Thyroid Ultrasound Examination (Full-scale Thyroid Screening Program)

Reported on 24 August 2014

1. Summary

1.1 Purpose

In order to protect the long-term health of children, we are now engaged in a Full-scale Thyroid Screening Program following a preliminary Initial Screening period.

1.2 Group

Residents of Fukushima Prefecture including visitors who were born between 2 April 1990 and 1 April 2011 (Initial Screening), and those who were born between 2 April 2011 and 1 April 2012.

1.3 Implementation Period

The full-scale screening starts from 2 April 2014 and lasts for two years.

We repeat the examination every two years until the age of 20, and every five years afterwards.

1.4 Responsible Organizations

Fukushima Prefecture commissioned Fukushima Medical University to conduct the survey in cooperation with institutions inside and outside Fukushima.

We provide the Primary Examination at four medical institutions under contract, and try to have more institutions inside Fukushima Prefecture.

Eighty-seven institutions outside Fukushima have agreed to cooperate as of 30 June 2014.

The confirmatory examination has been conducted in Koriyama and Iwaki in Fukushima Prefecture from July 2013, Aizuwakamatsu from August 2014, and several institutions outside Fukushima Prefecture from November 2013.

1.5 Method

1.5-1 Primary Examination

We used ultrasonography for examination of the thyroid gland.

Assessments were made by specialists on the basis of the following criteria.

-Diagnostic Criteria: A

Those with A1 and A2 test results were advised to take the next examination starting from April 2014.

(A1) No nodules / cysts

(A2) Nodules $\leq$50mm or cysts $\leq$20.0mm

-Diagnostic Criteria: B

Those with B test result are advised to take the Confirmatory Examination.

(B) Nodules $\geq$5.1mm or cysts $\geq$20.1mm

Some A2 test results may be classified as B results when clinically indicated.

-Diagnostic Criteria: C

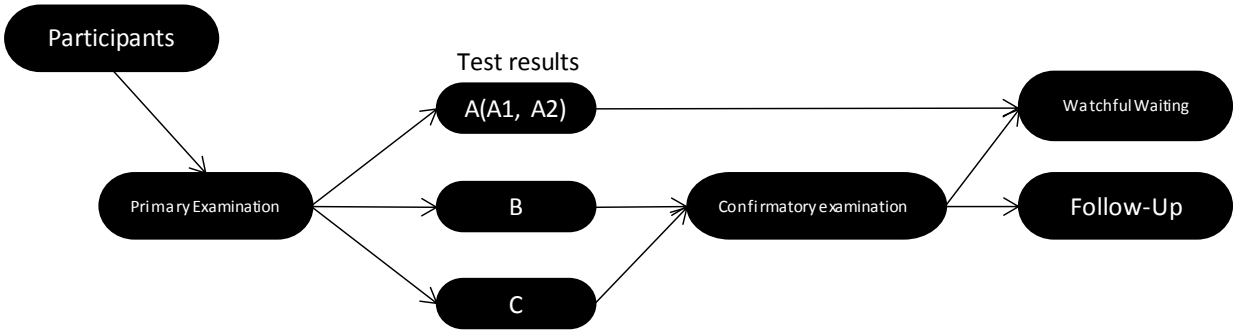
Those with C test result are advised to take the Confirmatory Examination.

(C) Immediate need for confirmatory examination.

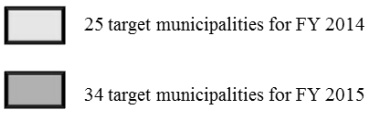
1.5-2 Confirmatory Examination

We conduct fine-needle aspiration cytology (FNAC), blood test, and urine test for those with B or C test results.

1.5-3 Flow chart



1.6 Target Municipalities



2. Results

2.1 Primary Examination

The Primary Examination started from 2 April 2014, and the participation rate as of 30 June 2014 is 13.5% (28,775) out of around 220,000 from 25 municipalities (Appendix 1 and 2).

The results have been returned to 22.5% (6,465) of the participants (Appendix 3).

Those with A1 or A2 test results were 6,419 (99.3%), B were 46 (0.7%), and C were 0.

