

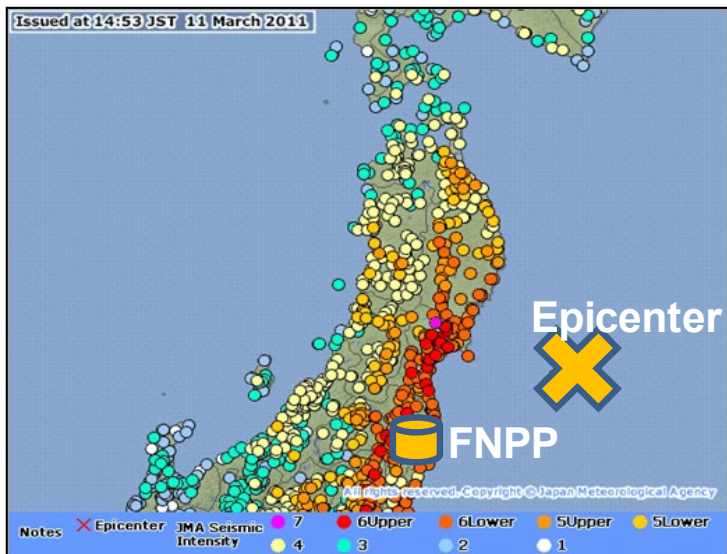
Establishing a long term epi–study on Fukushima emergency workers

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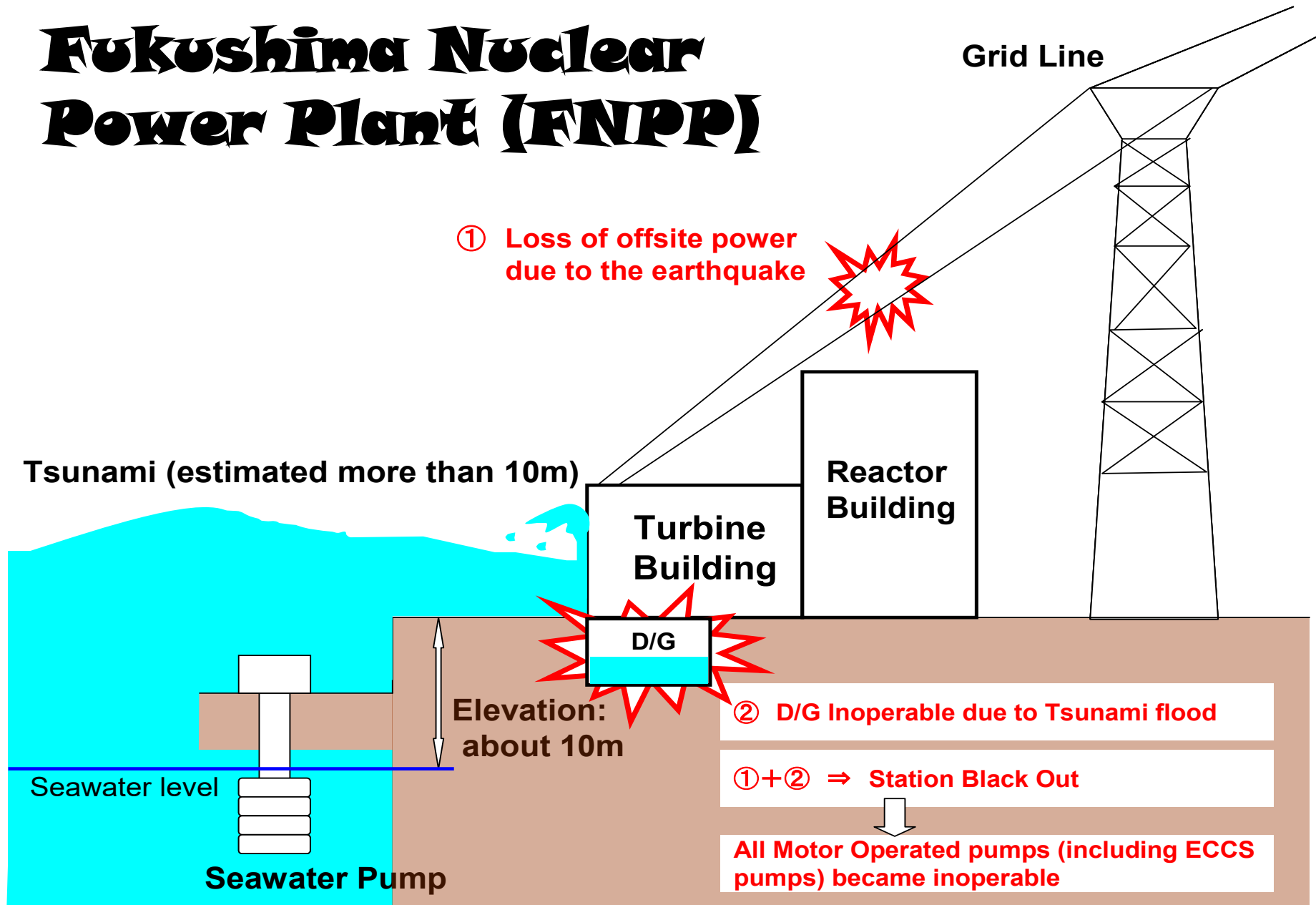
**Research Center for Prevention from
Radiation Hazards of Workers,
National Institute of Occupational Safety and Health, Japan**

