APRU Global Health Workshop 2015

"Cohort study of health in Fukushima residents after the 2011 Great Earthquake"

Date: November 1, 2015
Venue: Icho-kaikan, Osaka University

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Today's topic

1. The Great East Japan Earthquake and a nuclear accident at Tokyo Electric Power Company's Fukushima Daiichi Nuclear Power Plant

2. Preparation of and Overview of the "Fukushima Health Management (FHM) Survey"

3. Some results obtained by "FHM survey"

4. Important issues in the recovery phase

Calendar of major events in Fukushima

Date	Common
3/11 (Fri)	• At 14:46, the earthquake occurred. • At 19:03, an emergency situation was declared. (Fuk Tokyo Electric Power Company) ("Fukushima Daiic • At 21:23, an evacuation order was issued for the 3-k order for the 10-km radius area. (Fukushima Daiichi Station)
3/12 (Sat)	• At 5:44, an evacuation order was issued for the 10-km radius area. (Fukushima Daiichi Station) • At 7:45, an evacuation order was issued for the 3-km order for the 10-km radius area. (Fukushima Daini Nu Power Company) ("Fukushima Daini Station") • At 15:36, a hydrogen explosion occurred at Unit 1 of • At 17:36, an evacuation order was issued for the 10-k • At 18:25, an evacuation order was issued for the 20-km area. (Fukushima Daiichi Station)
3/13 (Sun)	
3/14 (Mon)	• At 11:01, a hydrogen explosion occurred at Unit 3 of the Fukushima Daiichi Station.
3/15 (Tue)	• At 6:10, an explosion sound was heard at Unit 2 of the Fukushima Daiichi Station. (There was a doubt that a pressure suppression chamber might have been damaged.) • At 6:14, it was confirmed that the outer wall of Unit 4 of the Fukushima Daiichi Station was damaged. • At 9:38, a fire occurred at Unit 4 of the Fukushima Daiichi Station. (The fire was brought under control at 11:00.) • At 11:00, an indoor evacuation order was issued for (Fukushima Daiichi Station)
3/16 (Wed)	• At 8:30, white smoke arose from Unit 3 of the Fukushima Daiichi Station.
3/17 (Thu)	• In the morning, seawater was dropped into Unit 3 by helicopters of the Self-Defense Forces. (a total of four times)

Evacuation 3km

Sheltering 3-10km

Evacuation 10km

Evacuation 20km

Sheltering 20-30km

3/18 (Fri)	
3/19 (Sat)	• Water was sprayed onto Unit 3 of the Fukushima Daiichi Station. (Hyper Rescue Team of the Tokyo Fire Department) • Approximately 700 residents in Iitate Village began to be evacuated to Tochigi Prefecture.
3/20 (Sun)	
3/21 (Mon)	• White smoke was discharged from Units 2 and 3 of the Fukushima Daiichi Station. • The shipment of raw milk, spinach and *kakina* (green leafy vegetable) was blocked.
3/22 (Tue)	• White smoke was discharged from Units 2 and 3 of the Fukushima Daiichi Station.
3/23 (Wed)	• White smoke was discharged from Units 2 and 3 of the Fukushima Daiichi Station. • The shipment of head leafy vegetables, cruciferous flower buds, turnips and non-head leafy vegetables (other than those announced on March 21) was blocked. • Japan Post's domestic parcel delivery service was resumed in Fukushima Prefecture. • The 83rd National Invitational High-School Baseball Tournament opened.
3/24 (Thu)	• Foot contamination was detected in two workers at Unit 3. • After being taken to Fukushima Medical University, they were transferred to the National Institute of Radiological Sciences on the following day.
3/25 (Fri)	• A voluntary evacuation request was issued for the 20- to 30-km radium area. (Fukushima Daiichi Station)

Evacuations and Sheltering at the Initial Period Successfully handled by the Government

Public concerns about health effects of radioactive contamination have increased.

“Great East Japan Earthquake” Triple Disaster in Fukushima

1,980 deaths were “disaster-related deaths”. (Oct. 23, 2015)
No one died due to radiation from the NPP accident.

1,604 died, 200 still “missing” due to Earthquake and/or Tsunami.

