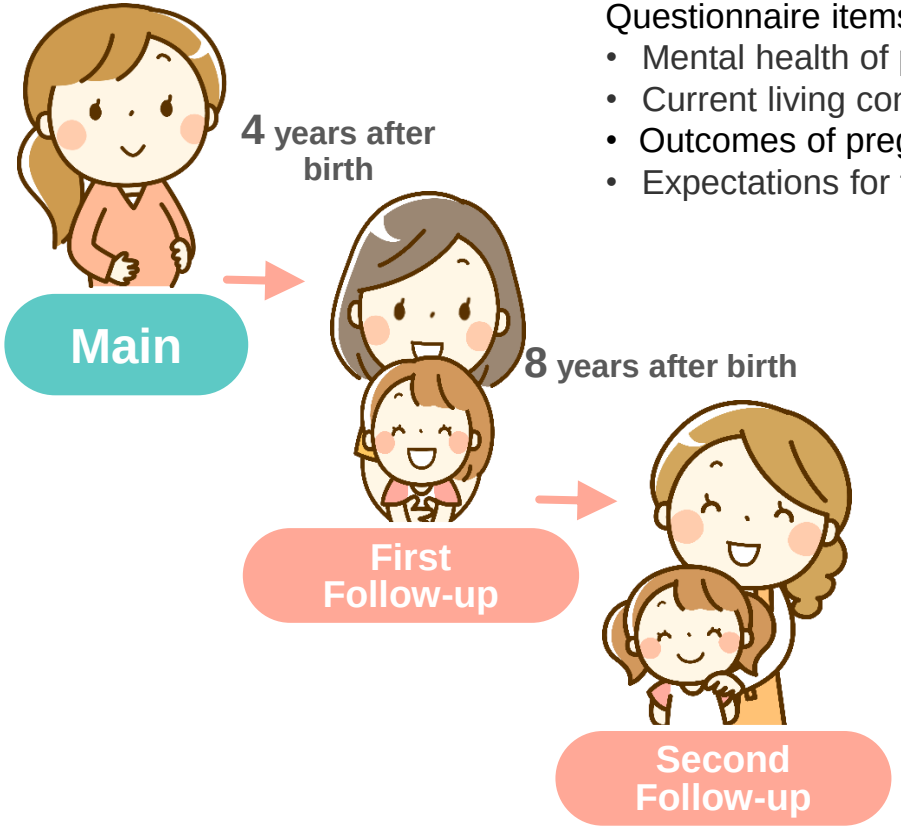
Pregnancy and Birth Survey – Outline

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

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

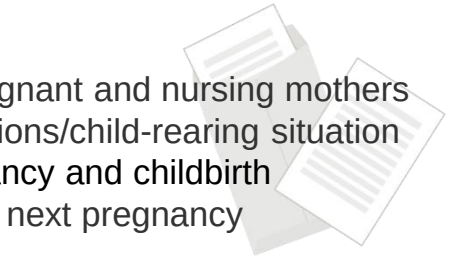
Follow-up Survey: Covered population 5,200 - 7,300

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



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



Send questionnaires

Send response

Consult by phone and/or email

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

Radiation Medical Science Center for the Fukushima Health Management Survey

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	

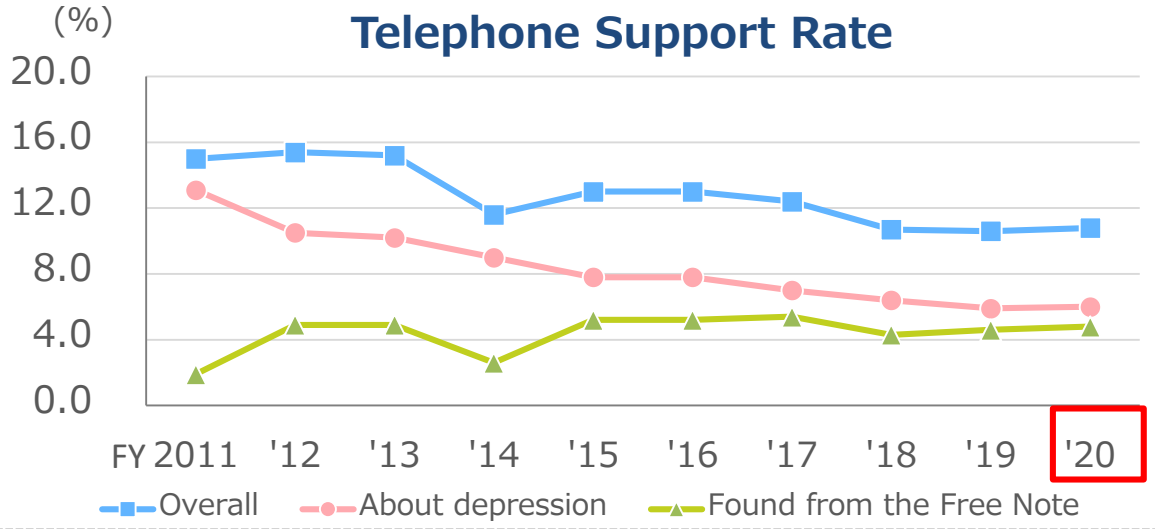
* Vital Statistics (Ministry of Health, Labor and Welfare) ** Guidelines for Obstetrical Practice in Japan 2023

