

"We will promote the health of the children in Fukushima for the long term."

[Purpose]


It has been reported that cases of thyroid cancer increased among children after the Chernobyl NPS Accident due to internal exposure to radioactive iodine. Although radioactive iodine doses are considered to be lower in Fukushima than in Chernobyl, the Thyroid Ultrasound Examination was commenced with the aim of ascertaining children's thyroid status and promoting their health for the long term.

[Coverage]

All people of Fukushima Prefecture who were aged zero to 18 as of March 11, 2011 (those born from April 2, 1992, to April 1, 2011) (approx. 368,000 people)

* For the Full-scale Survey in FY2014 onward, the coverage was expanded to include those born from April 2, 2011, to April 1, 2012 (approx. 381,000 people in total).

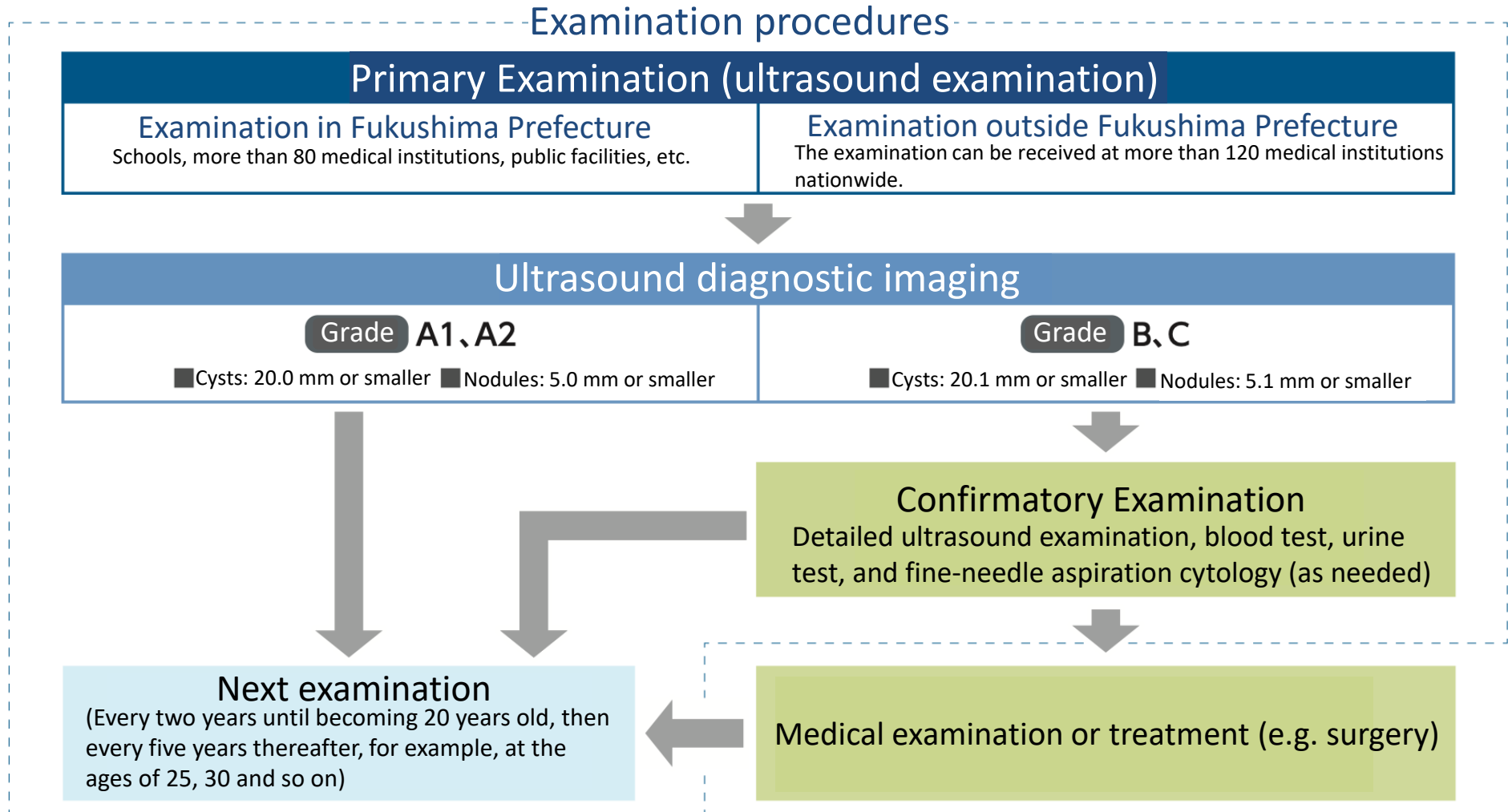
● Examination schedule

	Category	Period	Eligible subjects
First examination	Preliminary Baseline Survey Ascertain children's thyroid status	Oct. 2011 - March 2014	Residents who were residing in Fukushima Prefecture at the time of the earthquake and were approximately 18 years old or younger (those born from April 2, 1992, to April 1, 2011)
Second examination		April 2014 - March 2016	<p>Those born from April 2, 1992, to April 1, 2012</p> <p>Once every two years until becoming 20 years old, then once every five years after becoming 25 years old, for example, at the ages of 25, 30 and so on</p>
Third examination		May 2016 - March 2018	
Fourth examination		April 2018 - March 2020	
Fifth examination		April 2020 - March 2023	

Due to the impact of the COVID-19 pandemic, the fifth-round survey was conducted during the period of three years from FY2020 to FY2022.