Table 1. Screening test coverage as of 30 June 2014

	Target Population	Participants		Test results				
		Proportion (%)	Screened outside Fukushima	Proportion (%)	Class			
					A		Requiring confirmatory test	
	a	b (b/a)		c (c/b)	A1 d (d/c)	A2 e (e/c)	B f (f/c)	C g (g/c)
FY 2014	213,223	28,575 (13.4)	1,893	6,458 (22.6)	2,739 (42.4)	3,673 (56.9)	46 (0.7)	0 (0.0)
FY 2015	200	200 (100.0)	1	7 (3.5)	1 (14.3)	6 (85.7)	0 (0.0)	0 (0.0)
Total	213,423	28,775 (13.5)	1,894	6,465 (22.5)	2,740 (42.4)	3,679 (56.9)	46 (0.7)	0 (0.0)

Table 2. Number and proportion of children with nodules/cysts as of 30 June 2014

	Number of confirmed screening results	Number and proportions of children with nodules/cysts			
		Nodules		Cysts	
	a	≥5.1mm b (b/a)	≤5.0mm c (c/a)	≥20.1mm d (d/a)	≤20.0mm e (e/a)
FY 2014	6,458	46 (0.7)	46 (0.7)	0 (0.0)	3,684 (57.0)
FY 2015	7	0 (0.0)	0 (0.0)	0 (0.0)	6 (85.7)
Total	6,465	46 (0.7)	46 (0.7)	0 (0.0)	3,690 (57.1)

Fractions have been rounded and may not total to 100%.

2.2 Confirmatory Examination

The number of children who required further testing (started in June 2014) is 46, of whom 22 (47.8%) underwent the confirmatory testing. Among them, 3 (13.6%) have completed the tests (Appendix 4).

Of 46 participants with B test results from the Primary Examination, 3 with confirmed test results of Confirmatory Examination have been confirmed within the range of A1 and A2.

Table 3. Confirmatory testing coverage and results as of 30 June 2014

	Number of children requiring confirmatory test	Participants	Confirmatory test coverage (%)	Confirmed test results			
		Proportion (%)		Next screening advised		Follow-up advised	
				A1	A2		Cytology
	a	b (b/a)	c (c/b)	d (d/c)	e (e/c)	f (f/c)	g (g/f)
FY 2014	46	22 (47.8)	3 (13.6)	0 (0.0)	3 (100.0)	0 (0.0)	0 (0.0)
FY 2015	0	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Total	46	22 (47.8)	3 (13.6)	0 (0.0)	3 (100.0)	0 (0.0)	0 (0.0)

Priority was given to those in urgent clinical need.

Those confirmed within the range of A1 and A2 (including those with other thyroid conditions) were advised to take the next examination.

Those who require 6- or 12-month follow-up provided by health insurance and those beyond the specified level of A2 were categorized as “Follow-up advised”.

