

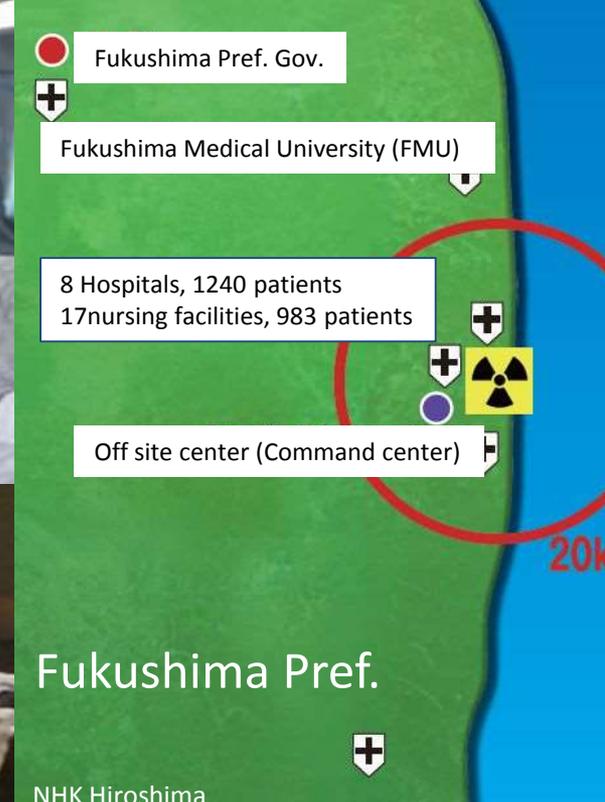
Medical and Health Surveillance in Post-Accident Recovery: Lessons learned in Fukushima

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The presenter declares no conflicts of interest

The views expressed in this presentation are solely those of the presenter.



Most of the patients hospitalized within 20 km zone were transported by SDF helicopters or chartered buses to shelters in Fukushima Prefecture by March 15th. However, no medical personnel attended during or after evacuation (no care, medicine, even water/food). Significant difficulties were encountered to find facilities to accept those patients. In addition, appropriate medical care was not available at shelters.

Disaster-Related Death (DRD)

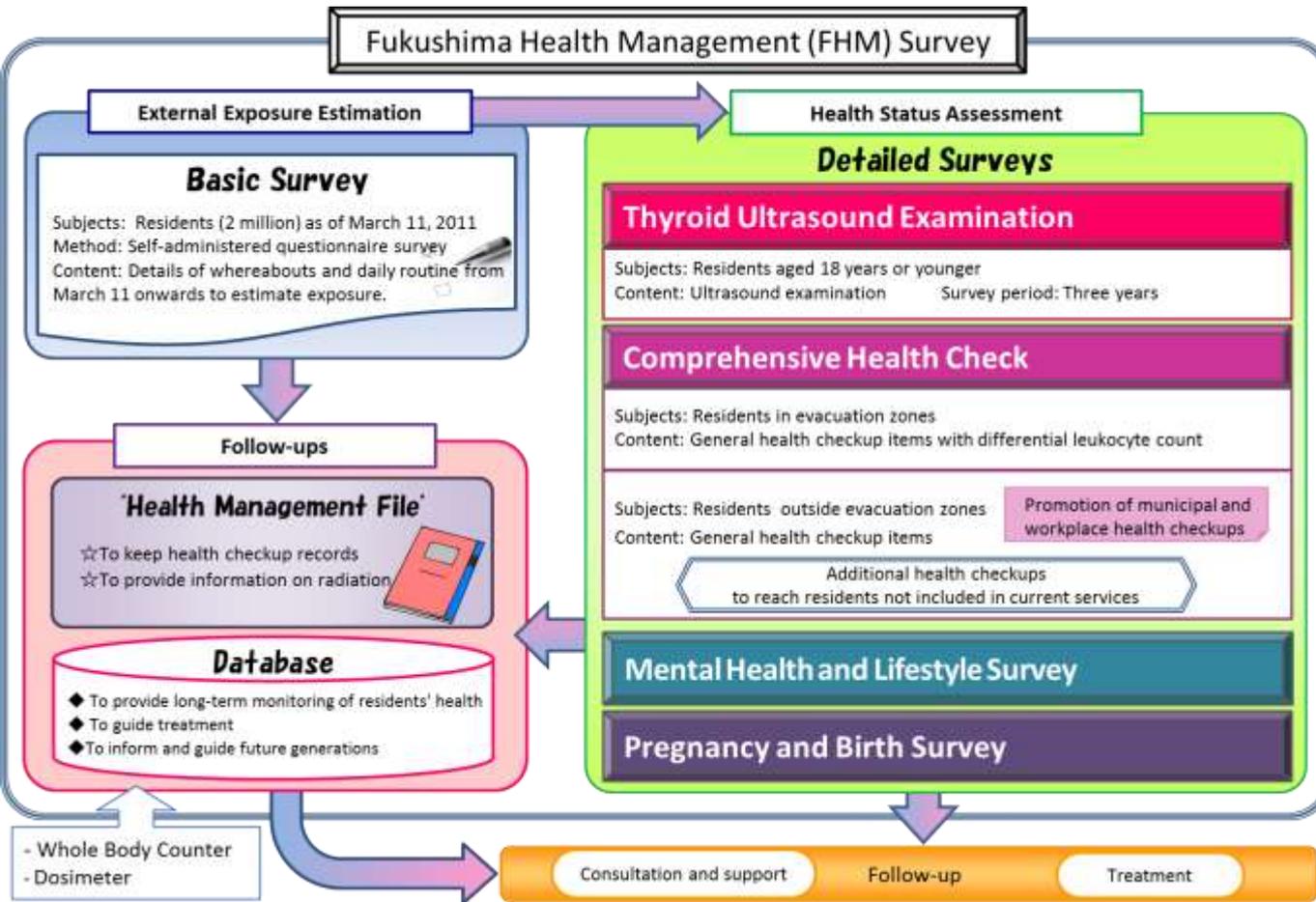
- After the accident, the mortality rate among evacuated elderly people requiring nursing care increased about 3-fold in the first 3 months; it remained about 1.5-fold higher afterward compared with before the accident.
- DRDs in Fukushima accounted for 56% of all DRDs (1704 of 3089 DRDs in total) that occurred for the first 52 months after the earthquake.
- DRDs in Fukushima increased to 2,147 (60%) of 3,591 DRDs in total of Tohoku regions, i.e., Iwate, Miyagi and Fukushima prefecture (as of March 31, 2017).