Earthquake

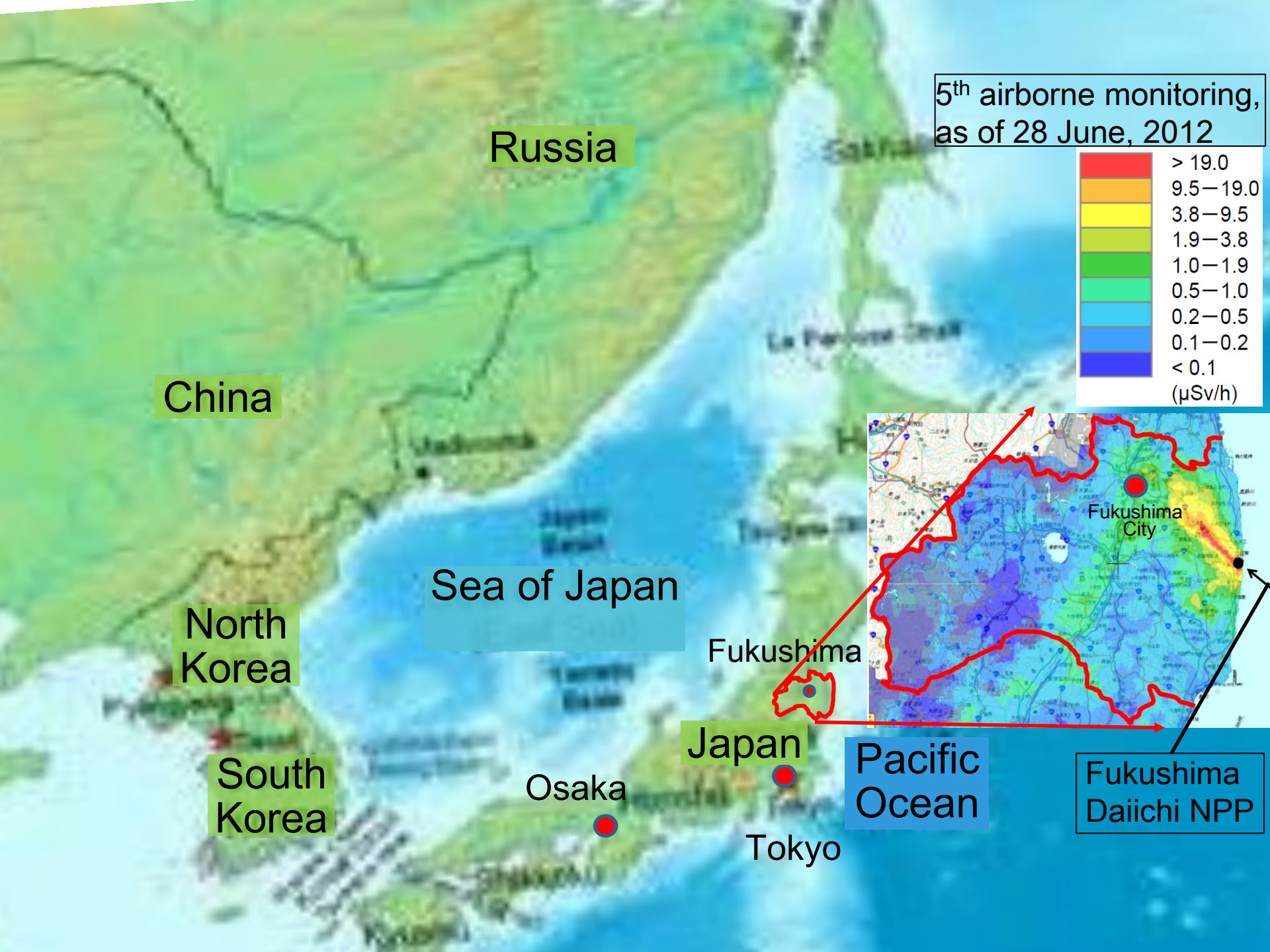
Fukushima City

Tsunami

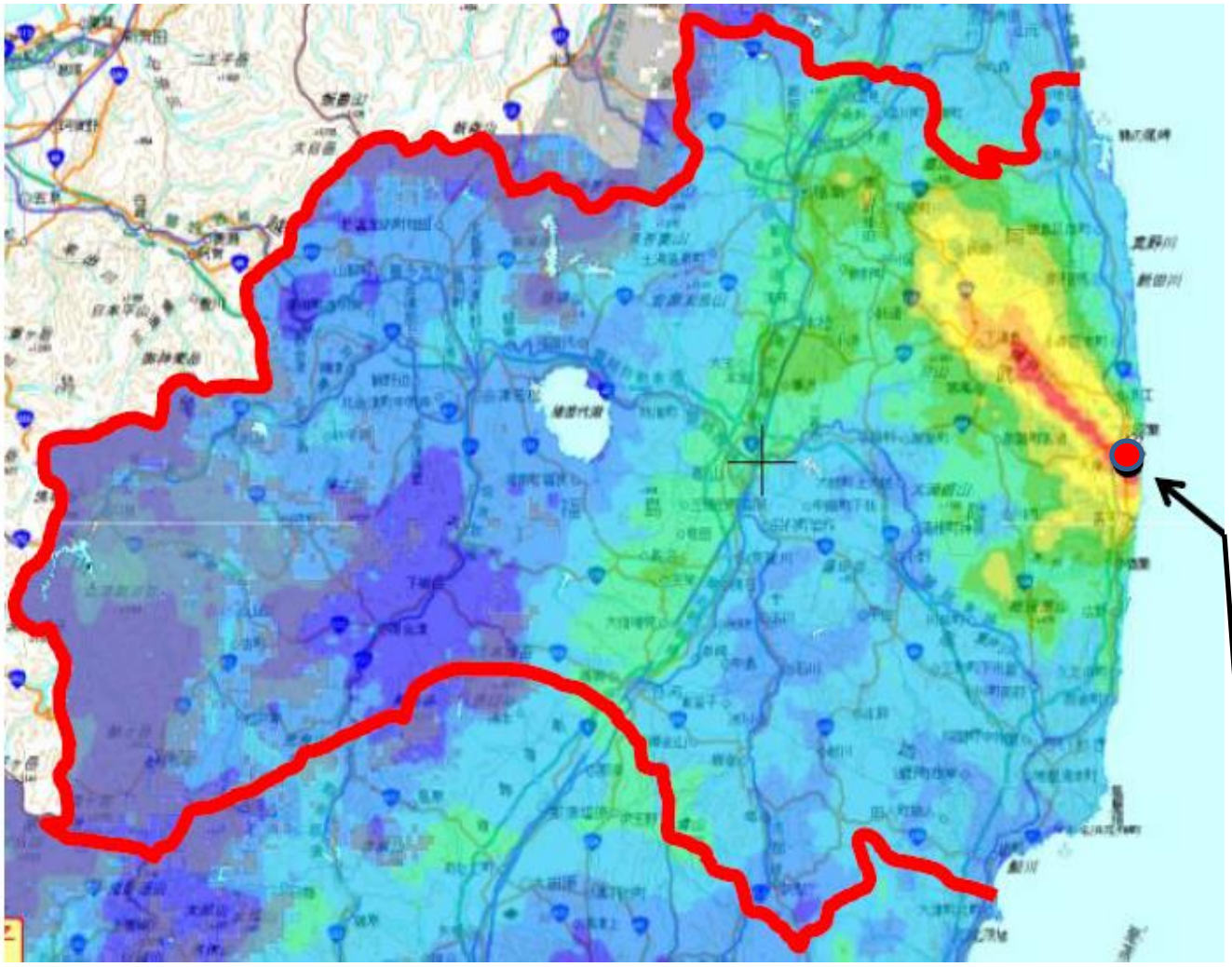
Minamisoma City

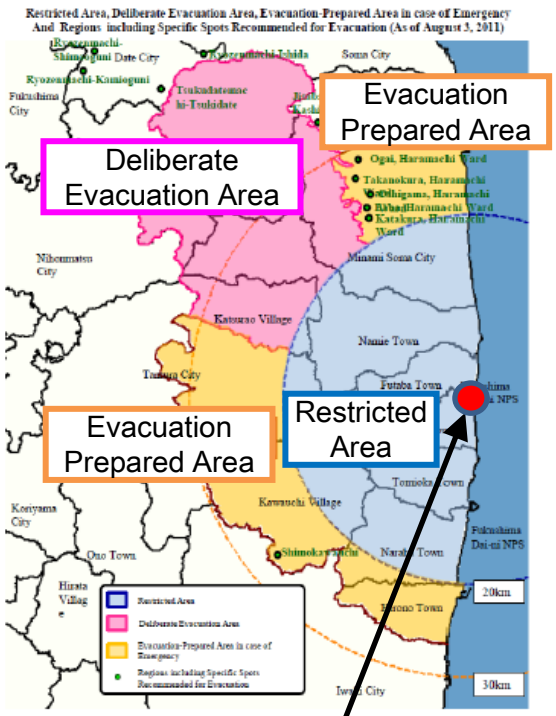
Nuclear Power Plant Accident

Fukushima Dai-ichi Nuclear Power Plant


5th airborne monitoring, as of 28 June, 2012
> 19.0
9.5—19.0
3.8—9.5
1.9—3.8
1.0—1.9
0.5—1.0
0.2—0.5
0.1—0.2
< 0.1
(μSv/h)
Russia
China
North Korea
South Korea
Sea of Japan
Fukushima
Japan
Osaka
Tokyo
Pacific Ocean
Fukushima City
Fukushima Daiichi NPP

5th airborne monitoring, as of 28 June, 2012
Evacuation zone in Fukushima





(Source: MEXT)

Fukushima Daiichi NPP

Evacuees in Fukushima Prefecture (Sep. 10, 2015)

Number of evacuees

- Residents forced to evacuate fror their own houses in accordance with municipal relocation (N=146,000)
- Residents living outside evacuation areas who evacuated voluntarily (N=20,000)

Total; 164,845 (May, 2011)

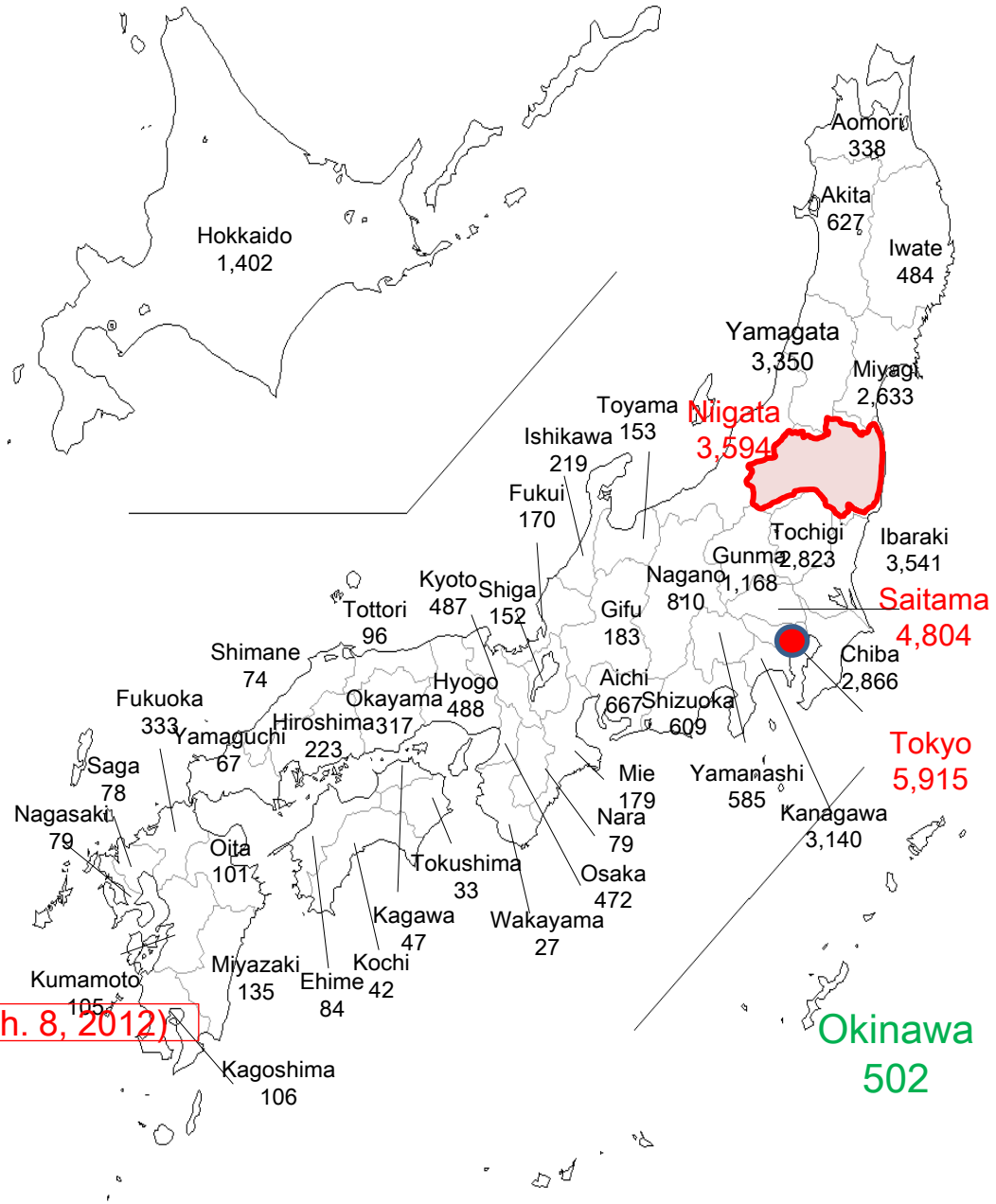
⇩

Inside Fukushima Prefecture: 61,891

Outside Fukushima Prefecture: 44,387 ⇐ 62,831 (March. 8, 2012)

Total; 106,278

(including voluntary evacuees, Sep 10, 2015, Fukushima Prefecture)



Countermeasures on different targets

Object	Situation	Contents
Plant workers	High risk in radiation exposure & contamination, accident	Radiation Emergency Medicine
Emergency responder	High risk in radiation exposure & contamination	Consultation clinic for mental, physical, radiation
Residents	Chronic low dose exposure, stress/fear for risks	education/communication/information

(20130311 NCRP Prof. S. Yamashita)

Background of the Fukushima Health Management Survey:

After the Great East Japan Earthquake of March 11, 2011, under these circumstances mentioned, Fukushima Prefecture decided to launch "Fukushima Health Management Survey“ and Fukushima Medical University took the lead in planning and implementing this survey.

