What is Fukushima Prefecture’s Fukushima Health Management Survey?

Considering the effects of radiation due to the nuclear disaster, Fukushima Prefecture has been conducting the "Fukushima Health Management Survey" since June 2011 in order to monitor and improve the health of residents for the long term into the future.

The Fukushima Health Management Survey consists of the following five components.

(i) **Basic Survey (estimation of external doses)** (all residents)

(ii) **Detailed Surveys**
- **Thyroid Examination** (residents aged around 18 or younger as of March 11, 2011)
- **Comprehensive Health Checkup** (residents of municipalities under evacuation orders)
- **Mental Health and Lifestyle Survey** (residents in Evacuation Areas)
- **Pregnancy and Birth Survey** (pregnant women who have obtained a maternity handbook)

In the aftermath of the diffusion of radioactive materials from the accident at Tokyo Electric Power Company (TEPCO)’s Fukushima Daiichi NPS, subsequent evacuations and such, the "Fukushima Health Management Survey" was commenced in Fukushima Prefecture, aiming to improve and maintain the health of the residents of the prefecture into the future by means of understanding their health conditions and linking such data to the prevention and early detection and treatment of diseases, while assessing their radiation doses.

Within the Fukushima Health Management Survey, the Basic Survey was offered to all residents of Fukushima Prefecture to ascertain their external doses during the four months following the accident at the NPS. Additionally, for all residents who were around 18 years old or younger at the time of the accident, the Thyroid Examination has been conducted. The Comprehensive Health Checkup to ascertain physical health conditions and the Mental Health and Lifestyle Survey to ascertain mental health conditions have also been conducted for approximately 210,000 people who were residing in areas designated for evacuation at the time of the accident. Furthermore, the Pregnancy and Birth Survey has been conducted every year for pregnant women who obtained a maternity handbook within Fukushima Prefecture and those who obtained a maternity handbook somewhere else but gave birth in the prefecture.

Included in this reference material on March 31, 2013
Updated on December 1, 2017
The Fukushima Health Management Survey is being carried out by Fukushima Medical University under commission from Fukushima Prefecture, which serves as the responsible entity. Fukushima Medical University established the Radiation Medical Science Center for the Fukushima Health Management Survey to carry out the Survey.

Fukushima Prefecture set up the Prefectural Oversight Committee Meeting for Fukushima Health Management Survey with the aim of obtaining advice on the Fukushima Health Management Survey from a broad panel of experts.

Included in this reference material on March 31, 2015
Updated on December 1, 2017
The Fukushima Health Management Survey is broadly divided into the Basic Survey and Detailed Surveys.

The Basic Survey was conducted for the purpose of estimating residents' external doses for the four months after the accident at Tokyo Electric Power Company (TEPCO)’s Fukushima Daiichi NPS based on their behavioral records and obtaining data that is to serve as the basis for monitoring and protecting their health into the future.

The Detailed Surveys are to ascertain residents’ present health conditions, as follows:

The first is the Thyroid Examination targeting all residents who were around 18 years old or younger as of March 11, 2011. As cases of thyroid cancer increased among children after the Chernobyl accident, this examination is to be repeated periodically for the applicable participants.

The second is the Comprehensive Health Checkup targeting people who used to reside in Evacuation Areas, being conducted with the aim of achieving the prevention, early detection, and treatment of lifestyle-related diseases that may be caused by changes in their living circumstances.

The third is the Mental Health and Lifestyle Survey, which also targets people from Evacuation Areas. This is for offering support to the disaster victims to ease anxiety and emotional trauma caused by the Great East Japan Earthquake and the accident at the NPS.

The fourth is the Pregnancy and Birth Survey targeting pregnant women who have worries over various things including radiation fears in relation to childbirth and child rearing.

Individuals are encouraged to personally keep records of these surveys and examinations in a Fukushima Health Management File, which is delivered to all residents, and utilize the data for their own health management. Additionally, Fukushima Prefecture compiles all data into a centralized database for the long-term utilization of accumulated knowledge.

Included in this reference material on March 31, 2013
Updated on December 1, 2017
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 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
Basic Survey: Outline

[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 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
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
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)

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

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
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

<table>
<thead>
<tr>
<th>Coverage</th>
<th>2,055,258</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detailed version</td>
<td>493,584</td>
</tr>
<tr>
<td>Simplified version</td>
<td>73,189</td>
</tr>
<tr>
<td>Total</td>
<td>566,773</td>
</tr>
</tbody>
</table>

* Response rates are rounded off for each category.

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

<table>
<thead>
<tr>
<th>Age bracket</th>
<th>0-9</th>
<th>10-19</th>
<th>20-29</th>
<th>30-39</th>
<th>40-49</th>
<th>50-49</th>
<th>60-</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response rate</td>
<td>46.6%</td>
<td>35.8%</td>
<td>18.1%</td>
<td>24.7%</td>
<td>22.4%</td>
<td>23.0%</td>
<td>27.9%</td>
<td>27.6%</td>
</tr>
</tbody>
</table>

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

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.

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.

< 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:

Included in this reference material on March 31, 2016
Updated on December 1, 2017
"We will promote the health of the children in Fukushima for the long term."

**[Purpose]**

Health effects of radiation due to the accident at Tokyo Electric Power Company (TEPCO)'s Fukushima Daiichi NPS are considered to be extremely small, taking into consideration the expected internal and external exposure doses.

