Summary of Results of the Comprehensive Health Check (FY2011-FY2019)

1. Purpose

The Great East Japan Earthquake and the accident at TEPCO's Fukushima Daiichi Nuclear Power Plant led to a large-scale evacuation of residents. Many of the evacuees have since been concerned about their own health, due primarily to drastic changes in their lifestyle, such as diet and exercise habits, in addition to the loss of opportunity to undergo necessary health checks. In response to this situation, the Comprehensive Health Check (CHC) has been conducted to ascertain people's health status and use such data for the prevention of lifestyle diseases and early detection and treatment of diseases.

2. Survey Methods and Outline of the Provision of Support

(1) Coverage

- Residents registered in the covered area* from March 11, 2011 to April 1, 2012 (also after moving out of the area)
- Residents registered in evacuation zones as of April 1 of the examination year
- Others, as warranted, based on Basic Survey results, even if the above conditions are not met

* Covered area: municipalities designated as evacuation zones in 2011
Hirono Town, Naraha Town, Tomioka Town, Kawauchi Village, Okuma Town, Futaba Town, Namie Town, Katsurao Village, Iitate Village, Minamisoma City, Tamura City, Kawamata Town, and parts of Date City (specifically recommended for evacuation)

(2) Health check items

Health check items differ according to age as follows (Table 1).

Table 1 Health check items by age group

Age group	Health check items
0-6 years old (preschool children and infants)	Height, weight [The items below are performed upon request] CBC (number of red blood cells, hematocrit, hemoglobin, platelet count, number of white blood cells, differential white blood count)
7-15 years old (from 1st to 9th grade)	Height, weight, blood pressure, CBC (number of red blood cells, hematocrit, hemoglobin, platelet count, number of white blood cells, differential white blood count) [The items below are performed upon request] Blood biochemistry (AST, ALT, γ-GT, TG, HDL-C, LDL-C, HbA1c, plasma glucose, serum creatinine, uric acid)
16 years old and older	Height, weight, abdominal circumference (BMI), blood pressure, CBC (number of red blood cells, hematocrit, hemoglobin, platelet count, number of white blood cells, differential white blood count), urinanalysis (urine sugar, urine protein, urine occult blood), blood biochemistry (AST, ALT, γ-GT, TG, HDL-C, LDL-C, HbA1c, plasma glucose, serum creatinine, estimated glomerular filtration rate [eGFR], uric acid) *The underlined values are not routinely measured during specific health checks.

(3) Methods

Health check venues are arranged as follows for the convenience of eligible persons (Table 2).

Table 2 Methods

Age group	Place of residence	Implementation method	Number of cooperating health check facilities in FY2019
15 or younger	Those living in the prefecture	Pediatric health checks at designated health check facilities within the prefecture	91 facilities
	Those living outside the prefecture	Pediatric health checks at designated health check facilities outside the prefecture	350 facilities (of which, 226 facilities also accept those aged 16 or older)
16 or older	Those living in the prefecture	Additional health check items are added to specific health checks or general health checks conducted by municipalities.	—
		Individual health checks conducted at designated health check facilities in the prefecture(*)	457 facilities
		Group health checks conducted by FMU(*)	A total of 47 group health checks at 30 venues in the prefecture were scheduled, but due to partial suspension, a total of 32 group health checks were actually conducted at 21 venues in the prefecture.
	Those living outside the prefecture	Additional health check items are added to specific health checks or general health checks conducted by municipalities.	—
		Individual health checks conducted at designated health check facilities outside the prefecture	571 facilities (of which, 226 facilities also accept those aged 15 or younger)

* Health checks have been suspended since March 5, 2020, in order to prevent the spread of the COVID-19 infection.

(4) Participation rates from FY2011 to FY2019

The participation rate of those aged 15 or younger who received the CHC was 64.5% in FY2011, immediately after the earthquake, but the percentage declined gradually from FY2012 and was 16.2% in FY2019. With regard to those aged 16 or older, the participation rate was 30.9% in FY2011 and remained above 20% until FY2018, but declined to 18.4% in FY2019, probably due to the partial suspension of CHC for preventing the spread of the COVID-19 infection (Figure 1).

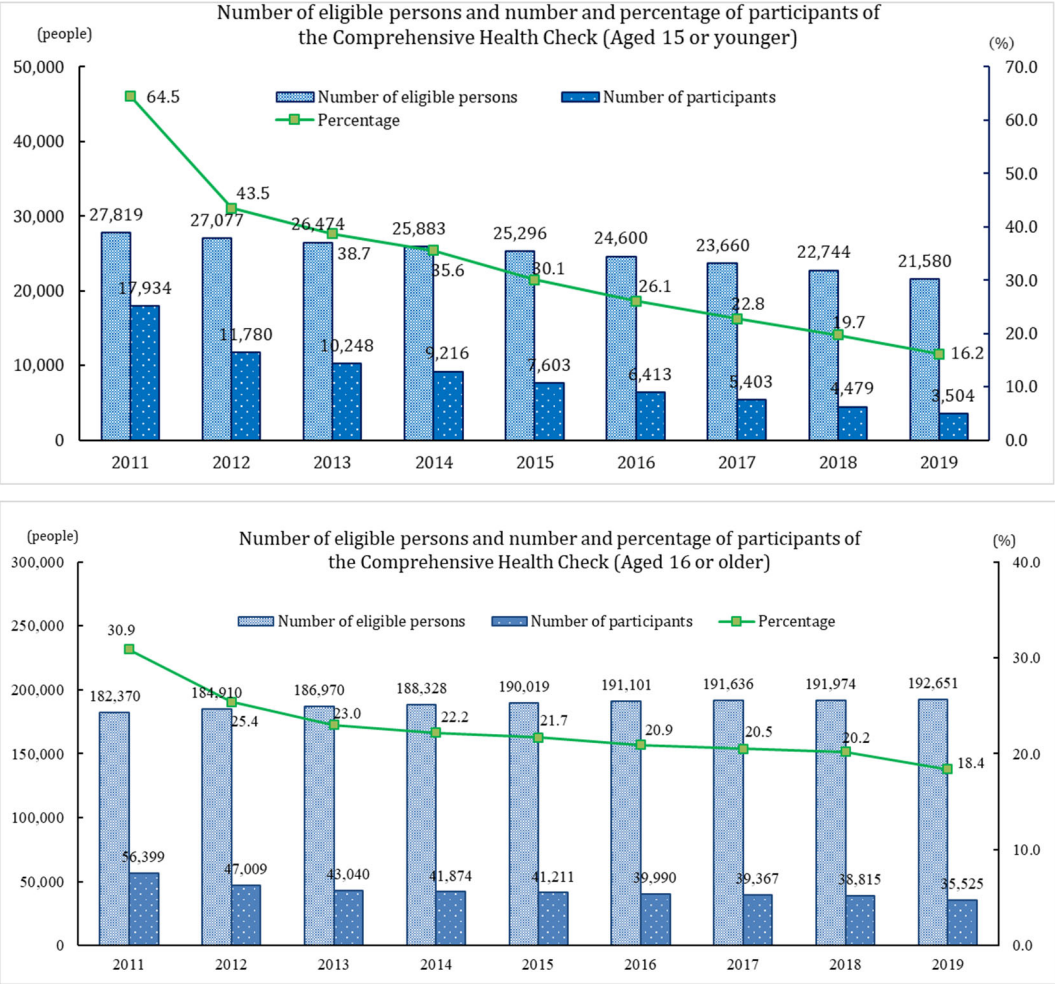


Figure 1 Number of eligible persons and number and percentage of participants of the Comprehensive Health Check

In most age groups (years 0-6, 7-15, 16-39, 40-64), the numbers of participants have decreased year by year, while the number of participants aged 65 or older increased up to FY2018 (Table 3). The participation rate of those aged 65 or older has increased year by year and accounted for 50% of the overall total in FY2019 (Figure 2).

Table 3 Changes in numbers of participants by age group (persons)

	Ages 0 to 6	Ages 7 to 15	Ages 16 to 39	Ages 40 to 64	Ages 65 or older
2011	6,462	11,481	14,762	23,651	16,726
2012	4,365	7,437	8,480	19,553	18,642
2013	3,802	6,429	6,536	16,922	18,969
2014	3,328	5,840	5,843	15,594	19,166
2015	2,655	4,903	5,354	14,748	19,559
2016	2,057	4,315	4,632	13,386	19,768
2017	1,647	3,712	4,309	12,677	20,299
2018	1,220	3,169	3,979	11,948	20,337
2019	959	2,457	2,984	10,095	19,529

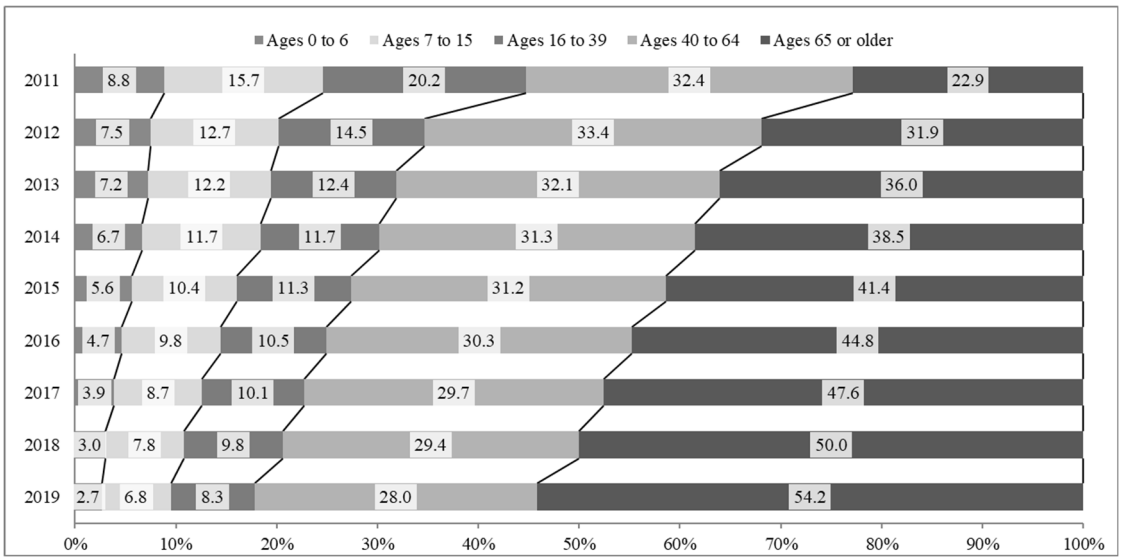


Figure 2 Changes in participation rates by age group

* As values in Figure 2 are rounded off, the sum is not necessarily 100%.
* The numbers of participants by age group are cited from the materials for the 21st, 26th, 30th, 34th, and 37th Prefectural Oversight Committee Meetings for the Fukushima Health Management Survey.
(Those who received a health check for at least one health check item)

3. Results

(1) Participants aged 15 or younger

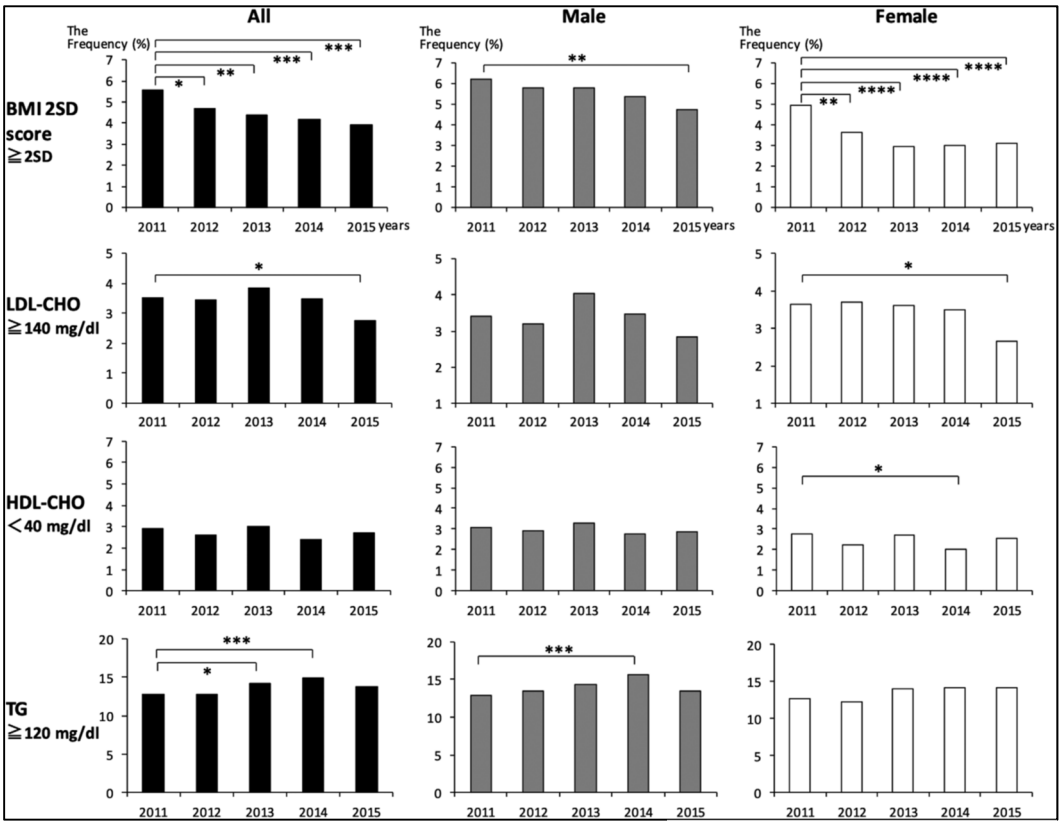
The CHC revealed the existence of a certain number of children with obesity, hyperlipidemia, hyperuricemia, liver dysfunction, hypertension, and glucose intolerance after the earthquake (Table 4)[23] (Figure 3).[4]

Subsequent follow-up surveys show an improvement in those children's obesity, but an improvement of hyperlipidemia has been delayed (Figure 3).[4]

Table 4 LDL-C, triglycerides, and HLD-C values for those aged 7 to 15 who had lived in the evacuation zone during childhood

		HDL-C (mg/dL)			Triglycerides (mg/dL)				LDL-C (mg/dL)			
		n	means	<40	n	means	≥150	≥300	n	means	≥120	≥140
2011	male	5,586	62.2	3.1%	5,584	75.5	7.7%	0.6%	5,587	91.9	11.7%	3.3%
	female	5,515	62.7	2.8%	5,507	77.5	6.3%	0.5%	5,511	96.3	14.8%	3.6%
2012	male	3,711	61.4	3.1%	3,711	75.9	7.7%	0.6%	3,710	91.9	10.7%	3.2%
	female	5,515	61.1	2.3%	3,531	78.1	6.5%	0.7%	3,530	95.6	13.9%	3.6%

Kawasaki Y, et al. Fukushima J. Med. Sci, 2015



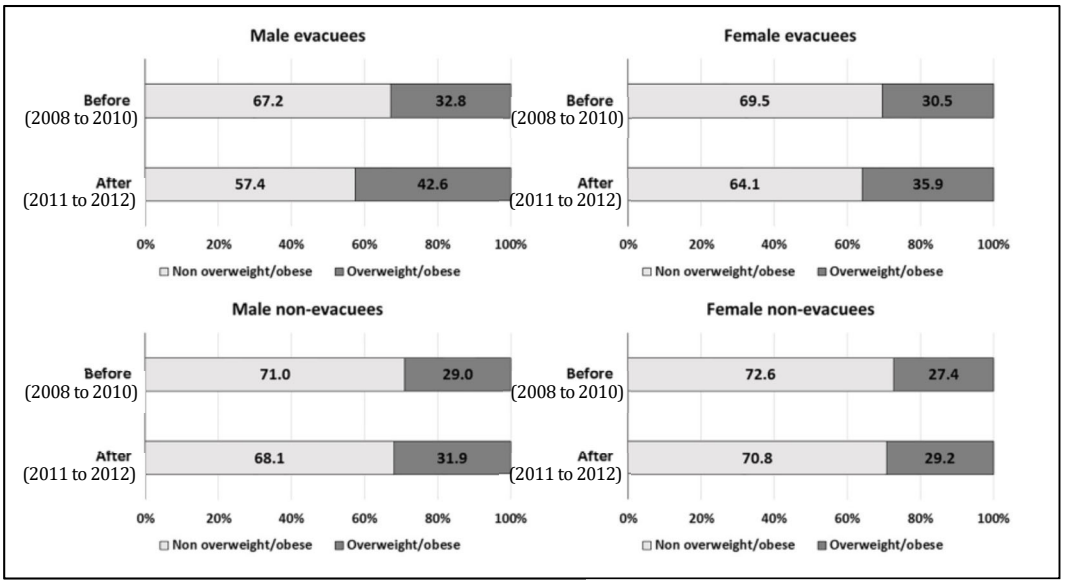
Kawasaki Y, et al. Pediatr Int, 2020

Figure 3　Changes in percentages of obesity (BMI 2SD score ≥ 2SD) and hyperlipidemia from 2011 to 2015

(2) Participants aged 16 or older

A. Obesity

After the earthquake, overweight participants increased; in particular, larger increases were observed in the obesity rates among evacuees than among non-evacuees (Figure 4).[15)]



Ohira T, et al. Asia Pac J Public Health 2017

Figure 4　Changes in obesity rates before and after the earthquake

B. Hypertension

Evacuation was associated with an increased risk of hypertension among males two years after the earthquake, with an age-adjusted hazard ratio (HR) of 1.24 for hypertension among male evacuees (Figure 5).[17)]

Table 5 Incidence of hypertension after the earthquake

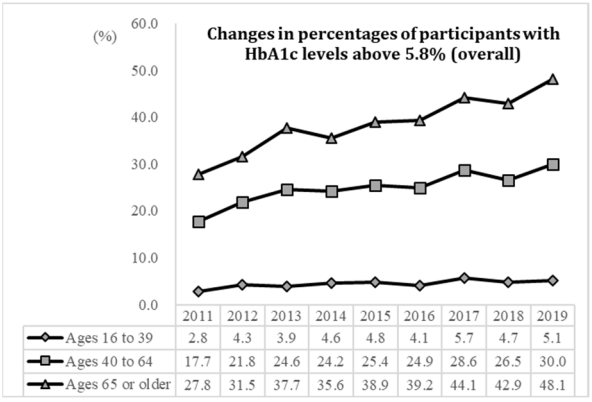
Characteristics	Non-evacuees	Evacuees		P Value
Men				
No. of at-risk individuals	2977	1538		…
No. of cases	761	481		…
Incidence rate/1000 person-years	118	146		…
Age-adjusted HR (95% CI)	Reference	1.24	1.11–1.39	<0.001
Women				
No. of at-risk individuals	4229	2293		…
No. of cases	855	507		…
Incidence rate/1000 person-years	93	101		…
Age-adjusted HR (95% CI)	Reference	1.05	0.94–1.17	0.37

Ohira T, et al. Hypertension, 2016

C. Diabetes

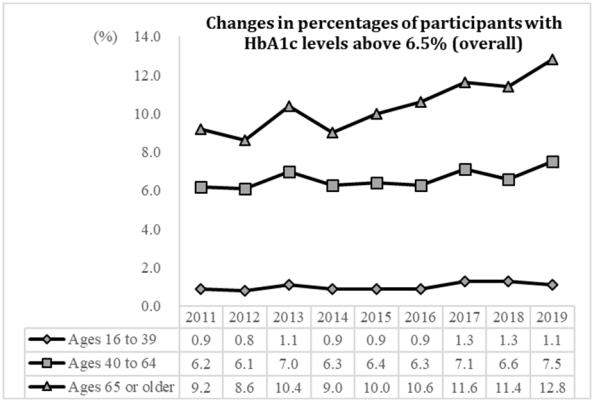
The percentages of those with HbA1c levels ≥ 5.8% ("borderline type")* and ≥ 6.5% ("diabetes")* both increased in all age groups from FY2011 to FY2019 (Figures 5 and 6).

* Individuals with the HbA1c level of 5.8% or over are categorized as "borderline type" and those with the HbA1c level of 6.5% or over are categorized "diabetic type" in the Treatment Guide for Diabetes 2012-2013 of the Japan Diabetes Society (JDS). In this report, a diagnosis of being diabetic type based on one examination is referred to as "diabetes" in accordance with the 1999 report of a JDS committee on classification and diagnostic criteria.



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Ages 16 to 39	2.8	4.3	3.9	4.6	4.8	4.1	5.7	4.7	5.1
Ages 40 to 64	17.7	21.8	24.6	24.2	25.4	24.9	28.6	26.5	30.0
Ages 65 or older	27.8	31.5	37.7	35.6	38.9	39.2	44.1	42.9	48.1

Figure 5 Changes in percentages of participants with HbA1c levels above 5.8% (overall)



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Ages 16 to 39	0.9	0.8	1.1	0.9	0.9	0.9	1.3	1.3	1.1
Ages 40 to 64	6.2	6.1	7.0	6.3	6.4	6.3	7.1	6.6	7.5
Ages 65 or older	9.2	8.6	10.4	9.0	10.0	10.6	11.6	11.4	12.8

Figure 6 Changes in percentages of participants with HbA1c levels above 6.5% (overall)

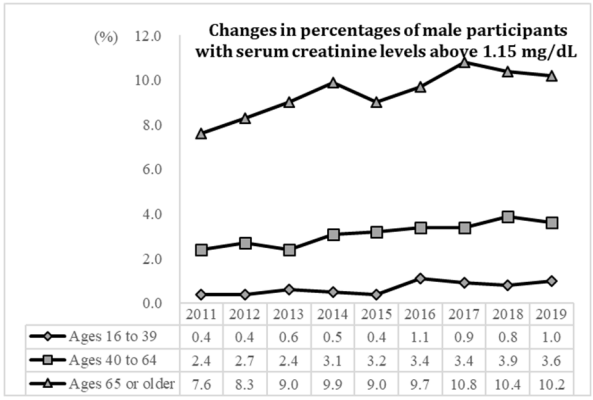
Excerpted from materials for the Prefectural Oversight Committee Meeting for the Fukushima Health Management Survey

D. Renal dysfunction

The percentage of male participants with serum creatinine levels of 1.15 mg/dL or higher was rising among those aged 40 to 64 from FY2011 to FY2019. The relevant percentage continued to increase for those aged 65 or older until FY2017 and exceeded 10% thereafter until FY2019 (Figure 7).

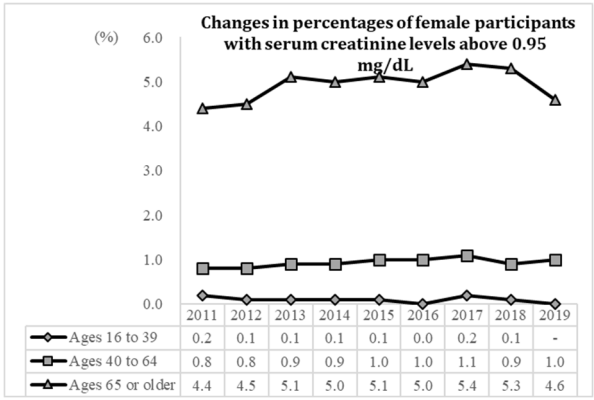
The percentage of female participants with serum creatinine levels of 0.95 mg/dL or higher exceeded 5% for those aged 65 or older in FY2013 and remained unchanged until FY2018, but decreased to 4.6% in FY2019 (Figure 8).

The percentages of those with eGFR levels below 60mL/min/1.73m^2 increased both for those aged 40 to 64 and those aged 65 or older (Figure 9); in particular, the increase was large for those aged 40 to 64 (from 6.5% to 11.3%).



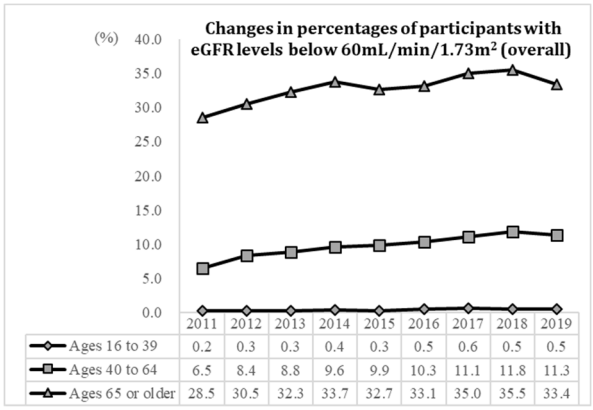
	2011	2012	2013	2014	2015	2016	2017	2018	2019
Ages 16 to 39	0.4	0.4	0.6	0.5	0.4	1.1	0.9	0.8	1.0
Ages 40 to 64	2.4	2.7	2.4	3.1	3.2	3.4	3.4	3.9	3.6
Ages 65 or older	7.6	8.3	9.0	9.9	9.0	9.7	10.8	10.4	10.2

Figure 7 Changes in percentages of male participants with serum creatinine levels of 1.15 mg/dL or higher



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Ages 16 to 39	0.2	0.1	0.1	0.1	0.1	0.0	0.2	0.1	-
Ages 40 to 64	0.8	0.8	0.9	0.9	1.0	1.0	1.1	0.9	1.0
Ages 65 or older	4.4	4.5	5.1	5.0	5.1	5.0	5.4	5.3	4.6

Figure 8 Changes in percentages of female participants with serum creatinine levels of 0.95 mg/dL or higher



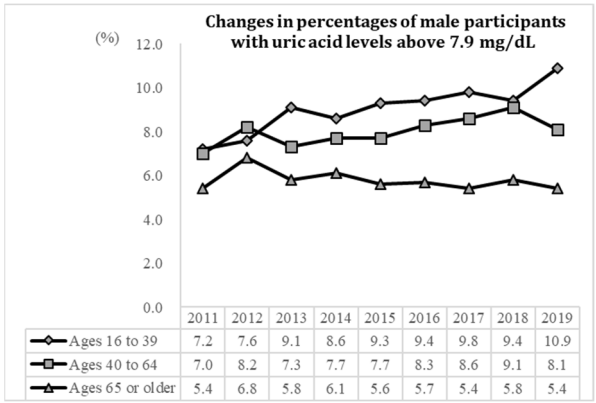
	2011	2012	2013	2014	2015	2016	2017	2018	2019
Ages 16 to 39	0.2	0.3	0.3	0.4	0.3	0.5	0.6	0.5	0.5
Ages 40 to 64	6.5	8.4	8.8	9.6	9.9	10.3	11.1	11.8	11.3
Ages 65 or older	28.5	30.5	32.3	33.7	32.7	33.1	35.0	35.5	33.4

Figure 9 Changes in percentages of participants with eGFR levels below 60mL/min/1.73m² (overall)

Excerpted from materials for the Prefectural Oversight Committee Meeting for the Fukushima Health Management Survey

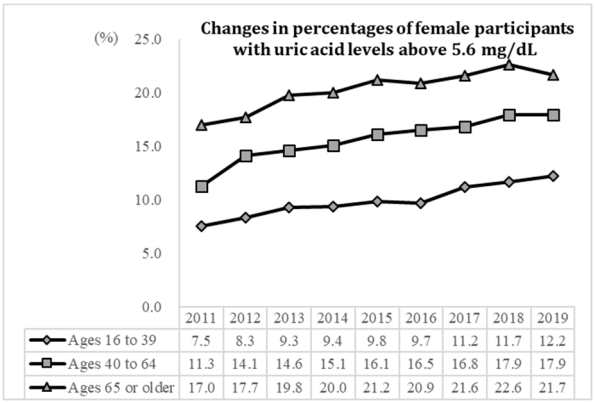
E. Hyperuricemia

The percentages of male participants with uric acid levels of 7.9mg/dL or higher increased for those aged 16 to 39 and those aged 40 to 64 from FY2011 to FY2019 (Figure 10). The percentages of female participants with uric acid levels of 5.6mg/dL or higher also increased for all age groups from FY2011 to FY2019 (Figure 11).



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Ages 16 to 39	7.2	7.6	9.1	8.6	9.3	9.4	9.8	9.4	10.9
Ages 40 to 64	7.0	8.2	7.3	7.7	7.7	8.3	8.6	9.1	8.1
Ages 65 or older	5.4	6.8	5.8	6.1	5.6	5.7	5.4	5.8	5.4

Figure 10 Changes in percentages of male participants with uric acid levels of 7.9 mg/dL or higher



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Ages 16 to 39	7.5	8.3	9.3	9.4	9.8	9.7	11.2	11.7	12.2
Ages 40 to 64	11.3	14.1	14.6	15.1	16.1	16.5	16.8	17.9	17.9
Ages 65 or older	17.0	17.7	19.8	20.0	21.2	20.9	21.6	22.6	21.7

Figure 11 Changes in percentages of female participants with uric acid levels of 5.6 mg/dL or higher

Excerpted from materials for the Prefectural Oversight Committee Meeting for Fukushima Health Management Survey

F. Liver dysfunction

The risk of newly developing liver dysfunction after the earthquake was larger among evacuees than among non-evacuees by 1.38 times for non-drinkers, 1.43 times for light drinkers, and 1.24 times for moderate to heavy drinkers (Table 6).[12)]

Table 6 Factors influencing the incidence of liver dysfunction after the earthquake in 1,960 of 14,519 participants who had no liver dysfunction before the earthquake

Variable	Non-drinkers		Light drinkers		Moderate/Heavy drinkers	
	Odds ratio (95% CI)	*p*-Value	Odds ratio (95% CI)	*p*-Value	Odds ratio (95% CI)	*p*-Value
Age, per 1-year	0.96 (0.96–0.97)	<0.001	0.97 (0.97–0.98)	<0.001	0.98 (0.97–0.98)	<0.001
Women vs. men	0.45 (0.39–0.53)	<0.001	0.46 (0.41–0.52)	<0.001	0.41 (0.30–0.56)	<0.001
Body mass index, per 1 kg/m^2	1.15 (1.14–1.17)	<0.001	1.13 (1.12–1.15)	<0.001	1.14 (1.11–1.17)	<0.001
Smoking, yes	1.00 (0.78–1.28)	0.981	0.97 (0.83–1.13)	0.654	1.45 (1.26–1.67)	<0.001
Evacuation, yes	1.38 (1.20–1.58)	<0.001	1.43 (1.29–1.59)	<0.001	1.24 (1.09–1.42)	0.001

Odds ratio: A ratio of the odds of an event compared between two groups; assuming the odds of a certain event in group 1 is p1, and the odds of the same event in group 2 is p2, the odds ratio is (p1/(1-p1))/(p2/(1-p2)).

Takahashi A, et al. J Epidemiol, 2017

The overall percentage of participants with liver dysfunction* showed a statistically significant decrease from 29.9% to 27.1%. Examining the factors influencing the improvement of liver dysfunction, an association was found with better daily physical activity and more frequent breakfast consumption (Table 7).[13)]

* Liver dysfunction: AST levels of 51 U/L or higher, ALT levels of 51 U/L or higher, and γ-GT levels of 101 U/L or higher

Table 7 Factors influencing the improvement of liver dysfunction among 18,070 participants from 2011-2012 to 2013-2014

	Non-drinkers		Light drinkers		Moderate/Heavy drinkers		All	
	Odds ratio (95% CI)	*p-value*	Odds ratio (95% CI)	*p-value*	Odds ratio (95% CI)	*p-value*	Odds ratio (95% CI)	*p-value*
Daily physical activity (improved)	1.14 (1.11–1.78)	0.004	1.23 (1.02–1.50)	0.033	1.28 (1.00–1.63)	0.046	1.30 (1.15–1.48)	<0.001
Sleeping (improved)	0.99 (0.75–1.29)	0.924	1.00 (0.80–1.24)	0.967	0.99 (0.76–1.30)	0.970	0.99 (0.86–1.15)	0.934
Diet before bed time (improved)	0.96 (0.69–1.34)	0.812	0.94 (0.74–1.20)	0.615	1.13 (0.88–1.46)	0.347	1.00 (0.86–1.17)	0.961
Snack after dinner (improved)	0.83 (0.56–1.23)	0.348	1.04 (0.77–1.39)	0.814	0.83 (0.53–1.31)	0.428	0.92 (0.75–1.14)	0.456
Breakfast skipping (improved)	1.37 (0.80–2.32)	0.249	1.53 (1.04–2.25)	0.032	1.38 (0.85–2.25)	0.187	1.43 (1.10–1.86)	0.008
Eating speed (improved)	0.94 (0.66–1.32)	0.709	0.90 (0.68–1.18)	0.445	1.17 (0.87–1.58)	0.311	0.99 (0.83–1.17)	0.870

Odds ratio: A ratio of the odds of an event compared between two groups; assuming the odds of a certain event in group 1 is p1, and the odds of the same event in group 2 is p2, the odds ratio is (p1/(1-p1))/(p2/(1-p2)).

Takahashi A, et al. Sci Rep, 2017

G. Polycythemia

After the earthquake, the incidence of polycythemia increased. Polycythemia was significantly more prevalent among evacuees than non-evacuees, irrespective of whether they have obesity, a smoking habit, or hypertension (Table 8).[9)]

Table 8 Influence of the evacuation on prevalence of polycythemia in relation to overweight/obesity, smoking, and hypertension

				Prevalence of polycythemia, n (%)				
n				Baseline	2011–2012	p^a	2013–2014	p^a
Total		non-Evacuees	2349	22(0.94)	24 (1.02)	0.86	18 (0.77)	0.56
		Evacuees	5364	47(0.88)	76 (1.42)	<0.0001	90 (1.68)	<0.0001
Overweight/Obesity	(+)	non-Evacuees	666	9(1.35)	11 (1.65)	0.79	6 (0.9)	0.51
	(+)	Evacuees	1704	25(1.47)	38 (2.23)	<0.05	37 (2.17)	0.09
	(−)	non-Evacuees	1683	13(0.77)	13 (0.77)	1	12 (0.71)	1
	(−)	Evacuees	3660	22(0.6)	38 (1.04)	0.01	53 (1.45)	<0.0001
Smoking	(+)	non-Evacuees	233	3(1.29)	3 (1.29)	1	3 (1.29)	1
	(+)	Evacuees	647	12(1.85)	20 (3.09)	0.13	18 (2.78)	0.24
	(−)	non-Evacuees	2116	19(0.9)	21 (0.99)	0.86	15 (0.71)	0.54
	(−)	Evacuees	4717	35(0.74)	56 (1.19)	<0.005	72 (1.53)	<0.0001
Hypertension	(+)	non-Evacuees	1322	15(1.13)	14 (1.06)	1	10 (0.76)	0.3
	(+)	Evacuees	2903	34(1.17)	48 (1.65)	0.06	51 (1.76)	0.03
	(−)	non-Evacuees	1027	7(0.68)	10 (0.97)	0.55	8 (0.78)	1
	(−)	Evacuees	2461	13(0.53)	28 (1.14)	<0.01	39 (1.58)	<0.0001

Sakai A, et al. Prev Med Rep, 2017

H. Peripheral Blood Examination (WBC counts and WBC differential)

The analysis of white blood cell counts and differentials of participants within one year after the earthquake revealed no statistically significant differences among the 13 municipalities designated as the evacuation zone (Table 9)[21)].

Table 9 WBCs (neutrophils and lymphocytes) of participants in 13 municipalities (evacuation areas) and percentages of those with low WBCs

		Tamura	Minami-Soma	Kawamata	Hirono	Naraha	Tomioka	Kawauchi	Okuma	Futaba	Namie	Katsurao	Iitate	Date	*P for difference*[a]
Total *n*		8680	15646	3894	992	1426	2498	572	2358	1026	4398	471	1788	771	
WBC	Mean (/μL)	5865.28	5986.96	6079.51	5851.11	6019.07	6108.53	6202.62	6010.86	6117.25	5995.41	6076.65	6088.65	6022.18	<0.001
	<4000/μL (%)[b]	9.75	8.22	6.86	9.88	7.71	8.41	5.59	7.97	8.19	8.03	6.58	7.89	8.56	<0.001
Neutrophil	Mean (/μL)	3228.33	3296.10	3411.98	3230.31	3340.14	3445.06	3494.40	3363.07	3438.17	3321.82	3355.52	3351.04	3406.32	<0.001
	<1600/μL (%)[b]	3.72	3.14	2.16	4.03	3.09	3.16	2.27	2.93	3.22	2.77	1.91	3.47	2.98	0.00
Lymphocyte	Mean (/μL)	2124.02	2166.81	2136.40	2110.91	2158.13	2140.07	2173.11	2127.29	2150.44	2158.06	2202.14	2195.81	2083.63	<0.001
	<800/μL (%)[b]	0.29	0.22	0.26	0.20	0.14	0.28	0.00	0.42	0.29	0.25	0.00	0.28	0.52	0.46

a. Adjusted for age, sex, and smoking status.
b. The standard values for WBC count and the ratios of neutrophils or lymphocytes are as follows: WBC 4.0–9.0 × 10^3/μL; percentage of neutrophils 40.0%-70.0%; and percentage of lymphocytes 20.0%-55.0%.

Sakai A, et al. J Epidemiol, 2015

I. Health check items and association with social and psychological factors and lifestyles

Metabolic syndrome was observed in 19.5% of the total (20,920 participants) (males: 30.4%, females: 11.5%). For both male and female participants, age, smoking, and decreased physical activity were associated with the development of metabolic syndrome. Posttraumatic stress disorder (PTSD) is also found to exert an influence on the development of metabolic syndrome among females (Table 10).[2)]

Table 10 Logistic regression analysis of factors influencing metabolic syndrome after the earthquake among 20,920 examinees

	Men (8,810)		Women (12,110)	
	Odds ratio (95% CI)	*p* value	Odds ratio (95% CI)	*p* value
Age (1-year increase)	1.04 (1.03-1.05)	<0.01	1.06 (1.05-1.07)	<0.01
Evacuation (ref: non-evacuation)	1.07 (0.96-1.20)	0.19	1.00 (0.86-1.15)	0.94
Smoking (ref: non-smoker)				
Current smoker	0.97 (0.84-1.12)	0.65	1.04 (0.77-1.39)	0.81
Quit smoker	1.30 (1.14-1.48)	<0.01	1.60 (1.23-2.07)	<0.01
Alcohol intake (ref: non-drinker)				
<44 g/day	0.86 (0.76-0.97)	0.01	0.71 (0.61-0.84)	<0.01
≥ 44 g/day	0.97 (0.84-1.12)	0.68	0.65 (0.37-1.14)	0.13
Physical activity (ref: every day)				
<4 times a week	1.23 (1.07-1.41)	<0.01	1.42 (1.15-1.75)	<0.01
Change of job (ref: no change)	0.98 (0.87-1.10)	0.73	0.98 (0.83-1.15)	0.78
Unemployment (ref: no)	1.04 (0.91-1.20)	0.57	1.16 (0.97-1.40)	0.11
Sleep dissatisfaction (ref: yes)	1.02 (0.91-1.14)	0.75	0.94 (0.81-1.10)	0.45
Psychological distress (ref: K6 <13)	0.93 (0.77-1.12)	0.46	0.89 (0.72-1.09)	0.25
Post-traumatic stress disorder (ref: PCL-S <44)	1.12 (0.95-1.31)	0.17	1.29 (1.08-1.55)	<0.01

Logistic regression analysis was used (dependent variable: metabolic syndrome; independent variable of interest: presence versus absence of each life-style factor; adjustment variables: age and sex). CI, confidence interval; K6, Kessler 6-item scale; PCL-S, Post-traumatic Stress Disorder Checklist.
Survey period: June 2011 to March 2012.

Takahashi A, et al. J Atheroscler Thromb, 2020

(3) Comparison of the 13 municipalities with municipalities in Aizu

(Based on materials for the 37th Prefectural Oversight Committee Meeting for the Fukushima Health Management Survey, comparing municipalities covered by the CHC and another area)

We examined changes in the incidence of lifestyle diseases after the earthquake using data from health checks conducted for residents in entirely evacuated municipalities, partially evacuated municipalities, and in another area within Fukushima Prefecture (3 municipalities in Aizu), where the impact of the disaster is considered to be relatively small.

A. Hypertension and hyperlipidemia

Among residents in partially and entirely evacuated municipalities, the percentage of those under treatment increased and their blood pressure values and LDL cholesterol counts showed signs of improvement. In Aizu, improvements of blood pressure values were observed in the same manner as in partially and entirely evacuated municipalities, but LDL cholesterol counts remained unchanged (Figures 12 to 17).

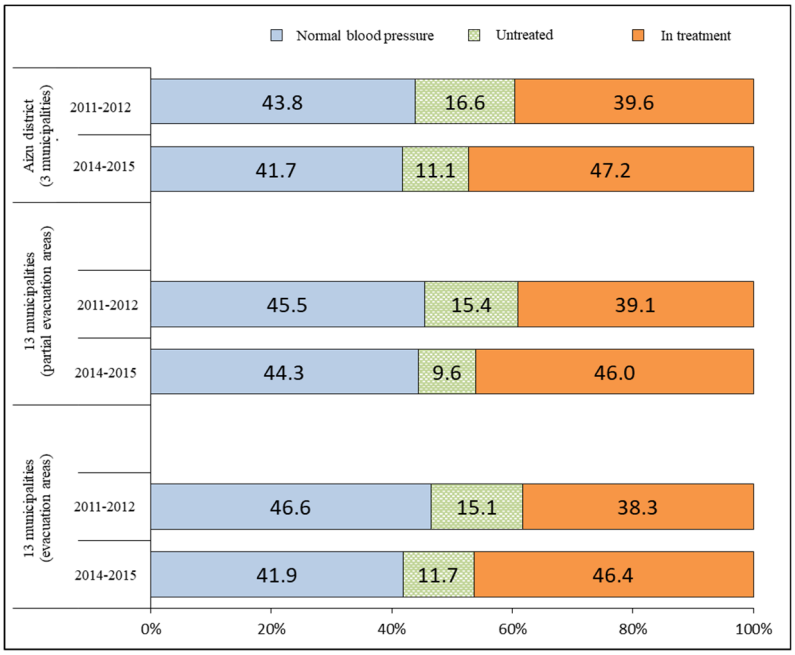


Figure 12 Changes in percentages of residents with hypertension who are untreated and who are being treated

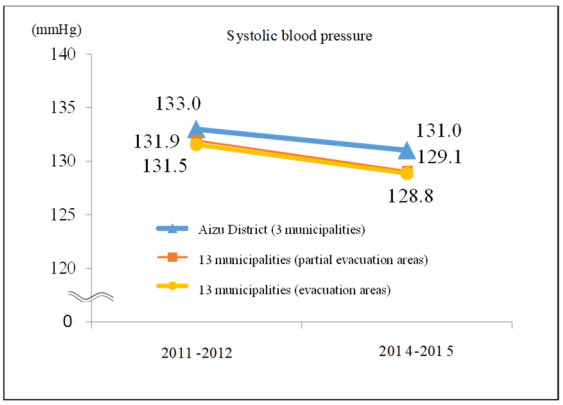


Figure 13 Changes in average systolic blood pressure

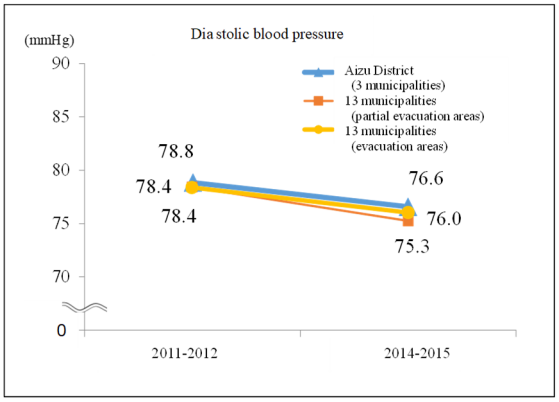


Figure 14 Changes in average diastolic blood pressure

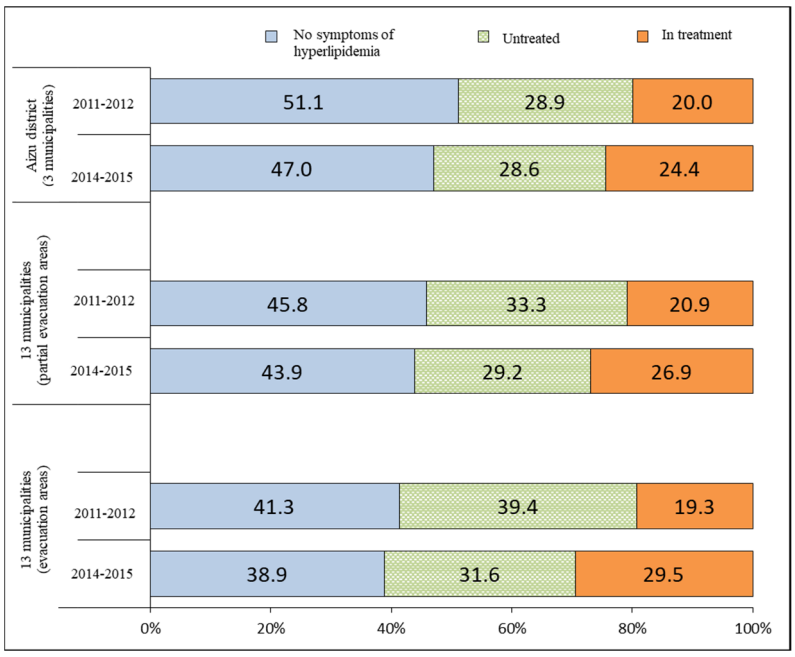


Figure 15: Changes in percentages of examinees with hyperlipidemia who are untreated and who are being treated

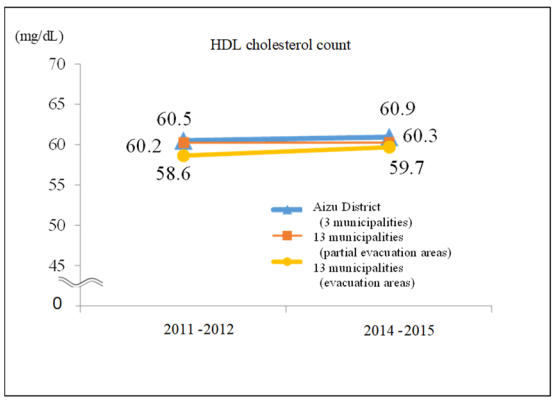


Figure 16 Changes in average HDL cholesterol count

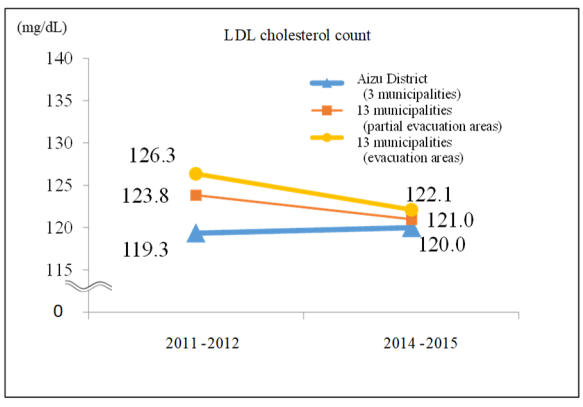


Figure 17 Changes in average LDL cholesterol count

B. Diabetes

Among residents in partially and entirely evacuated municipalities, the number of diabetics in treatment was already larger than in other areas (in Aizu) in 2011 to 2012, but further increased in 2014 to 2015. The total percentage of untreated diabetics and diabetics in treatment showed large increases to 13.4% in partial evacuation areas and to 16.7% in evacuation areas. This suggests possible increases in the incidence of cardiovascular diseases and diabetic nephropathy, and potential need for dialysis in the future (Figure 18).

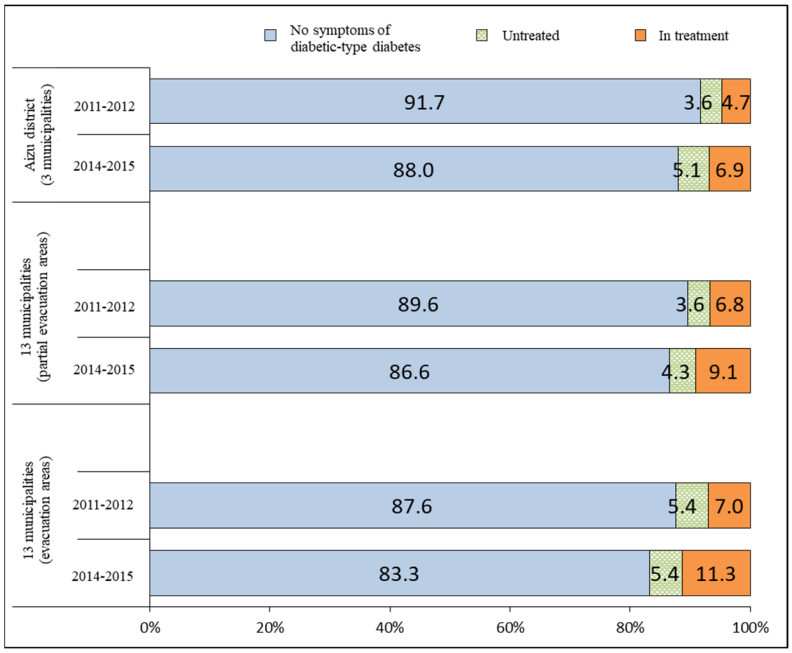


Figure 18: Changes in percentages of residents with diabetes who are untreated and who are being treated

(4) Conclusion

By ascertaining health conditions of the residents of the evacuation zone through the Comprehensive Health Check, it was found that reduced physical activity and changes in diet due to evacuation may have affected the increases in residents' body weight and obesity, and that evacuation life is considered to constitute a risk factor for some diseases.

A. Examinees aged 15 or younger

The CHC revealed the existence of a certain number of children who came to have obesity, hyperlipidemia, hyperuricemia, liver dysfunction, hypertension, and impaired glucose tolerance after the earthquake. Subsequent follow-up surveys show an improvement in those children's obesity, but an improvement of hyperlipidemia has been delayed.

B. Examinees aged 16 or older

The analysis of WBC counts and DLCs (differential leukocyte counts) of examinees within one year after the earthquake disaster revealed no direct impact of radiation.

After the disaster, increases were observed in the incidence of obesity, hypertension, hyperlipidemia, diabetes, renal dysfunction, liver dysfunction, hyperuricemia, and polycythemia, suggesting the possibility of an indirect impact of radiation (impact on health due to changes in living environment caused by evacuation, etc.). On the other hand, the percentage of those receiving treatment increased and participants' blood pressure values and LDL cholesterol counts showed signs of improvements. Additionally, an improvement of liver dysfunction was confirmed in association with better physical activity and diet.

The analysis of changes in living environment, mental health indices, and the CHC results showed an association between posttraumatic stress disorder (PTSD) and metabolic syndrome.

4. Evaluation of the Results

The Interim Report on the Fukushima Health Management Survey published in March 2016 shows the following evaluation of the survey results and future direction presented by the Prefectural Oversight Committee for the Fukushima Health Management Survey.

(i) Through the analysis of WBC counts and DLCs of examination participants, no direct impact of radiation has been confirmed thus far. On the other hand, increases have been observed in risk factors for cardiovascular diseases (obesity, hypertension, hyperlipidemia, diabetes, renal dysfunction, and hyperlipidemia), which are considered as indirect impacts of radiation (health effects due to changes in living environment caused by evacuation, etc.), so further emphasis should be placed on countermeasures.
(ii) Blood sampling for infants should be limited to cases where their guardians give informed consent.

Based on the Committee's evaluation, we have continued monitoring the possibility of direct impacts of radiation by measuring WBC counts and DLCs. For indirect impacts, we have intensively carried out such measures as awareness-raising about the prevention of lifestyle diseases, which are considered among the health effects due to changes in living environment caused by evacuation, etc., and activities to promote good health, while encouraging residents to receive treatment.

With regard to blood sampling for infants, we recently added a column for checking guardians' intention in an examinee's record and conduct sampling only with guardians' consent.

5. Publication and Feedback of the Results

(1) Notification of personal results

Survey results are sent to individual participants by post. Additionally, for examinees aged 15 or younger and their guardians, explanations by physicians are provided at the medical facility where they received health checks.

(2) Preparation of a leaflet

When sending invitations for group or individual health checks to eligible persons aged 16 or older, a leaflet compiling what has become clear from the results of the CHC is enclosed. The leaflet theme changes every year: it was "Lifestyle Diseases" for FY2017, "Diabetes" for FY2018, and "Metabolic Syndrome" for FY2019. For FY2020, under "The Basis of Your Diet" as a theme, the leaflet specifically addresses current salt intake in Fukushima, what the Fukushima Health Management Survey has clarified, recommendations for a well-balanced diet, and matters to note when eating meals and in day-to-day life (for the leaflet, see pp. 39-41).

(3) Preparation of reports on analysis results

In order to have residents understand their health conditions, we prepare a Report on Analysis Results regarding changes in survey results for each municipality to provide updated information to municipalities (for an outline of the reports, see pp. 19-24).

In FY2020, we also prepared a report analyzing associations with the Mental Health and Lifestyle Survey for each municipality and provided explanations at briefing sessions, etc. and exchanged opinions with responsible personnel of individual municipalities (for an outline of the report, see pp. 25-31).

Furthermore, we occasionally conduct further analysis upon request from a covered municipality (analysis by age group, and analysis of associations with drinking, smoking, physical activity, etc.).

(4) Holding of health seminars

We hold health seminars on such occasions as health classes or other events organized by covered municipalities with the aim of deepening people's understanding of the significance of receiving health checks every year and encouraging them to continue to receive health checks. In a health seminar, lectures are given by physicians and others and the analysis results for each municipality are reported directly to residents. Health exercises are introduced and measurement of blood glucose levels, etc., are also conducted (for details of the seminars, see pp. 32-37).