Thyroid Ultrasound Examination: Outline (2/3)

● Examination procedures and diagnosis criteria



● Content of the examination

[Primary Examination]

An ultrasound examination assesses whether there are any nodules or cysts. The examination ordinarily finishes in three to five minutes with no pain involved.

The diagnosis panel, consisting of medical specialists, reviews the ultrasound images and makes diagnoses. The examination results are sent by post, but explanations are given at the examination venues or by phone upon examinees' requests.



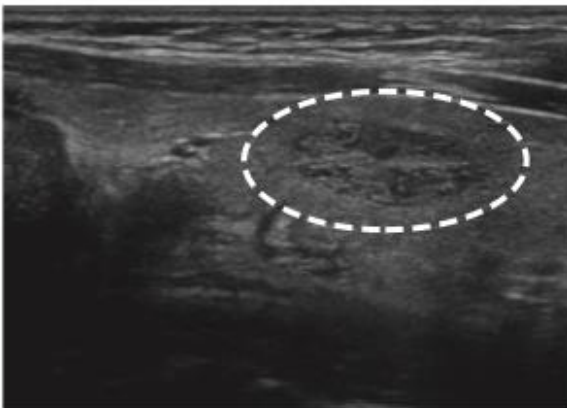
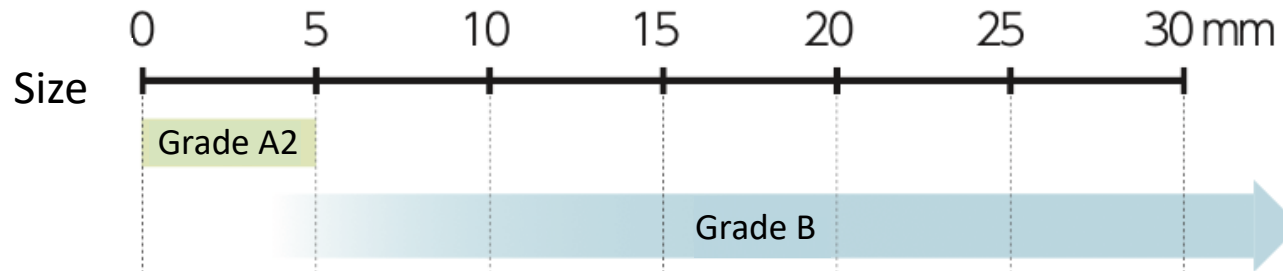
[Confirmatory Examination]

When a more detailed examination is found to be necessary as a result of the Primary Examination, the Confirmatory Examination is conducted for the relevant person. In the Confirmatory Examination, another ultrasound examination, plus blood and urine tests are conducted.

If a doctor considers it necessary as a result of these tests, fine-needle aspiration cytology of the thyroid may also be performed and interpreted.

Thyroid Ultrasound Examination: Nodules

A nodule, which might also be called a lump, is an irregular density of thyroid cells.



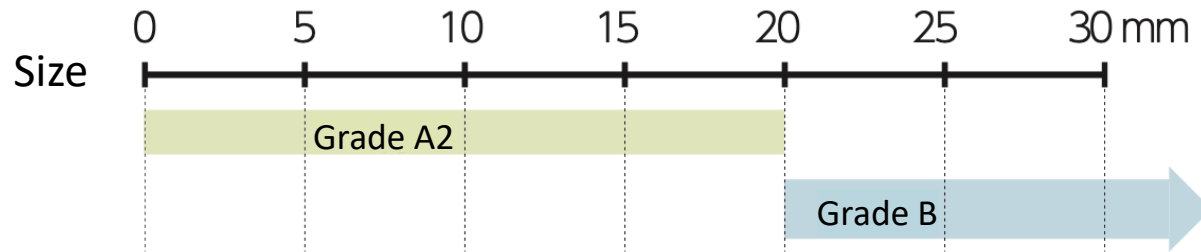
Nodules

* The part circled with a dotted line is a nodule.

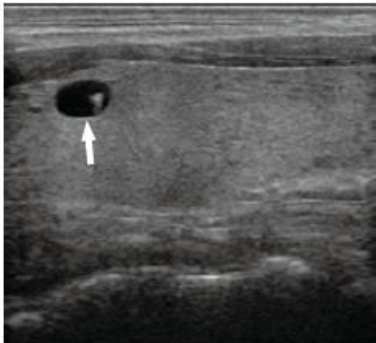
- Nodules may be benign or malignant (cancerous), and most are benign. Even if a detected nodule is 5.0 mm or smaller, if the Confirmatory Examination is considered to be necessary, the diagnosis is Grade B.
- It has been widely known that many cases of thyroid cancer are occult (latent), showing no symptoms or health effects over a lifetime. Occult thyroid cancer is 5.0 mm or smaller in most cases and it is considered to be disadvantageous for patients to detect and treat them. Accordingly, it is generally recommended not to conduct a detailed examination, such as cytological testing, for nodules of 5.0 mm or smaller.
- Therefore, in the Thyroid Ultrasound Examination conducted through the Fukushima Health Management Survey, the Confirmatory Examination is not performed for nodules of 5.0 mm or smaller; instead, an ultrasound examination (Primary Examination) is to be conducted in 2 to 5 years.

Thyroid Ultrasound Examination: Cysts

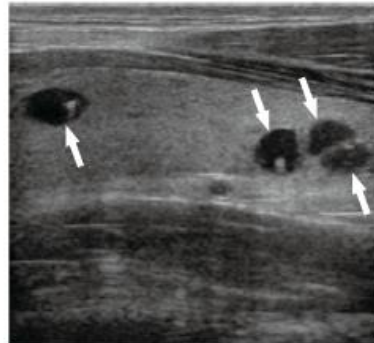
A cyst, which resembles a bag filled with fluid, is generally benign, and is often found even in healthy people



Cysts are generally benign, but those of 20 mm or larger may cause a feeling of pressure in the throat and fluid in a cyst is sometimes withdrawn.