On the other hand, it has been reported that cases of thyroid cancer increased among children after the Chernobyl accident due to internal exposure to radioactive iodine. Therefore, the Thyroid Examination targeting children has been conducted since October 2011 with the aim of ascertaining their thyroid status and promoting their health for the long term.

**[Coverage]**

All people of Fukushima Prefecture who were aged zero to 18 as of March 11, 2011 (those born from April 2, 1992, to April 1, 2011) (approx. 368,000 people)

* The Full-scale Screening expanded coverage to include those born from April 2, 2011, to April 1, 2012 (approx. 382,000 people in total).

It has been reported that cases of thyroid cancer increased among children after the Chernobyl accident due to internal exposure to radioactive iodine. Compared with the Chernobyl accident, the amount of radioactive materials discharged into the environment after the accident in Fukushima was much smaller and estimated internal and external doses of the residents were even smaller. Therefore, it is predicted that there would be no epidemiologically detectable thyroid health risks. However, as concerns remain about effects of radiation due to the accident on children's thyroid glands, the Thyroid Examination has been continued under the framework of the Fukushima Health Management Survey with the aim of ascertaining children's current thyroid status and promoting their health into the future.

Included in this reference material on March 31, 2013
Updated on March 31, 2017
# Thyroid Examination: Outline (1/3)

- **Coverage and examination plan**

<table>
<thead>
<tr>
<th>Screening category</th>
<th>Period</th>
<th>Coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>First examination</td>
<td>Initial Screening (In order to ascertain children’s thyroid status)</td>
<td>Oct. 2011 - March 2014</td>
</tr>
<tr>
<td>Second examination</td>
<td>Full-scale Screening (In order to make comparison with the results of the Initial Screening)</td>
<td>April 2014 - March 2016</td>
</tr>
<tr>
<td>Third examination</td>
<td></td>
<td>April 2016 - March 2018</td>
</tr>
<tr>
<td>Fourth examination -</td>
<td></td>
<td>Once every two years until becoming 20 years old, then once every five years after becoming 25 years old, for example, at the ages of 30, 35 and so on</td>
</tr>
</tbody>
</table>

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

Ascertaining the current thyroid status of the relevant group of people even though radiation effects are unlikely to be detected is very important for promoting their health for the long term. Therefore, the Thyroid Examination was conducted for all children in Fukushima Prefecture after the accident at Tokyo Electric Power Company (TEPCO)'s Fukushima Daiichi NPS over a period of approximately two and a half years from October 2011 (Initial Screening).

Then, in FY2014, the coverage was expanded to include those born from April 2, 2011, to April 1, 2012, and the Full-scale Screening was conducted as the second examination.

From the third examination onward, the targeted people receive examinations once every two years until they become 20 years old and once every five years thereafter.

Included in this reference material on March 31, 2013
Updated on December 1, 2017
This shows the procedures for the Thyroid Examination.

The Primary Examination checks whether there are any nodules or cysts and measures the sizes thereof, if any. The Confirmatory Examination is recommended to those who are considered to require a more detailed examination.

In the Confirmatory Examination, a more accurate ultrasound examination, plus blood and urine tests are conducted, and fine-needle aspiration cytology is also conducted when a doctor considers it necessary.

The Thyroid Examination is completed at this point.

Then, individuals who are found to require treatment receive it from their regular healthcare provider, under the relevant medical insurance system.

Included in this reference material on March 31, 2016
Updated on December 1, 2017
Content of the examination

[Primary Examination]
An ultrasound examination assesses whether there are any nodules or cysts. The examination ordinarily finishes in three to five minutes with no pain involved.

The diagnosis panel, consisting of medical specialists, reviews the ultrasound images and makes diagnoses. The examination results are sent by post, but explanations are given at the examination venues or by phone upon examinees' requests.

[Confirmatory Examination]
When a more detailed examination is found to be necessary as a result of the Primary Examination, the Confirmatory Examination is conducted for the relevant person. In the Confirmatory Examination, another ultrasound examination, plus blood and urine tests are conducted.
If a doctor considers it necessary as a result of these tests, fine-needle aspiration cytology of the thyroid may also be performed and interpreted.

An ultrasound examination is conducted with an examinee lying on his/her back. A doctor places an ultrasonic probe with jelly on its tip over the examinee’s thyroid (located around the base of the neck) and searches for cysts and nodules while moving the probe over the examinee's skin.

The examination ordinarily finishes in three to five minutes with no pain involved.

Definitive diagnoses from the Primary Examination are not made at the venues. In order to make comprehensive and objective judgments, ultrasound images are later reviewed by a panel of medical specialists. This is to ensure a consistently high level of diagnostic accuracy throughout the Fukushima Health Management Survey.

The sizes of nodules and cysts mentioned above are reference values for making diagnoses. If any nodules or cysts found in ultrasound images are suspected to be malignant, the case is designated as Grade B irrespective of the sizes of the nodules or cysts and the Confirmatory Examination is recommended.

In the Confirmatory Examination, a more accurate ultrasound examination, plus blood and urine tests, are conducted. If, as a result of these tests, a doctor considers it necessary, fine-needle aspiration cytology, an examination of a sample tissue taken from the person's thyroid, may also be conducted.

Included in this reference material on March 31, 2016
Updated on March 31, 2017
A nodule, which might also be called a lump, is an irregular growth of thyroid cells. Some nodules are malignant, but most are benign.