* DRD is defined as a death caused by the deterioration of underlying medical problems due to poor medical access or illnesses arising from poor living environments, such as temporary shelters, in a disaster.

SHAMISEN recommendations (excerpt from R9, 15, 22)

- ✧ Plans need to identify populations that are vulnerable to radiation (pregnant women, children), those requiring special care (patients, nursing home residents, persons with disability), and those with unique needs (prison inmates, etc.).
- ✧ Optimize the timing and support for sheltering and evacuation to reduce radiation exposure, avoid negative health effects arising from evacuation or relocation, and provide the necessary medical and psychological assistance.
- ✧ Have plans for lifting of evacuation orders as soon as possible to minimise the adverse effects of evacuation on physical and mental health of evacuees, and communities.

Fukushima Health Management Survey



Objectives:

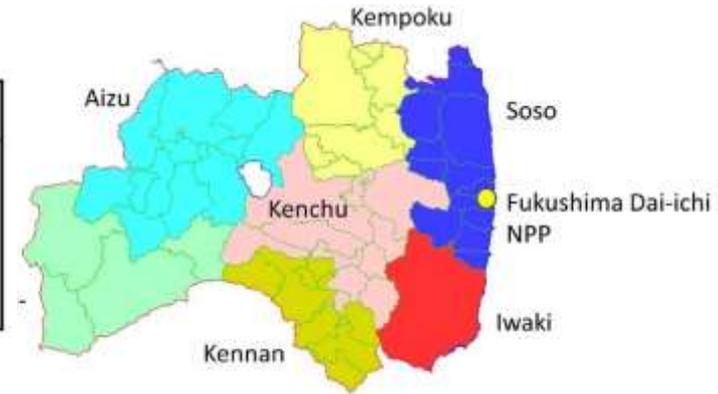
- To monitor long-term health condition of resident in Fukushima and to promote their health
- To see if there were any health effects related to long-term, low-dose radiation exposure



Basic Survey

	Whereabouts	Time												Place/Facility
		0	3	6	9	12	15	18	21	24				
March 11 (Fri)	Indoors	← (1)			← (2)			← (3)						(1) Home
	Moving	(1)→(2)			(2)→(3)									(2) Place of employment
	Outdoors													(3) District community

An example form for writing records of moves and activities in the Basic Survey questionnaire



Estimated external radiation doses (preceding and full-scale surveys)