6. Implementation and Utilization of the CHC and Efforts for Raising People's Awareness

While people's living environment has been changing with the lapse of time since the earthquake, we have conducted awareness-raising activities as follows, with the aim of having people stay interested in their own health.

(1) Information dissemination

In order to have as many people as possible receive the CHC to prevent the development of diseases or encourage them to receive treatment, we requested the prefecture and covered municipalities to post information on the CHC in their PR magazines.
We also prepared posters and leaflets to recommend receiving health checks, then put up and placed them at medical facilities, etc.

(2) Utilization of the Fukushima Kenmin App

Residents of Fukushima Prefecture are encouraged to use the Fukushima Kenmin App to stay interested in their own health and establish a habit of enjoying exercise, thereby improving their daily habits.

We sent a related leaflet together with an invitation to the CHC to eligible persons aged 16 or older and gave them user points for the Fukushima Kenmin App (100 points with a health check invitation and 200 points with a result report).

(3) Securing venues for group health checks

From the beginning, we established venues for group health checks at areas where the number of eligible persons is large, but have endeavored to secure venues convenient for participants by securing new venues in accordance with the lifting of evacuation orders or changing venues in areas with fewer eligible persons.

(4) Efforts for deepening people's understanding of good health

We prepared a pamphlet, "Health Check, Your Body's Report Card," which explains how to read disease diagnoses, mechanisms, and prevention measures, emphasizing the necessity of receiving the CHC. We made this pamphlet available at health seminars and delivered copies on occasions of various events.

We posted a column on blood pressure 12 times on the website of the Radiation Medical Science Center for the Fukushima Health Management Survey and otherwise have endeavored to raise people's awareness and interest in their health under familiar themes (such as a better way to live and prevent diseases depending on the season) to have them live a healthy life based on a deeper understanding of blood pressure.

Furthermore, we provided columns on individual diseases (hypertension, diabetes, hyperlipidemia, stroke, myocardial infarction, etc.) to municipalities to have them post those columns in their PR magazines.

(5) Awareness-raising activities targeting residents

We participated in the event "Iki Iki Kenko Zukuri (Live with Vitality) Forum" hosted by Fukushima Medical University's Health Promotion Center and established a booth to exhibit panels showing the results of the CHC and to measure blood glucose levels, etc. so that such activities will trigger visitors to deepen their understanding of the checkup (for the details of the panels, see pp. 42-43)

7. Summary (roles played by the Survey)

(1) Provision of opportunities to receive health checks

The CHC helped to provide opportunities to receive health checks after the earthquake and have contributed to monitoring people's health conditions amid significant changes in their living environment.

Additionally, it was meaningful that we provided opportunities for health checks to a younger cohort, aged 16 to 39, who have generally fewer opportunities under the usual framework for health checks.

(2) Close collaboration with municipalities

If the results of group or individual health checks showed values that correspond to the "urgent contact required" category, we promptly contacted those residents, encouraging them to see a doctor and shared their relevant information with municipal health nurses.

In addition, we cooperated with health check result-reporting meetings and other health events by holding health seminars in conjunction with health-related events held by municipalities

From now on, we need to strengthen our efforts to accurately and broadly disseminate the current status (health check results, analysis results, etc.) to local residents, together with individual municipalities, and further enhance our initiatives to have people understand the significance of regular health checks and encourage them to receive the CHC to increase the participation rate.

(3) Effects of post-disaster evacuation on the body were examined

By monitoring the health status of residents in the designated evacuation zone, the CHC has correlated decreases in physical activity and changes in dietary habits due to evacuation with increases in weight and obesity, and has shown that some medical conditions are related to evacuation life.

A. Examinees aged 15 or younger

- The health check results revealed the existence of a certain number of children who came to have obesity, hyperlipidemia, hyperuricemia, liver dysfunction, hypertension, and impaired glucose tolerance after the earthquake, but subsequent follow-up surveys show an improvement in those children's obesity while an improvement of hyperlipidemia has been delayed. Accordingly, it is important to look for such trends as they grow older.
- We need to analyze radiation effects on the hematopoietic system based on further analyses by area and by year and the association with external exposure doses estimated through the Basic Survey (currently being analyzed).

B. Examinees aged 16 or older

- As increases in those with obesity, hypertension, hyperlipidemia, diabetes, renal dysfunction, liver dysfunction, hyperuricemia, and polycythemia have been observed after the earthquake, it is important to continue monitoring the influence of evacuation on residents' health.
- No direct radiation effects have been confirmed from the CHC results so far, but it is necessary to conduct monitoring with a long-term perspective. As the results of the Mental Health and Lifestyle Survey show the existence of a high percentage of residents worrying about delayed or next-generation effects of radiation, continued monitoring is required to help them regain a greater sense of safety and security. We need to analyze radiation effects on the hematopoietic system based on further analyses by area and by year and the association with external exposure doses estimated through the Basic Survey (currently being analyzed).

(4) Effects of the feedback of the CHC results

An increase of residents' health consciousness through our proactive feedback of CHC results to municipalities led to an increase in the percentage of those receiving treatment and improving their blood pressure values and LDL cholesterol counts.

It has also been confirmed that improvements in physical activity and diet are improving liver function.

Individual municipalities have utilized the CHC results to hold original health classes and prepare PR magazines, etc., and they have highly evaluated the CHC as being helpful in organizing events friendly to residents.

From now on, we will have to make further efforts while clarifying the purpose of the CHC, that is, to offer support to help local residents deepen their interest in good health, thereby improving their awareness to manage personal health and receive necessary treatment.

(5) Concrete recommendations based on the CHC results

We analyzed associations of lifestyles and mental conditions with lifestyle diseases and clarified factors for developing diseases, and, at the same time, provided concrete recommendations for improvements to municipalities and local residents, such as the significance of physical activity and nutritional management, care for mental health, and promotion of social participation.

In full consideration of requests from residents and municipalities, we need to proceed with the initiatives to offer support to municipalities more effectively through analysis and provision of data and better collaboration with the Mental Health and Lifestyle Survey, etc.

Summary of Scientific Papers concerning the Comprehensive Health Check
(published as of December 2020)

1. No relationship was found between the prevalence of polycythemia and mental conditions indicated by PCL-S or K6 scores, while there were significant relationships with age over 65, high educational background, obesity, hypertension, diabetes, liver dysfunction and smoking habit, which suggests that polycythemia is a sign accompanying a lifestyle disease.
   Relationship between the prevalence of polycythemia and factors observed in the mental health and lifestyle survey after the Great East Japan Earthquake
   SAKAI Akira, et al., Medicine (2020) 99:1

2. Metabolic syndrome was found in 19.5% of the total (20,920 participants; 30.4% of male participants and 11.5% of female participants). For both male and female participants, aging, smoking, and decreased physical activity were associated with the development of metabolic syndrome. Posttraumatic stress disorder (PTSD) was also found to exert an influence on the development of metabolic syndrome for females.
   Effects of Psychological and Lifestyle Factors on Metabolic Syndrome Following the Fukushima Daiichi Nuclear Power Plant Accident: The Fukushima Health Management Survey.
   TAKAHASHI Atsushi, et al., J Atheroscler Thromb. 2020

3. Dietary patterns were classified into the following three: consuming mainly vegetables; consuming a lot of juice and milk; and consuming a lot of meat. The analysis of their association with risk factors for cardiovascular diseases suggests the possibility that continuing a plant-based diet may reduce the risk of cardiovascular diseases caused by lipid abnormalities.
   Associations between Dietary Patterns and Cardiometabolic Risks in Japan:
   A Cross-Sectional Study from the Fukushima Health Management Survey, 2011–2015
   Ma Enbo, et al., Nutrients 2020, 12, 129 ; doi :10.3390/nu12010129

4. Pediatric Health Checks after the earthquake revealed the existence of children with obesity and hyperlipidemia, but subsequent follow-up surveys show an improvement in those children's obesity, although an improvement of hyperlipidemia has been delayed. It is necessary to continue health checks.
   Influence of post-disaster evacuation on childhood obesity and hyperlipidemia
   KAWASAKI Yukihiko, et al., Pediatrics International (2020) 0, 1–8

5. It became clear that hyperuricemia has been found more often among evacuees than among non-evacuees after the Great East Japan Earthquake.
   Influence of post-disaster evacuation on incidence of hyperuricemia in residents of Fukushima Prefecture: the Fukushima Health Management Survey
   HASHIMOTO Shigeatsu, et al., Clinical and Experimental Nephrology. 2020

6. There is a possibility that residents of municipalities designated as the evacuation zone, and those who actually experienced evacuation, in particular, are apt to develop cardiovascular diseases, such as myocardial infarction and stroke.
   Trends in lifestyle-related diseases before and after the Great East Japan Earthquake: the Fukushima Health Management Survey
   OHIRA Tetsuya, et al. Journal of the National Institute of Public Health. 2018

7. No significant relationship was found between the incidence of liver dysfunction and lifestyle-related factors (K6≧13, PCL-S≧44).
   Effects of lifestyle on hepatobiliary enzyme abnormalities following the Fukushima Daiichi nuclear power plant accident: The Fukushima Health Management Survey
   TAKAHASHI Atsushi, et al. Medicine. 2018, 97(42):e12890.

8. When defining CKD as eGFR levels being below 60mL/min/1.73m^2 or urinary protein levels being above 1+, for people who did not have CKD before the earthquake, evacuation had significantly affected the development of CKD due to abnormalities in eGFR levels but positive urinary protein had nothing to do with CKD.
   The impact of evacuation on the incidence of chronic kidney disease after the Great East Japan Earthquake: The Fukushima Health Management Survey.
   HAYASHI Yoshimitsu, et al., Clinical and Experimental Nephrology. 2017

9. Polycythemia was still significantly prevalent among evacuees, even four years after the earthquake.
   Persistent prevalence of polycythemia among evacuees 4 years after the Great East Japan Earthquake: A

follow-up study.
SAKAI Akira, et al., Preventive Medicine Reports. 2017

10. After the earthquake, the incidence rate of metabolic syndrome was significantly higher among evacuees than among non-evacuees, both for males and females. Additionally, BMI, abdominal circumferences, triglyceride levels, and fasting blood glucose levels were higher among evacuees.
    Influence of post-disaster evacuation on incidence of metabolic syndrome.
    HASHIMOTO Shigeatsu, et al., Journal of Atherosclerosis and Thrombosis. 2017

11. Results of the 4-year follow-up of the Fukushima Health Management Survey revealed that the incidence rate of diabetes was higher among evacuees than among non-evacuees by 1.61 times. Furthermore, the percentages of those with obesity, hyperlipidemia, weight increases of 10kg or more since the age of 20 years, weight changes of 3 kg or more within one year, and smoking habit were significantly larger among evacuees.
    Evacuation is a risk factor for diabetes development among evacuees of the Great East Japan earthquake: A 4-year follow-up of the Fukushima Health Management Survey.
    SATO Hiroaki, et al., Diabetes and Metabolism. 2017

12. Evacuation after the earthquake had an association with liver dysfunction irrespective of having a drinking habit or the amount of alcohol intake.
    Effect of evacuation on liver function after the Fukushima Daiichi Nuclear Power Plant accident: The Fukushima Health Management Survey.
    TAKAHASHI Atsushi, et al., Journal of Epidemiology. 2017

13. The percentage of participants found to have liver dysfunction immediately after the earthquake decreased for the following three to four years due to such factors as better daily physical activity and more frequent breakfast consumption.
    Changes in Hepatobiliary Enzyme Abnormality After the Great East Japan Earthquake: The Fukushima Health Management Survey.
    TAKAHASHI Atsushi, et al., Scientific Reports. 2017

14. The prevalence of hypertension continued to increase until 2012 and reached a peak of 48.8% among males and 39.0% among females, but showed a declining trend thereafter, while the percentages of those receiving treatment and those controlling their own blood pressure continued to increase. The impact of evacuation on these tendencies was not observed at all or was observed only slightly in most years.
    Impact of evacuation on trends in the prevalence, treatment, and control of hypertension before and after a disaster.
    NAGAI Masato, et al., J Hypertens. 2017

15. Before and after the earthquake, the percentages of participants with obesity, hypertension, hyperlipidemia, diabetes, atrial fibrillation, and erythroid proliferation increased significantly in evacuation areas.
    Changes in Cardiovascular Risk Factors after the Great East Japan Earthquake: A Review of the Comprehensive Health Check in the Fukushima Health Management Survey.
    OHIRA Tetsuya, et al., Asia Pacific Journal of Public Health. 2017

16. After the earthquake, overweight/obesity rates increased among residents of municipalities designated as the evacuation zone (among evacuees, in particular).
    Effect of Evacuation on Body Weight After the Great East Japan Earthquake.
    OHIRA Tetsuya, et al., American Journal of Preventive Medicine. 2016

17. After the earthquake, increases in blood pressure values were observed among residents of municipalities designated as the evacuation zone (among evacuees, in particular), and a significant association was found between evacuation and the incidence of hypertension two years after the disaster, especially among males.
    Evacuation and Risk of Hypertension After the Great East Japan Earthquake: The Fukushima Health Management Survey.
    OHIRA Tetsuya, et al., Hypertension. 2016

18. Evacuation after the earthquake had an impact on the incidence of low HDL cholesterolemia.
    Hypo-high-density Lipoprotein Cholesterolemia Caused by Evacuation after the Fukushima Daiichi Nuclear Power Plant Accident: Results from the Fukushima Health Management Survey.
    SATO Hiroaki, et al., Internal Medicine. 2016

19. It was not concluded that evacuation after the earthquake has increased the prevalence of CKD.
    Prevalence of renal dysfunction among evacuees and non-evacuees after the Great East Earthquake: Results from the Fukushima Health Management Survey.
    SATO Hiroaki, et al., Internal Medicine. 2016

20. After the earthquake, the percentage of those with diabetes increased significantly, and the incidence rate was found to be higher among evacuees than among non-evacuees.
    Evacuation after the Fukushima Daiichi Nuclear Power Plant Accident Is a Cause of Diabetes: Results from the Fukushima Health Management Survey.
    SATO Hiroaki, et al., Journal of Diabetes Research. 2015

21. The CHC conducted within one year after the earthquake showed no significant differences in neutrophil counts and lymphocyte counts among residents of 13 municipalities that were designated as the evacuation zone.
    White Blood Cell, Neutrophil, and Lymphocyte Counts in Individuals in the Evacuation Zone Designated by the Government After the Fukushima Daiichi Nuclear Power Plant accident: The Fukushima Health Management Survey
    SAKAI Akira, et al., Journal of Epidemiology.25 (1): 80-87, 2015

22. After the earthquake, the percentage of those with atrial fibrillation increased among residents of the evacuation zone and relevant risk factors were heavy drinking and obesity.
    Increased prevalence of atrial fibrillation after the Great East Japan Earthquake: Results from the Fukushima Health Management Survey.
    SUZUKI Hitoshi, et al., International Journal of Cardiology. 2015

23. It was suggested that there were residents of the evacuation zone aged 15 or younger who came to have obesity, hyperlipidemia, hyperuricemia, liver dysfunction, hypertension, and impaired glucose tolerance.
    The Basic Data for residents aged 15 years or younger who received a Comprehensive Health Check in 2011-2012 as a part of the Fukushima Health Management Survey after the Great East Japan Earthquake.
    KAWASAKI Yukihiko, et al., Fukushima Journal of Medical Science. 2015

24. It was suggested that residents of the evacuation zone aged 16 or older who came to have obesity, hyperlipidemia, hyperuricemia, liver dysfunction, hypertension, impaired glucose tolerance, and renal dysfunction increased in number as the cohort grew older.
    The Basic Data for residents aged 16 years or older who received a Comprehensive Health Check Examinations in 2011-2012 as a part of the Fukushima Health Management Survey after the Great East Japan Earthquake.
    KAWASAKI Yukihiko, et al., Fukushima Journal of Medical Science. 2014

25. Life as an evacuee had a significant relationship with the development of polycythemia.
    Life as an evacuee after the Fukushima Daiichi Nuclear Power Plant accident is a cause of polycythemia: The Fukushima Health Management Survey.
    SAKAI Akira, et al., BMC Public Health.2014, 14:1318 doi:10. 1186/1471-2458-14-1318

Utilization of the Results of the Comprehensive Health Check

Changes over 7 Years in Municipalities Covered by the Comprehensive Health Check, Fukushima Health Management Survey (Overall)

We have prepared an analysis report on Comprehensive Health Check (CHC) results for each covered municipality and have provided explanations at briefing sessions with each of the 13 municipalities designated as the evacuation zone. This time, we prepared a report compiling the results for all 13 municipalities.

[Purpose of this report and outline of the results]

Residents who had to evacuate after the earthquake and nuclear accident experienced moving into temporary housing and living in unfamiliar places; analysis of the results of the CHC conducted so far revealed increases in lifestyle diseases among them, due to a lack of exercise, changes in diet, and increased social and psychological stresses. In the approximately 10 years since the disaster, evacuation orders have been lifted for some areas and the circumstances surrounding the evacuees have been changing. In order to examine whether these changes are temporary or can be observed over years, we compared the CHC results of the covered municipalities for seven years after the disaster.

As a result, it was confirmed as a whole that the obesity rate has not decreased and there has been a continued increase in the number of people with hypertension, blood sugar abnormalities, and lipid abnormalities; thus the risks of developing cardiovascular diseases have remained high. In the meantime, the percentage of people with liver dysfunction has decreased and improvements have been observed in blood pressure values and LDL cholesterol counts as the number of people untreated for hypertension and lipid abnormalities has been decreasing. As the average follow-up period is over five years, an influence of aging is supposed, but these improvements are considered to have been brought about by health guidance and advice to recommend visits to medical institutions provided by municipal health nurses. However, the percentage of untreated people for blood sugar abnormalities is increasing and people's blood glucose levels are becoming higher, which suggests the need to continuously encourage people to visit medical institutions.

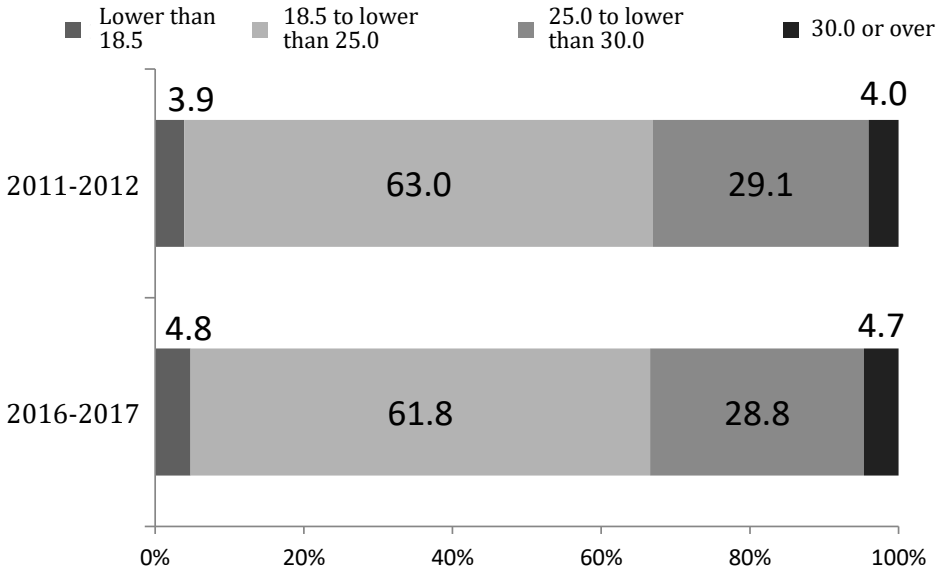
[Coverage]

The analysis covered people aged 40 or older who have received any of the specific health checks, health checks for citizens aged 75 or older, or the CHC of the Fukushima Health Management Survey in FY2011 to FY2012 (53,752 people in total [23,888 men and 29,864 women]; average age: 63.2 years old). For people who received health checks twice or more during this period, we used the results of the earliest health check after the disaster as the base line and made comparisons with the health check data from FY2016 to FY2017. For people who received health checks twice or more in FY2016 to FY2017, we used the results of the latest health check for the analysis.

Out of 53,752 people, 27,536 (12,254 men and 15,282 women; 51.2% follow-up rate; 5.5 year average follow-up period) received health checks in FY2016 to FY2017.

[Analysis Method]

- Statistical significance was tested for continuous variables (degree of obesity, blood pressure values, HbA1c levels, and cholesterol counts) using paired t-tests, and for changes in percentages (of overweight, underweight, hypertension, diabetes, lipid abnormalities, liver dysfunction, and frequency of administration and other treatment) using McNemar tests.
- The analysis software used was SAS, version 9.4 (SAS Institute, Inc., Cary, NC, USA).
  The significance test was two-sided with a significance level of 5% ($p < 0.05$).

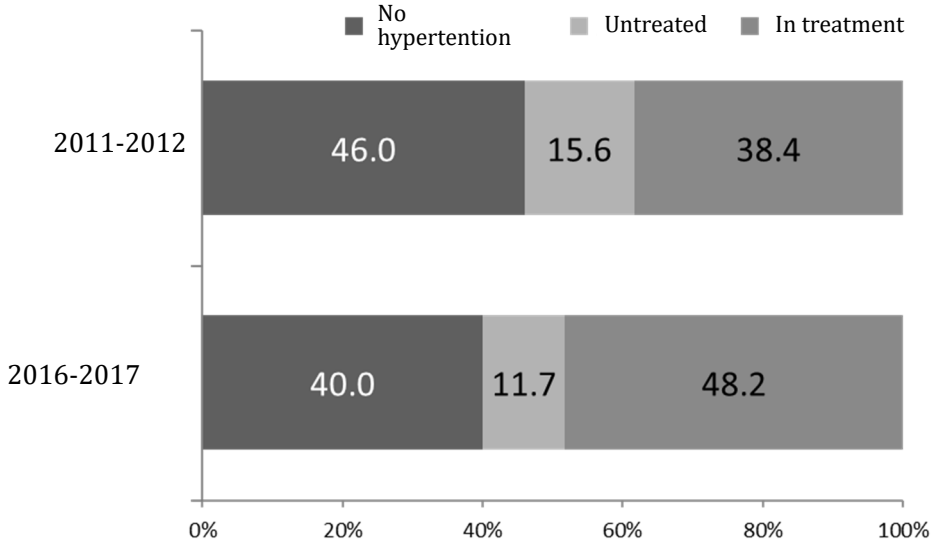


Percentage of underweight people (BMI: lower than 18.5): p <0.001
Percentage of overweight people (BMI: 25.0 or over): p = 0.10
The total of the values in the graph may not be 100% due to rounding off.

Figure 1. Changes in percentages of BMI (Body Mass Index; kg/m^2) (overall)

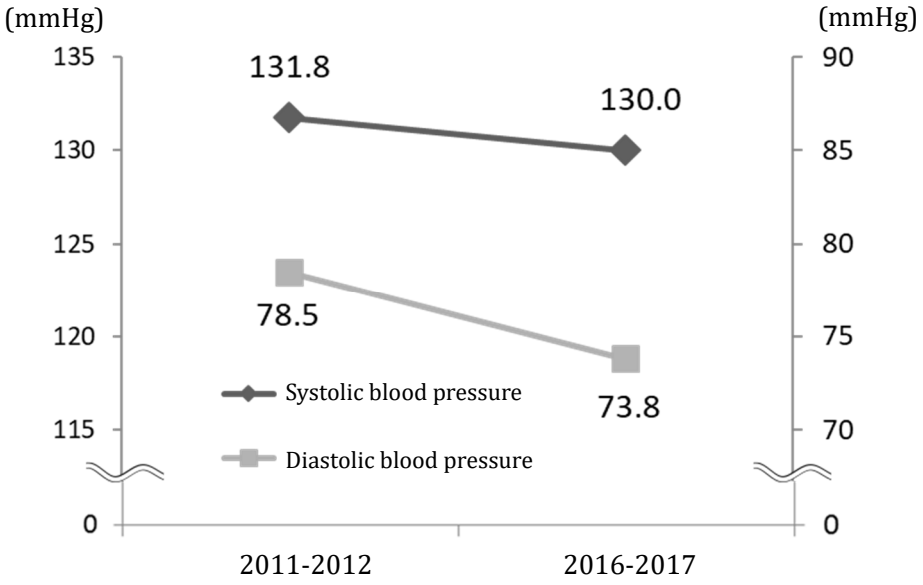
The percentage of overweight people (BMI: 25.0 kg/m^2 or over) showed no significant change (p = 0.10), with a slight increase from 33.1% to 33.4%.

However, the percentage of underweight people (BMI: lower than 18.5kg/m^2) increased significantly (p < 0.001) from 3.9% to 4.8%.



For both percentages of people with hypertension*1 and those in treatment, p < 0.001.
*1 People whose systolic blood pressure is 140 mmHg or over, whose diastolic blood pressure is 90 mmHg or over, or who are taking blood pressure medications
The total of the values in the graph may not be 100% due to rounding off.

Figure 2. Changes in percentages of participants with hypertension who are untreated and who are being treated (overall)

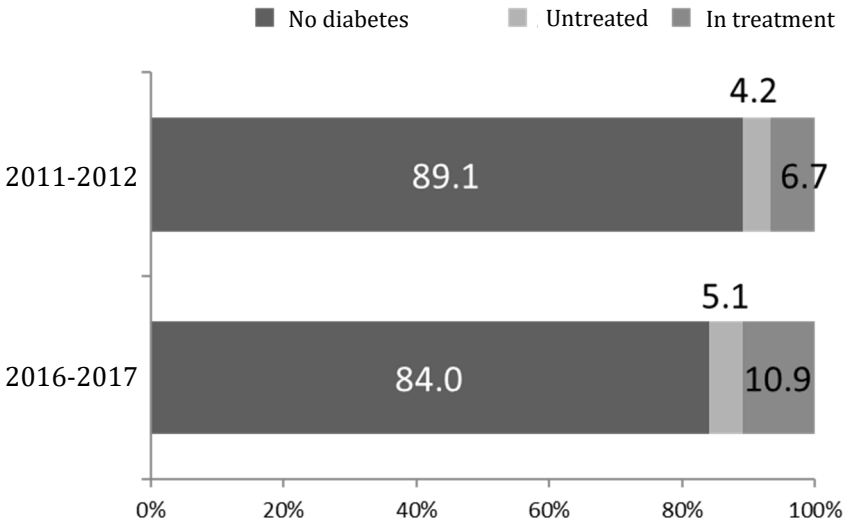


For both systolic blood pressure and diastolic blood pressure, p <0.001.

Figure 3. Changes in average systolic blood pressure and diastolic blood pressure (overall)

Significant increases were observed in the percentage of people with hypertension (from 54.0% to 60.0%) and the percentage of people who are taking blood pressure medications (from 38.4% to 48,2%) (for both, p < 0.001).

The average systolic blood pressure and diastolic blood pressure decreased significantly from 131.8 mmHg to 130.0 mmHg and from 78.5 mmHg to 73.8 mmHg, respectively (for both, p <0.001).



For both percentages of people with diabetes*2 and those in treatment, p < 0.001.

*2 People whose fasting blood glucose level is 126 mg/dL or over, whose casual blood glucose level is 200 mg/dL or over, whose HbA1c level is 6.5% or over, or who are being treated with hypoglycemic drugs, etc.

The total of the values in the graph may not be 100% due to rounding off.

Figure 4. Changes in percentages of people with diabetes who are untreated and who are being treated (overall)

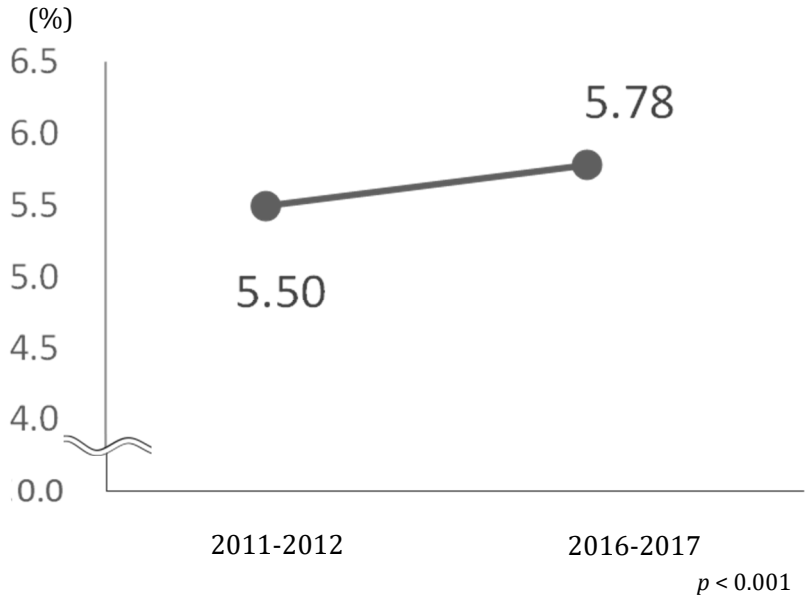
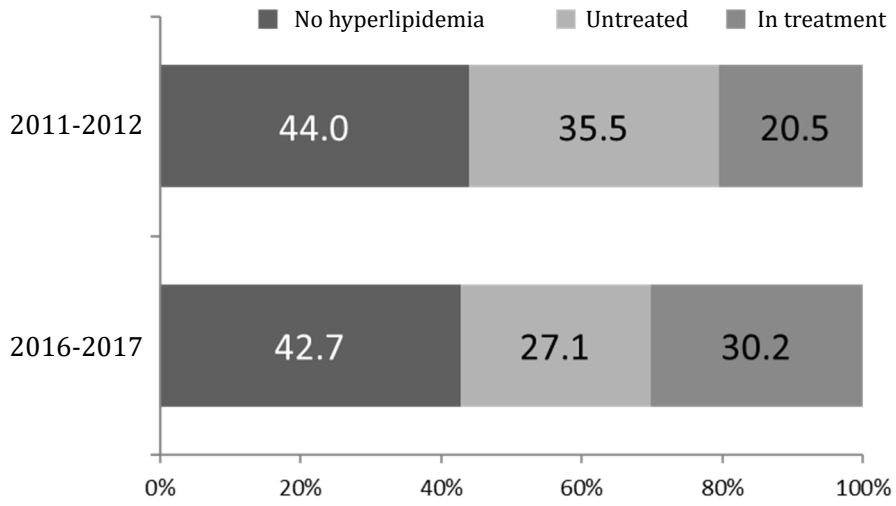


Figure 5. Changes in the average HbA1c level (overall)

The percentage of people with diabetes increased significantly from 10.9% to 16.0%, and the percentage of people who are taking hypoglycemic drugs, etc., also increased significantly from 6.7% to 10.9% (for both, $p < 0.001$).

The average HbA1c level (NGSP) also showed a significant increase from 5.50% to 5.78% ($p < 0.001$).

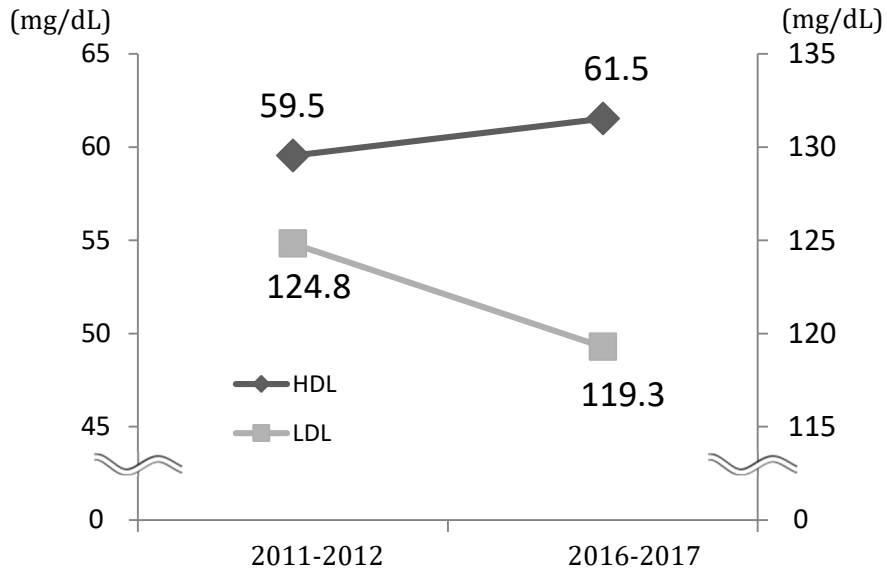


For both percentages of people with lipid abnormalities*3 and those who on medication, $p < 0.001$.

*3 People whose HDL cholesterol count is less than 40 mg/dL, whose LDL cholesterol count is 140 mg/dL or over, whose fasting triglyceride level is 150 mg/dL or over, or who are being treated for lipid abnormalities

The total of the values in the graph may not be 100% due to rounding off.

Figure 6. Changes in percentages of people with lipid abnormalities who are untreated and who are being treated (overall)

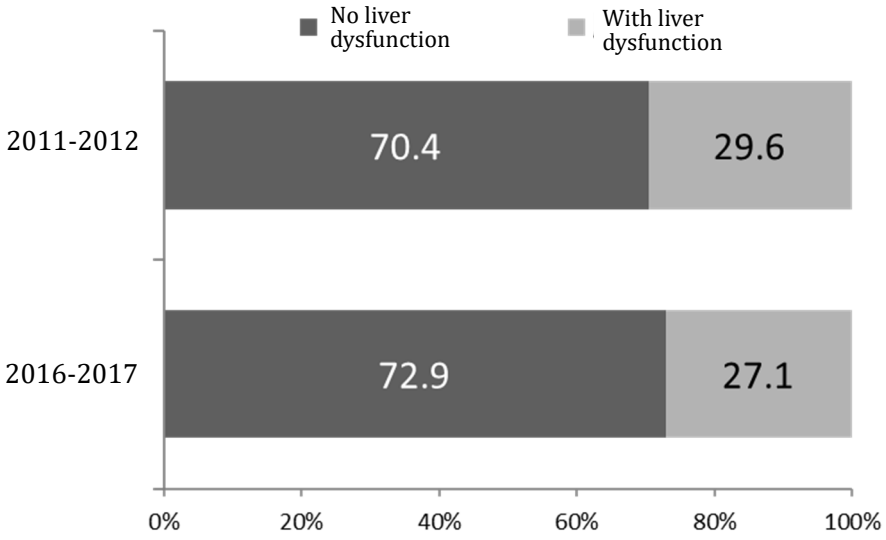


For both, $p < 0.001$.

Figure 7. Changes in the average HDL cholesterol count and LDL cholesterol count (overall)

The percentage of people with lipid abnormalities increased significantly from 56.0% to 57.3%, and the percentage of people who are in treatment also increased significantly from 20.5% to 30.29% (for both, $p < 0.001$).

The average HDL cholesterol count increased significantly from 59.5 mg/dL to 61.5 mg/dL, while the average LDL cholesterol count decreased significantly from 124.8 mg/dL to 119.3 mg/dL (for both, $p < 0.001$).



For the percentage of people with liver dysfunction,*4 $p < 0.001$.

*4 People whose AST level is 31U/L or over, whose ALT level is 31U/L or over, or whose γ-GT level is 51U/L or over

The total of the values in the graph may not be 100% due to rounding off.

Figure 8. Changes in percentages of people with liver dysfunction (overall)

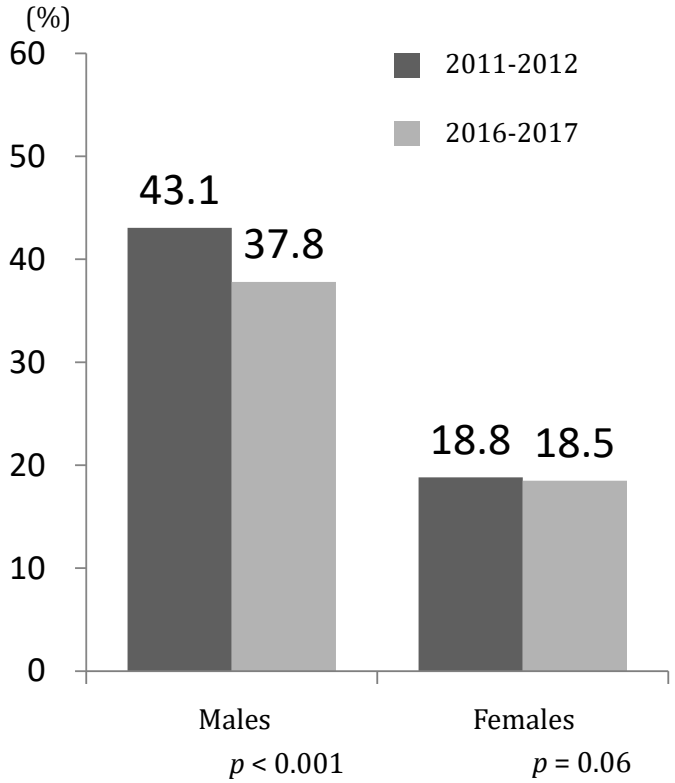


Figure 9. Changes in the percentages of people with liver dysfunction (by sex)

The percentage of people with liver dysfunction decreased significantly, from 29.6% to 27.1% ($p < 0.001$). Among men, the percentage showed a significant decrease from 43.1% to 37.8%, but no significant decrease was observed among women, with only a slight change from 18.8% to 18.5% ($p < 0.001$ and $p = 0.06$, respectively).

Utilization of the Results of the Comprehensive Health Check

Results of the Analysis of Lifestyle Disease-related Factors for 7 Years after the Earthquake Disaster in Municipalities Covered by the Comprehensive Health Checkup, Fukushima Health Management Survey (Overall)

We have prepared an analysis report on Comprehensive Health Check (CHC) results for each covered municipality and have provided explanations at briefing sessions with each of the 13 municipalities designated as the evacuation zone. This time, we prepared a report compiling the results for all 13 municipalities.

1. Background and Purpose

The Radiation Medical Science Center for the Fukushima Health Management Survey, Fukushima Medical University, has analyzed the health check results of residents of the evacuation zone, and it was confirmed that compared with the time prior to the occurrence of the Great East Japan Earthquake, the percentages of people found to have obesity, hypertension, diabetes, lipid abnormalities, hepatic dysfunction, etc. have increased after the disaster.

Therefore, this analysis aims to clarify the factors that have caused increases in incidences of seven types of lifestyle diseases (overweight, underweight, hypertension, diabetes, lipid abnormalities, hepatic dysfunction, and renal dysfunction) as identified based on the health check results for FY2012 to FY2017 compared with those for FY2011, based on data of people's lifestyle habits that were obtained through the Mental Health and Lifestyle Survey conducted in FY2011, and to provide information for solving problems in the future.

2. Method

A) Coverage

The analysis covered, from among residents registered in the 13 municipalities designated as the evacuation zone after the nuclear disaster, those who received any of the specific health checks, health checks for citizens aged 75 or older, or the CHC in the Fukushima Health Management Survey at least once in FY2011, and responded to the Mental Health and Lifestyle Survey conducted in FY2011 at an age between 40 to 89 years, and who also received any health check at least once in FY2012 to FY2017.

B) Analysis Method

With regard to people who did not have any of the covered lifestyle diseases at the time of receiving a health check in FY2011, we calculated their risks (hazard ratios[*1]) of developing lifestyle diseases in FY2012 onward in relation to each of their lifestyle habits and the disaster-related factors as of FY2011.

Regarding mental health disturbances, people whose Kessler 6 scale (K6) scores were 13 or over were judged as having mental health disturbances.

For traumatic stress, we used the Post Traumatic Stress Disorder Checklist (PCL), and those whose scores were 44 or over were judged as being suspected of having traumatic stress.

Regarding perceptions of radiation risks, from the four options for a question about the possibility of health effects of radiation in later years, from "1: Possibility is extremely low" to "4: Possibility is extremely high," those who chose option 1 or 2 were judged to perceive the possibility as low, and those who chose option 3 or 4 were judged to perceive the possibility as high.

As a statistical tool, we used the Cox's proportional hazards model and calculated hazard ratios, adjusted by age and sex, with 95% confidence intervals[*2] for factors considered to have contributed to the development of lifestyle diseases. For a multivariate analysis, the factors for which the *p*-value is less than 0.1 after age and sex adjustment were input in multivariate analysis models, in addition to sex and age, as variables. When the *p*-value was less than 0.1 both for mental health disturbances and traumatic stress after age and sex adjustment, only the existence or nonexistence of mental health disturbances was input in multivariate analysis models. If

the critical rate was less than 5%, it was judged that there was a significant difference.

*1 The hazard ratio shows how many times persons with respective risk factors are more likely to develop relevant lifestyle diseases, for example in this case, compared with those with standard risk factors. When the hazard ratio is 1, there is no difference in the probability between the former and the latter. When the hazard ratio is 2, the former are twice as likely to develop relevant lifestyle diseases as the latter, and when the hazard ratio is 0.5, the probability is half.

*2 The 95% confidence interval is the range in which the actual hazard ratio falls with a probability of 95%. When the 95% confidence interval includes 1, this means that a hazard ratio not 1 has a probability of 5% (a hazard ratio greater than 1 implies a greater probability of developing relevant lifestyle diseases, when compared persons having standard risk factors).

3. Results and Consideration

A) Results of Data Tabulation

40,092 people (16,952 males and 23,140 females) received a health check in FY2011. Of these, 29,020 people (12,382 males and 16,638 females) responded to the Mental Health and Lifestyle Survey, and from among them, a total of 24,081 people (10,120 males and 13,961 females) who received a health check at least once in FY2012 to FY2017 were chosen for analysis and follow-up. The average number of health checks that these people received from FY2012 to FY2017 was 4.2.

The percentages of covered residents who were found to have lifestyle diseases at the time of the FY2011 health check were as follows: overweight, 34.6% (40.5% for males and 30.4% for females); underweight, 3.9% (1.9% for males and 5.4% for females); hypertension, 54.0% (61.5% for males and 48.5% for females); diabetes, 11.9% (16.6% for males and 8.5% for females); lipid abnormalities, 58.0% (56.7% for males and 59.0% for females); liver dysfunction, 29.6% (44.5% for males and 18.9% for females); and renal dysfunction, 18.1% (19.9% for males and 16.8% for females).

B) Association between Lifestyle Habits and Disaster-related Factors Immediately after the Nuclear Disaster and Development of Lifestyle Diseases Thereafter (Table 1)

Being overweight increased the risks of all lifestyle diseases, except for being underweight.

Being underweight decreased the risks of hypertension and lipid abnormalities for both males and females, and further decreased the risks of diabetes for females.

Exercise habit (exercising twice or more per week) decreased the risks of lipid abnormalities and increased the risks of liver dysfunction among males, but had no association with the development of lifestyle diseases among females.

Sleep satisfaction levels (almost satisfied) showed no association with the development of lifestyle diseases among males, but decreased the risks of diabetes among females.

Regarding **drinking habits, alcohol intake of less than 44 g per day** decreased the risks of underweight and lipid abnormalities but increased the risks of hypertension for males, while decreasing the risks of diabetes and lipid abnormalities for females. On the other hand, **alcohol intake over 44 g per day** increased the risks of hypertension and liver dysfunction both for males and females, while additionally decreasing the risks of lipid abnormalities and renal dysfunction for males.

Smoking habit at present increased the risks of being underweight both for males and females, and additionally increased the risks of diabetes and lipid abnormalities for males. Furthermore, for males, a **smoking habit in the past** also increased the risks of diabetes, lipid abnormalities, and renal dysfunction.

Experience of living in an evacuation center or temporary housing increased the risks of lipid abnormalities and liver dysfunction both for males and females, and additionally increased the risks of hypertension for males and overweight for females.

Experience of a job change decreased the risks of being underweight for both males and females, while additionally increasing the risks of overweight, diabetes, lipid abnormalities, and liver dysfunction for males.

Mental health disturbances increased the risks of liver dysfunction both for males and females.

Perceiving that the possibility of delayed health effects from radiation is high increased the risks of overweight for males but showed no association with the development of lifestyle diseases among females.

Participation in recreational activities decreased the risks of overweight, underweight, and liver dysfunction for males but increased the risks for renal dysfunction for females.

Table 1. Association between Lifestyle Habits and Disaster-related Factors Immediately after the Earthquake and Development of Lifestyle Diseases Thereafter

	Overweight		Underweight		Hypertension		Diabetes		Lipid abnormality		Liver dysfunction		Renal dysfunction	
	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females
Older age		↑	↑	↓	↑	↑	↑	↑		↑	↓	↑	↑	↑
Being overweight	-	-	-	-	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
Being underweight	-	-	-	-	↓	↓		↓	↓	↓				
Exercise habit (exercising twice or more per week)									↓		↑			
Almost satisfied with sleep								↓						
Drinking habit in the past		↑												
Drinking habit at present (alcohol intake less than 44 g per day)			↓		↑			↓	↓	↓				
Drinking habit at present (alcohol intake over 44 g per day)					↑	↑			↓		↑	↑	↓	
Smoking habit in the past							↑		↑				↑	
Smoking habit at present			↑	↑			↑		↑					
Experience of living in an evacuation center or temporary housing		↑			↑				↑	↑	↑	↑		
Experience of a job change	↑		↓	↓			↑		↑		↑			
Having mental disturbances											↑	↑		
Suspected to have traumatic stress														
Perceiving that the possibility of radiation health effects is high	↑													
Participation in recreational activities	↓		↓								↓			↑

* "-" in the table means that the analysis was not conducted and a blank space means that no association was found.

Given these, overdrinking increases the risks of hypertension and liver dysfunction, and smoking increases the risks of diabetes and lipid abnormalities for males, as has long been pointed out. In particular, overweight is a risk factor relating to many types of lifestyle diseases.

This analysis newly revealed the possibility that the experience of living in an evacuation center or temporary housing, experience of a job change and mental health disturbances, etc., due to the earthquake and subsequent evacuation may have an association with the development of various lifestyle diseases thereafter. On the other hand, for males, participation in recreational activities may decrease the risks of overweight, underweight, and liver dysfunction.

Drinking is found to have some association with decreases in the risks of certain types of lifestyle diseases, but that does not mean that drinking is positively recommended. Additionally, as smoking is known to increase the risks of many diseases, it is preferable not to smoke. The results of this analysis are based specifically on data from people who received health checks and also responded to the Mental Health and Lifestyle Survey, and may not apply to all residents.

4. Conclusion

The types of lifestyle diseases covered by this analysis are risk factors leading to stroke, ischemic cardiac diseases, and frailty; therefore, it is imperative to prevent the worsening of relevant symptoms and make improvements in order to extend residents' healthy life expectancy. The results of the analysis suggest the

possibility that disaster-related factors, including evacuation, have been increasing the risks of lifestyle diseases, in addition to other risk factors conventionally pointed out, such as overweight and older age. Accordingly, it is considered important to give due consideration to ensure residents' mental health care and promote their social participation when taking measures against lifestyle diseases, in addition to conventional measures. As some analysis results need to be examined further, we need to continue surveys to examine the association of various factors over the medium- to long-term and conduct more detailed data analysis.
* As reference, overall analysis results for both males and females are shown in Figure 1 to Figure 7 below.

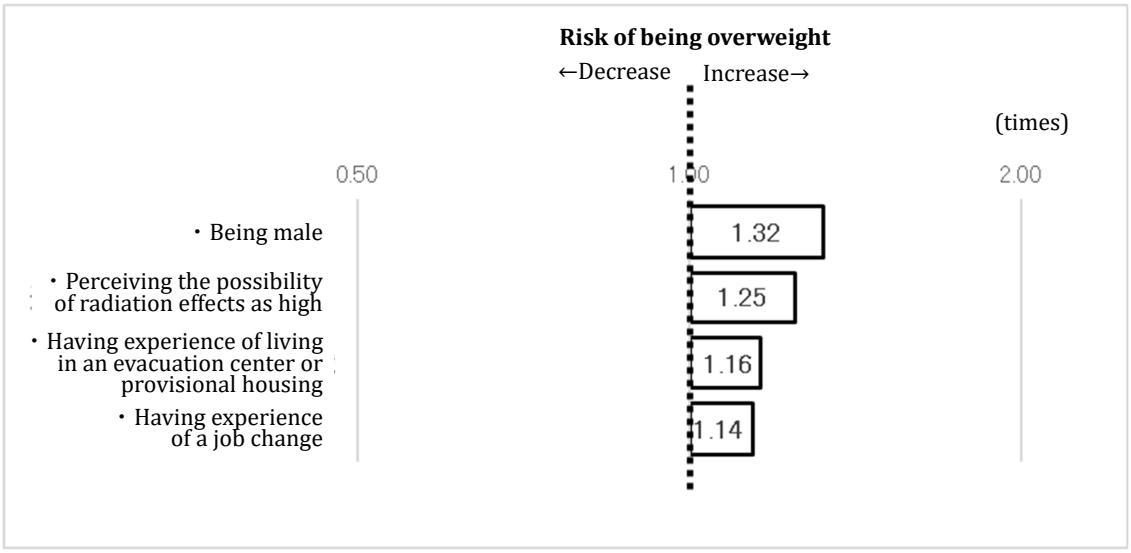


Figure 1. Factors related to being overweight after the earthquake (overall)

* Overweight: Body Mass Index (BMI): 25 kg/m^2 or over
* Values in the figure show the risk levels when assuming that risks due to the factors of being female, having no experience of living in an evacuation center or provisional housing, perceiving the possibility of radiation effects as low, and having no experience of a job change are 1, respectively.
* As overall data covering both males and females were analyzed, results may differ from those for the analysis by sex.

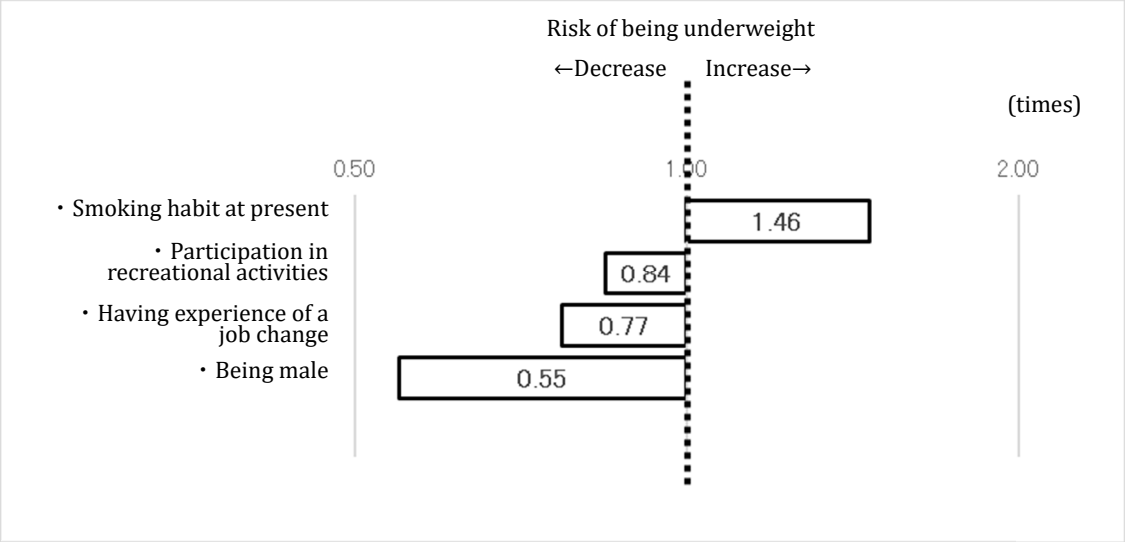


Figure 2. Factors related to being underweight after the earthquake (overall)

* Underweight: Body Mass Index (BMI): Less than 18.5 kg/m^2
* Values in the figure show the risk levels when assuming that risks due to the factors of never having a smoking habit, no participation in recreational activities, having no experience of a job change, and being female are 1, respectively.
* As overall data covering both males and females were analyzed, results may differ from those for the analysis by sex.

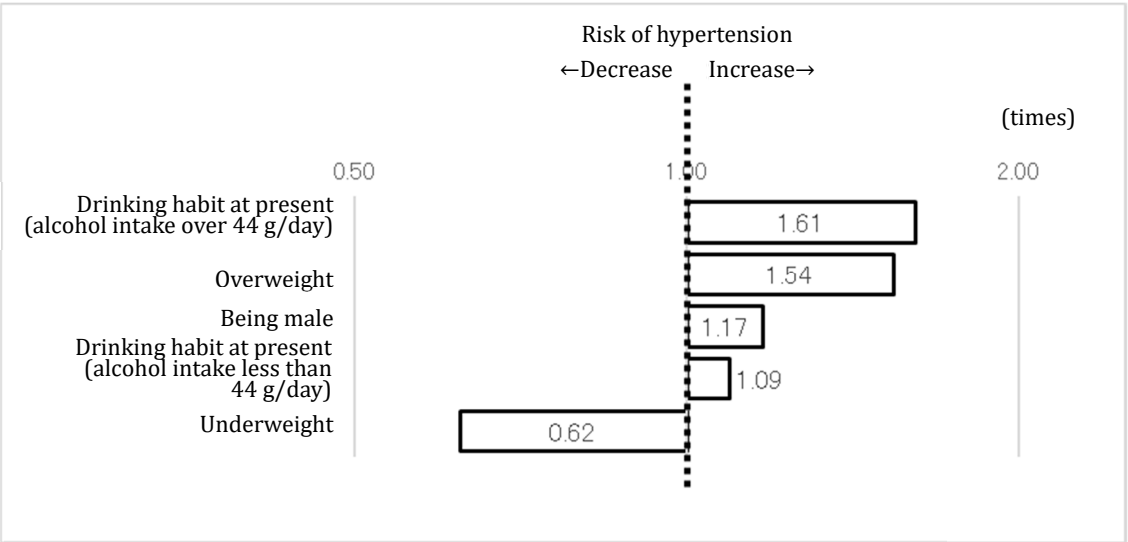


Figure 3. Factors related to hypertension after the earthquake (overall)

* Hypertension: Systolic blood pressure of 140 mmHg or over, diastolic blood pressure of 90 mmHg or over, or being treated using blood pressure drugs
* Values in the figure show the risk levels when assuming that risks due to the factors of never having a drinking habit, standard somatotype (BMI between 18.5 kg/m^2 and 25 kg/m^2), and being female are 1, respectively.
* As overall data covering both males and females were analyzed, results may differ from those for the analysis by sex.