Thyroid cancer has been known as a type of cancer that is latent, that is, having no symptoms or health effects over a lifetime. Thus, detecting all cancers and forcing patients to receive treatment may be sometimes rather disadvantageous, so a detailed examination, such as cytological diagnosis, is not generally conducted for small nodules. In the Thyroid Examination conducted through the Fukushima Health Management Survey, the Confirmatory Examination is not generally performed for nodules of 5 mm or smaller; instead, follow-ups are to be made at the time of the next regularly scheduled ultrasound examination (Primary Examination).

In some cases, a person once diagnosed as Grade A1 is diagnosed as Grade A2 or Grade B in the next examination, or conversely, a person once diagnosed as Grade A2 is subsequently diagnosed as Grade A1.
A cyst, which resembles a bag filled with fluid, is generally benign, and is often found even in healthy people.

- Cysts often change in size or number.
- Many people have multiple cysts, and the estimated size of the largest one is told to each examinee in this examination.
- Cysts consisting only of fluid and containing no cells are not cancerous.
- Cysts found in the latest examination were all deemed to be benign.
- Cysts are seldom found in babies and infants but are rather found in primary and secondary school students.

Cysts identified in the Thyroid Examination being conducted in Fukushima Prefecture are considered benign, consisting only of fluid and containing no cells. They are often found even in healthy people, especially among primary and secondary school students. Therefore, repeated examinations often find cysts as children grow up.

Included in this reference material on March 31, 2013
Updated on March 31, 2017
Cysts with solid components are all judged as nodules.

- Cysts partially containing solid components (cells) are called cystic nodules or cysts with solid components.
- They are treated as equivalents to ordinary cysts in general medical examinations. Even when the Confirmatory Examination is conducted, they are deemed unlikely to cause problems and are placed under follow-up observations.

When the maximum size of a cyst with solid components (the length of the orange arrow) is 5.1 mm or larger, the examinee is diagnosed as Grade B.

Prepared based on the website of the Radiation Medical Science Center for the Fukushima Health Management Survey, Fukushima Medical University, "Q&A on the Thyroid Examination"

Some cysts contain nodules. In the Thyroid Examination conducted in the Fukushima Health Management Survey, those cysts with solid components (nodules) are all judged as nodules and diagnosis criteria for nodules are applied.

For example, a 10 mm-cyst with a 4 mm-nodule is judged as a nodule and diagnosis criteria for nodules are applied. As the size is larger than 5.1 mm, the examinee is diagnosed as Grade B and is advised to receive the Confirmatory Examination.

Items judged as fluid-only cysts are considered to be benign.

(Related to P.121, Vol. 2, "Thyroid Examination: Cysts")

Included in this reference material on March 31, 2016
Updated on March 31, 2017
The Thyroid Examination is conducted in collaboration between Fukushima Medical University and medical institutions in and outside Fukushima Prefecture. For more convenience to residents of the prefecture, efforts have been made to increase venues and opportunities with the aim of properly promoting the health of the people in Fukushima Prefecture for the long term.

Included in this reference material on March 31, 2015
Updated on March 31, 2017
The Thyroid Examination has been conducted sequentially, starting in areas where ambient dose rates were highest at the time of the accident at Tokyo Electric Power Company (TEPCO)’s Fukushima Daiichi NPS.

After the first Full-scale Screening, which was the second one after the Initial Screening, notices of the examination have been sent mostly in the same order so that the interval from the Initial Screening would not be prolonged. Since FY2016, the examination for those aged 20 or older has come to be conducted once every five years, but the examination plan is designed so that all targeted people will receive examinations regularly without more than a five-year gap between examinations through age 25.

Included in this reference material on March 31, 2015
Updated on December 1, 2017
These are the final results of the Initial Screening, which was the very first Thyroid Examination. Examinees diagnosed as Grade A in the Primary Examination accounted for 99.2% of the total, while those diagnosed as Grade B accounted for 0.8%. It became clear that most of those diagnosed as Grade A2 had cysts of 20 mm or smaller and that those diagnosed as Grade B had nodules of 5.1 mm or larger.

In the Confirmatory Examination, as a result of a more accurate ultrasound examination and other tests, 34%, or approximately one out of three who received the Confirmatory Examination, were diagnosed as being equivalent to Grade A and were recommended to receive the next periodic examination in the same manner as those diagnosed as Grade A in the Primary Examination. This is because those who were suspected to have any abnormalities were diagnosed as Grade B just to be safe in the Primary Examination, and such people include those eventually diagnosed as Grade A in the Confirmatory Examination as a result of comprehensive and objective judgments through a more detailed examination, etc.

Among the examinees receiving the Confirmatory Examination, 66% were shifted to ordinary medical care covered by health insurance and most of them have been advised to receive another thyroid examination six months to one year later, as determined by the responsible doctor, based on individual findings and circumstances.

Furthermore, 39.7% received fine-needle aspiration cytology, and out of 116 examinees whose tumors were diagnosed as malignant or suspicious for malignancy, 102 people had surgery. It is not that all patients whose tumors are diagnosed as malignant or suspicious for malignancy have surgery. Whether to have surgery or not is decided depending on the individuals’ situations on a case-by-case basis through consultations among doctors in charge, patients themselves, and their families.