As of 31 December 2015

Effective Dose (mSv)	Total	Excluding radiation workers					By area (excluding radiation workers)												
							Kempoku*		Kenchu		Kennan		Aizu		Minami-aizu		Soso**		Iwaki
<1	291,093	285,418	62.1%			24,853	20.1%	57,643	51.5%	25,460	88.2%	44,456	99.3%	4,837	99.3%	55,661	77.3%	72,508	99.1%
1-2	148,178	145,845	31.7%	93.8%		83,056	67.0%	45,780	40.9%	3,386	11.7%	300	0.7%	34	0.7%	12,658	17.6%	631	0.9%
2-3	25,769	25,396	5.5%	5.8%	99.8%	15,499	12.5%	8,138	7.3%	17	0.1%	25	0.1%	0	-	1,687	2.3%	30	0.0%
3-4	1,571	1,491	0.3%			468	0.4%	423	0.4%	0	-	1	0.0%	0	-	595	0.8%	4	0.0%
4-5	550	504	0.1%			40	0.0%	5	0.0%	0	-	0	-	0	-	458	0.6%	1	0.0%
5-6	441	389	0.1%	0.2%		19	0.0%	3	0.0%	0	-	0	-	0	-	366	0.5%	1	0.0%
6-7	268	230	0.1%			10	0.0%	1	0.0%	0	-	1	0.0%	0	-	218	0.3%	0	-
7-8	155	116	0.0%	0.1%	0.2%	1	0.0%	0	-	0	-	0	-	0	-	115	0.2%	0	-
8-9	118	78	0.0%	0.0%		1	0.0%	0	-	0	-	0	-	0	-	77	0.1%	0	-
9-10	72	41	0.0%			0	-	0	-	0	-	0	-	0	-	41	0.1%	0	-
10-11	69	36	0.0%	0.0%		0	-	0	-	0	-	0	-	0	-	36	0.1%	0	-
11-12	52	30	0.0%			1	0.0%	0	-	0	-	0	-	0	-	29	0.0%	0	-
12-13	37	13	0.0%	0.0%	0.0%	0	-	0	-	0	-	0	-	0	-	13	0.0%	0	-
13-14	34	12	0.0%			0	-	0	-	0	-	0	-	0	-	12	0.0%	0	-
14-15	27	6	0.0%	0.0%		0	-	0	-	0	-	0	-	0	-	6	0.0%	0	-
≥15	314	15	0.0%	0.0%	0.0%	0	-	0	-	0	-	0	-	0	-	15	0.0%	0	-
Total	468,748	459,620	100.0%	100.0%	100.0%	123,948	100%	111,993	100%	28,863	100%	44,783	100%	4,871	100%	71,987	100%	73,175	100%
Max	66 mSv	25 mSv				11 mSv		6.3 mSv		2.6 mSv		6.0 mSv		1.9 mSv		25 mSv		5.9 mSv	
Mean Value	0.9 mSv	0.8 mSv				1.4 mSv		1.0 mSv		0.6 mSv		0.2 mSv		0.1 mSv		0.8 mSv		0.3 mSv	

*Including Yamakiya of Kawamata.

**Including Namie and Iitate.

Percentages have been rounded and may not total to 100%.
Excluding those with estimation period less than four months.

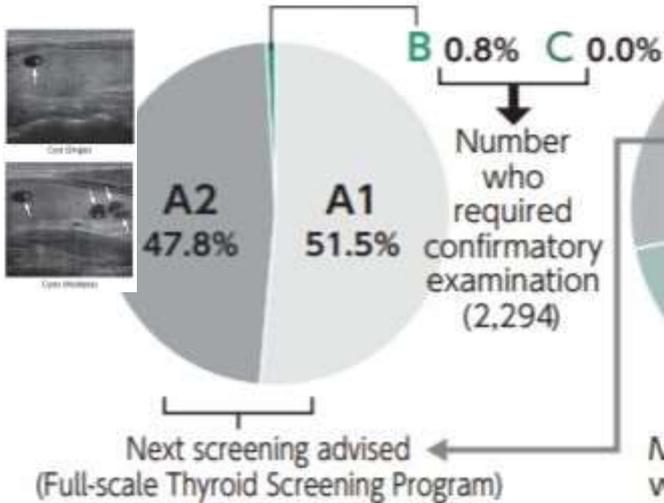
Major limitations in dose estimation after the Fukushima accident include;

- A low response rate and delayed timing of the survey;
- The results of external exposure dose were not based on direct measurements. There was a significant shortage of measurement instruments and supporting staff available for public immediately after the accident;
- Measurements of internal contamination for short lived radionuclides such as I-131 were very limited;
- Most of the data obtained from WBC measurements later in Fukushima were not incorporated into personal dose estimation in the Basic Survey.

Thyroid Ultrasound Examination

● Results of Primary Examination

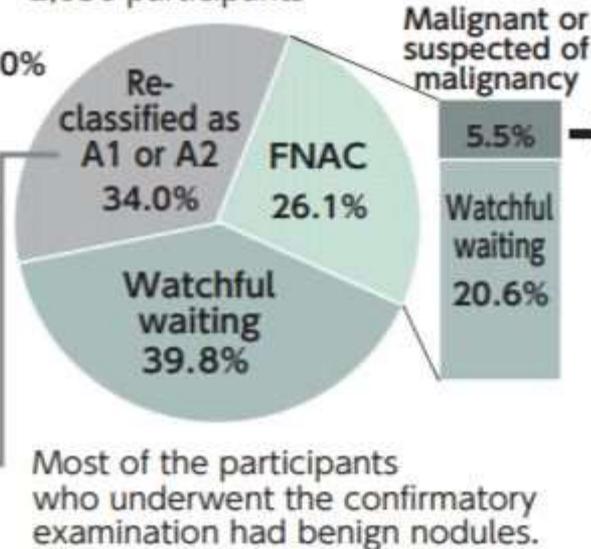
Confirmed test results of 300,476 participants