Great-East Japan Earthquake and Tsunami

Earthquake of 9.0Mw occurred at 14:46 of 3/11, 2011
followed by 13-15 m height Tsunami
which attacked Fukushima Nuclear Power Plant (FNPP)



Fukushima Nuclear Power Plant (FNPP)



Earthquake H₂-Explosions

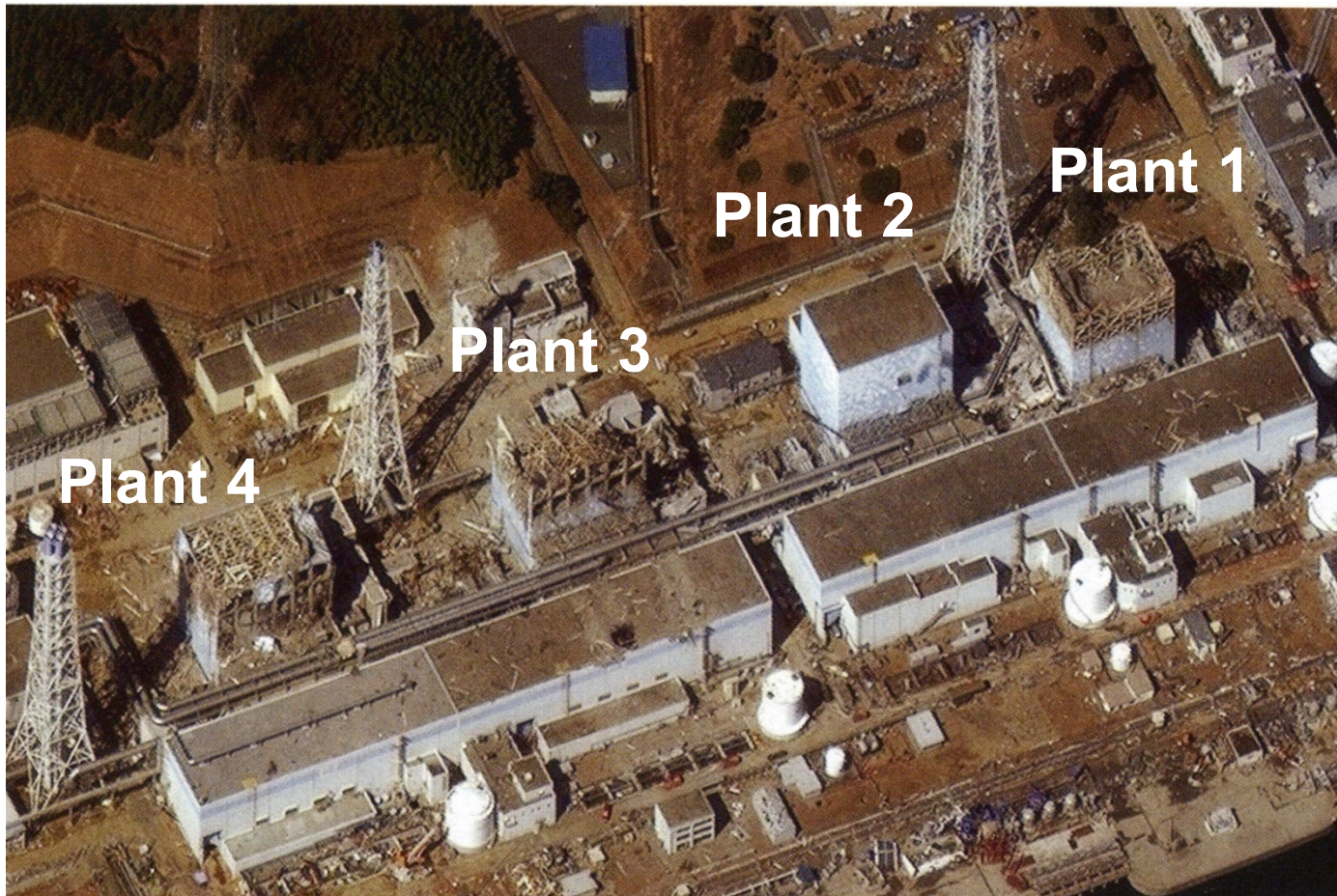
March 11 14:46

Fuel rods were melted
down at all plants

Plant 1 March 12 15:36

Plant 3 March 14 11:01

Plant 4 March 15 6:10



**Permissible exposure limit
was tentatively increased
for the FNPP workers**

from **100mSv/5yrs** to **250mSv**
from **March 14, 2011**
until **December 16, 2011**

by the Government

The emergency workers (FNPP workers)

※ Only civilians were included

public employees such as

1. government officers
 2. self-defense-forces
 3. police officers
 4. firefighters
 - & 5. foreigners
- were excluded