Fukushima Health Management Survey, May 2011

Objectives:

- To monitor long-term health condition of resident in Fukushima and to promote their health

- To investigate whether a long-term low-dose radiation exposure has an effect on their health

Contents:

1. Basic survey (subjects: 2 million all resident in Fukushima)
2. Detailed surveys
    - Thyroid Ultrasound Examination (370,000; 0-18 y/o)
    - Comprehensive Health Check (210,000 ; Evacuees)
    - Mental Health and Lifestyle Survey (210,000 ; Evacuees)
    - Pregnancy and Birth Survey(16,000)

Fukushima Health Management (FHM) Survey

External Exposure Estimation

Basic Survey

Subjects: Residents (2 million) as of March 11, 2011
Method: Self-administered questionnaire survey
Content: Details of whereabouts and daily routine from March 11 onwards to estimate exposure.

Health Status Assessment

Detailed Surveys

Thyroid Ultrasound Examination

Subjects: Residents aged 18 years or younger
Content: Ultrasound examination Survey period: Three years

Comprehensive Health Check

Subjects: Residents in evacuation zones
Content: General health checkup items with differential leukocyte count

Subjects: Residents outside evacuation zones
Content: General health checkup items

Promotion of municipal and workplace health checkups

Additional health checkups
to reach residents not included in current services

Mental Health and Lifestyle Survey

Pregnancy and Birth Survey

Follow-ups

"Health Management File"

☆To keep health checkup records
☆To provide information on radiation

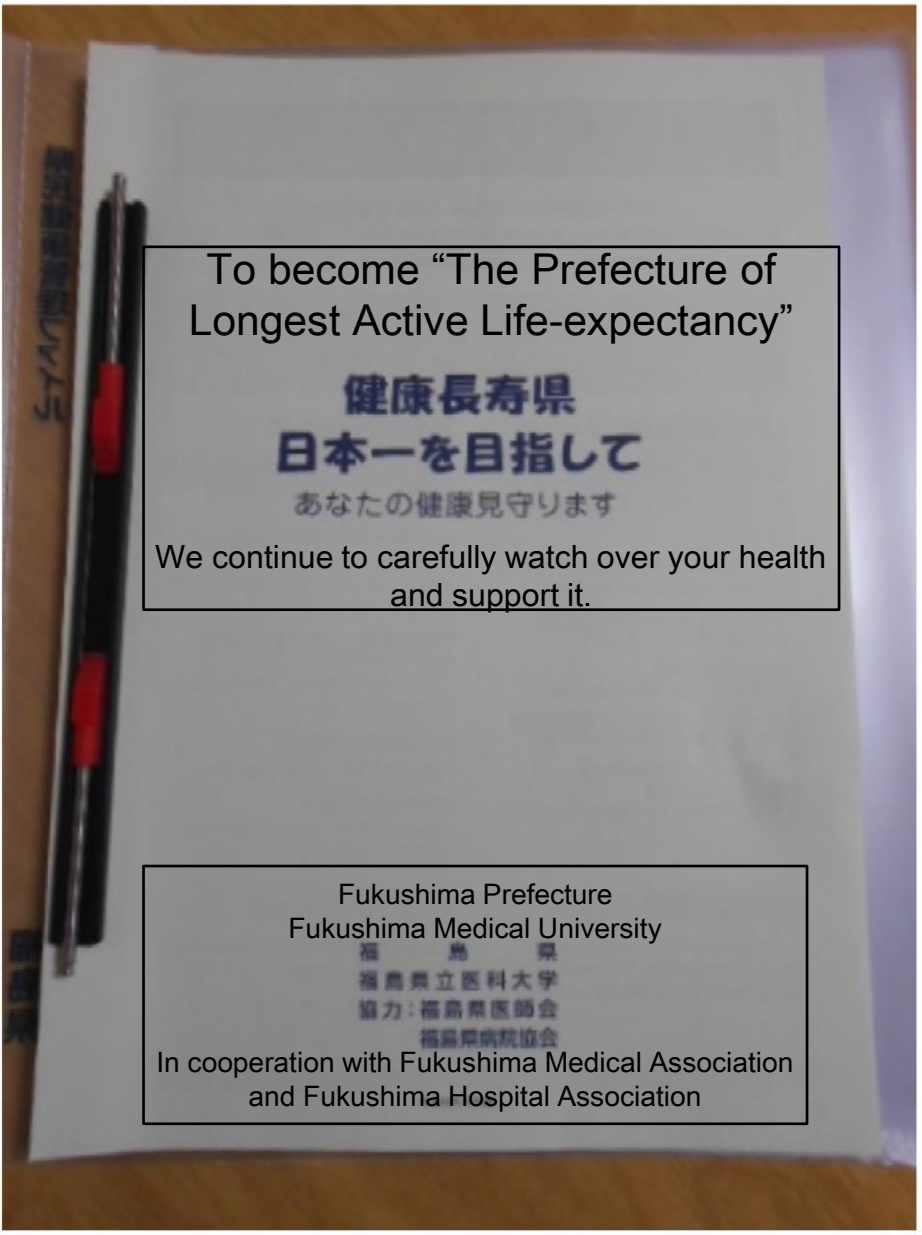
Database

◆ To provide long-term monitoring of residents' health
◆ To guide treatment
◆To inform and guide future generations

- Whole Body Counter
- Dosimeter

Consultation and support Follow-up Treatment

Health management file



【県民健康管理ファイル案】

◆ファイル素材
⇒長期間にわたって使用することに耐えうる素材（例：硬質プラスチック）
◆サイズ
⇒A４サイズ　2穴バインダー式ファイル
◆ファイリング機能
⇒とじ込み用金具は、小さなお子さんが指を挟むことのないような配慮した器具を使用

【ファイルの内容】

分類		内容	頁数	
属性記録		氏名・住所等記載ページ　イラスト	1	1
啓発部分	1	放射線の基礎知識 ⇒一般的な基礎知識、単位や数値の持つ意味の解説	1	
	2	放射線の人体影響 ⇒人体影響に関する解説	1	
	3	内部被ばく、外部被ばくとは	1	
	4	甲状腺がんと超音波検査 ⇒甲状腺がんについての一般的な知識の解説	1	
	5	⇒生活習慣病の予防、健康診査の重要性の解説	1	
	6	がんのリスクの大きさ リスクの比較、医療被ばくの解説	1	
	7	放射線とストレス ⇒不安・ストレスと健康障害についての解説	1	
	8	妊娠と放射線 ⇒赤ちゃんへの影響についての解説	1	9
記録部分	1	県民健康管理調査の基本調査の結果 ⇒基本調査の結果を保管しておく頁	1	
	2	居住地の変遷の記録	1	
	3	線量計結果、内部被ばく検査結果の記録	1	
	4	甲状腺超音波検査の記録	1	
	5		1	
	6	がん検診受診の記録	1	
	7	ストレスチェック表	1	16
資料部分	1	積算線量マップ	1	
	2	相談機関一覧	1	
	3	出来事カレンダー	2	20
ファイル部分		ファイル	各種健診結果の書類をとじ込むクリアファイル	10枚

ノート部分（ノート部分も長期間の使用を想定してクリアファイルを使用）

Information on radiation, disease (cancer), stress, pregnancy,

Document, result of the FHM survey, stress check list,

Advance Publication by J-STAGE

J Epidemiol 2012
doi:10.2188/jea.JE20120105

Special Article

Study Protocol for the Fukushima Health Management Survey

Seiji Yasumura[1,2], Mitsuaki Hosoya[1,3], Shunichi Yamashita[1], Kenji Kamiya[1,4], Masafumi Abe[1,5], Makoto Akashi[6], Kazunori Kodama[7], and Kotaro Ozasa[7], for the Fukushima Health Management Survey Group