Single cyst



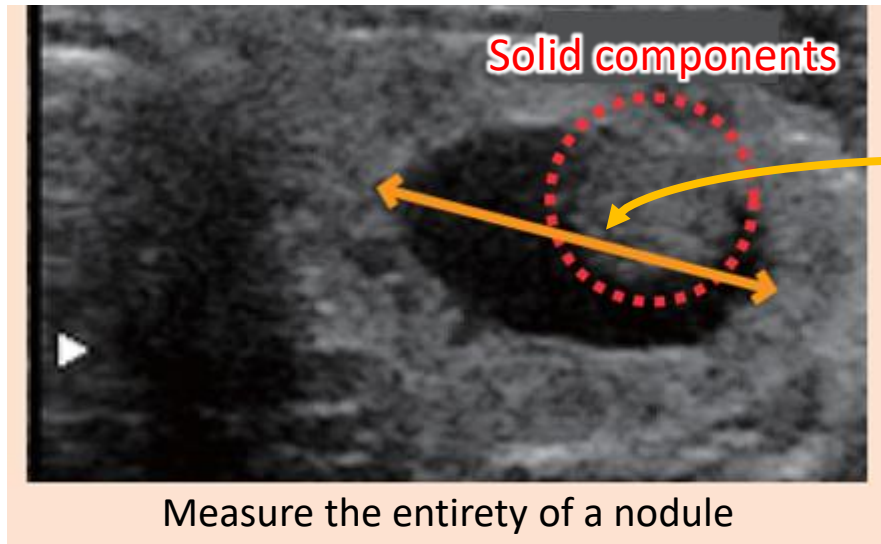
Multiple cysts

* The parts pointed with arrows are cysts.

- A cyst, which resembles a bag filled with fluid, is benign, and is often found even in healthy people.
- Cysts often change in size or number, and many people have multiple cysts.
- Examinations so far revealed that cysts are seldom found in infants and young children but are found more often in elementary, junior high, and high school students.

Thyroid Ultrasound Examination: Handling of Cysts with Solid Components

Cysts with solid components are all judged as nodules.



When the maximum size of a nodule with solid and cystic components (the length of the orange arrow) is 5.1 mm or larger, the examinee is diagnosed as Grade B.

- "Cysts with solid components," which are cysts containing nodules inside, are all evaluated as nodules in this examination.
- In such case, not the size of a nodule inside but the maximum size of a cyst with the nodule is recorded. For example, when a 3 mm-nodule is found in a 30 mm-cyst, the relevant examinee is judged to have a 30 mm-nodule and is diagnosed as Grade B (as the size exceeds 5.1 mm).

Expansion of available institutions and system for implementing examinations in Fukushima Prefecture

Efforts have been continued to increase the number of institutions in Fukushima Prefecture and to enhance system for implementing examinations in order to reduce the number of people who cannot receive the examination due to various reasons.

Examination venue of your choice



Public facilities



Medical institutions
within the prefecture

Expansion of institutions for implementing examinations outside Fukushima Prefecture

Efforts have been continued to increase institutions so that people can receive the examination even outside the prefecture.

The examination can be received at more than 120 medical institutions nationwide.

In order to receive the Thyroid Ultrasound Examination, you need to make a reservation in advance with the Radiation Medical Science Center for the Fukushima Health Management Survey.

Provision of explanation booths

Since July 2015, booths have been set up at examination venues in public facilities, etc. for providing examinees with explanations on examination results. Physicians explain provisional examination results available on the day using ultrasound images.

When explanation booths cannot be set up at the examination venue or for examination performed in some venues such as schools, telephone consultation services are provided instead.

Thyroid Ultrasound Examination: Order of Full-scale Survey



The examination has been conducted sequentially, starting in areas where ambient dose rates were highest after the disaster.

- Full-scale Survey (fourth-round survey)
(for those aged 18 or younger)

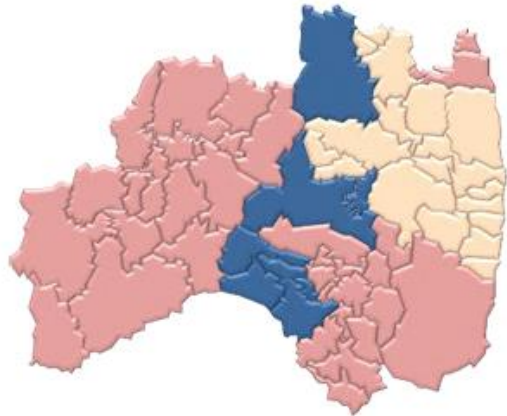
- Municipalities where the FY2018 Primary Examination was conducted (25 municipalities)
- Municipalities where the FY2019 Primary Examination was conducted (34 municipalities)

- Full-scale Survey (fifth-round survey)
(those living outside Fukushima Prefecture and classification for analysis)

- Municipalities where the FY2020 Primary Examination was conducted (25 municipalities)
- Municipalities where the FY2021 Primary Examination was conducted (34 municipalities)

Order of Implementing the Full-scale Survey (Fifth-round Survey) of the Thyroid Ultrasound Examination (within Fukushima Prefecture)

- Full-scale Survey (fifth-round survey):
At elementary schools and junior high schools in Fukushima Prefecture



- Municipalities where the Primary Examination was conducted in FY2020 (18 municipalities)
- Municipalities where the Primary Examination was conducted in FY2021 (7 municipalities)
- Municipalities where the Primary Examination was conducted in FY2022 (34 municipalities)

* Due to the impact of the COVID-19 pandemic, the survey at elementary schools and junior high schools for FY2020 was commenced in September 2020.

