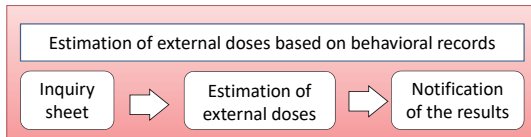


A survey to obtain data that is to serve as the basis for monitoring and protecting residents' health

In order to estimate external doses, individuals were asked to keep and submit a record of their behavior.

Based on collected behavioral records for the four months from March 11 to July 11, 2011, each individual's external dose was estimated using the External Dose Estimation System developed by the National Institute of Radiological Sciences.

[Survey scheme]



Estimated results and the period for estimation are reported to participating individuals to let them know their own external doses, and at the same time, the obtained data are utilized in the Detailed Surveys and individuals' health management to be continued for the long term.

The 4th Expert Meeting on Communications with Nuclear Disaster Victims Regarding Their Health, Ministry of the Environment

The Basic Survey was conducted for the purpose of estimating the level of radiation exposure of people who were residing in Fukushima Prefecture at the time of the accident at Tokyo Electric Power Company (TEPCO)'s Fukushima Daiichi NPS, and compiling data useful for individuals' health management into the future.

Specifically, inquiry sheets were delivered to the applicable residents to ask them to record their behavior during the four months after the accident. Based on the behavioral records entered in the inquiry sheets, individuals' external doses were estimated using a program developed by the National Institute of Radiological Sciences.

Individuals' estimated external doses were compiled and statistically processed, and have been utilized for analyzing radiation exposure and its health effects in Fukushima Prefecture.

Included in this reference material on March 31, 2013

Updated on December 1, 2017

[Period for estimation]

Behavior during the four months from March 11 to July 11, 2011

[Coverage]

Approx. 2.06 million people

- Residents of the prefecture:

People with residence registration in the prefecture from March 11 to July 1, 2011

- People residing outside the prefecture:

- (1) People who were registered as residents in other prefectures but were residing in the prefecture from March 11 to July 1, 2011
- (2) People residing outside the prefecture who commuted to work or school in the prefecture from March 11 to July 1, 2011
- (3) People residing outside the prefecture who temporarily stayed in the prefecture from Mar. 11 to Mar. 25, 2011

(For people residing outside the prefecture, inquiry sheets were sent upon their request.)

The 4th Expert Meeting on Communications with Nuclear Disaster Victims Regarding Their Health, Ministry of the Environment

The period for surveying behavioral records was the four months from March 11 to July 11, 2011.

The Basic Survey covered approx. 2.06 million people who were registered as residents of the prefecture at the time of the earthquake. People residing outside the prefecture, for example, those registered as residents in other prefectures, were also covered if they resided, commuted to work or school, or temporarily stayed in the prefecture during this period.

Included in this reference material on March 31, 2013

Updated on March 31, 2017

Basic Survey: Inquiry Sheets

In November 2013, a simplified inquiry sheet was introduced.

● Detailed version (conventional version)

年月	場所	時	期	地名・施設名
3/11	市内	①	②	③自宅
(B)	移動	④	⑤	⑥学校
屋外	⑦	⑧	⑨	⑩
3/12	市内	⑪	⑫	⑬学校(○)
(C)	移動	⑭	⑮	⑯学校(△)
屋外	⑰	⑱	⑲	⑳
3/13	市内	㉑	㉒	㉓学校(○)
(E)	移動	㉔	㉕	㉖学校(○)
屋外	㉗	㉘	㉙	㉚
3/14	移動	㉛	㉜	㉝学校(○)
(F)	移動	㉞	㉟	㊱学校(○)
屋外	㊲	㊳	㊴	㊵
3/15	市内	㊶	㊷	㊸学校(○)
(K)	移動	㊹	㊺	㊻学校(○)
屋外	㊼	㊽	㊾	㊿

All respondents were asked to record the activities they conducted on an hourly basis for the period from March 11 to March 25, but the simplified inquiry sheet allows some respondents to summarize their behavior and only enter basic behavioral patterns for a certain period of time.