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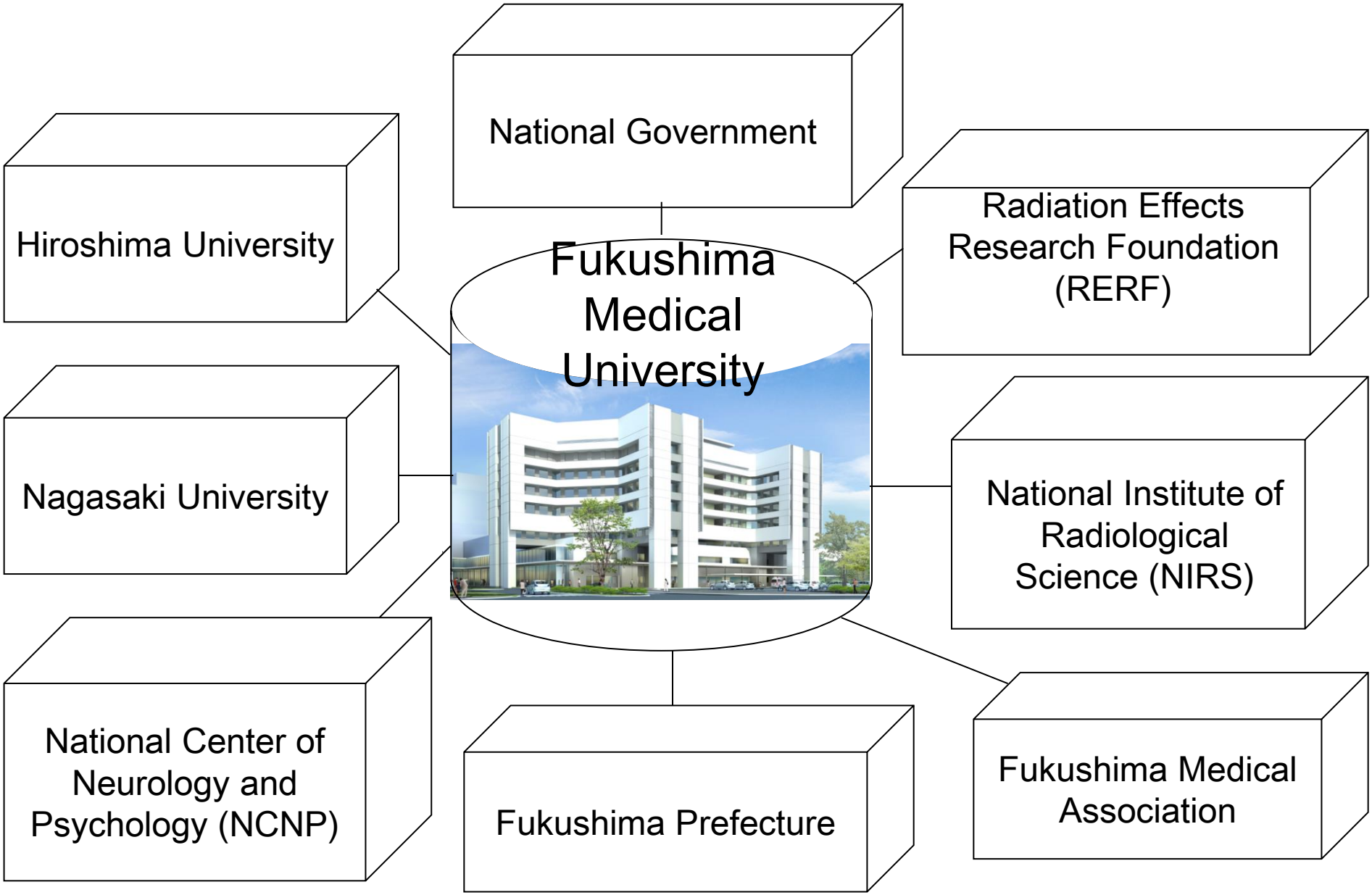
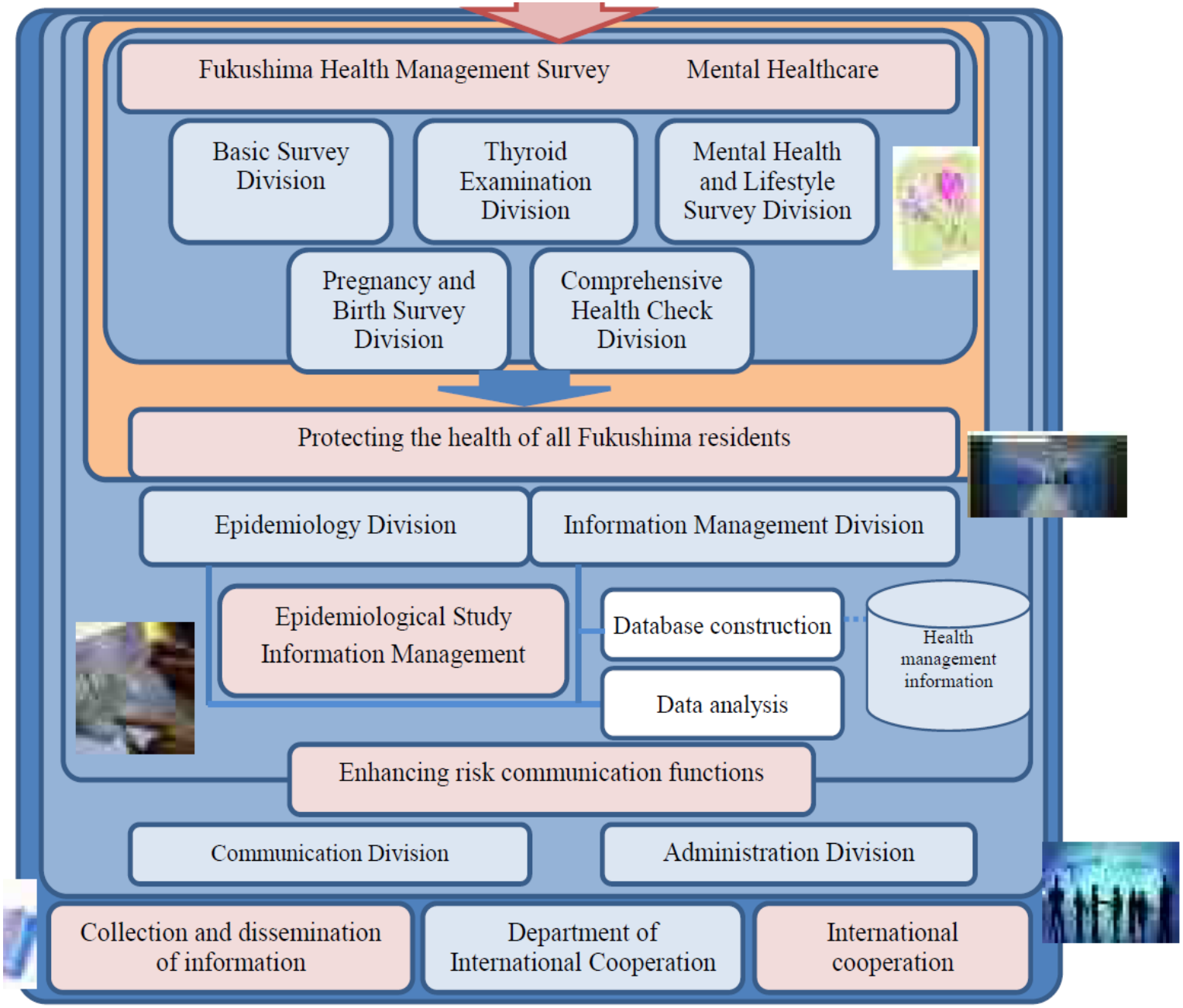
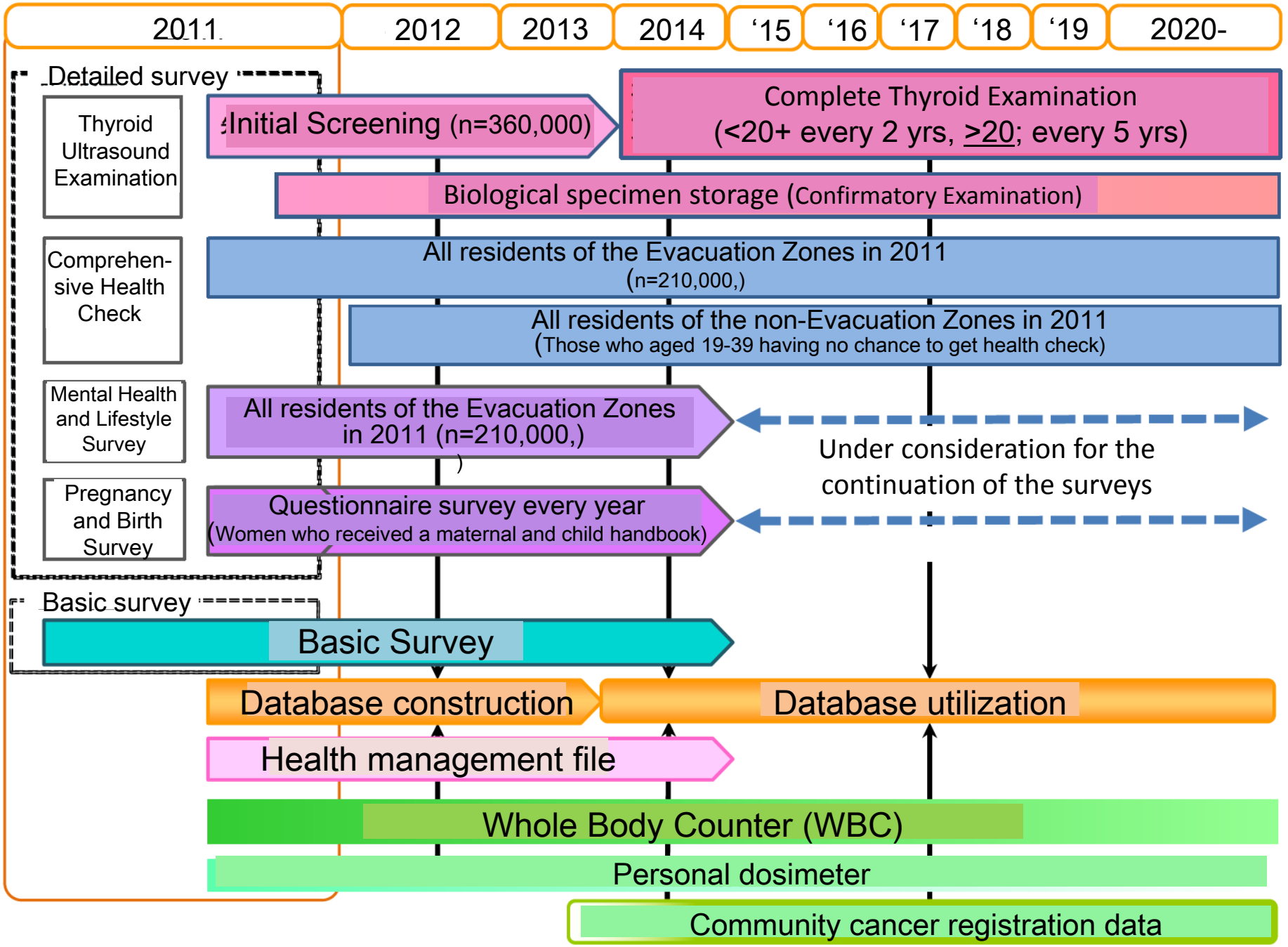
Collaboration with other institutions inside Japan



