Thyroid Ultrasound Examination

Thyroid Ultrasound Examination: Purpose and Coverage

"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).

Prepared based on the Report on the Fukushima Prefecture's Fukushima Health Management Survey (FY2019)

It has been reported that cases of thyroid cancer increased among children after the Chernobyl NPS Accident due to internal exposure to radioactive iodine. Compared with the Chernobyl NPS Accident, the amount of radioactive materials discharged into the environment after the accident in Fukushima was much smaller, and estimated internal and external doses of the residents were even smaller. Therefore, it is predicted that there would be no epidemiologically detectable thyroid health risks (p.141 of Vol. 1, "Evaluation of the Interim Report on Thyroid Cancer Compiled by the Expert Meeting on Health Management After the TEPCO's Fukushima Daiichi NPS Accident"). However, as concerns remain about effects of radiation due to the accident on children's thyroid glands, the Thyroid Ultrasound Examination has been continued under the framework of the Fukushima Health Management Survey with the aim of ascertaining children's thyroid status and promoting their health into the future.

Included in this reference material on March 31, 2013
Updated on March 31, 2021

Thyroid Ultrasound Examination

Thyroid Ultrasound Examination: Outline (1/3)

● Examination schedule

	Category	Period	Eligible subjects
First examination < Finished >	**Preliminary Baseline Survey** In order to 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 Third examination Fourth examination < Finished >	**Full-scale Survey** In order to make comparison with the results of the Initial Screening	April 2014 - March 2020	Those born from April 2, 2011, to April 1, 2012 *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 30, 35 and so on
Fifth examination*1		April 2020 -	

*1 Depending on the age of residents, the examination is the fourth one. For details, access the following to check the year to receive the examination (https://fukushima-mimamori.jp/thyroid-examination/yearsearch.html) (in Japanese).

Prepared based on the website of the Radiation Medical Science Center for the Fukushima Health Management Survey, Fukushima Medical University (information on the Thyroid Ultrasound Examination)

Ascertaining the current thyroid status of the relevant group of people even though radiation effects are unlikely to be detected is very important for promoting their health for the long term. Therefore, the Thyroid Ultrasound Examination was conducted for all children in Fukushima Prefecture after the accident at Tokyo Electric Power Company (TEPCO)'s Fukushima Daiichi NPS over a period of approximately two and a half years from October 2011 (Preliminary Baseline Survey).

Then, in FY2014, the coverage was expanded to include those born from April 2, 2011, to April 1, 2012, and the Full-scale Survey was conducted as the second examination.

From the third examination onward, the targeted people receive examinations once every two years until they become 20 years old and once every five years thereafter.

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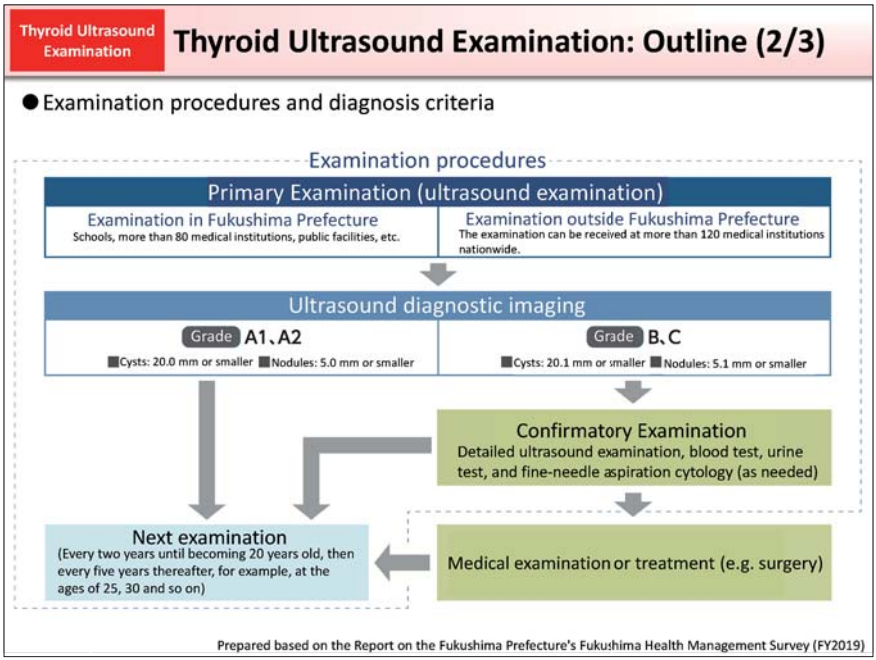

The Primary Examination checks whether there are any nodules or cysts and measures the sizes thereof, if any. The Confirmatory Examination is recommended to those who are considered to require a more detailed examination.

In the Confirmatory Examination, a more accurate ultrasound examination, plus blood and urine tests are conducted, and fine-needle aspiration cytology is also conducted when a doctor considers it necessary.