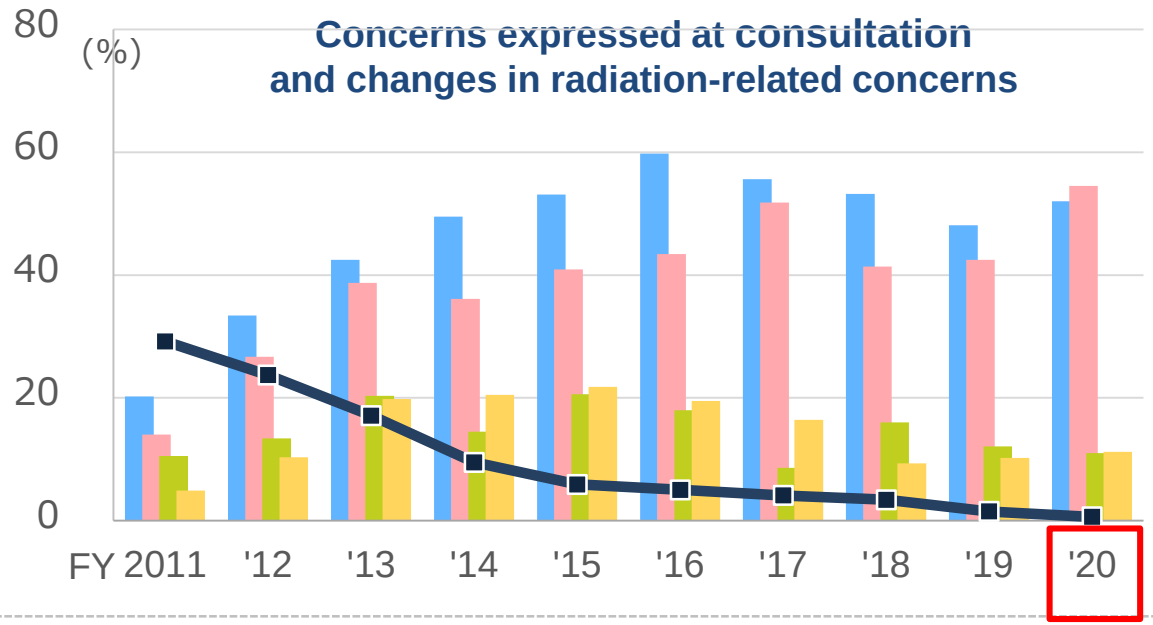
Pregnancy and Birth Survey – Support

Source: 44th meeting of the Oversight Committee for the Fukushima Health Management Survey (May 17, 2022)

Incidence rates of depression needing support

reduced to about half from rates immediately after the disaster.





"Concerns about the effect of radiation" were highest immediately after the disaster and reduced over time

Part 4

Summary

Radiation Medical Science Center for the Fukushima Health Management Survey
KAMIYA Kenji, OHTO Hitoshi, YASUMURA Seiji

[For the future]