Structure


Fukushima Health Management Survey
Mental Healthcare
Basic Survey Division
Thyroid Examination Division
Mental Health and Lifestyle Survey Division
Pregnancy and Birth Survey Division
Comprehensive Health Check Division
Protecting the health of all Fukushima residents
Epidemiology Division
Information Management Division
Epidemiological Study Information Management
Database construction
Data analysis
Health management information
Enhancing risk communication functions
Communication Division
Administration Division
Collection and dissemination of information
Department of International Cooperation
International cooperation

Fukushima Health Management Survey (2011-2020, 2021-continue)



Response rates to the Basic survey by area

As of March 31, 2015

Area (preceding and full-scale surveys)	Survey population a	Responses b	Response rate c=b/a	Completed dose estimates d	Proportion e=d/b	Returned results f	Proportion g=f/b
Kempoku	504,042	150,866	29.9%	147,690	97.9%	147,527	97.8%
Kenchu	557,234	134,549	24.1%	130,594	97.1%	129,346	96.1%
Kennan	152,225	33,969	22.3%	33,008	97.2%	32,683	96.2%
Aizu	267,203	56,267	21.1%	53,785	95.6%	53,628	95.3%
Minami-aizu	30,789	6,224	20.2%	5,894	94.7%	5,851	94.0%
Soso	195,604	89,353	45.7%	86,478	96.8%	86,327	96.6%
Iwaki	348,223	87,322	25.1%	85,122	97.5%	85,044	97.4%
Total	2,055,320	558,550	27.2%	542,571	97.1%	540,406	96.8%

Estimated external radiation doses by area

Effective Dose (mSv)	Total	Excluding radiation workers	By region							Proportion (%) excluding radiation workers		
			Kempoku	Kenchu	Kennan	Aizu	Minami-aizu	Soso	Iwaki			
<1	287,852	282,227	24,789	56,569	24,846	43,955	4,771	55,298	71,999	62.0	93.8	99.8
1-2	146,938	144,636	82,689	45,269	3,320	298	34	12,402	624	31.8		
2-3	25,533	25,169	15,397	8,050	17	25	0	1,650	30	5.5	5.9	
3-4	1,548	1,470	464	417	0	1	0	584	4	0.3		
4-5	540	495	40	5	0	0	0	449	1	0.1	0.2	
5-6	430	378	18	3	0	0	0	356	1	0.1		0.2
6-7	268	229	10	1	0	1	0	217	0	0.1	0.1	
7-8	152	114	1	0	0	0	0	113	0	0.0		
8-9	113	73	1	0	0	0	0	72	0	0.0	0.0	
9-10	69	39	0	0	0	0	0	39	0	0.0		
10-11	68	35	0	0	0	0	0	35	0	0.0	0.0	0.0
11-12	52	30	1	0	0	0	0	29	0	0.0		
12-13	36	13	0	0	0	0	0	13	0	0.0	0.0	
13-14	34	12	0	0	0	0	0	12	0	0.0		
14-15	27	6	0	0	0	0	0	6	0	0.0	0.0	
≥15	309	14	0	0	0	0	0	14	0	0.0	0.0	0.0
Total	463,969	454,940	123,410	110,314	28,183	44,280	4,805	71,289	72,659	100.0	100.0	100.0
Max	66	25	11	6.3	2.6	6.0	1.9	25	5.9			
Mean value	0.9	0.8	1.4	1.0	0.6	0.2	0.1	0.8	0.3			

Estimated external radiation doses by age group

Effective Dose (mSv)	Age at the time of the disaster									Total
	0 - 9	10 - 19	20 - 29	30 - 39	40 - 49	50 - 59	60 - 69	70 - 79	80 -	
<1	47,126	43,456	20,762	33,317	28,015	32,134	35,273	25,143	17,001	282,227
1-2	22,692	21,373	9,929	17,975	16,396	18,273	19,061	12,044	6,893	144,636
2-3	6,353	4,198	1,112	2,306	2,200	2,901	3,323	1,946	830	25,169
3-4	248	157	81	154	149	228	224	162	67	1,470
4-5	19	45	36	40	75	92	77	72	39	495
5-6	13	14	27	33	44	83	73	64	27	378
6-7	4	5	12	21	25	45	50	46	21	229
7-8	3	6	6	8	13	35	22	14	7	114
8-9	2	4	3	8	7	15	14	10	10	73
9-10	0	1	1	2	4	12	11	5	3	39
10-11	1	1	1	2	5	11	5	6	3	35
11-12	0	0	1	3	0	5	8	11	2	30
12-13	0	0	0	0	1	6	4	1	1	13
13-14	0	0	1	1	1	4	3	2	0	12
14-15	0	0	0	0	0	3	3	0	0	6
≥15	0	0	0	0	3	3	5	1	2	14
Total	76,461	69,260	31,972	53,870	46,938	53,850	58,156	39,527	24,906	454,940

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

Flow Chart of Thyroid Ultrasound Examination

First Screening (Portable US machine)

No ← **Nodule** → **Yes**

Follow-up (2,5)

LOGIQ *e* Expert

Secondary Screening
Precise US examination, Blood and Urine analysis

HIVISION Ascendus

Follow-up ← **Criteria** → **FNAB**

Explanation Examination

Benign

Malignant → **Surgical Treatment**

Thyroid ultrasound examination

Table Screening test coverage as of 30 April 2014

Table 1. Screening test coverage

	Target Population	Participants		Test results				
		Proportion (%)	Screened outside Fukushima	Proportion (%)	Class			
					A		Requiring confirmatory test	
	a	b (b/a)		c (c/b)	A1 d (d/c)	A2 e (e/c)	B f (f/c)	C g (g/c)
FY 2011	47,768	41,810 (87.5)	2,024	41,810 (100.0)	26,373 (63.1)	15,216 (36.4)	221 (0.5)	0 (0.0)
FY 2012	161,129	139,338 (86.5)	4,266	139,338 (100.0)	76,196 (54.7)	62,154 (44.6)	987 (0.7)	1 (0.0)
FY 2013	158,788	119,328 (75.1)	3,220	119,328 (100.0)	52,037 (43.6)	66,206 (55.5)	1,085 (0.9)	0 (0.0)
Total	367,685	300,476 (81.7)	9,510	300,476 (100.0)	154,606 (51.5)	143,576 (47.8)	2,293 (0.8)	1 (0.0)