The Thyroid Ultrasound Examination is completed at this point.

Then, individuals who are found to require treatment receive it from their regular healthcare provider, under the relevant medical insurance system.

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Thyroid Ultrasound Examination

Thyroid Ultrasound Examination: Outline (3/3)

● 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.

Prepared based on the website of the Radiation Medical Science Center for the Fukushima Health Management Survey, Fukushima Medical University (information on the Thyroid Ultrasound Examination, FAQs)

An ultrasound examination is conducted with an examinee lying on his/her back. A doctor places an ultrasonic probe with jelly on its tip over the examinee's thyroid (located around the base of the neck) and examines whether there are any cysts or nodules while moving the probe over the examinee's skin.

The examination ordinarily finishes in three to five minutes with no pain involved.

Definitive diagnoses from the Primary Examination are not made at the venues. In order to make comprehensive and objective judgments, ultrasound images are later reviewed by a panel of medical specialists. This is to ensure a consistently high level of diagnostic accuracy throughout the Fukushima Health Management Survey.

The sizes of nodules and cysts mentioned above are reference values for making diagnoses. If any nodules or cysts found in ultrasound images are suspected to be malignant, the case is designated as Grade B irrespective of the sizes of the nodules or cysts and the Confirmatory Examination is recommended.

In the Confirmatory Examination, a more accurate ultrasound examination, plus blood and urine tests, are conducted. If, as a result of these tests, a doctor considers it necessary, fine-needle aspiration cytology, an examination of a sample tissue taken from the person's thyroid, may also be conducted.

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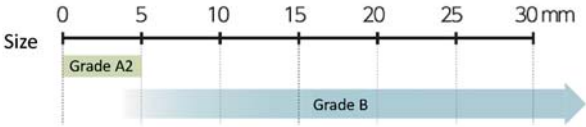
Thyroid Ultrasound Examination

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.

Prepared based on the Report on the Fukushima Prefecture's Fukushima Health Management Survey (FY2019)

A nodule, which might also be called a lump, is a thyroid cell with irregular density. Some nodules are malignant, but most are benign.

It has been known that thyroid cancer is often latent, presenting no symptoms or health effects over a lifetime. Thus, detecting all cancers and forcing patients to receive treatment may be sometimes rather disadvantageous, so a detailed examination, such as cytological testing, is not generally conducted for small nodules. In the Thyroid Ultrasound Examination conducted through the Fukushima Health Management Survey, the Confirmatory Examination is not performed for nodules of 5 mm or smaller; instead, the next regularly scheduled ultrasound examination (Primary Examination) is to be conducted.

In some cases, a person once diagnosed as Grade A1 is diagnosed as Grade A2 or Grade B in the next examination, or conversely, a person once diagnosed as Grade A2 is subsequently diagnosed as Grade A1.

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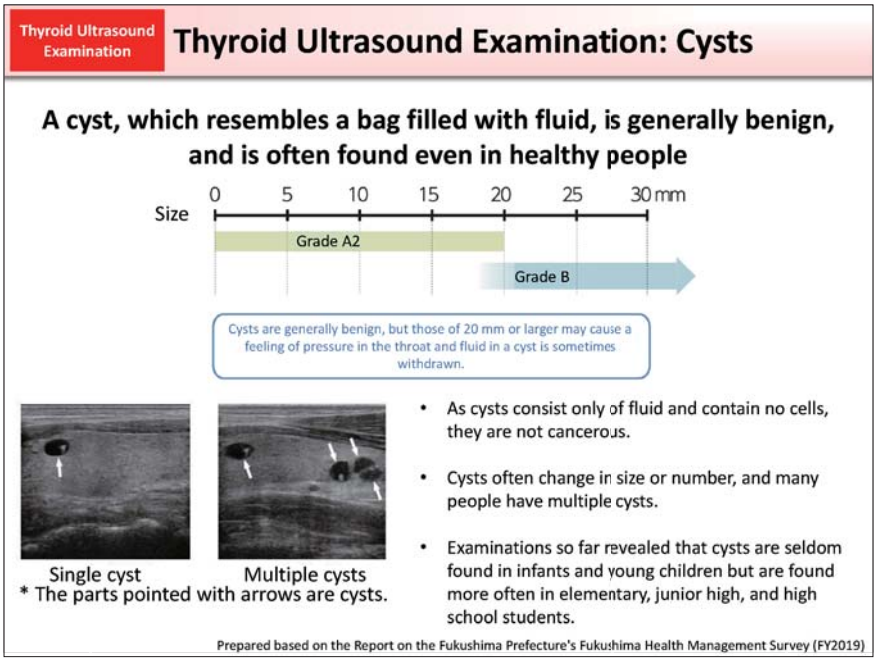

Cysts identified in the Thyroid Ultrasound Examination being conducted in Fukushima Prefecture are considered benign, consisting only of fluid and containing no cells. They are often found even in healthy people, especially among primary and secondary school students. Therefore, repeated examinations often find cysts as children grow up.