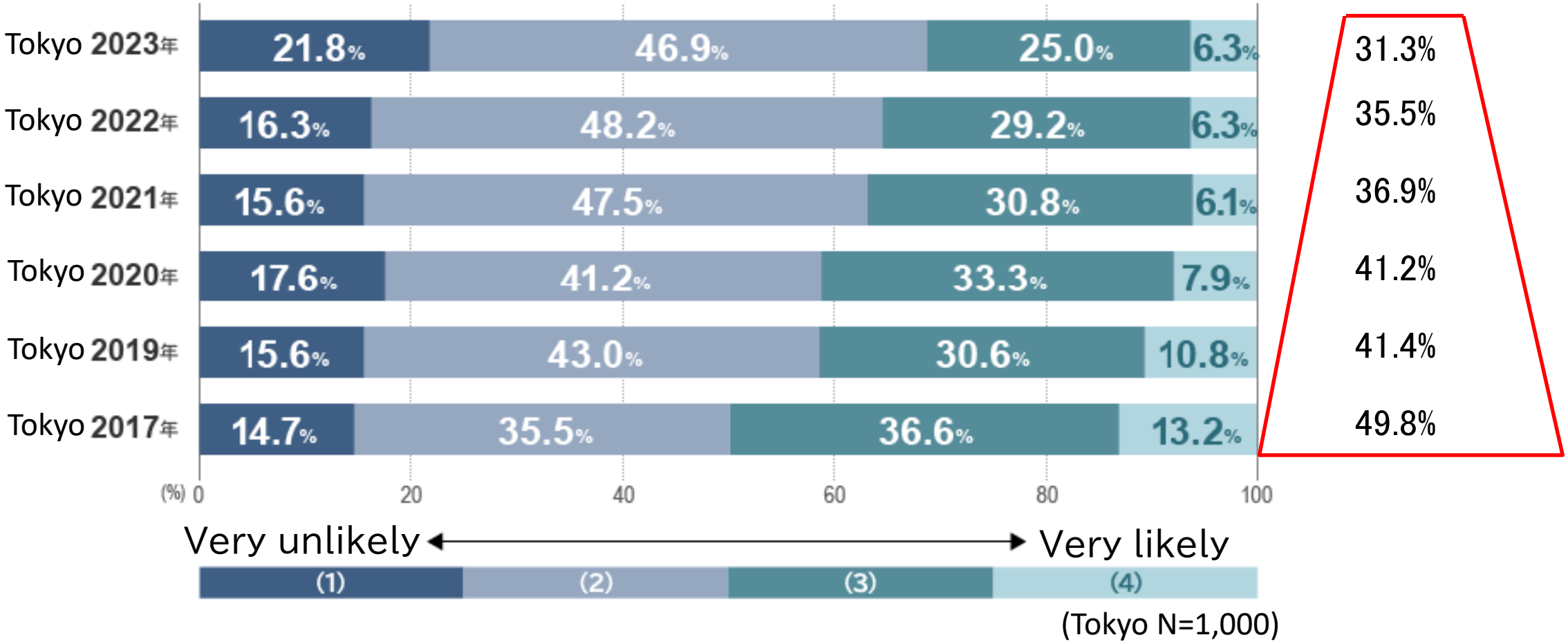
As we approach the 10-year anniversary of the earthquake and the start of the survey, it is necessary to establish a new framework to understand the needs that have become increasingly diverse over time and to provide information, while conducting public relations activities in an engaging way, by utilizing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



(Tokyo N=1,000)

（2024 Mitsubishi Soken 6th survey 「震災・復興についての東京都民と福島県民の意識の比較」について）

What problems of the Fukushima nuclear accident continue to the present day?

(personal opinion)

…The word “revitalization” is often used and its definition is “the process of making something grow, develop, or become successful again” (Cambridge Dictionary). It is obvious that the goal is “revitalization,” but considering calmly the situation, pessimistic notions persist that even “restoration,” in fact “returning something to its earlier condition” (Cambridge Dictionary), may be difficult.

…What is important is human support. It is the restoration and revitalization of the lives of the people who lived there and their families. This may be connected to employment or livelihood support, but the core part of the problem is whether the dignity of their “place of living,” which they have not been aware of until now, is being maintained. For the people of Fukushima Prefecture, the “place of living" is considered as “the area that was contaminated," “the area where people are not certain if the food is safe to eat," and “the area where people from other prefectures are afraid to come," and the fact that these rumors are still continuing today. This is quite different from other disasters…

(YASUMURA Seiji, Perception: Reflections on Public Health in Nuclear Disasters, Igaku-Shoin (Public Health) Journal. 2023;87, p1076-78)

Fukushima's lessons for the future: promoting health and responding to disasters