- Full-scale Survey (fifth-round survey): At high schools in Fukushima Prefecture



- Municipalities where the Primary Examination was conducted in FY2021 (25 municipalities)
- Municipalities where the Primary Examination was conducted in FY2022 (34 municipalities)

Thyroid Ultrasound Examination: Results of the Preliminary Baseline Survey

Latest Examination Results: <https://www.pref.fukushima.lg.jp/site/portal/kenkocyoa-kentoiinkai.html> (in Japanese)

● Results of the Primary Examination

	Number of eligible subjects (people)	Number of examinees (people)		Diagnosis rate (%)	Number of those diagnosed (people)			
		Examination rate (%)	Examinees from outside of the prefecture		Breakdown by grade (%)			
					A		Those recommended to take the Confirmatory Examination	
					A 1	A 2	B	C
Total	367,637	300,472 (81.7)	9,511	300,472 (100.0)	154,605(51.5)	143,573 (47.8)	2,293(0.8)	1 (0.0)

Grade A : 99.2%

● Results of the Confirmatory Examination

	Number of eligible subjects (people)	Number of examinees (people) Examination rate (%)	Rate of definitive diagnosis (%)	Number of those who received a definitive diagnosis (people)			
				For next examination		For regular healthcare program, etc.	
				A 1	A 2	Those who received fine-needle aspiration cytology	
Total	2,293	2,130 (92.9)	2,091 (98.2)	132 (6.3)	579 (27.7)	1,380 (66.0)	547 (39.6)

● Results of the fine-needle aspiration cytology

Malignant or suspicious for malignancy: 116 people; 39 males and 77 females

Average age: 17.3 ± 2.7 years old (8 to 22 years old); At the time of the earthquake: 14.9 ± 2.6 years old (6 to 18 years old)

Average tumor size: 13.9 ± 7.8 mm (5.1 to 45.0 mm)

- Out of 116 people whose tumors were diagnosed as malignant or suspicious for malignancy, 102 received surgery (benign nodule: 1; papillary cancer: 100; poorly differentiated cancer: 1).

Thyroid Ultrasound Examination

Thyroid Ultrasound Examination: Results of the First Full-scale Survey (Second-round Survey)

Latest Examination Results: <https://www.pref.fukushima.lg.jp/site/portal/kenkocyoa-kentoiinkai.html> (in Japanese)

● Results of the Primary Examination

	Number of eligible subjects (people)	Number of examinees (people)		Diagnosis rate (%)	Number of those diagnosed (people)			
		Examination rate (%)	Examinees from outside of the prefecture		Breakdown by grade (%)			
					A		Those recommended to take the Confirmatory Examination	
					A 1	A 2	B	C
Total	381,237	270,552(71.0)	15,663	270,552 (100.0)	108,726(40.2)	159,596(59.0)	2,230(0.8)	0 (0.0)

Grade A : 99.2%

● Results of the Confirmatory Examination

	Number of eligible subjects (people)	Number of examinees (people) Examination rate (%)	Rate of definitive diagnosis (%)	Number of those who received a definitive diagnosis (people)			
				For next examination		For regular healthcare program, etc.	
				A 1	A 2	Those who received fine-needle aspiration cytology	
Total	2,230	1,877(84.2)	1,834(97.7)	63(3.4)	367(20.0)	1,404(76.6)	207(14.7)

* The total of percentages with one decimal place may not be 100% due to rounding.

● Results of the fine-needle aspiration cytology

Malignant or suspicious for malignancy: 71people; 32 males and 39 females

Average age: 16.9 ± 3.2 years old (9 to 23 years old); At the time of the earthquake: 12.6 ± 3.2 years old (5 to 18 years old)

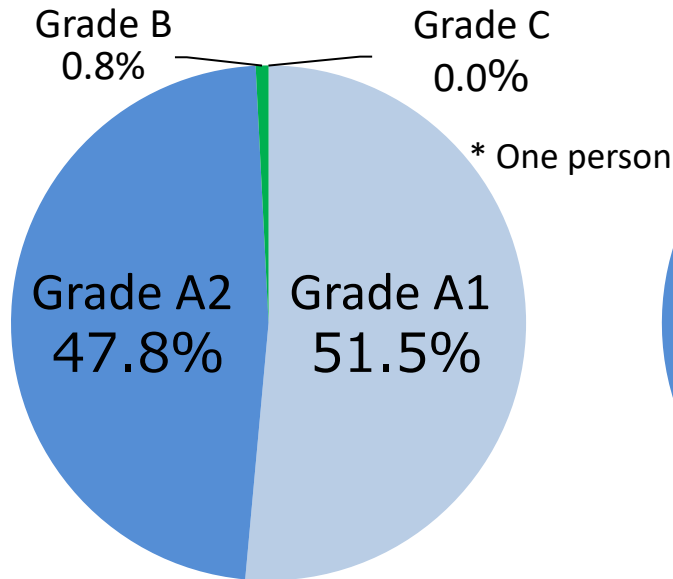
Average tumor size: 11.1 ± 5.6 mm (5.3 to 35.6 mm)

- Out of 71 people whose tumors were diagnosed as malignant or suspicious for malignancy, 55 received surgery (papillary cancer: 54; other types of thyroid cancer: 1).