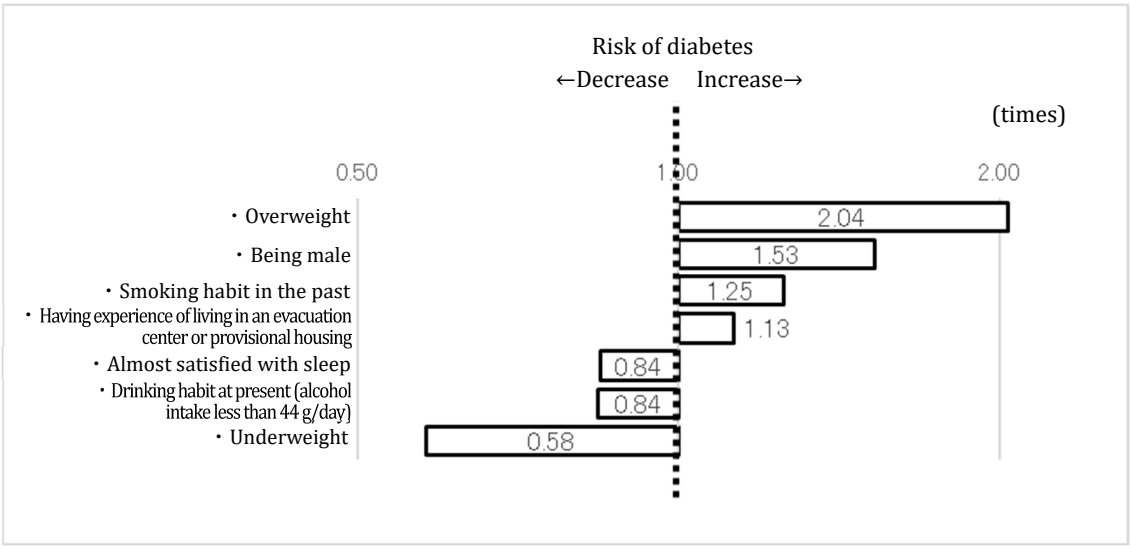


Figure 4. Factors related to diabetes after the earthquake (overall)

* Diabetes: Fasting blood glucose level of 126 mg/dL or over, casual blood glucose level of 200 mg/dL or over, HbA1c level of 6.5% or over (based on the NGSP), or being treated using hypoglycemic drugs, etc.
* Values in the figure show the risk levels when assuming that risks due to the factors of standard somatotype (BMI between 18.5 kg/m^2 and 25 kg/m^2), being female, never having a smoking habit, having no experience of living in an evacuation center or provisional housing, significant dissatisfaction with sleep, and never having a drinking habit are 1, respectively.
* As overall data covering both males and females were analyzed, results may differ from those for the analysis by sex.

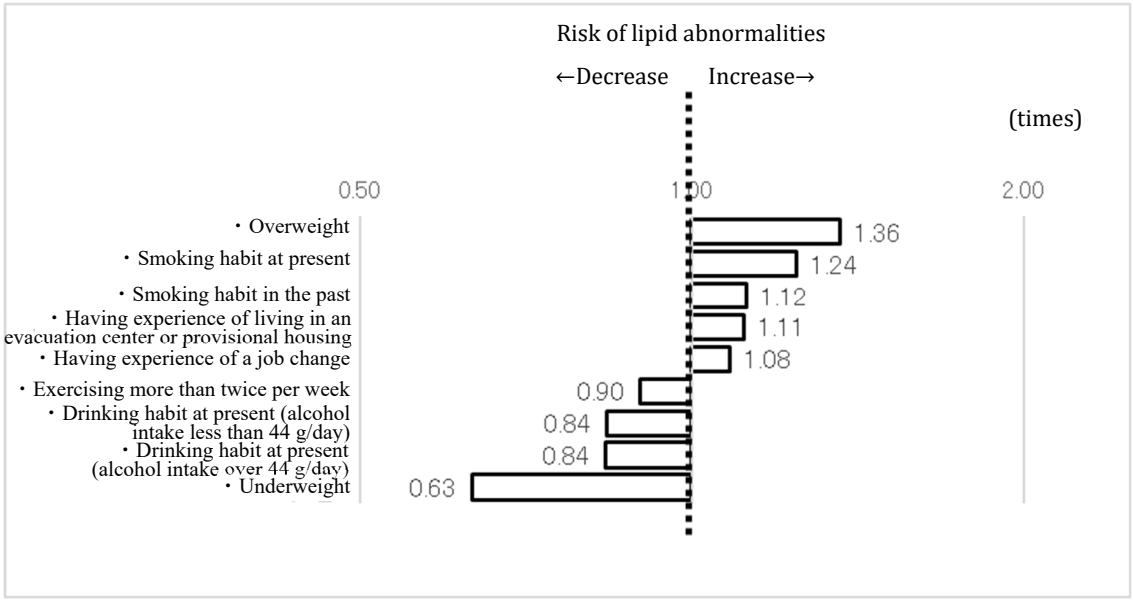


Figure 5. Factors concerning lipid abnormalities after the earthquake (overall)

* Lipid abnormalities: HDL cholesterol of less than 40 mg/dL, LDL cholesterol of 140 mg/dL or over, fasting triglycerides of 150 mg/dL or over, or being treated for lipid abnormalities
* Values in the figure show the risk levels when assuming that risks due to the factors of standard somatotype (BMI between 18.5 kg/m^2 and 25 kg/m^2), never having a smoking habit, having no experience of living in an evacuation center or provisional housing, having no experience of a job change, fitness habit of exercising less than twice per week, and never having drinking habit are 1, respectively.
* As overall data covering both males and females were analyzed, results may differ from those for the analysis by sex.

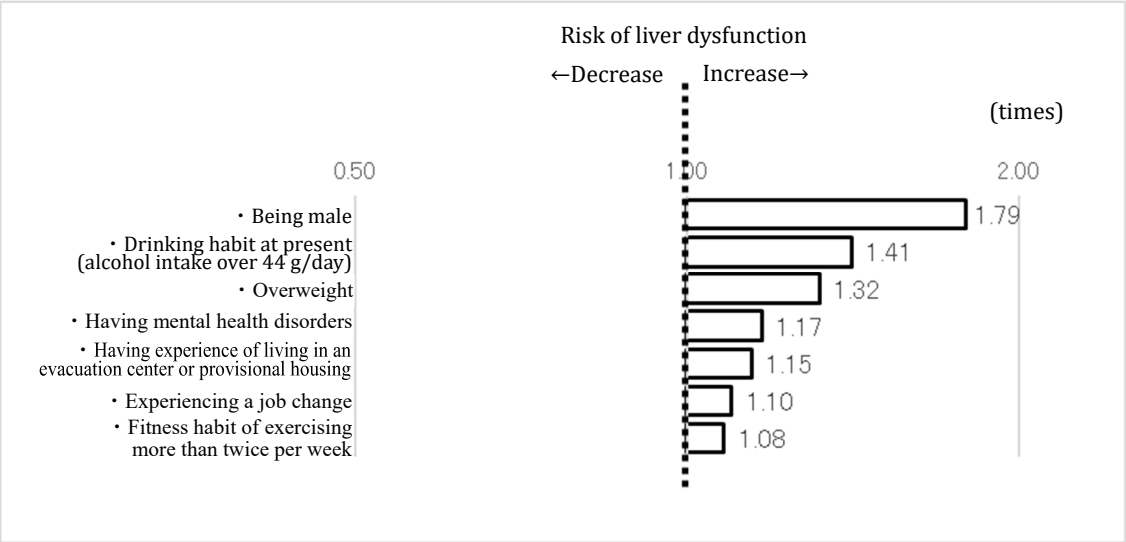


Figure 6. Factors concerning hepatic dysfunction after the earthquake disaster (overall)

* Hepatic dysfunction: AST level of 31 U/L or over, ALT level of 31 U/L or over, or γ-GT level of 51 U/L or over
* Values in the figure show the risk levels when assuming that risks due to the factors of being female, never having a drinking habit, standard somatotype (BMI between 18.5 kg/m^2 and 25 kg/m^2), having no mental health disorders, having no experience of living in an evacuation center or provisional housing, having no experience of a job change, and a fitness habit of exercising less than twice per week are 1, respectively.
* As overall data covering both males and females were analyzed, results may differ from those for the analysis by sex.

Utilization of the Results of the Comprehensive Health Check

Holding of Health Seminars

1. Purpose

Since FY2016, we have held Heath Seminars, on occasions such as events organized by the covered municipalities, with the aim of deepening residents' understanding of the significance of receiving a health check every year and offering support to encourage them to continue receiving health checks.

Before commencing Health Seminars, the Radiation Medical Science Center for the Fukushima Health Management Survey took the initiative and held sessions for explaining Comprehensive Health Check results. However, based on the awareness that collaboration with the municipalities would be important, we developed these sessions into Health Seminars in FY2016.

2. Method

Municipalities that wish to hold a Health Seminar are to select the content in accordance with the purpose of their events, etc., and file an application with Fukushima Medical University. The venue, date, and method of providing information to covered residents are decided by separate consultation with a relevant municipality.

3. Content

(i) Health lecture by physicians (example themes: Tips for extending one's healthy life span, What can be seen from health check results, How to prevent hypertension and diabetes, etc.)
(Slides used in such a lecture are as shown in the Attachment.)
(ii) Private explanation and consultation concerning health check results by experts (nurses, public health nurses, dietitians, etc.)
(iii) Health exercises by physical therapists
(iv) Blood pressure measurement
(v) Blood sugar measurement
(vi) Matters concerning the Mental Health and Lifestyle Survey, Fukushima Health Management Survey
(vii) Exhibition of panels including results of the Comprehensive Health Check
(Panels are as shown in the Attachment.)

4. Implementation Status

- FY2016: 11 times in 3 municipalities; 495 participants
- FY2017: 42 times in 6 municipalities; 2,379 participants
- FY2018: 26 times in 6 municipalities; 2,324 participants
- FY2019: 38 times in 6 municipalities; 3,334 participants
- FY2020: 17 times in 3 municipalities * The number of times decreased due to the impact of the COVID-19 infection.

(Implementation status by municipality is as shown in the Attached Table.)

5. Collaboration with Relevant Organizations

For blood sugar measurement, experts are dispatched with cooperation from the Fukushima Association of Medical Technologists. Additionally, we seek cooperation from the Fukushima Medical Association and other relevant organizations as necessary, thereby endeavoring to hold Health Seminars in line with the requests of individual municipalities.

Attachment
Slides Used in a Health Lecture by a Medical Doctor (extract)

福島県「県民健康調査」の
結果について
（〇〇町編）

令和２年〇月〇日
〇〇町健診結果説明会

公立大学法人福島県立医科大学
放射線医学県民健康管理センター

1

〇〇町の健康について
県民健康調査「健康診査」の
結果からわかること

（震災後７年間の比較）

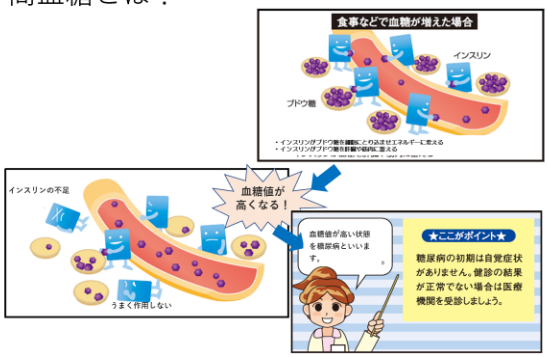
11

〇〇町の健康について
県民健康調査「健康診査」と
「こころの健康度・生活習慣に関する
調査」の結果からわかること

（生活習慣と健診結果の比較）

14

高血糖とは？



23

予防法１（健診・検診の受診）

●HbA1c（ヘモグロビン・エイワンシー）
過去１～２か月の血糖値の平均的な状態がわかる。
食事や運動の影響は受けないので、食事の有無に関わらず糖尿病や糖尿病のなりやすさを判定できます。

●糖尿病になりやすい数値
HbA1c　：　5.6%以上(NGSP値)
空腹時血糖：　100mg/dL以上
随時血糖　：　140mg/dL以上
※あてはまる方は、再検査を受けてください。

30

予防法２（食事）

●食生活の見直し
①総摂取カロリーを抑える（食事は腹八分）
②外食を減らす
③栄養のバランスを考える
（一度にたくさん食べず、
何度かに分けて、
多くの食材を、
ゆっくり規則正しく食べる。
アルコールの摂取を控える）

32

予防法３（運動）

高血圧症、脂質異常症などの
既往症がある方は、
必ず主治医に相談してから運動
をしてください。

①たとえば
ラジオ体操、ウォーキング、家事等
少し息があがるくらいの運動が良い。
歩く速度をいつもより早めることも効果的。
②運動量の目安
平日30分、休日60分を目安に、週3回以上。
毎日3食後10分程度の運動をするだけでも効果あり。

34

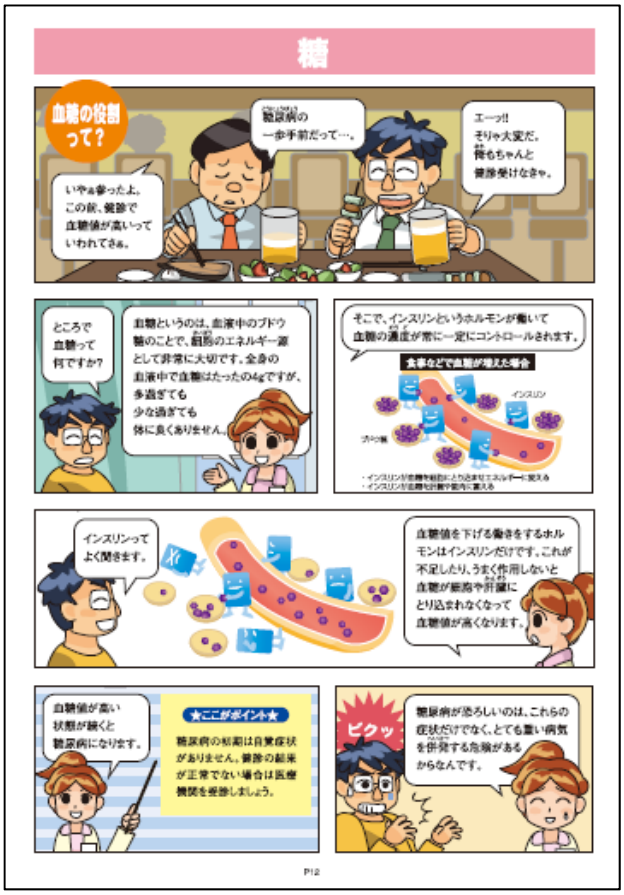
予防法４（相談）

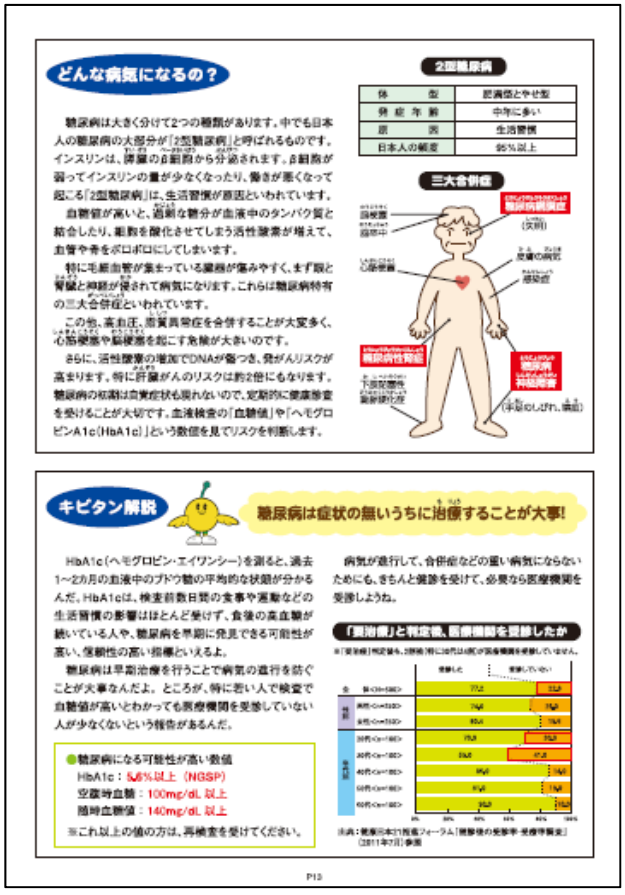
●健診結果だけでなく、日ごろの悩みを話せる相手をみつけてみましょう。

・たとえば
かかりつけ医
〇〇町の保健師さん
地域のサロンで知り合った方等

8

Attachment
Panels Exhibited at a Health Seminar (extract)





Attached Table
Implementation Status of Health Seminars by Municipality

[FY2016] 11 times

Municipality	Event	Number of times	Content
Hirono Town	Health Check Results Explanation Session	1	・Lectures by physicians ・Blood pressure/blood glucose measurement ・Body composition measurement
	Health Festival	1	・Private consultations by physicians ・Blood glucose measurement
Tamura City	Tamura City Health University	1	・Lectures and private consultations by physicians ・Private consultations by experts ・Blood pressure/blood glucose measurement
Futaba Town	Session to Return and Explain Health Check Results	8	・Lectures and private consultations by physicians ・Private consultations by experts

[FY2017] 42 times

Municipality	Event	Number of times	Content
Iitate Village	Health Check Results Explanation Session	11	・Lectures by physicians ・Lectures by physical therapists ・Private consultations by experts
Kawauchi Village	General Health Check	3	・Health exercises
	Session to Return General Health Check Results	4	・Lectures by physicians ・Private consultations by experts ・Blood pressure measurement ・Health exercises
Hirono Town	Health Check Results Explanation Session	2	・Lectures by physicians ・Blood pressure/blood glucose measurement
	Hirono Health Walk	1	・Blood glucose measurement ・Health exercises, lectures
	Health Festival	1	・Blood pressure measurement ・Blood glucose measurement
Naraha Town	General Health Check	9	・Private consultations by experts ・Matters concerning mental health
Tamura City	Tamura City Health University	2	・Lectures by physicians ・Private consultations by experts ・Health exercises ・Blood pressure/blood glucose measurement
Futaba Town	Session to Return and Explain Health Check Results	7	・Lectures by physicians ・Private consultations by experts
	Diabetes Class	2	・Blood glucose measurement

[FY2018] 26 times

Municipality	Event	Number of times	Content
Iitate Village	General Health Check	5	・Matters concerning the Mental Health and Lifestyle Survey ・Panel exhibition (Comprehensive Health Check and Mental Health and Lifestyle Survey)
	Health Check Results Explanation Session	4	・Private consultations by experts ・Panel exhibition (Comprehensive Health Check)
Naraha Town	General Health Check	7	・Private consultations by experts ・Panel exhibition (Comprehensive Health Check)
	Healthy-Up Class	1	・Lectures by physicians ・Private consultations by experts ・Blood glucose measurement
Hirono Town	Health Check Results Explanation Session	1	・Blood pressure/blood glucose measurement (vascular age, body composition analysis) ・Panel exhibition
	Health Festival	1	・Blood pressure/blood glucose measurement ・Panel exhibition (Comprehensive Health Check)
Kawauchi Village	Health Check Result Reporting Session	4	・Lectures by physicians ・Private consultations by experts ・Blood pressure measurement
Tamura City	Public Lecture for Health Promotion	1	・Lectures by physicians ・Private consultations by experts ・Blood pressure/blood glucose measurement
Futaba Town	Health Promotion Support Class	2	・Blood glucose measurement ・Panel exhibition (Comprehensive Health Check)

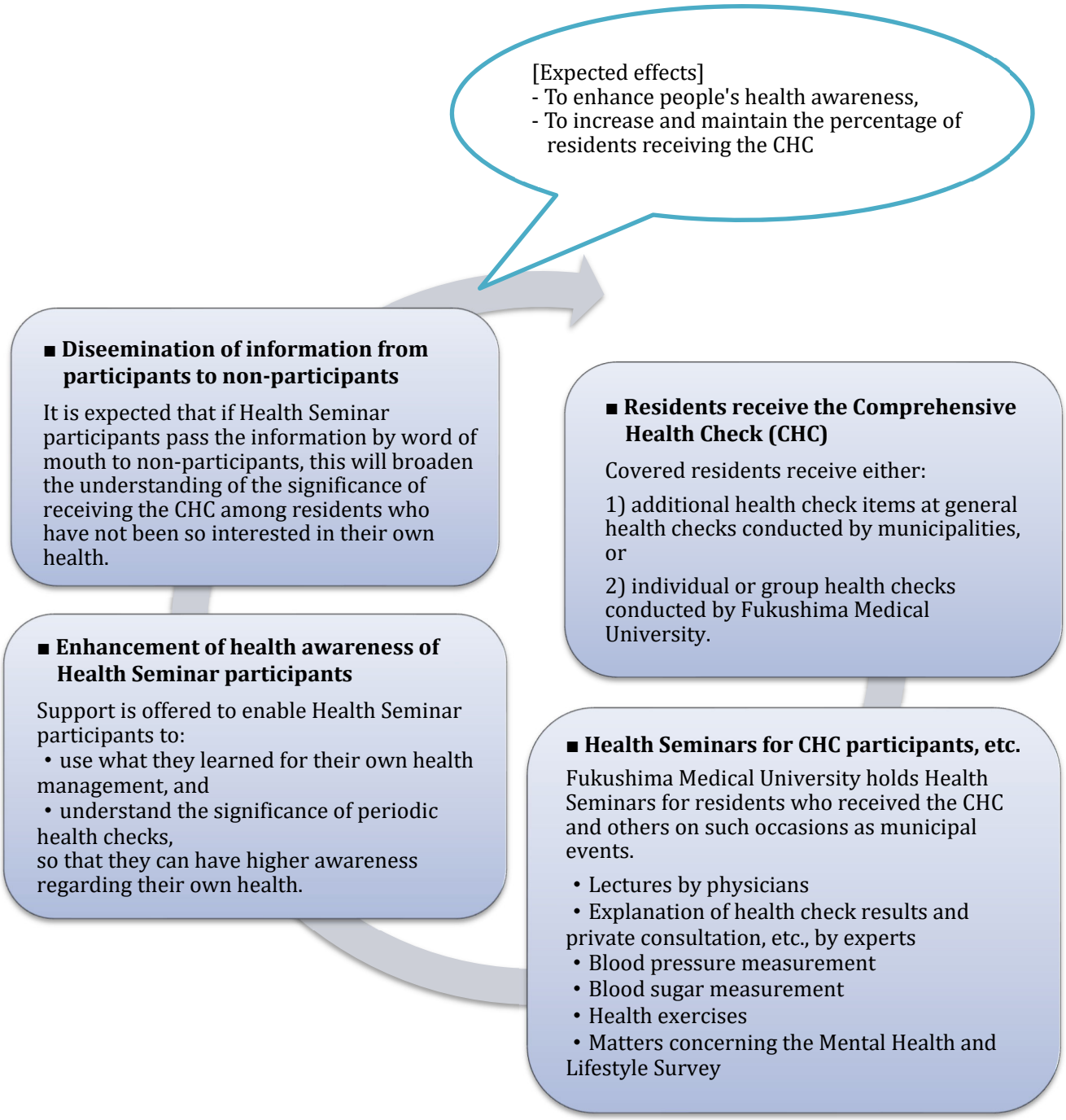
[FY2019] 38 times

Municipality	Event	Number of times	Content
Iitate Village	General Health Check	7	・Matters concerning the Mental Health and Lifestyle Survey ・Panel exhibition (Comprehensive Health Check)
Naraha Town	Healthy-Up Class	6	・Lectures by physicians ・Private consultations by experts ・Blood glucose measurement
	General Health Check	7	・Private consultations by experts ・Panel exhibition
	Health Check Results Explanation Session	4	・Lectures by physicians ・Private consultations by experts
Kawauchi Village	Health Check Results Explanation Session	5	・Lectures by physicians ・Private consultations by experts ・Blood pressure measurement
Futaba Town	Health Class by Clinical State	1	・Blood glucose measurement
	Session to Return and Explain Health Checkup Results	5	・Health exercises
Tamura City	Public Lecture for Health Promotion	1	・Lectures by physicians ・Private consultations by experts ・Blood pressure/blood glucose measurement
Hirono Town	Health Check Results Explanation Session	1	・Blood pressure/blood glucose measurement ・Panel exhibition
	Health Festival	1	・Blood pressure/blood glucose measurement ・Panel exhibition

[FY2020] 17 times

Municipality	Event	Number of times	Content
Naraha Town	General Health Check	8	・Private consultations by experts ・Panel exhibition
	Private Health Consultation Session	7	・Private consultations by experts ・Panel exhibition
Hirono Town	Health Check Results Explanation Session	1	・Private consultations by experts ・Blood pressure measurement
Tamura City	Public Lecture for Health Promotion	1	・Lectures by physicians ・Private consultations by experts ・Blood pressure measurement

<< Reference: Conceptual Drawing >>



Utilization of the Results of the Comprehensive Health Checkup

Preparation of Leaflets

In order to stimulate interest in good health, we prepare leaflets compiling what emerged from health check results and send a copy thereof together with a notice on group and individual health checks to eligible persons aged 16 or older. The leaflet theme changes every year, and we prepared a leaflet for FY2020 under the theme of "The Basis of Your Diet."
(The leaflet for FY2020 is shown below.)

「食の基本=バランスがとれた食生活」から健康づくりをはじめよう

※医師の指導を受けている方や健康に不安のある方が実践する際には、事前に医師と相談してください。

食の基本=バランスがとれた食生活※8「主食・主菜・副菜」+「減塩」の実践

～生活習慣病※9の予防・改善が期待できます～

心身ともに健康を保つにはバランスがとれた食生活が大切ですが、ライフスタイルの多様化によりバランスの崩れや不規則な食生活になりがちなケースも考えられ、生活習慣病の発症につながることが懸念されています。生活習慣病は、食生活と密接に関係していることから、健康的な食生活「食の基本=バランスがとれた食生活」を実践して健康づくりをはじめましょう。

主食
脳や身体を動かす
- ごはん
- パン
- 麺
- 麺類
- シリアル

…など

主菜
身体をつくる
- 大豆製品（豆腐、納豆等）
- 魚
- 肉（肉類、ハム、ソーセージ等）
- 卵
- 乳製品（牛乳、チーズ、ヨーグルト）

…など

副菜
身体の調子を整える
- 野菜
- きのこ
- 海藻
- みそ汁、スープ
- 果物

…など

主食・主菜・副菜のそろった食事ってどんな食事?

主菜
たんぱく質の供給源となる肉、魚、卵、大豆および大豆製品などを主材料とする料理

副菜
各種ビタミン、ミネラルおよび食物繊維の供給源となる野菜、いも、豆類（大豆を除く）、きのこ、海藻などを主材料とする料理

主食
炭水化物の供給源であるごはん、パン、麺、パスタなどを主材料とする料理

食事を作ったり、選んだりするときに、主食、主菜、副菜を組み合わせることを意識すると、栄養面をはじめ、見た目にもバランスの良い食事になります。

※8　バランスがとれた食生活「主食・主菜・副菜」については、農林水産省のホームページ掲載のパンフレット等を参考に作成。
※9　生活習慣病は食事、運動、飲酒、喫煙、睡眠等の生活習慣の乱れや偏りが関連する病気の全般のことをいいます。代表的な病気としては、がん、脳血管疾患、心筋梗塞、高血圧、糖尿病などが挙げられます。
生活習慣病はわが国の死亡原因の6割を占めており、福島県でも生活習慣病で亡くなる人が多いことがわかっています。

課題※10　食事バランスの乱れ　塩分のとりすぎ　若い世代の野菜摂取不足

※10　福島県の「第二次健康ふくしま21計画 改訂版（2019年5月）より

減塩をはじめよう

減塩のポイント

つけて食べる	しょうゆなど調味料はつけて食べる
香辛料、酸味	しょうゆ、塩を減らして、七味やレモン汁、生姜などの薬味をつかう
汁は残す	カップラーメンの汁は残す
減塩の調味料	減塩しょうゆ、減塩みそをつかう

ベジファーストをはじめよう

食事のときに野菜から食べ始める「ベジ・ファースト」は手軽に実践でき、メタボリックシンドロームを始めとする生活習慣病の予防に効果があるといわれています。

ベジ・ファーストって何?
食事のときに、野菜から食べ始めることです。たとえば…。
◎サラダや野菜の小鉢を食べてから、メインの料理を食べる。
◎丼や麺類のトッピングや具の野菜から食べ始める。

健康状態を把握しよう!

健康づくりの2つのポイント

Point 1 「じっとしていない」を意識しよう ～日常生活で手軽にできること～

運動は消費エネルギーを増やす、脂肪を燃焼させる、脂肪を分解する、筋肉量を増やす、などの効果があり、
内臓脂肪を減らすのに効果的です。
内臓脂肪を減らすためには、激しい運動を行う必要はありません。
運動が苦手でも、じっとしている時間を減らすだけで十分効果が得られます。

日常生活で

- 家の中のそうじ
- 大きな店で ウインドウショッピング
- 散歩したあとに 買い物
- 子どもと 活動的に遊ぶ

これらの積み重ねが内臓脂肪を減らすのに大きく役立ちます。

職場などで

- 遠い場所のトイレを使用する
- 積極的に階段を使用する
- 休憩時間中に散歩をする
- 駐車は建物の入り口からなるべく遠く

※治療中の病気やけががあったり、体調に不安があるときは、まず医師に相談してから始めましょう。
※無理をせず、自分のペースで行い、痛みを感じた場合は活動を中止し、医師に相談しましょう。

Point 2 睡眠にも気を配ろう ～睡眠不足は肥満のもと～

睡眠も肥満と関係があります。
睡眠不足になると、食欲を高めるホルモン(グレリン)の分泌が増加する一方、
逆に食欲を抑えるホルモン(レプチン)の分泌が減少します。
そのため、おなかが空きやすく、
食欲が増してしまうため
肥満になりやすくなります。

睡眠不足 食欲増加ホルモン UP ／ 食欲抑制ホルモン DOWN

良い睡眠を取るためのポイント

- ○ アルコールの摂取は控えめにする
- ○ 寝る直前までスマートフォンやパソコンを使わない
- ○ 起きたらまず日光を浴びる&1日3食規則正しく →体内時計のリセット
- ○ 就寝前3～4時間以内の激しい運動を避ける

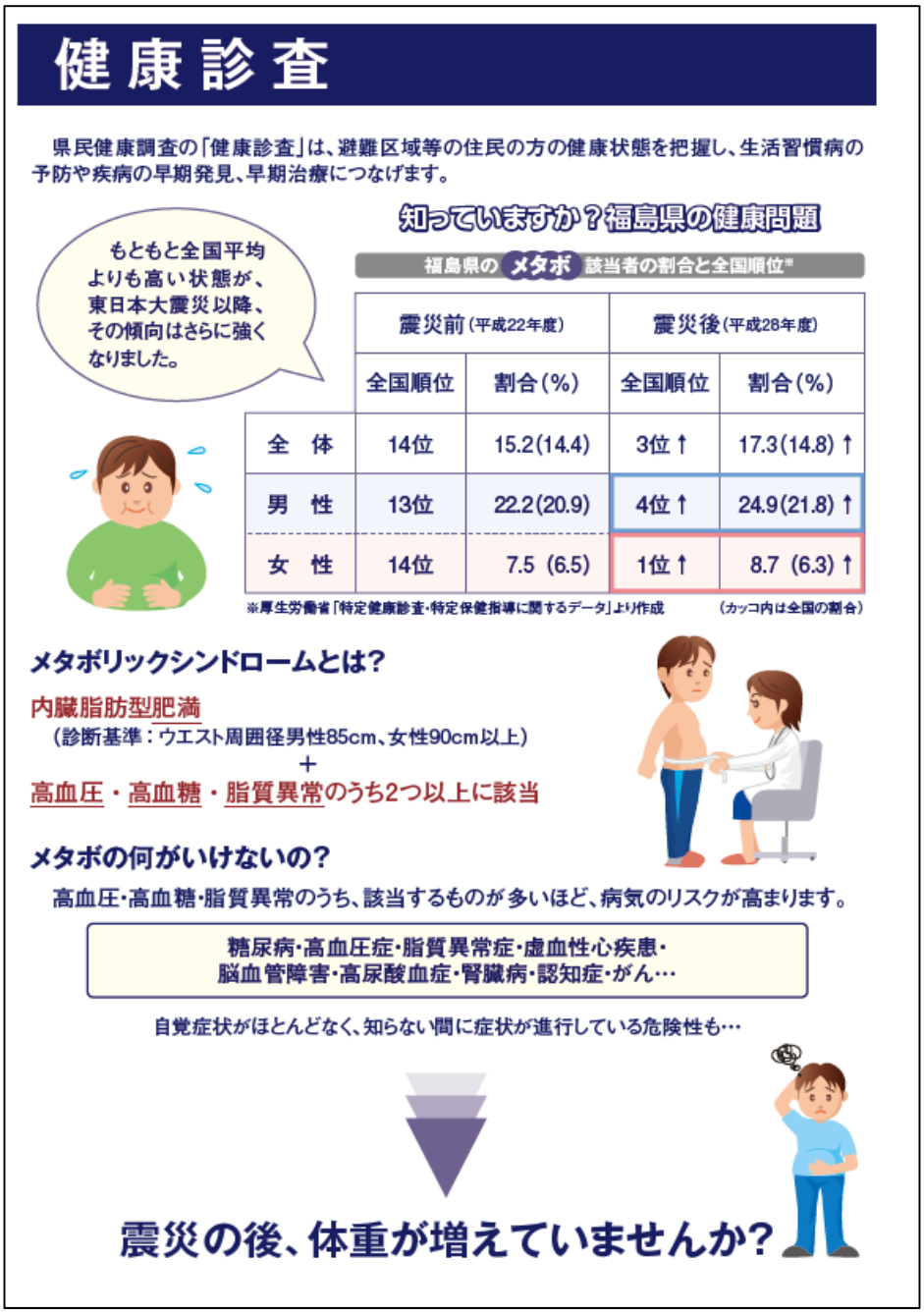
などなど、無理はせず、できることからはじめていきましょう。

日々の健康づくりには、「ふくしま健民アプリ」を活用してはいかがでしょうか?

Utilization of the Results of the Comprehensive Health Check

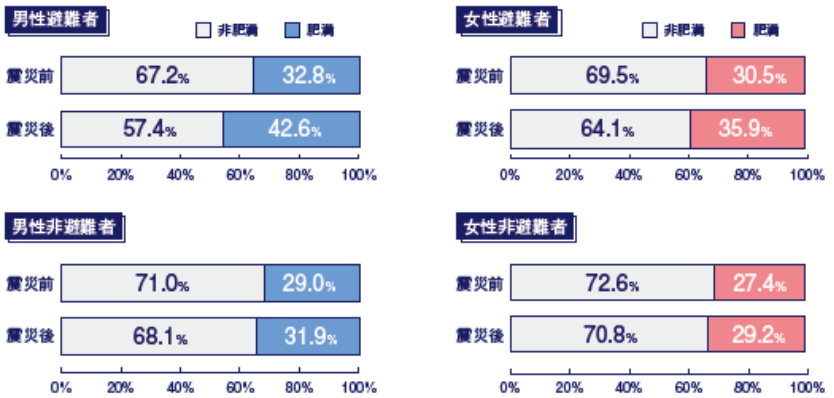
Example of Panel Exhibition at an Event
(Iki Iki Kenkozukuri (Live with Vitality) Forum)

At the "Iki Iki Kenkozukuri (Live with Vitality) Forum," which was held by the Health Promotion Center of Fukushima Medical University on February 11, 2020, the Radiation Medical Science Center for the Fukushima Health Management Survey established a booth and exhibited panels on the Comprehensive Health Check and other various surveys and conducted blood glucose measurements.
(The panels on the Comprehensive Health Check are shown below.)



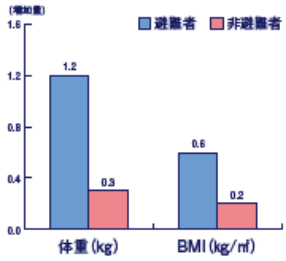
健康と避難の影響　「健康診査」の結果からわかったこと！

震災前後での肥満の割合の変化



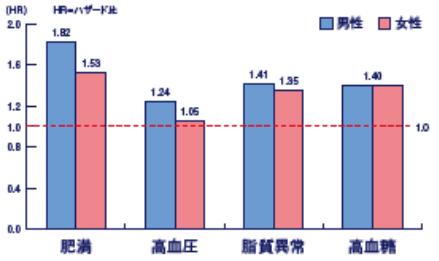
Ohira T, Asia Pacific J Public Health 2017

震災前後における体重とBMIの変化



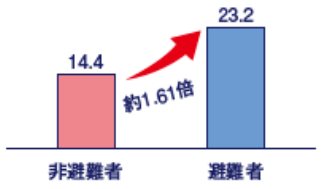
BMI＝体重(kg)÷身長(m)÷身長(m)
18.5未満なら「やせすぎ」25以上なら「肥満」です。
県民健康調査の研究成果
(American Journal of Preventive Medicine 2016)より

メタボ要因の新規発症における避難の影響



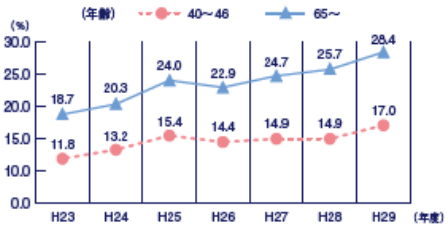
非避難者を基準として、避難者が何倍その病気にかかりやすいか?を示しています。
県民健康調査の研究成果
(Journal of National Institute of Public Health 2018)より

糖尿病発症率の比較(／1,000人年)



佐藤博亮らの研究(Diabetes and Metabolism 2017)より

HbA1c 6.0%以上※の割合の推移(全体)



※6.0～6.4%：糖尿病の疑いが否定できない。

Report on the Results of the FY2019 Comprehensive Health Check
Fukushima Health Management Survey
(Participants Aged 15 or Younger)

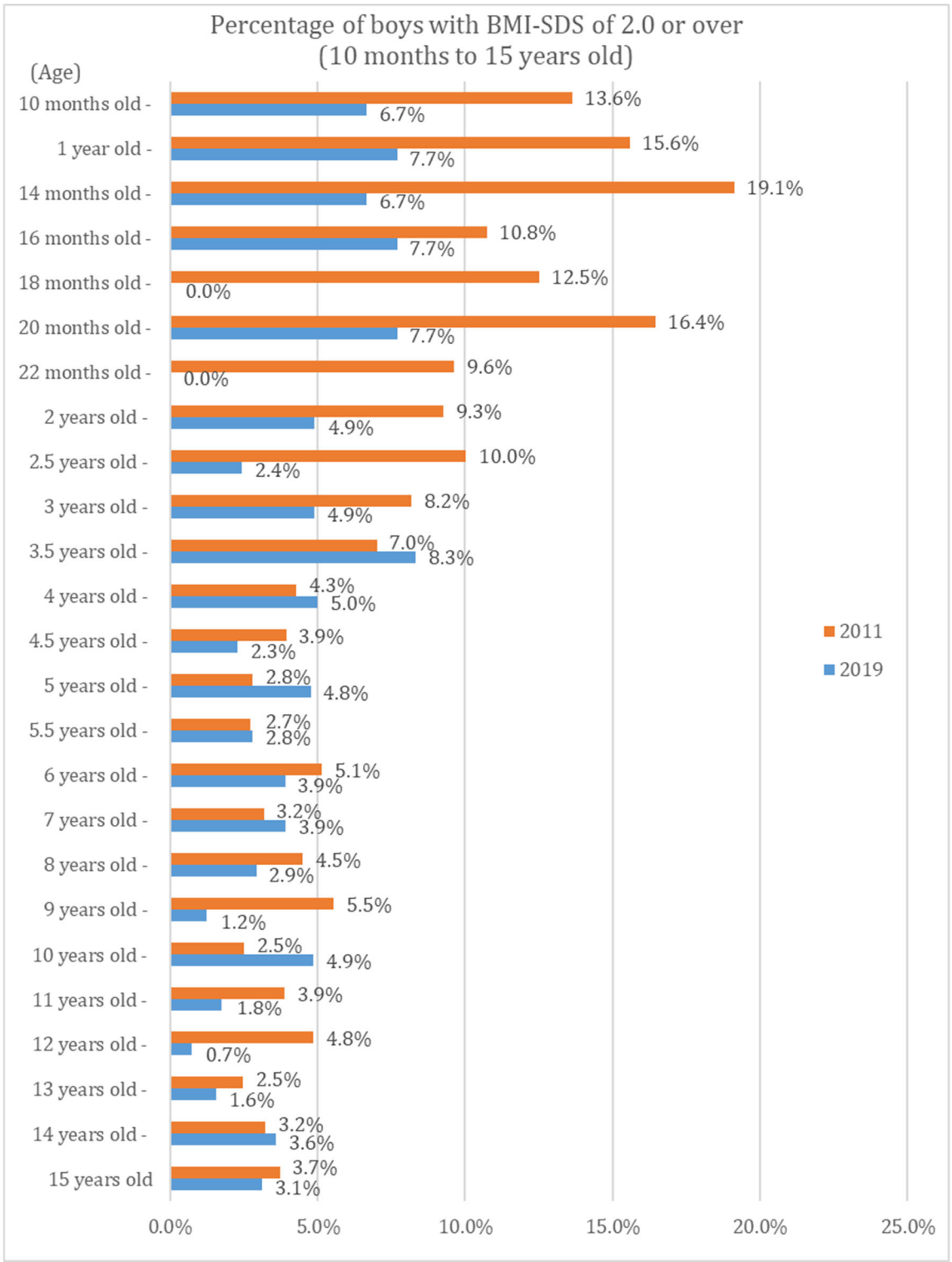
< Supplementary Notes >

* Pediatric Health Checks were conducted during the following period.
  FY2011 : January to March 2012
  FY2012 to FY2019 : July to December of each fiscal year
* We calculated Body Mass Index (BMI) and BMI Standard Deviation Score (BMI SDS) based on measured height and weight and compared results from FY2011 and FY2019.
* Results of blood tests vary substantially by age, but since participants were divided broadly into two age groups, 0 to 6 years and 7 to 15 years, year-by-year comparisons are not possible and definitive conclusions cannot be drawn.
* Rules for describing tabulation results are the same as those used for *Vital Statistics in Japan* by the Ministry of Health, Labour and Welfare.
  When there is no data: -
  When the ratio is minor (lower than 0.05): 0.0%
* Reference materials
  FY2011 to FY2014: Material 3-2 "Basic Statistics of CHC Results by Health Check Item" for the 21st Prefectural Oversight Committee Meeting for the Fukushima Health Management Survey
  FY2015 : Material 3-2 "Basic Statistics of CHC Results by Health Check Item" for the 26th Prefectural Oversight Committee Meeting for the Fukushima Health Management Survey
  FY2016 : Material 2-3 "Basic Statistics of CHC Results by Health Check Item" for the 30th Prefectural Oversight Committee Meeting for the Fukushima Health Management Survey
  FY2017 : Material 2-3 "Basic Statistics of CHC Results by Health Check Item" for the 34th Prefectural Oversight Committee Meeting for the Fukushima Health Management Survey
  FY2018 : Material 4-4 "Tabulation Results by Health Check Item" for the 37th Prefectural Oversight Committee Meeting for the Fukushima Health Management Survey

Physical Exam: BMI-SDS (Percentage of Overweight Participants)

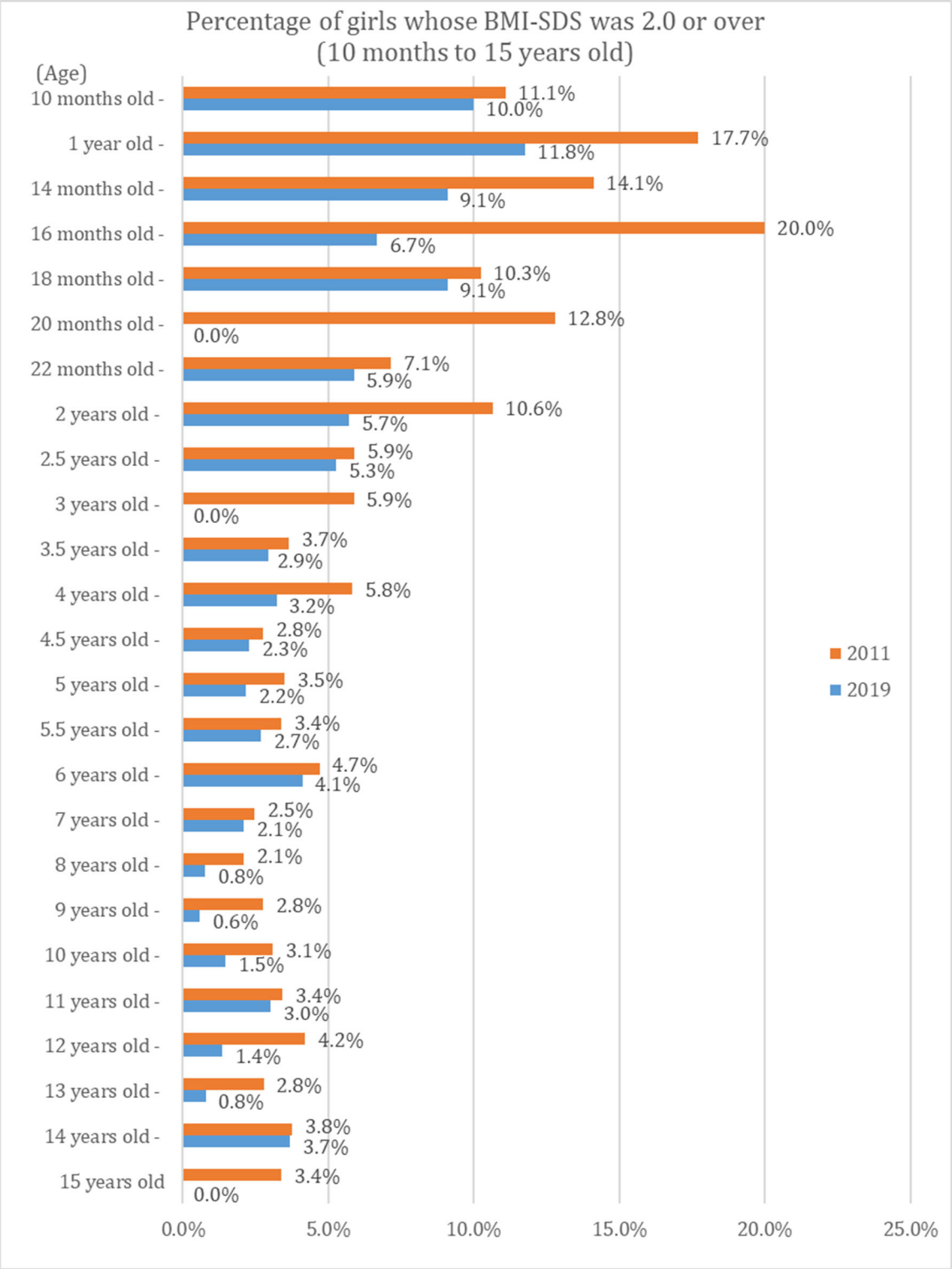
1. Results

Compared with the results for FY2011, the percentage of overweight boys in FY2019 was higher for those aged 3.5 to 4.5, those aged 5 to younger than 5.5, those aged 7, those aged 10, and those aged 14.
The percentage of overweight boys was almost the same in FY2011 and FY2019 for those aged 5.5 to younger than 6.



Cited file for calculation:
Growth Research Committee, The Japanese Association for Human Auxology/The Japanese Society for Pediatric Endocrinology: http://jspe.umin.jp/medical/chart_dl.html (final access on October 13, 2020)

The percentage of overweight girls was lower in FY2019 than in FY2011 for all age groups.



Cited file for calculation:
Growth Research Committee, The Japanese Association for Human Auxology/The Japanese Society for Pediatric Endocrinology: http://jspe.umin.jp/medical/chart_dl.html (final access on October 13, 2020)

2. Explanation of Health Check Item (BMI)

Body Mass Index (BMI) and BMI Standard Deviation Score (BMI SDS), based on measured height and weight, are indicators of obesity in children during their growth years.

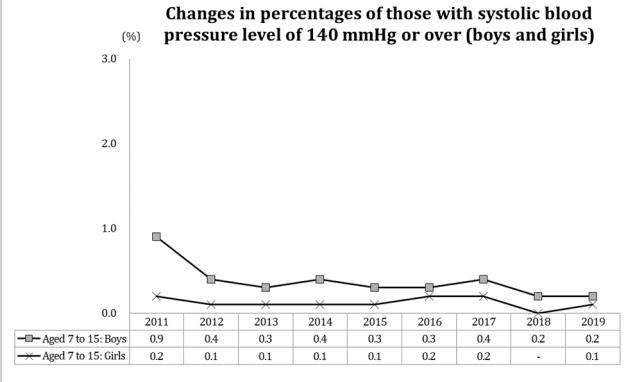
3. Action Threshold

Item	Overweight
BMI-SDS	≥ 2 SD

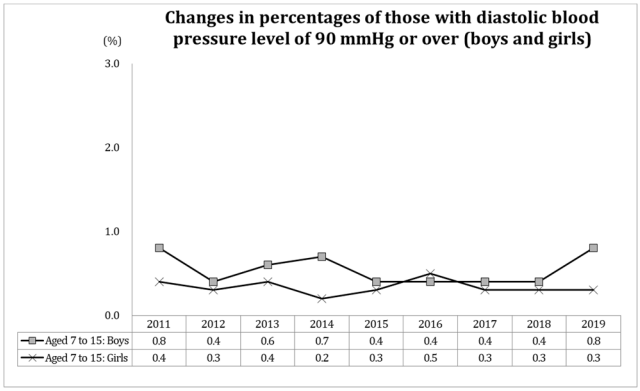
Physical Exam: Blood Pressure

1. Results

Hypertension was generally found more often among boys than among girls in all fiscal years. Among boys, the percentage of those with hypertension was the highest in FY2011, with a decline thereafter. However, boys' diastolic blood pressures approached FY2011 values in FY2019. No substantial changes in blood pressure levels were observed among girls.



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 7 to 15: Boys	0.9	0.4	0.3	0.4	0.3	0.3	0.4	0.2	0.2
Aged 7 to 15: Girls	0.2	0.1	0.1	0.1	0.1	0.2	0.2	-	0.1



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 7 to 15: Boys	0.8	0.4	0.6	0.7	0.4	0.4	0.4	0.4	0.8
Aged 7 to 15: Girls	0.4	0.3	0.4	0.2	0.3	0.5	0.3	0.3	0.3

2. Explanation of Health Check Item (Blood Pressure)

Blood pressure levels are measured to screen participants for hypertension.

3. Reference Intervals for Blood Pressure

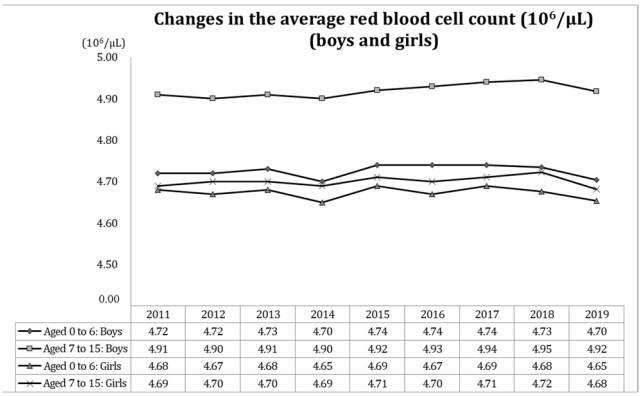
Age	Systolic blood pressure level (mmHg)		Diastolic blood pressure level (mmHg)	
	Boys	Girls	Boys	Girls
Newborns (1 day)	60-76	60-74	31-45	30-44
Newborns (4 days)	67-83	68-84	37-53	35-53
Infants (1 month)	73-91	74-94	36-56	37-55
Infants (3 months)	78-100	81-103	44-64	45-65
Infants (6 months)	82-102	87-105	46-66	48-68
Infants (1 year)	86-104	85-103	40-58	37-58
Children (aged 2)	88-105	88-106	45-63	42-61
Children (aged 7)	96-113	97-115	57-75	57-76
Young adults (aged 15)	110-127	113-131	65-83	64-83

Reference: Compliant with the "American Heart Association. PALS Provider Manual. AHA Guideline 2010" Japanese version, Tokyo: Synergy; 2013

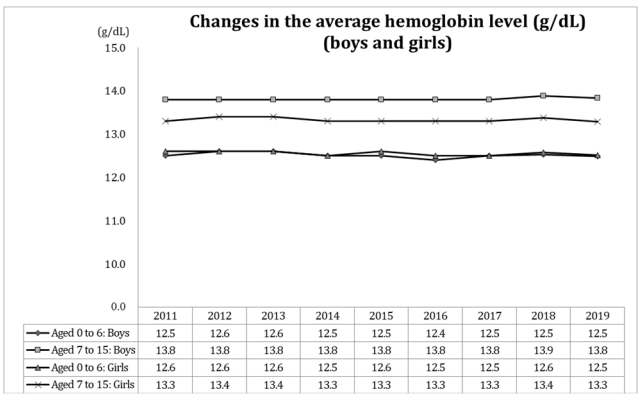
Peripheral Blood Test: Red Blood Cells, Hemoglobin, Hematocrit

1. Results

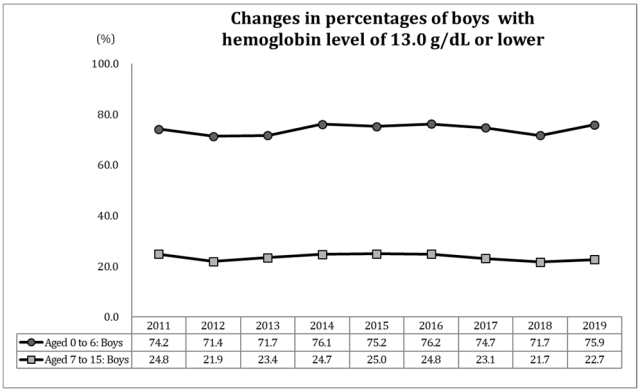
There were no substantial changes in red blood cell counts, hemoglobin, or hematocrit for either boys or girls in any age group.



