Thyroid Examination

Thyroid Examination: Purpose and Coverage

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

[Purpose]

Health effects of radiation due to the accident at Tokyo Electric Power Company (TEPCO)'s Fukushima Daiichi NPS are considered to be extremely small, taking into consideration the expected internal and external exposure doses.

On the other hand, it has been reported that cases of thyroid cancer increased among children after the Chernobyl accident due to internal exposure to radioactive iodine. Therefore, the Thyroid Examination targeting children has been conducted since October 2011 with the aim of ascertaining their 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)

* The Full-scale Screening expanded coverage to include those born from April 2, 2011, to April 1, 2012 (approx. 382,000 people in total).

Prepared based on the website of the Radiation Medical Science Center for the Fukushima Health Management Survey, Fukushima Medical University, "Information on the Thyroid Examination"

Thyroid Examination

Thyroid Examination: Outline (1/3)

● Coverage and examination plan

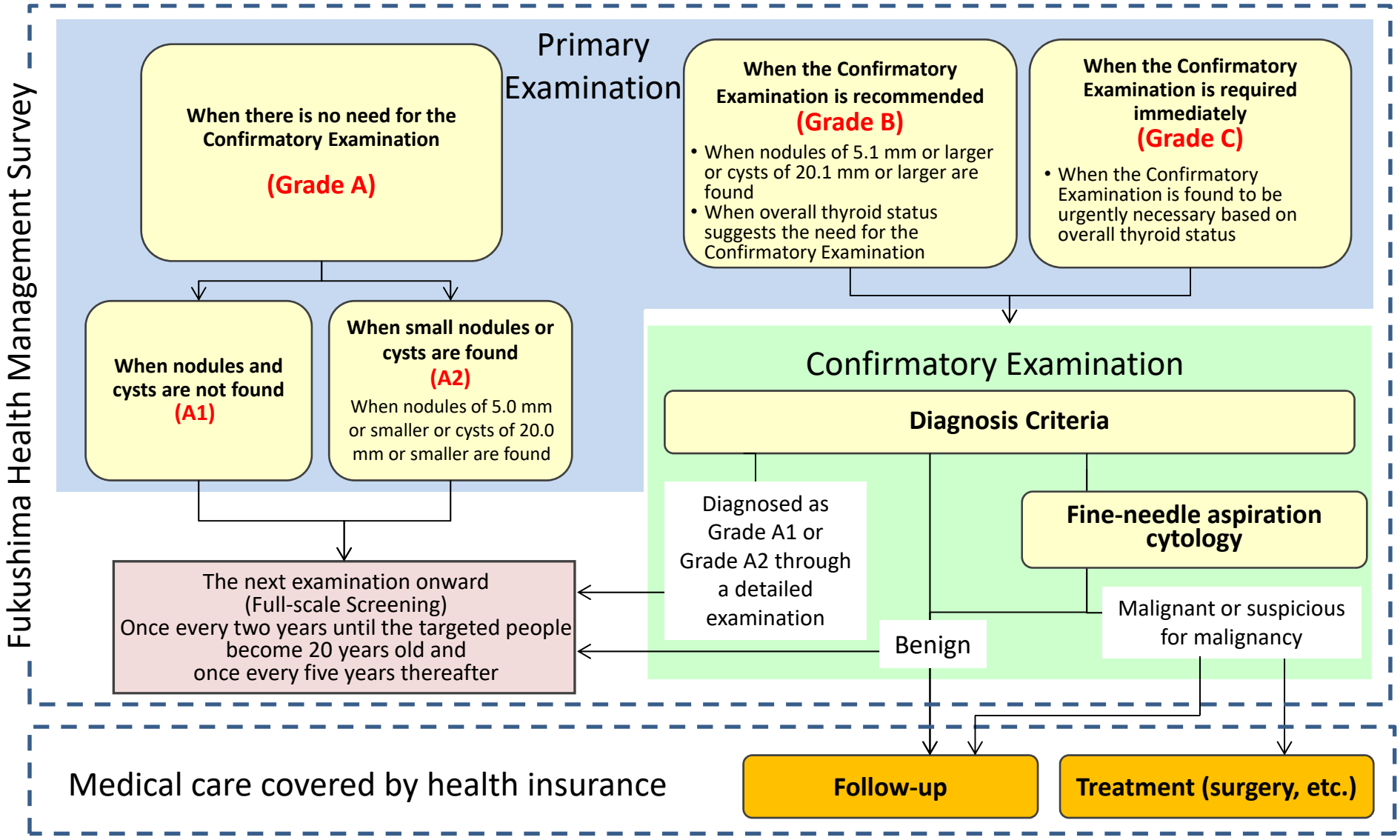
	Screening category	Period	Coverage
First examination	**Initial Screening** (In order to ascertain children's thyroid status)	Oct. 2011 - March 2014	Residents who were residing in Fukushima Prefecture at the time of the earthquake and were approximately 18 years old or younger (those born from April 2, 1992, to April 1, 2011)
Second examination	**Full-scale Screening** (In order to make comparison with the results of the Initial Screening)	April 2014 - March 2016	In addition to those covered by the Initial Screening, those born from April 2, 2011, to April 1, 2012
Third examination		April 2016 - March 2018	In principle, those born from April 2, 1992, to April 1, 2012
Fourth examination -		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	