Study design

**“Longitudinal
epidemiology for the
entire life span of the
participants”**

Number of the workers by age

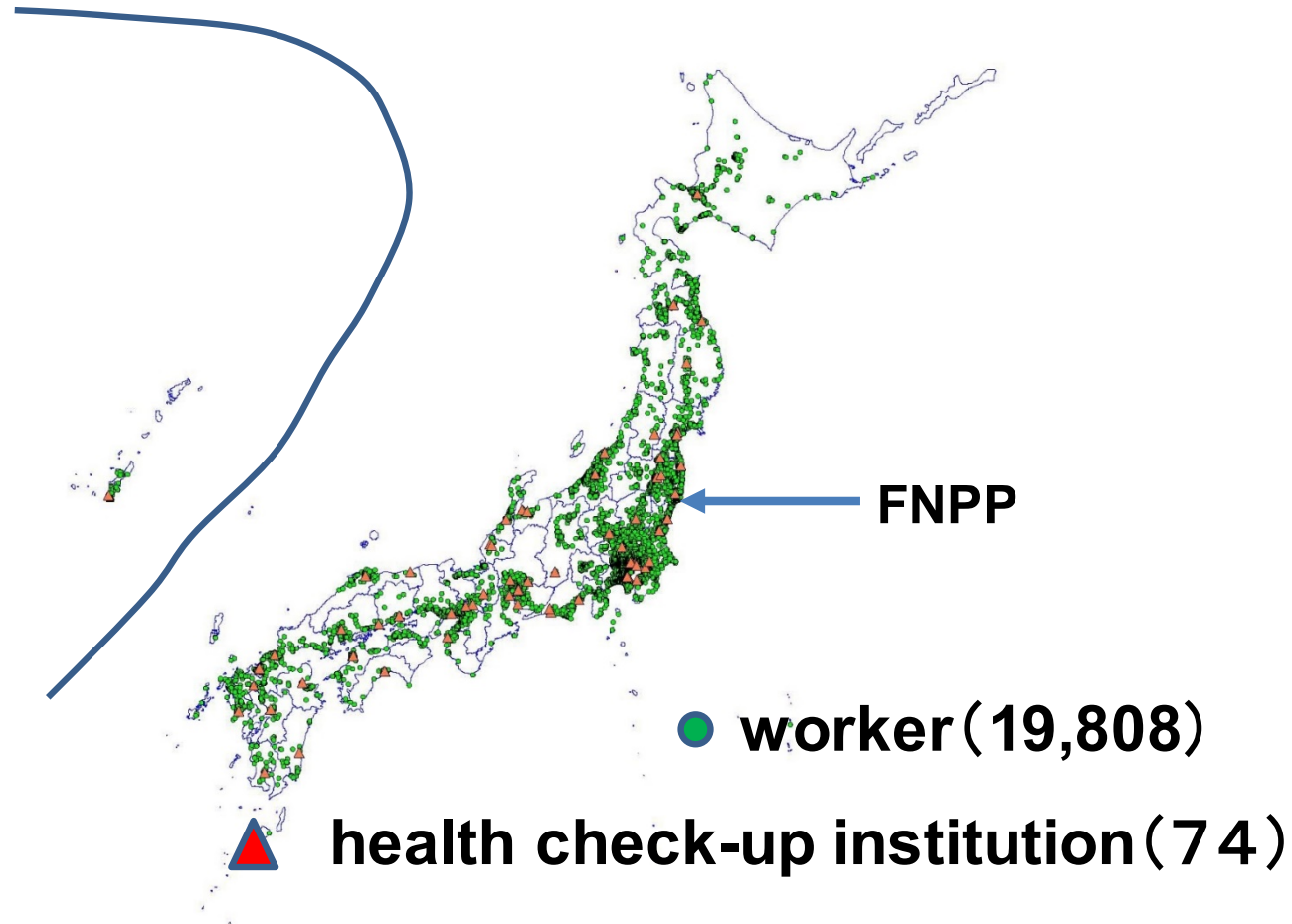
age as of 2018.10.31

age		() No. death		
20~	592	(1)	3.0%	
30~	2,752	(11)	13.9%	
40~	5,221	(26)	26.4%	} 80%
50~	5,759	(60)	29.1%	
60~	4,781	(124)	24.1%	
70~	696	(32)	3.5%	
unknown	7		0.0%	
	19,808	(254)	100.0%	