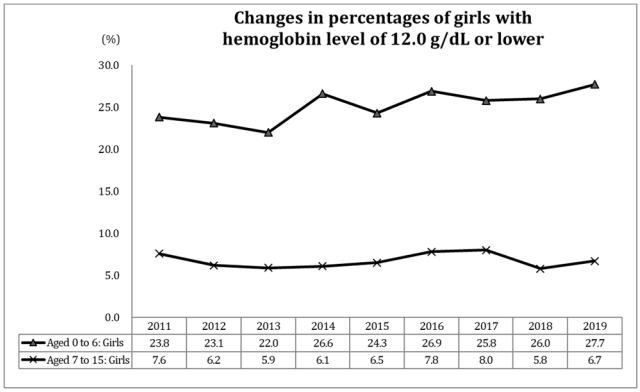
	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 0 to 6: Boys	4.72	4.72	4.73	4.70	4.74	4.74	4.74	4.73	4.70
Aged 7 to 15: Boys	4.91	4.90	4.91	4.90	4.92	4.93	4.94	4.95	4.92
Aged 0 to 6: Girls	4.68	4.67	4.68	4.65	4.69	4.67	4.69	4.68	4.65
Aged 7 to 15: Girls	4.69	4.70	4.70	4.69	4.71	4.70	4.71	4.72	4.68



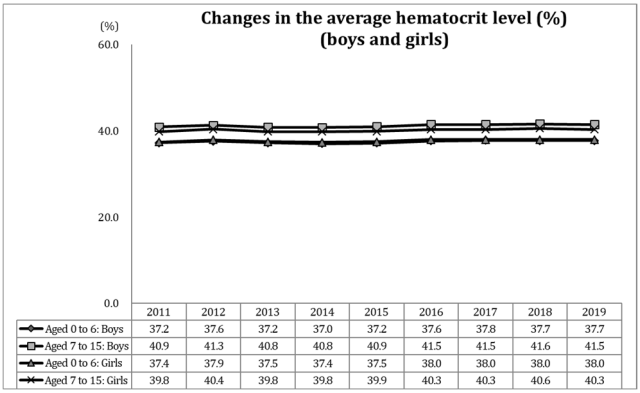
	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 0 to 6: Boys	12.5	12.6	12.6	12.5	12.5	12.4	12.5	12.5	12.5
Aged 7 to 15: Boys	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.9	13.8
Aged 0 to 6: Girls	12.6	12.6	12.6	12.5	12.6	12.5	12.5	12.6	12.5
Aged 7 to 15: Girls	13.3	13.4	13.4	13.3	13.3	13.3	13.3	13.4	13.3



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 0 to 6: Boys	74.2	71.4	71.7	76.1	75.2	76.2	74.7	71.7	75.9
Aged 7 to 15: Boys	24.8	21.9	23.4	24.7	25.0	24.8	23.1	21.7	22.7



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 0 to 6: Girls	23.8	23.1	22.0	26.6	24.3	26.9	25.8	26.0	27.7
Aged 7 to 15: Girls	7.6	6.2	5.9	6.1	6.5	7.8	8.0	5.8	6.7



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 0 to 6: Boys	37.2	37.6	37.2	37.0	37.2	37.6	37.8	37.7	37.7
Aged 7 to 15: Boys	40.9	41.3	40.8	40.8	40.9	41.5	41.5	41.6	41.5
Aged 0 to 6: Girls	37.4	37.9	37.5	37.4	37.5	38.0	38.0	38.0	38.0
Aged 7 to 15: Girls	39.8	40.4	39.8	39.8	39.9	40.3	40.3	40.6	40.3

* Hemoglobin levels of 13.0 g/dL or lower for boys and 12.0 g/dL or lower for girls are the criteria used for group and individual health checks for those aged 16 or older.

2. Explanation of Health Check Items (Red Blood Cells, Hemoglobin, Hematocrit)

Types and levels of anemia are examined.

3. Reference Intervals (from *Clinical Management of Laboratory Data in Pediatrics 2017*)

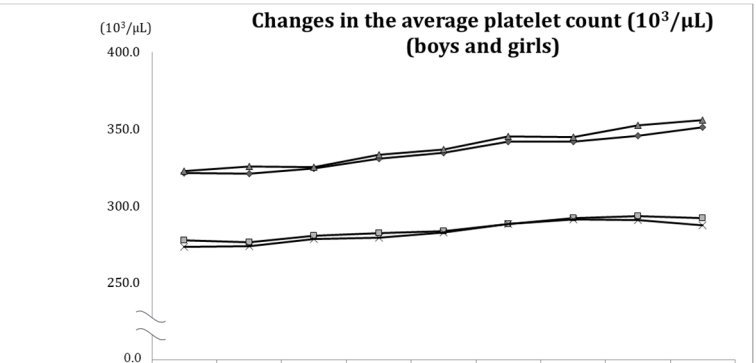
Age	Number of red blood cells ($\times 10^{12}$/L)	Hemoglobin level (g/dL)	Hematocrit level (%)
At birth	5.25±0.40	16.6±1.5	53±4.5
1 day old	5.14±0.60	19.0±2.0	58±5.5
1 week old	4.86±0.60	17.9±1.5	56±6.0
1 month old	4.10±0.60	14.2±2.0	43±6.0
3 months old	3.70±0.35	11.3±1.0	33±3.0
6 months old	4.60±0.35	12.3±1.0	36±3.0
12 months old	4.60±0.40	11.6±0.75	36±1.5
Aged 1 to 4	4.70±0.35	12.6±0.5	38±1.5
Aged 4 to 12	4.80±0.30	13.0±1.0	40±2.5
Adult males	5.40±0.35	16.0±1.0	47±3.0
Adult females	4.80±0.30	14.0±1.0	42±2.5

* Average value ± standard deviation
* By international consensus, red blood cell counts are expressed as numbers $\times 10^{12}$/L or $\times 10^{6}$/μL).

Peripheral Blood Test: Platelet Count

1. Results

There were no substantial changes in platelet counts for either boys or girls in any age group.



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 0 to 6: Boys	321.2	321.1	324.4	330.9	334.5	341.8	341.7	345.7	351.3
Aged 7 to 15: Boys	277.4	276.3	280.5	282.1	283.6	288.1	292.2	293.4	292.1
Aged 0 to 6: Girls	322.5	325.4	325.0	333.3	336.6	345.1	344.8	352.4	355.9
Aged 7 to 15: Girls	273.5	273.6	278.5	279.4	282.8	288.1	291.1	290.8	287.5

2. Explanation of Health Check Item (Number of Blood Platelets)

The platelet count is a clue for detecting infectious diseases and leukemia.

3. Reference Interval (from *Clinical Management of Laboratory Data in Pediatrics 2017*)

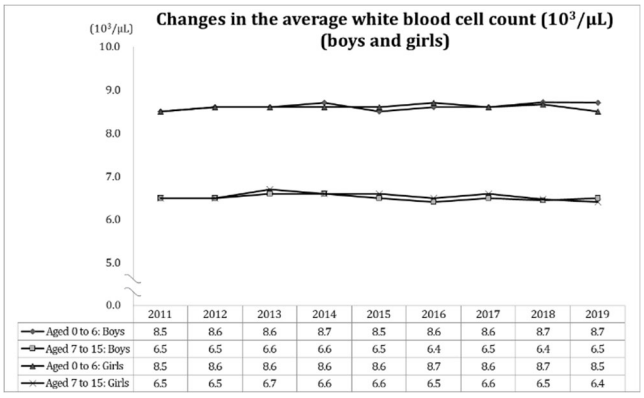
Item	Reference interval
Number of blood platelets ($\times 10^9$/L)	150-400

* By international consensus, platelet counts are expressed as numbers $\times 10^9$/L or $\times 10^3$/μL.

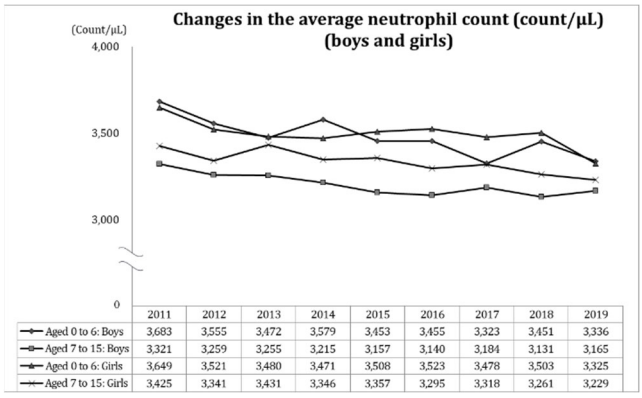
Peripheral Blood Test: White Blood Cell Count and Differential

1. Results

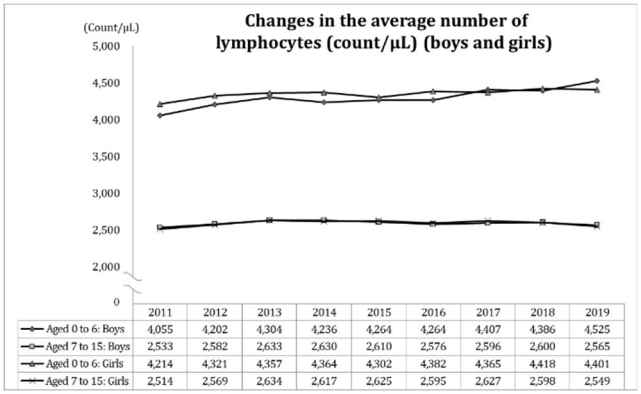
There were no substantial changes in white blood cell count or differential for either boys or girls in any age group.



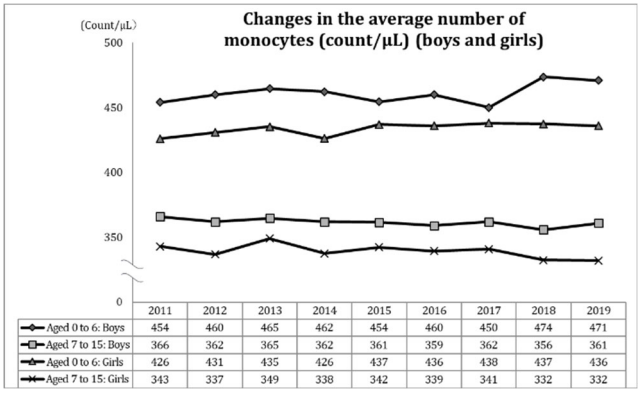
	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 0 to 6: Boys	8.5	8.6	8.6	8.7	8.5	8.6	8.6	8.7	8.7
Aged 7 to 15: Boys	6.5	6.5	6.6	6.6	6.5	6.4	6.5	6.4	6.5
Aged 0 to 6: Girls	8.5	8.6	8.6	8.6	8.6	8.7	8.6	8.7	8.5
Aged 7 to 15: Girls	6.5	6.5	6.7	6.6	6.6	6.5	6.6	6.5	6.4



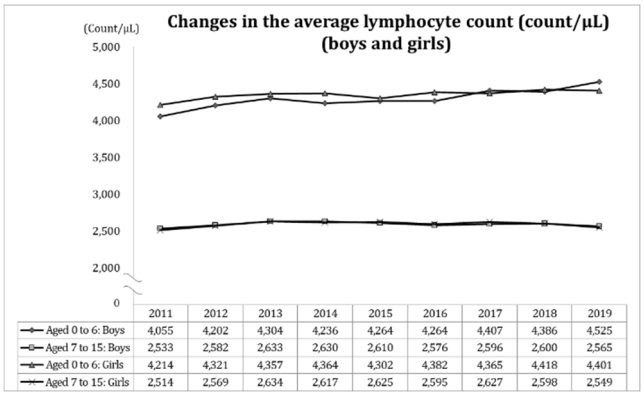
	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 0 to 6: Boys	3,683	3,555	3,472	3,579	3,453	3,455	3,323	3,451	3,336
Aged 7 to 15: Boys	3,321	3,259	3,255	3,215	3,157	3,140	3,184	3,131	3,165
Aged 0 to 6: Girls	3,649	3,521	3,480	3,471	3,508	3,523	3,478	3,503	3,325
Aged 7 to 15: Girls	3,425	3,341	3,431	3,346	3,357	3,295	3,318	3,261	3,229



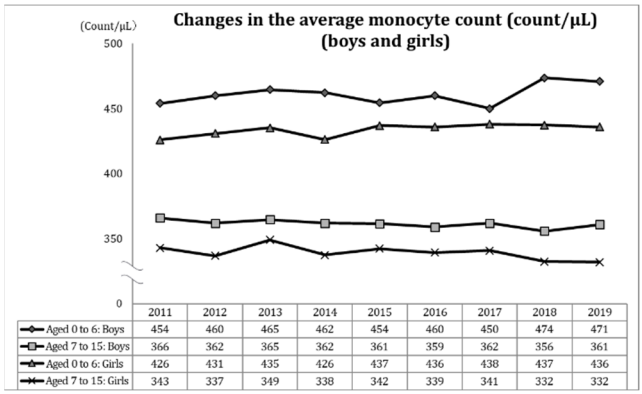
	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 0 to 6: Boys	4,055	4,202	4,304	4,236	4,264	4,264	4,407	4,386	4,525
Aged 7 to 15: Boys	2,533	2,582	2,633	2,630	2,610	2,576	2,596	2,600	2,565
Aged 0 to 6: Girls	4,214	4,321	4,357	4,364	4,302	4,382	4,365	4,418	4,401
Aged 7 to 15: Girls	2,514	2,569	2,634	2,617	2,625	2,595	2,627	2,598	2,549



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 0 to 6: Boys	454	460	465	462	454	460	450	474	471
Aged 7 to 15: Boys	366	362	365	362	361	359	362	356	361
Aged 0 to 6: Girls	426	431	435	426	437	436	438	437	436
Aged 7 to 15: Girls	343	337	349	338	342	339	341	332	332



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 0 to 6: Boys	4,055	4,202	4,304	4,236	4,264	4,264	4,407	4,386	4,525
Aged 7 to 15: Boys	2,533	2,582	2,633	2,630	2,610	2,576	2,596	2,600	2,565
Aged 0 to 6: Girls	4,214	4,321	4,357	4,364	4,302	4,382	4,365	4,418	4,401
Aged 7 to 15: Girls	2,514	2,569	2,634	2,617	2,625	2,595	2,627	2,598	2,549



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 0 to 6: Boys	454	460	465	462	454	460	450	474	471
Aged 7 to 15: Boys	366	362	365	362	361	359	362	356	361
Aged 0 to 6: Girls	426	431	435	426	437	436	438	437	436
Aged 7 to 15: Girls	343	337	349	338	342	339	341	332	332

2. Explanation of Health Check Item (White Blood Cell Count and Differential)

The white blood cell count and differential provides clues for detecting infectious diseases and leukemia.

3. Reference Intervals (from *Clinical Management of Laboratory Data in Pediatrics 2017*)

Total number of white blood cells ($\times 10^9$/L)

Age	Average	Range	Age	Average	Range
At birth	18.1	9.0-30.0	Aged 1	11.4	6.0-17.5
12 hours old	22.8	13.0-38.0	Aged 2	10.6	6.0-17.0
24 hours old	18.9	9.4-34.0	Aged 4	9.1	5.5-15.5
1 week old	12.2	5.0-21.0	Aged 6	8.5	5.0-14.5
2 weeks old	11.4	5.0-20.0	Aged 8	8.3	4.5-13.5
1 month old	10.8	5.0-19.5	Aged 10	8.1	4.5-13.5
6 months old	11.9	6.0-17.5	Aged 16	7.8	4.5-13.0
			Aged 21	7.4	4.5-11.0

* By international consensus, white blood cell counts are expressed as numbers $\times 10^9$/L or $\times 10^3$/μL).

Neutrophil, lymphocyte, monocyte and eosinophil counts and percentages

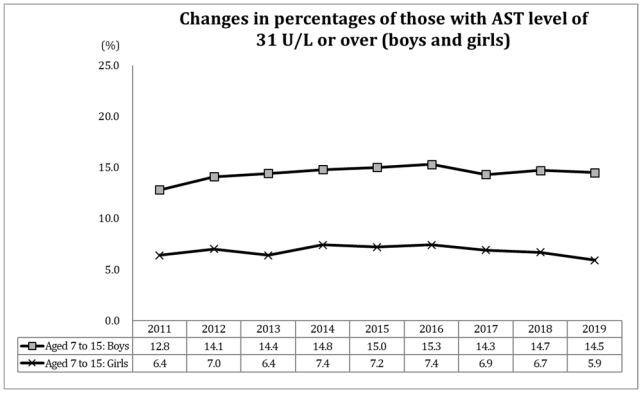
($x10^3$/μL; Range is the 95% confidence interval.)

Age	Neutrophil count			Lymphocyte count			Monocyte count		Eosinophil count	
	Average	Range	%	Average	Range	%	Average	%	Average	%
At birth	11.0	6.0-26.0	61	5.5	2.0-11.0	31	1.1	6	0.4	2
12 hours old	15.5	6.0-28.0	68	5.5	2.0-11.0	24	1.2	5	0.5	2
24 hours old	11.5	5.0-21.0	61	5.8	2.0-11.5	31	1.1	6	0.5	2
1 week old	5.5	1.5-10.0	45	5.0	2.0-17.0	41	1.1	9	0.5	4
2 weeks old	4.5	1.0-9.5	40	5.5	2.0-17.0	48	1.0	9	0.4	3
1 month old	3.8	1.0-9.0	35	6.0	2.5-16.5	56	0.7	7	0.3	3
6 months old	3.8	1.0-8.5	32	7.3	4.0-13.5	61	0.6	5	0.3	3
Aged 1	3.5	1.5-8.5	31	7.0	4.0-10.5	61	0.6	5	0.3	3
Aged 2	3.5	1.5-8.5	33	6.3	3.0-9.5	59	0.5	5	0.3	3
Aged 4	3.8	1.5-8.5	42	4.5	2.0-8.0	50	0.5	5	0.3	3
Aged 6	4.3	1.5-8.0	51	3.5	1.5-7.0	42	0.4	5	0.2	3
Aged 8	4.4	1.5-8.0	53	3.3	1.5-6.8	39	0.4	4	0.2	2
Aged 10	4.4	1.8-8.0	54	3.1	1.5-6.5	38	0.4	4	0.2	2
Aged 16	4.4	1.8-8.0	57	2.8	1.2-5.2	35	0.4	5	0.2	3
Aged 21	4.4	1.8-7.7	59	2.5	1.0-4.8	34	0.3	4	0.2	3

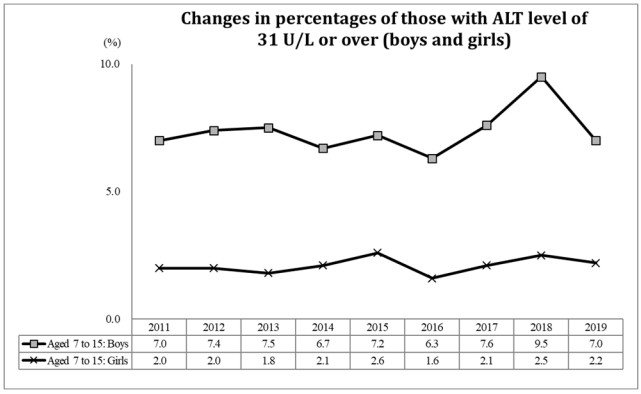
Liver Function: AST, ALT, γ-GT

1. Results

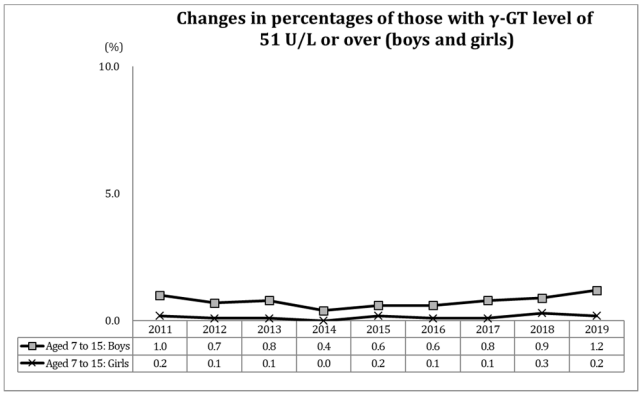
Liver dysfunction was found more often among boys than among girls in all fiscal years. The percentages showed no substantial changes for either boys or girls.



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 7 to 15: Boys	12.8	14.1	14.4	14.8	15.0	15.3	14.3	14.7	14.5
Aged 7 to 15: Girls	6.4	7.0	6.4	7.4	7.2	7.4	6.9	6.7	5.9



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 7 to 15: Boys	7.0	7.4	7.5	6.7	7.2	6.3	7.6	9.5	7.0
Aged 7 to 15: Girls	2.0	2.0	1.8	2.1	2.6	1.6	2.1	2.5	2.2



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 7 to 15: Boys	1.0	0.7	0.8	0.4	0.6	0.6	0.8	0.9	1.2
Aged 7 to 15: Girls	0.2	0.1	0.1	0.0	0.2	0.1	0.1	0.3	0.2

* An AST level of 31 U/L or over, an ALT level of 31 U/L or over, and a γ-GT level of 51 U/L or over are judgment criteria used for group and individual health checks for those aged 16 or older.

2. Explanation of Health Check Item (AST, ALT, γ-GT)

AST, ALT and γ-GT levels are clues for detecting hepatic diseases.

3. Reference Intervals (from *Clinical Management of Laboratory Data in Pediatrics 2017*)

AST (GOT) (U/L)

Age	Males	Females
1 month old	19-61	20-71
6 months old	25-85	22-76
Aged 1	23-51	22-50
Aged 3	20-45	20-44
Aged 6	17-39	16-38
Aged 12	14-33	12-30
Adults	30 or lower	

ALT (GPT) (U/L)

Age	Males	Females
1 month old	10-50	11-68
6 months old	12-62	10-63
Aged 1	5-25	5-31
Aged 3	4-24	5-27
Aged 6	4-23	4-25
Aged 12	3-20	3-18
Adults	30 or lower	

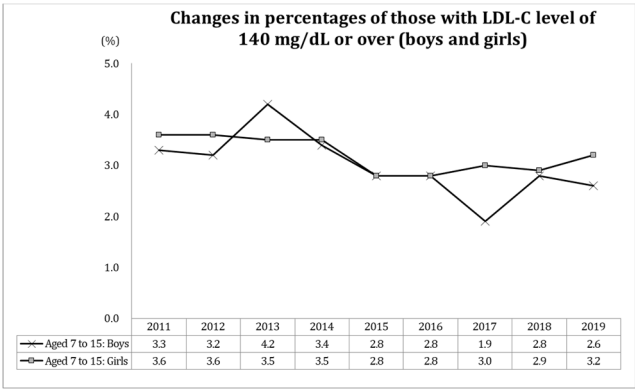
γ-GT (U/L)

	Males	Females
Adults	0-50	0-30
From children to young adults	γ-GT levels normally reach adult values 5 to 6 months after birth.	
Newborns	5 to 6 times the normal upper limit	

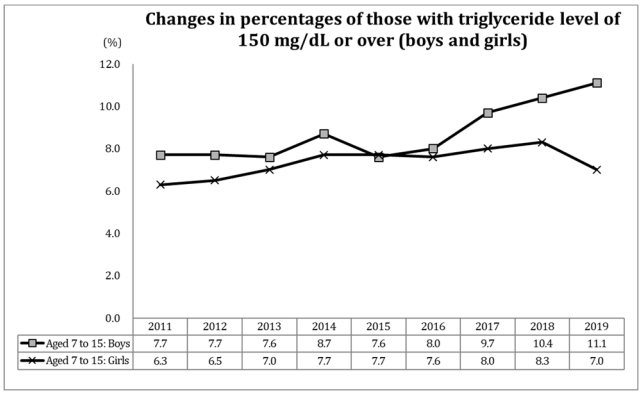
Lipids: LDL Cholesterol, Triglyceride, HDL Cholesterol

1. Results

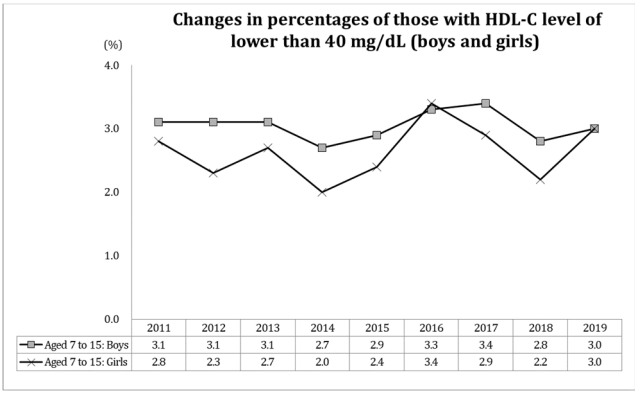
There were no substantial differences between boys and girls in the percentages of those whose LDL-C level was 140 mg/dL or over, whose triglyceride level was 150 mg/dL or over, and whose HDL-C level was lower than 40 mg/dL. These percentages remained almost the same both for boys and girls.



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 7 to 15: Boys	3.3	3.2	4.2	3.4	2.8	2.8	1.9	2.8	2.6
Aged 7 to 15: Girls	3.6	3.6	3.5	3.5	2.8	2.8	3.0	2.9	3.2



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 7 to 15: Boys	7.7	7.7	7.6	8.7	7.6	8.0	9.7	10.4	11.1
Aged 7 to 15: Girls	6.3	6.5	7.0	7.7	7.7	7.6	8.0	8.3	7.0



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 7 to 15: Boys	3.1	3.1	3.1	2.7	2.9	3.3	3.4	2.8	3.0
Aged 7 to 15: Girls	2.8	2.3	2.7	2.0	2.4	3.4	2.9	2.2	3.0

* An LDL-C level of 140 mg/dL or over, a triglyceride level of 150 mg/dL or over, and an HDL-C level of lower than 40 mg/dL are the judgment criteria used for group and individual health checks for those aged 16 or older.

2. Explanation of Health Check Item (LDL Cholesterol, Triglyceride, HDL Cholesterol)

Possible risks of arteriosclerosis are indicated.

3. Reference Intervals (from *Clinical Management of Laboratory Data in Pediatrics 2017*)

Triglycerides (TG) (mg/dL)

Age	Males	Females
Cord blood	10-98	10-98
Aged 0 to 5	30-86	32-99
Aged 6 to 11	31-108	35-114
Aged 12 to 15	36-138	41-138

HDL cholesterol (HDL-C) (mg/dL); **LDL cholesterol** (LDL-C) (mg/dL)

Item	Measurement method	Reference Interval	Action Threshold	Elevated value
HDL cholesterol	Direct method	≧40	—	—
LDL cholesterol	Direct method	<110	110-139	≧140

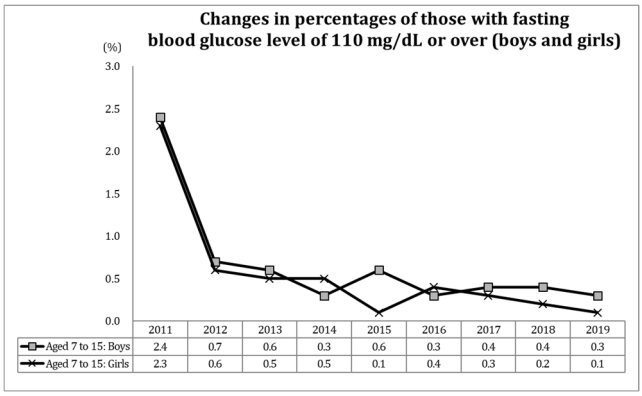
Blood Glucose: Fasting Blood Glucose, HbA1c

1. Results

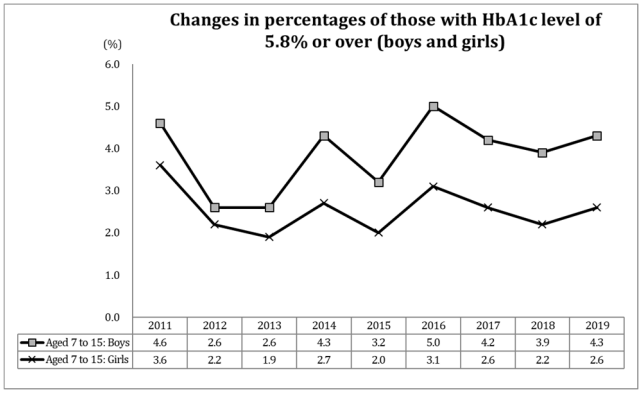
Both for boys and girls, the percentages of those whose fasting blood glucose level was 110 mg/dL or over hit a peak in FY2011, decreased in FY2012, and maintained almost the same levels thereafter.

There were no substantial differences in the percentages of those whose HbA1c level was 5.8% or over between boys and girls. The relevant percentages decreased from FY2011 to FY2013 and showed ups and downs thereafter both for boys and girls.

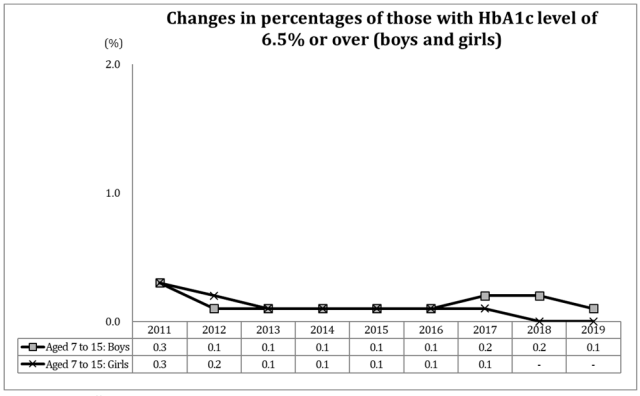
There were also no substantial differences in the percentages of those whose HbA1c level was 6.5% or over between boys and girls, and the percentages remained unchanged both for boys and girls.



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 7 to 15: Boys	2.4	0.7	0.6	0.3	0.6	0.3	0.4	0.4	0.3
Aged 7 to 15: Girls	2.3	0.6	0.5	0.5	0.1	0.4	0.3	0.2	0.1



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 7 to 15: Boys	4.6	2.6	2.6	4.3	3.2	5.0	4.2	3.9	4.3
Aged 7 to 15: Girls	3.6	2.2	1.9	2.7	2.0	3.1	2.6	2.2	2.6



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 7 to 15: Boys	0.3	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1
Aged 7 to 15: Girls	0.3	0.2	0.1	0.1	0.1	0.1	0.1	-	-

* Individuals with the HbA1c level of 5.8% or over are categorized as "borderline type" and those with the HbA1c level of 6.5% or over are categorized "diabetic type" in the Treatment Guide for Diabetes 2012-2013 of the Japan Diabetes Society (JDS). In this report, a diagnosis of being diabetic type based on one examination is referred to as "diabetes" in accordance with the 1999 report of a JDS committee on classification and diagnostic criteria.

2. Explanation of Health Check Item (Fasting Blood Glucose, HbA1c)

Fasting blood glucose levels and HbA1c levels are clues for detecting diabetes, etc.

3. Reference Interval and Diagnostic Criteria (from *Clinical Management of Laboratory Data in Pediatrics 2017*)

Item	Hypoglycemia	Reference Interval	Diabetes
Fasting blood glucose level (mg/dL)		70-109	≧126
Casual blood glucose level (mg/dL)			≧200

*** Criteria for hypoglycemia**

- Newborns: 45-50 mg/dL or lower (The certain diagnosis criterion in the diagnosis criteria for hypoglycemia is 30 mg/dL or lower.)
- Children: 65-70 mg/dL or lower (The certain diagnosis criterion in the diagnosis criteria for hypoglycemia is 40 mg/dL or lower.)

*** Criteria for hyperglycemia**

- Fasting blood glucose level: A level lower than 110 mg/dL is diagnosed as being normal, a level of 110 mg/dL or over and lower than 126 mg/dL is diagnosed as having impaired fasting glucose, and a level of 126 mg/dL or over is diagnosed as having diabetic-type diabetes.
- A casual blood glucose level of 200 mg/dL or over and an HbA1c level of 6.5% or over are also diagnosed as having diabetic-type diabetes.

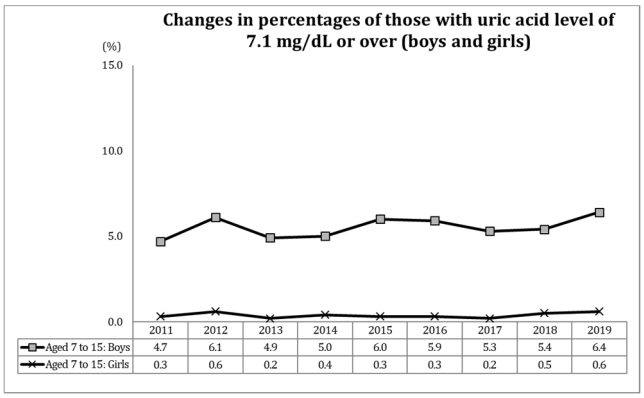
  (Revisions based on the Report of the Committee on the Classification and Diagnostic Criteria of Diabetes Mellitus (for International Standardization) (The Japan Diabetes Society), Diabetes 55(7)492, 2012)

Item	Reference Interval
HbA1c (%) (NGSP unit)	4.6-6.2

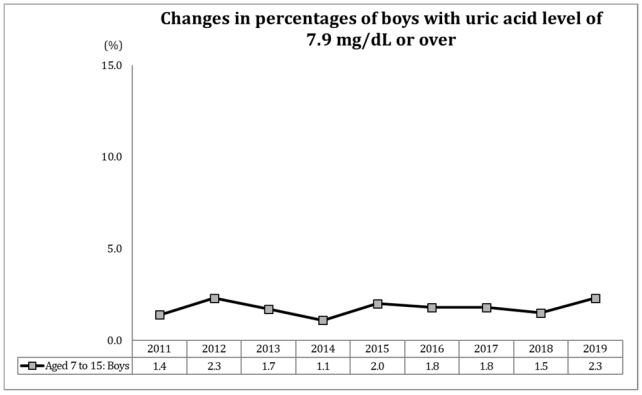
Renal Function: Uric Acid

1. Results

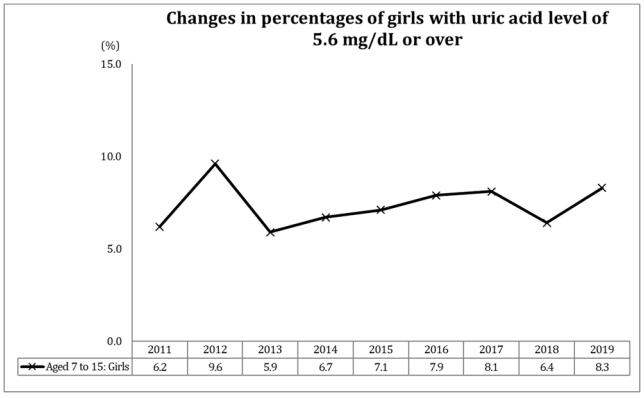
Both for boys and girls, there were no substantial changes in the percentages of those whose uric acid level was 7.1 mg/dL or over.



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 7 to 15: Boys	4.7	6.1	4.9	5.0	6.0	5.9	5.3	5.4	6.4
Aged 7 to 15: Girls	0.3	0.6	0.2	0.4	0.3	0.3	0.2	0.5	0.6



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 7 to 15: Boys	1.4	2.3	1.7	1.1	2.0	1.8	1.8	1.5	2.3



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 7 to 15: Girls	6.2	9.6	5.9	6.7	7.1	7.9	8.1	6.4	8.3

* A uric acid level of 7.1 mg/dL is the value defined in the Guideline for the Management of Hyperuricemia and Gout by the Japanese Society of Gout and Uric & Nucleic Acids. Uric acid levels of 7.9 mg/dL or over for boys and 5.6 mg/dL or over for girls are values exceeding the upper limits of the common reference intervals established by the Japanese Committee for Clinical Laboratory Standards.

2. Explanation of Health Check Item (Uric Acid)

Uric acid levels are clues for detecting gout, etc.

3. Reference Intervals (from *Clinical Management of Laboratory Data in Pediatrics 2017*)

Item		Reference Interval
Uric acid (UA) (mg/dL)	Males	3.7-7.0
	Females	2.5-7.0

Report on the Results of the FY2019 Comprehensive Health Check
Fukushima Health Management Survey
(Participants Aged 16 or Older)

< Supplementary Notes >

* Participants aged 16 or older were divided into three age groups, 16 to 39 years, 40 to 64 years, and 65 years or older, with results compiled and shown accordingly.
* Because individuals shift from one age group to another, year-by-year comparisons are difficult, and definitive conclusions cannot be drawn.
* Rules for describing tabulation results are the same as those used for the Vital Statistics in Japan by the Ministry of Health, Labour and Welfare.
  When there is no data: -
  When the ratio is minor (lower than 0.05): 0.0%

* Reference materials

FY2011 to FY2014: Material 3-2 "Basic Statistics of CHC Results by Health Check Item" for the 21st Prefectural Oversight Committee Meeting for the Fukushima Health Management Survey

FY2015 : Material 3-2 "Basic Statistics of CHC Results by Health Check Item" for the 26th Prefectural Oversight Committee Meeting for the Fukushima Health Management Survey

FY2016 : Material 2-3 "Basic Statistics of CHC Results by Health Check Item" for the 30th Prefectural Oversight Committee Meeting for the Fukushima Health Management Survey

FY2017 : Material 2-3 "Basic Statistics of CHC Results by Health Check Item" for the 34th Prefectural Oversight Committee Meeting for the Fukushima Health Management Survey

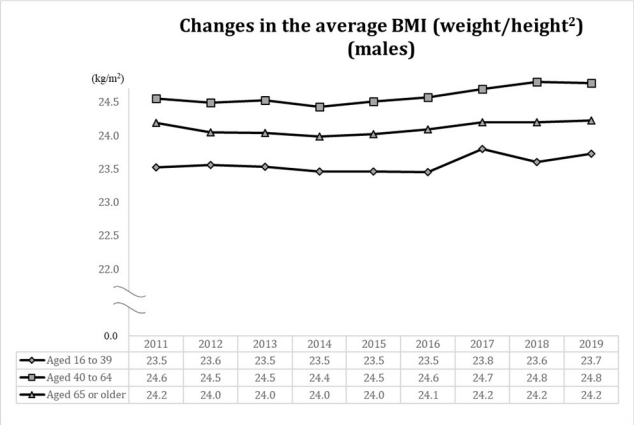
FY2018 : Material 4-4 "Tabulation Results by Health Check Item" for the 37th Prefectural Oversight Committee Meeting for the Fukushima Health Management Survey

Physical Exam: BMI

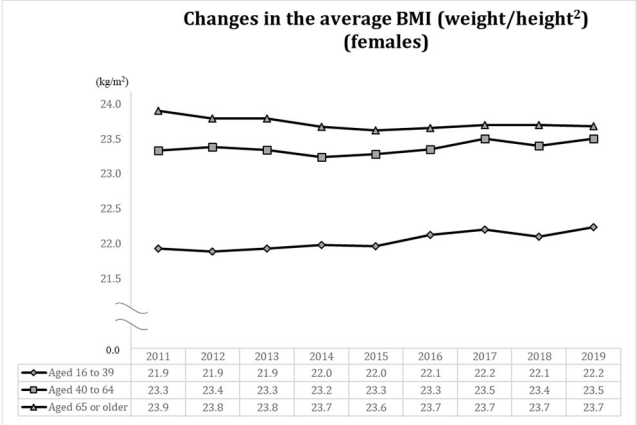
1. Results

Compared with the results for FY2016, the percentage of males with BMI of 25 kg/m^2 or over increased in FY2017 for all age groups and no substantial changes were observed thereafter until FY2019.

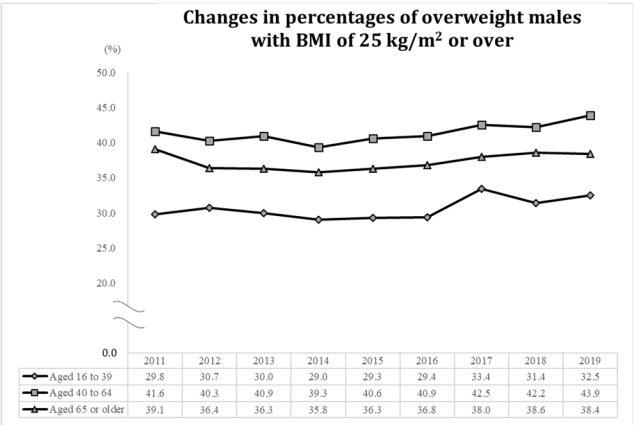
The percentage of females with BMI of 25 kg/m^2 or over showed an upward trend among those aged 16 to 39 from FY2011 to FY2019. The same percentage increased slightly among those aged 40 to 64 and decreased slightly among those aged 65 or older in FY2019 compared to the levels in FY2011.



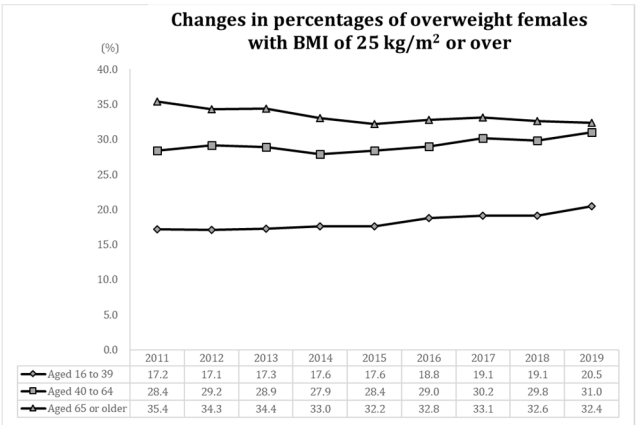
	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 16 to 39	23.5	23.6	23.5	23.5	23.5	23.5	23.8	23.6	23.7
Aged 40 to 64	24.6	24.5	24.5	24.4	24.5	24.6	24.7	24.8	24.8
Aged 65 or older	24.2	24.0	24.0	24.0	24.0	24.1	24.2	24.2	24.2



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 16 to 39	21.9	21.9	21.9	22.0	22.0	22.1	22.2	22.1	22.2
Aged 40 to 64	23.3	23.4	23.3	23.2	23.3	23.3	23.5	23.4	23.5
Aged 65 or older	23.9	23.8	23.8	23.7	23.6	23.7	23.7	23.7	23.7



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 16 to 39	29.8	30.7	30.0	29.0	29.3	29.4	33.4	31.4	32.5
Aged 40 to 64	41.6	40.3	40.9	39.3	40.6	40.9	42.5	42.2	43.9
Aged 65 or older	39.1	36.4	36.3	35.8	36.3	36.8	38.0	38.6	38.4



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 16 to 39	17.2	17.1	17.3	17.6	17.6	18.8	19.1	19.1	20.5
Aged 40 to 64	28.4	29.2	28.9	27.9	28.4	29.0	30.2	29.8	31.0
Aged 65 or older	35.4	34.3	34.4	33.0	32.2	32.8	33.1	32.6	32.4

2. Explanation of Health Check Item (BMI)

Body Mass Index (BMI), based on measured height and weight, is an indicator of obesity.

3. Reference Interval and Action Thresholds (Used for Group and Individual Health Checks)

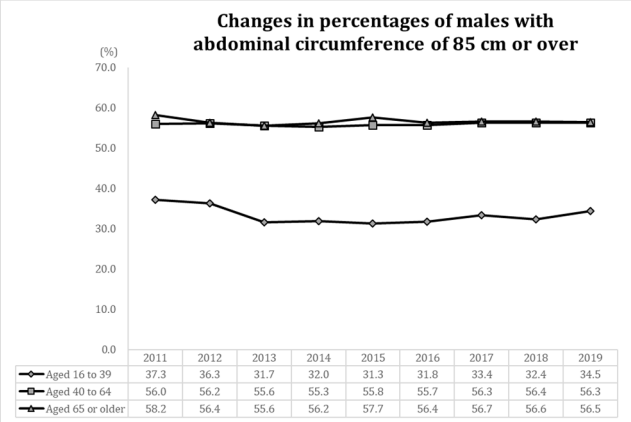
Item \ Diagnosis	Reference Interval	Action Thresholds		Abnormality	Unit
Body Mass Index (BMI)	18.5-24.9	18.4 or lower	25.0 or over	–	kg/m^2

Physical Exam: Abdominal Circumference

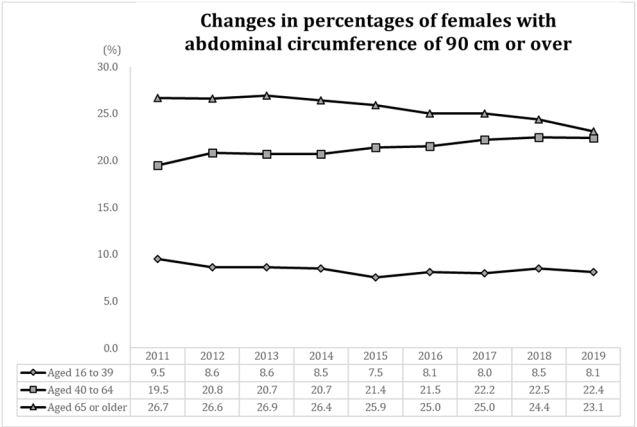
1. Results

The percentage of males with abdominal circumference of 85.0 cm or over decreased among those aged 16 to 39 from FY2011 to FY2013 but remained almost the same from FY2014 onward.

The percentage of females with abdominal circumference of 90.0 cm or over increased among those aged 40 to 64 from FY2011 to FY2018, then remained almost the same in FY2019.



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 16 to 39	37.3	36.3	31.7	32.0	31.3	31.8	33.4	32.4	34.5
Aged 40 to 64	56.0	56.2	55.6	55.3	55.8	55.7	56.3	56.4	56.3
Aged 65 or older	58.2	56.4	55.6	56.2	57.7	56.4	56.7	56.6	56.5



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 16 to 39	9.5	8.6	8.6	8.5	7.5	8.1	8.0	8.5	8.1
Aged 40 to 64	19.5	20.8	20.7	20.7	21.4	21.5	22.2	22.5	22.4
Aged 65 or older	26.7	26.6	26.9	26.4	25.9	25.0	25.0	24.4	23.1

2. Explanation of Health Check Item (Abdominal Circumference)

An abdominal circumference serves as one of the judgment criteria for metabolic syndrome (visceral fat syndrome).

3. Reference Intervals and Action Thresholds (Used for Group and Individual Health Checks)

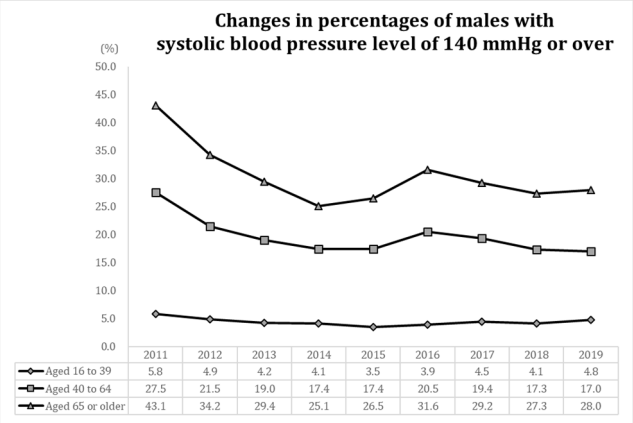
Item \ Diagnosis		Reference Interval	Action Threshold	Abnormality	Unit
Abdominal circumference	Males	84.9 or less	85.0 or over	—	cm
	Females	89.9 or less	90.0 or over	—	

Physical Exam: Blood Pressure

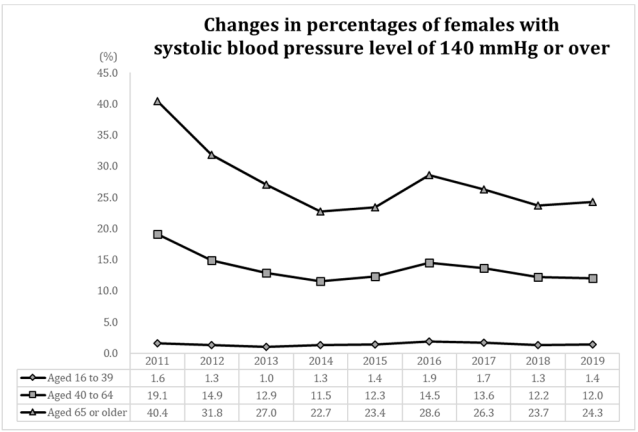
1. Results

The percentage of those with systolic blood pressure levels of 140 mmHg or over decreased both among males and females aged 40 or older from FY2011 to FY2014. These percentages showed an upward trend from FY2015 to FY2016 but decreased thereafter among those aged 40 to 64 until FY2019.

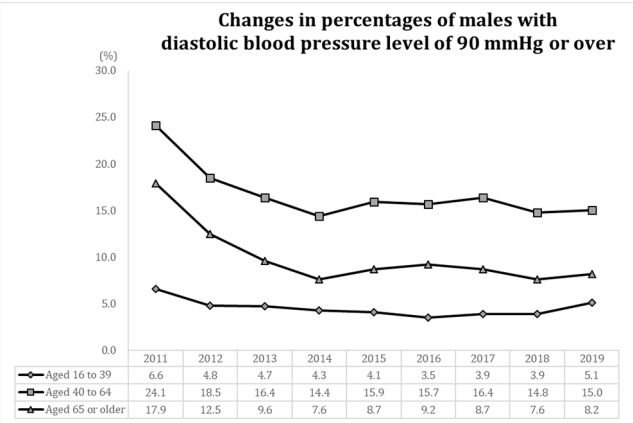
The percentage of those with diastolic blood pressure levels of 90 mmHg or over decreased both among males and females aged 40 or older from FY2011 to FY2014 but remained almost the same from FY2015 onward. Among males aged 16 to 39, the percentage showed an increase from FY2018 to FY2019.



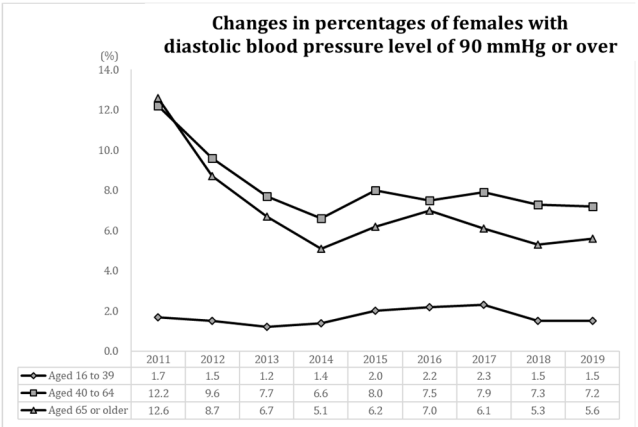
	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 16 to 39	5.8	4.9	4.2	4.1	3.5	3.9	4.5	4.1	4.8
Aged 40 to 64	27.5	21.5	19.0	17.4	17.4	20.5	19.4	17.3	17.0
Aged 65 or older	43.1	34.2	29.4	25.1	26.5	31.6	29.2	27.3	28.0



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 16 to 39	1.6	1.3	1.0	1.3	1.4	1.9	1.7	1.3	1.4
Aged 40 to 64	19.1	14.9	12.9	11.5	12.3	14.5	13.6	12.2	12.0
Aged 65 or older	40.4	31.8	27.0	22.7	23.4	28.6	26.3	23.7	24.3



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 16 to 39	6.6	4.8	4.7	4.3	4.1	3.5	3.9	3.9	5.1
Aged 40 to 64	24.1	18.5	16.4	14.4	15.9	15.7	16.4	14.8	15.0
Aged 65 or older	17.9	12.5	9.6	7.6	8.7	9.2	8.7	7.6	8.2



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 16 to 39	1.7	1.5	1.2	1.4	2.0	2.2	2.3	1.5	1.5
Aged 40 to 64	12.2	9.6	7.7	6.6	8.0	7.5	7.9	7.3	7.2
Aged 65 or older	12.6	8.7	6.7	5.1	6.2	7.0	6.1	5.3	5.6

2. Explanation of Health Check Item (Blood Pressure)

Blood pressure levels are checked to detect hypertension, etc.