Total for cases FY 2011 – FY 2013

Suspicious or malignant	113*
Male to female ratio	38:75
Mean age(SD, min-max)	17.3 (2.7, 8-22) 14.8 (2.6, 6-18) at the time of the disaster
Mean tumor size	14.2 mm (7.8 mm, 5.1-45.0 mm)

(Suspicious or malignant: 113 (99 surgical cases: 1 of benign thyroid nodules; 95 of papillary thyroid carcinoma; 3 poorly differentiated thyroid carcinoma)

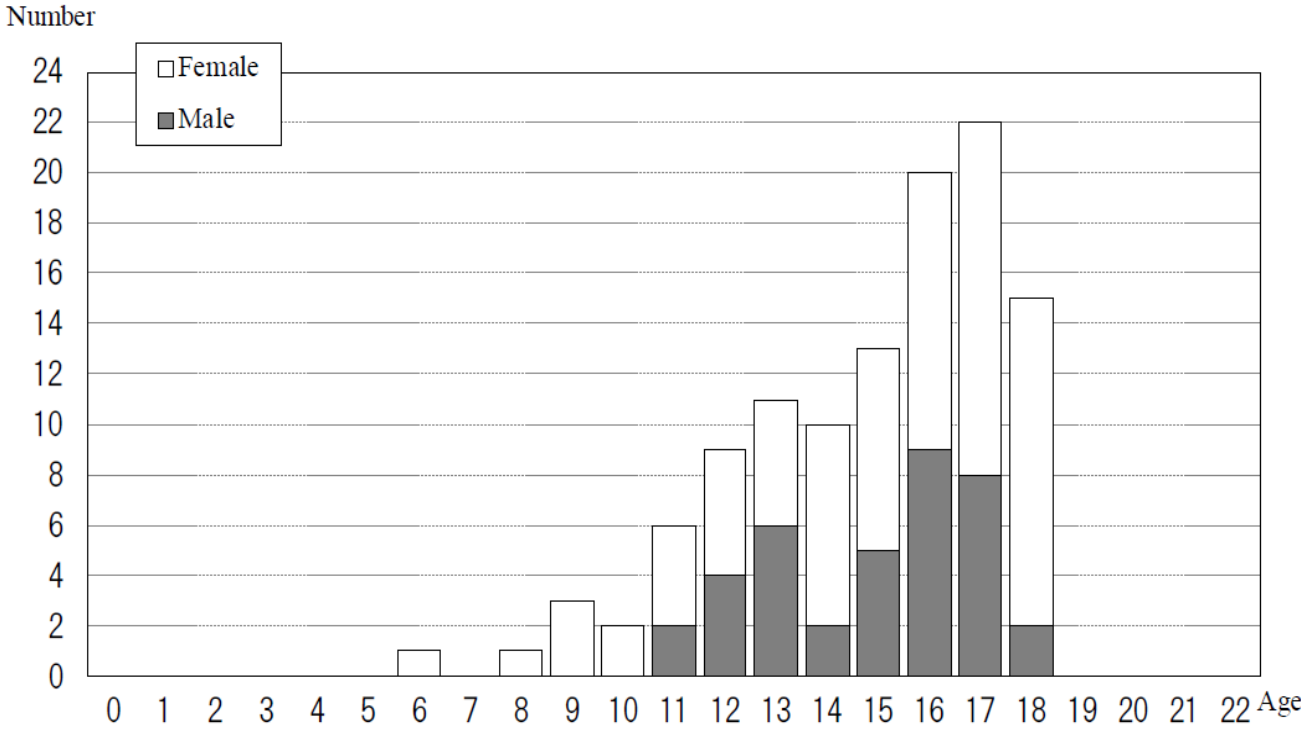


Figure Suspicious/malignant cases on FNAC by age and sex (age as of 11 March, 2011)

Changes in the results of Comprehensive check after the disaster (1)

1. Body mass index (BMI)* shows increased obesity in adults in Iitate village

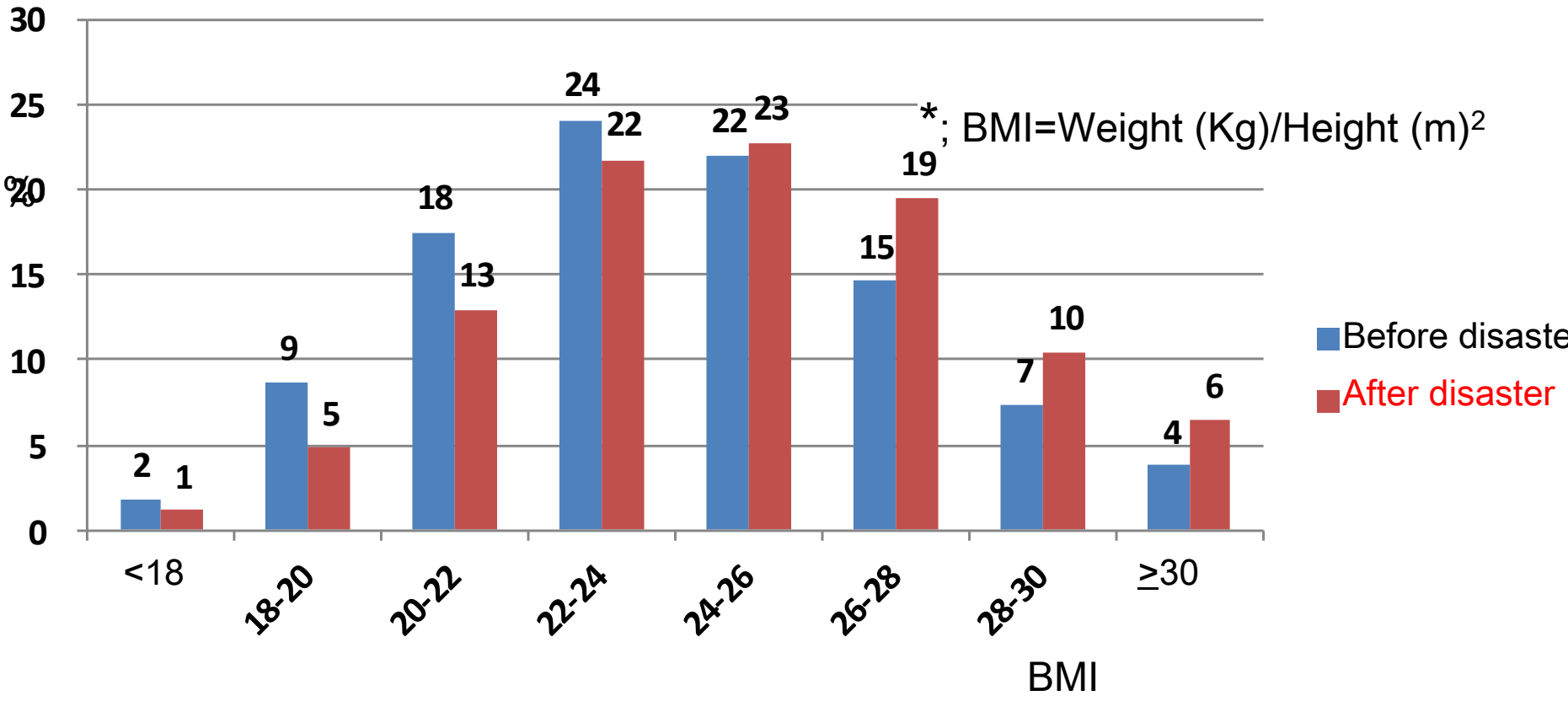


Table 2. Changes in body weight and body mass index among evacuees and non-evacuees stratified by age

	Non-evacuees				Evacuees			
	Before	After	Δ	*P* value	Before	After	Δ	*P* value
	6,890				3,962			
	57.0 (6.3)	58.5 (6.2)			56.7 (6.2)	58.4 (6.2)		
nt (kg)[b]	58.8 (10.7)	59.3 (10.9)	0.5	**<0.001**	59.8 (10.9)	61.1 (11.3)	1.4	**<0.001**
index (kg/m^2)[b]	23.4 (3.4)	23.6 (3.4)	0.2	**<0.001**	23.7 (3.5)	24.3 (3.6)	0.6	**<0.001**
t (>=25kg/m^2, %)	28.1	30.6	2.5	**<0.001**	31.5	38.5	7.0	**<0.001**
	10,925				5,709			
	72.2 (5.1)	73.6 (5.1)			72.8 (5.3)	74.4 (5.4)		
nt (kg)[b]	55.6 (9.6)	55.9 (9.8)	0.2	**<0.001**	55.9 (9.7)	57.0 (10.0)	1.1	**<0.001**
index (kg/m^2)[b]	23.4 (3.1)	23.5 (3.2)	0.1	**<0.001**	23.6 (3.2)	24.2 (3.3)	0.6	**<0.001**
t (>=25kg/m^2, %)	28.2	30.4	2.2	**<0.001**	31.6	39.1	7.5	**<0.001**

sex-adjusted p value for comparing the changes in the evacuee group to the changes in the non-evacuee group betwe
he earthquake. [b]Means (SD)