Included in this reference material on March 31, 2016
Updated on December 1, 2017
When the Thyroid Examination commenced, many people were concerned about a relatively high percentage of examinees diagnosed as Grade A2. Therefore, in FY2012, the Ministry of the Environment (MOE) conducted the Thyroid Examination targeting approx. 4,300 children in Nagasaki, Yamanashi and Aomori Prefectures (3-prefecture examination) in the same manner as the examination conducted in Fukushima Prefecture.

The examination in Fukushima Prefecture covered children aged zero to 18, while the 3-prefecture examination excluded children aged under 3 and covered only those aged 3 to 18. As the cohort was much smaller in the 3-prefecture examination, a simple comparison cannot be made, but the results show that those diagnosed as Grade A2 were not greater in number among the children of Fukushima Prefecture. The figures above show that the percentage of those diagnosed as Grade A2 in Fukushima Prefecture was actually smaller by 9 points than in the three prefectures and, conversely, the percentage of those diagnosed as Grade A1 was larger by 9 points. The report of the 3-prefecture examination made the following observations: ”It is generally known that the detection rate of nodular lesions is lower in the group of examinees aged 3 to 5 than in the group of examinees aged 6 or older, and that females show higher detection rate than males. Therefore, there is the possibility that a detection rate tabulated based on simple descriptive statistical methods as in this case may be higher than the actual rate.”* The gaps in the percentages of those diagnosed as Grade A1 and Grade A2 between the examination in Fukushima Prefecture and the 3-prefecture examination are considered to be due to differences in the cohort sizes and examinees’ ages (the 3-prefecture examination excluded children aged under 3).

* Source: "Report on the Outcome of the FY2012 Survey on Detection Rates of Thyroid Abnormalities" (commissioned by MOE), The Japan Association of Breast and Thyroid Sonology (March 2013)
These are the interim results of the Full-scale Screening, which was the second round of the Thyroid Examination.

Examinees diagnosed as Grade A in the Primary Examination accounted for 99.2% of the total, while those diagnosed as Grade B accounted for 0.8%. Most of those diagnosed as Grade A2 had cysts of 20 mm or smaller and those diagnosed as Grade B had nodules of 5.1 mm or larger. This tendency was the same as that observed in the Initial Screening.

In the Confirmatory Examination, as a result of fine-needle aspiration cytology, 71 examinees were diagnosed that their tumors were malignant or suspicious for malignancy.

Included in this reference material on March 31, 2016
Updated on December 1, 2017
These graphs show the age distribution, as of March 11, 2011, of examinees who subsequently had thyroid lesions diagnosed as malignant or suspicious for malignancy by fine-needle aspiration cytology, and their ages at the time of the Confirmatory Examination. So far, the situation is that thyroid cancer is not found more frequently among young children (aged zero to 5), who are considered to have higher sensitivity to radiation, than among people in the other age brackets.

These are only interim results and will be updated later.

Included in this reference material on March 31, 2014
Updated on December 1, 2017
The Thyroid Examination, which had no precedent for childhood screening, revealed thyroid cancers that might have otherwise gone unnoticed.

<table>
<thead>
<tr>
<th>Percentage of examinees whose tumors were diagnosed as malignant or suspicious for malignancy as a result of fine-needle aspiration cytology (against the total examinees of the Primary Examination)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY2011</td>
</tr>
<tr>
<td>0.03%</td>
</tr>
</tbody>
</table>

Evaluation of thyroid cancers found in the Initial Screening, the Interim Report by the Prefectural Oversight Committee Meeting for Fukushima Health Management Survey (March 2016)

"Comprehensively considering that: exposure doses due to the accident at the Fukushima Daiichi NPS were generally lower than those caused by the Chernobyl accident; the period of time from the exposure to the detection of cancers is short (mostly from one to four years); cancers have not been detected in those aged 5 or younger at the time of the accident; and there is no significant regional difference in detection rates, it can be concluded that thyroid cancers found so far through the Thyroid Examination cannot be attributed to radiation discharged due to the accident.

However, the possibility of radiation effects may be small but cannot be completely denied at this point in time. Additionally, it is necessary to accumulate information in the long term for accurate evaluation of the effects. Therefore, the Thyroid Examination should be continued, while meticulously explaining the disadvantages of receiving the examination and obtaining the understanding of examinees."

The United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) reiterated in its 2015 White paper* that excessive thyroid cancer risks due to radiation exposure do not need to be taken into consideration.

*Developments since the 2013 UNSCEAR Report on the levels and effects of radiation exposure due to the nuclear accident following the great east-Japan earthquake and tsunami (A 2015 White Paper to guide the Scientific Committee’s future programme of work)

In order to ascertain radiation effects, it is necessary to monitor developments over a long term. Please receive the examination continuously from the viewpoint of managing your own health as well.

Thyroid cancers found so far through the Thyroid Examination being conducted in Fukushima Prefecture are considered to be unrelated to the radiation discharged due to the accident at Tokyo Electric Power Company (TEPCO)’s Fukushima Daiichi NPS.

This evaluation is based on a comprehensive judgment of the following facts:

(i) Exposure doses due to the accident at the Fukushima Daiichi NPS were generally lower compared with those caused by the Chernobyl accident.
(ii) The period of time from the exposure to the detection of cancers is short, mostly from one to four years.
(iii) Cancers have not been detected in those who were 5 years old or younger at the time of the accident.
(iv) Age distribution of patients significantly differs in Fukushima Prefecture and Chernobyl (p.132 of Vol. 1, "Comparison between the Chernobyl Accident and the Accident at Tokyo Electric Power Company (TEPCO)’s Fukushima Daiichi NPS (Ages at the Time of Radiation Exposure").
(v) There are no significant differences in detection rates among different regions.