3. Reference Intervals and Action Thresholds (Used for Group and Individual Health Checks)

	Reference Interval	Action Threshold	Abnormality	Unit
Systolic (maximal) blood pressure	129 or lower	130-139	140 or over	mmHg
Diastolic (minimal) blood pressure	84 or lower	85-89	90 or over	

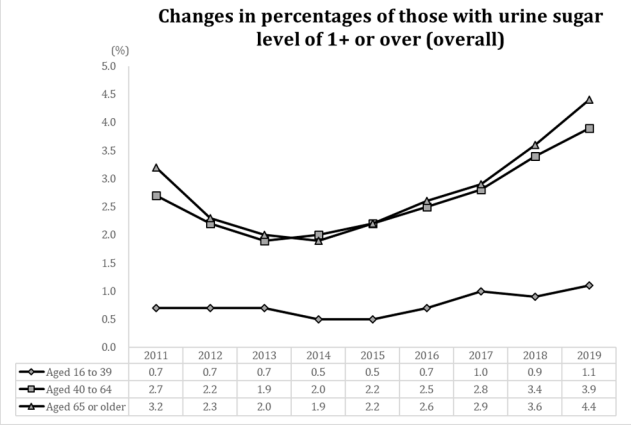
Urine Test: Urine Sugar, Urine Protein, Urine Occult Blood

1. Results

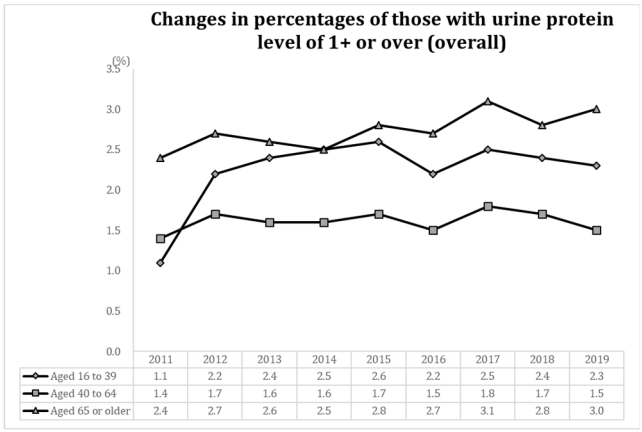
The percentage of those with a urine sugar level of 1+ or over showed an upward trend among those aged 40 or older from FY2015.

The percentage of those with a urine protein level of 1+ or over increased among those aged 16 to 39 from FY2011 to FY2019.

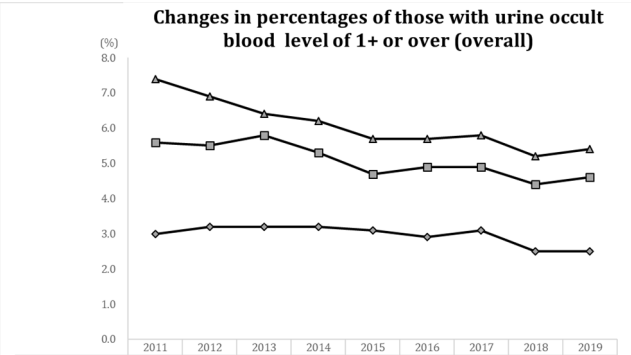
The percentage of those with a urine occult blood level of 1+ or over decreased among those aged 40 or older from FY2011 to FY2019.



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 16 to 39	0.7	0.7	0.7	0.5	0.5	0.7	1.0	0.9	1.1
Aged 40 to 64	2.7	2.2	1.9	2.0	2.2	2.5	2.8	3.4	3.9
Aged 65 or older	3.2	2.3	2.0	1.9	2.2	2.6	2.9	3.6	4.4



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 16 to 39	1.1	2.2	2.4	2.5	2.6	2.2	2.5	2.4	2.3
Aged 40 to 64	1.4	1.7	1.6	1.6	1.7	1.5	1.8	1.7	1.5
Aged 65 or older	2.4	2.7	2.6	2.5	2.8	2.7	3.1	2.8	3.0



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 16 to 39	3.0	3.2	3.2	3.2	3.1	2.9	3.1	2.5	2.5
Aged 40 to 64	5.6	5.5	5.8	5.3	4.7	4.9	4.9	4.4	4.6
Aged 65 or older	7.4	6.9	6.4	6.2	5.7	5.7	5.8	5.2	5.4

*(+1) or over and excluding those on their period

2. Explanation of Health Check Item (Urine Sugar, Urine Protein, Urine Occult Blood)

Urine sugar levels are clues for detecting diabetes.
Urine protein levels are clues for detecting kidney diseases.
Urine occult blood levels are clues for detecting diseases of the kidney, ureter, and bladder.

3. Screening Values (Used for Group and Individual Health Checks)

Item \ Diagnosis	Expected	Action Threshold	Abnormality
Urine sugar	(−)	(±)	(+) or over
Urine protein	(−)	(±)	(+) or over
Urine occult blood	(−)	(±)	(+) or over

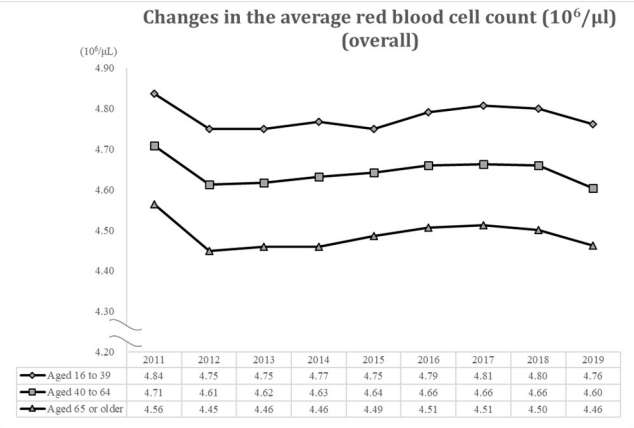
Peripheral Blood Test: Red Blood Cells, Hemoglobin, Hematocrit

1. Results

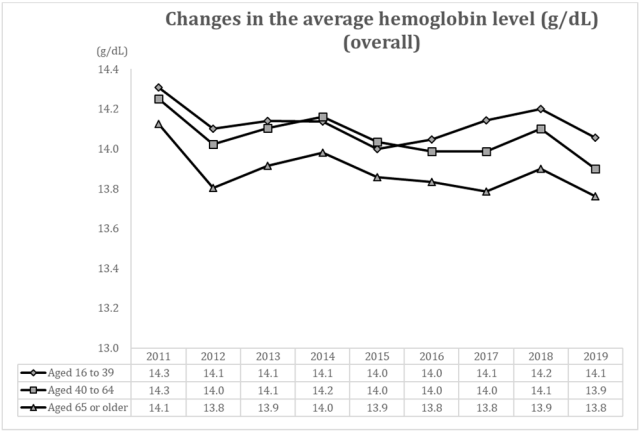
The average red blood cell count and the average hemoglobin level decreased for all age groups from FY2011 to FY2012 but increased in FY2013 and remined almost the same thereafter.

The percentage of males with hemoglobin levels of 13.0 g/dL or lower increased among those aged 65 or older from FY2011 to FY2012 but remained flat thereafter. The percentage of females with hemoglobin levels of 12.0 g/dL or lower increased among those aged 65 or older from FY2011 to FY2012 and then fluctuated up and down thereafter.

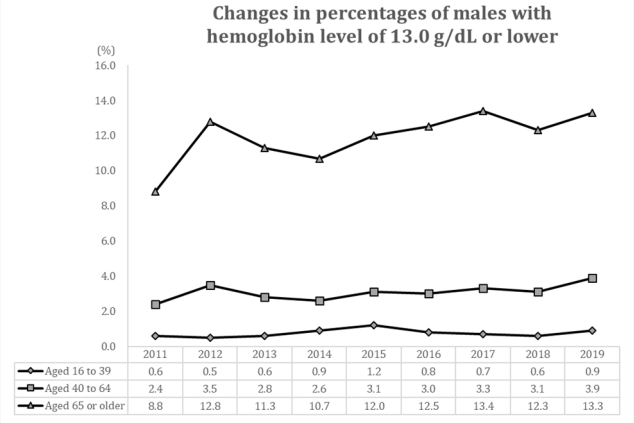
There were no substantial changes in hematocrit levels in any age groups.



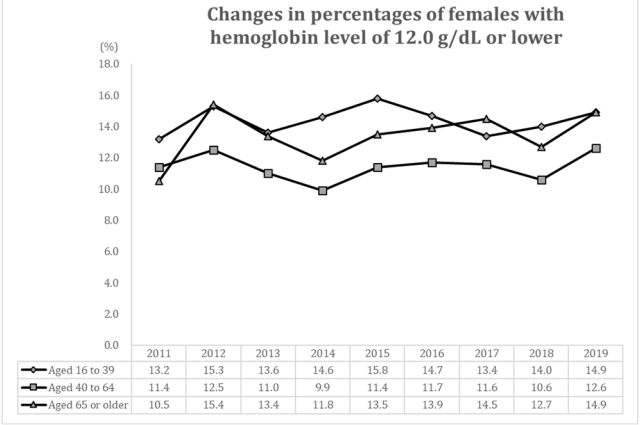
	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 16 to 39	4.84	4.75	4.75	4.77	4.75	4.79	4.81	4.80	4.76
Aged 40 to 64	4.71	4.61	4.62	4.63	4.64	4.66	4.66	4.66	4.60
Aged 65 or older	4.56	4.45	4.46	4.46	4.49	4.51	4.51	4.50	4.46



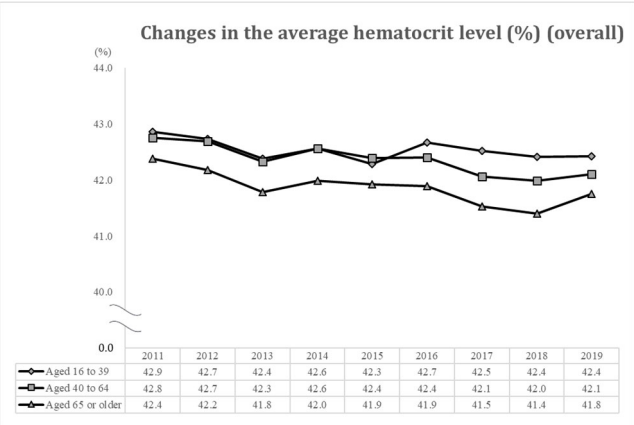
	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 16 to 39	14.3	14.1	14.1	14.1	14.0	14.0	14.1	14.2	14.1
Aged 40 to 64	14.3	14.0	14.1	14.2	14.0	14.0	14.0	14.1	13.9
Aged 65 or older	14.1	13.8	13.9	14.0	13.9	13.8	13.8	13.9	13.8



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 16 to 39	0.6	0.5	0.6	0.9	1.2	0.8	0.7	0.6	0.9
Aged 40 to 64	2.4	3.5	2.8	2.6	3.1	3.0	3.3	3.1	3.9
Aged 65 or older	8.8	12.8	11.3	10.7	12.0	12.5	13.4	12.3	13.3



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 16 to 39	13.2	15.3	13.6	14.6	15.8	14.7	13.4	14.0	14.9
Aged 40 to 64	11.4	12.5	11.0	9.9	11.4	11.7	11.6	10.6	12.6
Aged 65 or older	10.5	15.4	13.4	11.8	13.5	13.9	14.5	12.7	14.9



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 16 to 39	42.9	42.7	42.4	42.6	42.3	42.7	42.5	42.4	42.4
Aged 40 to 64	42.8	42.7	42.3	42.6	42.4	42.4	42.1	42.0	42.1
Aged 65 or older	42.4	42.2	41.8	42.0	41.9	41.9	41.5	41.4	41.8

2. Explanation of Health Check Item (Red Blood Cells, Hemoglobin, Hematocrit)

Types and levels of anemia are examined.

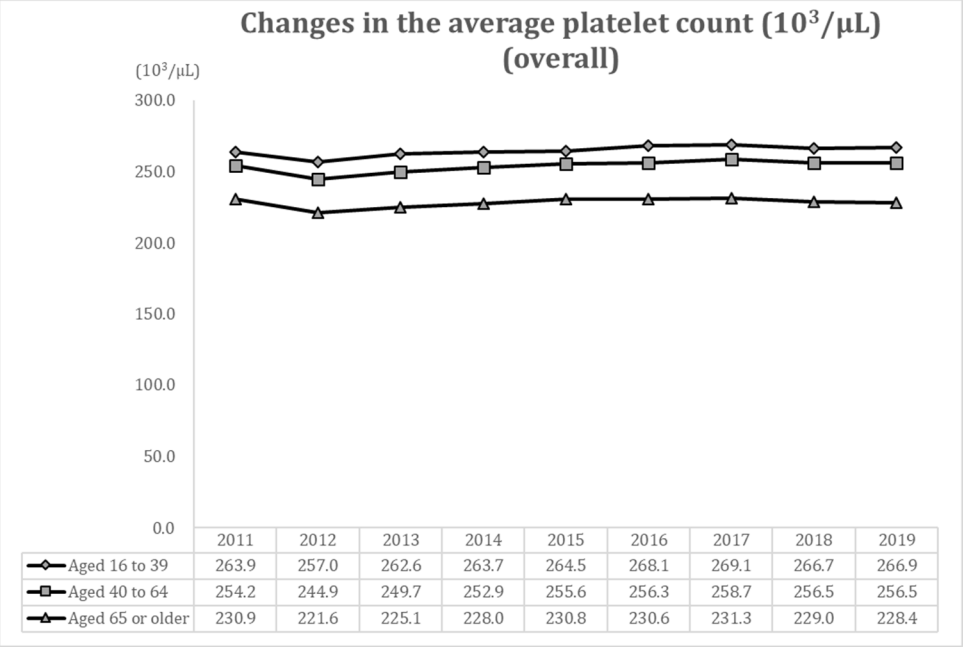
3. Reference Intervals and Action Thresholds (Used for Group and Individual Health Checks)

Item \ Diagnosis		Reference Interval	Action Thresholds		Abnormality		Unit
Number of red blood cells	Males	4.00-5.79	3.70-3.99	5.80 or over	3.69 or lower		$\times 10^6/\mu L$
	Females	3.70-5.49	3.40-3.69	5.50 or over	3.39 or lower		
Hemoglobin level	Males	13.1-17.9	12.1-13.0		12.0 or lower	18.0 or over	g/dL
	Females	12.1-15.9	11.1-12.0		11.0 or lower	16.0 or over	
Hematocrit level	Males	38.0-54.9	36.0-37.9	55.0 or over	35.9 or lower		%
	Females	33.0-47.9	29.0-32.9	48.0 or over	28.9 or lower		

Peripheral Blood Test: Platelet Count

1. Results

There were no substantial changes in the average platelet count from FY2011 to FY2019 in any age group.



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 16 to 39	263.9	257.0	262.6	263.7	264.5	268.1	269.1	266.7	266.9
Aged 40 to 64	254.2	244.9	249.7	252.9	255.6	256.3	258.7	256.5	256.5
Aged 65 or older	230.9	221.6	225.1	228.0	230.8	230.6	231.3	229.0	228.4

2. Explanation of Health Check Item (Platelet Count)

The platelet count is a clue for detecting infectious diseases and leukemia.

3. Reference Interval and Action Thresholds (Used for Group and Individual Health Checks)

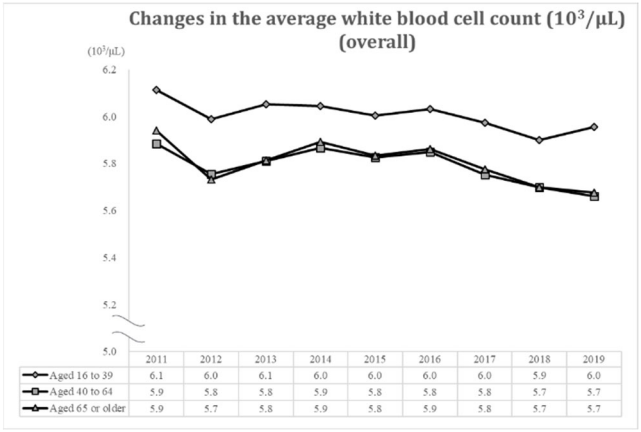
Item \ Diagnosis	Reference Interval	Action Thresholds		Abnormality		Unit
Number of blood platelets	130-369	90-129	370-449	89 or lower	450 or over	$\times 10^3$/μL

Peripheral Blood Test: White Blood Cell Count and Differential

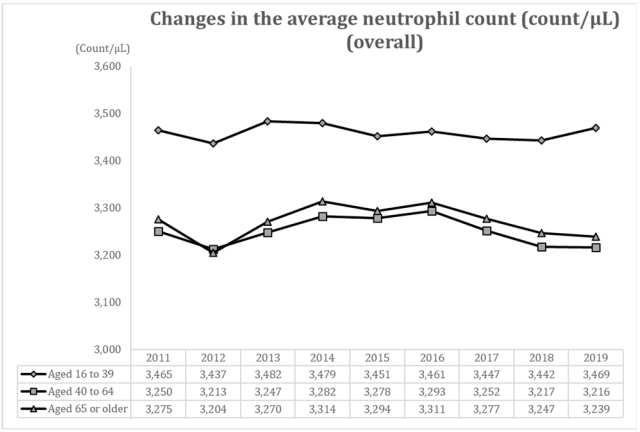
1. Results

There were no substantial changes in the average white blood cell count from FY2011 to FY2019 in any age group.

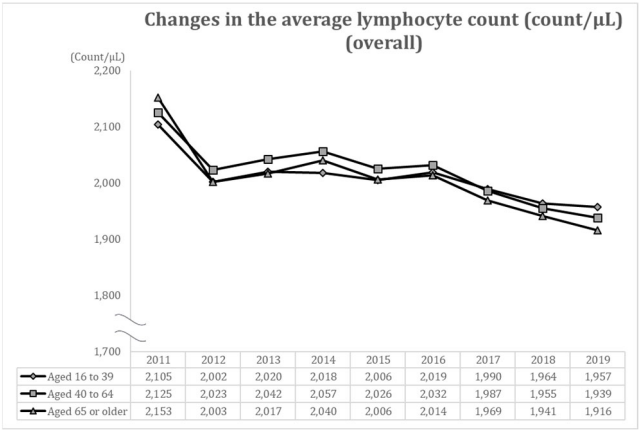
There were also no substantial changes in the average values of neutrophil, lymphocyte, monocyte and eosinophil count from FY2011 to FY2019 in any age group. The average basophil count remained almost the same from FY2012 to FY2019 in all age groups.



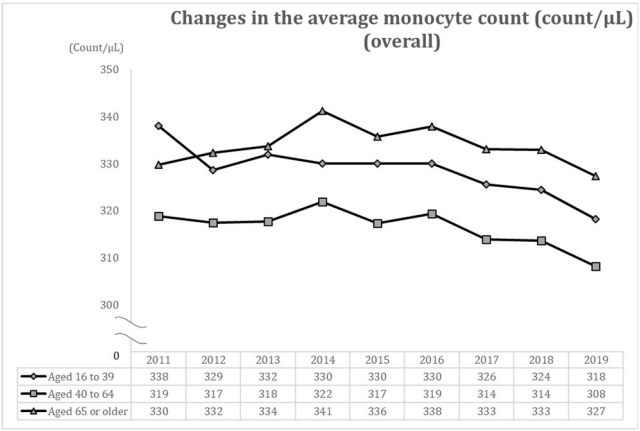
	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 16 to 39	6.1	6.0	6.1	6.0	6.0	6.0	6.0	5.9	6.0
Aged 40 to 64	5.9	5.8	5.8	5.9	5.8	5.8	5.8	5.7	5.7
Aged 65 or older	5.9	5.7	5.8	5.9	5.8	5.9	5.8	5.7	5.7



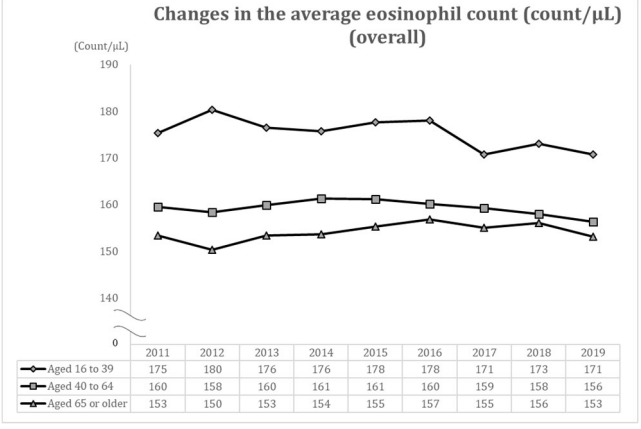
	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 16 to 39	3,465	3,437	3,482	3,479	3,451	3,461	3,447	3,442	3,469
Aged 40 to 64	3,250	3,213	3,247	3,282	3,278	3,293	3,252	3,217	3,216
Aged 65 or older	3,275	3,204	3,270	3,314	3,294	3,311	3,277	3,247	3,239



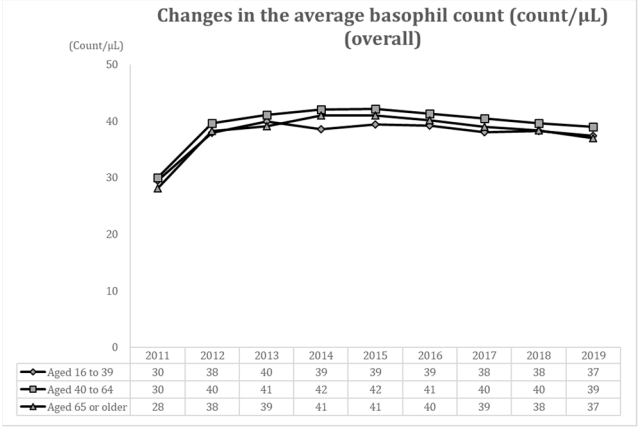
	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 16 to 39	2,105	2,002	2,020	2,018	2,006	2,019	1,990	1,964	1,957
Aged 40 to 64	2,125	2,023	2,042	2,057	2,026	2,032	1,987	1,955	1,939
Aged 65 or older	2,153	2,003	2,017	2,040	2,006	2,014	1,969	1,941	1,916



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 16 to 39	338	329	332	330	330	330	326	324	318
Aged 40 to 64	319	317	318	322	317	319	314	314	308
Aged 65 or older	330	332	334	341	336	338	333	333	327



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 16 to 39	175	180	176	176	178	178	171	173	171
Aged 40 to 64	160	158	160	161	161	160	159	158	156
Aged 65 or older	153	150	153	154	155	157	155	156	153



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 16 to 39	30	38	40	39	39	39	38	38	37
Aged 40 to 64	30	40	41	42	42	41	40	40	39
Aged 65 or older	28	38	39	41	41	40	39	38	37

2. Explanation of Health Check Item (White Blood Cell Count and Differential)

The white blood cell count and differential provides clues for detecting infectious diseases and leukemia.

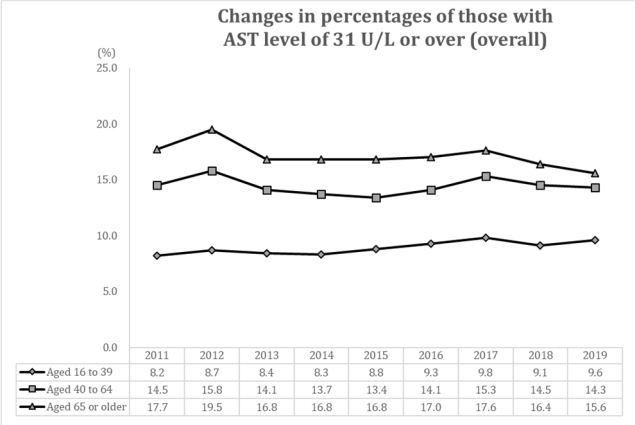
3. Reference Intervals and Action Thresholds (Used for Group and Individual Health Checks)

Item \ Diagnosis		Reference Interval	Action Thresholds		Abnormality		Unit
Number of white blood cells		4.0-9.5	3.0-3.9	9.6-11.0	2.9 or lower	11.1 or over	$\times 10^3/\mu L$
DLCs (Reference)	Neutrophils	40.0-75.0					%
	Lymphocytes	20.0-55.0					
	Monocytes	0-12.0					
	Eosinophils	0-10.0					
	Basophils	0-3.0					

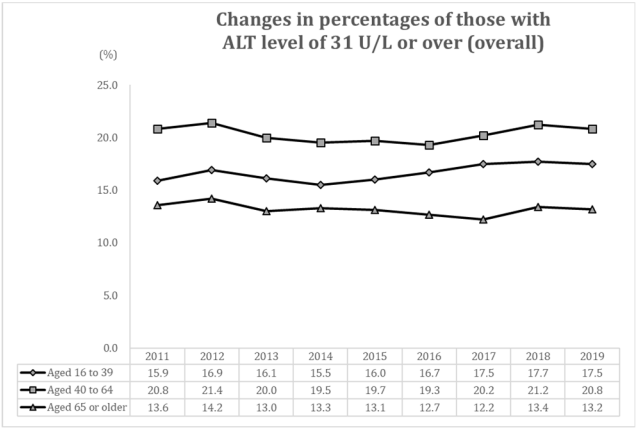
Liver Function: AST, ALT, γ-GT

1. Results

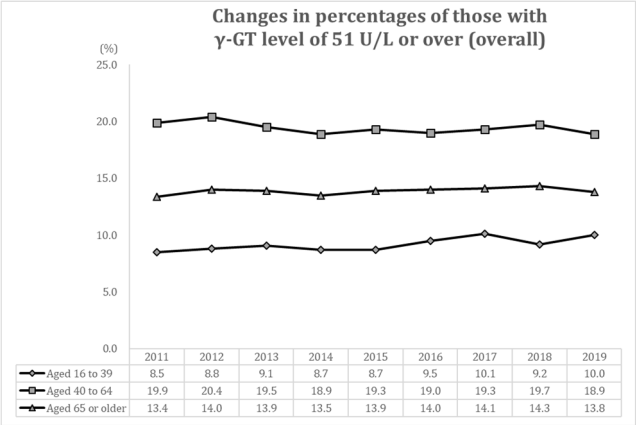
The percentages of those with AST level of 31 U/L or over, those with ALT level of 31 U/L or over, and those with γ-GT level of 51 U/L or over showed no substantial changes in any age group.



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 16 to 39	8.2	8.7	8.4	8.3	8.8	9.3	9.8	9.1	9.6
Aged 40 to 64	14.5	15.8	14.1	13.7	13.4	14.1	15.3	14.5	14.3
Aged 65 or older	17.7	19.5	16.8	16.8	16.8	17.0	17.6	16.4	15.6



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 16 to 39	15.9	16.9	16.1	15.5	16.0	16.7	17.5	17.7	17.5
Aged 40 to 64	20.8	21.4	20.0	19.5	19.7	19.3	20.2	21.2	20.8
Aged 65 or older	13.6	14.2	13.0	13.3	13.1	12.7	12.2	13.4	13.2



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 16 to 39	8.5	8.8	9.1	8.7	8.7	9.5	10.1	9.2	10.0
Aged 40 to 64	19.9	20.4	19.5	18.9	19.3	19.0	19.3	19.7	18.9
Aged 65 or older	13.4	14.0	13.9	13.5	13.9	14.0	14.1	14.3	13.8

2. Explanation of Health Check Item (AST, ALT, γ-GT)

AST, ALT and γ-GT levels are clues for detecting hepatic diseases. AST (GOT) levels are clues for detecting myocardial infarction.

3. Reference Intervals and Action Thresholds (Used for Group and Individual Health Checks)

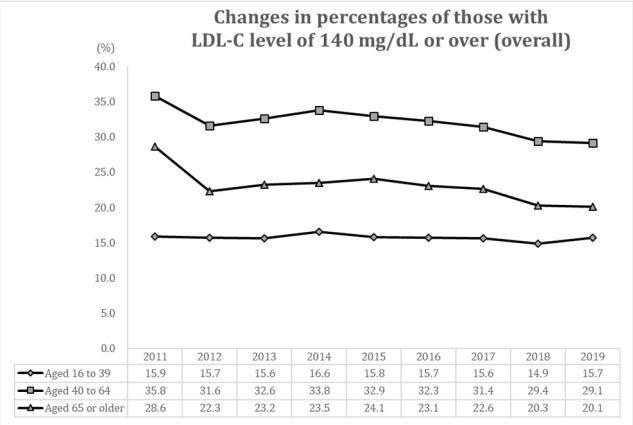
Item \ Diagnosis	Reference Interval	Action Threshold	Abnormality	Unit
AST (GOT)	30 or lower	31-50	51 or over	U/L
ALT (GPT)	30 or lower	31-50	51 or over	U/L
γ-GT	50 or lower	51-100	101 or over	U/L

Lipids: LDL Cholesterol, Triglyceride, HDL Cholesterol

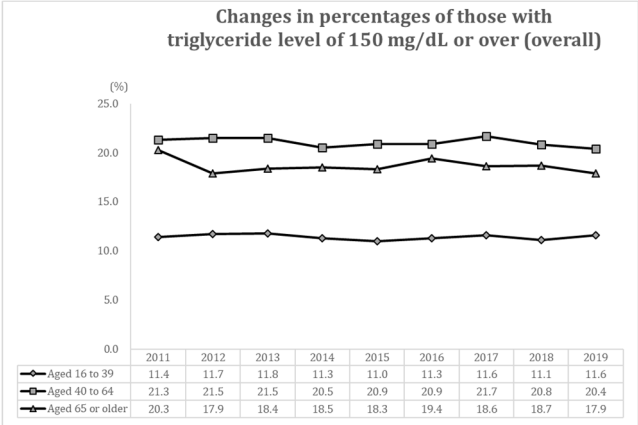
1. Results

The percentages of those with LDL-C levels of 140 mg/dL or over and those with triglyceride levels of 150 mg/dL or over slightly decreased among those aged 65 or older from FY2011 to FY2012, but remained almost the same thereafter.

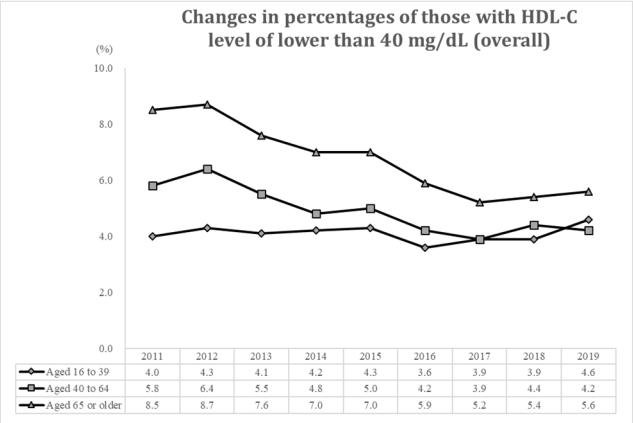
The percentage of those with HDL-C level of lower than 40 mg/dL showed a declining trend among those aged 40 or older from FY2011 to FY2019.



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 16 to 39	15.9	15.7	15.6	16.6	15.8	15.7	15.6	14.9	15.7
Aged 40 to 64	35.8	31.6	32.6	33.8	32.9	32.3	31.4	29.4	29.1
Aged 65 or older	28.6	22.3	23.2	23.5	24.1	23.1	22.6	20.3	20.1



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 16 to 39	11.4	11.7	11.8	11.3	11.0	11.3	11.6	11.1	11.6
Aged 40 to 64	21.3	21.5	21.5	20.5	20.9	20.9	21.7	20.8	20.4
Aged 65 or older	20.3	17.9	18.4	18.5	18.3	19.4	18.6	18.7	17.9



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 16 to 39	4.0	4.3	4.1	4.2	4.3	3.6	3.9	3.9	4.6
Aged 40 to 64	5.8	6.4	5.5	4.8	5.0	4.2	3.9	4.4	4.2
Aged 65 or older	8.5	8.7	7.6	7.0	7.0	5.9	5.2	5.4	5.6

2. Explanation of Health Check Item (LDL Cholesterol, Triglycerides, HDL Cholesterol)

Possible risks of arteriosclerosis are examined.

3. Reference Intervals and Action Thresholds (Used for Group and Individual Health Checks)

Item \ Diagnosis	Reference Interval	Action Threshold	Abnormality	Unit
LDL cholesterol	119 or lower	120-139	140 or over	mg/dL
Triglyceride	149 or lower	150-299	300 or over	mg/dL
HDL cholesterol	40 or over	35-39	34 or lower	mg/dL

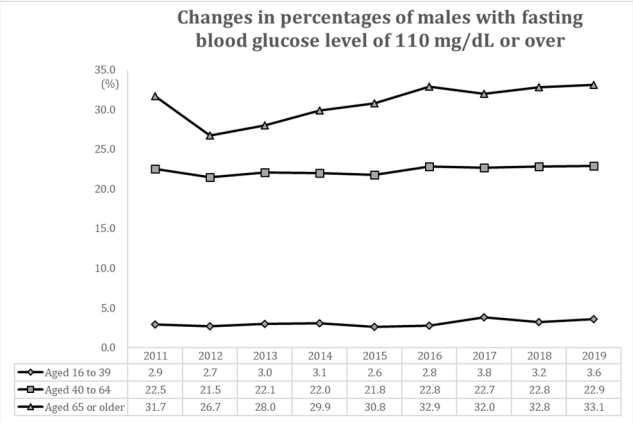
Blood Glucose: Fasting Blood Glucose, HbA1c

1. Results

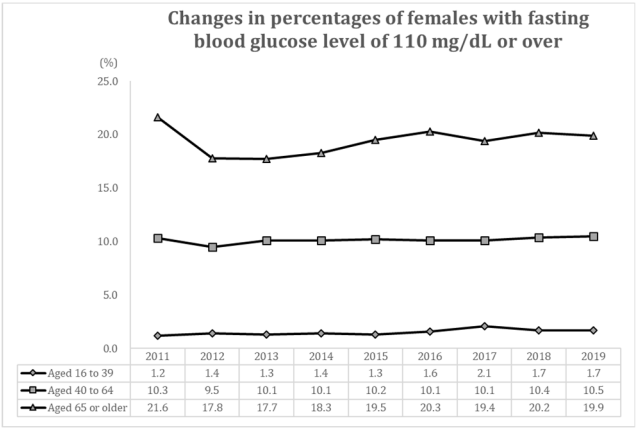
Among male and females aged 65 or older, the percentages of those with fasting blood glucose level of 110 mg/dL or over decreased from FY2011 to FY2012, but maintained almost the same levels thereafter.

The percentages of those with HbA1c levels ≥ 5.8% ("borderline type")* and ≥ 6.5% ("diabetes")* both increased in all age groups from FY2011 to FY2019.

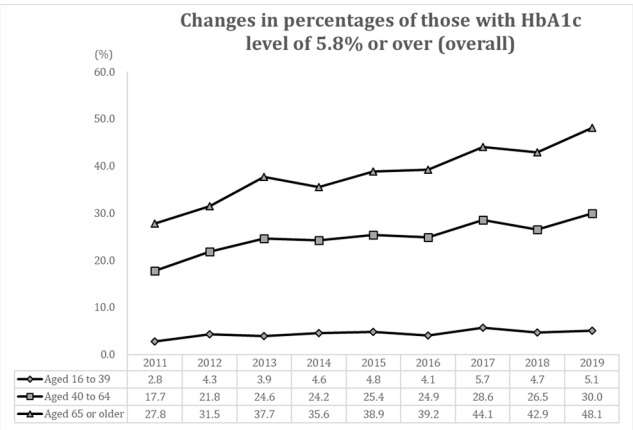
* Individuals with the HbA1c level of 5.8% or over are categorized as "borderline type" and those with the HbA1c level of 6.5% or over are categorized "diabetic type" in the Treatment Guide for Diabetes 2012-2013 of the Japan Diabetes Society (JDS). In this report, a diagnosis of being diabetic type based on one examination is referred to as "diabetes" in accordance with the 1999 report of a JDS committee on classification and diagnostic criteria.



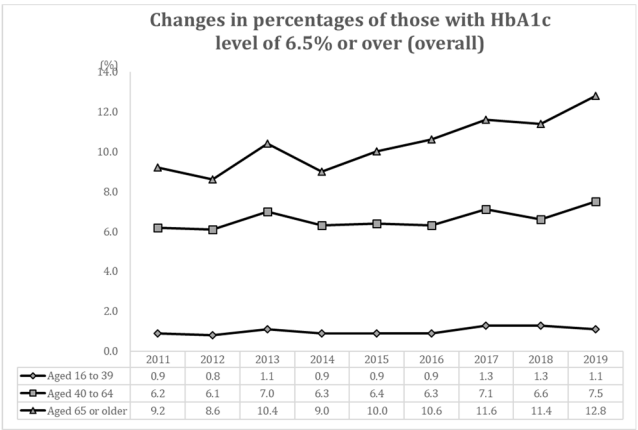
	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 16 to 39	2.9	2.7	3.0	3.1	2.6	2.8	3.8	3.2	3.6
Aged 40 to 64	22.5	21.5	22.1	22.0	21.8	22.8	22.7	22.8	22.9
Aged 65 or older	31.7	26.7	28.0	29.9	30.8	32.9	32.0	32.8	33.1



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 16 to 39	1.2	1.4	1.3	1.4	1.3	1.6	2.1	1.7	1.7
Aged 40 to 64	10.3	9.5	10.1	10.1	10.2	10.1	10.1	10.4	10.5
Aged 65 or older	21.6	17.8	17.7	18.3	19.5	20.3	19.4	20.2	19.9



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 16 to 39	2.8	4.3	3.9	4.6	4.8	4.1	5.7	4.7	5.1
Aged 40 to 64	17.7	21.8	24.6	24.2	25.4	24.9	28.6	26.5	30.0
Aged 65 or older	27.8	31.5	37.7	35.6	38.9	39.2	44.1	42.9	48.1



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 16 to 39	0.9	0.8	1.1	0.9	0.9	0.9	1.3	1.3	1.1
Aged 40 to 64	6.2	6.1	7.0	6.3	6.4	6.3	7.1	6.6	7.5
Aged 65 or older	9.2	8.6	10.4	9.0	10.0	10.6	11.6	11.4	12.8

2. Explanation of Health Check Item (Fasting Blood Glucose, HbA1c)

Fasting blood glucose and HbA1c levels are clues for detecting diabetes, etc.

3. Reference Intervals and Action Thresholds (Used for Group and Individual Health Checks)

Item \ Diagnosis		Reference Interval	Action Threshold	Abnormality	Unit
Blood glucose	Fasting	99 or lower	100-125	126 or over	mg/dL
	Casual	139 or lower	140-199	200 or over	
HbA1c		5.5 or lower	5.6-6.4	6.5 or over	%

* HbA1c levels of 5.8% or over and 6.5% or over are the criteria for "borderline type" and "diabetes" in the Treatment Guide for Diabetes 2012-2013 of the Japan Diabetes Society.

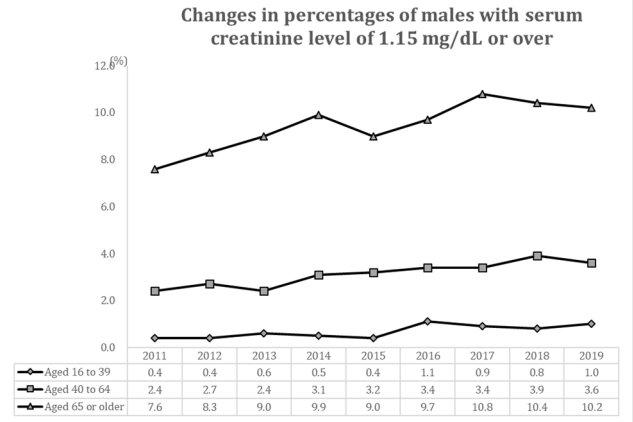
Renal Function (Serum Creatinine, eGFR)

1. Results

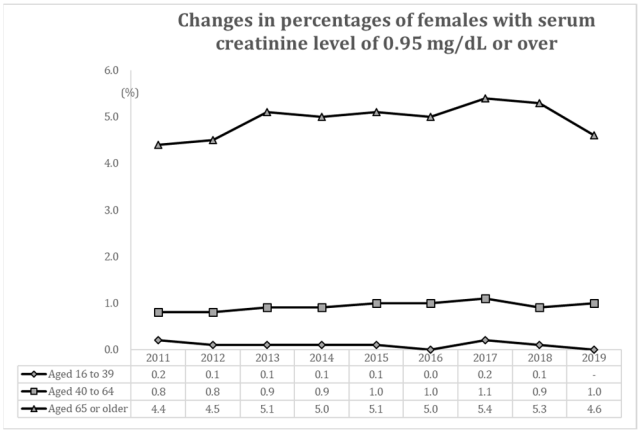
The percentage of males with serum creatinine level of 1.15 mg/dL or over increased among those aged 40 to 64 from FY2011 to FY2019, while the relevant percentage for males aged 65 or older continued to increase until FY2017, exceeded 10%, and maintained that level until FY2019.

The percentage of females aged 65 or older with serum creatinine level of 0.95 mg/dL or over exceeded 5% in FY2013, maintained that level until FY2018, then decreased to 4.6% in FY2019.

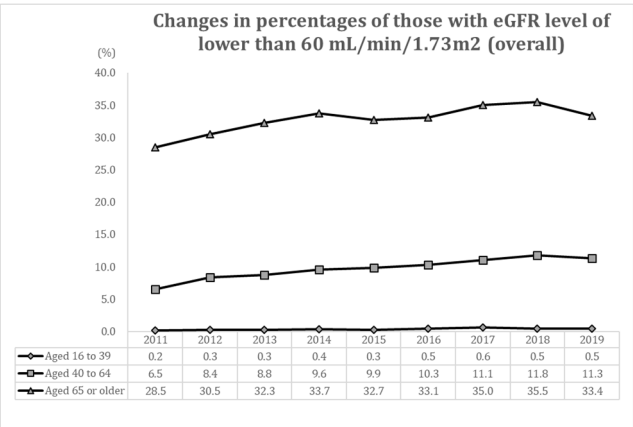
The percentages of those with eGFR level of lower than 60 mL/min/1.73m^2 showed increases among those aged 40 to 64 and those aged 65 or older, and the rate of increase was especially large for those aged 40 to 64.



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 16 to 39	0.4	0.4	0.6	0.5	0.4	1.1	0.9	0.8	1.0
Aged 40 to 64	2.4	2.7	2.4	3.1	3.2	3.4	3.4	3.9	3.6
Aged 65 or older	7.6	8.3	9.0	9.9	9.0	9.7	10.8	10.4	10.2



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 16 to 39	0.2	0.1	0.1	0.1	0.1	0.0	0.2	0.1	-
Aged 40 to 64	0.8	0.8	0.9	0.9	1.0	1.0	1.1	0.9	1.0
Aged 65 or older	4.4	4.5	5.1	5.0	5.1	5.0	5.4	5.3	4.6



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 16 to 39	0.2	0.3	0.3	0.4	0.3	0.5	0.6	0.5	0.5
Aged 40 to 64	6.5	8.4	8.8	9.6	9.9	10.3	11.1	11.8	11.3
Aged 65 or older	28.5	30.5	32.3	33.7	32.7	33.1	35.0	35.5	33.4

2. Explanation of Health Check Item (Serum Creatinine, eGFR)

Serum creatinine and eGFR levels are clues for detecting kidney diseases.

3. Reference Intervals and Action Thresholds (Used for Group and Individual Health Checks)

Item \ Diagnosis		Reference Interval	Action Threshold	Abnormality	Unit
Serum creatinine (Enzymatic method)	Males	0.45-1.14	1.15-1.34	1.35 or over	mg/dL
	Females	0.35-0.94	0.95-1.14	1.15 or over	
eGFR (Estimated glomerular filtration rate)		60.0 or over	45.0-59.9	44.9 or lower	mL/min./1.73m^2

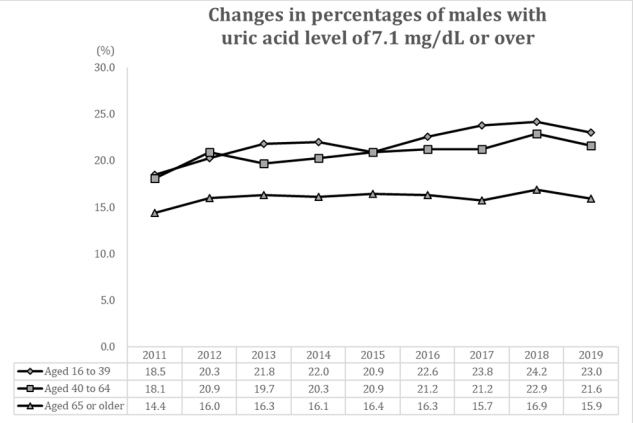
Renal Function: Uric Acid

1. Results

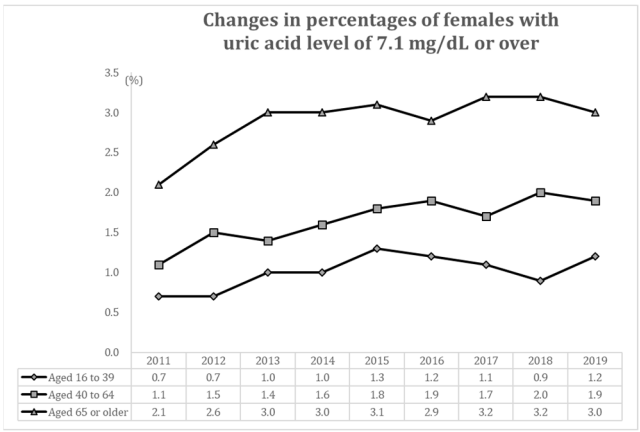
The percentage of males with uric acid levels of 7.1 mg/dL or over increased for all age groups from FY2011 to FY2018 but decreased slightly in FY2019. The percentage among females slightly increased in all age groups from FY2011 to FY2019.

The percentage of males with uric acid levels of 7.9 mg/dL or over increased among those aged 16 to 39 and those aged 40 to 64 from FY2011 to FY2019.

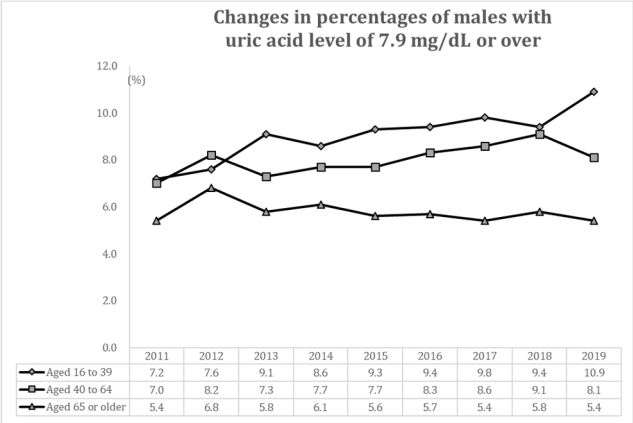
The percentage of females with uric acid levels of 5.6 mg/dL or over increased from FY2011 to FY2019 in all age groups.



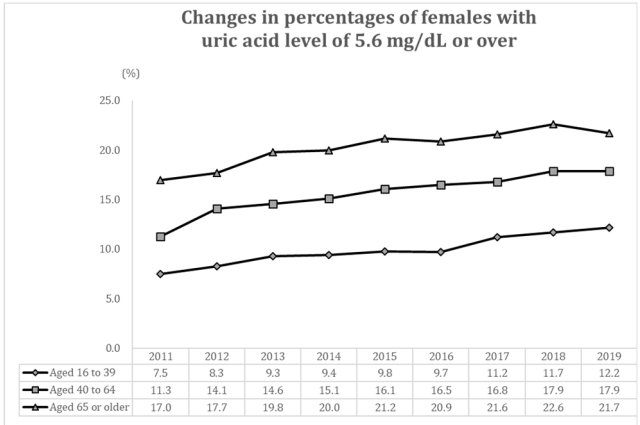
	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 16 to 39	18.5	20.3	21.8	22.0	20.9	22.6	23.8	24.2	23.0
Aged 40 to 64	18.1	20.9	19.7	20.3	20.9	21.2	21.2	22.9	21.6
Aged 65 or older	14.4	16.0	16.3	16.1	16.4	16.3	15.7	16.9	15.9



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 16 to 39	0.7	0.7	1.0	1.0	1.3	1.2	1.1	0.9	1.2
Aged 40 to 64	1.1	1.5	1.4	1.6	1.8	1.9	1.7	2.0	1.9
Aged 65 or older	2.1	2.6	3.0	3.0	3.1	2.9	3.2	3.2	3.0



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 16 to 39	7.2	7.6	9.1	8.6	9.3	9.4	9.8	9.4	10.9
Aged 40 to 64	7.0	8.2	7.3	7.7	7.7	8.3	8.6	9.1	8.1
Aged 65 or older	5.4	6.8	5.8	6.1	5.6	5.7	5.4	5.8	5.4



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Aged 16 to 39	7.5	8.3	9.3	9.4	9.8	9.7	11.2	11.7	12.2
Aged 40 to 64	11.3	14.1	14.6	15.1	16.1	16.5	16.8	17.9	17.9
Aged 65 or older	17.0	17.7	19.8	20.0	21.2	20.9	21.6	22.6	21.7

2. Explanation of Health Check Item (Uric Acid)

Uric acid levels are clues for detecting gout, etc.

3. Reference Interval and Action Threshold (Used for Group and Individual Health Checks)

Item \ Diagnosis	Reference Interval	Action Threshold	Abnormality	Unit
Uric acid	7.0 or lower	7.1-7.9	8.0 or over	mg/dL

* A uric acid level of 7.1 mg/dL is the value defined in the Guideline for the Management of Hyperuricemia and Gout by the Japanese Society of Gout and Uric & Nucleic Acids.

* Uric acid levels of 7.9 mg/dL or over for males and 5.6 mg/dL or over for females are values exceeding the upper limits of the common reference intervals established by the Japanese Committee for Clinical Laboratory Standards.

FY2019 Comprehensive Health Check
Fukushima Health Management Survey
Results of Tabulation by Health Check Item

[Coverage]

- Residents registered at covered areas* from March 11, 2011 to April 1, 2012 (also after moving out from those covered areas)
- Residents registered at evacuation zones, etc. as of April 1 of the examination year
- Others, as warranted, based on Basic Survey results, even if the above conditions are not met

* Covered areas: Municipalities designated as the evacuation zone in 2011
Hirono Town, Naraha Town, Tomioka Town, Kawauchi Village, Okuma Town, Futaba Town, Namie Town, Katsurao Village, Iitate Village, Minamisoma City, Tamura City and Kawamata Town, and parts of Date City (containing specific spots recommended for evacuation)

[Examination Items]

Age Group	Examination items
0-6 years old (Preschool children and infants)	Height, weight [The items below are performed upon request] CBC (number of red blood cells, hematocrit, hemoglobin, platelet count, number of white blood cells, differential white blood count)
7-15 years old (from 1st to 9th grades)	Height, weight CBC (number of red blood cells, hematocrit, hemoglobin, platelet count, number of white blood cells, differential white blood count) [The items below are performed upon request] Blood biochemistry (AST, ALT, γ-GT, TG, HDL-C, LDL-C, HbA1c, plasma glucose, serum creatinine, uric acid)
16 years old and older	Height, weight, abdominal circumference (BMI), blood pressure, CBC (number of red blood cells, hematocrit, hemoglobin, platelet count, number of white blood cells, differential white blood count), Urine test (urine sugar, urine protein, urine occult blood), Blood biochemistry (AST, ALT, γ-GT, TG, HDL-C, LDL-C, HbA1c, plasma glucose, serum creatinine, estimated glomerular filtration rate [eGFR],uric acid) The underlined values are not routinely measured during regular health checks.

* As general age categories and items for the Comprehensive Health Check do not correspond, we classified the participants into five age groups, namely, those aged 0 to 6, those aged 7 to 15, those aged 16 to 39, those aged 40 to 64, and those aged 65 or older, and tabulated the results by each health

* For each health check item, tabulation was conducted by age group and by gender.

* Tabulation results include those who received health checks twice or more in the same fiscal year.

* Rules for describing tabulation results are the same as those used for the Vital Statistics in Japan by the Ministry of Health, Labour and Welfare.