As of 30 April 2015

● Results of Confirmatory Examination

Confirmed test results of 2,056 participants

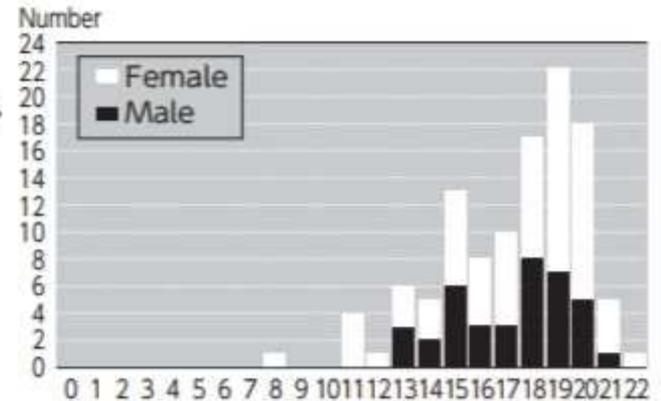


Most of the participants who underwent the confirmatory examination had benign nodules.

As of 30 June 2015

● Suspicious or malignant cases on FNAC by age and sex

*Age at the time of Confirmatory Examination



Results of the first round Thyroid Ultrasound Examination during the first 4 years after the accident

EPIDEMIC OF FEAR

A bumper crop of thyroid abnormalities in Fukushima children, including cancer, has perplexed scientists and alarmed locals

By Dennis Normile

The March 2011 meltdowns at the Fukushima Daiichi Nuclear Power Plant caused extensive human suffering—evacuations, emotional trauma and premature deaths, disrupted jobs and schooling. What they have not caused, so far, is radiation-related illness among the general public, and few specialists expect dramatic increases in cancers or other ailments. The reactors spewed just a tenth of the radiation emitted by the Chernobyl disaster, winds blew much of that out to sea, and evacuations were swift. Yet one wave of illness has been linked to the disaster—the ironic result of a well-intentioned screening program.

Months after the disaster, Fukushima Prefecture set about examining the

interpretations. Many acknowledge that baseline data from noncontaminated areas were needed from the outset and that the public should have been better educated to understand results and, perhaps, to accept watchful waiting as an alternative to immediate surgery. But most also say the findings hint at a medical puzzle: Why are thyroid abnormalities so common in children? The “surprising” results of the screening, Williams says, show that “many more thyroid carcinomas than were previously realized must originate in early life.”

MEMORIES OF CHERNOBYL got Japanese authorities worrying about thyroid cancer. The fallout from that April 1986 accident included radioactive iodine, which settled

across swathes of Belarus, Russia, and Ukraine, contaminating pastures grazed by dairy cows. Children who drank the tainted milk accumulated the radioactive iodine in their thyroids. (Adult thyroids absorb less iodine.) A 2006 World Health Organization (WHO) study found that in the most contaminated areas, there had been about 5000 thyroid cancer cases among those who were under 18 at the time of the accident, though the report noted that more cases could emerge over time. The United Nations in 2006 attributed 15 childhood thyroid cancer deaths to Chernobyl. Caught early, the cancer is almost always cured by removal of the thyroid gland.

With that in mind, Japa-

the meltdowns, Japanese authorities evacuated some 150,000 people living within 20 kilometers of the plant, and a week later they started screening for contaminated food. Also, a limited number of Fukushima residents were offered iodine tablets after the accident to block absorption of radioactive iodine from breathing contaminated air or eating contaminated food.

In 2013, WHO estimated that the 12 to 25 millisieverts (mSv) of exposure in the hardest hit areas might result in minuscule increases in cancer rates. (Worldwide, people receive on average 2.4 mSv per year from background radiation; a medical chest x-ray delivers about 0.1 mSv.) WHO noted that females have a 0.75% lifetime risk of

developing thyroid cancer; it estimated that the highest exposures in the Fukushima area raised that risk by an additional 0.5%.

The initial round of thyroid screening, started in late 2011, was simply to provide baseline data, as any radiation-induced tumors were not expected to emerge for at least 4 years. Children with nodules larger than 5.0 mm or cysts bigger than 20.1 mm underwent a second, more detailed examination and, if necessary, fine needle aspiration. After the initial screening, children will have their thyroids examined every 2 years until age 20 and every 5 years after that.

Results were released as screening progressed, and right from the start there

The Asahi Shimbun | Asia & Japan Watch

FIVE YEARS AFTER: Fukushima thyroid cancer patients' families join forces

By MURAKAZU HONDA/ Staff Writer
March 24, 2016 at 11:30 JST



Families of young thyroid cancer patients from Fukushima Prefecture diagnosed after the 3/11 disaster have formed a support group that also aims to pressure doctors and authorities for better policies.

The 311 Thyroid Cancer Family Group hopes to share the concerns people have felt over the health of their loved ones in the five years since the onset of the nuclear crisis.

“We want the Fukushima prefectural government and doctors to demonstrate a better understanding of patients,” one member said.