Prepared based on the website of the Radiation Medical Science Center for the Fukushima Health Management Survey, Fukushima Medical University, "Information on the Thyroid Examination"

Thyroid Examination

Thyroid Examination: Outline (2/3)

● Examination procedures and diagnosis criteria



Prepared based on the website of the Radiation Medical Science Center for the Fukushima Health Management Survey, Fukushima Medical University, "Information on the Thyroid Examination"

Thyroid 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]

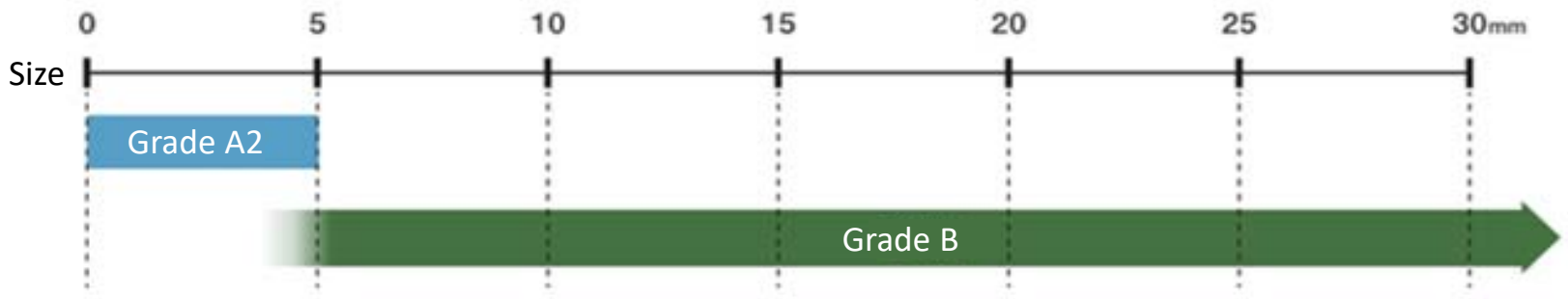
When a more detailed examination is found to be necessary as a result of the Primary Examination, the Confirmatory Examination is conducted for the relevant person.
In the Confirmatory Examination, another ultrasound examination, plus blood and urine tests are conducted.

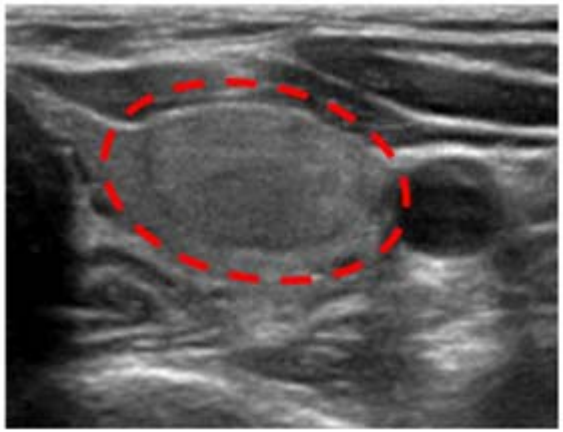
If a doctor considers it necessary as a result of these tests, fine-needle aspiration cytology of the thyroid may also be performed and interpreted.