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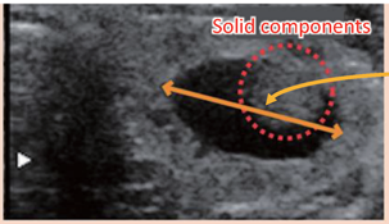
Thyroid Ultrasound Examination

Thyroid Ultrasound Examination: Handling of Cysts with Solid Components

Cysts with solid components are all judged as nodules.



Measure the entirety of a cyst

When the maximum size of a cyst with solid 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).

Prepared based on the website of the Radiation Medical Science Center for the Fukushima Health Management Survey, Fukushima Medical University (information on the Thyroid Ultrasound Examination, FAQs)

Some cysts contain nodules. In the Thyroid Ultrasound Examination conducted in the Fukushima Health Management Survey, those cysts with solid components (nodules) are all judged as nodules and diagnosis criteria for nodules are applied.

For example, a 30 mm-cyst with a 3 mm-nodule is judged as a nodule and diagnosis criteria for nodules are applied. As the size is larger than 5.1 mm, the examinee is diagnosed as Grade B and is advised to receive the Confirmatory Examination.

Items judged as fluid-only cysts are considered to be benign.

(Related to p.130 of Vol. 2, "Thyroid Ultrasound Examination: Cysts")

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Thyroid Ultrasound Examination

Thyroid Ultrasound Examination: System for Examinations in and outside Fukushima

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.

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.

Prepared based on the Fukushima Health Management Survey Reports (2018 and 2019)

The Thyroid Ultrasound Examination is conducted in collaboration between Fukushima Medical University and medical institutions in and outside Fukushima Prefecture. For more convenience to residents of the prefecture, efforts have been made to increase venues and opportunities with the aim of promoting the health of the residents in Fukushima Prefecture for the long term.

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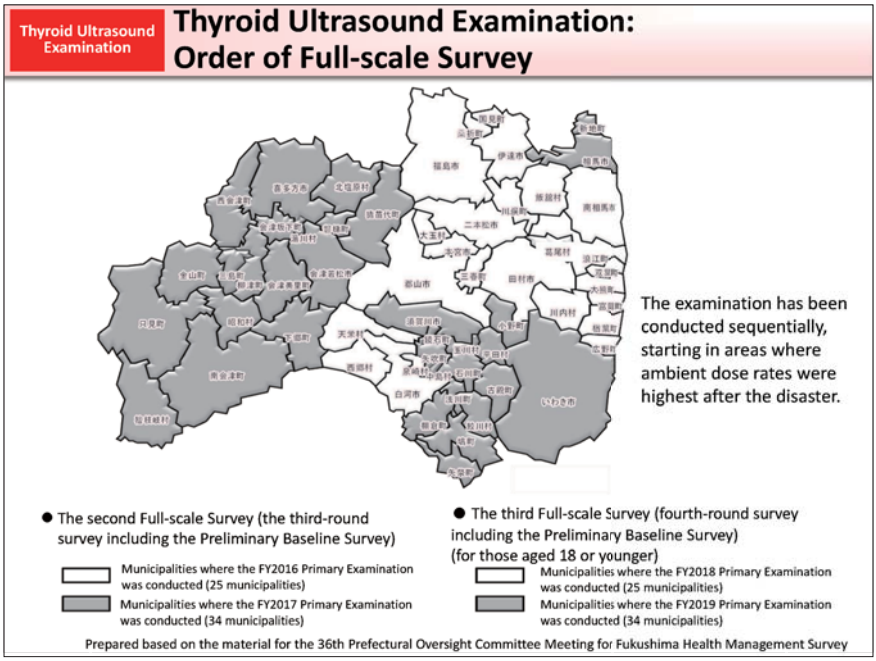

The Thyroid Ultrasound Examination has been conducted sequentially, starting in areas where ambient dose rates were higher at the time of the accident at Tokyo Electric Power Company (TEPCO)'s Fukushima Daiichi NPS.

For Full-scale Surveys following the Preliminary Baseline Survey, notices of the examination have been sent mostly in the same order.

Since the third Full-scale Survey (fourth-round survey overall), the examination has been conducted mostly in the same order for those aged 18 or younger. However, for those aged 19 or older, the examination has been conducted not by region but by age (school year). In FY2018, those born in FY1996 (aged 22) and born in FY1998 (aged 20) were examined, and in FY2019, those born in FY1997 (aged 22) and born in FY1999 (aged 20) were examined.

Since FY2017, the examination has been conducted for those who become 25 years old in the relevant year, and then once every five years thereafter.