● Simplified version

期 間 居 住 地 等

平成23年 ①この期間の居住場所は、2ページで記載した住所と同じですか？
 はい いいえ(住所の住所) 1月1日現在の居住地 居住地)
 異なる(下記に記入ください) 住所 市区 町 丁目
 市 区 町 丁目

↓
 月 日 ②居住地域のくわりの期間、定期的に異なる日数、定期的に異なる時間、
 1日あたりどのくらいですか？
 1時間 2時間 3時間 4時間以上()時間
 ③定期的な外出先(勤務先や学校など)はありましたか？
 はい(次の欄に記入してください) いいえ(次の欄に記入してください)
 ④ ⑤()の欄に記入してください。外出先と住所の記入は半票)
 外出先施設名: 住所 市区 町 丁目
 市 区 町 丁目

⑥の外出先での滞在期間は、1日あたりどのくらいでしたか？
 屋内()時間 屋外()時間
 外出する曜日とは？(○で選択) 月・火・水・木・金・土・日
 休日に、よく外出する先がありましたか？
 はい いいえ(次の欄に記入してください)
 外出先施設名: 住所 市区 町 丁目
 市 区 町 丁目

⑦の外出先での滞在期間は、1日あたりどのくらいでしたか？
 屋内()時間 屋外()時間
 外出する曜日とは？(○で選択) 月・火・水・木・金・土・日

[Requirements for using the simplified inquiry sheet]

People who have experienced none or only one significant behavioral pattern change (such as a change of residence, school or workplace due to evacuation or moving) in the four months following the earthquake

Examples

- 1 A person who was residing in Fukushima City at the time of the earthquake, evacuated to Kanagawa on March 15 and continued staying in Kanagawa until July 11.
 Moved once → **Simplified version**
- 2 A person who was residing in Fukushima City at the time of the earthquake, evacuated to Aizuwakamatsu on March 18 but returned to Fukushima City on June 10.
 Moved twice → **Detailed version**

Prepared based on the website of the Radiation Medical Science Center for the Fukushima Health Management Survey, Fukushima Medical University, "Information on the Fukushima Health Management Survey"

The original inquiry sheet for the Basic Survey required respondents to record the activities they conducted on an hourly basis for the period from March 11 to March 25. In response to complaints concerning the difficulty in filling in the sheet, a simplified version was introduced in November 2013.

However, in order to maintain the accuracy of the survey, there are requirements for using the simplified inquiry sheet. Only those who have experienced none or only one significant change in their living place due to evacuation or moving, etc. in the four months following the earthquake are allowed to use it.

Included in this reference material on March 31, 2013

Updated on March 31, 2016

Basic Survey: Analysis Methods

(Behavioral Pattern Survey and Dose Rate Map)

Behavioral pattern survey

Examine behavioral patterns based on inquiry sheets of the Fukushima Health Management Survey

Survey period

Four months from March 11 to July 11, 2011

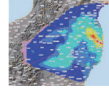
Surveyed items

- Stays (places, hours and building structures)
- Moves (places and hours)

区分 項目	滞在 場所	時 刻	地名・施設名
記 入	①	0 3 6 9 12 15 18 21 24	①自宅 ②自宅の隣 ③車内 ④遊樂所
移 動	②	③	⑤(○)市××中学校 ⑥(○)市××町立A
別 例	④	⑦	

Dose rate maps

Prepare maps showing average daily effective dose rates based on data of SPEEDI and the Ministry of Education, Culture, Sports, Science and Technology (MEXT)



- March 12 to 14 Evaluation results by SPEEDI (effective dose rates)
- From March 15 onward Monitoring data released by MEXT (at that time) (ambient dose equivalent rates)

Convert ambient dose equivalent rates to effective dose rates by multiplying by 0.6

- Divide into 2 km × 2 km grids
- Interpolate discrete data using software to create a map

* Values of natural radiation are not included.