However, it is necessary to monitor developments over a long term to ascertain radiation effects, so the Thyroid Examination program should continue.

Included in this reference material on March 31, 2015
Updated on March 31, 2017
"We will promote the health of the residents who were forced to evacuate."

Due to the Great East Japan Earthquake and the accident at Tokyo Electric Power Company (TEPCO)'s Fukushima Daiichi NPS, many of the residents of Fukushima Prefecture were forced to evacuate and face drastic changes in their daily lives. Accordingly, many may have also experienced significant changes in their diet, exercise, or other lifestyle factors or have had difficulty in receiving medical checkups, and are worried about their own health.

Fukushima Prefecture has been conducting health checkups for people who were residing in Evacuation Areas, such as Restricted Areas, designated by the national government as of 2011 ("covered areas"), considering it necessary to ascertain the overall health conditions of the residents, not limited to the health effects caused by their anxieties over radiation and prolonged refugee life, and to utilize the obtained data for the prevention and early detection and treatment of lifestyle-related diseases, thereby promoting and maintaining the good health of the residents.

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

The residents who were forced to evacuate from covered areas have been living as refugees away from their own homes for a prolonged period of time. Fukushima Prefecture has been conducting the Comprehensive Health Checkup for the purpose of monitoring whether they have any physical problems and utilizing the data for early treatment as necessary.

Included in this reference material on March 31, 2013
Updated on December 1, 2017
### Comprehensive Health Checkup: Outline (1/2)

#### [Check items]

<table>
<thead>
<tr>
<th>Age bracket</th>
<th>Check items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aged zero to 6</td>
<td>Body height and weight</td>
</tr>
<tr>
<td>(babies and preschoolers)</td>
<td>Blood counts (red blood cell count, hematocrit, hemoglobin, platelet count, white blood cell count)</td>
</tr>
<tr>
<td></td>
<td>[Only when requested]</td>
</tr>
<tr>
<td>Aged 7 to 15</td>
<td>Body height, weight, blood pressure, and blood counts (red blood cell count, hematocrit, hemoglobin, platelet count, white blood cell count, and differential white blood cell count)</td>
</tr>
<tr>
<td>(first to ninth grade students)</td>
<td>[Only when requested]</td>
</tr>
<tr>
<td></td>
<td>Blood biochemistry (AST, ALT, γ-GT, TG, HDL-C, LDL-C, HbA1c, blood sugar, serum creatinine, and uric acid)</td>
</tr>
<tr>
<td>Aged 16 or older</td>
<td>Body height, weight, abdominal girth, body mass index (BMI), blood pressure, and blood counts (red blood cell count, hematocrit, hemoglobin, platelet count, white blood cell count, and differential white blood cell count)</td>
</tr>
<tr>
<td></td>
<td>Urine test (uric protein, uric sugar, and uric blood)</td>
</tr>
<tr>
<td></td>
<td>Blood biochemistry (AST, ALT, γ-GT, TG, HDL-C, LDL-C, HbA1c, blood sugar, serum creatinine, eGFR, and uric acid)</td>
</tr>
<tr>
<td></td>
<td>* Items in red letters are additional items that are not ordinarily checked in the specified health checkups.</td>
</tr>
</tbody>
</table>

#### [Coverage]

Residents who were registered at any of the municipalities designated as Restricted Areas, Deliberate Evacuation Areas or Evacuation-Prepared Areas in Case of Emergency or at any of the areas containing Specific Spots Recommended for Evacuation as of 2011 (approx. 210,000 people) and residents who were found to require the Comprehensive Health Checkup as a result of the Basic Survey (= The entire areas of Tamura City, Minamisoma City, Kawamata Town, Hirono Town, Naraha Town, Tomioka Town, Kawauchi Village, Okuma Town, Futaba Town, Namie Town, Katsurao Village and Iitate Village, and parts of Date City)

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

Check items are those for ordinary health checkups plus blood counts, serum creatinine, urine occult blood, etc.

In the Specific Health Checkup targeting people aged 16 or older conducted by municipalities excluding Date City, items for ordinary health checkups plus those in red letters are checked.

The Comprehensive Health Checkup covers people who were residing in any of the municipalities designated as Restricted Areas, Deliberate Evacuation Areas or Evacuation-Prepared Areas in Case of Emergency or in any of the areas containing Specific Spots Recommended for Evacuation* at the time of the accident at Tokyo Electric Power Company (TEPCO)'s Fukushima Daiichi NPS.

* The entire areas of Tamura City, Minamisoma City, Kawamata Town, Hirono Town, Naraha Town, Tomioka Town, Kawauchi Village, Okuma Town, Futaba Town, Namie Town, Katsurao Village and Iitate Village, and parts of Date City

Included in this reference material on March 31, 2013
Updated on March 31, 2017
Every year, the Comprehensive Health Checkup is conducted at designated medical institutions individually for all children aged 15 or younger and people aged 16 or older who reside outside the prefecture. Residents aged 16 or older who reside within the prefecture can receive the Comprehensive Health Checkup by any of the following three methods:

1. Receive a Specific Health Checkup or a General Health Checkup conducted by a municipality, wherein the items specific to the Comprehensive Health Checkup are additionally checked
2. Receive a Group Health Checkup conducted by Fukushima Medical University
3. Individually receive the Comprehensive Health Checkup at any of the designated medical institutions in the prefecture