No. participating companies

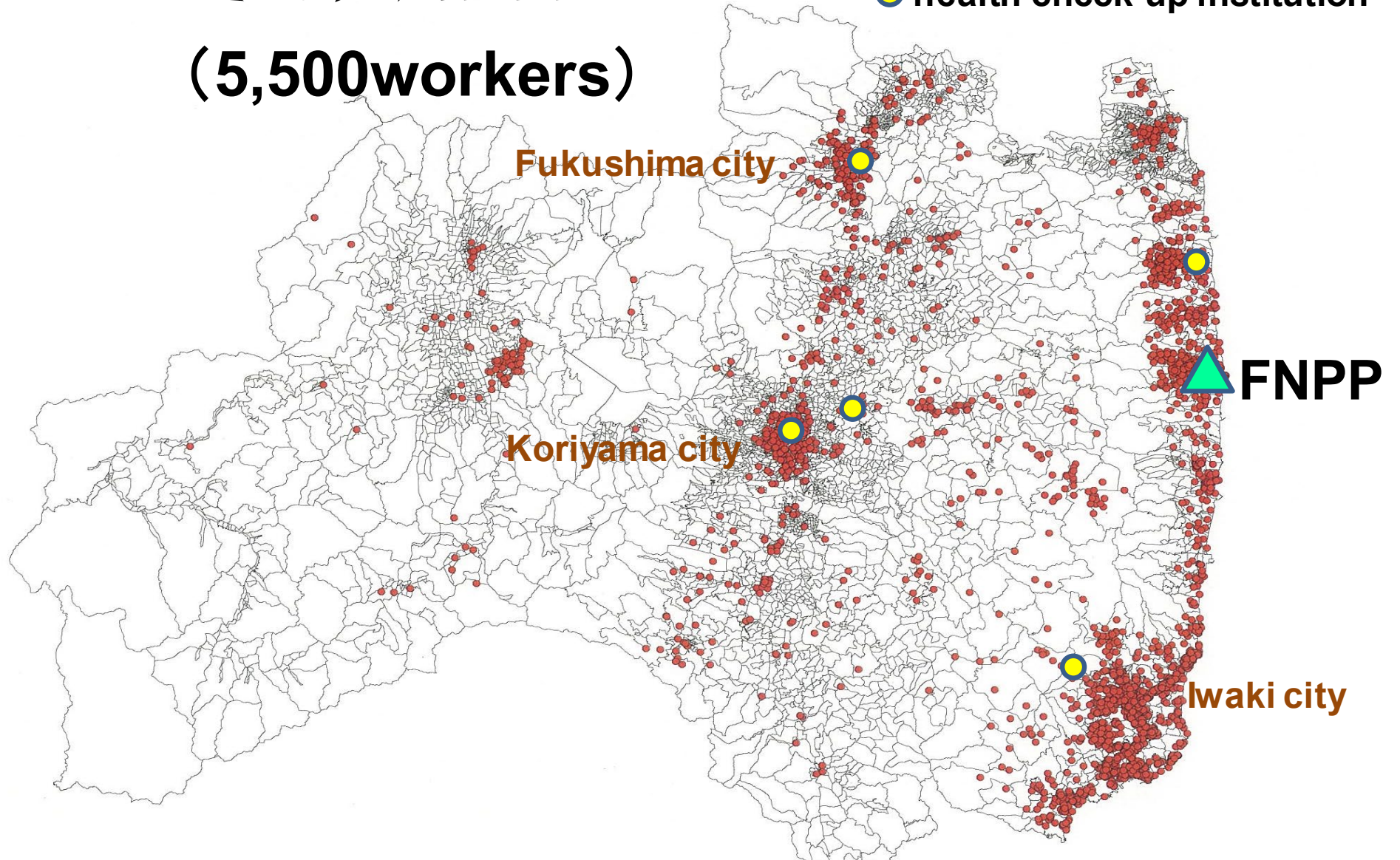
No. workers by a company	No. companies	Total workers involved
1000~	1	1388
100~1000	6	819
50~100	6	422
30~50	7	304
10~30	42	639
~10	1995	3140
?a few	? α	13096
Total	2057+ α	19808

Distribution of the emergency workers in 2014



Distribution in Fukushima (5,500 workers)

● health check-up institution



Fukushima city

Koriyama city

FNPP

Iwaki city

Items to be observed

- 1. cancer incidence and cause of death**
- 2. periodic clinical examinations, ECG & X-ray photo**
- 3. cataract exam, thyroid ultrasonography**
- 4. laboratory tests of blood and urine**
- 5. psychological interview**
- 6. blood and urine preservation(-80°C)**

Radiation dose

- 1. External dose was measured by personal dosimeter. FNCC workers were requested to wear it every working day**
- 2. Internal intake was measured by whole body counter**
- 3. Calculation of effective dose**
- 4. Calculation of organ dose (thyroid etc)**

Active personnel detector : APD



Number of the workers by effective dose during the emergency work

~5 mSv	9336	47.1%	
5~9	2854	14.4%	
10~19	3265	16.5%	
20~49	2818	14.2%	
50~99	881	4.4%	
100~149	139	0.7%	} 176
150~	37	0.2%	
unknown	480	2.4%	
	<hr/>		
	19,808	100.0%	

Health check-up institutions

- 1. At least one in each prefecture**
- 2. Additional institutions in proportion to the number of FNCC workers living in the prefecture**
- 3. Requested to assign a research coordinator**

Research coordinator in the health check-up institution

- 1. Appointed from among nurses or public health nurses**
- 2. Direct contactor to the participants**
- 3. Arrangement of the health check-up date**
- 4. Health interview**
- 5. Arrangement of bio-samples for clinical tests and preservation**
- 6. Explanation of the check-up results**