Thyroid Examination

Thyroid Examination: Nodules

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





- Nodules may be malignant (cancerous), but most are benign.

< Thyroid cancer >

- In many cases, latent thyroid cancer has no symptoms or health effects over a lifetime.
- Latent thyroid cancer is usually small. It may be disadvantageous to force patients to receive treatment if such a cancer is found incidentally.
- Therefore, a detailed examination is not generally conducted for small nodules.

< Thyroid Examination conducted in the Fukushima Health Management Survey>

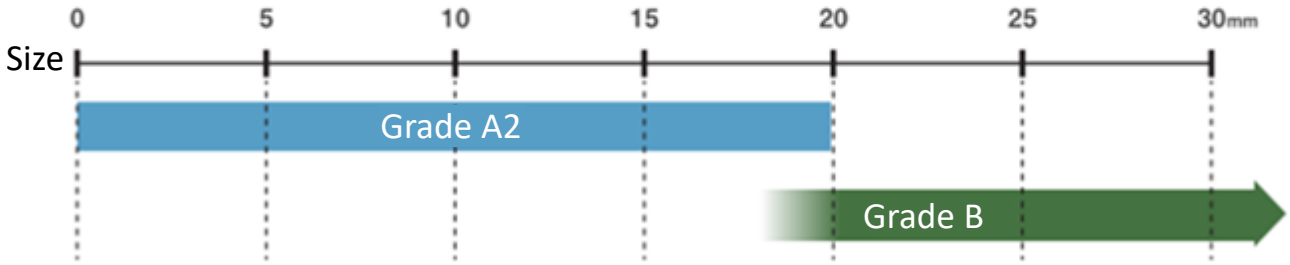
- The Confirmatory Examination is not conducted for nodules of 5 mm or smaller and follow-ups are to be made at the time of the next examination.
- However, when a detailed examination is found to be necessary, a case with nodules of 5 mm or smaller is diagnosed as Grade B and the Confirmatory Examination is recommended.

Prepared based on the website of the Radiation Medical Science Center for the Fukushima Health Management Survey, Fukushima Medical University, "Q&A on the Thyroid Examination"

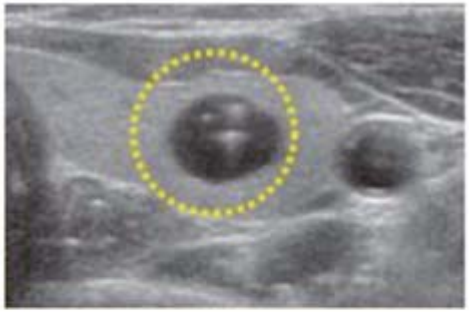
Thyroid Examination

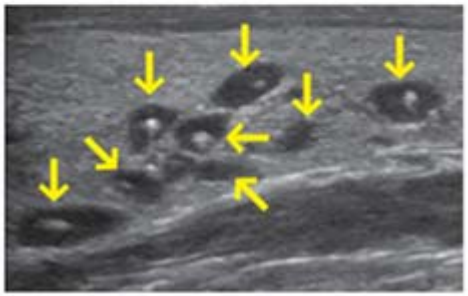
Thyroid Examination: Cysts

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.