Comparison between the Thyroid Ultrasound Examination and the Examination in Other Prefectures

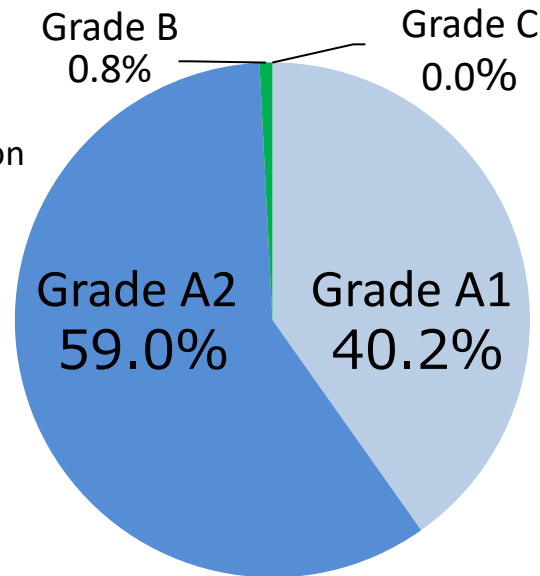
Fukushima Prefecture

Preliminary Baseline Survey



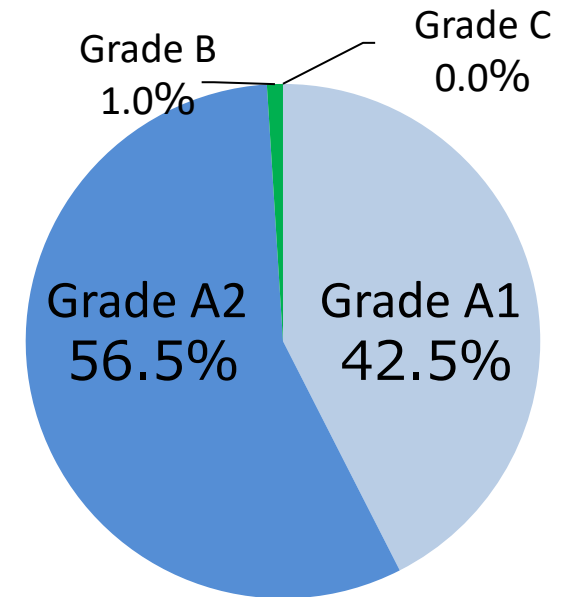
300,473 residents of Fukushima Prefecture who were aged 18 or younger at the time of the earthquake

First Full-scale Survey (second-round survey)



270,552 residents of Fukushima Prefecture who were aged 1 to 18 at the time of the earthquake

3 prefectures
(Nagasaki, Yamanashi, and Aomori)



4,365 children ranging from kindergarteners to high school students in Nagasaki, Yamanashi and Aomori Prefectures (young children aged under 3 were not covered)

Prepared based on the materials for the 27th and 42nd Prefectural Oversight Committee Meeting for Fukushima Health Management Survey

Prepared based on the "Survey Results on Detection Rates of Thyroid Abnormalities in the Examination in Three Prefectures Other than Fukushima Prefecture" (March 29, 2013) released by the Ministry of the Environment

Thyroid Ultrasound Examination: Results of the Second Full-scale Survey (Third-round Survey)

Latest Examination Results: <https://www.pref.fukushima.lg.jp/site/portal/kenkocyoa-kentoiinkai.html> (in Japanese)

● Results of the Primary Examination

	Number of eligible subjects (people)	Number of examinees (people)		Diagnosis rate (%)	Number of those diagnosed (people)			
		Examination rate (%)	Examinees from outside the prefecture		Breakdown by grade (%)			
					A		Those recommended to take the Confirmatory Examination	
					A 1	A 2	B	C
Total	336,667	217,922(64.7)	12,512	217,922 (100.0)	76,431(35.1)	139,989(64.2)	1,502(0.7)	0 (0.0)

Grade A: 99.3%

● Results of the Confirmatory Examination

	Number of eligible subjects (people)	Number of examinees (people) Examination rate (%)	Rate of definitive diagnosis (%)	Number of those who received a definitive diagnosis (people)			
				For next examination		For regular healthcare program, etc.	Those who received fine-needle aspiration cytology
				A 1	A 2		
Total	1,502	1,104(73.5)	1,068(96.7)	9(0.8)	100(9.4)	959(89.8)	79(8.2)

* The total of percentages with one decimal place may not be 100% due to rounding.

● Results of the fine-needle aspiration cytology

Malignant or suspicious for malignancy: 31 people; 13 males and 18 females

Average age: 16.3 ± 2.9 years old (12 to 23 years old); At the time of the earthquake: 9.6 ± 2.9 years old (5 to 16 years old)

Average tumor size: 12.9 ± 6.4 mm (5.6 to 33.0 mm)

● Out of 31 people whose tumors were diagnosed as malignant or suspicious for malignancy, 29 received surgery (papillary cancer: 29).