Aged 15 or younger

- Residents residing in the prefecture
  - People residing outside the prefecture
    - Receive a Child Health Checkup at a designated medical institution in the prefecture
    - Receive a Child Health Checkup at a designated medical institution outside the prefecture
    - Receive a Specific Health Checkup or a General Health Checkup conducted by a municipality, with additional check items
    - Receive a Group Health Checkup conducted by Fukushima Medical University
    - Receive the Comprehensive Health Checkup individually at a designated medical institution in the prefecture
    - Receive the Comprehensive Health Checkup individually at a designated medical institution outside the prefecture

Aged 16 or older

- Residents residing in the prefecture
  - People residing outside the prefecture
    - Receive a Specific Health Checkup or a General Health Checkup conducted by a municipality, with additional check items
    - Receive a Group Health Checkup conducted by Fukushima Medical University
    - Receive the Comprehensive Health Checkup individually at a designated medical institution in the prefecture
    - Receive the Comprehensive Health Checkup individually at a designated medical institution outside the prefecture

Children aged 15 or younger, whether residing in or outside Fukushima Prefecture, can receive the Comprehensive Health Checkup at any of the designated medical institutions with cooperating pediatricians. Examinees should return to the same medical institution respectively to receive explanations on the results directly from doctors. They can consult with doctors and receive answers or treatment on these occasions if they have any worries or if the health checkup results contain some worrisome points.

Residents aged 16 or older who reside in the prefecture can select one of three methods to receive a checkup: Receive a Specific Health Checkup or a General Health Checkup conducted by a municipality, with additional check items specific to the Comprehensive Health Checkup; Receive a Group Health Checkup conducted by Fukushima Medical University; or Receive the Comprehensive Health Checkup individually at a designated medical institution in the prefecture.

Included in this reference material on March 31, 2013
Updated on March 31, 2016
The Comprehensive Health Checkup conducted from FY2011 to FY2015 covered residents of Evacuation Areas designated as of FY2011 and residents who were found to require the Comprehensive Health Checkup as a result of the Basic Survey. The table above shows only the results for the examinees aged 40 to 64. On the other hand, the results for FY2010 are those of the checkup conducted in FY2010, targeting people covered by the national health insurance program aged 40 or older and senior citizens, by municipalities that were later designated as Evacuation Areas, etc. after the earthquake. As these checkups differ from the Comprehensive Health Checkup conducted from FY2011 to FY2015 in terms of the cohort and examinees' age brackets, the results for FY2010 as shown in the table are just for reference.

The condition of being overweight (BMI: 25 kg/m² or over) was found more among males than among females. The percentage of examinees who were overweight remained almost unchanged from FY2011 to FY2013 and showed a declining trend from FY2013 to FY2014, but increased again in FY2015 for both males and females.

The percentage of examinees with poor glycemic control (HbA1c: 7.0% or over) decreased in FY2015 from FY2011.

The percentage of examinees with liver function abnormality (ALT: 51 (U/L) or over), which is generally higher among males than among females, has shown no significant changes since FY2011.

The percentage of examinees with high blood pressure (systolic blood pressure: 140 mmHg or over) was higher among males than among females for all age brackets, but the percentage generally has shown a declining trend in FY2012 to FY2015 compared to the level in FY2011.

Included in this reference material on March 31, 2016
Updated on December 1, 2017
[Outline]

In order to promote the prevention and early detection and treatment of lifestyle-related diseases throughout a lifetime, Fukushima Prefecture now offers a health checkup for residents who have not been covered by the existing systems and have not received health examinations or checkups.

[Coverage]

Residents aged approximately 19 to 39 who are residing anywhere outside the Evacuation Areas, etc. and have no opportunity to receive health examinations or checkups under the existing systems (i.e., those covered by the national health insurance program and dependents of those covered by the social insurance program, etc., excluding students)

[Check items]

Body height, weight, BMI, blood pressure, urine test (uric protein and uric sugar), blood biochemistry (AST, ALT, γ-GT, TG, HDL-C, LDL-C, HbA1c, and fasting (or non-fasting) blood sugar)

This is the system newly established as part of the Fukushima Health Management Survey for the purpose of offering a health checkup to residents who have not been covered by the existing systems and have not received health examinations or checkups, thereby promoting and maintaining good health and the possibility of healthy longevity for residents of Fukushima Prefecture.

*1 Health examinations and checkups under the existing systems:
  ・ Health examinations based on the Industrial Safety and Health Act (periodic health examinations, etc.)
  ・ Health checkups for students based on Article 13 of the School Health and Safety Act
  ・ The Comprehensive Health Checkup conducted by Fukushima Prefecture, targeting residents of the Evacuation Areas, etc.(*2), under the framework of the Fukushima Health Management Survey (the Comprehensive Health Checkup with additional check items)

*2 Evacuation Areas, etc.:
The entire areas of Tamura City, Minamisoma City, Kawamata Town, Hirono Town, Naraha Town, Tomioka Town, Kawauchi Village, Okuma Town, Futaba Town, Namie Town, Katsurao Village and Iitate Village, and parts of Date City (the areas containing Specific Spots Recommended for Evacuation)

Included in this reference material on March 31, 2016
Updated on March 31, 2017
"We will promote the mental and physical health of residents of the Evacuation Areas, etc."