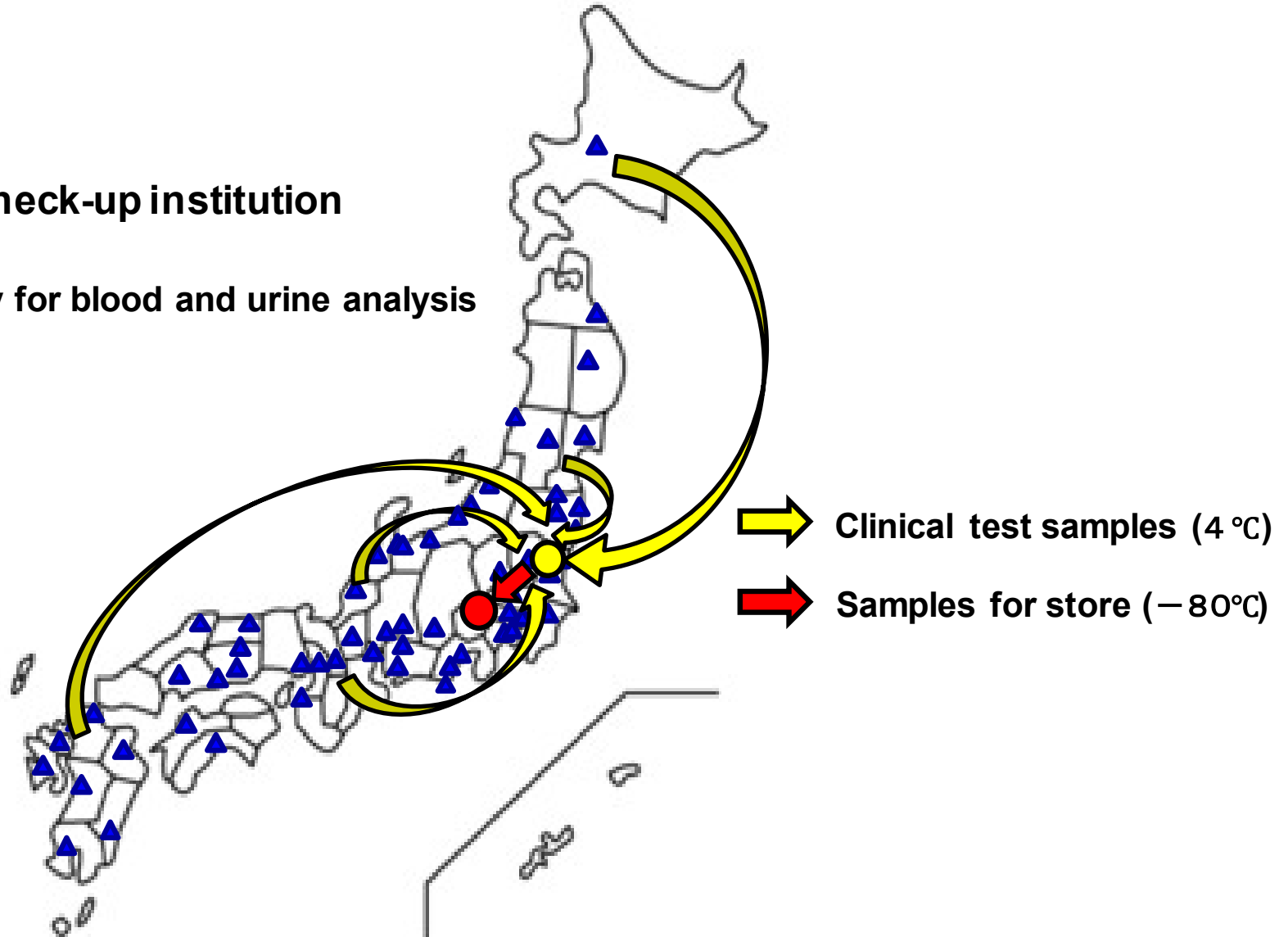
< key person of this study! >

Research coordinators meeting

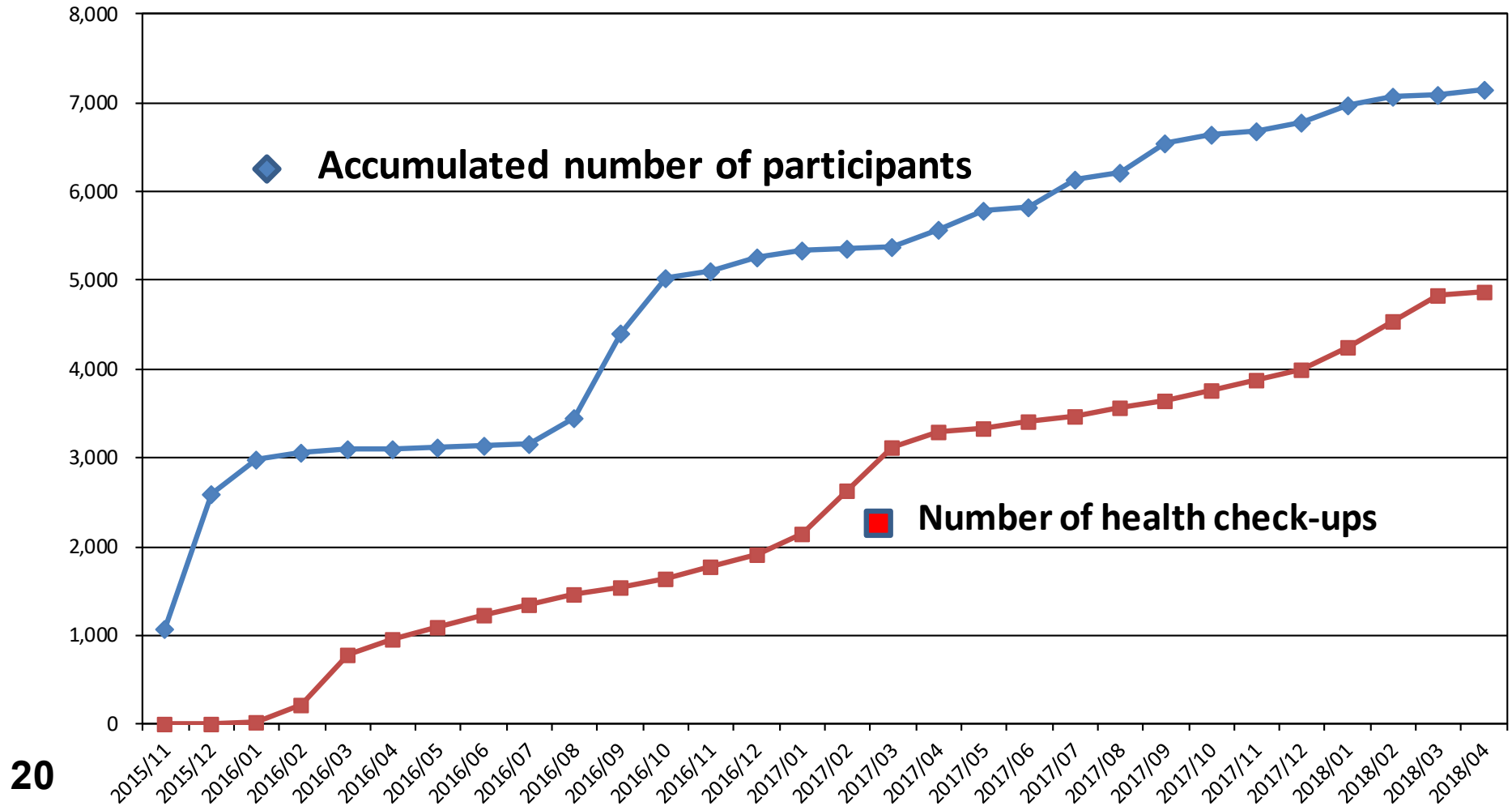


Storing blood and urine samples

- ▲ Health check-up institution
- Laboratory for blood and urine analysis
- JNIOOSH



Accumulated number of participants to the research and those finished health check-up



Response during the first 5 years

1828 9.2%

Address unknown

Accepted

7266 36.7%

5133 Health check-upped

6976 35.2%

No response

Rejected

3357 16.9%

As of 2018.10.31

Accomplishments

during the first 5 years

- 1. Establish a cohort to be followed**
- 2. Radiation dose for each worker**
- 3. Responsible organizations to follow-up**
- 4. Establish a central lab for clinical tests**
- 5. Sample preservation system**