

## Basic Survey (Radiation Dose Estimates) reported on 20 August 2013

### 1. Response Rates and Radiation Dose Estimates

#### 1.1 Response Rates of Residents

The overall effective response rate to the Basic Survey (radiation dose estimates), which targeted the entire population of Fukushima Prefecture, was 23.5% (483,088/2,056,994) as of 31 July 2013.

Although the response rate was higher (58.3%) in the preceding survey of high-priority areas (Yamakiya of Kawamata, Namie and Iitate), the response rate of the full-scale survey was 23.0%. Regional variations in the response rates were also observed, ranging from 13%–15% in Aizu and Minami-aizu to 42% in Soso area (Table 1).

#### 1.2 Radiation Dose Estimates

Recorded movements of respondents are converted to digital data, and effective external cumulative doses are calculated using the dose calculation system developed by the National Institute of Radiological Sciences. Doses have been estimated for 445,015/483,088 respondents (92.1%) as of 31 July 2013 (Table 1), and the results have been returned to 420,392 respondents.

		Target population	Response	Response rates	Completed dose estimation	Proportion	Returned results	Proportion
		a	b	c=b/a	d	e=d/b	f	g=f/b
Preceding Survey	Yamakiya of Kawamata, Namie and Iitate	29,044	16,936	58.3%	16,339	96.5%	16,166	95.5%
Full-scale Survey	Kempoku	504,291	132,998	26.4%	126,502	95.1%	120,489	90.6%
	Kenchu	560,116	116,444	20.8%	107,760	92.5%	101,697	87.3%
	Kennan	152,776	26,910	17.6%	24,588	91.4%	23,484	87.3%
	Aizu	267,696	40,411	15.1%	36,127	89.4%	34,449	85.2%
	Minami-aizu	30,831	4,140	13.4%	3,645	88.0%	3,587	86.6%
	Soso	168,409	70,928	42.1%	63,164	89.1%	58,421	82.4%
	Iwaki	343,831	74,321	21.6%	66,890	90.0%	62,099	83.6%
	Subtotal	2,027,950	466,152	23.0%	428,676	92.0%	404,226	86.7%
Total		2,056,994	483,088	23.5%	445,015	92.1%	420,392	87.0%

### 1.3 Response Rates (Visitors)

The survey questionnaire was distributed upon request to non-residents who were visiting or staying in Fukushima Prefecture at the time of the accident. Of 2,064 responses, doses have been estimated for 1,593 respondents (77.2%), and the results shall be returned accordingly (Table 2).

Number of request	Response	Response rates	Completed dose estimation	Proportion	Returned results	Proportion
a	b	c=b/a	d	e=d/b	f	g=f/b
3,789	2,064	54.5%	1,701	82.4%	1,593	77.2%

## 2. Results of Radiation Dose Estimates

Radiation doses for a total of 445,015 residents have been estimated to date. The results for 435,788 respondents (excluding radiation workers) suggested that the doses for more than 90% of the respondents were <2 mSv in Kempoku and Kenchu areas. The doses for approximately 91% of the respondents in Kennan area and more than 99% of those in Aizu and Minami-aizu were <1 mSv. Doses for 78% of respondents in Soso area and more than 99% of respondents in Iwaki were also <1 mSv (Table 3).

Effective Dose (mSv)	Total	Excluding radiation workers				By region (excluding radiation workers)													
						Kempoku *		Kenchu		Kennan		Aizu		Minami-aizu		Soso **		Iwaki	
<1	292,998	287,103	65.9%	94.8%	39,955	31.8%	62,993	59.1%	22,076	90.8%	35,531	99.4%	3,591	99.4%	57,898	78.0%	65,059	99.2%	
1-2	128,471	126,184	29.0%	99.8%	73,390	58.4%	37,510	35.2%	2,238	9.2%	198	0.6%	23	0.6%	12,325	16.6%	500	0.8%	
2-3	19,898	19,541	4.5%		4.8%	11,861	9.4%	5,784	5.4%	12	0.0%	8	0.0%	0	—	1,857	2.5%	19	0.0%
3-4	1,444	1,374	0.3%	0.2%	418	0.3%	278	0.3%	0	—	1	0.0%	0	—	674	0.9%	3	0.0%	
4-5	599	561	0.1%		0.2%	41	0.0%	5	0.0%	0	—	0	—	0	—	514	0.7%	1	0.0%
5-6	465	413	0.1%	0.1%	22	0.0%	2	0.0%	0	—	0	—	0	—	389	0.5%	0	—	
6-7	272	241	0.1%		0.1%	8	0.0%	0	—	0	—	0	—	0	—	233	0.3%	0	—
7-8	158	123	0.0%	0.0%	1	0.0%	0	—	0	—	0	—	0	—	122	0.2%	0	—	
8-9	122	82	0.0%		0.0%	0	—	0	—	0	—	0	—	0	—	82	0.1%	0	—
9-10	73	43	0.0%	0.0%	0	—	0	—	0	—	0	—	0	—	43	0.1%	0	—	
10-11	74	45	0.0%		0.0%	0	—	0	—	0	—	0	—	0	—	45	0.1%	0	—
11-12	50	31	0.0%	0.0%	1	0.0%	0	—	0	—	0	—	0	—	30	0.0%	0	—	
12-13	37	14	0.0%		0.0%	0	—	0	—	0	—	0	—	0	—	14	0.0%	0	—
13-14	33	11	0.0%	0.0%	0	—	0	—	0	—	0	—	0	—	11	0.0%	0	—	
14-15	32	11	0.0%		0.0%	0	—	0	—	0	—	0	—	0	—	11	0.0%	0	—
15<	289	11	0.0%	0.0%	0	—	0	—	0	—	0	—	0	—	11	0.0%	0	—	
<b>Total</b>	<b>445,015</b>	<b>435,788</b>	<b>100.0%</b>	<b>100.0%</b>	<b>125,697</b>	<b>100%</b>	<b>106,572</b>	<b>100%</b>	<b>24,326</b>	<b>100%</b>	<b>35,738</b>	<b>100%</b>	<b>3,614</b>	<b>100%</b>	<b>74,259</b>	<b>100%</b>	<b>65,582</b>	<b>100%</b>	
<b>Max</b>	<b>66mSv</b>	<b>25mSv</b>			<b>11mSv</b>		<b>5.9mSv</b>		<b>2.6mSv</b>		<b>3.6mSv</b>		<b>1.6mSv</b>		<b>25mSv</b>		<b>4.8mSv</b>		

\* Including Yamakiya of Kawamata.  
\*\* Including Namie and Iitate.  
Percentages have been rounded and may not total to 100%.

### 3. Evaluation of the results

The latest effective radiation dose estimates showed similar trends to those observed so far. Since previous epidemiological studies indicate no significant health effects at doses <100 mSv, we concluded that radiation doses estimated so far are unlikely to cause adverse effects on health, although this conclusion is based on effective doses estimated only for the first four months following the accident.

### References

- 1) Sources and effects of ionizing radiation, United Nations Scientific Committee on the Effects of Atomic Radiation, UNSCEAR 2008 Report to the General Assembly, with scientific annexes.