When there is no data: -

When an item is not applicable to the relevant age group: ・

When it is inappropriate to indicate data: …

When the ratio is minor (lower than 0.05): 0.0%

Height

Height (cm) (overall)			
Age group	Number of participants	Average age	Average value
0 to 6	959	3.4	93.8
7 to 15	2,457	11.2	143.6
16 to 39	2,984	29.4	163.0
40 to 64	10,095	55.1	160.7
65 or older	19,525	73.4	155.8

Height (cm) (males)					
Age group	Number of participants	Average age	Average value	150 cm or shorter	170 cm or taller
0 to 6	488	3.4	94.1	…	…
7 to 15	1,232	11.2	144.6	…	…
16 to 39	1,174	28.1	170.7	0.6%	54.9%
40 to 64	3,608	55.4	168.8	0.1%	42.8%
65 or older	8,977	73.5	162.7	2.3%	12.2%

Height (cm) (females)					
Age group	Number of participants	Average age	Average value	140 cm or shorter	160 cm or taller
0 to 6	471	3.5	93.4	…	…
7 to 15	1,225	11.3	142.5	…	…
16 to 39	1,810	30.2	158.0	0.3%	36.7%
40 to 64	6,487	54.9	156.1	0.4%	24.4%
65 or older	10,548	73.2	149.9	5.4%	3.9%

Weight

Weight (kg) (overall)			
Age group	Number of participants	Average age	Average value
0 to 6	959	3.4	14.4
7 to 15	2,457	11.2	38.7
16 to 39	2,984	29.4	60.9
40 to 64	10,095	55.1	62.1
65 or older	19,526	73.4	58.3

Weight (kg) (males)					
Age group	Number of participants	Average age	Average value	50 kg or less	70 kg or over
0 to 6	488	3.4	14.6	...	...
7 to 15	1,232	11.2	39.7	...	...
16 to 39	1,174	28.1	69.3	6.0%	41.7%
40 to 64	3,608	55.4	70.7	2.2%	48.3%
65 or older	8,977	73.5	64.3	6.1%	25.5%

Weight (kg) (females)					
Age group	Number of participants	Average age	Average value	45 kg or less	65 kg or over
0 to 6	471	3.5	14.2	...	...
7 to 15	1,225	11.3	37.7	...	...
16 to 39	1,810	30.2	55.5	12.9%	16.3%
40 to 64	6,487	54.9	57.3	8.6%	20.1%
65 or older	10,549	73.2	53.2	16.7%	9.4%

1. Physical Exam (1) BMI

BMI (Weight/Height^2) (overall)					
Age group	Number of participants	Average age	Average value	18 kg/m^2 or lower	25 kg/m^2 or over
0 to 6	.	.	.	.	.
7 to 15	.	.	.	.	.
16 to 39	2,984	29.4	22.8	8.5%	25.2%
40 to 64	10,095	55.1	24.0	3.7%	35.6%
65 or older	19,525	73.4	23.9	2.8%	35.2%

BMI (Weight/Height^2) (males)					
Age group	Number of participants	Average age	Average value	18 kg/m^2 or lower	25 kg/m^2 or over
0 to 6	.	.	.	.	.
7 to 15	.	.	.	.	.
16 to 39	1,174	28.1	23.7	6.0%	32.5%
40 to 64	3,608	55.4	24.8	1.7%	43.9%
65 or older	8,977	73.5	24.2	1.7%	38.4%

BMI (Weight/Height^2) (females)					
Age group	Number of participants	Average age	Average value	18 kg/m^2 or lower	25 kg/m^2 or over
0 to 6	.	.	.	.	.
7 to 15	.	.	.	.	.
16 to 39	1,810	30.2	22.2	10.2%	20.5%
40 to 64	6,487	54.9	23.5	4.8%	31.0%
65 or older	10,548	73.2	23.7	3.8%	32.4%

1. Physical Exam (2) Abdominal Circumference

Abdominal circumference (cm) (overall)			
Age group	Number of participants	Average age	Average value
0 to 6	·	·	·
7 to 15	·	·	·
16 to 39	786	28.3	77.8
40 to 64	10,093	55.1	84.2
65 or older	12,831	69.7	84.9

Abdominal circumference (cm) (males)				
Age group	Number of participants	Average age	Average value	85 cm or over
0 to 6	·	·	·	·
7 to 15	·	·	·	·
16 to 39	368	28.4	81.5	34.5%
40 to 64	3,608	55.4	87.1	56.3%
65 or older	5,849	69.9	86.5	56.5%

Abdominal circumference (cm) (females)				
Age group	Number of participants	Average age	Average value	90 cm or over
0 to 6	·	·	·	·
7 to 15	·	·	·	·
16 to 39	418	28.2	74.6	8.1%
40 to 64	6,485	55.0	82.6	22.4%
65 or older	6,982	69.6	83.5	23.1%

1. Physical Exam (3) Blood Pressure

Systolic blood pressure (mmHg) (overall)				
Age group	Number of participants	Average age	Average value	140 mmHg or over
0 to 6	.	.	.	.
7 to 15	2,454	11.2	105.8	0.2%
16 to 39	2,984	29.4	112.0	2.7%
40 to 64	10,095	55.1	123.4	13.8%
65 or older	19,529	73.4	131.0	26.0%

Systolic blood pressure (mmHg) (males)				
Age group	Number of participants	Average age	Average value	140 mmHg or over
0 to 6	.	.	.	.
7 to 15	1,231	11.2	106.8	0.2%
16 to 39	1,174	28.1	117.2	4.8%
40 to 64	3,608	55.4	126.7	17.0%
65 or older	8,978	73.5	131.7	28.0%

Systolic blood pressure (mmHg) (females)				
Age group	Number of participants	Average age	Average value	140 mmHg or over
0 to 6	.	.	.	.
7 to 15	1,223	11.3	104.8	0.1%
16 to 39	1,810	30.2	108.6	1.4%
40 to 64	6,487	54.9	121.6	12.0%
65 or older	10,551	73.2	130.3	24.3%

Diastolic blood pressure (mmHg) (overall)				
Age group	Number of participants	Average age	Average value	90 mmHg or over
0 to 6	.	.	.	.
7 to 15	2,454	11.2	61.3	0.6%
16 to 39	2,984	29.4	67.2	2.9%
40 to 64	10,095	55.1	75.0	9.9%
65 or older	19,529	73.4	73.5	6.8%

Diastolic blood pressure (mmHg) (males)				
Age group	Number of participants	Average age	Average value	90 mmHg or over
0 to 6	.	.	.	.
7 to 15	1,231	11.2	61.4	0.8%
16 to 39	1,174	28.1	69.6	5.1%
40 to 64	3,608	55.4	78.6	15.0%
65 or older	8,978	73.5	74.7	8.2%

Diastolic blood pressure (mmHg) (females)				
Age group	Number of participants	Average age	Average value	90 mmHg or over
0 to 6	.	.	.	.
7 to 15	1,223	11.3	61.3	0.3%
16 to 39	1,810	30.2	65.6	1.5%
40 to 64	6,487	54.9	73.0	7.2%
65 or older	10,551	73.2	72.5	5.6%

2. Urine Test (1) Urine Sugar

Urine sugar (overall)			
Age group	Number of participants	Average age	(1+) or over
0 to 6	·	·	·
7 to 15	·	·	·
16 to 39	2,971	29.4	1.1%
40 to 64	10,079	55.1	3.9%
65 or older	19,501	73.4	4.4%

Urine sugar (males)			
Age group	Number of participants	Average age	(1+) or over
0 to 6	·	·	·
7 to 15	·	·	·
16 to 39	1,174	28.1	1.5%
40 to 64	3,602	55.4	6.7%
65 or older	8,963	73.5	6.8%

Urine sugar (females)			
Age group	Number of participants	Average age	(1+) or over
0 to 6	·	·	·
7 to 15	·	·	·
16 to 39	1,797	30.2	0.8%
40 to 64	6,477	55.0	2.4%
65 or older	10,538	73.2	2.4%

2. Urine Test (2) Urine Protein

Urine protein (overall)			
Age group	Number of participants	Average age	(1+) or over
0 to 6	·	·	·
7 to 15	·	·	·
16 to 39	2,971	29.4	2.3%
40 to 64	10,079	55.1	1.5%
65 or older	19,501	73.4	3.0%

Urine protein (males)			
Age group	Number of participants	Average age	(1+) or over
0 to 6	·	·	·
7 to 15	·	·	·
16 to 39	1,174	28.1	2.5%
40 to 64	3,602	55.4	2.1%
65 or older	8,963	73.5	4.5%

Urine protein (females)			
Age group	Number of participants	Average age	(1+) or over
0 to 6	·	·	·
7 to 15	·	·	·
16 to 39	1,797	30.2	2.2%
40 to 64	6,477	55.0	1.1%
65 or older	10,538	73.2	1.7%

2. Urine Test (3) Urine Occult Blood

Urine occult blood (overall)				
Age group	Number of participants	Average age	(1+) or over	(1+) or over and excluding those on their period
0 to 6	·	·	·	·
7 to 15	·	·	·	·
16 to 39	2,969	29.4	6.4%	2.5%
40 to 64	10,076	55.1	5.8%	4.6%
65 or older	19,501	73.4	5.4%	5.4%

Urine occult blood (males)			
Age group	Number of participants	Average age	(1+) or over
0 to 6	·	·	·
7 to 15	·	·	·
16 to 39	1,174	28.1	0.9%
40 to 64	3,602	55.4	2.4%
65 or older	8,963	73.5	3.8%

Urine occult blood (females)				
Age group	Number of participants	Average age	(1+) or over	(1+) or over and excluding those on their period
0 to 6	·	·	·	·
7 to 15	·	·	·	·
16 to 39	1,795	30.2	10.0%	3.5%
40 to 64	6,474	55.0	7.7%	5.8%
65 or older	10,538	73.2	6.8%	6.8%

3. Peripheral Blood Test (1)-1 Red Blood Cells

Red blood cell count (10^6/μL) (overall)			
Age group	Number of participants	Average age	Average value
0 to 6	886	3.5	4.68
7 to 15	2,446	11.2	4.80
16 to 39	2,980	29.4	4.76
40 to 64	10,085	55.1	4.60
65 or older	19,518	73.4	4.46

Red blood cell count (10^6/μL) (males)						
Age group	Number of participants	Average age	Average value	3.69×10^6/μL or lower	3.99×10^6/μL or lower	5.80×10^6/μL or over
0 to 6	456	3.4	4.70	-	0.2%	0.2%
7 to 15	1,227	11.2	4.92	-	0.3%	1.0%
16 to 39	1,172	28.1	5.18	-	-	4.9%
40 to 64	3,604	55.4	4.89	0.8%	2.6%	2.4%
65 or older	8,974	73.5	4.63	3.1%	8.9%	0.8%

Red blood cell count (10^6/μL) (females)						
Age group	Number of participants	Average age	Average value	3.39×10^6/μL or lower	3.69×10^6/μL or lower	5.50×10^6/μL or over
0 to 6	430	3.5	4.65	-	-	0.9%
7 to 15	1,219	11.3	4.68	-	0.1%	0.5%
16 to 39	1,808	30.2	4.49	0.2%	1.2%	0.5%
40 to 64	6,481	54.9	4.45	0.2%	1.7%	0.4%
65 or older	10,544	73.2	4.32	1.4%	5.5%	0.2%

3. Peripheral Blood Test (1)-2 Hemoglobin

Hemoglobin (g/dL) (overall)			
Age group	Number of participants	Average age	Average value
0 to 6	886	3.5	12.5
7 to 15	2,446	11.2	13.6
16 to 39	2,980	29.4	14.1
40 to 64	10,085	55.1	13.9
65 or older	19,518	73.4	13.8

Hemoglobin (g/dL) (males)						
Age group	Number of participants	Average age	Average value	12.0 g/dL or lower	13.0 g/dL or lower	18.0 g/dL or over
0 to 6	456	3.4	12.5	32.7%	75.9%	-
7 to 15	1,227	11.2	13.8	3.7%	22.7%	0.2%
16 to 39	1,172	28.1	15.6	0.3%	0.9%	0.9%
40 to 64	3,604	55.4	15.1	1.1%	3.9%	0.9%
65 or older	8,974	73.5	14.5	4.4%	13.3%	0.5%

Hemoglobin (g/dL) (females)						
Age group	Number of participants	Average age	Average value	11.0 g/dL or lower	12.0 g/dL orlower	16.0 g/dL orover
0 to 6	430	3.5	12.5	3.5%	27.7%	-
7 to 15	1,219	11.3	13.3	0.7%	6.7%	-
16 to 39	1,808	30.2	13.1	6.0%	14.9%	0.2%
40 to 64	6,481	54.9	13.2	4.5%	12.6%	0.5%
65 or older	10,544	73.2	13.1	3.1%	14.9%	0.4%

3. Peripheral Blood Test (1)-3 Hematocrit

Hematocrit (%) (overall)			
Age group	Number of participants	Average age	Average value
0 to 6	886	3.5	37.8
7 to 15	2,446	11.2	40.9
16 to 39	2,980	29.4	42.4
40 to 64	10,085	55.1	42.1
65 or older	19,518	73.4	41.8

Hematocrit (%) (males)						
Age group	Number of examinees (people)	Average age	Average value	35.9% or lower	37.9% or lower	55.0% or over
0 to 6	456	3.4	37.7	26.5%	54.6%	-
7 to 15	1,227	11.2	41.5	3.1%	12.8%	0.1%
16 to 39	1,172	28.1	46.3	0.2%	0.3%	0.3%
40 to 64	3,604	55.4	45.2	0.8%	2.1%	0.5%
65 or older	8,974	73.5	43.6	3.3%	7.5%	0.3%

Hematocrit (%) (females)						
Age group	Number of participants	Average age	Average value	28.9% or lower	32.9% or lower	48.0% or over
0 to 6	430	3.5	38.0	-	2.8%	0.2%
7 to 15	1,219	11.3	40.3	-	0.4%	0.1%
16 to 39	1,808	30.2	39.9	0.2%	2.2%	0.5%
40 to 64	6,481	54.9	40.4	0.5%	2.2%	0.7%
65 or older	10,544	73.2	40.2	0.3%	1.8%	0.8%

3. Peripheral Blood Test (2) Platelet Count

Platelet count (10^3/μL) (overall)							
Age group	Number of participants	Average age	Average value	89×10^3/μL or lower	129×10^3/μL or lower	370×10^3/μL or over	450×10^3/μL or over
0 to 6	884	3.5	353.5	-	0.1%	37.7%	11.2%
7 to 15	2,446	11.2	289.8	0.0%	0.2%	8.8%	1.3%
16 to 39	2,978	29.4	266.9	0.1%	0.4%	5.4%	0.6%
40 to 64	10,080	55.1	256.5	0.1%	0.6%	4.2%	0.7%
65 or older	19,507	73.4	228.4	0.3%	1.8%	1.5%	0.3%

Platelet count (10^3/μL) (males)							
Age group	Number of participants	Average age	Average value	89×10^3/μL or lower	129×10^3/μL or lower	370×10^3/μL or over	450×10^3/μL or over
0 to 6	454	3.4	351.3	-	0.2%	36.1%	11.5%
7 to 15	1,227	11.2	292.1	-	0.2%	9.9%	1.5%
16 to 39	1,171	28.1	259.6	-	0.3%	2.7%	0.3%
40 to 64	3,602	55.4	249.7	0.3%	1.0%	2.9%	0.3%
65 or older	8,972	73.5	220.5	0.2%	2.4%	1.3%	0.3%

Platelet count (10^3/μL) (females)							
Age group	Number of participants	Average age	Average value	89×10^3/μL or lower	129×10^3/μL or lower	370×10^3/μL or over	450×10^3/μL or over
0 to 6	430	3.5	355.9	-	-	39.3%	10.9%
7 to 15	1,219	11.3	287.5	0.1%	0.1%	7.7%	1.1%
16 to 39	1,807	30.2	271.6	0.1%	0.4%	7.1%	0.8%
40 to 64	6,478	54.9	260.3	0.0%	0.4%	4.9%	0.9%
65 or older	10,535	73.2	235.1	0.3%	1.3%	1.7%	0.3%

3. Peripheral Blood Test (3)-1 White Blood Cell Count

White blood cell count (10^3/μL) (overall)							
Age group	Number of participants	Average age	Average value	2.9×10^3/μL or lower	3.9×10^3/μL or lower	9.6×10^3/μL or over	11.1×10^3/μL or over
0 to 6	886	3.5	8.6	0.1%	0.5%	28.8%	14.1%
7 to 15	2,446	11.2	6.4	0.1%	2.5%	4.5%	1.6%
16 to 39	2,980	29.4	6.0	0.8%	7.9%	3.4%	0.9%
40 to 64	10,085	55.1	5.7	1.1%	11.4%	2.2%	0.7%
65 or older	19,518	73.4	5.7	0.7%	9.3%	1.7%	0.5%

White blood cell count (10^3/μL) (males)							
Age group	Number of participants	Average age	Average value	2.9×10^3/μL or lower	3.9×10^3/μL or lower	9.6×10^3/μL or over	11.1×10^3/μL or over
0 to 6	456	3.4	8.7	-	0.4%	32.0%	14.9%
7 to 15	1,227	11.2	6.5	0.1%	2.0%	4.7%	1.6%
16 to 39	1,172	28.1	6.0	0.4%	6.9%	3.4%	1.0%
40 to 64	3,604	55.4	6.1	0.5%	6.9%	3.5%	1.2%
65 or older	8,974	73.5	5.9	0.5%	7.1%	2.4%	0.8%

White blood cell count (10^3/μL) (females)							
Age group	Number of participants	Average age	Average value	2.9×10^3/μL or lower	3.9×10^3/μL or lower	9.6×10^3/μL or over	11.1×10^3/μL or over
0 to 6	430	3.5	8.5	0.2%	0.5%	25.3%	13.3%
7 to 15	1,219	11.3	6.4	0.1%	3.0%	4.3%	1.6%
16 to 39	1,808	30.2	5.9	1.0%	8.5%	3.4%	0.9%
40 to 64	6,481	54.9	5.4	1.4%	13.9%	1.5%	0.4%
65 or older	10,544	73.2	5.5	0.9%	11.1%	1.1%	0.3%

3. Peripheral Blood Test (3)-2 Neutrophil count

Neutrophil count (count/μL) (overall)			
Age group	Number of participants	Average age	Average value
0 to 6	886	3.5	3,330
7 to 15	2,446	11.2	3,197
16 to 39	2,979	29.4	3,469
40 to 64	10,083	55.1	3,216
65 or older	19,515	73.4	3,239

Neutrophil count (count/μL) (males)			
Age group	Number of participants	Average age	Average value
0 to 6	456	3.4	3,336
7 to 15	1,227	11.2	3,165
16 to 39	1,172	28.1	3,392
40 to 64	3,604	55.4	3,474
65 or older	8,973	73.5	3,411

Neutrophil count (count/μL) (females)			
Age group	Number of participants	Average age	Average value
0 to 6	430	3.5	3,325
7 to 15	1,219	11.3	3,229
16 to 39	1,807	30.2	3,520
40 to 64	6,479	54.9	3,073
65 or older	10,542	73.2	3,093

3. Peripheral Blood Test (3)-3 Lymphocyte Count

Lymphocyte count (count/μL) (overall)			
Age group	Number of participants	Average age	Average value
0 to 6	886	3.5	4,465
7 to 15	2,446	11.2	2,557
16 to 39	2,979	29.4	1,957
40 to 64	10,083	55.1	1,939
65 or older	19,515	73.4	1,916

Lymphocyte count (count/μL) (males)			
Age group	Number of participants	Average age	Average value
0 to 6	456	3.4	4,525
7 to 15	1,227	11.2	2,565
16 to 39	1,172	28.1	2,022
40 to 64	3,604	55.4	2,037
65 or older	8,973	73.5	1,905

Lymphocyte count (count/μL) (females)			
Age group	Number of participants	Average age	Average value
0 to 6	430	3.5	4,401
7 to 15	1,219	11.3	2,549
16 to 39	1,807	30.2	1,916
40 to 64	6,479	54.9	1,884
65 or older	10,542	73.2	1,926

3. Peripheral Blood Test (3)-4 Monocyte Count

Monocyte count (count/μL) (overall)			
Age group	Number of participants	Average age	Average value
0 to 6	886	3.5	454
7 to 15	2,446	11.2	347
16 to 39	2,979	29.4	318
40 to 64	10,083	55.1	308
65 or older	19,515	73.4	327

Monocyte count (count/μL) (males)			
Age group	Number of participants	Average age	Average value
0 to 6	456	3.4	471
7 to 15	1,227	11.2	361
16 to 39	1,172	28.1	340
40 to 64	3,604	55.4	353
65 or older	8,973	73.5	363

Monocyte count (count/μL) (females)			
Age group	Number of participants	Average age	Average value
0 to 6	430	3.5	436
7 to 15	1,219	11.3	332
16 to 39	1,807	30.2	304
40 to 64	6,479	54.9	283
65 or older	10,542	73.2	297

3. Peripheral Blood Test (3)-5 Eosinophil Count

Eosinophil count (count/μL) (overall)			
Age group	Number of participants	Average age	Average value
0 to 6	886	3.5	323
7 to 15	2,446	11.2	280
16 to 39	2,979	29.4	171
40 to 64	10,083	55.1	156
65 or older	19,515	73.4	153

Eosinophil count (count/μL) (males)			
Age group	Number of participants	Average age	Average value
0 to 6	456	3.4	346
7 to 15	1,227	11.2	327
16 to 39	1,172	28.1	199
40 to 64	3,604	55.4	184
65 or older	8,973	73.5	177

Eosinophil count (count/μL) (females)			
Age group	Number of participants	Average age	Average value
0 to 6	430	3.5	300
7 to 15	1,219	11.3	233
16 to 39	1,807	30.2	152
40 to 64	6,479	54.9	141
65 or older	10,542	73.2	133

3. Peripheral Blood Test (3)-5 Basophil Count

Basophil count (count/μL) (overall)			
Age group	Number of participants	Average age	Average value
0 to 6	886	3.5	39
7 to 15	2,446	11.2	36
16 to 39	2,979	29.4	37
40 to 64	10,083	55.1	39
65 or older	19,515	73.4	37

Basophil count (count/μL) (males)			
Age group	Number of participants	Average age	Average value
0 to 6	456	3.4	42
7 to 15	1,227	11.2	39
16 to 39	1,172	28.1	39
40 to 64	3,604	55.4	43
65 or older	8,973	73.5	39

Basophil count (count/μL) (males)			
Age group	Number of participants	Average age	Average value
0 to 6	430	3.5	37
7 to 15	1,219	11.3	33
16 to 39	1,807	30.2	36
40 to 64	6,479	54.9	37
65 or older	10,542	73.2	35

4. Blood Biochemistry (1)-1 Liver Function (AST)

AST (U/L) (overall)					
Age group	Number of participants	Average age	Average value	31 U/L or over	51 U/L or over
0 to 6	·	·	·	·	·
7 to 15	2,414	11.2	23.7	10.2%	0.7%
16 to 39	2,980	29.4	21.8	9.6%	2.8%
40 to 64	10,085	55.1	24.2	14.3%	3.0%
65 or older	19,518	73.4	25.3	15.6%	2.5%

AST (U/L) (males)					
Age group	Number of participants	Average age	Average value	31 U/L or over	51 U/L or over
0 to 6	·	·	·	·	·
7 to 15	1,212	11.2	25.3	14.5%	1.1%
16 to 39	1,172	28.1	26.5	18.5%	5.0%
40 to 64	3,604	55.4	27.1	22.2%	4.7%
65 or older	8,974	73.5	26.4	19.8%	3.3%

AST (U/L) (females)					
Age group	Number of participants	Average age	Average value	31 U/L or over	51 U/L or over
0 to 6	·	·	·	·	·
7 to 15	1,202	11.3	22.2	5.9%	0.4%
16 to 39	1,808	30.2	18.7	3.8%	1.3%
40 to 64	6,481	54.9	22.6	9.9%	2.0%
65 or older	10,544	73.2	24.3	12.1%	1.8%

4. Blood Biochemistry (1)-2 Liver Function (ALT)

ALT (U/L) (overall)					
Age group	Number of participants	Average age	Average value	31 U/L or over	51 U/L or over
0 to 6	·	·	·	·	·
7 to 15	2,414	11.2	15.9	4.6%	1.7%
16 to 39	2,980	29.4	23.7	17.5%	8.1%
40 to 64	10,085	55.1	24.5	20.8%	6.7%
65 or older	19,518	73.4	21.5	13.2%	3.1%

ALT (U/L) (males)					
Age group	Number of participants	Average age	Average value	31 U/L or over	51 U/L or over
0 to 6	·	·	·	·	·
7 to 15	1,212	11.2	18.4	7.0%	2.7%
16 to 39	1,172	28.1	35.1	35.4%	16.8%
40 to 64	3,604	55.4	30.8	34.8%	11.7%
65 or older	8,974	73.5	23.5	17.8%	4.1%

ALT (U/L) (females)					
Age group	Number of participants	Average age	Average value	31 U/L or over	51 U/L or over
0 to 6	·	·	·	·	·
7 to 15	1,202	11.3	13.3	2.2%	0.7%
16 to 39	1,808	30.2	16.3	5.9%	2.4%
40 to 64	6,481	54.9	21.0	13.1%	3.9%
65 or older	10,544	73.2	19.7	9.3%	2.2%

4. Blood Biochemistry (1)-3 Liver Function (γ-GT)

γ to GT (U/L) (overall)					
Age group	Number of participants	Average age	Average value	51 U/L or over	101 U/L or over
0 to 6	·	·	·	·	·
7 to 15	2,414	11.2	14.3	0.7%	0.1%
16 to 39	2,979	29.4	25.7	10.0%	2.5%
40 to 64	10,085	55.1	39.5	18.9%	6.1%
65 or older	19,518	73.4	33.8	13.8%	3.6%

γ to GT (U/L) (males)					
Age group	Number of participants	Average age	Average value	51 U/L or over	101 U/L or over
0 to 6	·	·	·	·	·
7 to 15	1,212	11.2	15.7	1.2%	0.2%
16 to 39	1,172	28.1	38.1	21.0%	5.7%
40 to 64	3,604	55.4	59.6	34.5%	12.1%
65 or older	8,974	73.5	44.1	22.0%	6.3%

γ to GT (U/L) (females)					
Age group	Number of participants	Average age	Average value	51 U/L or over	101 U/L or over
0 to 6	·	·	·	·	·
7 to 15	1,202	11.3	12.9	0.2%	-
16 to 39	1,807	30.2	17.6	2.9%	0.4%
40 to 64	6,481	54.9	28.3	10.2%	2.8%
65 or older	10,544	73.2	25.0	6.8%	1.3%

4. Blood Biochemistry (2)-1 Lipids (LDL Cholesterol)

LDL-C (mg/dL) (overall)					
Age group	Number of participants	Average age	Average value	120 mg/dL or over	140 mg/dL or over
0 to 6	·	·	·	·	·
7 to 15	2,414	11.2	91.8	11.0%	2.9%
16 to 39	2,980	29.4	110.1	33.5%	15.7%
40 to 64	10,085	55.1	124.1	54.0%	29.1%
65 or older	19,518	73.4	116.0	42.6%	20.1%

LDL-C (mg/dL) (males)					
Age group	Number of participants	Average age	Average value	120 mg/dL or over	140 mg/dL or over
0 to 6	·	·	·	·	·
7 to 15	1,212	11.2	90.5	10.7%	2.6%
16 to 39	1,172	28.1	114.7	40.4%	21.8%
40 to 64	3,604	55.4	121.9	51.9%	26.8%
65 or older	8,974	73.5	112.3	38.7%	17.0%

LDL-C (mg/dL) (females)					
Age group	Number of participants	Average age	Average value	120 mg/dL or over	140 mg/dL or over
0 to 6	·	·	·	·	·
7 to 15	1,202	11.3	93.2	11.2%	3.2%
16 to 39	1,808	30.2	107.0	29.0%	11.8%
40 to 64	6,481	54.9	125.4	55.2%	30.4%
65 or older	10,544	73.2	119.1	46.0%	22.7%

4. Blood Biochemistry (2)-2 Lipids (Triglyceride)

Triglyceride (TG) (mg/dL) (overall)					
Age group	Number of participants	Average age	Average value	150 mg/dL or over	300 mg/dL or over
0 to 6	·	·	·	·	·
7 to 15	2,414	11.2	81.5	9.0%	0.8%
16 to 39	2,979	29.4	89.2	11.6%	1.7%
40 to 64	10,085	55.1	115.0	20.4%	2.8%
65 or older	19,518	73.4	110.7	17.9%	1.5%

Triglyceride (TG) (mg/dL) (males)					
Age group	Number of participants	Average age	Average value	150 mg/dL or over	300 mg/dL or over
0 to 6	·	·	·	·	·
7 to 15	1,212	11.2	82.2	11.1%	1.2%
16 to 39	1,172	28.1	111.9	19.9%	3.5%
40 to 64	3,604	55.4	141.7	31.5%	5.3%
65 or older	8,974	73.5	116.4	21.0%	2.2%

Triglyceride (TG) (mg/dL) (females)					
Age group	Number of participants	Average age	Average value	150 mg/dL or over	300 mg/dL or over
0 to 6	·	·	·	·	·
7 to 15	1,202	11.3	80.7	7.0%	0.5%
16 to 39	1,807	30.2	74.5	6.2%	0.6%
40 to 64	6,481	54.9	100.2	14.2%	1.4%
65 or older	10,544	73.2	105.8	15.2%	0.8%

4. Blood Biochemistry (2)-3 Lipids (HDL Cholesterol)

HDL-C (mg/dL) (overall)				
Age group	Number of participants	Average age	Average value	Lower than 40 mg/dL
0 to 6	.	.	.	.
7 to 15	2,414	11.2	60.8	3.0%
16 to 39	2,980	29.4	62.0	4.6%
40 to 64	10,085	55.1	63.4	4.2%
65 or older	19,518	73.4	60.2	5.6%

HDL-C (mg/dL) (males)				
Age group	Number of participants	Average age	Average value	Lower than 40 mg/dL
0 to 6	.	.	.	.
7 to 15	1,212	11.2	60.7	3.0%
16 to 39	1,172	28.1	55.4	8.8%
40 to 64	3,604	55.4	56.7	8.5%
65 or older	8,974	73.5	56.4	9.0%

HDL-C (mg/dL) (females)				
Age group	Number of participants	Average age	Average value	Lower than 40 mg/dL
0 to 6	.	.	.	.
7 to 15	1,202	11.3	60.9	3.0%
16 to 39	1,808	30.2	66.2	1.8%
40 to 64	6,481	54.9	67.1	1.8%
65 or older	10,544	73.2	63.4	2.6%

4. Blood Biochemistry (3)-1 Blood Glucose (Fasting Blood Glucose)

Fasting blood glucose (mg/dL) (overall)						
Age group	Number of participants	Average age	Average value	110 mg/dL or over	130 mg/dL or over	160 mg/dL or over
0 to 6	.	.	.	.	.	.
7 to 15	1,609	11.4	86.9	0.2%	0.1%	0.1%
16 to 39	2,634	29.3	89.4	2.5%	1.1%	0.4%
40 to 64	9,132	55.1	99.1	14.9%	5.0%	1.4%
65 or older	16,795	73.1	104.6	25.9%	8.8%	2.0%

Fasting blood glucose (mg/dL) (males)						
Age group	Number of participants	Average age	Average value	110 mg/dL or over	130 mg/dL or over	160 mg/dL or over
0 to 6	.	.	.	.	.	.
7 to 15	792	11.4	87.5	0.3%	0.1%	0.1%
16 to 39	1,022	28.2	91.5	3.6%	1.5%	0.5%
40 to 64	3,224	55.3	103.8	22.9%	8.3%	2.4%
65 or older	7,692	73.3	107.9	33.1%	12.0%	2.8%

Fasting blood glucose (mg/dL) (females)						
Age group	Number of participants	Average age	Average value	110 mg/dL or over	130 mg/dL or over	160 mg/dL or over
0 to 6	.	.	.	.	.	.
7 to 15	817	11.5	86.2	0.1%	0.1%	0.1%
16 to 39	1,612	30.0	88.0	1.7%	0.9%	0.3%
40 to 64	5,908	54.9	96.5	10.5%	3.2%	0.9%
65 or older	9,103	72.9	101.9	19.9%	6.0%	1.2%

4. Blood Biochemistry (3)-2 Blood Glucose (HbA1c)

HbA1c (%) (NGSP) (overall)						
Age group	Number of participants	Average age	Average value	6.0% or over	7.0% or over	8.0% or over
0 to 6	·	·	·	·	·	·
7 to 15	2,411	11.2	5.3	0.5%	0.0%	-
16 to 39	2,980	29.4	5.3	2.4%	0.8%	0.4%
40 to 64	10,085	55.1	5.7	17.5%	3.8%	1.5%
65 or older	19,518	73.4	5.9	31.1%	5.7%	1.3%

HbA1c (%) (NGSP) (males)						
Age group	Number of participants	Average age	Average value	6.0% or over	7.0% or over	8.0% or over
0 to 6	·	·	·	·	·	·
7 to 15	1,209	11.2	5.3	0.7%	0.1%	-
16 to 39	1,172	28.1	5.3	2.4%	0.9%	0.5%
40 to 64	3,604	55.4	5.7	21.4%	5.6%	2.2%
65 or older	8,974	73.5	5.9	33.4%	7.3%	1.7%

HbA1c (%) (NGSP) (females)						
Age group	Number of participants	Average age	Average value	6.0% or over	7.0% or over	8.0% or over
0 to 6	·	·	·	·	·	·
7 to 15	1,202	11.3	5.3	0.4%	-	-
16 to 39	1,808	30.2	5.3	2.4%	0.7%	0.3%
40 to 64	6,481	54.9	5.6	15.3%	2.9%	1.1%
65 or older	10,544	73.2	5.8	29.2%	4.3%	1.0%

4. Blood Biochemistry (4)-1 Renal Function (Serum Creatinine)

Serum creatinine (mg/dL) (overall)			
Age group	Number of participants	Average age	Average value
0 to 6	·	·	·
7 to 15	2,414	11.2	0.49
16 to 39	2,980	29.4	0.70
40 to 64	10,085	55.1	0.74
65 or older	19,518	73.4	0.80

Serum creatinine (mg/dL) (males)					
Age group	Number of participants	Average age	Average value	1.15 mg/dL or over	1.35 mg/dL or over
0 to 6	·	·	·	·	·
7 to 15	1,212	11.2	0.50	-	-
16 to 39	1,172	28.1	0.83	1.0%	0.1%
40 to 64	3,604	55.4	0.89	3.6%	1.1%
65 or older	8,974	73.5	0.93	10.2%	3.9%

Serum creatinine (mg/dL) (females)					
Age group	Number of participants	Average age	Average value	0.95 mg/dL or over	1.15 mg/dL or over
0 to 6	·	·	·	·	·
7 to 15	1,202	11.3	0.47	-	-
16 to 39	1,808	30.2	0.61	-	-
40 to 64	6,481	54.9	0.66	1.0%	0.4%
65 or older	10,544	73.2	0.69	4.6%	1.4%

4. Blood Biochemistry (4)-2 Renal Function (eGFR)

eGFR (mL/min/1.73m^2) (overall)			
Age group	Number of participants	Average age	Average value
0 to 6	·	·	·
7 to 15	·	·	·
16 to 39	2,980	29.4	94.8
40 to 64	10,085	55.1	74.6
65 or older	19,518	73.4	65.6

eGFR (mL/min/1.73m^2) (males)			
Age group	Number of participants	Average age	Average value
0 to 6	·	·	·
7 to 15	·	·	·
16 to 39	1,172	28.1	94.4
40 to 64	3,604	55.4	74.2
65 or older	8,974	73.5	65.3

eGFR (mL/min/1.73m^2) (females)			
Age group	Number of participants	Average age	Average value
0 to 6	·	·	·
7 to 15	·	·	·
16 to 39	1,808	30.2	95.2
40 to 64	6,481	54.9	74.9
65 or older	10,544	73.2	65.8

4. Blood Biochemistry (4)-3 Renal Function (Uric Acid)

Uric acid (mg/dL) (overall)					
Age group	Number of participants	Average age	Average value	7.1 mg/dL or over	8.0 mg/dL or over
0 to 6	.	.	.	.	.
7 to 15	2,414	11.2	4.6	3.5%	1.0%
16 to 39	2,980	29.4	5.1	9.8%	3.9%
40 to 64	10,085	55.1	5.1	8.9%	2.8%
65 or older	19,518	73.4	5.2	8.9%	2.5%

Uric acid (mg/dL) (males)						
Age group	Number of participants	Average age	Average value	7.1 mg/dL or over	7.9 mg/dL or over	8.0 mg/dL or over
0 to 6	.	.	.	.	.	.
7 to 15	1,212	11.2	4.9	6.4%	2.3%	1.8%
16 to 39	1,172	28.1	6.2	23.0%	10.9%	9.6%
40 to 64	3,604	55.4	6.1	21.6%	8.1%	6.9%
65 or older	8,974	73.5	5.8	15.9%	5.4%	4.8%

Uric acid (mg/dL) (females)						
Age group	Number of participants	Average age	Average value	5.6 mg/dL or over	7.1 mg/dL or over	8.0 mg/dL or over
0 to 6	.	.	.	.	.	.
7 to 15	1,202	11.3	4.3	8.3%	0.6%	0.1%
16 to 39	1,808	30.2	4.4	12.2%	1.2%	0.3%
40 to 64	6,481	54.9	4.6	17.9%	1.9%	0.5%
65 or older	10,544	73.2	4.7	21.7%	3.0%	0.6%

Implementation Status of the Comprehensive Health Check, Fukushima Health Management Survey

1. Implementation Status for FY2011 to FY2019

(1) Number of participants by type and venue (in or outside Fukushima) of health checks

A. Participants aged 15 or younger

(Unit: people, %)

	FY2011	FY2012	FY2013	FY2014	FY2015	FY2016	FY3017	FY2018	FY2019
	Definite data Sep. 11, 2012	Definite data Jul. 5, 2013	Definite data Sep. 1, 2014	Definite data Sep. 1, 2015	Definite data Sep. 1, 2016	Definite data Dec. 31, 2017	Definite data Mar. 31, 2018	Definite data Mar. 31, 2019	Definite data Mar. 31, 2020
Number of eligible persons	27,819	27,077	26,474	25,883	25,296	24,600	23,660	22,744	21,580
Pediatric Health Checks in Fukushima	15,002	9,534	8,432	7,432	6,206	5,193	4,474	3,648	2,857
Pediatric Health Checks outside Fukushima	2,949	2,283	1,822	1,792	1,403	1,226	929	834	650
Number of those having received multiple health checks	17	37	6	8	6	6	0	3	3
Total (excluding the above)	17,934	11,780	10,248	9,216	7,603	6,413	5,403	4,479	3,504
Participation rate (%)	64.5%	43.5%	38.7%	35.6%	30.1%	26.1%	22.8%	19.7%	16.2%

B. Participants aged 16 or older

(Unit: people, %)

	FY2011	FY2012	FY2013	FY2014	FY2015	FY2016	FY3017	FY2018	FY2019
	Definite data Sep. 11, 2012	Definite data Jul. 5, 2013	Definite data Sep. 1, 2014	Definite data Sep. 1, 2015	Definite data Sep. 1, 2016	Definite data Dec. 31, 2017	Definite data Mar. 31, 2018	Definite data Mar. 31, 2019	Definite data Mar. 31, 2020
Number of eligible subjects	182,370	184,910	186,970	188,328	190,019	191,101	191,636	191,974	192,651
General health checks conducted by municipalities in Fukushima	8,798	23,907	25,604	25,913	26,195	26,636	26,411	26,140	25,255
Individual health checks in Fukushima	—	6,692	5,806	4,927	4,443	3,941	3,782	3,730	2,869
Group health checks in Fukushima	41,949	10,603	6,767	5,808	5,183	4,341	3,963	3,776	2,444
Individual health checks outside Fukushima	3,815	3,055	3,205	3,418	3,332	2,118	2,102	2,087	1,988
Others *1, *2	2,045	3,206	2,017	1,846	2,113	3,011	3,154	3,122	3,001
Number of those having received multiple health checks	208	454	359	38	55	57	45	40	32
Total (excluding the above)	56,399	47,009	43,040	41,874	41,211	39,990	39,367	38,815	35,525
Participation rate (%)	30.9%	25.4%	23.0%	22.2%	21.7%	20.9%	20.5%	20.2%	18.4%

*1 Conducted in Fukushima (under municipalities' entrustment to relevant medical associations and medical institutions)
*2 Conducted outside Fukushima (under municipalities' entrustment to agencies conducting health checkups)

[Reference] Number of participants* by address to send invitations to (in or outside Fukushima) for FY2019

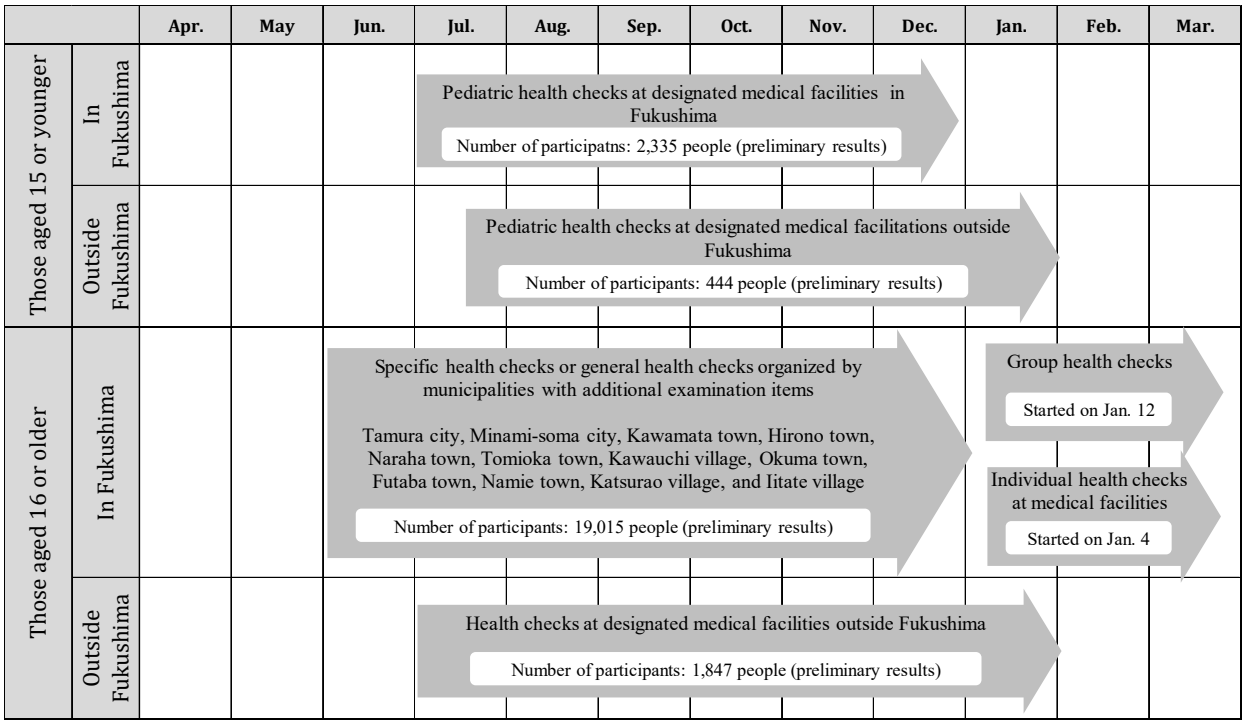
(Aged 15 or younger)	In Fukushima	Outside Fukushima	Total
Number of eligible persons	17,755	3,825	21,580
Number of participants	2,854	650	3,504
Participation rate	16.1%	17.0%	16.2%

(Aged 16 or older)	In Fukushima	Outside Fukushima	Total
Number of eligible persons	161,933	30,718	192,651
Number of participants	32,339	3,186	35,525
Participation rate	20.0%	10.4%	18.4%

* Eligible persons and participants are divided into those in Fukushima and those outside Fukushima based on the addresses to send invitations to health checks. The numbers differ from those in the tables above by type and venue of health checks.

2. Implementation Status for FY2020 [as of January 31, 2021]

Eligible persons: 213,873 people (20,515 people aged 15 or younger and 193,358 people aged 16 or older)



Introduction of Related Papers* on the Comprehensive Health Check, Fukushima Health Management Survey (Influence of the Evacuation)

Office of Comprehensive Health Check & Health Promotion
Radiation Medical Science Center for the Fukushima Health Management Survey

* Papers published after the 34th Prefectural Oversight Committee Meeting for Fukushima Health Management Survey (until December 2020)

Related Paper 1

Relationship between the prevalence of polycythemia and factors observed in the Mental Health and Lifestyle Survey after the Great East Japan Earthquake

SAKAI Akira (Radiation Medical Science Center for the Fukushima Health Management Survey, Fukushima Medical University), et al.

Medicine (2020)

Multivariate analysis of relationships between characteristics of participants and the prevalence of polycythemia after the adjustment.

	Multivariable-adjusted model* (n = 29,267) Age (20–90 yr)			Multivariable-adjusted model† (n = 19,549) Age < 65 yr			Multivariable-adjusted model‡ (n = 9718) Age ≥ 65 yr		
	OR	95% CI	*P* values	OR	95% CI	*P* values	OR	95% CI	*P* values
Demographic characteristics									
Male (vs female)§	1.213	0.995–1.48	.0567	1.497	1.17–1.915	<.01	0.74	0.524–1.046	.0885
Age‖									
20 to 49 yr	1								
50 to 64 yr	0.671	0.442–1.019	.061	–	–	–	–	–	–
≥65 yr	0.46	0.249–0.849	.013						
Education level (junior college and higher)¶	0.732	0.587–0.913	<.01	0.753	0.591–0.959	<.05	0.668	0.383–1.164	.1541
Experience of disaster¶									
Tsunami	0.833	0.657–1.056	.1313	0.886	0.669–1.173	.3464	–	–	–
Nuclear power plant accident	–	–	–	1.14	0.921–1.41	.2441	0.712	0.518–0.979	<.05
Bereavement¶	1.237	0.98–1.561	.0732	–	–	–	1.888	1.183–3.012	<.01
Lack of exercise¶	–	–	–	0.808	0.654–0.999	<.05	1.344	0.958–1.886	.0865
Obesity (BMI ≥ 25)¶	1.885	1.569–2.265	<.0001	1.842	1.471–2.306	<.0001	1.903	1.375–2.635	<.001
Hypertension¶	1.296	1.055–1.593	<.05	1.405	1.1–1.794	<.01	0.973	0.673–1.406	.883
Diabetes¶	2.253	1.812–2.801	<.0001	2.97	2.265–3.894	<.0001	1.503	1.036–2.179	<.05
Liver dysfunction¶	2.187	1.806–2.648	<.0001	2.098	1.653–2.664	<.0001	2.336	1.678–3.252	<.0001
Smoking¶	1.82	1.488–2.226	<.0001	1.654	1.317–2.077	<.0001	2.486	1.593–3.881	<.0001
Heavy drinking¶	0.971	0.707–1.334	.8557	1.1	0.779–1.554	.5875	0.552	0.219–1.392	.2077

BMI = body mass index, CI = confidence interval, OR = odds ratio.

* Logistic regression model was used to adjust for sex, age, education level, dwelling status of evacuees (rental house or apartment), house damage, experience of tsunami, bereavement, obesity, hypertension, diabetes, liver dysfunction, smoking, and heavy drinking.

† Logistic regression model was used to adjust for sex, age, education level, dwelling status of evacuees (rental house or apartment), house damage, experience of tsunami, experience of nuclear power plant accident, lack of exercise, obesity, hypertension, diabetes, liver dysfunction, smoking, and heavy drinking.

‡ Logistic regression model was used to adjust for sex, age, education level, dwelling status of evacuees (rental house or apartment), house damage, experience of nuclear power plant accident, bereavement, lack of exercise, obesity, hypertension, diabetes, liver dysfunction, smoking, and heavy drinking.

§ Age-adjusted.

‖ Sex-adjusted.

¶ Age- and Sex-adjusted.

We have so far conducted the Comprehensive Health Check that covers residents of the evacuation zone designated by the national government after the Great East Japan Earthquake (GEJE), and have reported that life as evacuees is one of the risk factors for lifestyle diseases and polycythemia. The experience of the unprecedented disaster and life as evacuees are suspected to have caused stress polycythemia (so-called relative polycythemia). However, the relationship with traumatic symptoms (PCL-S) and depression (K6) due to the GEJE and the relationship with socioeconomic factors such as living environment and working conditions had yet to be clarified. Accordingly, we analyzed the relationship between polycythemia and the items of the Mental Health and Lifestyle Survey.

As a result, no relationship was observed between polycythemia and mental conditions shown with scores of PCL-S and K6. On the other hand, a multivariate analysis showed that polycythemia is apt to be found more often among males than among females, and statistically significant relationships were found with older age, high educational background, obesity, hypertension, diabetes, liver dysfunction and smoking habit. Given these, it is considered that polycythemia after the GEJE is a sign mainly accompanying a lifestyle disease.

Related Paper 2

Effects of Psychological and Lifestyle Factors on Metabolic Syndrome Following the Fukushima Daiichi Nuclear Power Plant Accident: The Fukushima Health Management Survey

TAKAHASHI Atsushi (Radiation Medical Science Center for the Fukushima Health Management Survey, Fukushima Medical University), et al.

J Atheroscler Thromb (2020)

Logistic regression analysis of factors influencing metabolic syndrome after the disaster among 20,920 participants

	Male (8,810)		Female (12,110)	
	Odds ratio (95% CI)	*p* value	Odds ratio (95% CI)	*p* value
Age (1-year increase)	1.04 (1.03-1.05)	<0.01	1.06 (1.05-1.07)	<0.01
Evacuation (ref: non-evacuation)	1.07 (0.96-1.20)	0.19	1.00 (0.86-1.15)	0.94
Smoking (ref: non-smoker)				
Current smoker	0.97 (0.84-1.12)	0.65	1.04 (0.77-1.39)	0.81
Quit smoker	1.30 (1.14-1.48)	<0.01	1.60 (1.23-2.07)	<0.01
Alcohol intake (ref. non-drinker)				
<44 g/day	0.86 (0.76-0.97)	0.01	0.71 (0.61-0.84)	<0.01
≥44 g/day	0.97 (0.84-1.12)	0.68	0.65 (0.37-1.14)	0.13
Physical activity (ref: every day)				
<4 times a week	1.23 (1.07-1.41)	<0.01	1.42 (1.15-1.75)	<0.01
Change of job (ref: no change)	0.98 (0.87-1.10)	0.73	0.98 (0.83-1.15)	0.78
Unemployment (ref: no)	1.04 (0.91-1.20)	0.57	1.16 (0.97-1.40)	0.11
Sleep dissatisfaction (ref: yes)	1.02 (0.91-1.14)	0.75	0.94 (0.81-1.10)	0.45
Psychological distress (ref: no distress [K6 <13])	0.93 0.77-1.12)	0.46	0.89 (0.72-1.09)	0.25
Post-traumatic stress disorder (ref: no PTSD [PCL-S <44])	1.12 (0.95-1.31)	0.17	1.29 (1.08-1.55)	<0.01

Logistic regression analysis was used (dependent variable: metabolic syndrome, independent variable of interest: presence versus absence of each life-style factor, adjustment variables: age and sex). CI=confidence interval: K6=Kessler 6-item scale; PCL-S=Post-traumatic Stress Disorder Checklist.
Survey period: June 2011 to March 2012

Since the Great East Japan Earthquake in 2011, the Comprehensive Health Check and the Mental Health and Lifestyle Survey have been conducted as part of the Fukushima Health Management Survey, covering residents of the 13 municipalities designated as the evacuation zone. Based on the results of the Fukushima Health Management Survey, we have reported that the percentage of residents with metabolic syndrome increased after the earthquake and that evacuation after the disaster may be a risk factor for metabolic syndrome.

In this paper, we linked the results of the Comprehensive Health Check to the results of the Mental Health and Lifestyle Survey to clarify the factors that cause metabolic syndrome. Metabolic syndrome was found in 19.5% of the total (20,920 participants; 30.4% of males and 11.5% of females). For both males and females, aging, smoking and decreased physical activity were associated with the development of metabolic syndrome. Posttraumatic stress disorder (PTSD) and moderate drinking are also found to exert an influence on the development of metabolic syndrome for females. This paper shows that various factors have been exerting an influence on the development of metabolic syndrome after the earthquake.

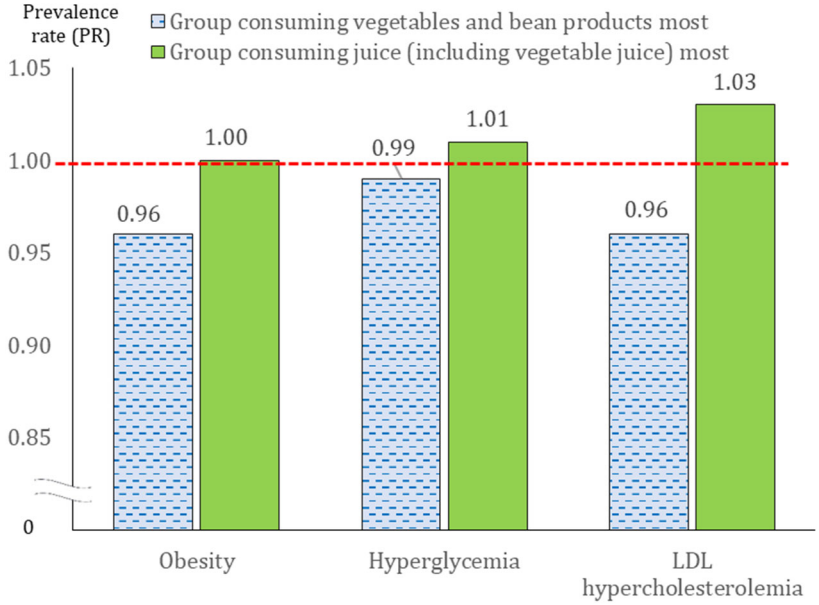
Related Paper 3

Associations between Dietary Patterns and Cardiometabolic Risks in Japan: A Cross-Sectional Study from the Fukushima Health Management Survey, 2011–2015

MA Enbo (Radiation Medical Science Center for the Fukushima Health Management Survey, Fukushima Medical University), et al.