(Ohira T, Hosoya M, Yasumura S, et al. Effect of evacuation on body weight after the Great East Japan Earthquake. American Journal of Preventive Medicine, in press)

Table 3. Multivariable-adjusted hazard ratios and 95% confidence intervals of overweight for evacuation among men and women

	Non-evacuees	Evacuees		*P* value
Men				
No. at risk	5,788	2,873		
No. of cases	465	509		
Incidence rate/1,000 person-years	54	108		
Age-adjusted HR (95%CI)	Referent	1.82	1.60-2.06	**<0.0001**
Multivariable-adjusted HR (95% CI)[a]	Referent	1.82	1.61-2.07	**<0.0001**
Multivariable-adjusted HR (95%CI)[b]	Referent	1.78	1.57-2.02	**<0.0001**
Women				
No. at risk	7,011	3,749		
No. of cases	463	452		
Incidence rate/1,000 person-years	44	72		
Age-adjusted HR (95%CI)	Referent	1.53	1.34-1.74	**<0.0001**
Multivariable-adjusted HR (95% CI)[a]	Referent	1.52	1.34-1.74	**<0.0001**
Multivariable-adjusted HR (95%CI)[b]	Referent	1.45	1.28-1.66	**<0.0001**
Total				
No. at risk	12,799	6,622		
No. of cases	928	961		
Incidence rate/1,000 person-years	48	87		
Age-adjusted HR (95%CI)	Referent	1.67	1.53-1.83	**<0.0001**
Multivariable-adjusted HR (95% CI)[a]	Referent	1.68	1.53-1.84	**<0.0001**
Multivariable-adjusted HR (95%CI)[b]	Referent	1.61	1.47-1.77	**<0.0001**

[a]Adjusted for age, sex, excess ethanol intake, and current smoking at baseline.

[b]Adjusted for age, sex, excess ethanol intake, current smoking, and body mass index at baseline.

HR; hazard ratio, 95%CI; 95% confidence interval.

(Ohira T, Hosoya M, Yasumura S, et al. Effect of evacuation on body weight after the Great East Japan Earthquake. American Journal of Preventive Medicine, in press)

Table 2. Changes in prevalence of atrial fibrillation among residents in the evacuation zone after the Great East Japan Earthquake: The Fukushima Health Management Survey

	Total			Men			Women		
	Before	After	P value	Before	After	P value	Before	After	P value
n	12,045			5,526			6,519		
Atrial fibrillation	233 (1.9)*	288 (2.4)	<0.001	168 (3.0)	210 (3.8)	<0.001	65 (1.0)	78 (1.2)	<0.01
Age									
40-69 years (n=6,883)	72 (1.1)	88 (1.3)	<0.01	60 (1.9)	73 (2.4)	0.02	12 (0.3)	15 (0.4)	0.25
70-90 years (n=5,162)	161 (3.1)	200 (3.9)	<0.001	108 (4.5)	137 (5.6)	<0.001	53 (1.9)	63 (2.3)	0.03

*n (%)

(Suzuki H, Ohira T, Takeish Ti, et al. Increased incidence of atrial fibrillation after the Great East Japan Earthquake: Results from the Fukushima Health Management Survey. International Journal of Cardiology, in press)

Table 3. Multivariable-adjusted odds ratios and 95% confidence intervals of atrial fibrillation for risk factors after the Great East Japan Earthquake among 120,45 men and women: The Fukushima Health Management Survey

Variables	Odds ratio	95% Confidence Interval	P value
Age, years	1.10	1.07-1.14	<0.0001
Sex, men	2.91	1.64-5.18	<0.001
Overweight, ≥ 25.0 kg/m^2	2.16	1.33-3.51	0.002
Excess ethanol intake, ≥44 g/day	3.47	1.72-7.03	<0.001
Current smoking, yes	1.31	0.68-2.50	0.42
Hypertension, yes	1.08	0.64-1.82	0.78
Diabetes mellitus, yes	1.12	0.55-2.30	0.75

The number of the incidence of AF is 72.

(Suzuki H, Ohira T, Takeish Ti, et al. Increased incidence of atrial fibrillation after the Great East Japan Earthquake: Results from the Fukushima Health Management Survey. International Journal of Cardiology, in press)

Changes in the results of Comprehensive check after the disaster (2)

Drawn from the 12th Prefectural Oversight Committee Meeting for the Fukushima Health Management Survey.

	Obesity* (BMI ≥25 kg/m2)		Impaired glucose tolerance** (HbA1c ≥6.5%)		Hepatic dysfunction*** (ALT of ≥51 U/L)		Hypertension (Diastolic pressure of ≥90 mmHg)	
	Male	Female	Male	Female	Male	Female	Male	Female
FY 2008	30%	31%	4.1%	2.9%	4.3%	1.8%	16.4%	11.6%
FY 2009	30%	30%	4.5%	2.8%	4.0%	1.8%	15.4%	9.6%
FY 2010	30%	28%	4.4%	2.7%	3.8%	1.7%	15.7%	10.3%
FY 2011	42%	34%	7.0%	3.4%	11.0%	4.4%	19.7%	11.6%
FY 2012	38%	33%	5.1%	2.7%	7.7%	3.9%	15.8%	10.1%

(Comparing results with data of Special Health Checkups organized by the municipalities of nationally designated evacuation zones and Health Checks for the Elderly. The group of the data and the Comprehensive Health Check are not the same.)

*Body mass index (BMI) is a measure of body fat based on height and weight used to predict metabolic syndrome.

**HbA1c refers to glycated hemoglobin used for diagnosing diabetes. Measuring HbA1c shows what the average blood sugar levels have been over a period of months.

HbA1c 6.5 % and above is the criteria established by Japan Diabetes Society (JDS) before March 2012.

***An alanine aminotransferase (ALT) is an enzyme found in the liver. ALT is measured to see if the liver is damaged or diseased.

Short Communication

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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

Akira Sakai[1,11], Tetsuya Ohira[2,11], Mitsuaki Hosoya[3,11], Akira Ohtsuru[4,11], Hiroaki Satoh[5,11], Yukihiko Kawasaki[3,11], Hitoshi Suzuki[6,11], Atsushi Takahashi[7,11], Gen Kobashi[8], Kotaro Ozasa[9], Seiji Yasumura[10,11], Shunichi Yamashita[11,12], Kenji Kamiya[11,13], and Masafumi Abe[11], for the Fukushima Health Management Survey Group

ABSTRACT

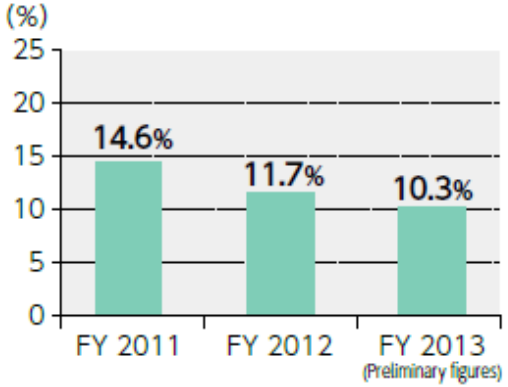
Background: Lymphocytes are susceptible to damage from radiation, and the white blood cell (WBC) count, including counts of neutrophils and lymphocytes, is a useful method of dosimetry. According to the basic survey of the Fukushima Health Management Survey (FHMS), among 13 localities where evacuation was recommended, Iitate and Namie had more individuals with external radiation exposure of more than 5 mSv than the other evacuation areas. We analyzed whether or not WBC, neutrophil, and lymphocyte counts decreased after the disaster.

Methods: The subjects of this study were 45 278 men and women aged 20 to 99 years (18 953 men and 26 325 women; mean age 56 years) in the evacuation zone who participated in the Comprehensive Health Check (CHC) from June 2011 to the end of March 2012.

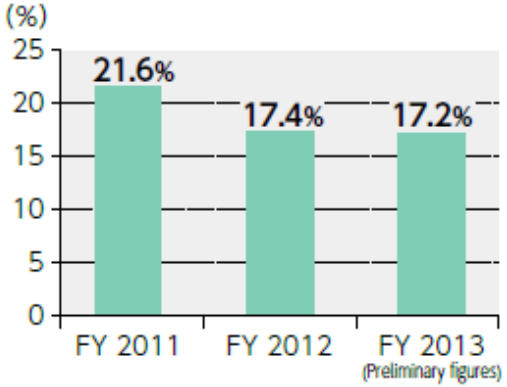
Results: Significant differences were detected in the mean values of WBC, neutrophil, and lymphocyte counts, and for the proportion of individuals under the minimum standard for WBC and neutrophil counts, among the 13 localities. However, the distribution of individuals at each 200-cell/μL increment in lymphocyte count were similar in these areas, and the WBC, neutrophil, and lymphocyte counts did not decrease in Iitate or Namie specifically.