The grandmother, left, and mother of a female high school student who underwent thyroid surgery talk about their concerns in Fukushima Prefecture on March 5. (Masakazu Honda)

300,476

Number of Fukushima residents 18 and under whose thyroid screening results were available as Science went to press.

50%

Approximate fraction of those screened with solid nodules or fluid-filled cysts on their thyroids.

110

Number of thyroid cancer cases identified by December 2014 as a result of the screening.

Communication with residents about thyroid examination

- Explanatory Meetings for Parents of Tested Children:
FMU held explanatory community meetings on thyroid examination specifically for the parents of children to be tested. This took place in small scale sites such as schools. Since 2013, more than 150 such meetings with more than 8,000 participants have been conducted.
- Immediate Post-examination Individual Counseling:
Three years after the start of the examinations, in October 2014, the program strategy was modified and the practice of immediate post-examination counseling was adopted.
- In-School Class Dialogue:
Since 2015, FMU group has held classes on thyroid examination for students in elementary school through to the high school level. The aim was to provide better understanding of the meaning of the examination and interpretation of the results.

Major Issues we need to address are;

- Thyroid ultrasound examination of children in elementary, junior high, and high school students was performed at their schools, with a participation rate over 90%, which is much higher than that for examinations performed for those at a high school graduate age or older.
- Despite our efforts as described, the biggest concern is that a majority of children and parents in Fukushima may not have sufficient information required for informed decision about thyroid ultrasound examination.

Challenges in thyroid ultrasound examination;

- Health surveillance as monitoring can provide assurance in responsible population's concerns about health risks. On the other hand, challenges lay in identification of population at risks, where a surveillance may produce more benefits than potential harm.
- Unfortunately, there is no international agreed criteria for selecting people who should be the subject for long-term follow-up. No clear standard protocol exists today for such follow-up programs.
- This is a gap which should be addressed in Fukushima.

Mental Health and Pregnancy/Birth Survey

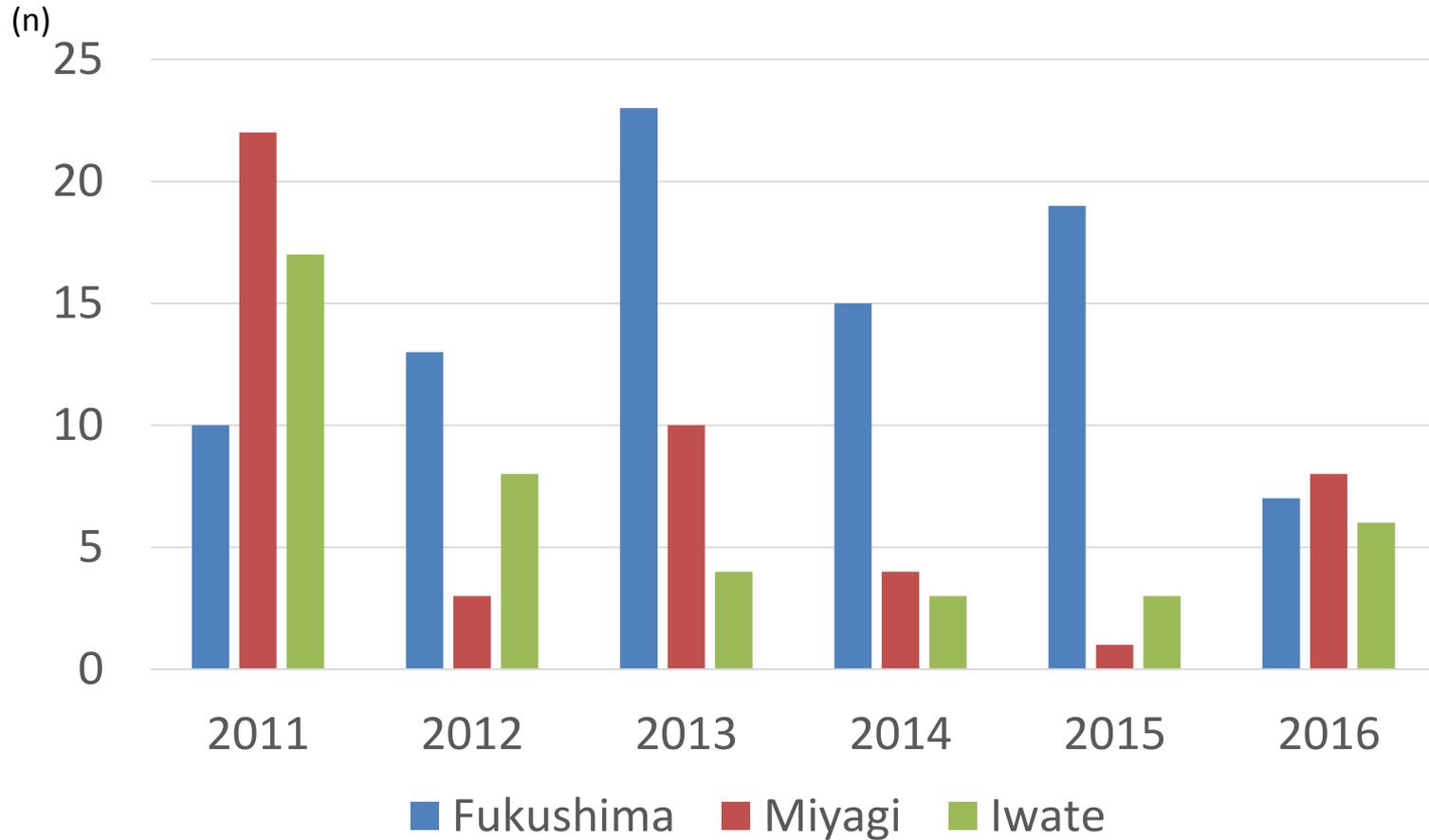
- The proportion of those with psychological distress including children (14.6%) was far greater than in other areas affected by the earthquake and tsunami (6.2%) or the Japanese population under normal circumstances (4.2–4.4%).
- The proportion of residents who require support for depressive symptoms and anxieties has been decreasing gradually over the 6 years since the accident, but remained at higher levels in comparison with general population.
- The Pregnancy and Birth Survey showed that one fourth of mothers surveyed had depressive symptoms in 2011, with the highest proportion observed in the Soso region where the Fukushima Nuclear Power Plant is located.
- Although a gradual decline was seen in the proportion of mothers with depressive symptoms, 20% of the surveyed mothers in 2014 were depression positive.