Nutrients (2020)

Prevalence rate for cardiometabolic factors



Obesity: BM I ≧ 25 kg/㎡

Hyperglycemia: HbA1c (NGSP) ≧ 6.5%

High LDL cholesterol (LDL hypercholesterolemia):

LDL (bad) cholesterol ≧ 140mg/dL

It has been reported that cardiometabolic risks are increasing among residents of Fukushima after the Great East Japan Earthquake. This study examined associations between dietary patterns and cardiometabolic risks among residents of the evacuation zone aged 16 or older. Based on the results of the surveys on the frequency of consumption of foods conducted from 2011 to 2013, we evaluated dietary patterns through a principal component analysis and examined associations with the results of health checks in 2014 (15,409 participants) and in 2015 (14,999 participants).

We classified participants by dietary patterns into a group consuming a lot of vegetables and bean products, a group consuming a lot of meat, and a group consuming a lot of juice (including vegetable juice) and milk. The surveys in 2014 and 2015 both showed similar associations between dietary patterns of consuming a lot of vegetables and consuming a lot of juice and milk and health check results. People with obesity and hyperlipidemia were found more among the group consuming less vegetables, and people with hyperglycemia, hypertriglyceridemia, and LDL hypercholesterolemia were large in number among the group consuming a lot of juice and milk. A dietary pattern of consuming a lot of meat shows an association with low HDL cholesterol levels only in the survey in 2015. A dietary pattern of consuming a lot of vegetables is similar to the dietary pattern obtained through another cohort study in Japan and coincides with the top three categories of habitually consumed foods in Japan (soy beans and soy bean-derived products, seafood, and vegetables) that were revealed through a recent statistical survey. Accordingly, the results of this study show that the traditional dietary pattern of the Japanese has a preventive effect against cardiometabolic risks.

As above, this study suggests a possible association between a dietary pattern of consuming a lot of vegetables and bean products and the reduction of cardiometabolic risks, such as overweight, hypertension, and hyperlipidemia, and a possible association between a dietary pattern of consuming a lot of juice and milk and the increase of risks of glucose abnormality and hyperlipidemia.

As a conclusion, in order to reduce cardiometabolic risks of hyperlipidemia, in particular, it is necessary to continuously have a dietary pattern of consuming vegetables and bean products, like the traditional Japanese diet containing a lot of these foods.

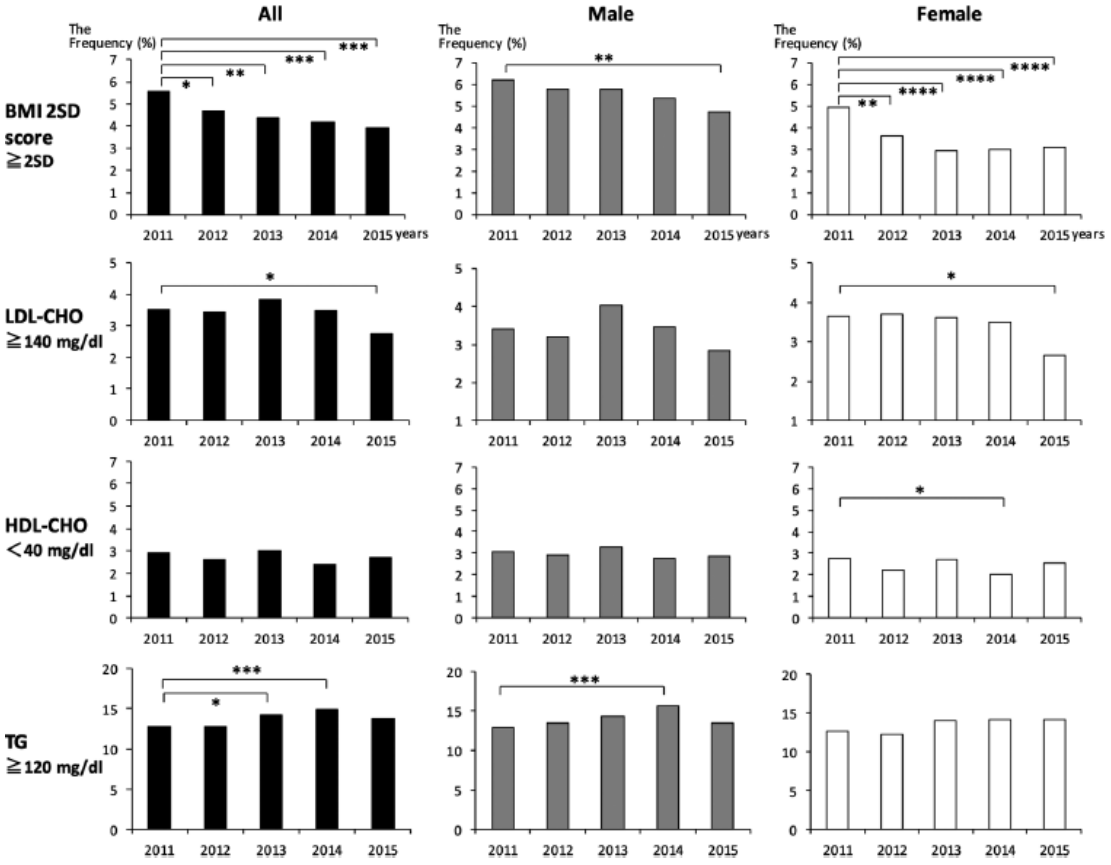
Related Paper 4

Influence of post-disaster evacuation on childhood obesity and hyperlipidemia

KAWASAKI Yukihiko (Radiation Medical Science Center for the Fukushima Health Management Survey, Fukushima Medical University), et al.

Pediatrics International (2020)

Changes in percentages of overweight participants (BMI 2SD score ≥ 2SD)
and those with hyperlipidemia from 2011 to 2015



* shows a statistically significant difference

Based on data of height and weight of participants aged 0 to 15 that were measured from 2011 to 2015, we calculated Body Mass Indexes (BMI) and BMI Standard Deviation Scores (BMI SD). Additionally, based on data regarding LDL cholesterol (LDL-CHO), HDL cholesterol (HDL-CHO), and triglyceride (TG) levels of participants aged 7 to 15 (from the first grade to the ninth grade children), we obtained the average values, standard deviations and percentages of abnormal values, and analyzed the changes over time in examination results in 2011, 2012, 2013, 2014 and 2015.

[1] In 2011, the BMI SD was 0.113, which showed an increase in overweight participants compared with the national average, but the number of overweight participants decreased gradually to 2015. [2] In 2011, serum LDL cholesterol levels and TG levels of overweight participants whose BMI level exceeded +2SD were significantly higher than those of normal participants whose BMI level was below +2SD. [3] The frequency of participants whose serum LDL cholesterol level was 140 mg/dl or over in 2012, 2013 and 2014 was not declining compared with that in 2011 but showed a decline in 2015. Additionally, the frequency of participants whose serum TG level was 120 mg/dl or over increased in these five years.

These results suggest that a lot of children had obesity and hyperlipidemia after the earthquake. The follow-up over five years showed an improvement in those children's obesity but an improvement of hyperlipidemia has been delayed. Accordingly, it became clear that it is necessary to continue health checks for those children regarding hyperlipidemia.

Related Paper 5

Influence of post-disaster evacuation on incidence of hyperuricemia in residents of Fukushima Prefecture: the Fukushima Health Management Survey

HASHIMOTO Shigeatsu (Radiation Medical Science Center for the Fukushima Health Management Survey, Fukushima Medical University), et al.

Clinical and Experimental Nephrology (2020)

Association between evacuation status and incidence of hyperuricemia.

	n	Hyperuricemia	ORs (95% CIs)		
			Crude	Sex-age-adjusted	Multivariable adjusted[a]
All					
Evacuee	2298	113	1.40 (1.05–1.85)	1.37 (1.02–1.83)	1.38 (1.03–1.86)
Non-evacuee	2491	89	Reference	Reference	Reference
Men					
Evacuee	969	98	1.41 (1.03–1.94)	1.41 (1.03–1.93)	1.46 (1.06–2.02)
Non-evacuee	1002	74	Reference	Reference	Reference
Women					
Evacuee	1329	15	1.12 (0.55–2.30)	1.20 (0.58–2.47)	0.98(0.45–2.12)
Non-evacuee	1489	15	Reference	Reference	Reference

OR odds ratio, *CI* confidence interval

[a]Age (continuous), evacuation status (evacuee or non-evacuee), waist circumference (continuous), physical activity ;walking at least ≧1 h/day (yes or no), smoking status (current, never or former), and alcohol consumption (current at ≧ 44 g/day, current at < 44 g/day, never or former)

We conducted a cohort study covering residents of Fukushima aged 40 to 90 who were in Fukushima and did not suffer from hyperuricemia at the time of the earthquake. Out of the 8,173 residents meeting the criteria for the study, 4,789 residents were followed up (1,971 males and 2,818 females; the percentage of the follow-up participants: 58.6%) for the period after the disaster to the end of March 2013. We conducted an analysis using health check data before and after the disaster, mainly based on the incidence of hyperuricemia as defined in the guideline by the Japanese Society of Gout and Uric & Nucleic Acids. We divided the participants into a group of evacuees and a group of non-evacuees and compared the results, and estimated the odds ratios of developing hyperuricemia by using a logistic regression model and by making adjustment based on confounding factors (other factors affecting the results), such as age, sex, waist circumference, exercise habits, and alcohol consumption.

The incidence of hyperuricemia was 10.1% among male evacuees and 1.1% among female evacuees, while it was 7.4% among male non-evacuees and 1.0% among female non-evacuees. The incidence was thus higher among evacuees than among non-evacuees both for males and females. Compared with non-evacuees, evacuees showed higher BMIs, waist circumferences, triglyceride levels, fasting blood glucose levels, and HbA1c levels. We found a statistically significant association between the experience of evacuation and the incidence of hyperuricemia (adjusted odds ratio: 1.38; 95% confidence interval: 1.03 to 1.86).

It became clear that evacuees have been more likely to develop hyperuricemia than non-evacuees after the Great East Japan Earthquake. This is the first study that demonstrated the association between evacuation after the disaster and the incidence of hyperuricemia.

Report on the TUE Full-Scale Survey (the fourth-round survey)

1. Summary

1.1 Purpose

In order to monitor the long-term health of children, we are now engaged in the Full-Scale Survey (the fourth-round survey), following the Preliminary Baseline Survey for background assessment of thyroid glands, and two Full-Scale Surveys (the second- and third-round surveys) to continuously confirm thyroid gland status.

1.2 Eligible Persons

All Fukushima residents approximately 18 years old or younger at the time of earthquake (those born between April 2, 1992 and April 1, 2012).

1.3 Implementation Period

FY2018 and FY2019, starting in April 2018:

1.3-1 For those 18 years old or younger

The examination will be carried out on a municipality-by-municipality basis in FY2018 and FY2019.

1.3-2 For those 19 years old or older

The examination will be carried out on an age group basis (i.e., school grade).

FY2018: those born in FY1996 and FY1998

FY2019: those born in FY1997 and FY1999

1.3-3 For those 25 years old and older

Those who are older than 20 are recommended to receive the examination every 5 years at the ages of 25, 30, and so on.

FY2018: those born in FY1993

FY2019: those born in FY1994

Results of the survey for those 25 years old will be reported separately.

1.4 Responsible Organizations

Fukushima Prefecture commissioned Fukushima Medical University (FMU) to conduct the survey in cooperation with organizations inside and outside Fukushima for the convenience of participants (the number of medical facilities shown below is as of September 30, 2020).

1.4-1 Primary examination facilities

Inside Fukushima Prefecture	84 medical facilities
Outside Fukushima Prefecture	125 medical facilities

1.4-2 Confirmatory examination facilities

Inside Fukushima Prefecture	5 medical facilities including FMU
Outside Fukushima Prefecture	37 medical facilities

1.5 Methods

1.5-1 Primary examination

Ultrasonography of the thyroid gland

Assessments are made by specialists on the basis of the following criteria:

- Grade A
  - A1: No nodules/cysts
  - A2: Nodules ≤ 5.0 mm and/or cysts ≤ 20.0 mm
- Grade B
  - Nodules ≥ 5.1 mm and/or cysts ≥ 20.1 mm
  - Some A2 results may be re-classified as B results when clinically indicated.
- Grade C
  - Immediate need for confirmatory examination, judging from the condition of the thyroid gland.

1.5-2 Confirmatory examination

Ultrasonography of the thyroid gland, blood test, urine test, and fine needle aspiration cytology (FNAC) if needed for those with Grade B or C results.

Priority is given to those in urgent clinical need. A medical follow-up may be recommended based on confirmatory examination results.

1.5-3 Flow chart

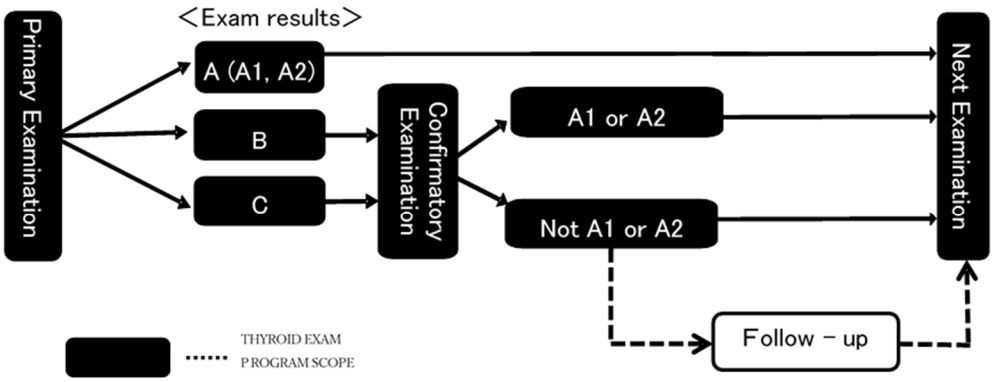


Fig. 1 Flow chart

1.6 Covered Municipalities

The municipalities where examinations (for those 18 years old or younger) were carried out in FY2018 and FY2019 are as follows:

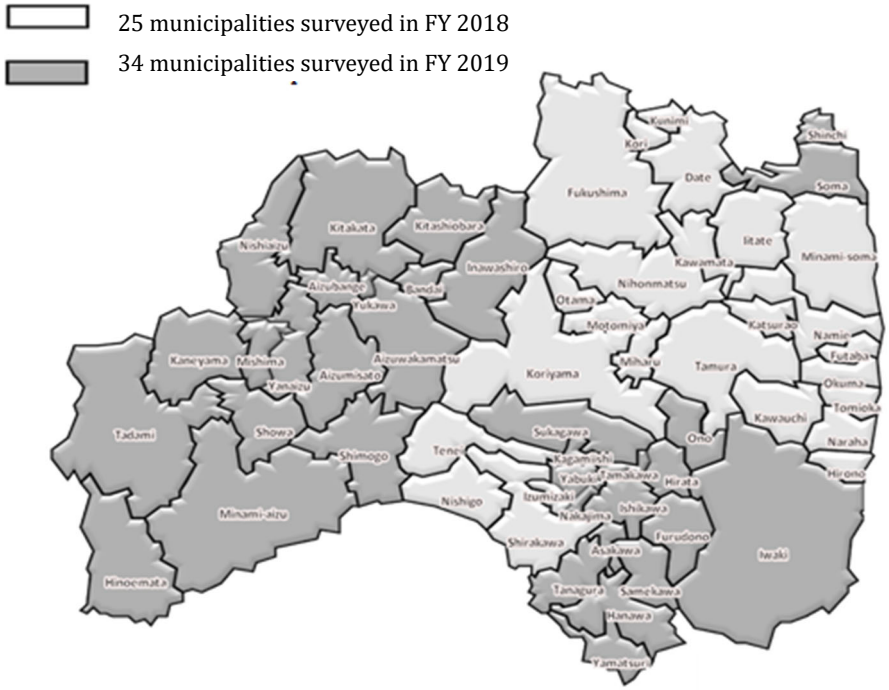


Fig.2 Municipalities surveyed in FY2018 and FY2019

Note: Primary examinations that had been scheduled in March 2020 at elementary and junior high schools in Iwaki City and postponed due to COVID-19 pandemic were conducted in September and October of 2020.

2. Results as of September 30, 2020

2.1 Results of the Primary Examination

2.1-1 Implementation status

The primary examination was carried out for 182,856 (62.1%) participants by September 30, 2020 (Implementation status for each municipality and prefectures other than Fukushima are shown in Appendix 1 and Appendix 2).

Results of 181,130 (99.1%) participants have been finalized and individual result reports were already sent to them. (The result for each municipality is shown in Appendix 3).

Of these, 60,953 (33.7%) had Grade A1 results, 118,803 (65.6%) had Grade A2, 1,374 (0.8%) had Grade B, and none had Grade C.

Table 1 Progress and results of the primary examination

	Eligible persons	Participants (%)		Participants with finalized results (%)				
			Outside the prefecture		A		Those referred to confirmatory exam (%)	
					A1	A2	B	C
	a	b (b/a)		c (c/b)	d (d/c)	e (e/c)	f (f/c)	g (g/c)
FY2018	168,033	107,838 (64.2)	7,162	107,691 (99.9)	36,803 (34.2)	70,190 (65.2)	698 (0.6)	0 (0.0)
FY2019	126,209	75,018 (59.4)	2,950	73,439 (97.9)	24,150 (32.9)	48,613 (66.2)	676 (0.9)	0 (0.0)
Total	294,242	182,856 (62.1)	10,112	181,130 (99.1)	60,953 (33.7)	118,803 (65.6)	1,374 (0.8)	0 (0.0)

Table 2 Number and percentage of participants with nodules/cysts

	Participants with finalized results	Participants with nodules/cysts (%)			
		Nodules		Cysts	
		≥ 5.1mm	≤ 5.0mm	≥ 20.1mm	≤ 20.0mm
	a	b (b/a)	c (c/a)	d (d/a)	e (e/a)
FY2018	107,691	694 (0.6)	365 (0.3)	4 (0.0)	70,542 (65.5)
FY2019	73,439	675 (0.9)	295 (0.4)	1 (0.0)	48,953 (66.7)
Total	181,130	1,369 (0.8)	660 (0.4)	5 (0.0)	119,495 (66.0)

- Percentages are rounded to a lower decimal place. This applies to other tables as well.
- Those who were eligible for and participated in the Age 25 Survey (those born between FY1992 and FY1997) are excluded. Their results will be reported separately.
- Examinations for those born in FY1992 (approx. 23,000), FY1993 (approx. 22,000) FY1994 (approx. 22,000), FY1995 (approx. 21,000), and FY1996 (approx. 21,000) took place in FY2017, FY2018, FY2019, FY2020, and FY2021, respectively. Examinations for those born in FY1997 (approx. 20,000) will be carried out in FY2022.

2.1-2 Participation rate by age group

The participation rate for each age group as of April 1 of each year is shown in Table 3.

Table 3 Participation rates by age group

			Total	Age group		
FY2018	Age group*			6-11	12-17	18-24
	Eligible persons	(a)	168,033	56,939	64,829	46,265
	Participants	(b)	107,838	49,614	52,668	5,556
	Participation rate (%)	(b/a)	64.2	87.1	81.2	12.0
FY2019	Age group **			7-11	12-17	18-24
	Eligible persons	(a)	126,209	34,206	47,276	44,727
	Participants	(b)	75,018	29,916	39,245	5,857
	Participation rate (%)	(b/a)	59.4	87.5	83.0	13.1
Total	Eligible persons	(a)	294,242	91,145	112,105	90,992
	Participants	(b)	182,856	79,530	91,913	11,413
	Participation rate (%)	(b/a)	62.1	87.3	82.0	12.5

*Age groups are formed with the age as of April 1 of each fiscal year.

2.1-3 Comparison of the third- and fourth-round survey results

Comparison of results of two Full-Scale Surveys (third- and fourth-round surveys) is shown in Table 4.

Among 161,850 participants with Grade A1 or A2 results in the third-round survey, 161,176 (99.6%) had Grade A1 or A2 results and 674 (0.4%) had Grade B results in the fourth-round survey.

Among 725 participants with Grade B results in the third-round survey, 145 (20.0%) had Grade A1 or A2 results and 580 (80.0%) had Grade B results in the fourth-round survey.

Table 4 Comparison of the third- and fourth round survey results

			Results of the third-round survey*	Results of the fourth-round survey**			
				A		B	C
				A1	A2		
			a (%)	b (b/a)	c (c/a)	d (d/a)	e (e/a)
Results of the third-round survey	A	A1	55,701 (100.0)	42,249 (75.8)	13,346 (24.0)	106 (0.2)	0 (0.0)
		A2	106,149 (100.0)	11,198 (10.5)	94,383 (88.9)	568 (0.5)	0 (0.0)
	B		725 (100.0)	12 (1.7)	133 (18.3)	580 (80.0)	0 (0.0)
	C		0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
	Not participated		18,555 (100.0)	7,494 (40.4)	10,941 (59.0)	120 (0.6)	0 (0.0)
Total			181,130 (100.0)	60,953 (33.7)	118,803 (65.6)	1,374 (0.8)	0 (0.0)

* Results of the third-round survey, just from fourth-round survey participants with finalized results, not the breakdown of all third-round survey participants.

** Results of the fourth-round survey participants who were diagnosed for each grade in the third-round survey.

2.2 Results of the Confirmatory Examination

2.2-1 Implementation status

By September 30, 2020, 928 of 1,374 people (67.5%) received the confirmatory examination. Of those, 868 (93.5%) completed the entire process of the confirmatory examination. (Progress and results of the confirmatory examination are shown in Table 5.)

Of the aforementioned 868 people, 82 (9.4%) were confirmed to meet Grade A diagnostic criteria by the primary examination standards (A1: 6, A2: 72) (including those with other thyroid conditions). The remaining 786 (90.6%) were confirmed to be outside of A1/A2 criteria.

Table 5 Progress and results of the confirmatory examination

	Those referred to confirmatory exams	Participants (%)	Total	Those with finalized results (%)			
				A1	A2	Not A1 or A2	
							FNAC
	a	b (b/a)	c (c/b)	d (d/c)	e (e/c)	f (f/c)	g (g/f)
FY2018	698	495 (70.9)	476 (96.2)	3 (0.6)	43 (9.0)	430 (90.3)	41 (9.5)
FY2019	676	433 (64.1)	392 (90.5)	3 (0.8)	33 (8.4)	356 (90.8)	33 (9.3)
Total	1,374	928 (67.5)	868 (93.5)	6 (0.7)	76 (8.8)	786 (90.6)	74 (9.4)

2.2-2 Results of fine needle aspiration cytology (FNAC)

Among those who underwent FNAC, 30 had nodules classified as malignant or suspicious for malignancy: 12 of them were male, and 18 were female.

Participants' age at the time of the confirmatory examination ranged from 9 to 20 years (mean age: 16.2 ± 2.9 years). The minimum and maximum tumor diameters were 6.1 mm and 29.4 mm. Mean tumor diameter was 13.0 ± 6.7 mm.

Of these 30 participants, 23 had Grade A results (A1: 5, A2: 18) and 5 had Grade B results in the third-round survey. The remaining 2 people did not participate in the third-round survey.

Table 6. Results of FNAC

A. Municipalities surveyed in FY 2018	
・Malignant or suspicious for malignancy:	17*
・Male to female ratio:	7:10
・Mean age (SD, min-max):	15.8 (2.8, 11-20), 7.8 (2.8, 2-12) at the time of disaster
・Mean tumor size:	12.0 mm (5.6 mm, 6.9-29.4 mm)
B. Municipalities surveyed in FY 2019	
・Malignant or suspicious for malignancy:	13 *
・Male to female ratio:	5:8
・Mean age (SD, min-max):	16.7 (3.0, 9-20), 8.0 (3.2, 0-12) at the time of disaster
・Mean tumor size:	14.4 mm (7.9 mm, 6.1-29.0 mm)
C. Total	
・Malignant or suspicious for malignancy:	30 *
・Male to female ratio:	12:18
・Mean age (SD, min-max):	16.2 (2.9, 9-20), 7.9 (2.9, 0-12) at the time of disaster
・Mean tumor size:	13.0 mm (6.7 mm, 6.1-29.4 mm)

* Surgical cases are shown in Appendix 6.

2.2-3 Age distribution of malignant or suspicious-for-malignancy cases diagnosed by FNAC

Age distribution of 30 people with malignant or suspicious nodules based on their age as of March 11, 2011, is per Fig. 3, and age distribution based on their age at the time of confirmatory examination is per Fig. 4.

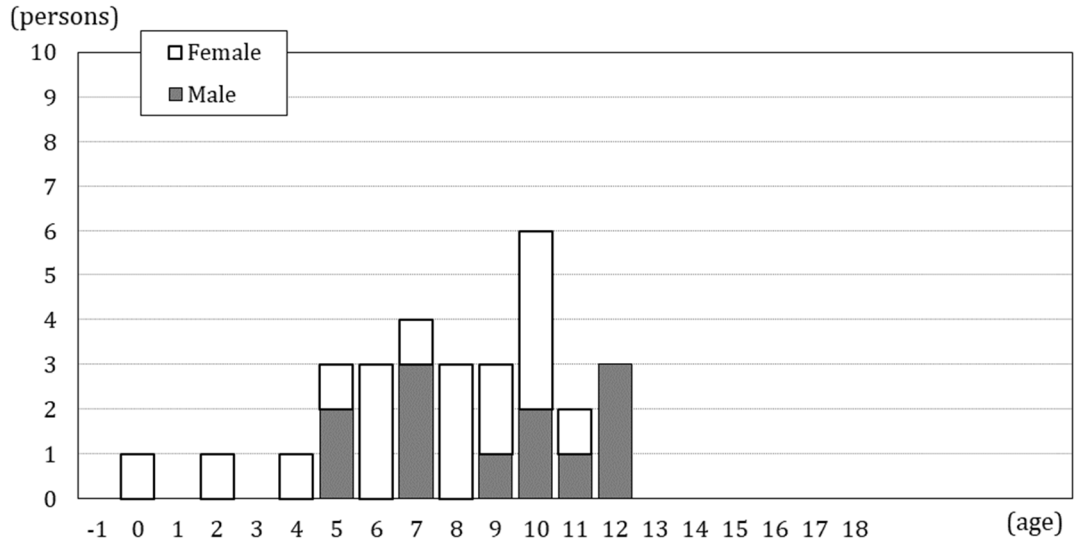


Fig. 3 Age as of March 11, 2011

Note: Those who were 15 and 18 at the time of disaster are not included in the fourth-round survey.

The horizontal axis begins at -1 to include Fukushima Prefecture residents born between April 2, 2011 and April 1, 2012.
Those born between March 12, 2011 and April 1, 2011 are included in Age 0.

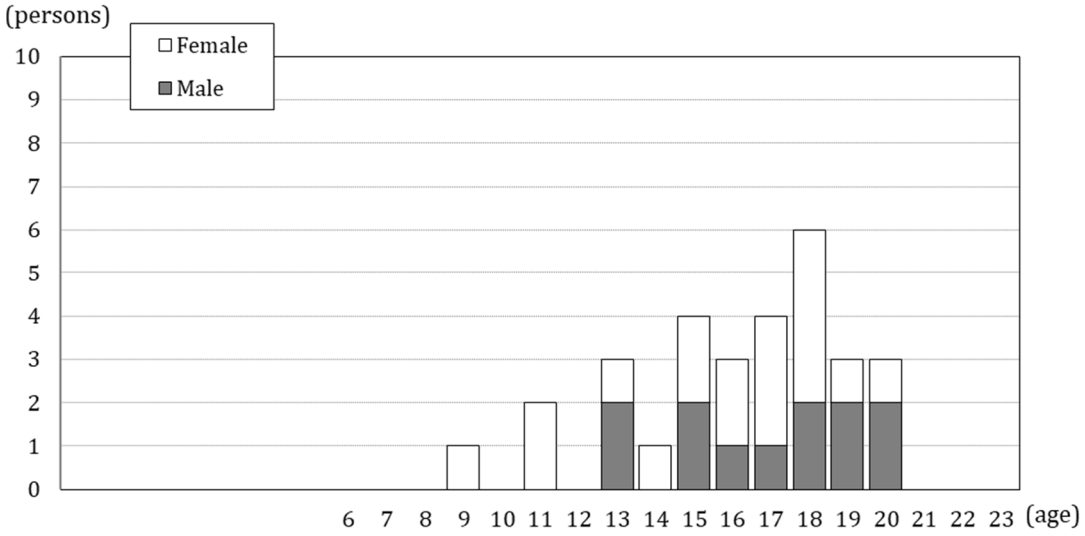


Fig. 4 Age as of the date of confirmatory examination

2.2-4 Basic Survey results of those with malignant or suspicious nodules diagnosed by FNAC

Of the 30 people with malignant or suspicious nodules, 11 people (36.7%) had participated in the Basic Survey (for external radiation dose estimation), and all 11 received their results. The highest effective dose documented was 2.4 mSv.

Table 7 A breakdown of dose estimates for Basic Survey participants

Effective dose (mSv)	Age at the time of the disaster									
	0–5		6–10		11–15		16–18		Total	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
< 1	0	0	1	1	0	0	0	0	1	1
1-1.9	0	0	2	1	1	0	0	0	3	1
2-4.9	2	0	0	2	1	0	0	0	3	2
5-9.9	0	0	0	0	0	0	0	0	0	0
10-19.9	0	0	0	0	0	0	0	0	0	0
≥ 20	0	0	0	0	0	0	0	0	0	0
Total	2	0	3	4	2	0	0	0	7	4

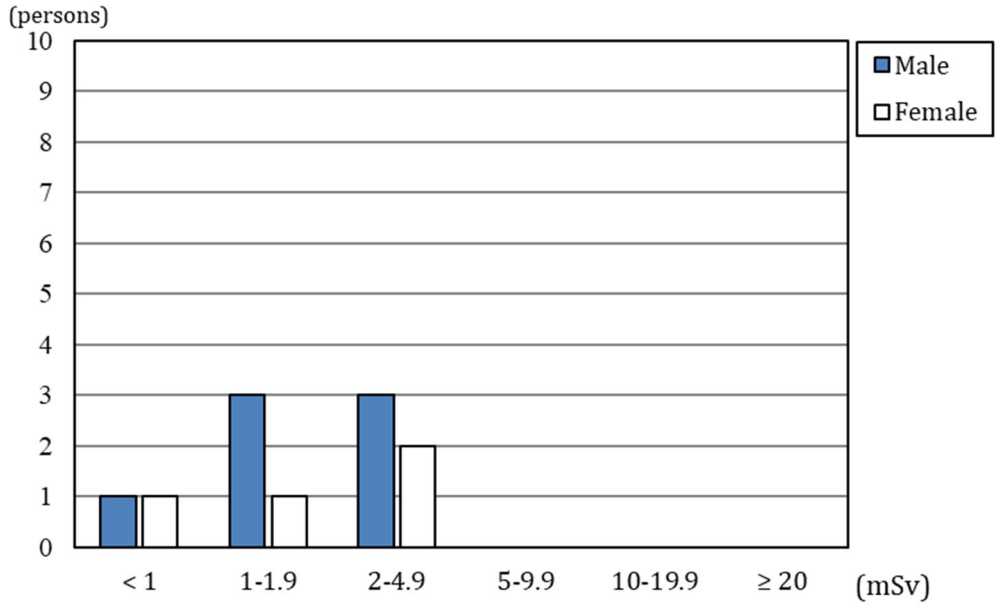


Fig. 5 Effective doses of Basic Survey participants

2.2-5 Blood and urinary iodine test results

Table 8 Blood test results: Mean±SD (percentage of values outside reference range)

vf	FT4[1] (ng/dL)	FT3[2] (pg/mL)	TSH[3] (μIU/mL)	Tg[4] (ng/mL)	TgAb[5] (IU/mL)	TPOAb[6] (IU/mL)
Reference Range	0.95–1.74[7]	2.13–4.07[7]	0.340–3.880[7]	≤ 33.7	< 28.0	< 16.0
Malignant or suspicious: 30 persons	1.3 ± 0.1 (0.0%)	3.5 ± 0.5 (0.0%)	1.4 ± 0.8 (3.3%)	30.0 ± 56.8 (16.7%)	43.3%	30.0%
Other: 800 persons	1.2 ± 0.2 (5.4%)	3.5 ± 0.8 (7.1%)	1.2 ± 0.8 (8.1%)	31.8 ±117.1 (15.6%)	6.8%	7.1%

Table 9 Urinary iodine test results (μg/day)

	Minimum	25th percentile	Median	75th percentile	Maximum
Malignant or suspicious: 30 persons	35	91	195	461	1783
Other: 794 persons	32	118	192	342	31920

1) FT4: free thyroxine; thyroid hormone binding 4 iodines; higher among patients with thyrotoxicosis (such as Graves' disease) and lower with hypothyroidism (such as Hashimoto's thyroiditis).
2) FT3: free triiodothyronine; thyroid hormone binding 3 iodines; higher among patients with thyrotoxicosis (such as Graves' disease) and lower with hypothyroidism (such as Hashimoto's thyroiditis).
3) TSH: thyroid-stimulating hormone; higher among patients with Hashimoto's disease and lower with Graves' disease.
4) Tg: thyroglobulin; higher when thyroid tissue is destroyed or when neoplastic tissue produces thyroglobulin.
5) TgAb: anti-thyroglobulin antibody; higher among patients with Hashimoto's disease and Graves' disease.
6) TPOAb: anti-thyroid peroxidase antibody; higher among patients with Hashimoto's disease or Graves' disease.
7) Reference interval varies according to age.

2.2-6 Confirmatory examination results by area

The percentage of those with malignant or suspicious nodules was 0.02% in Nakadori, Hamadori, and Aizu, versus 0.01% in the 13 municipalities of the nationally-designated evacuation zone.

Table 10 Confirmatory examination results by area

	Number of participants a	Those referred to confirmatory exam b	Percentage of b (%) b/a	Confirmatory exam participants	Malignant or suspicious cases c	Percentage of c (%) c/a
13 municipalities[1]	22,517	150	0.7	113	2	0.01
Nakadori[2]	104,008	702	0.7	488	18	0.02
Hamadori[3]	33,428	316	0.9	193	6	0.02
Aizu[4]	22,903	206	0.9	134	4	0.02
Total	182,856	1,374	0.8	928	30	0.02

1) Tamura, Minami-soma, Date, Kawamata, Hirono, Naraha, Tomioka, Kawauchi, Okuma, Futaba, Namie, Katsurao, Iitate
2) Fukushima, Koriyama, Shirakawa, Sukagawa, Nihonmatsu, Motomiya, Kori, Kunimi, Otama, Kagamiishi, Tenei, Nishigo, Izumizaki, Nakajima, Yabuki, Tanagura, Yamatsuri, Hanawa, Samegawa, Ishikawa, Tamakawa, Hirata, Asakawa, Furudono, Miharu, Ono
3) Iwaki, Soma, Shinchi
4) Aizuwakamatsu, Kitakata, Shimogo, Hinoemata, Tadami, Minami-aizu, Kitashiobara, Nishiaizu, Bandai, Inawashiro, Aizubange, Yugawa, Yanaizu, Mishima, Kaneyama, Showa, Aizumisato

3. Mental Health Care

We provide the following support for thyroid examination participants.

3.1 Support for Primary Examination Participants

After the examination, medical doctors offer person-to-person explanation of examination results, showing ultrasound images in private consultation booths at examination venues set up in public facilities.

Consultation booths were set up at all venues for examinations conducted in and after April 2018; as of September 30, 2020, 2,592 of 2,593 participants (100%) have visited these consultation booths.

3.2 On-location Lectures and Information Sessions

To help participants and their parents/guardians improve their understanding of the thyroid examination, we have conducted on-location lectures and information sessions since April 2018.

By March 31, 2020, a total of 1,063 people had participated in these sessions, offered at 32 locations.

3.3 Support for Confirmatory Examination Participants

A support team has been set up within Fukushima Medical University to offer psychological support to address the anxiety and concerns of confirmatory examination participants during examination. The team also answers questions and offers counseling via our website.

Since the start of the fourth-round survey, 462 participants (151 males and 311 females) have received support as of September 30, 2020. The number of support sessions provided was 917 in total. Of these, 459 sessions (50.1%) were offered at the participants' first examination and 458 (49.9%) at subsequent examinations.

For those who proceeded to regular insured medical care, the support team continues to provide support in cooperation with teams of medical staff at hospitals.

Appendix 1

Implementation status of the TUE primary examination by municipality

As of September 30, 2020

	Number of eligible persons	Participants		%	Number of participants and participation rate by age group[2]			Participants living outside Fukushima	%
	a	b	Participation outside Fukushima[1]	b/a	6–11	12–17	18–24	c[3]	c/b
Municipalities surveyed in FY2018									
Kawamata	1,832	1,134	26	61.9	472 41.6	576 50.8	86 7.6	53	4.7
Namie	2,858	1,515	311	53.0	584 38.5	718 47.4	213 14.1	362	23.9
Iitate	852	542	19	63.6	220 40.6	279 51.5	43 7.9	26	4.8
Minamisoma	10,202	5,997	842	58.8	2,493 41.6	2,979 49.7	525 8.8	936	15.6
Date	8,781	5,926	193	67.5	2,333 39.4	3,042 51.3	551 9.3	199	3.4
Tamura	5,435	3,423	70	63.0	1,515 44.3	1,640 47.9	268 7.8	105	3.1
Hirono	801	446	34	55.7	182 40.8	215 48.2	49 11.0	30	6.7
Naraha	1,094	592	50	54.1	218 36.8	293 49.5	81 13.7	60	10.1
Tomioka	2,341	1,190	197	50.8	444 37.3	570 47.9	176 14.8	211	17.7
Kawauchi	267	150	9	56.2	55 36.7	85 56.7	10 6.7	11	7.3
Okuma	2,020	1,131	210	56.0	437 38.6	551 48.7	143 12.6	227	20.1
Futaba	978	362	61	37.0	146 40.3	179 49.4	37 10.2	64	17.7
Katsurao	174	109	3	62.6	39 35.8	57 52.3	13 11.9	4	3.7
Fukushima	43,242	29,027	1,829	67.1	11,774 40.6	14,383 49.6	2,870 9.9	1,861	6.4
Nihonmatsu	8,104	5,469	203	67.5	2,275 41.6	2,780 50.8	414 7.6	191	3.5
Motomiya	4,910	3,199	101	65.2	1,401 43.8	1,564 48.9	234 7.3	110	3.4
大玉村	1,287	918	26	71.3	416 45.3	440 47.9	62 6.8	18	2.0
Koriyama	52,560	33,341	2,512	63.4	13,489 40.5	16,707 50.1	3,145 9.4	2,514	7.5
Koori	1,609	1,129	31	70.2	465 41.2	545 48.3	119 10.5	34	3.0
Kunimi	1,204	808	17	67.1	296 36.6	431 53.3	81 10.0	18	2.2
Tenei	839	525	8	62.6	224 42.7	262 49.9	39 7.4	9	1.7
Shirakawa	9,972	6,515	274	65.3	2,625 40.3	3,294 50.6	596 9.1	300	4.6
Nishigo	3,263	2,209	95	67.7	919 41.6	1,083 49.0	207 9.4	105	4.8
Izumizaki	1,025	667	4	65.1	277 41.5	336 50.4	54 8.1	4	0.6
Miharu	2,383	1,514	37	63.5	562 37.1	780 51.5	172 11.4	36	2.4
Subtotal	168,033	107,838	7,162	64.2	43,861 40.7	53,789 49.9	10,188 9.4	7,488	6.9

1) The number of participants who received the examination at facilities outside Fukushima (as of August 31, 2020)
2) Split cells show the number of participants above the corresponding percentage.
3) The number of participants who have resident registration outside of Fukushima.

・Age groups are based on participants' age at the Full-Scale Survey (the fourth-round survey). This applies to other tables hereafter.

	Number of eligible persons	Participants		%	Participants and Participation rate[2] by age group			Participants living outside Fukushima	%
	a	b	Participation outside Fukushima[1]	b/a	6–11	12–17	18–24	c[3]	c/b
Municipalities surveyed in FY2019									
Iwaki	49,643	29,562	1,652	59.5	9,240 31.3	16,067 54.4	4,255 14.4	1,564	5.3
Sukagawa	12,378	7,545	217	61.0	2,762 36.6	3,935 52.2	848 11.2	202	2.7
Soma	5,507	3,189	212	57.9	1,263 39.6	1,645 51.6	281 8.8	232	7.3
Kagamiishi	2,133	1,319	33	61.8	491 37.2	702 53.2	126 9.6	30	2.3
Shinchi	1,162	677	33	58.3	232 34.3	375 55.4	70 10.3	33	4.9
Nakajima	849	505	8	59.5	192 38.0	265 52.5	48 9.5	5	1.0
Yabuki	2,672	1,686	28	63.1	727 43.1	837 49.6	122 7.2	30	1.8
Ishikawa	2,182	1,349	26	61.8	543 40.3	677 50.2	129 9.6	28	2.1
Yamatsuri	816	478	13	58.6	213 44.6	238 49.8	27 5.6	10	2.1
Asakawa	1,064	661	22	62.1	238 36.0	360 54.5	63 9.5	23	3.5
Hirata	969	608	8	62.7	245 40.3	308 50.7	55 9.0	5	0.8
Tanagura	2,399	1,466	29	61.1	589 40.2	782 53.3	95 6.5	29	2.0
Hanawa	1,299	706	15	54.3	289 40.9	371 52.5	46 6.5	19	2.7
Samegawa	519	307	7	59.2	137 44.6	156 50.8	14 4.6	5	1.6
Ono	1,488	877	9	58.9	354 40.4	448 51.1	75 8.6	11	1.3
Tamakawa	1,052	658	4	62.5	253 38.4	357 54.3	48 7.3	4	0.6
Furudono	817	522	20	63.9	208 39.8	251 48.1	63 12.1	13	2.5
Hinoemata	87	36	1	41.4	16 44.4	16 44.4	4 11.1	1	2.8
Minamiaizu	2,128	1,168	17	54.9	482 41.3	605 51.8	81 6.9	23	2.0
Kaneyama	147	72	1	49.0	21 29.2	41 56.9	10 13.9	2	2.8
Showa	115	68	3	59.1	31 45.6	33 48.5	4 5.9	3	4.4
Mishima	148	84	0	56.8	29 34.5	50 59.5	5 6.0	0	0.0
Shimogo	747	426	4	57.0	179 42.0	222 52.1	25 5.9	6	1.4
Kitakata	6,948	4,089	78	58.9	1,487 36.4	2,224 54.4	378 9.2	85	2.1
Nshiaizu	761	407	9	53.5	169 41.5	190 46.7	48 11.8	13	3.2
Tadami	555	335	6	60.4	138 41.2	170 50.7	27 8.1	6	1.8
Inawashiro	2,070	1,204	28	58.2	507 42.1	593 49.3	104 8.6	25	2.1
Bandai	477	288	8	60.4	109 37.8	157 54.5	22 7.6	7	2.4
Kitashiobara	445	280	3	62.9	115 41.1	145 51.8	20 7.1	3	1.1
Aizumisato	2,823	1,725	33	61.1	634 36.8	896 51.9	195 11.3	36	2.1
Aizubange	2,402	1,420	37	59.1	540 38.0	724 51.0	156 11.0	34	2.4
Yanaizu	464	284	2	61.2	115 40.5	143 50.4	26 9.2	3	1.1
Aizuwakamatsu	18,424	10,666	378	57.9	3,889 36.5	5,588 52.4	1,189 11.1	391	3.7
Yugawa	519	351	6	67.6	123 35.0	178 50.7	50 14.2	11	3.1
Subtotal	126,209	75,018	2,950	59.4	26,560 35.4	39,749 53.0	8,709 11.6	2,892	3.9
Total	294,242	182,856	10,112	62.1	70,421 38.5	93,538 51.2	18,897 10.3	10,380	5.7

Appendix 2

Implementation status of the TUE primary examination by prefecture

As of August 31, 2020

Prefecture	No. of medical facilities	Participants
Hokkaido	7	**275**
Aomori	2	**123**
Iwate	3	**249**
Miyagi	2	**2,239**
Akita	1	**156**
Yamagata	3	**470**
Ibaraki	4	**568**
Tochigi	8	**626**
Gunma	2	**173**
Saitama	3	**529**
Chiba	5	**464**
Tokyo	18	**1,669**
Kanagawa	6	**744**
Niigata	3	**446**
Toyama	2	**26**
Ishikawa	1	**35**

Prefecture	No. of medical facilities	Participants
Fukui	1	**18**
Yamanashi	2	**86**
Nagano	3	**121**
Gifu	1	**29**
Shizuoka	2	**83**
Aichi	5	**178**
Mie	1	**17**
Shiga	1	**14**
Kyoto	3	**79**
Osaka	7	**173**
Hyogo	2	**123**
Nara	2	**24**
Wakayama	1	**9**
Tottori	1	**7**
Shimane	1	**11**
Okayama	3	**47**

Prefecture	No. of medical facilities	Participants
Hiroshima	2	**27**
Yamaguchi	1	**21**
Tokushima	1	**5**
Kagawa	1	**25**
Ehime	1	**15**
Kochi	1	**11**
Fukuoka	3	**71**
Saga	1	**1**
Nagasaki	3	**25**
Kumamoto	1	**28**
Oita	1	**13**
Miyazaki	1	**20**
Kagoshima	1	**5**
Okinawa	1	**34**

Total	125	**10,112**

The number of participants who received examination at medical facilities outside Fukushima

Appendix 3 TUE primary examination results by municipality

	No. of partici-pants	Those with finalized results	No. of participants by grade				No. of partipants with nodules		No. of participants with cysts	
			%							
		b	A		B	C	%		%	
		%	A1	A2			≥ 5.1mm	≤ 5.0mm	≥ 20.1mm	≤ 20.0mm
	a	b/a								
Municipalities surveyed in FY2018										
Kawamata	1,134	1,134	408	721	5	0	4	3	1	725
		100.0	36.0	63.6	0.4	0.0	0.4	0.3	0.1	63.9
Namie	1,515	1,501	495	992	14	0	14	6	0	997
		99.1	33.0	66.1	0.9	0.0	0.9	0.4	0.0	66.4
Iitate	542	542	201	337	4	0	4	2	0	340
		100.0	37.1	62.2	0.7	0.0	0.7	0.4	0.0	62.7
Minamisoma	5,997	5,985	2,112	3,830	43	0	43	28	0	3,845
		99.8	35.3	64.0	0.7	0.0	0.7	0.5	0.0	64.2
Date	5,926	5,924	2,042	3,847	35	0	35	19	0	3,868
		100.0	34.5	64.9	0.6	0.0	0.6	0.3	0.0	65.3
Tamura	3,423	3,422	1,270	2,130	22	0	22	10	0	2,140
		100.0	37.1	62.2	0.6	0.0	0.6	0.3	0.0	62.5
Hirono	446	442	168	268	6	0	6	3	0	268
		99.1	38.0	60.6	1.4	0.0	1.4	0.7	0.0	60.6
Naraha	592	575	203	370	2	0	2	1	0	370
		97.1	35.3	64.3	0.3	0.0	0.3	0.2	0.0	64.3
Tomioka	1,190	1,171	417	747	7	0	7	3	0	750
		98.4	35.6	63.8	0.6	0.0	0.6	0.3	0.0	64.0
Kawauchi	150	149	44	103	2	0	2	0	0	105
		99.3	29.5	69.1	1.3	0.0	1.3	0.0	0.0	70.5
Okuma	1,131	1,110	385	717	8	0	8	5	0	724
		98.1	34.7	64.6	0.7	0.0	0.7	0.5	0.0	65.2
Futaba	362	357	108	248	1	0	1	0	0	249
		98.6	30.3	69.5	0.3	0.0	0.3	0.0	0.0	69.7
Katsurao	109	106	33	72	1	0	1	0	0	72
		97.2	31.1	67.9	0.9	0.0	0.9	0.0	0.0	67.9
Fukushima	29,027	29,006	9,998	18,839	169	0	168	94	1	18,921
		99.9	34.5	64.9	0.6	0.0	0.6	0.3	0.0	65.2
Nihonmatsu	5,469	5,468	1,912	3,503	53	0	52	20	1	3,533
		100.0	35.0	64.1	1.0	0.0	1.0	0.4	0.0	64.6
Motomiya	3,199	3,196	1,121	2,061	14	0	14	8	0	2,063
		99.9	35.1	64.5	0.4	0.0	0.4	0.3	0.0	64.5
Otama	918	918	305	606	7	0	7	2	0	609
		100.0	33.2	66.0	0.8	0.0	0.8	0.2	0.0	66.3
Koriyama	33,341	33,327	10,966	22,146	215	0	214	115	1	22,259
		100.0	32.9	66.5	0.6	0.0	0.6	0.3	0.0	66.8
Koori	1,129	1,129	399	723	7	0	7	2	0	726
		100.0	35.3	64.0	0.6	0.0	0.6	0.2	0.0	64.3
Kunimi	808	808	261	538	9	0	9	1	0	545
		100.0	32.3	66.6	1.1	0.0	1.1	0.1	0.0	67.5
Tenei	525	525	192	329	4	0	4	2	0	333
		100.0	36.6	62.7	0.8	0.0	0.8	0.4	0.0	63.4
Shirakawa	6,515	6,510	2,272	4,196	42	0	42	25	0	4,217
		99.9	34.9	64.5	0.6	0.0	0.6	0.4	0.0	64.8
Nishigo	2,209	2,207	737	1,456	14	0	14	9	0	1,463
		99.9	33.4	66.0	0.6	0.0	0.6	0.4	0.0	66.3
Izumizaki	667	665	243	420	2	0	2	2	0	422
		99.7	36.5	63.2	0.3	0.0	0.3	0.3	0.0	63.5
Miharu	1,514	1,514	511	991	12	0	12	5	0	998
		100.0	33.8	65.5	0.8	0.0	0.8	0.3	0.0	65.9
Subtotal	107,838	107,691	36,803	70,190	698	0	694	365	4	70,542
		99.9	34.2	65.2	0.6	0.0	0.6	0.3	0.0	65.5