Conclusions: No marked effects of radiation exposure on the distribution of WBC counts, including neutrophil and lymphocyte counts were detected within one year after the disaster in the evacuation zone.

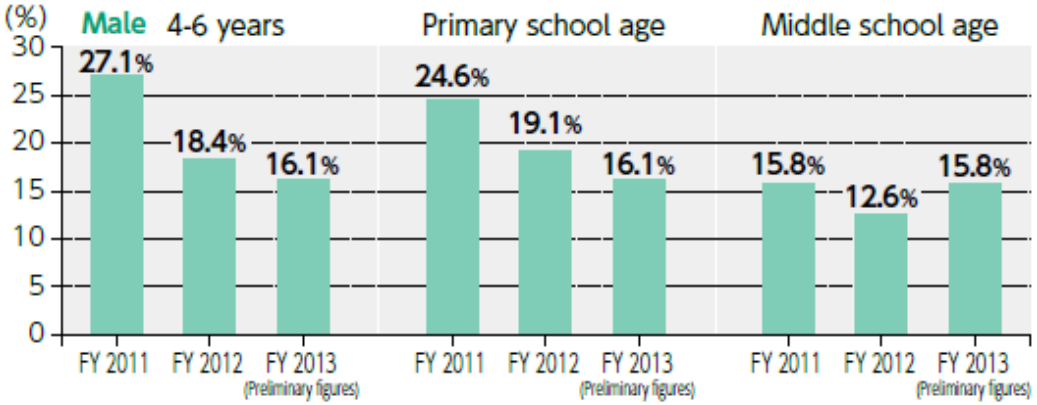
Proportion of participants who required support in regard to depression or anxiety



Proportion of participants who required support in regard to post-traumatic reaction caused by the disaster



Proportion of participants by sex who required support



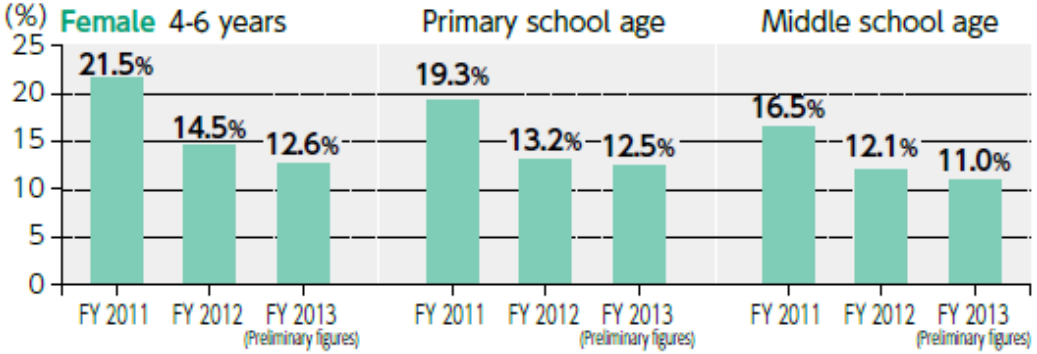


Table Changes of Sources of Nourishment

(%)	Breastfeeding only	Breast and bottle feeding combined	Bottle feeding only
FY 2011	30.4	62.5	7.0
FY 2012	35.2	54.9	9.8
FY 2013	36.6	54.4	8.7

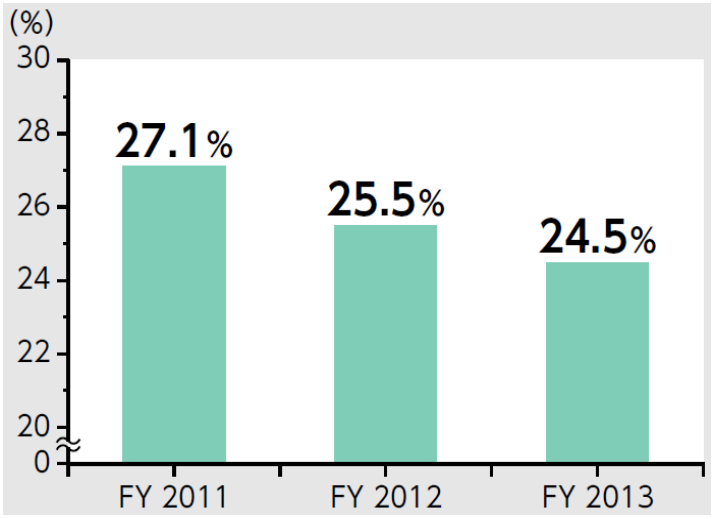


Figure Changes in the Numbers of Mothers with Depressive Symptoms with Depressive Symptoms

Table Preterm deliveries, Low birth weight infants, Congenital anomalies, and Congenital anomalies

(%)	Preterm deliveries	Low birth weight infants	Congenital anomalies	
FY 2011	4.75(5.7)	8.9(9.6)	2.85	(3~5)*
FY 2012	5.74(5.7)	9.6(9.6)	2.39	
FY 2013	5.40(5.8)	9.9(9.6)	2.35	

January 20, 2014 → 2016 ?

新刊書籍のご案内

2014年1月発売!

原子力災害の公衆衛生

福島からの発信

3.11から千日にわたる記憶と軌跡

福島県立医科大学医学部公衆衛生学教授／
福島県立医科大学放射線医学県民健康管理センター
副センター長
安村誠司 編

2011年3月11日に起こった東日本大震災では地震・津波に加え福島第一原発の事故に伴う放射線の放出によって，多くの人が避難を余儀なくされた．原発事故による住民への直接・間接の健康影響は大きい．
本書は「一般的な災害の対応」とは違う，想定外の災害に見舞われた福島県での公衆衛生的な取り組みについてまとめた一冊である．

● B5判　390頁　● 定価（本体5,000円+税）

Public Health in Case of Nuclear Disaster

Messages from Fukushima

Edited by Seiji Yasumura 1) and Kenji Kamiya 2)

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Member, Radiation Medical Science Center for the Fukushima Health Management Survey, Fukushima Medical University

2) Professor, Research Institute for Radiation Biology and Medicine, Hiroshima University
Program Director, Organization for the Leading Graduate Education Program, Global Environmental Leaders Education Program, Hiroshima University

Hiroshima University Publication
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To People Involved in Public Health throughout Japan

– The disaster is still continuing –

The Great East Japan Earthquake occurred on March 11, 2011.

In Fukushima Prefecture, all residents were not only affected by the earthquake and tsunami, but also were forced to face radiation issues caused by the nuclear power station accident. In particular, approximately 0.21 million residents, who were forced to be evacuated, experienced great distress and are still forced to live inconvenient lives. Other residents, who were not evacuated, also had a highly painful and severe experience. It will take a good amount of time to heal the emotional wounds inflicted by their unhappy experience. Meanwhile, there are concerns that people's memories might fade with time, and that even the tragedy caused by the disaster might be gradually forgotten, although accidents, such as a leakage of contaminated water, may remind people that the nuclear power station accident has not been settled yet.

I planned to write this book for the following three reasons.

1. Fukushima Prefectural Government/Public Health Center, municipalities and diverse

   nuclear disaster. Unfortunately, these activities are relatively unknown throughout Japan.
2. Public health activities conducted in Iwate and Miyagi Prefectures at the time of the Great East Japan Earthquake are considerably well known throughout Japan. Their efforts are compiled in
3. The biggest reason why I planned to write this book is that those involved in public health in Fukushima Prefecture did not have enough time and energy left to communicate the information, because they were caught up in a large amount of disaster-related work that was newly assigned to them in addition to their routine work. Since they had no experience in disaster-related work and had no appropriate manuals for it, they even had to study how to cope with nuclear disaster. Moreover, their work load was extraordinarily high in terms of both the quality of the services required and the quantity. Nevertheless, public health nurses in Fukushima Prefecture had a belief that those involved in public health in Fukushima Prefecture should have the responsibility to preserve peoples' memories of the accident and make use of the experience gained during the accident to prepare for similar disasters in the future.

Fukushima Radiation and Health

Radiation Medical Science Center for the Fukushima Health Management Survey,
Fukushima Medical University

Future From Fukushima.
ふくしまから はじめよう。

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- Upcoming Events

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News

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- 11–12 May 2015 Prof. Elisabeth Cardis of CREAL visited FMU NEW!
- 17 Apr 2015 World Health Summit Satellite Symposium convenes at FMU: Responsive and Resilient Health Systems to Meet Emerging Challenges NEW!
- 16 Mar 2015 ICRP Seminar Convened.
- 16 Mar 2015 "Seminar: Fukushima Nuclear Disaster and Health Risk Management" Convened
- 15 Mar 2015 4th Int'l Expert Symposium in Fukushima convened
- 10–11 Mar 2015 KIRAMS and WHO co-sponsor "Medical Preparedness and Response to Radiation Emergencies" in Seoul, ROK.
- 16 Feb 2015 ICRP Seminar Convened.
- 12 Feb 2015 Proceedings of the 18th Prefectural Oversight Committee