Calculation of cumulative effective doses

Evaluate effective doses based on behavioral patterns and dose rate maps

Prepared based on the website of Fukushima Prefecture, "Estimation of External Doses (Outline of the External Dose Estimation System and Estimation Results by Model Pattern of Evacuation Behavior)", National Institute of Radiological Sciences" (December 13, 2011)

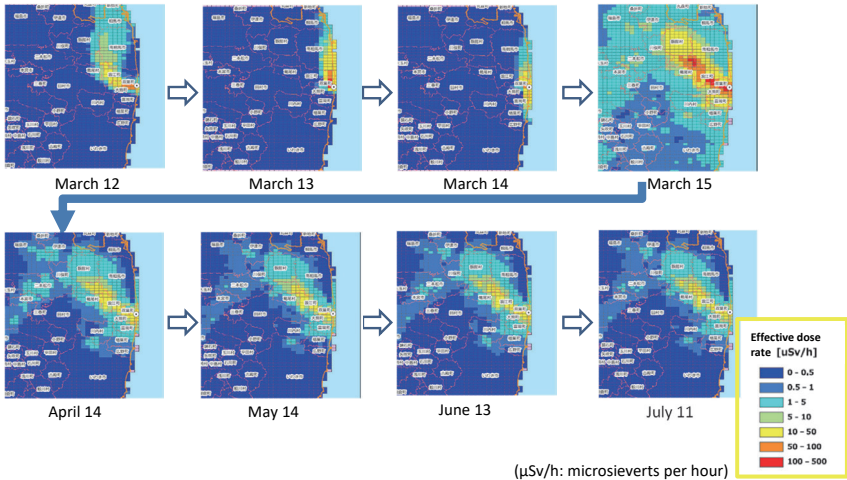
In the Basic Survey, external doses were evaluated combining the results of the behavioral pattern survey and the created dose rate maps. The evaluation was conducted based on dose rate maps and behavioral records entered by respondents, such as where and how long they stayed in buildings, and the type of buildings where they stayed, during the survey period.

Included in this reference material on March 31, 2013

Updated on March 31, 2016

Basic Survey: Analysis Methods

(Time-Series Dose Rate Maps)



Prepared based on the website of Fukushima Prefecture, "Estimation of External Doses (Outline of the External Dose Estimation System and Estimation Results by Model Pattern of Evacuation Behavior), National Institute of Radiological Sciences" (December 13, 2011)

Dose rate maps used here are the monitoring data released by the Ministry of Education, Culture, Sports, Science and Technology (MEXT) (at that time).*

* For the three days from March 12 to March 14, which are included in the period (March 12 to March 15, 2011) during which the monitoring data released by MEXT (at that time) is not available, calculation results by SPEEDI (System for Prediction of Environmental Emergency Dose Information) using the data on radioactive material discharge released by the Nuclear and Industrial Safety Agency (at that time) in June 2011 were applied. Data for March 15 was assumed to be the same as that for March 16, and from March 16 onward, the monitoring data released by MEXT (at that time) was used.

Included in this reference material on March 31, 2013

Updated on March 31, 2016

The response rate was 27.6% for the entirety of Fukushima Prefecture

Table 1 Responses to the Basic Survey As of June 30, 2017

Coverage		2,055,258	
Number of responses	Detailed version	493,584	24.0%
	Simplified version	73,189	3.6%
	Total	566,773	27.6%

* Response rates are rounded off for each category.

Table 2 Response rate by age bracket As of Jun. 30, 2017

Age bracket	0-9	10-19	20-29	30-39	40-49	50-49	60-	Total
Response rate	46.6%	35.8%	18.1%	24.7%	22.4%	23.0%	27.9%	27.6%

Material for the 28th Prefectural Oversight Committee Meeting for Fukushima Health Management Survey

During the survey period, i.e., the four months from March 12 to July 11, 2011, ambient dose rates were especially high and ascertaining people's external doses during this period is most important.

Approx. 566,773 people have made responses so far (response rate: 27.6%).