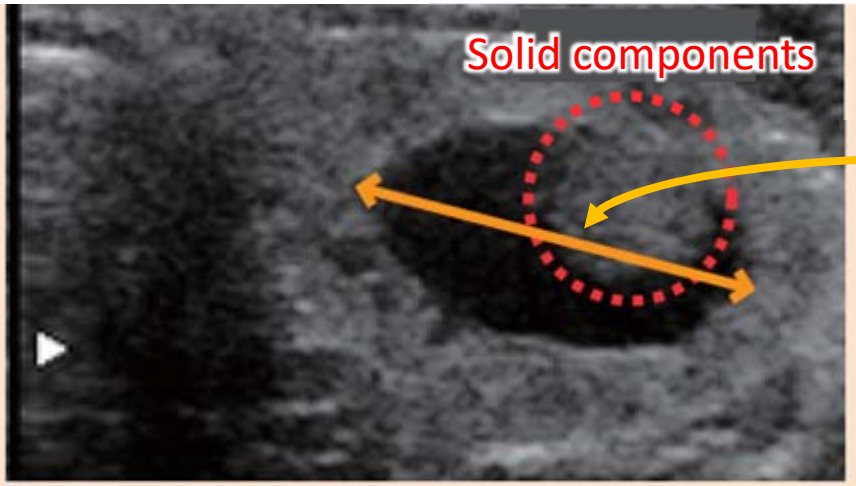
- Cysts often change in size or number.
- Many people have multiple cysts, and the estimated size of the largest one is told to each examinee in this examination.
- Cysts consisting only of fluid and containing no cells are not cancerous.
- Cysts found in the latest examination were all deemed to be benign.
- Cysts are seldom found in babies and infants but are rather found in primary and secondary school students.

Prepared based on the website of the Radiation Medical Science Center for the Fukushima Health Management Survey, Fukushima Medical University, "Q&A on the Thyroid Examination"

Thyroid Examination

Thyroid Examination: Handling of Cysts with Solid Components

Cysts with solid components are all judged as nodules.



Measure the entirety of a cyst

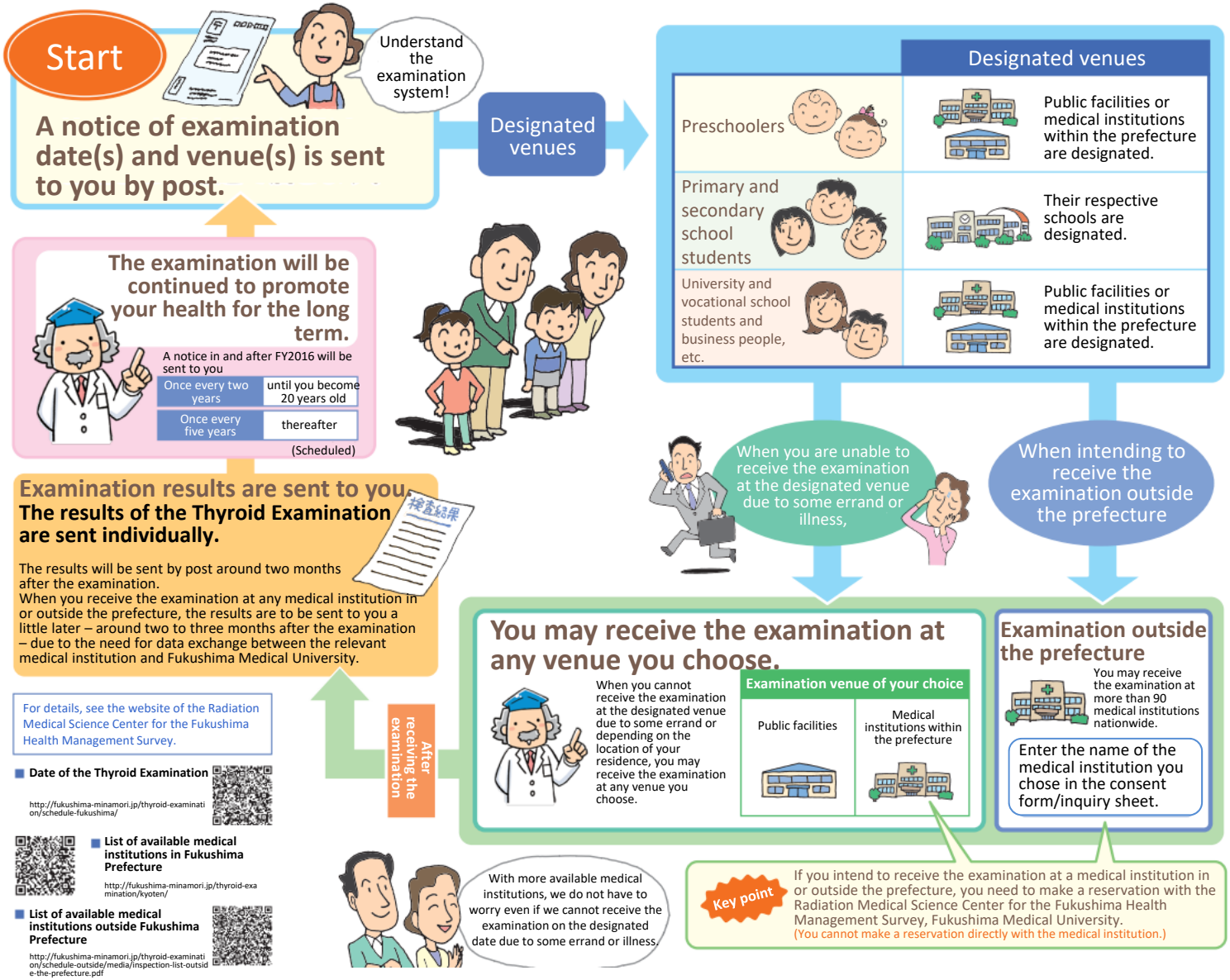
When the maximum size of a cyst with solid components (the length of the orange arrow) is 5.1 mm or larger, the examinee is diagnosed as Grade B.