Suicide



Standardized suicide mortality ratio in the aftermath of the 2011 earthquake in Japan

Disaster Related Suicide



Third Active Plan of countermeasures for suicide

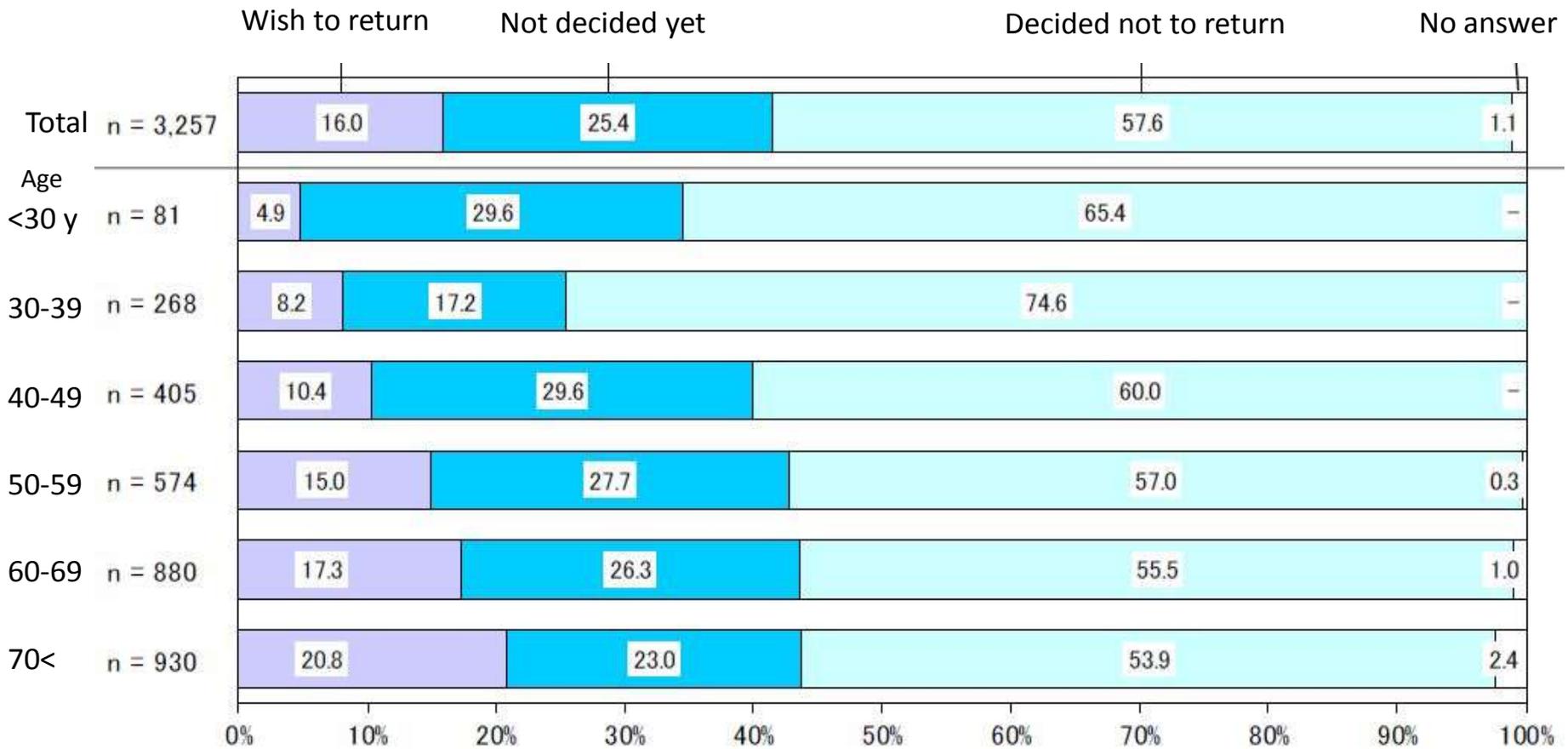
- Fukushima Prefectural Government -

- Establishing social supports by strengthening a network of the government, municipalities, hospitals, employers, schools, private organizations;
- Building circumstances in family, friends or workplace where a person at risk feels comfortable to consult;
- Training supporting staff of municipalities, counselling agencies, related institutions to support and play a key role as gatekeeper;
- Continuing support evacuees or people who are suffering from psychological stress due to concerns about radiation through the activities of the Mental Health Care Center;