Appendix 1

Thyroid Ultrasound Examination (TUE) coverage by municipality

As of 30 June 2014

	Target Population	Participants		Proportion (%)	Number and proportion of participants by age group				Participants living outside Fukushima	Proportion (%)
			Screened outside Fukushima 3)		2-7	8-12	13-17	18-22		
	a	b		b/a					c 4)	c/b
Screening coverage by municipality in FY 2014										
Kawamata	2,461	1,277	15	51.9	333	545	381	18 1)	13	1.0
					26.1	42.7	29.8	1.4 2)		
Namie	3,769	1,103	305	29.3	379	327	264	133	343	31.1
					34.4	29.6	23.9	12.1		
Iitate	1,123	371	12	33.0	137	96	132	6	12	3.2
					36.9	25.9	35.6	1.6		
Minami-soma	12,980	4,522	777	34.8	946	2,165	1,259	152	744	16.5
					20.9	47.9	27.8	3.4		
Date	11,737	6,226	128	53.0	1,853	2,597	1,617	159	100	1.6
					29.8	41.7	26.0	2.6		
Tamura	7,320	3,000	54	41.0	572	1,539	834	55	45	1.5
					19.1	51.3	27.8	1.8		
Hirono	1,108	397	27	35.8	113	141	104	39	27	6.8
					28.5	35.5	26.2	9.8		
Naraha	1,488	592	58	39.8	173	194	169	56	67	11.3
					29.2	32.8	28.5	9.5		
Tomioka	3,101	905	176	29.2	273	261	246	125	217	24.0
					30.2	28.8	27.2	13.8		
Kawauchi	360	110	4	30.6	29	50	27	4	6	5.5
					26.4	45.5	24.5	3.6		
Okuma	2,498	963	159	38.6	326	317	253	67	191	19.8
					33.9	32.9	26.3	7.0		
Futaba	1,258	284	88	22.6	107	91	63	23	105	37.0
					37.7	32.0	22.2	8.1		
Katsurao	240	60	5	25.0	19	26	12	3	5	8.3
					31.7	43.3	20.0	5.0		
Fukushima	55,708	8,364	81	15.0	1,687	4,374	2,208	95	80	1.0
					20.2	52.3	26.4	1.1		
Nihonmatsu	10,484	97	0	0.9	9	6	75	7	1	1.0
					9.3	6.2	77.3	7.2		
Motomiya	6,321	19	0	0.3	2	0	17	0	0	0.0
					10.5	0.0	89.5	0.0		
Otama	1,677	6	0	0.4	0	0	6	0	0	0.0
					0.0	0.0	100.0	0.0		
Koriyama	64,383	90	3	0.1	34	30	26	0	3	3.3
					37.8	33.3	28.9	0.0		
Kori	2,065	92	0	4.5	9	12	67	4	0	0.0
					9.8	13.0	72.8	4.3		
Kunimi	1,593	42	0	2.6	4	7	30	1	0	0.0
					9.5	16.7	71.4	2.4		
Tenei	1,061	2	0	0.2	1	1	0	0	0	0.0
					50.0	50.0	0.0	0.0		
Shirakawa	12,155	9	0	0.1	4	3	2	0	0	0.0
					44.4	33.3	22.2	0.0		
Nishigo	3,977	5	1	0.1	0	1	3	1	1	20.0
					0.0	20.0	60.0	20.0		
Izumizaki	1,289	0	0	0.0	0	0	0	0	0	0.0
					0.0	0.0	0.0	0.0		
Miharu	3,067	39	0	1.3	9	27	3	0	0	0.0
					23.1	69.2	7.7	0.0		
Subtotal	213,223	28,575	1,893	13.4	7,019	12,810	7,798	948	1,960	6.9
					24.6	44.8	27.3	3.3		
Screening coverage by municipality in FY 2015										
Subtotal	200	200	1	100.0	40	68	84	8	8	4.0
					20.0	34.0	42.0	4.0		
Total	213,423	28,775	1,894	13.5	7,059	12,878	7,882	956	1,968	6.8
					24.5	44.8	27.4	3.3		

1) Number of participants. 2) Number of participants in the age group/Number of participants.

3) Number of participants who underwent the test outside Fukushima.

Fractions have been rounded and may not total to100%. Ages are at the time of the disaster.

Appendix 2

Thyroid Ultrasound Examination (TUE) coverage by prefecture

As of 30 June 2014

Prefecture	Number of test venues	Participants
Hokkaido	4	**16**
Aomori	1	**19**
Iwate	2	**27**
Miyagi	2	**457**
Akita	1	**31**
Yamagata	3	**71**
Ibaraki	2	**113**
Tochigi	5	**110**
Gunma	1	**4**
Saitama	1	**36**
Chiba	3	**52**
Tōkyō	10	**228**
Kanagawa	4	**231**
Niigata	1	**363**
Toyama	1	**0**
Ishikawa	1	**6**

Prefecture	Number of test venues	Participants
Fukui	1	**5**
Yamanashi	1	**32**
Nagano	2	**5**
Gifu	1	**8**
Shizuoka	2	**8**
Aichi	3	**15**
Mie	1	**0**
Shiga	1	**1**
Kyōto	2	**2**
Ōsaka	6	**16**
Hyōgo	2	**17**
Nara	1	**0**
Wakayama	1	**0**
Tottori	1	**0**
Shimane	1	**0**
Okayama	3	**6**

Prefecture	Number of test venues	Participants
Hiroshima	1	**0**
Yamaguchi	1	**2**
Tokushima	1	**1**
Kagawa	1	**0**
Ehime	1	**0**
Kōchi	1	**0**
Fukuoka	2	**3**
Saga	1	**0**
Nagasaki	2	**0**
Kumamoto	1	**0**
Ōita	1	**0**
Miyazaki	1	**3**
Kagoshima	1	**0**
Okinawa	1	**6**

Total	87	**1,894**

Participants underwent testing at venues outside Fukushima carried out either by Fukushima Medical University staff (once in Niigata and Kanagawa respectively) or by local specialists.