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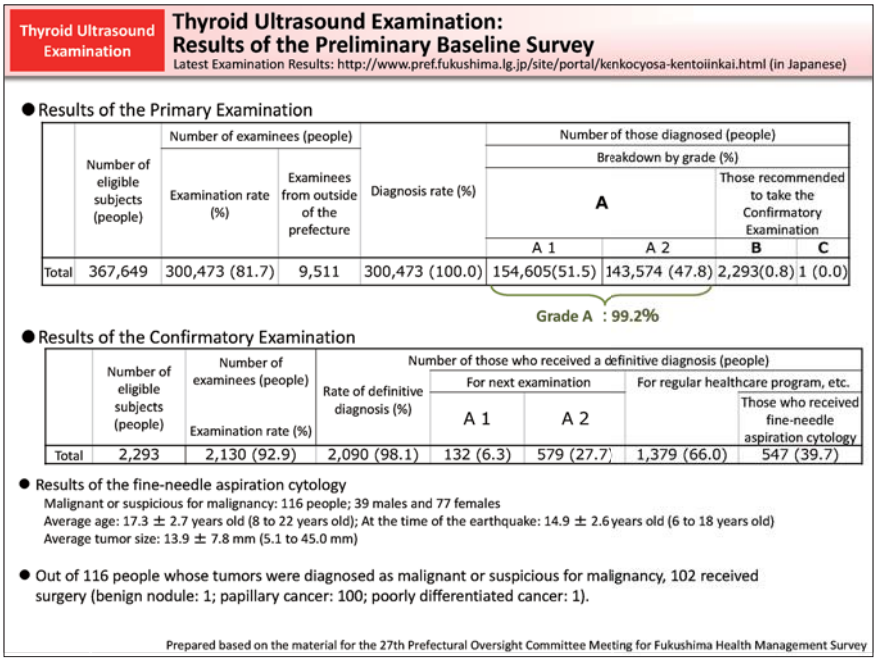

Thyroid Ultrasound Examination

Thyroid Ultrasound Examination: Results of the Preliminary Baseline Survey

Latest Examination Results: http://www.pref.fukushima.lg.jp/site/portal/kenkocyosa-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)			
					Breakdown by grade (%)			
		Examination rate (%)	Examinees from outside of the prefecture		A		Those recommended to take the Confirmatory Examination	
					A 1	A 2	B	C
Total	367,649	300,473 (81.7)	9,511	300,473 (100.0)	154,605(51.5)	143,574 (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)	2,090 (98.1)	132 (6.3)	579 (27.7)	1,379 (66.0)	547 (39.7)

● 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).

Prepared based on the material for the 27th Prefectural Oversight Committee Meeting for Fukushima Health Management Survey

These are the results of the Preliminary Baseline Survey, which was the very first Thyroid Ultrasound Examination (FY2011 to FY2013).

Examinees diagnosed as Grade A in the Primary Examination accounted for 99.2% of the total, while those diagnosed as Grade B accounted for 0.8%. It became clear that most of those diagnosed as Grade A2 had cysts of 20 mm or smaller and that those diagnosed as Grade B had nodules of 5.1 mm or larger.

In the Confirmatory Examination, as a result of a more accurate ultrasound examination and other tests, 34%, or approximately one out of three who received the Confirmatory Examination, were diagnosed as being equivalent to Grade A and were recommended to receive the next periodic examination (Full-scale Survey) in the same manner as those diagnosed as Grade A in the Primary Examination. This is because those who were suspected to have any abnormalities were diagnosed as Grade B just to be safe in the Primary Examination, and such people include those eventually diagnosed as Grade A in the Confirmatory Examination as a result of comprehensive and objective judgments through a more detailed examination, etc.

Among the examinees whose results of the Confirmatory Examination were finalized, 66% were shifted to ordinary medical care covered by health insurance, and appropriate measures are determined by the responsible doctor, based on individual findings and circumstances.

Furthermore, 39.7% went through fine-needle aspiration cytology, and 116 examinees were diagnosed as malignant or suspicious for malignancy. Out of these examinees, it is known that 102 had surgery. However, not all the patients who are diagnosed as malignant or suspicious for malignancy are indicated for immediate surgery, and the decisions are made depending on the individuals' situations after the consultation among physicians, examinees, and their families.

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Updated on March 31, 2021

Thyroid Ultrasound Examination

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

Latest Examination Results: http://www.pref.fukushima.lg.jp/site/portal/kenkocyosa-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	381,244	270,540(71.0)	15,658	270,529 (100.0)	108,718(40.2)	159,584(59.0)	2,227(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	2,227	1,874(84.1)	1,826(97.4)	63(3.5)	365(20.0)	1,398(76.6)	207(14.8)

* 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, 54 received surgery (papillary cancer: 53; other types of thyroid cancer: 1).

Prepared based on the material for the 31st and 39th Prefectural Oversight Committee Meeting for Fukushima Health Management Survey

These are the results of the first Full-scale Survey, which was the second round of the Thyroid Ultrasound Examination.