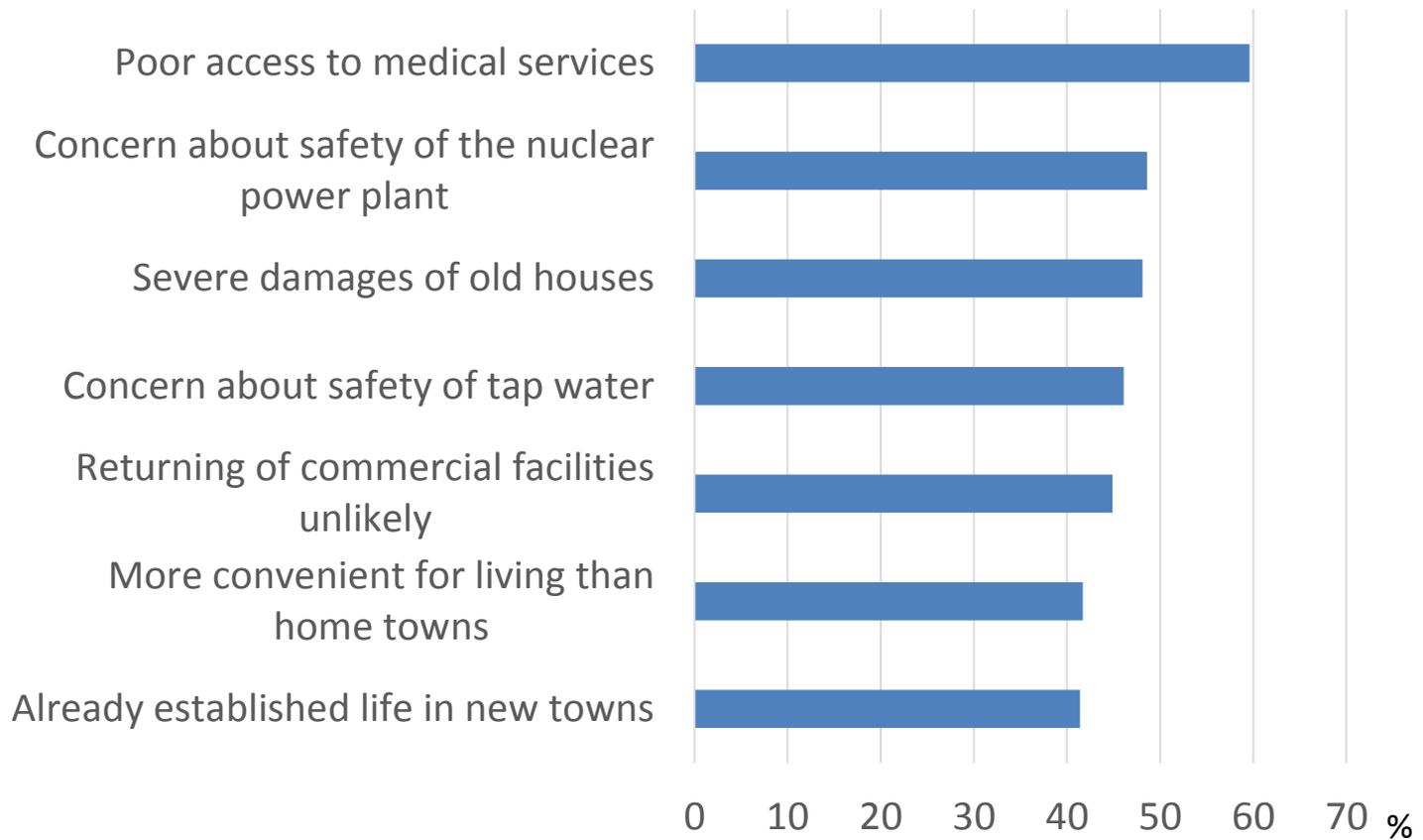
Countermeasures for the psychological issues;

- Mental health support team of Fukushima Medical University has been performing brief counseling by telephone to approximately 4,000 evacuees at risk of psychiatric disorders such as PTSD or depression every year.
- Fukushima Mental Health Care Center, which has 6 branches in Fukushima with about 50 staff consisting of psychiatrists, social workers, clinical psychologists, nurses, and occupational therapists, has been providing active outreach service and group interventions for evacuees, also began to provide mental health intervention programs in 2012.