Appendix 3

Results of primary examination by municipality

As of 30 June 2014

	Participants	Number confirmed b	Number by test results				Nodules		Cysts	
			Proportion (%)							
			A		B	C	Proportion (%)		Proportion (%)	
	a	Proportion (%) b/a (%)	A1	A2			≥5.1	≤5.0	≥20.1mm	≤20.0mm
Screening coverage by municipality in FY 2014										
Kawamata	1,277	1,114	490	618	6	0	6	8	0	620
		87.2	44.0	55.5	0.5	0.0	0.5	0.7	0.0	55.7
Namie	1,103	699	304	390	5	0	5	3	0	393
		63.4	43.5	55.8	0.7	0.0	0.7	0.4	0.0	56.2
Iitate	371	129	57	69	3	0	3	1	0	69
		34.8	44.2	53.5	2.3	0.0	2.3	0.8	0.0	53.5
Minami-soma	4,522	2,248	891	1,345	12	0	12	14	0	1,348
		49.7	39.6	59.8	0.5	0.0	0.5	0.6	0.0	60.0
Date	6,226	53	24	28	1	0	1	1	0	27
		0.9	45.3	52.8	1.9	0.0	1.9	1.9	0.0	50.9
Tamura	3,000	15	8	7	0	0	0	0	0	7
		0.5	53.3	46.7	0.0	0.0	0.0	0.0	0.0	46.7
Hirono	397	245	107	132	6	0	6	4	0	132
		61.7	43.7	53.9	2.4	0.0	2.4	1.6	0.0	53.9
Naraha	592	383	178	203	2	0	2	3	0	204
		64.7	46.5	53.0	0.5	0.0	0.5	0.8	0.0	53.3
Tomioka	905	704	298	400	6	0	6	5	0	401
		77.8	42.3	56.8	0.9	0.0	0.9	0.7	0.0	57.0
Kawauchi	110	51	15	36	0	0	0	0	0	36
		46.4	29.4	70.6	0.0	0.0	0.0	0.0	0.0	70.6
Okuma	963	578	248	325	5	0	5	7	0	327
		60.0	42.9	56.2	0.9	0.0	0.9	1.2	0.0	56.6
Futaba	284	187	88	99	0	0	0	0	0	99
		65.8	47.1	52.9	0.0	0.0	0.0	0.0	0.0	52.9
Katsurao	60	17	11	6	0	0	0	0	0	6
		28.3	64.7	35.3	0.0	0.0	0.0	0.0	0.0	35.3
Fukushima	8,364	23	13	10	0	0	0	0	0	10
		0.3	56.5	43.5	0.0	0.0	0.0	0.0	0.0	43.5
Nihonmatsu	97	4	2	2	0	0	0	0	0	2
		4.1	50.0	50.0	0.0	0.0	0.0	0.0	0.0	50.0
Motomiya	19	1	1	0	0	0	0	0	0	0
		5.3	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Otama	6	0	0	0	0	0	0	0	0	0
		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Koriyama	90	4	3	1	0	0	0	0	0	1
		4.4	75.0	25.0	0.0	0.0	0.0	0.0	0.0	25.0
Kori	92	0	0	0	0	0	0	0	0	0
		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Kunimi	42	0	0	0	0	0	0	0	0	0
		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tenei	2	2	1	1	0	0	0	0	0	1
		100.0	50.0	50.0	0.0	0.0	0.0	0.0	0.0	50.0
Shirakawa	9	1	0	1	0	0	0	0	0	1
		11.1	0.0	100.0	0.0	0.0	0.0	0.0	0.0	100.0
Nishigo	5	0	0	0	0	0	0	0	0	0
		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Izumizaki	0	0	0	0	0	0	0	0	0	0
		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Miharu	39	0	0	0	0	0	0	0	0	0
		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal	28,575	6,458	2,739	3,673	46	0	46	46	0	3,684
		22.6	42.4	56.9	0.7	0.0	0.7	0.7	0.0	57.0
Screening coverage by municipality in FY 2015										
Subtotal	200	7	1	6	0	0	0	0	0	6
		3.5	14.3	85.7	0.0	0.0	0.0	0.0	0.0	85.7
Total	28,775	6,465	2,740	3,679	46	0	46	46	0	3,690
		22.5	42.4	56.9	0.7	0.0	0.7	0.7	0.0	57.1

Fractions have been rounded and may not total to 100%.