- Cysts partially containing solid components (cells) are called cystic nodules or cysts with solid components.
- They are treated as equivalents to ordinary cysts in general medical examinations. Even when the Confirmatory Examination is conducted, they are deemed unlikely to cause problems and are placed under follow-up observations.

Prepared based on the website of the Radiation Medical Science Center for the Fukushima Health Management Survey, Fukushima Medical University, "Q&A on the Thyroid Examination"

Thyroid Examination

Thyroid Examination: System for Examinations in and outside Fukushima



Prepared based on Thyroid Report No. 3 of the Radiation Medical Science Center for the Fukushima Health Management Survey, Fukushima Medical University

Thyroid Examination

Thyroid Examination: Order of Full-scale Screening

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

- The first Full-scale Screening (the second one after the Initial Screening)
  - Municipalities where the FY2014 Primary Examination was conducted (25 municipalities)
  - Municipalities where the FY2015 Primary Examination was conducted (34 municipalities)
- The second Full-scale Screening (the third one after the Initial Screening)
  - Municipalities where the FY2016 Primary Examination was conducted (25 municipalities)
  - Municipalities where the FY2017 Primary Examination was conducted (34 municipalities)

Materials for the 22nd and 24th Prefectural Oversight Committee Meetings for Fukushima Health Management Survey

Thyroid Examination

Thyroid Examination: Results of the Initial Screening

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

● Results of the Primary Examination

	Coverage (people)	Examinees (people)		Diagnosis rate (%)	Number of those diagnosed (people)			
		Percentage of examinees (%)	Those who received the examination outside the prefecture		Breakdown by grade (%)			
					A		Those requiring the Confirmatory Examination	
					A1	A2	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%

● Number and percentage of those having nodules or cysts

	Number of those with determined results (people)	Number of those having nodules or cysts against number of those with determined results (%)			
		Nodules		Cysts	
		5.1 mm or larger	5.0 mm or smaller	20.1 mm or larger	20.0 mm or smaller
Total	300,473	2,275 (0.8)	1,713 (0.6)	12 (0.0)	143,899 (47.9)

Grade B

* Even when nodules were 5.0 mm or smaller or cysts were 20.0 mm or smaller, the relevant examinee may be diagnosed as Grade B depending on other factors.

● Results of the Confirmatory Examination

	Coverage (people)	Examinees (people)	Determination rate (%)	Number of those with determined results (people)			
				Next examination		Regular healthcare program, etc.	
		Percentage of examinees (%)		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)