Examinees diagnosed as Grade A in the Primary Examination accounted for 99.2% of the total, while those diagnosed as Grade B accounted for 0.8%. Most of those diagnosed as Grade A2 had cysts of 20 mm or smaller and those diagnosed as Grade B had nodules of 5.1 mm or larger. This tendency was the same as that observed in the Preliminary Baseline Survey.

In the Confirmatory Examination, as a result of fine-needle aspiration cytology, 71 examinees were diagnosed that their tumors were malignant or suspicious for malignancy.

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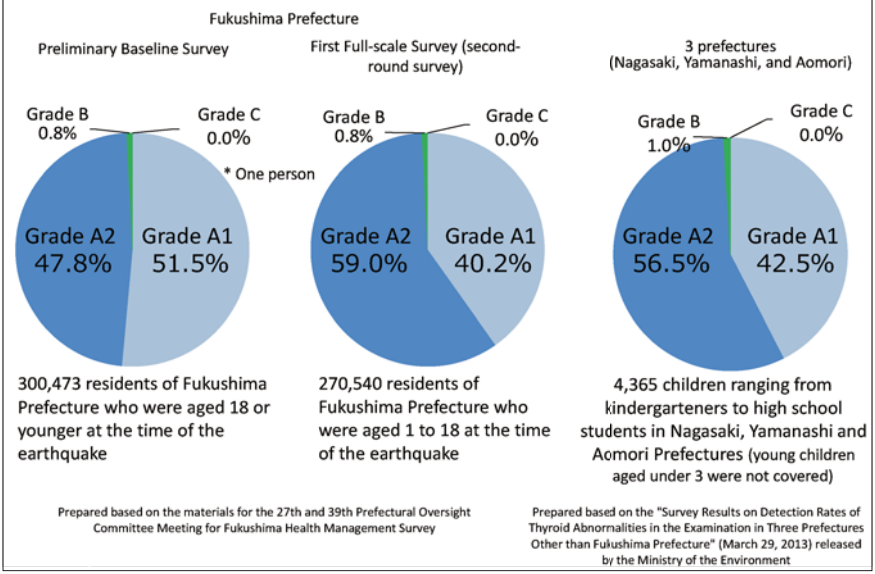
Updated on March 31, 2021

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



When the Thyroid Ultrasound Examination commenced, many concerns were raised about a relatively high percentage of examinees diagnosed as Grade A2. Therefore, in FY2012, the Ministry of the Environment (MOE) conducted the thyroid examination targeting approx. 4,300 children in Nagasaki, Yamanashi and Aomori Prefectures (3-prefecture examination) in the same manner as the examination conducted in Fukushima Prefecture.

The Preliminary Baseline Survey in Fukushima Prefecture covered those aged zero to 18 at the time of the earthquake, and the first Full-scale Survey covered those aged two to 23 at the time of the examination, respectively, while the 3-prefecture examination excluded children aged under 3 and covered only those aged 3 to 18. As the sample size of the cohort was much smaller in the 3-prefecture examination, a simple comparison cannot be made, but the results show that those diagnosed as Grade A2 were not exceedingly greater in number among the children of Fukushima Prefecture. The results of the 3-prefecture examination after age adjustment based on the demographics of Japan as of 2010 show that the detection rate of cysts was reported as 52.35% and that of nodules as 1.54%,[*1] which were similar to the results of the Preliminary Baseline Survey and the first Full-scale Survey in Fukushima Prefecture. The report of the 3-prefecture examination also made the following observations: "It is generally known that the detection rate of nodular lesions is lower in the group of examinees aged 3 to 5 than in the group of examinees aged 6 or older, and that females show higher detection rate than males. Therefore, there is the possibility that a detection rate tabulated based on simple descriptive statistical methods as in this case may be higher than the actual rate."[*2] In fact, the percentage of those diagnosed as Grade A2 in the first Full-scale Survey (second-round survey) excluding examinees aged 2 or younger was extremely close to the results of the 3-prefecture examination.

*1: Hayashida N, et al. Thyroid Ultrasound Findings in Children from Three Japanese Prefectures: Aomori, Yamanashi and Nagasaki. PLoS One. 8(12): e83220, 2013.
*2: "Report on the Outcome of the FY2012 Survey on Detection Rates of Thyroid Abnormalities" (commissioned by MOE), The Japan Association of Breast and Thyroid Sonology (March 2013)

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Updated on March 31, 2021

Thyroid Ultrasound Examination

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

Latest Examination Results: http://www.pref.fukushima.lg.jp/site/portal/kenkocyosa-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	336,670	217,921(64.7)	12,509	217,920 (100.0)	76,433(35.1)	139,986(64.2)	1,501(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.	
				A 1	A 2		Those who received fine-needle aspiration cytology
Total	1,501	1,101(73.4)	1,060(96.3)	9(0.8)	100(9.4)	951(89.7)	78(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, 27 received surgery (papillary cancer: 27).