Appendix 4

Confirmatory test results by municipality

As of 30 June 2014

	Number of children screened	Number who required confirmatory test	Number of children who underwent confirmatory test by age					Number of confirmed results				
			Total	Ages 2-7	Ages 8-12	Ages 13-17	Ages 18-22	Total	Next screening advised		Follow-up advised	
												Aspiration
	a	b	c	d	e	f	g	h	A1 i	A2 j	k	l
		Proportion (%)	Proportion (%)	Proportion (%)	Proportion (%)	Proportion (%)	Proportion (%)	Proportion (%)	Proportion (%)	Proportion (%)	Proportion (%)	Proportion (%)
Screening coverage by municipality in FY 2014												
Kawamata	1,277	6	2	0	1	1	0	0	0	0	0	0
		0.5	33.3	0.0	50.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0
Namie	1,103	5	3	0	0	1	2	2	0	2	0	0
		0.5	60.0	0.0	0.0	33.3	66.7	66.7	0.0	100.0	0.0	0.0
Iitate	371	3	1	0	1	0	0	0	0	0	0	0
		0.8	33.3	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minami-soma	4,522	12	5	0	2	3	0	0	0	0	0	0
		0.3	41.7	0.0	40.0	60.0	0.0	0.0	0.0	0.0	0.0	0.0
Date	6,226	1	0	0	0	0	0	0	0	0	0	0
		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tamura	3,000	0	0	0	0	0	0	0	0	0	0	0
		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hirono	397	6	4	0	1	1	2	0	0	0	0	0
		1.5	66.7	0.0	25.0	25.0	50.0	0.0	0.0	0.0	0.0	0.0
Naraha	592	2	2	0	0	0	2	0	0	0	0	0
		0.3	100.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0
Tomioka	905	6	2	0	1	0	1	1	0	1	0	0
		0.7	33.3	0.0	50.0	0.0	50.0	50.0	0.0	100.0	0.0	0.0
Kawauchi	110	0	0	0	0	0	0	0	0	0	0	0
		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Okuma	963	5	3	0	0	3	0	0	0	0	0	0
		0.5	60.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0
Futaba	284	0	0	0	0	0	0	0	0	0	0	0
		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Katsurao	60	0	0	0	0	0	0	0	0	0	0	0
		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fukushima	8,364	0	0	0	0	0	0	0	0	0	0	0
		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nihonmatsu	97	0	0	0	0	0	0	0	0	0	0	0
		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Motomiya	19	0	0	0	0	0	0	0	0	0	0	0
		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Otama	6	0	0	0	0	0	0	0	0	0	0	0
		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Koriyama	90	0	0	0	0	0	0	0	0	0	0	0
		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Kori	92	0	0	0	0	0	0	0	0	0	0	0
		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Kunimi	42	0	0	0	0	0	0	0	0	0	0	0
		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tenei	2	0	0	0	0	0	0	0	0	0	0	0
		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Shirakawa	9	0	0	0	0	0	0	0	0	0	0	0
		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nishigo	5	0	0	0	0	0	0	0	0	0	0	0
		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Izumizaki	0	0	0	0	0	0	0	0	0	0	0	0
		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Miharu	39	0	0	0	0	0	0	0	0	0	0	0
		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal	28,575	46	22	0	6	9	7	3	0	3	0	0
		0.2	47.8	0.0	27.3	40.9	31.8	13.6	0.0	100.0	0.0	0.0
Screening coverage by municipality in FY 2015												
Subtotal	200	0	0	0	0	0	0	0	0	0	0	0
		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	28,775	46	22	0	6	9	7	3	0	3	0	0
		0.2	47.8	0.0	27.3	40.9	31.8	13.6	0.0	100.0	0.0	0.0

h) Excluding participants who have not receive the test results.