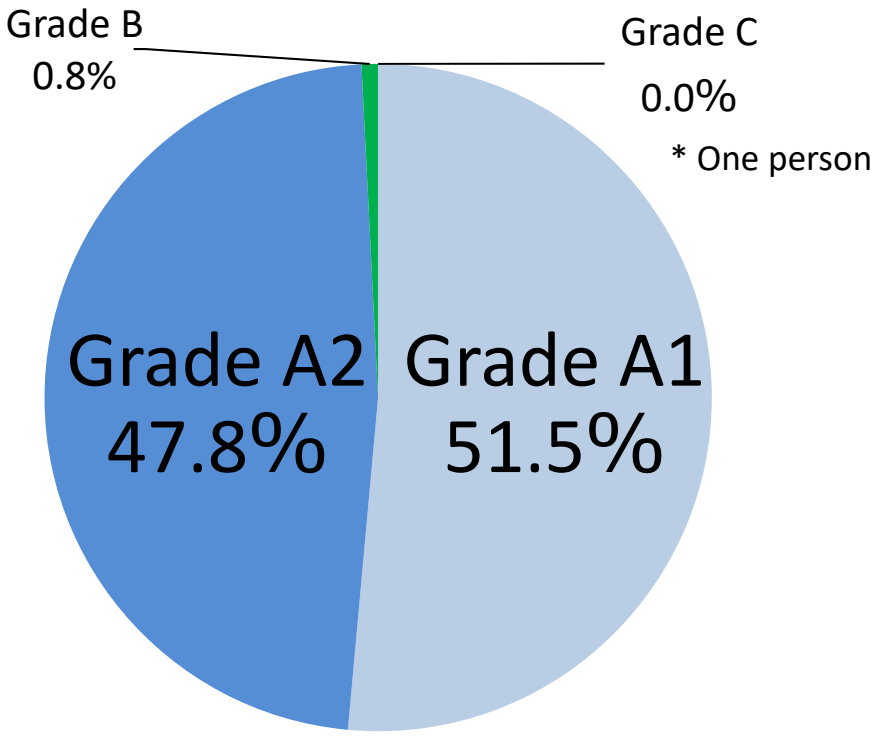
● Out of 116 people whose tumors were diagnosed as malignant or suspicious for malignancy, 102 people had surgery (benign nodule: 1; papillary cancer: 100; poorly differentiated cancer: 1).

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

Thyroid Examination

Thyroid Examination: Comparison between the Initial Screening and the Examination in Other Prefectures

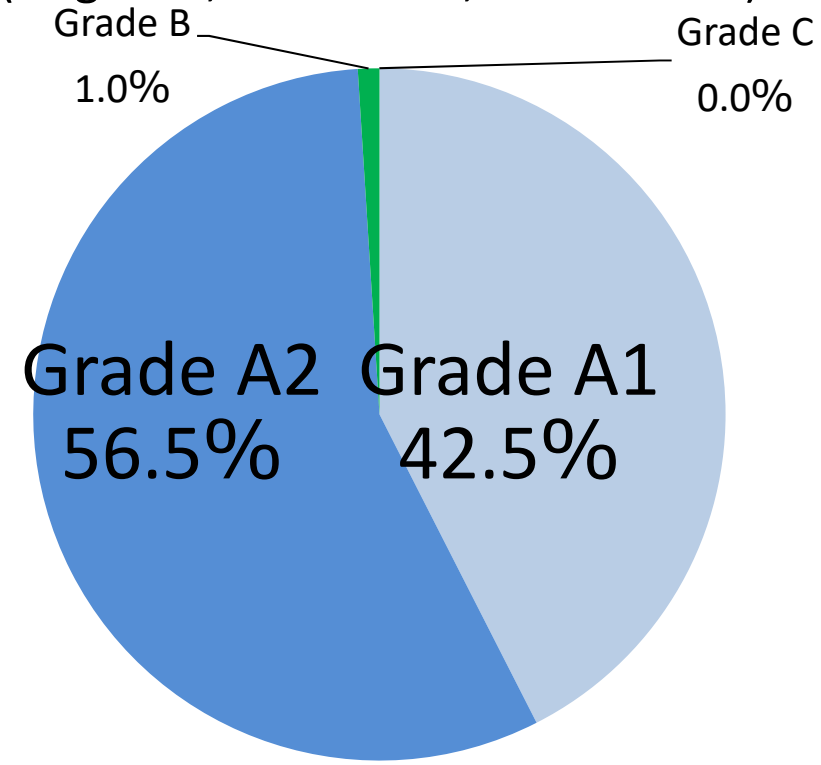
Fukushima Prefecture



300,476 residents of Fukushima Prefecture who were aged 18 or younger at the time of the earthquake