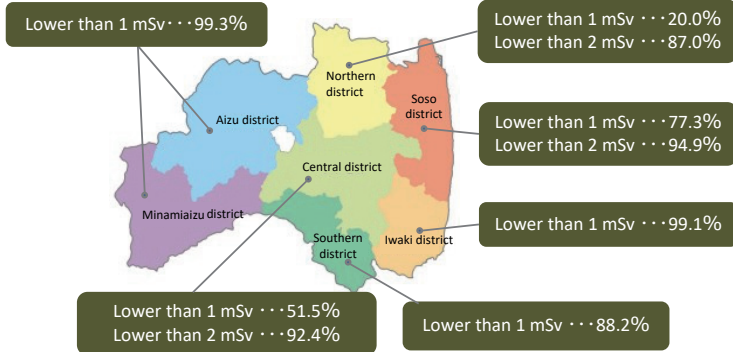
Thanks to the introduction of the simplified inquiry sheet and assistance for filling in the inquiry sheet offered at venues of the Thyroid Examination, the response rate improved, mainly among young people.

Included in this reference material on March 31, 2013

Updated on December 1, 2017

Results of estimated external effective doses by district

(for 464,420 people excluding radiation workers)



Evaluation of estimated effective doses

Past epidemiological studies have not confirmed clear health effects of radiation below 100 mSv. Therefore, the estimated external effective doses, though covering only four months, can be evaluated as values that are unlikely to show any health effects caused by radiation.

Prepared based on the material for the 28th Prefectural Oversight Committee Meeting for Fukushima Health Management Survey

Out of a total of 552,298 people for whom external effective doses have been estimated by June 30, 2017, a total of 473,605 people submitted records of their behavior for the entirety of the four-month period for estimation. The figure above shows the estimation results of 464,420 people, excluding those who had engaged in radiation work, by district. As shown in the figure, people for whom estimated external effective doses were lower than 1 mSv accounted for 88.2% in the southern district, 99.3% in the Aizu and Minamiaizu districts, 77.3% in the Soso district, and 99.1% in the Iwaki district. The maximum value was 25 mSv estimated for a person residing in the Soso district.

Included in this reference material on March 31, 2013

Updated on December 1, 2017

[Purpose]

In light of the fact that the response rate of the Basic Survey was approximately 27%, this examination aims to ascertain whether the dose distribution based on the data obtained so far through the Basic Survey correctly reflects the actual status for all residents of the prefecture and is not biased (representativeness of the dose distribution).

[Method]

In FY2015, a group of people was selected at random for each of the seven districts in the prefecture, and the selected people were classified into those who had already responded to the Basic Survey and those who had not in each district. Staff visited people who had not responded to the Basic Survey to ask them to make responses, and a comparison was made between estimated doses for these people and estimated doses for people who had responded to the Basic Survey earlier.

[Results]

In each district, the dose distribution based on the data obtained so far was found to be unbiased and to properly represent respective districts.

Prepared based on the material for the 22nd Prefectural Oversight Committee Meeting for Fukushima Health Management Survey

< Method >

In FY2015, a group of people was selected at random for each of the seven districts in the prefecture, and the selected people were classified into those who had already responded to the Basic Survey and those who had not in each district. Staff visited people who had not responded to the Basic Survey to ask them to make responses, and a comparison was made between estimated doses for these people and estimated doses for people who had responded to the Basic Survey earlier.

For districts with wider dose distribution being ascertained so far, a larger number of people were selected at random.

A statistical comparison was made between estimated doses for people who had responded to the Basic Survey earlier and those for people who had not responded to the Basic Survey but provided responses upon this door-to-door examination.

< Results >

As a result of a statistical analysis, average doses for both groups (people who had responded to the Basic Survey earlier and people who provided responses upon this door-to-door examination) differ only by ± 0.25 mSv at the most and it was found that estimated external doses for both groups were at the same level.

See the following website for details:

① -5 and ① -6: <http://www.pref.fukushima.lg.jp/uploaded/attachment/151271.pdf> (in Japanese)

Included in this reference material on March 31, 2016

Updated on December 1, 2017