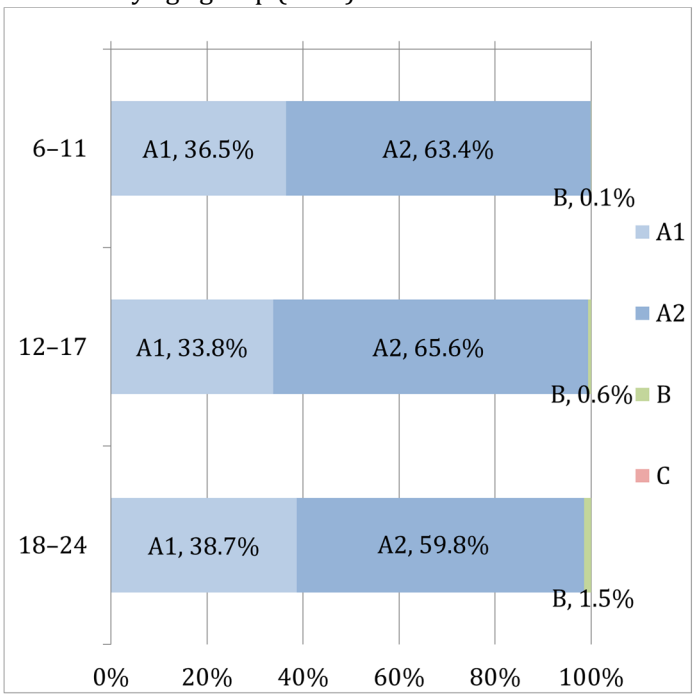
	No. of partici-pants	Those with finalized results	No. of participants by grade				No. of partipants with nodules		No. of participants with cysts	
			%							
		b	A		B	C	%		%	
	a	% b/a	A1	A2			≥ 5.1mm	≤ 5.0mm	≥ 20.1mm	≤ 20.0mm
Municipalities surveyed in FY2019										
Iwaki	29,562	28,010	8,799	18,939	272	0	271	116	1	19,068
		94.8	31.4	67.6	1.0	0.0	1.0	0.4	0.0	68.1
Sukagawa	7,545	7,540	2,373	5,099	68	0	68	44	0	5,131
		99.9	31.5	67.6	0.9	0.0	0.9	0.6	0.0	68.1
Soma	3,189	3,188	1,056	2,093	39	0	39	11	0	2,120
		100.0	33.1	65.7	1.2	0.0	1.2	0.3	0.0	66.5
Kagamiishi	1,319	1,319	408	898	13	0	13	5	0	903
		100.0	30.9	68.1	1.0	0.0	1.0	0.4	0.0	68.5
Shinchi	677	676	228	443	5	0	5	3	0	446
		99.9	33.7	65.5	0.7	0.0	0.7	0.4	0.0	66.0
Nakajima	505	505	175	327	3	0	3	1	0	330
		100.0	34.7	64.8	0.6	0.0	0.6	0.2	0.0	65.3
Yabuki	1,686	1,685	611	1,066	8	0	8	7	0	1,070
		99.9	36.3	63.3	0.5	0.0	0.5	0.4	0.0	63.5
Ishikawa	1,349	1,347	459	874	14	0	14	4	0	882
		99.9	34.1	64.9	1.0	0.0	1.0	0.3	0.0	65.5
Yamatsuri	478	478	151	327	0	0	0	2	0	327
		100.0	31.6	68.4	0.0	0.0	0.0	0.4	0.0	68.4
Asakawa	661	661	211	443	7	0	7	3	0	444
		100.0	31.9	67.0	1.1	0.0	1.1	0.5	0.0	67.2
Hirata	608	608	235	371	2	0	2	2	0	372
		100.0	38.7	61.0	0.3	0.0	0.3	0.3	0.0	61.2
Tanagura	1,466	1,465	540	915	10	0	10	7	0	923
		99.9	36.9	62.5	0.7	0.0	0.7	0.5	0.0	63.0
Hanawa	706	706	267	435	4	0	4	2	0	435
		100.0	37.8	61.6	0.6	0.0	0.6	0.3	0.0	61.6
Samegawa	307	306	129	174	3	0	3	0	0	175
		99.7	42.2	56.9	1.0	0.0	1.0	0.0	0.0	57.2
Ono	877	877	272	596	9	0	9	1	0	603
		100.0	31.0	68.0	1.0	0.0	1.0	0.1	0.0	68.8
Tamakawa	658	658	243	404	11	0	11	2	0	410
		100.0	36.9	61.4	1.7	0.0	1.7	0.3	0.0	62.3
Furudono	522	522	202	318	2	0	2	2	0	317
		100.0	38.7	60.9	0.4	0.0	0.4	0.4	0.0	60.7
Hinoemata	36	36	12	24	0	0	0	0	0	24
		100.0	33.3	66.7	0.0	0.0	0.0	0.0	0.0	66.7
Minamiaizu	1,168	1,164	434	718	12	0	12	3	0	724
		99.7	37.3	61.7	1.0	0.0	1.0	0.3	0.0	62.2
Kaneyama	72	72	22	49	1	0	1	0	0	50
		100.0	30.6	68.1	1.4	0.0	1.4	0.0	0.0	69.4
Showa	68	68	23	45	0	0	0	0	0	45
		100.0	33.8	66.2	0.0	0.0	0.0	0.0	0.0	66.2
Mishima	84	84	21	62	1	0	1	0	0	63
		100.0	25.0	73.8	1.2	0.0	1.2	0.0	0.0	75.0
Shimogo	426	426	162	260	4	0	4	0	0	262
		100.0	38.0	61.0	0.9	0.0	0.9	0.0	0.0	61.5
Kitakata	4,089	4,083	1,403	2,648	32	0	32	21	0	2,656
		99.9	34.4	64.9	0.8	0.0	0.8	0.5	0.0	65.1
Nishiaizu	407	407	149	255	3	0	3	1	0	257
		100.0	36.6	62.7	0.7	0.0	0.7	0.2	0.0	63.1
Tadami	335	335	117	217	1	0	1	0	0	218
		100.0	34.9	64.8	0.3	0.0	0.3	0.0	0.0	65.1
Inawashiro	1,204	1,203	417	770	16	0	16	4	0	783
		99.9	34.7	64.0	1.3	0.0	1.3	0.3	0.0	65.1
Bandai	288	288	83	202	3	0	3	1	0	204
		100.0	28.8	70.1	1.0	0.0	1.0	0.3	0.0	70.8
Kitashiobara	280	280	96	182	2	0	2	0	0	184
		100.0	34.3	65.0	0.7	0.0	0.7	0.0	0.0	65.7
Aizumisato	1,725	1,724	553	1,155	16	0	16	8	0	1,159
		99.9	32.1	67.0	0.9	0.0	0.9	0.5	0.0	67.2
Aizubange	1,420	1,420	444	965	11	0	11	6	0	973
		100.0	31.3	68.0	0.8	0.0	0.8	0.4	0.0	68.5
Yanaizu	284	284	103	181	0	0	0	0	0	181
		100.0	36.3	63.7	0.0	0.0	0.0	0.0	0.0	63.7
Aizuwakamatsu	10,666	10,663	3,610	6,953	100	0	100	36	0	7,006
		100.0	33.9	65.2	0.9	0.0	0.9	0.3	0.0	65.7
Yugawa	351	351	142	205	4	0	4	3	0	208
		100.0	40.5	58.4	1.1	0.0	1.1	0.9	0.0	59.3
Subtotal	75,018	73,439	24,150	48,613	676	0	675	295	1	48,953
		97.9	32.9	66.2	0.9	0.0	0.9	0.4	0.0	66.7
Total	182,856	181,130	60,953	118,803	1,374	0	1,369	660	5	119,495
		99.1	33.7	65.6	0.8	0.0	0.8	0.4	0.0	66.0

Appendix 4

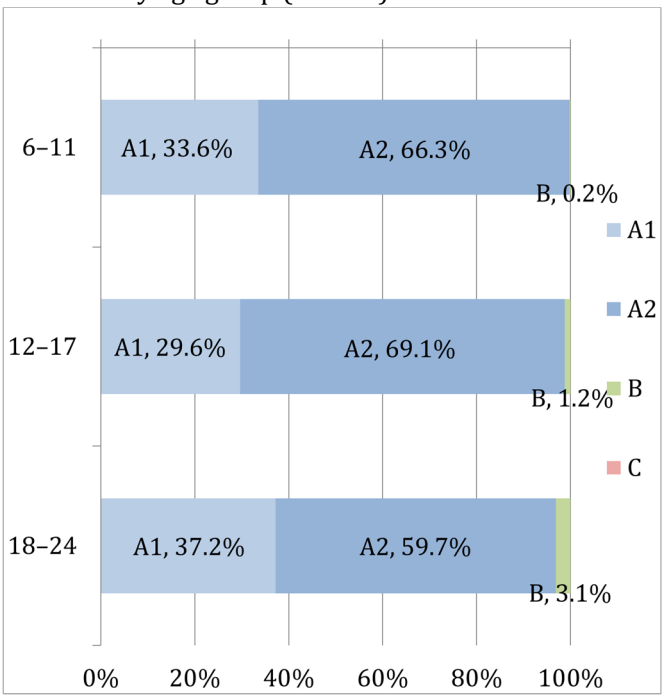
1 TUE primary examination results by age and sex, as of September 30, 2020

Grade / Age group	A						B			C			Total		
	A1			A2											
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
6–11	12,888	11,282	24,170	22,416	22,262	44,678	38	56	94	0	0	0	35,342	33,600	68,942
12–17	16,010	13,617	29,627	31,087	31,764	62,851	283	554	837	0	0	0	47,380	45,935	93,315
18–24	3,388	3,768	7,156	5,237	6,037	11,274	130	313	443	0	0	0	8,755	10,118	18,873
Total	32,286	28,667	60,953	58,740	60,063	118,803	451	923	1,374	0	0	0	91,477	89,653	181,130

Results by age group (Male)



Results by age group (Female)

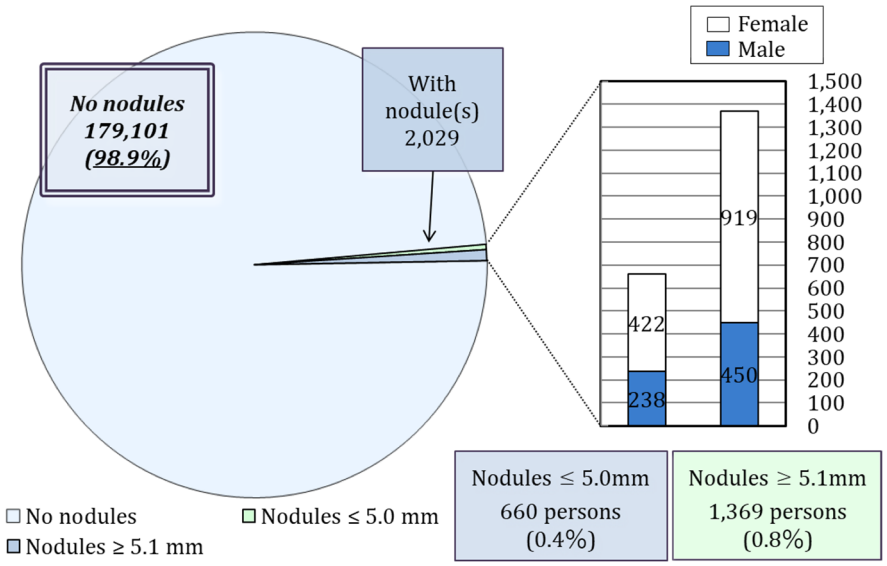


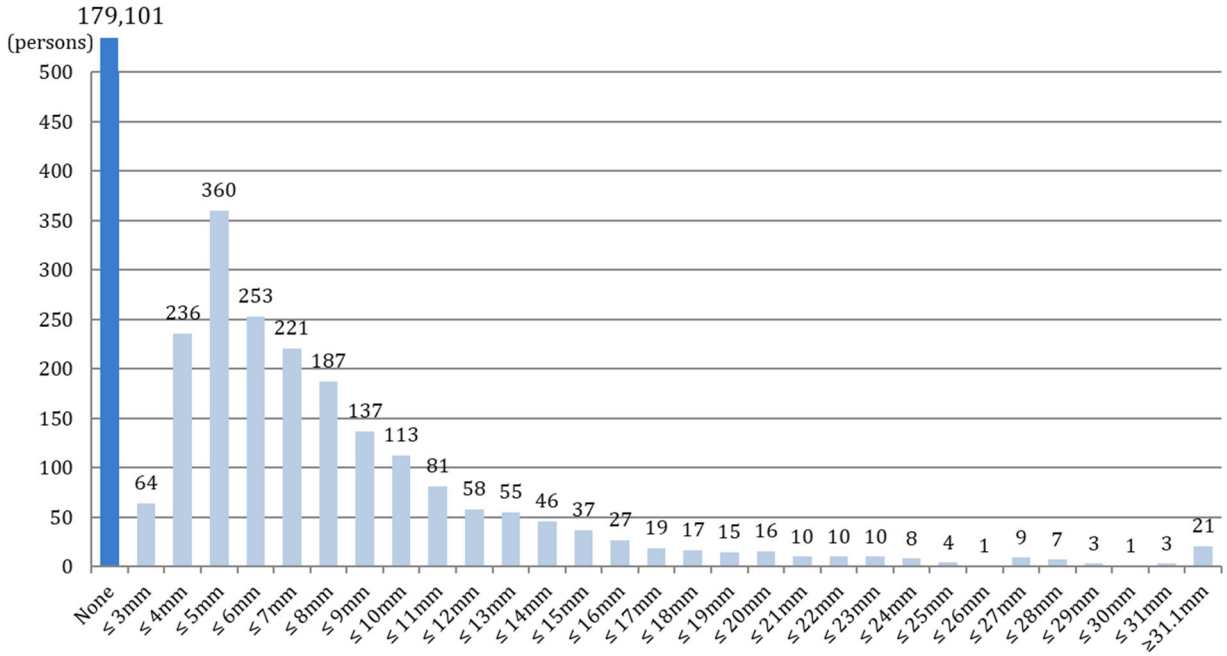
2 Nodule characteristics

(persons)

As of September 30, 2020

Nodule size	Total	Male	Female	Grade	
None	179,101	90,789	88,312	A1	98.9%
≤ 3.0mm	64	31	33	A2	0.4%
3.1–5.0mm	596	207	389		
5.1–10.0mm	911	306	605	B	0.8%
10.1–15.0mm	277	93	184		
15.1–20.0mm	94	27	67		
20.1–25.0mm	42	13	29		
≥ 25.1mm	45	11	34		
Total	181,130	91,477	89,653		

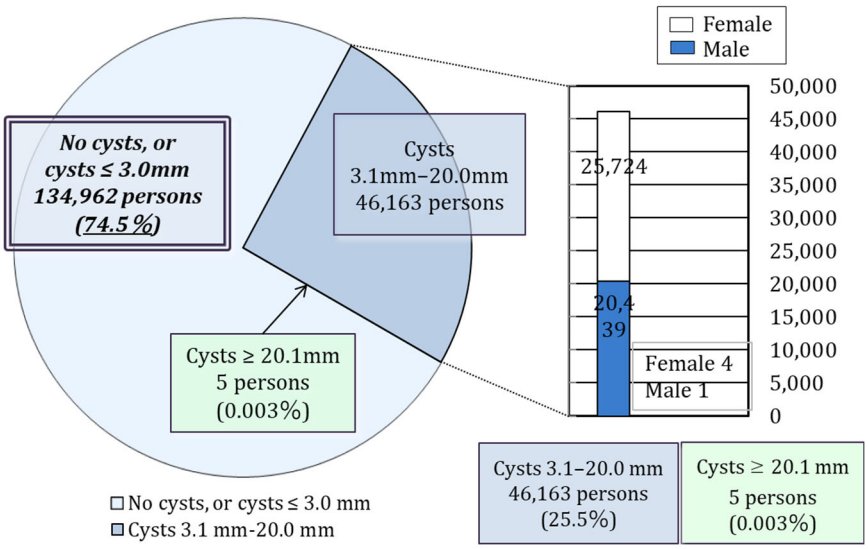


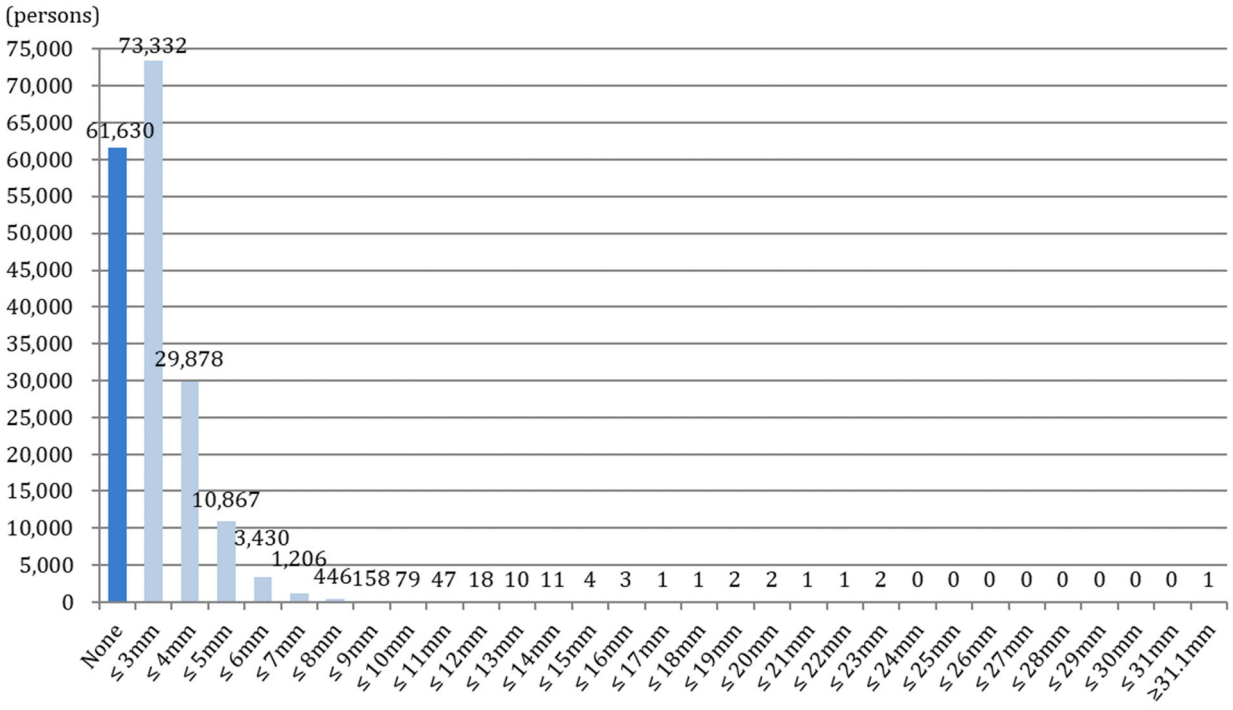


3 Cyst characteristics

(persons)
As of September 30, 2020

Cyst size	Total	Male	Female	Grade	
None	61,630	32,535	29,095	A1	74.5%
≤ 3.0mm	73,332	38,502	34,830	A2	25.5%
3.1–5.0mm	40,745	18,515	22,230		
5.1–10.0mm	5,319	1,890	3,429		
10.1–15.0mm	90	33	57		
15.1–20.0mm	9	1	8		
20.1–25.0mm	4	0	4	B	0.003%
≥ 25.1mm	1	1	0		
Total	181,130	91,477	89,653		





Appendix 5

Implementation status of the TUE confirmatory examination by area — As of September 30, 2020

	Primary exam participants	Those referred to confirmatory exam	Confirmatory exam participants				Those with finalized results				
			Total	Age 6-11	Age 12-17	≥ Age 18	Total	A1	A2	Not A1 or A2	
											FNAC
	a	b	c	d	e	f	g	h	i	j	k
		b/a (%)	c/b (%)	d/c (%)	e/c (%)	f/c (%)	g/c (%)	h/g (%)	i/g (%)	j/g (%)	k/j (%)
13 municipalities[1)]	22,517	150	113	7	68	38	109	1	5	103	7
		0.7	75.3	6.2	60.2	33.6	96.5	0.9	4.6	94.5	6.8
Nakadori[2)]	104,008	702	488	45	272	171	467	3	51	413	41
		0.7	69.5	9.2	55.7	35.0	95.7	0.6	10.9	88.4	9.9
Hamadori[3)]	33,428	316	193	8	115	70	173	1	11	161	16
		0.9	61.1	4.1	59.6	36.3	89.6	0.6	6.4	93.1	9.9
Aizu[4)]	22,903	206	134	7	77	50	119	1	9	109	10
		0.9	65.0	5.2	57.5	37.3	88.8	0.8	7.6	91.6	9.2
Total	182,856	1,374	928	67	532	329	868	6	76	786	74
		0.8	67.5	7.2	57.3	35.5	93.5	0.7	8.8	90.6	9.4

1) Tamura, Minami-soma, Date, Kawamata, Hirono, Naraha, Tomioka, Kawauchi, Okuma, Futaba, Namie, Katsurao, Iitate
2) Fukushima, Koriyama, Shirakawa, Sukagawa, Nihonmatsu, Motomiya, Kori, Kunimi, Otama, Kagamiishi, Tenei, Nishigo, Izumizaki, Nakajima, Yabuki, Tanagura, Yamatsuri, Hanawa, Samegawa, Ishikawa, Tamakawa, Hirata, Asakawa, Furudono, Miharu, Ono
3) Iwaki, Soma, Shinchi
4) Aizuwakamatsu, Kitakata, Shimogo, Hinoemata, Tadami, Minami-aizu, Kitashiobara, Nishiaizu, Bandai, Inawashiro, Aizubange, Yugawa, Yanaizu, Mishima, Kaneyama, Showa, Aizumisato

Appendix 6

Surgical cases for malignancy or suspicion of malignancy

1. Municipalities surveyed in FY2018	
Malignant or suspicious for malignancy:	17 (14 surgical cases: 14 papillary thyroid carcinomas)
2. Municipalities surveyed in FY2019	
Malignant or suspicious for malignancy:	13 (11 surgical case: 11 papillary thyroid carcinomas)
3. Total	
Maalignant or suspicious for malignancy:	30 (25 surgical cases: 25 papillary thyroid carcinomas)

Report on the TUE Full-Scale Survey (fifth-round survey)

1. Summary

1.1 Purpose

In order to monitor the long-term health of children, we are now engaged in the Full-Scale Survey (fifth-round survey), following the Preliminary Baseline Survey for background assessment of thyroid glands, and three Full-Scale Surveys (second-, third-, and fourth-round surveys) to continuously confirm the status of thyroid glands.

1.2 Eligible persons

All Fukushima residents approximately 18 years old or younger at the time of earthquake (those born between April 2, 1992 and April 1, 2012).

1.3 Implementation Period

FY2020 and FY2021, starting in April 2020:

1.3-1 For those 18 years old or younger

The examination will be carried out over 3 years, from FY2020 through FY2022.

1.3-2 For those 19 years old or older

The examination will be carried out on an age group basis (i.e., school grade).

FY2020: those born in FY1998 and FY2000

FY2021: those born in FY1999 and FY2001

1.3-3 For those 25 years old or older

Those who are older than 20 are recommended to receive the examination every 5 years at the ages of 25, 30, and so on.

FY2020: those born in FY1995

FY2021: those born in FY1996

Results of the survey for those 25 years old will be reported separately.

1.4 Responsible Organizations

Fukushima Prefecture commissioned Fukushima Medical University (FMU) to conduct the survey in cooperation with organizations inside and outside Fukushima for the convenience of participants (the number of medical facilities shown below is as of September 30, 2020).

1.4-1 Primary examination facilities

Inside Fukushima Prefecture	84 medical facilities
Outside Fukushima Prefecture	125 medical facilities

1.4-2 Confirmatory examination facilities

Inside Fukushima Prefecture	5 medical facilities including FMU
Outside Fukushima Prefecture	37 medical facilities

1.5 Methods

1.5-1 Primary examination

Ultrasonography of the thyroid gland

Assessments are made by specialists on the basis of the following criteria:

- Grade A
  - A1: No nodules/cysts
  - A2: Nodules ≤ 5.0 mm or cysts ≤ 20.0 mm
- Grade B
  - B: Nodules ≥ 5.1 mm or cysts ≥ 20.1 mm
  - Some A2 results may be re-classified as B results when clinically indicated.
- Grade C
  - C: Immediate need for confirmatory examination, judging from the condition of the thyroid gland.

1.5-2 Confirmatory examination

Ultrasonography of the thyroid gland, blood test, urine test, and fine needle aspiration cytology (FNAC) if needed for those with B or C test results.

Priority is given to those in urgent clinical need. A medical follow-up may be recommended based on

confirmatory exam results.

1.5-3 Flow chart

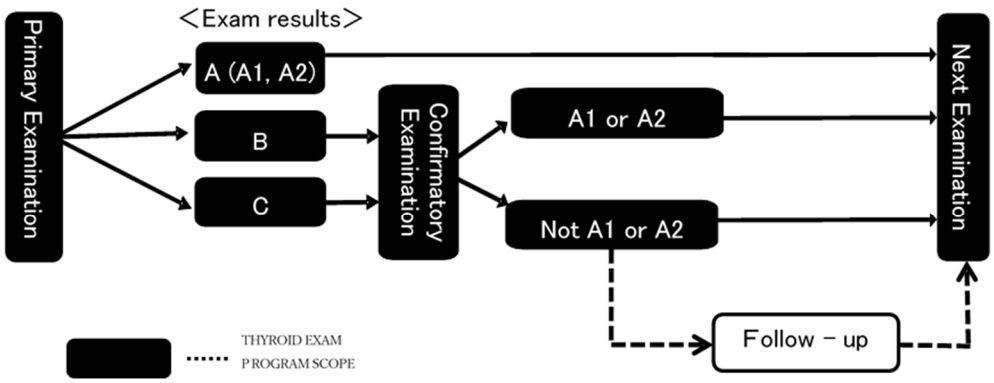


Fig. 1 Flow chart

1.6 Municipalities Surveyed

The municipalities where examinations (for those 18 years old or younger) were carried out in FY2020 and FY2021 are as follows:

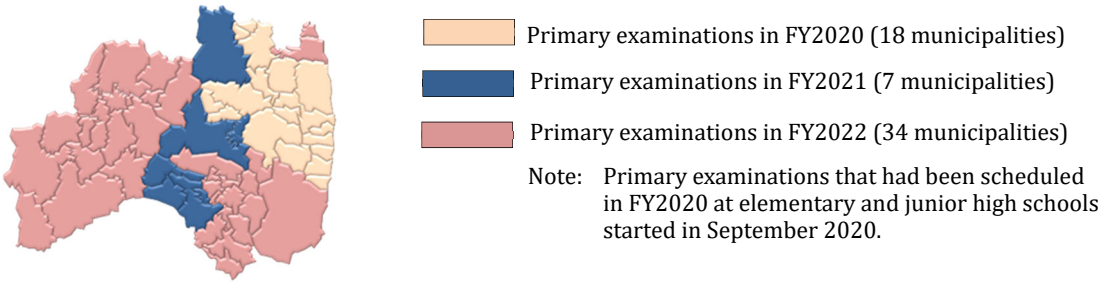


Fig. 2 Municipalities covered for primary examinations at elementary and junior high schools

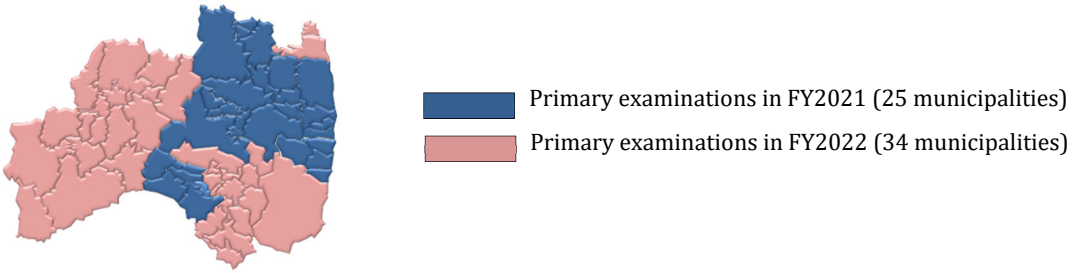


Fig. 3 Municipalities covered for primary examinations at high schools and other facilities

Results of these surveys were aggregated based on the year when examinations were originally scheduled, which may differ from the year in which some examinations were actually conducted.

2. Results as of September 30, 2020

2.1 Results of the Primary Examination

2.1-1 Implementation status

The primary examination was carried out for 3,070 participants (1.2%) by September 30, 2020.

Results of 2,138 participants (69.6%) have been finalized and individual result reports were already sent to them.

Of these, 747 (34.9%) had Grade A1 results, 1,365 (63.8%) had Grade A2, 26 (1.2%) had Grade B, and none had Grade C.

Table 1 Progress and results of the primary examination

	Eligible persons	Participants (%)		Participants with finalized results (%)				
			Outside the prefecture		A		Those referred to confirmatory exam (%)	
					A1	A2	B	C
	a	b (b/a)		c (c/b)	d (d/c)	e (e/c)	f (f/c)	g (g/c)
FY2020	144,845	2,395 (1.7)	1,410	1,615 (67.4)	582 (36.0)	1,015 (62.8)	18 (1.1)	0 (0.0)
FY2021	107,983	675 (0.6)	87	523 (77.5)	165 (31.5)	350 (66.9)	8 (1.5)	0 (0.0)
Total	252,828	3,070 (1.2)	1,497	2,138 (69.6)	747 (34.9)	1,365 (63.8)	26 (1.2)	0 (0.0)

Table 2 Number and percentage of participants with nodules/cysts

	Participants with finalized results	Participants with nodules/cysts (%)			
		Nodules		Cysts	
		≥ 5.1mm	≤ 5.0mm	≥ 20.1mm	≤ 20.0mm
	a	b (b/a)	c (c/a)	d (d/a)	e (e/a)
FY2020	1,615	18 (1.1)	15 (0.9)	0 (0.0)	1,019 (63.1)
FY2021	523	8 (1.5)	9 (1.7)	0 (0.0)	356 (68.1)
Total	2,138	26 (1.2)	24 (1.1)	0 (0.0)	1,375 (64.3)

- Percentages are rounded to a lower decimal place. This applies to other tables as well.
- Those who were eligible for and participated in the Age 25 Survey (those born between FY1992 and FY1997) are excluded. Their results will be reported separately.
- Examinations for those born in FY1992 (approx. 23,000), FY1993 (approx. 22,000) FY1994 (approx. 22,000), FY1995 (approx. 21,000), and FY1996 (approx. 21,000) took place in FY2017, FY2018, FY2019, FY2020, and FY2021, respectively. Examinations for those born in FY1997 (approx. 20,000) will be carried out in FY2022.

2.1-2 Participation rate by age group

The participation rate for each age group as of April 1 of each year is shown in Table 3.

Table 3 Participation rates by age group

			Total	Age group		
FY2020	Age group*			6-11	12-17	18-24
	Eligible persons	(a)	144,845	37,048	61,908	45,889
	Participants	(b)	2,395	608	706	1,081
	Participation rate (%)	(b/a)	1.7	1.6	1.1	2.4
FY2021	Age group **			7-11	12-17	18-24
	Eligible persons	(a)	107,983	19,719	45,057	43,207
	Participants	(b)	675	4	8	663
	Participation rate (%)	(b/a)	0.6	0.0	0.0	1.5
Total	Eligible persons	(a)	252,828	56,767	106,965	89,096
	Participants	(b)	3,070	612	714	1,744
	Participation rate (%)	(b/a)	1.2	1.1	0.7	2.0

*Age groups are formed with the age as of April 1 of each fiscal year.

2.1-3 Comparison of the fourth- and fifth-round survey results

Comparison of results of two Full-Scale Surveys (fourth- and fifth-round surveys) is shown in Table 4.

Among 1,731 participants with Grade A1 or A2 results in the fourth-round survey, 1,720 (99.4%) had Grade A1 or A2 results and 11 (0.6%) had Grade B results in the fifth-round survey.

Among 15 participants with Grade B results in the fourth-round survey, 4 (26.7%) had Grade A1 or A2 results and 11 (73.3%) had Grade B results in the fifth-round survey.

Table 4 Comparison of the fourth- and fifth round surveys

			Results of the fourth-round survey*	**Results of the fifth-round survey****			
				A		**B**	**C**
				A1	**A2**		
			a (%)	b (b/a)	c (c/a)	d (d/a)	e (e/a)
Results of the fourth-round survey	A	A1	591 (100.0)	476 (80.5)	113 (19.1)	2 (0.3)	0 (0.0)
		A2	1,140 (100.0)	132 (11.6)	999 (87.6)	9 (0.8)	0 (0.0)
	B		15 (100.0)	1 (6.7)	3 (20.0)	11 (73.3)	0 (0.0)
	C		0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
	Not participated		392 (100.0)	138 (35.2)	250 (63.8)	4 (1.0)	0 (0.0)
Total			2,138 (100.0)	747 (34.9)	1,365 (63.8)	26 (1.2)	0 (0.0)

* Results of the fourth-round survey are from fifth-round survey participants with finalized results, not the breakdown of all fourth-round survey participants.

** Results of the fifth-round survey participants who were diagnosed for each grade in the fourth-round survey.

2. Mental Health Care

We provide the following support for thyroid examination participants.

3.1 Support for Primary Examination Participants

After the examination, medical doctors offer person-to-person explanation on examination results, showing ultrasound images in private consultation booths at examination venues set up in public facilities.

Consultation booths were set up at all venues for examinations conducted in and after April 2020, and as of September 30, 2020, all 275 participants (100%) have visited these consultation booths.

3.2 On-location Lectures and Information Sessions

To help participants and their parents/guardians improve their understanding of the thyroid examination, we have conducted on-location lectures and information sessions since April 2018.

By March 31, 2020, a total of 180 people participated in these sessions offered at 2 locations.

Since the start of these sessions, 15,266 people have participated.

Report on the TUE Full-Scale Survey (Survey for Age 25+)

1. Summary

1.1 Survey Population

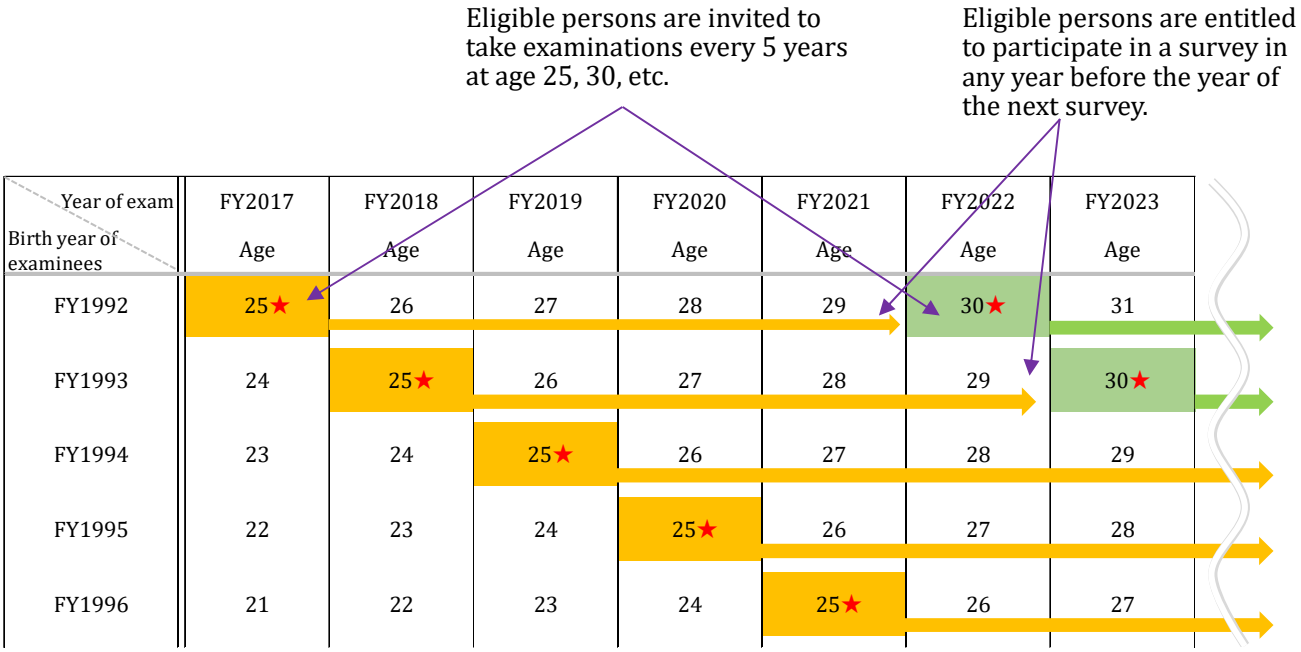
Among Fukushima residents 18 years old or younger at the time of disaster (born between April 2, 1992 and April 1, 2012), those who turn 25 years old during each fiscal year, including those who moved out of the prefecture, are invited to receive a thyroid ultrasound examination (TUE).

Examinations for those born in FY1995 have already started, but since the number of examinations conducted is still small, this report includes the status of the following groups:

- Those born in FY1992 (between April 2, 1992 and April 1, 1993)
- Those born in FY1993 (between April 2, 1993 and April 1, 1994)
- Those born in FY1994 (between April 2, 1994 and April 1, 1995)

1.2 Implementation Period

The Survey for Age 25+ (hereinafter "Age 25+ Survey") started in FY2017 for those who turn 25 years old during each fiscal year. If residents cannot receive the examination in the year they turn 25, they are entitled to one any time through the fiscal year prior to the year they turn 30 (see Fig. 1 for the implementation schedule of Age 25+ Survey).



Year of exam / Birth year of examinees	FY2017 Age	FY2018 Age	FY2019 Age	FY2020 Age	FY2021 Age	FY2022 Age	FY2023 Age
FY1992	25★	26	27	28	29	30★	31
FY1993	24	25★	26	27	28	29	30★
FY1994	23	24	25★	26	27	28	29
FY1995	22	23	24	25★	26	27	28
FY1996	21	22	23	24	25★	26	27

- Beginning in FY2017, examinations are offered to those who turn age 25 in each fiscal year.
- Invitations for the examination will be sent to those who turn age 25 in the fiscal year marked with ★.

Fig. 1 Implementation schedule for Age 25+ Survey

2. Results as of September 30, 2020

2.1 Results of the Primary Examination

2.1-1 Implementation status

Primary examinations for the Age 25+ Survey started in May 2017 for those who turned 25 years old in FY2017 (those born between FY1992 and FY1994) and 5,954 (8.9%) people participated.

Results of 5,907 (99.2%) participants have been finalized and individual results reports were already sent to them.

Of these, 2,540 (43.0%) had Grade A1 results, 2,762 (52.8%) had Grade A2, 244 (4.8%) had Grade B, and none had Grade C.

Table 1 Progress and results of the primary examination

	Eligible persons	Participants (%)		Participants with finalized results (%)				
			Outside the prefecture		A		Those referred to confirmatory exam (%)	
					A1	A2	B	C
	a	b (b/a)		c (c/b)	d (d/c)	e (e/c)	f (f/c)	g (g/c)
Those born in FY1992	22,653	2,260 (10.0)	722	2,258 (99.9)	944 (41.8)	1,215 (53.8)	99 (4.4)	0 (0.0)
Those born in FY1993	21,889	2,165 (9.9)	776	2,152 (99.4)	974 (45.3)	1,076 (50.0)	102 (4.7)	0 (0.0)
Those born in FY1994	22,095	1,529 (6.9)	548	1,497 (97.9)	622 (41.5)	795 (53.1)	80 (5.3)	0 (0.0)
Total	66,637	5,954 (8.9)	2,046	5,907 (99.2)	2,540 (43.0)	3,086 (52.2)	281 (4.8)	0 (0.0)

2.1-2 Comparison with previous examination results

Table 2 Number and percentage of participants with nodules/cysts
(Detailed results are shown in Appendix 1)

	Participants with finalized results	Participants with nodules/cysts (%)			
		Nodules		Cysts	
		≥ 5.1mm	≤ 5.0mm	≥ 20.1mm	≤ 20.0mm
	a	b (b/a)	c (c/a)	d (d/a)	e (e/a)
Those born in FY1992	2,258	98 (4.3)	47 (2.1)	1 (0.0)	1,260 (55.8)
Those born in FY1993	2,152	102 (4.7)	38 (1.8)	0 (0.0)	1,118 (52.0)
Those born in FY1994	1,497	80 (5.3)	32 (2.1)	0 (0.0)	840 (56.1)
Total	5,907	280 (4.7)	117 (2.0)	1 (0.0)	3,218 (54.5)

* Results of the previous survey results of the Age 25 Survey participants with finalized results.
** Results of the Age 25 Survey participants who were diagnosed for each grade in the previous survey.

Comparison of results of the Age 25 Survey and previous surveys is shown in Table 3.

Among 3,780 participants with Grade A1 or A2 results in the previous survey, 3,691 (97.6%) had Grade A1 or A2 results and 89 (2.4%) had Grade B results in the Age 25 Survey.

Among 128 participants with Grade B results in the previous survey, 36 (28.1%) had Grade A (A1 or A2) results and 92 (71.9%) had Grade B results in the Age 25 Survey.

Table 3 Comparison with the previous survey results

			Results of the previous survey*	Results of the Age 25 Survey**			
				A		B	C
				A1	A2		
			a (%)	b (b/a)	c (c/a)	d (d/a)	e (e/a)
Results of the previous survey	A	A1	1,546 (100.0)	1,265 (81.8)	268 (17.3)	13 (0.8)	0 (0.0)
		A2	2,234 (100.0)	367 (16.4)	1,791 (80.2)	76 (3.4)	0 (0.0)
	B		128 (100.0)	4 (3.1)	32 (25.0)	92 (71.9)	0 (0.0)
	C		0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
	Not participated		1,999 (100.0)	904 (45.2)	995 (49.8)	100 (5.0)	0 (0.0)
Total			5,907 (100.0)	2,540 (43.0)	3,086 (52.2)	281 (4.8)	0 (0.0)

* Results of the previous survey, just from Age 25 Survey participants with finalized results, not the breakdown of all third-round survey participants.

** Results of the Age 25 Survey participants who were diagnosed for each grade in their previous survey.

2.2 Results of the Confirmatory Examination

2.2-1 Implementation status

Of 281 eligible persons, 221 (78.6%) participated, of whom 211 (95.5%) completed the entire process of the confirmatory examination.

Of the aforementioned 211 participants, 16 (7.6%) were confirmed to meet Grade A diagnostic criteria by primary examination standards (A1:1, A2: 15) (including those with other thyroid conditions). The remaining 195 (92.4%) were confirmed to be outside of A1/A2 criteria.

Table 4 Progress and results of the confirmatory examination

	Those referred to confirmatory exams	Participants (%)	Total	Those with finalized results (%)			
				A1	A2	Not A1 or A2	
							FNAC
	a	b (b/a)	c (c/b)	d (d/c)	e (e/c)	f (f/c)	g (g/f)
Those born in FY1992	99	81 (81.8)	78 (96.3)	0 (0.0)	3 (3.8)	75 (96.2)	8 (10.7)
Those born in FY1993	102	86 (84.3)	86 (100.0)	0 (0.0)	7 (8.1)	79 (91.9)	6 (7.6)
Those born in FY1994	80	54 (67.5)	47 (87.0)	1 (2.1)	5 (10.6)	41 (87.2)	2 (4.9)
Total	281	221 (78.6)	211 (95.5)	1 (0.5)	15 (7.1)	195 (92.4)	16 (8.2)

2.2-2 Results of fine needle aspiration cytology (FNAC)

Among those who underwent FNAC, 8 had nodules classified as malignant or suspicious for malignancy: 2 of them were male and 6 were female.

Participants' age at the time of the confirmatory examination ranged from 24 to 27 years (mean age: 25.3 ± 0.9 years). The minimum and maximum tumor diameters were 10.8 mm and 49.9 mm. Mean tumor diameter was 21.6 ± 14.7 mm.

Of these 8 participants, 1 had Grade A2 results and 2 had Grade B results in the previous survey. The remaining 5 people did not participate in the previous survey.

Table 5. Results of FNAC

Among those who underwent the Age 25 Survey:	
・Malignant or suspicious for malignancy:÷	8*
・Male to female ratio:÷	2:6
・Mean age (SD, min-max):	25.3 (0.9, 24-27), 17.1 (0.6, 16-18) at the time of disaster
・Mean tumor size:	21.6 mm (14.7 mm, 10.8-49.9 mm)

* Surgical cases are as shown in Appendix 2.

3 Mental Health Care

3.1 Support for Primary Examination Participants

Since April 2017, medical doctors offer person-to-person explanations on examination results, showing ultrasound images in private consultation booths at examination venues set up in public facilities. As of September 30, 2020, 455 (99.8%) of 456 participants visited these consultation booths.

3.2 Support for Confirmatory Examination Participants

A support team has been set up within Fukushima Medical University to offer psychological support to address the anxieties and concerns of confirmatory examination participants during examination. The team also answers questions and offers counseling via our website.

Since the start of the Age 25 survey, 79 participants (19 males and 60 females) have received support as of September 30, 2020. The number of support sessions provided was 154 in total. Of these, 79 sessions (51.3%) were offered at the participants' first examination and 75 (48.7%) at subsequent examinations.

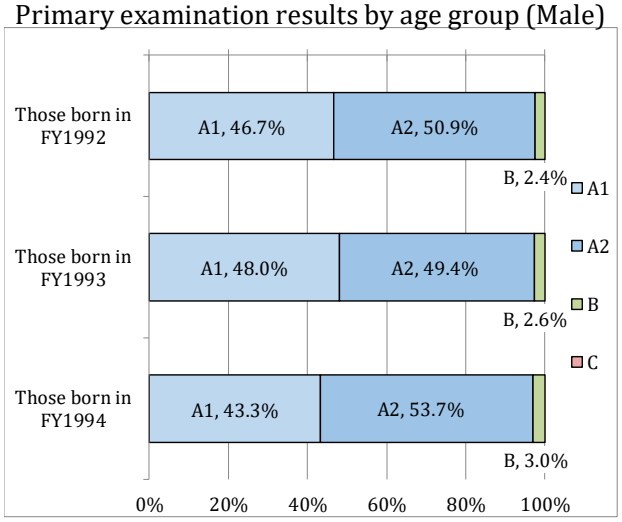
For those who proceeded to regular health insurance medical care, the support team continues to provide support in cooperation with teams of medical staff at hospitals.

Appendix 1

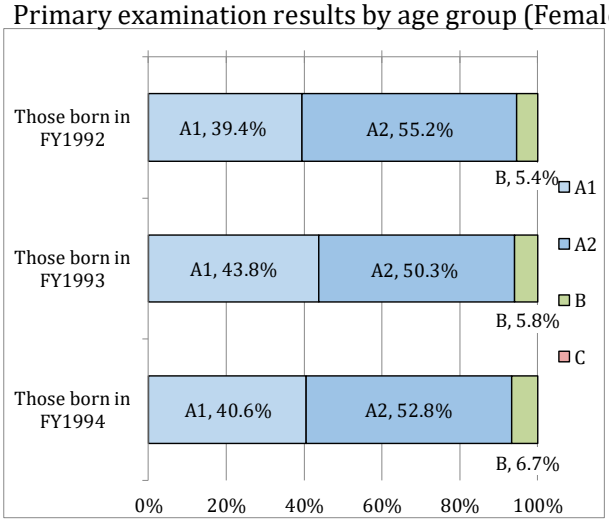
1 TUE Age 25 Survey results, by birth year and sex

Grade / Participants	A						B			C			Total		
	A1			A2											
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Those born in FY1992	351	593	944	383	832	1,215	18	81	99	0	0	0	752	1,506	2,258
Those born in FY1993	352	622	974	362	714	1,076	19	83	102	0	0	0	733	1,419	2,152
Those born in FY1994	233	389	622	289	506	795	16	64	80	0	0	0	538	959	1,497
Total	936	1,604	2,540	1,034	2,052	3,086	53	228	281	0	0	0	2,023	3,884	5,907

Primary examination results by age group (Male)



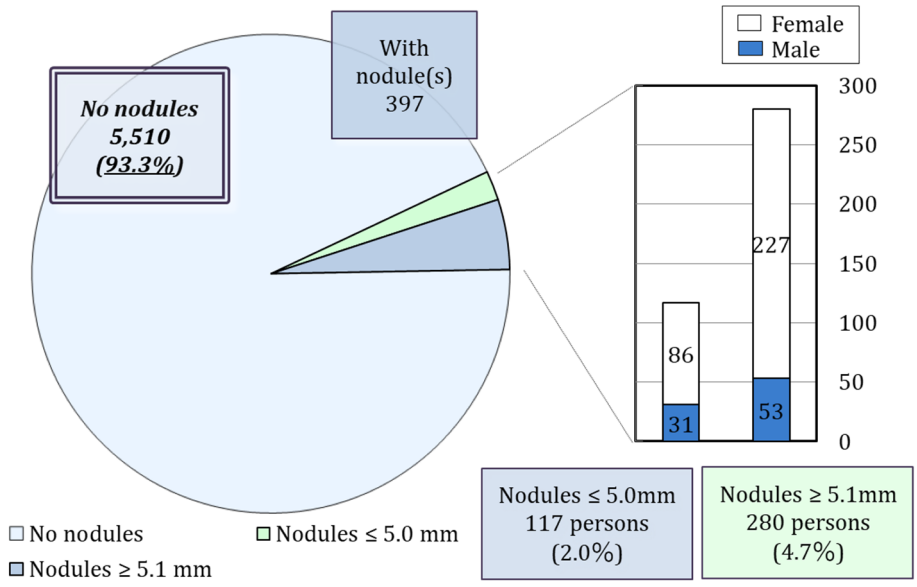
Primary examination results by age group (Female)

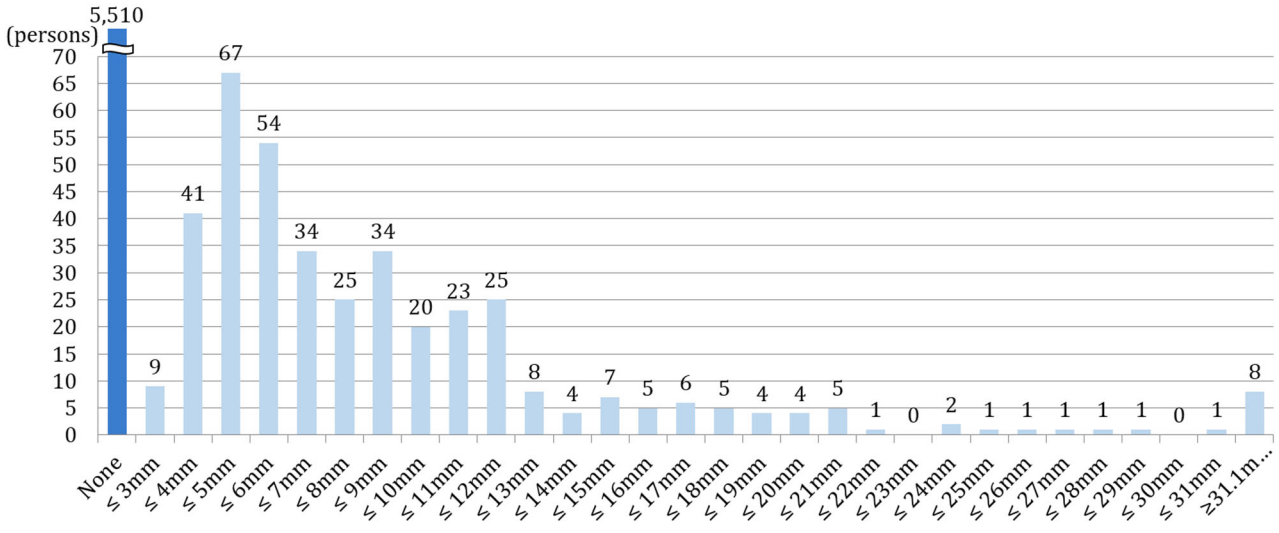


2 Nodule characteristics

(persons)
As of September 30, 2020

Nodule size	Total	Male	Female	Grade	
None	5,510	1,939	3,571	A1	93.3%
≤ 3.0mm	9	2	7	A2	2.0%
3.1–5.0mm	108	29	79		
5.1–10.0mm	167	32	135	B	4.7%
10.1–15.0mm	67	16	51		
15.1–20.0mm	24	2	22		
20.1–25.0mm	9	2	7		
≥ 25.1mm	13	1	12		
Total	5,907	2,023	3,884		

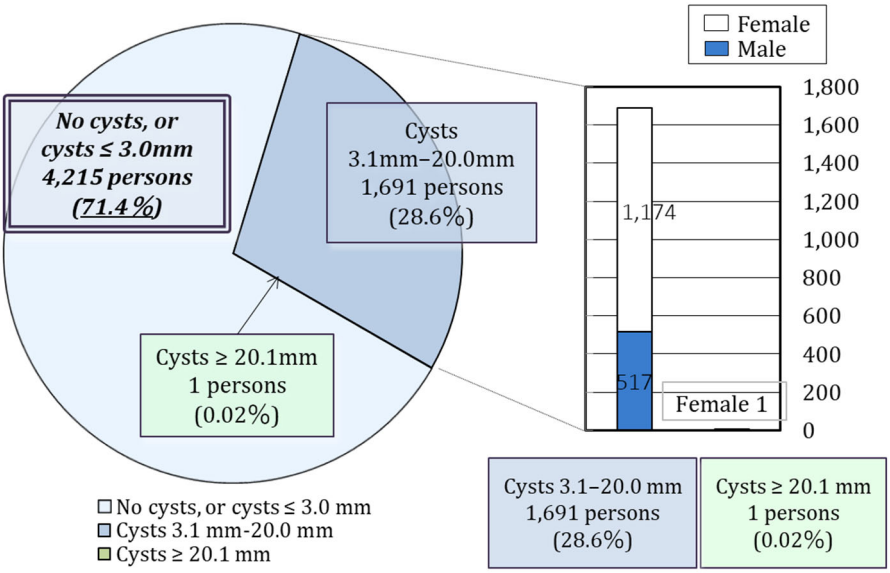


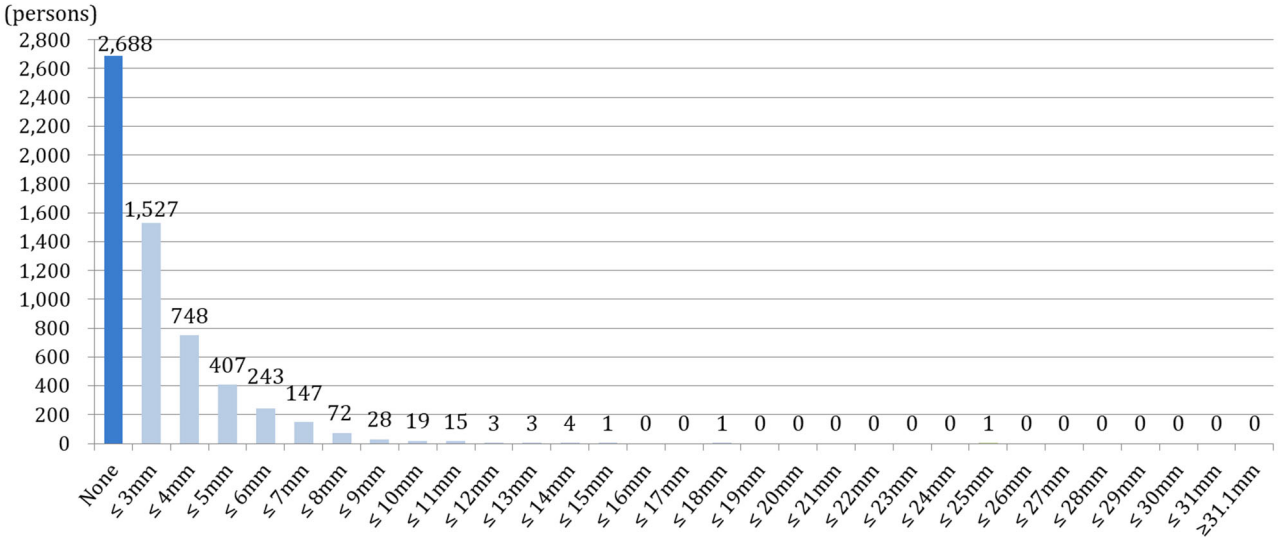


3 Cyst characteristics

(persons)
As of September 30, 2020

Cyst size	Total	Male	Female	Grade	
None	2,688	975	1,713	A1	71.4%
≤ 3.0mm	1,527	531	996	A2	28.6%
3.1–5.0mm	1,155	376	779		
5.1–10.0mm	509	135	374		
10.1–15.0mm	26	5	21		
15.1–20.0mm	1	1	0		
20.1–25.0mm	1	0	1	B	0.02%
≥ 25.1mm	0	0	0		
Total	5,907	2,023	3,884		





Appendix 2

Surgical cases for malignancy or suspicion of malignancy

Among those who underwent the Age 25 Survey:

- Malignant or suspicious for malignancy:
  8 (6 surgical cases: 5 papillary thyroid carcinomas, 1 follicular thyroid carcinoma)