Prepared based on the material for the 39th Prefectural Oversight Committee Meeting for Fukushima Health Management Survey

These are the results of the second Full-scale Survey, which was the third round of the Thyroid Ultrasound Examination. Examinees diagnosed as Grade A in the Primary Examination accounted for 99.3% of the total, while those diagnosed as Grade B accounted for 0.7%. Most of those diagnosed as Grade A2 had cysts of 20 mm or smaller and those diagnosed as Grade B had nodules of 5.1 mm or larger. This tendency was the same as that observed in the Preliminary Baseline Survey and the first Full-scale Survey (second-round survey). In the Confirmatory Examination, as a result of fine-needle aspiration cytology, 31 examinees were diagnosed that their tumors were malignant or suspicious for malignancy.

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Thyroid Ultrasound Examination

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

Latest Examination Results: http://www.pref.fukushima.lg.jp/site/portal/kenkocyosa-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	294,240	180,570(61.4)	9,799	177,424 (98.3)	59,808(33.7)	116,289(65.5)	1,327(0.7)	0 (0.0)

Grade A: 99.3%

● Results of the Confirmatory Examination

	Number of eligible subjects (people)	Number of examinees (people)	Rate of definitive diagnosis (%)	Number of those who received a definitive diagnosis (people)			
		Examination rate (%)		For next examination		For regular healthcare program, etc.	
				A 1	A 2		Those who received fine-needle aspiration cytology
Total	1,327	741(55.8)	647(87.3)	2(0.3)	57(8.8)	588(90.9)	49(8.3)

* 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: 21 people; 11 males and 10 females
Average age: 16.6 ± 2.5 years old (11 to 20 years old); At the time of the earthquake: 8.6 ± 2.4 years old (4 to 12 years old)
Average tumor size: 11.6 ± 5.3 mm (6.1 to 29.4 mm)

● Out of 21 people whose tumors were diagnosed as malignant or suspicious for malignancy, 13 received surgery (papillary cancer: 13).

Prepared based on the material for the 39th Prefectural Oversight Committee Meeting for Fukushima Health Management Survey

These are the results of the third Full-scale Survey which was the fourth round of the Thyroid Ultrasound Examination.

Examinees diagnosed as Grade A in the Primary Examination accounted for 99.3% of the total, while those diagnosed as Grade B accounted for 0.7%. Most of those diagnosed as Grade A2 had cysts of 20 mm or smaller and those diagnosed as Grade B had nodules of 5.1 mm or larger. This tendency was the same as that observed in the Preliminary Baseline Survey and the first and second Full-scale Surveys (second- and third-round surveys).

In the Confirmatory Examination, as a result of fine-needle aspiration cytology, 21 examinees were diagnosed that their tumors were malignant or suspicious for malignancy.

Included in this reference material on March 31, 2021

Thyroid Ultrasound Examination

Thyroid Ultrasound Examination: Results of Full-Scale Survey (Examination at the Age of 25)

Latest Examination Results: http://www.pref.fukushima.lg.jp/site/portal/kenkocyosa-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	66,637	5,578(8.4)	1,793	5,234 (93.8)	2,228(42.6)	2,762(52.8)	244(4.7)	0 (0.0)

Grade A: 95.3%

● Results of the Confirmatory Examination

	Number of eligible subjects (people)	Number of examinees (people)	Rate of definitive diagnosis (%)	Number of those who received a definitive diagnosis (people)			
		Examination rate (%)		For next examination		For regular healthcare program, etc.	
				A 1	A 2		Those who received fine-needle aspiration cytology
Total	244	168(68.9)	160(95.2)	1(0.6)	10(6.3)	149(93.1)	13(8.7)

* 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: 7 people; 2 males and 5 females
Average age: 25.3 ± 1.0 years old (24 to 27 years old); At the time of the earthquake: 17.1 ± 0.7 years old (16 to 18 years old)
Average tumor size: 22.6 ± 15.6 mm (10.8 to 49.9 mm)

● Out of 7 people whose tumors were diagnosed as malignant or suspicious for malignancy, 4 received surgery (papillary cancer: 3; follicular cancer: 1).

Prepared based on the material for the 39th Prefectural Oversight Committee Meeting for Fukushima Health Management Survey

In the implementation period of the second Full-scale Survey (FY2017), a survey targeting people who become 25 years old during the relevant fiscal year was commenced as part of the Full-scale Survey. These are the results of such surveys targeting people born in FY1992 through FY1994.

Examinees diagnosed as Grade A in the Primary Examination accounted for 95.3% of the total, while those diagnosed as Grade B accounted for 4.7%. Most of those diagnosed as Grade A2 had cysts of 20 mm or smaller and those diagnosed as Grade B had nodules of 5.1 mm or larger. This tendency was the same as that observed so far, but targeted examinees were older than in prior examinations, and therefore, the percentages of those diagnosed as Grade B and those diagnosed to have nodules were higher compared with the Preliminary Baseline Survey and the first to third Full-scale Surveys (second- to fourth-round surveys).