However, the number of staff working with the affected population of Fukushima is insufficient, resulting in a situation where supporting staff are at risk of burnout.

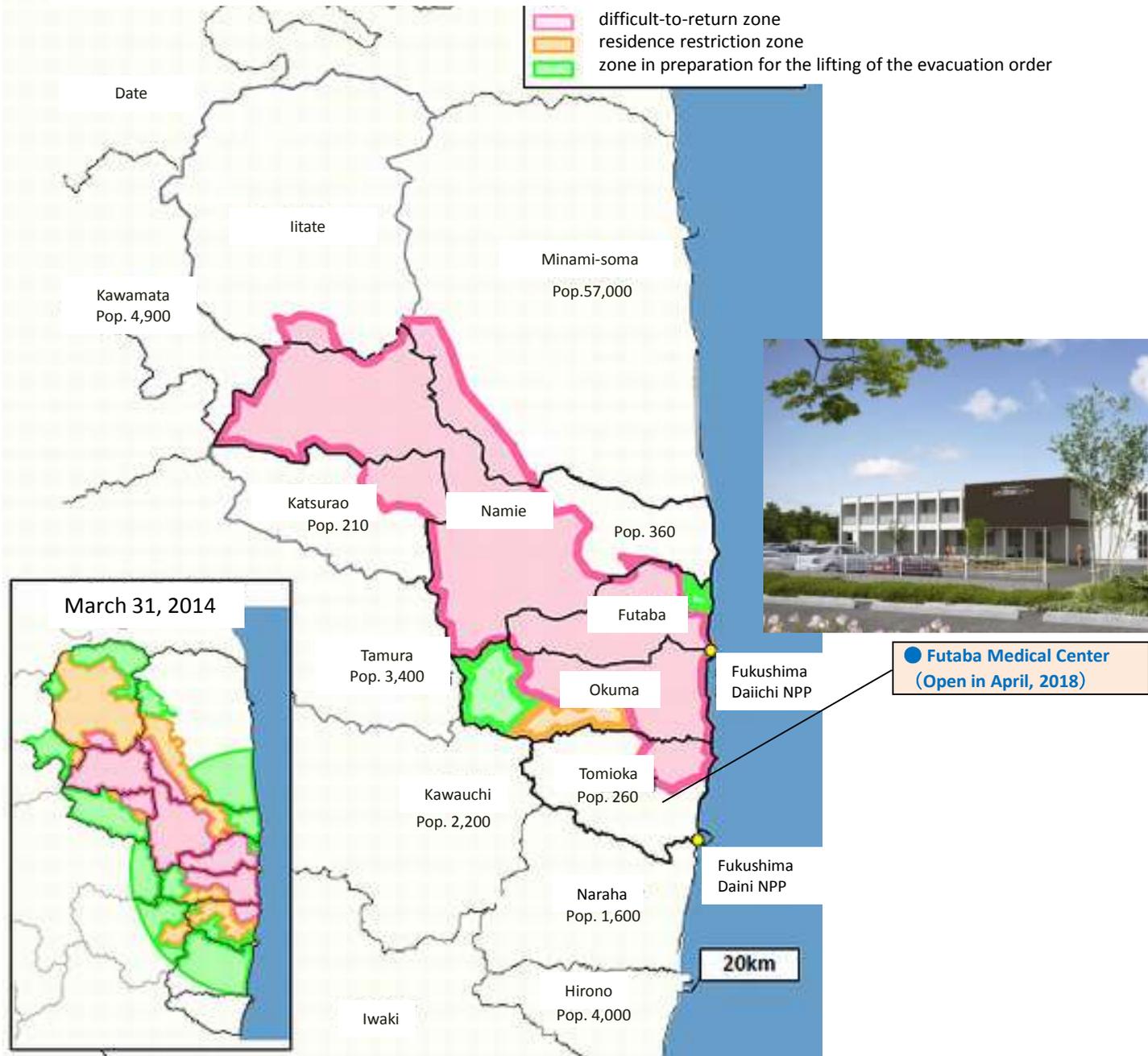


Intension about returning to Tomioka town



Major reasons for “decided not to return” or “not decided yet”

Evacuation areas and population in Futaba region (April 1, 2017)



SHAMISEN states;

- ✧ It recognizes the need for a holistic approach to accident management and health surveillance if the aim of doing more good than harm is to be realized.
- ✧ A multidisciplinary approach is needed if health surveillance is to identify and alleviate psychosocial impacts, including the participation of psychologists, mental health specialists, sociologists, radiation protection experts, radiation epidemiologists and other stakeholders able to take into account the concerns and expectations of local populations.
- ✧ Since the revitalisation of community welfare is a particularly important consideration, and often challenged by mistrust of authorities, the participation of local health practitioners and actors should be especially encouraged.