Thyroid Ultrasound Examination: Results of the Third Full-scale Survey (Fourth-round Survey)

Latest Examination Results: <https://www.pref.fukushima.lg.jp/site/portal/kenkocyoa-kentoiinkai.html> (in Japanese)

● Results of the Primary Examination

	Number of eligible subjects (people)	Number of examinees (people)		Diagnosis rate (%)	Number of those diagnosed (people)			
		Examination rate (%)	Examinees from outside the prefecture		Breakdown by grade (%)			
					A		Those recommended to take the Confirmatory Examination	
					A 1	A 2	B	C
Total	294,228	183,410 (62.3)	10,234	183,410 (100.0)	61,712 (33.6)	120,304 (65.6)	1,394 (0.8)	0 (0.0)

Grade A: 99.2%

● Results of the Confirmatory Examination

	Number of eligible subjects (people)	Number of examinees (people) Examination rate (%)	Rate of definitive diagnosis (%)	Number of those who received a definitive diagnosis (people)			
				For next examination		For regular healthcare program, etc.	
				A 1	A 2	Those who received fine-needle aspiration cytology	
Total	1,394	1,036 (74.3)	1,016 (98.1)	6 (0.6)	88 (8.7)	922 (90.7)	91 (9.9)

* The total of percentages with one decimal place may not be 100% due to rounding.

● Results of the fine-needle aspiration cytology

Malignant or suspicious for malignancy: 39 people; 17 males and 22 females

Average age: 17.0 ± 3.1 years old (9 to 24 years old); At the time of the earthquake: 8.3 ± 2.9 years old (0 to 14 years old)

Average tumor size: 13.1 ± 6.3 mm (6.1 to 29.4 mm)

- Out of 39 people whose tumors were diagnosed as malignant or suspicious for malignancy, 34 received surgery (papillary cancer: 34).

Thyroid Ultrasound Examination

Thyroid Ultrasound Examination: Results of Full-scale Survey (the survey at age 25 years)

Latest Examination Results: <https://www.pref.fukushima.lg.jp/site/portal/kenkocyoa-kentoiinkai.html> (in Japanese)

● Results of the Primary Examination

	Number of eligible subjects (people)	Number of examinees (people)		Diagnosis rate (%)	Number of those diagnosed (people)			
		Examination rate (%)	Examinees from outside the prefecture		Breakdown by grade (%)			
					A		Those recommended to take the Confirmatory Examination	
					A 1	A 2	B	C
Total	108,713	9,841 (9.1)	3,448	9,520 (96.7)	4,043 (42.5)	4,973 (52.2)	504 (5.3)	0 (0.0)

Grade A: 94.7%

● Results of the Confirmatory Examination

	Number of eligible subjects (people)	Number of examinees (people)	Examination rate (%)	Rate of definitive diagnosis (%)	Number of those who received a definitive diagnosis (people)		
					For next examination		For regular healthcare program, etc.
					A 1	A 2	
Total	430	353 (82.1)	345 (97.7)	2 (0.6)	23 (6.7)	320 (92.8)	31 (9.7)

* The total of percentages with one decimal place may not be 100% due to rounding.

● Results of the fine-needle aspiration cytology

Malignant or suspicious for malignancy: 16 people; 4 males and 12 females

Average age: 25.4 ± 0.7 years old (24 to 27 years old); At the time of the earthquake: 16.3 ± 1.1 years old (15 to 18 years old)

Average tumor size: 15.6 ± 12.1 mm (5.3 to 49.9 mm)

- Out of 16 people whose tumors were diagnosed as malignant or suspicious for malignancy, 10 received surgery (papillary cancer: 9; follicular cancer: 1).

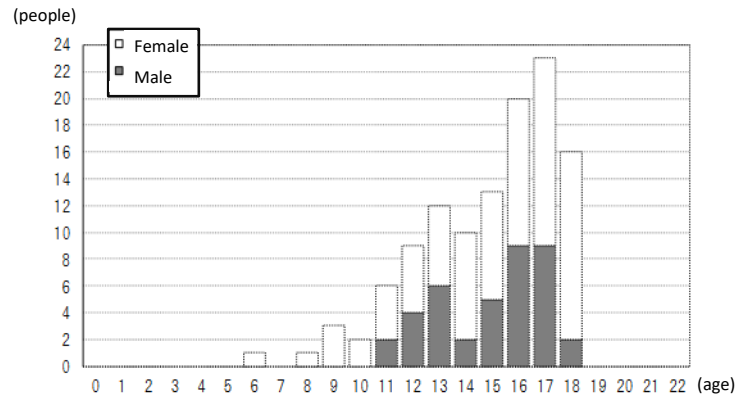
Thyroid Ultrasound Examination

Thyroid Ultrasound Examination: Results of the Preliminary Baseline Survey and the Full-scale Survey (Details of Fine-needle Aspiration Cytology 1)

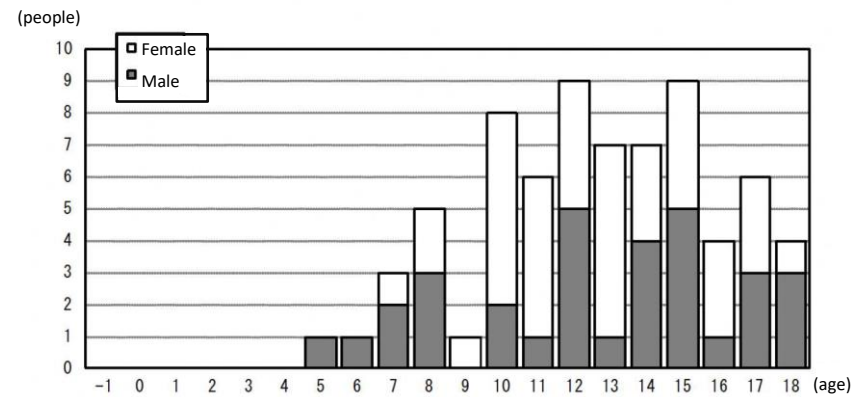
Latest Examination Results: <https://www.pref.fukushima.lg.jp/site/portal/kenkocyoosa-kentoiinkai.html> (in Japanese)