Prepared based on the material for the 20th Prefectural Oversight Committee Meeting for Fukushima Health Management Survey

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 "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 Examination

Thyroid Examination: Results of the Full-scale Screening (2nd Examination)

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

● Results of the Primary Examination

	Coverage (people)	Examinees (people)		Diagnosis rate (%)	Number of those diagnosed (people)			
					Breakdown by grade (%)			
					A		Those requiring the Confirmatory Examination	
		Percentage of examinees (%)	Those who received the examination outside the prefecture		A 1	A 2	B	C
Total	381,256	270,516(71.0)	15,647	270,515 (100.0)	108,710(40.2)	159,578(59.0)	2,227(0.8)	0 (0.0)

Grade A: 99.2%

● Number and percentage of those having nodules or cysts

	Number of those with determined results (people)	Number of those having nodules or cysts against number of those with determined results (%)			
		Nodules		Cysts	
		5.1 mm or larger	5.0 mm or smaller	20.1 mm or larger	20.0 mm or smaller
Total	270,515	2,219(0.8)	1,570(0.6)	6 (0.0)	160,357(59.3)

Grade B

* Even when nodules were 5.0 mm or smaller or cysts were 20.0 mm or smaller, the relevant examinee may be diagnosed as Grade B depending on other factors.

● Results of the Confirmatory Examination

	Coverage (people)	Examinees (people)	Determination rate (%)	Number of those with determined results (people)			
				Next examination		Regular healthcare program, etc.	
		Percentage of examinees (%)		A1	A2		Those who received fine-needle aspiration cytology
Total	2,227	1,844(82.8)	1,788(97.0)	63(3.5)	360(20.1)	1,365(76.3)	205(15.0)

* 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 ± 3.3 years old (9 to 23 years old); At the time of the earthquake: 12.6 ± 3.3 years old (5 to 18 years old)
Average tumor size: 11.1 ± 5.7 mm (5.3 to 35.6 mm)

● Out of 71 people whose tumors were diagnosed as malignant or suspicious for malignancy, 50 people had surgery (papillary cancer: 49; other types of thyroid cancer: 1).

Prepared based on the material for the 28th Prefectural Oversight Committee Meeting for Fukushima Health Management Survey

Thyroid Examination

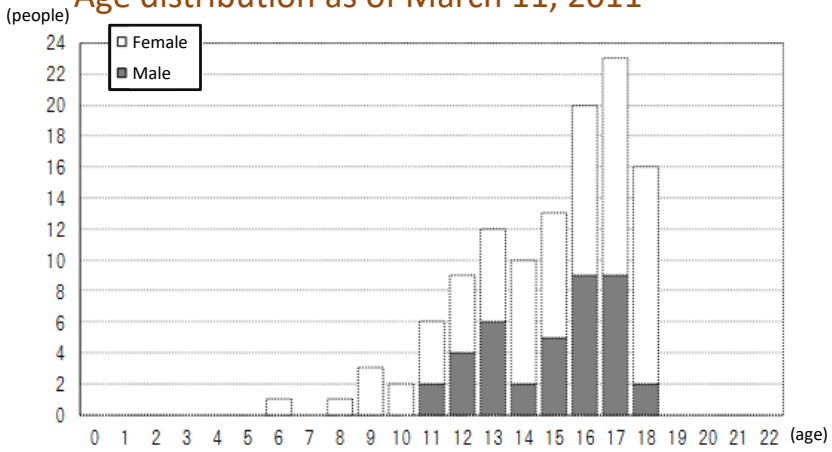
Thyroid Examination: Results of the Initial Screening and the Full-scale Screening (Details of Fine-needle Aspiration Cytology)