Fukushima Prefecture has been conducting the Mental Health and Lifestyle Survey with the aim of accurately ascertaining the mental and physical problems of residents who have been facing difficulties due to the Great East Japan Earthquake and the accident at Tokyo Electric Power Company (TEPCO)'s Fukushima Daiichi NPS in order to provide them with proper health, medical and welfare services, and also handing down to future generations accumulated knowledge on better mental care in an emergency or in the event of a natural disaster.

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

Many of the residents whose houses are located in municipalities designated as Evacuation Areas were forced to evacuate and live as refugees for a prolonged period of time. They have experienced drastic changes in their living environment and must have been forced to change their individual lifestyles as well. In order to carefully watch not only the physical disorders but also mental problems of these residents and offer them appropriate support and build a better system, Fukushima Prefecture has been conducting the Mental Health and Lifestyle Survey.

Included in this reference material on March 31, 2013
Updated on March 31, 2016
[Coverage]
Residents who were registered at any of the municipalities designated as Restricted Areas, Deliberate Evacuation Areas or Evacuation-Prepared Areas in Case of Emergency or at any of the areas containing Specific Spots Recommended for Evacuation as of 2011 (approx. 210,000 people) and residents who were found to require the Comprehensive Health Checkup as a result of the Basic Survey (= The entire areas of Tamura City, Minamisoma City, Kawamata Town, Hirono Town, Naraha Town, Tomioka Town, Kawauchi Village, Okuma Town, Futaba Town, Namie Town, Katsurao Village and Iitate Village, and parts of Date City)

[Method]
Prepare inquiry sheets by age bracket (self-reporting questionnaires or those to be filled in by guardians) and send them to the survey targets (responses are received by post or online)

[Major survey items]
• Present physical and mental status
• Lifestyle (diet, sleep, and smoking, drinking and exercise habits)
• Present living conditions (the public)

[Measures after receiving responses]
For respondents who are deemed to require support based on their responses, clinical psychotherapists, public health nurses, or clinical nurses, etc. of the Mental Health Support Team make a phone call to give advice and support concerning problems with their mental health and lifestyles.

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

As in the case of the Comprehensive Health Checkup, the Mental Health and Lifestyle Survey also covers residents who were registered, as of March 11, 2011, and as of April 1 of the relevant survey year, at any of the municipalities that were designated as Restricted Areas, Deliberate Evacuation Areas or Evacuation-Prepared Areas in Case of Emergency or at any of the areas containing Specific Spots Recommended for Evacuation* at the time of the accident at Tokyo Electric Power Company (TEPCO)'s Fukushima Daiichi NPS.

These residents are to respond to questions in an inquiry sheet concerning their mental and physical health conditions. Their responses are compiled into indicators to check their need for support.

Different inquiry sheets are prepared depending on the age brackets, with the aim of taking required measures more appropriately. Children are divided into four age brackets: those aged zero to 3; those aged 4 to 6; elementary school students; and junior high school students. People aged 16 or older are categorized as the general public.

In addition to questions concerning present mental and physical health conditions, the survey items include questions about changes in lifestyles, such as diet, sleep, drinking, smoking, and exercise habits, as respondents must have experienced drastic changes in their living environment.

Included in this reference material on March 31, 2013
Updated on December 1, 2017
### Mental Health and Lifestyle Survey: Outline (2/2)

Analysis results are individually sent to people who have submitted inquiry sheets. For respondents who are considered to require professional support as a result of analyzing their responses, clinical psychotherapists, public health nurses, or clinical nurses, etc. make a phone call to give advice and support concerning problems with their mental health and lifestyles. For people who did not enter their telephone numbers in inquiry sheets, contact is made in writing.

Remarks by people who have received support by phone include, "I am glad that I can confess what I cannot say to my family," or, "I am relieved to know that I can call this number to make consultations whenever I feel depressed."

Regarding those in need of continued support or professional medical care, relevant information is shared among municipalities, the Fukushima Center for Disaster Mental Health and registered doctors, on a case-by-case basis, to create a more positive support network.

Included in this reference material on March 31, 2013
Updated on December 28, 2017

<table>
<thead>
<tr>
<th>FY Year</th>
<th>Number of people who received support by phone</th>
<th>Number of people who received support in writing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Children</td>
<td>People aged 16 or older</td>
</tr>
<tr>
<td>FY2011</td>
<td>1,180</td>
<td>6,310</td>
</tr>
<tr>
<td>FY2012</td>
<td>623</td>
<td>5,991</td>
</tr>
<tr>
<td>FY2013</td>
<td>473</td>
<td>3,913</td>
</tr>
<tr>
<td>FY2014</td>
<td>327</td>
<td>3,053</td>
</tr>
<tr>
<td>FY2015</td>
<td>250</td>
<td>2,567</td>
</tr>
</tbody>
</table>

* For people who are deemed to require continued support, care is provided on an ongoing basis through collaboration among regional registered doctors, municipalities and the Fukushima Center for Disaster Mental Health.

* Survey results are sent individually from FY2014.

[Registered doctors] Psychiatrists and pediatricians, etc., who have received lectures concerning disaster mental health and radiation medical science: As of the end of December 2017, there are 130 registered doctors in 81 medical institutions.