- Age distribution of examinees whose tumors were diagnosed as malignant or suspicious for malignancy as a result of fine-needle aspiration cytology

Results of the Preliminary Baseline Survey
(116 examinees)
Age distribution as of March 11, 2011

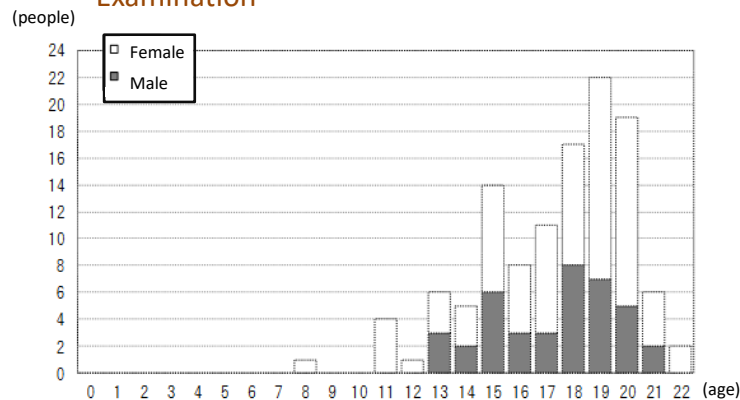


Results of the Full-scale Survey (second-round survey)
(71 examinees)
Age distribution as of March 11, 2011

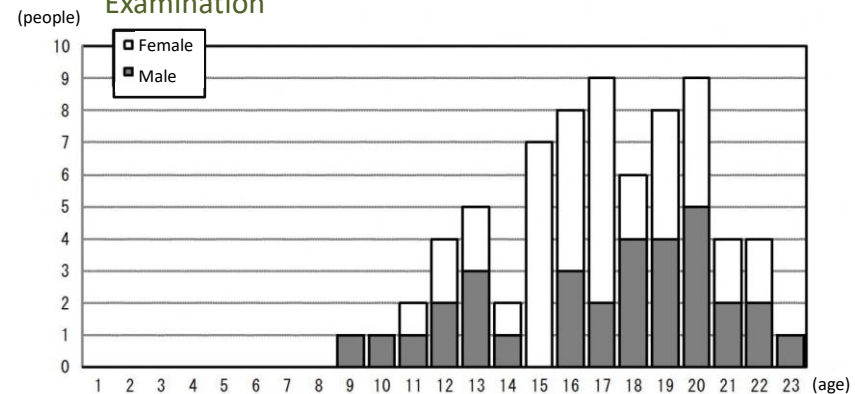


"-1" on the horizontal axis refers to Fukushima Prefecture residents born from April 2, 2011, to April 1, 2012.

Age distribution as of the time of the Confirmatory Examination



Age distribution as of the time of the Confirmatory Examination



Thyroid Ultrasound Examination

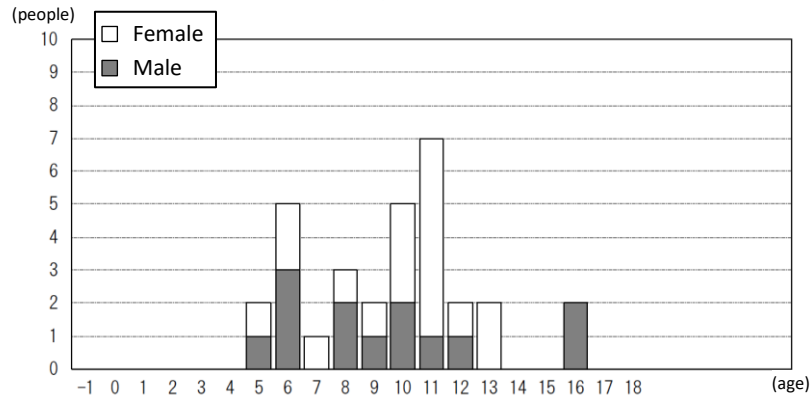
Thyroid Ultrasound Examination: Results of the Preliminary Baseline Survey and the Full-scale Survey (Details of Fine-needle Aspiration Cytology 2)

Latest Examination Results: <https://www.pref.fukushima.lg.jp/site/portal/kenkocoyosa-kentoiinkai.html> (in Japanese)

- Age distribution of examinees whose tumors were diagnosed as malignant or suspicious for malignancy as a result of fine-needle aspiration cytology

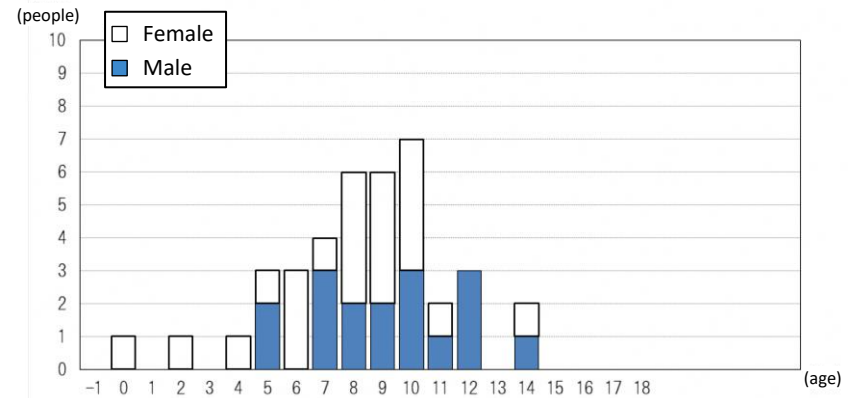
Results of the Full-scale Survey (third-round survey) (31 examinees)