In the Confirmatory Examination, as a result of fine-needle aspiration cytology, 7 examinees were diagnosed that their tumors were malignant or suspicious for malignancy.

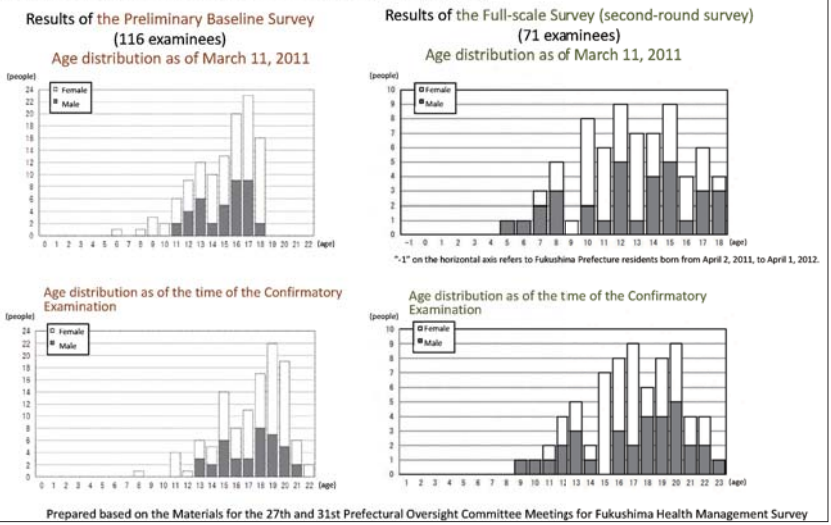
Included in this reference material on March 31, 2021

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: http://www.pref.fukushima.lg.jp/site/portal/kenkocyosa-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



Prepared based on the Materials for the 27th and 31st Prefectural Oversight Committee Meetings for Fukushima Health Management Survey

These graphs show the age distributions of examinees whose thyroid lesions were diagnosed as malignant or suspicious for malignancy by fine-needle aspiration cytology in the Preliminary Baseline Survey and the Full-scale Survey (second-round survey): they are shown by the age as of March 11, 2011 (top) and at the time of the Confirmatory Examination (bottom). The results of the Preliminary Baseline Survey and the Full-scale Survey (second-round survey) do not show the situation where thyroid cancer is found more frequently among young children (aged zero to 5), who are considered to have higher sensitivity to radiation, than among people in the other age groups.

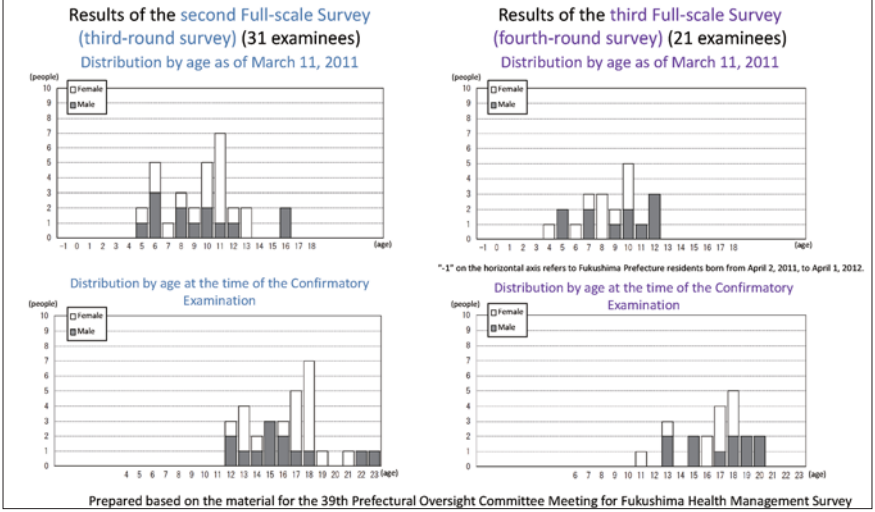
Included in this reference material on March 31, 2014
Updated on March 31, 2021

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: http://www.pref.fukushima.lg.jp/site/portal/kenkocyosa-kentoiinkai.html (in Japanese)