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

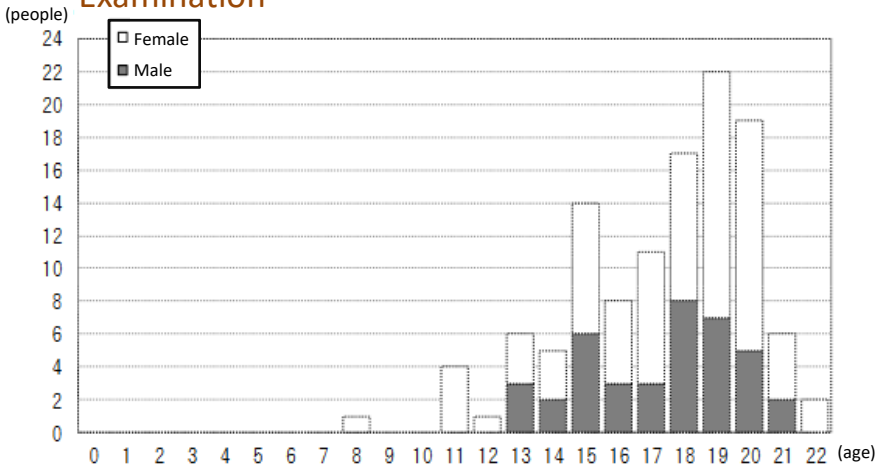
- Age distribution of examinees whose tumors were diagnosed as malignant or suspicious for malignancy as a result of fine-needle aspiration cytology

Results of the Initial Screening (116 examinees)

Age distribution as of March 11, 2011

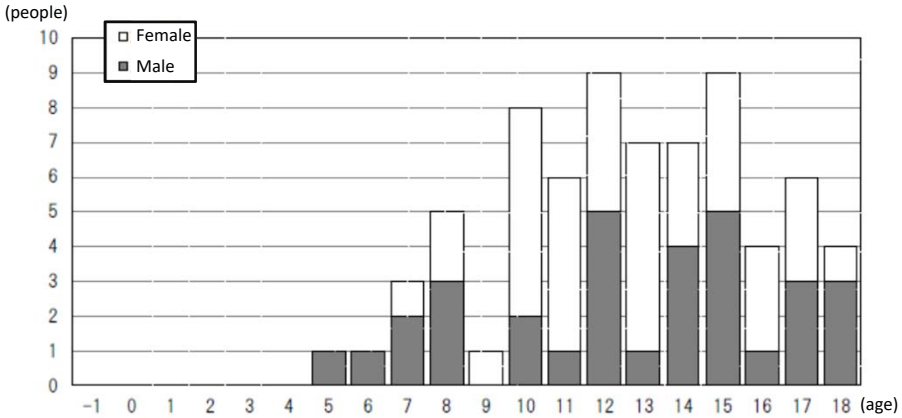


Age distribution as of the time of the Confirmatory Examination



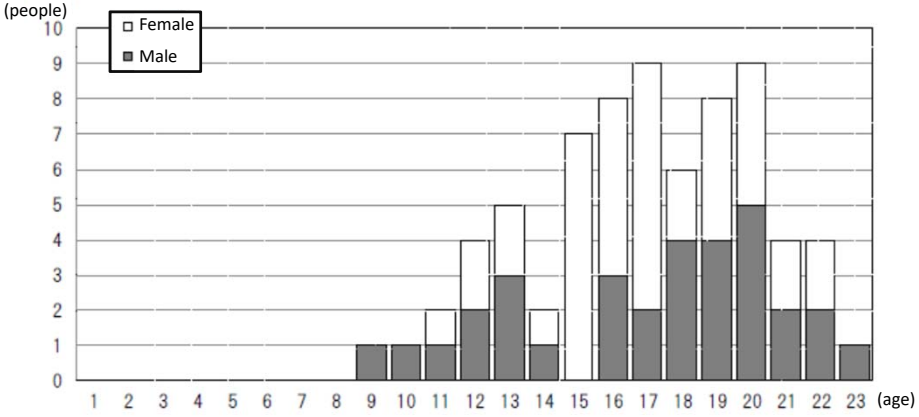
Results of the Full-scale Screening (2nd examination) (71 examinees)

Age distribution as of March 11, 2011



"-1" refers to babies of Fukushima Prefecture born from April 2, 2011, to April 1, 2012

Age distribution as of the time of the Confirmatory Examination



Thyroid Examination

Thyroid Examination: Remarks on the Results of the Initial Screening

- The Thyroid 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 Initial Screening, 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 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 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 2015 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 2015 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. Please receive the examination continuously from the viewpoint of managing your own health as well.