Distribution by age as of March 11, 2011



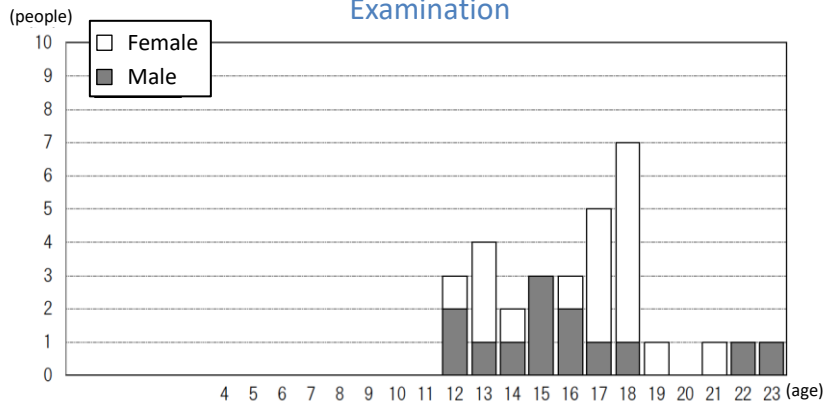
Results of the Full-scale Survey (fourth-round survey) (39 examinees)

Distribution by age as of March 11, 2011

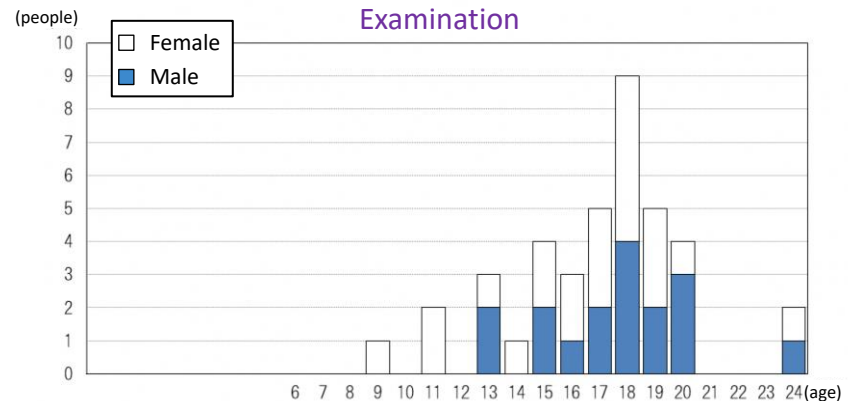


"-1" on the horizontal axis refers to Fukushima Prefecture residents born from April 2, 2011, to April 1, 2012.

Distribution by age at the time of the Confirmatory Examination



Distribution by age at the time of the Confirmatory Examination



Thyroid Ultrasound Examination: Remarks on the Results of the Preliminary Baseline Survey

- The Thyroid Ultrasound Examination, which had no precedent for childhood screening, revealed thyroid cancers that might have otherwise gone unnoticed.

Percentage of examinees whose tumors were diagnosed as malignant or suspicious for malignancy as a result of fine-needle aspiration cytology (against the total examinees of the Primary Examination)

FY2011	FY2012	FY2013
0.03%	0.04%	0.04%

Material for the 20th Prefectural Oversight Committee Meeting for Fukushima Health Management Survey

- Evaluation of thyroid cancers found in the Preliminary Baseline Survey, the Interim Report by the Prefectural Oversight Committee Meeting for Fukushima Health Management Survey (March 2016)

"Comprehensively considering that: exposure doses due to the accident at the Fukushima Daiichi NPS were generally lower than those caused by the Chernobyl NPS Accident; the period of time from the exposure to the detection of cancers is short (mostly from one to four years); cancers have not been detected in those aged 5 or younger at the time of the accident; and there is no significant regional difference in detection rates, it can be concluded that thyroid cancers found so far through the Thyroid Examination cannot be attributed to radiation discharged due to the accident.

However, the possibility of radiation effects may be small but cannot be completely denied at this point in time. Additionally, it is necessary to accumulate information in the long term for accurate evaluation of the effects. Therefore, the Thyroid Ultrasound Examination should be continued, while meticulously explaining the disadvantages of receiving the examination and obtaining the understanding of examinees."

- The United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) reiterated in its 2017 White paper* that excessive thyroid cancer risks due to radiation exposure do not need to be taken into consideration.

* Developments since the 2013 UNSCEAR Report on the levels and effects of radiation exposure due to the nuclear accident following the great east-Japan earthquake and tsunami (A 2017 White Paper to guide the Scientific Committee's future programme of work)

**In order to ascertain radiation effects,
it is necessary to monitor developments over a long term.**

In June 2019, the Thyroid Ultrasound Examination Evaluation Subcommittee, which was established under the Prefectural Oversight Committee for the Fukushima Health Management Survey, concluded that "at present, there are no indication of radiation effect on thyroid cancers found in the first Full-scale Survey," in consideration of the points described below. The Subcommittee reported this conclusion at the Prefectural Oversight Committee Meeting held in July 2019, and the Committee approved this report.

- As a result of the analysis of association between estimated absorbed thyroid doses and thyroid cancer detection rates published by the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR), no constant correlation (doses and effects), such as an increase in detection rates associated with an increase in doses, was found.
- The detection rates of suspected thyroid cancer through ultrasound examinations, etc. are higher among people who were older at the time of the accident, and the age group in which thyroid cancer was detected more frequently is different from that after the Chernobyl NPS Accident (mainly young children).