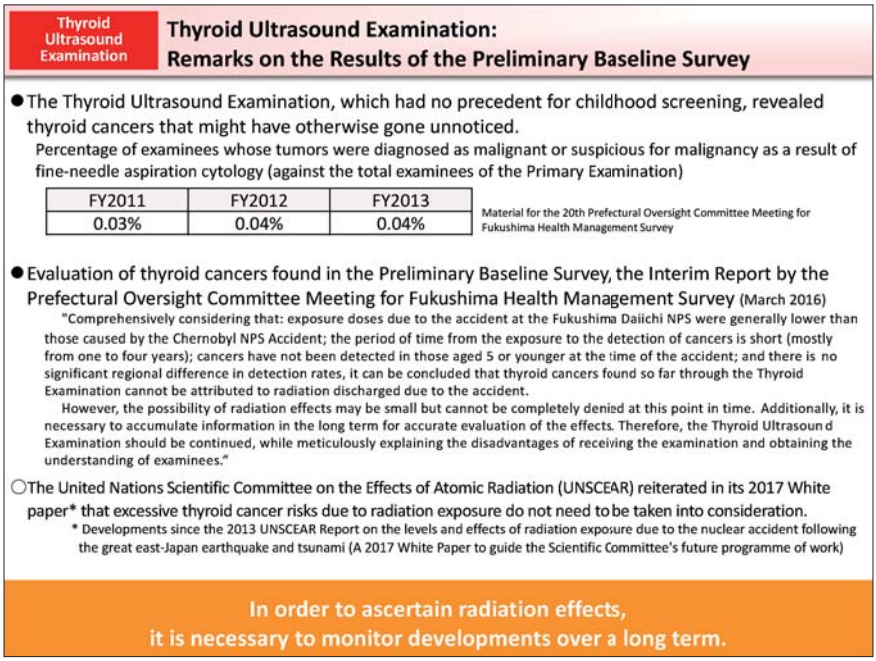
● Age distribution of examinees whose tumors were diagnosed as malignant or suspicious for malignancy as a result of fine-needle aspiration cytology



Prepared based on the material for the 39th Prefectural Oversight Committee Meeting for Fukushima Health Management Survey

These graphs show the age distribution, as of March 11, 2011, of examinees who subsequently had thyroid lesions diagnosed as malignant or suspicious for malignancy by fine-needle aspiration cytology in the second and third Full-scale Surveys (third- and fourth-round surveys), and their ages at the time of the Confirmatory Examination. The distribution by age at the time of the disaster tends to be shifted towards younger ages compared with the results of the Preliminary Baseline Survey and the first Full-scale Survey (second-round survey), but the distribution by age at the time of the Confirmatory Examination was the same as in the case of the Preliminary Baseline Survey and the first Full-scale Survey (second-round survey).

Included in this reference material on March 31, 2021



Thyroid cancers found so far through the Thyroid Ultrasound Examination being conducted in Fukushima Prefecture are considered to be unrelated to the radiation discharged due to the accident at Tokyo Electric Power Company (TEPCO)'s Fukushima Daiichi NPS.

This evaluation is based on a comprehensive judgment of the following facts:

(i) Exposure doses due to the accident at the Fukushima Daiichi NPS were generally lower compared with those caused by the Chernobyl NPS Accident.

(ii) The period of time from the exposure to the detection of cancers is short, mostly from one to four years.

(iii) Cancers have not been detected in those who were 5 years old or younger at the time of the accident.

(iv) Age distribution of patients significantly differs in Fukushima Prefecture and Chernobyl (p.140 of Vol. 1, "Comparison between the Chernobyl NPS Accident and the TEPCO's Fukushima Daiichi NPS Accident (Ages at the Time of Radiation Exposure)").

(v) There are no significant differences in detection rates among different regions.

However, it is necessary to monitor developments over a long term to ascertain radiation effects.

(Related to p.141 of Vol. 1, "Evaluation of the Interim Report on Thyroid Cancer Compiled by the Expert Meeting on Health Management After the TEPCO's Fukushima Daiichi NPS Accident")

Included in this reference material on March 31, 2015
Updated on March 31, 2021

Thyroid Ultrasound Examination

Thyroid Ultrasound Examination: Outline of the Evaluations of the First Full-Scale Survey (Second-round Survey) Results

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).

Prepared based on material for the 35th Prefectural Oversight Committee Meeting for Fukushima Health Management Survey

In June 2019, the Thyroid Ultrasound Examination Evaluation Subcommittee, which was established under the Prefectural Oversight Committee for the Fukushima Health Management Survey, published the "Report on the Results of the first Full-scale Survey of the Fukushima Thyroid Ultrasound Examination." In the Report, the Subcommittee states that no correlation is found between thyroid cancer cases detected through the first Full-scale Survey (second-round survey) and radiation exposure due to Tokyo Electric Power Company (TEPCO)'s Fukushima Daiichi NPS Accident. Additionally, the Subcommittee points out the necessity to review evaluations of the Thyroid Ultrasound Examination and examination results from the following perspectives:

・It is necessary to analyze accumulated results of the second and third Full-scale Surveys.

・It is necessary to conduct analyses by properly ascertaining the status of developing cancer among the subjects of Thyroid Ultrasound Examination using regional and national cancer registries.

・It is necessary to study correlation between doses and incidence rates of thyroid cancer in the future by using more detailed data on estimated thyroid exposure doses as a case-control study with adjusted confounding factors or as a prospective study.

Included in this reference material on March 31, 2020