* Preparing the materials for the 11th, 15th, 19th, 22nd, 26th and 27th Prefectural Oversight Committee Meetings for Fukushima Health Management Survey

Prepared based on the materials for the 11th, 15th, 19th, 22nd, 26th and 27th Prefectural Oversight Committee Meetings for Fukushima Health Management Survey
• Percentage of people who are considered to require support for their depressions and anxieties

Measurement scale: K6*

*Respondents reply to each question of a six-item questionnaire concerning their depression and anxieties with a score from zero to four points. When the total is 13 points or over, a mood disorder or anxiety disorder is suspected.

• Percentage of people who are considered to require support for their traumatic stresses due to the disaster

Measurement scale: PCL*

*Respondents reply to each question of a 17-item questionnaire concerning their frequently arising problems and need arising from their disaster experience (traumatic stress) with a score from zero to five. When the total is 44 points or over, PTSD is suspected.

*In order to ease psychological burdens associated with replying to the questionnaire, the FY2014 and FY2015 surveys did not include PCL-related questions.

*1: K6 = Scale to measure the levels of depression and anxieties
Respondents reply to each question of a six-item questionnaire concerning the frequencies with which they felt depressed or anxious during the past 30 days (such as "Have you felt extremely nervous?" or "Have you felt desperate and helpless?"). This survey targets people aged 16 or older to ascertain whether any mood or anxiety disorder poses a problem in their daily lives, based on their responses.

*2: PCL (Post-Traumatic Stress Disorder Checklist) = Scale to measure traumatic stresses
Respondents reply to each question of a 17-item questionnaire concerning how often they had problems and needs arising from their disaster experience (traumatic stress) during the past 30 days (such as "Repeatedly remembered disturbing memories, ideas, images (scenes) of the relevant stress experience" or "Repeatedly had disturbing dreams of the relevant stress experience"). Through this survey, individuals' levels of traumatic stress are ascertained.

Included in this reference material on March 31, 2015
Updated on December 1, 2017
Sleep is a significant factor that exerts influence on various chronic diseases such as high blood pressure or diabetes, as well as affecting people’s mental health.

It should be noted that approximately 60% of the respondents are somewhat unsatisfied with their sleep to some degree.

Included in this reference material on March 31, 2016
Updated on December 1, 2017
Not only those aged 16 or older, but also elementary school students and junior high school students have come to have more chances for exercises, showing an improving trend.

In particular, exercises are considered to exert a significant influence on the growth of elementary school students and junior high school students.

Included in this reference material on March 31, 2016
Updated on December 1, 2017
As an indicator to evaluate children’s mental health conditions, SDQ* is utilized.

In a prior study targeting the public in Japan who did not experience the nuclear disaster, people showing SDQ points over 16 accounted for 9.5% of the total. Compared with this, percentages of children showing SDQ points over 16 were higher for all groups except for girls aged 4 to 6 in the FY2015 survey, as was the case in the surveys in previous fiscal years.

In the FY2015 survey, percentages of high SDQ points decreased for all groups compared with the results of the FY2011 survey. However, the improvement slowed down and the percentages remained almost unchanged from those of the FY2012 survey.

Hours of sleep in the FY2015 survey were almost the same as those in the FY2012 survey and were approaching the level shown in the preceding study. Furthermore, the FY2015 survey shows a declining trend in percentages of children who seldom do exercise, but suggests poorer exercise habits compared with the results of a nationwide survey, although a direct comparison is difficult due to differences in survey content.

* SDQ (Strengths and Difficulties Questionnaire) = Scale to measure children’s mental health conditions

Respondents reply to each question of a 25-item questionnaire concerning children’s moods and behavior during the past six months (such as "Gives due consideration to other’s feelings" or "Is restless and cannot stay still for a long time"). This survey covers those aged 4 to 15 to judge whether they need professional support or not.
Pregnancy and Birth Survey: Purpose

"We will promote the health of pregnant women in Fukushima Prefecture."

Many pregnant women intending to give birth and raise children in Fukushima Prefecture have been forced to live as refugees due to the Great East Japan Earthquake and the accident at Tokyo Electric Power Company (TEPCO)'s Fukushima Daiichi NPS, and have stresses from changes in their lifestyles and worries concerning radiation.

Therefore, Fukushima Prefecture has been conducting the Pregnancy and Birth Survey with the aim of properly ascertaining those pregnant women's current status, mental and physical health conditions, as well as opinions and wishes in order to alleviate their worries, provide necessary care and ensure peace of mind and, to utilize the obtained data for improving obstetric and perinatal care in Fukushima Prefecture.

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

Worries, anxieties and stresses caused by the accident at TEPCO’s Fukushima Daiichi NPS have been obstacles for women who intend to give birth and raise children in Fukushima Prefecture.

In light of such circumstances, Fukushima Prefecture has been conducting the Pregnancy and Birth Survey in order to ascertain pregnant women’s mental and physical health conditions with the aim of providing care to those considered to be in need of support such as an opportunity to have consultations with midwives or public health nurses. At the same time, the survey also aims to obtain data to be utilized for improving obstetric and perinatal care in Fukushima Prefecture.

Included in this reference material on March 31, 2013
Updated on March 31, 2016
The Pregnancy and Birth Survey covers pregnant women who newly obtained a maternity handbook every fiscal year.

Not only those who obtained a maternity handbook in Fukushima Prefecture but also those who obtained a maternity handbook somewhere else but gave birth in the prefecture are covered.

For the former, inquiry sheets are sent based on information provided by each municipality in the prefecture. The latter may use inquiry sheets available at obstetric institutions in the prefecture or ask the Radiation Medical Science Center for the Fukushima Health Management Survey to send them inquiry sheets.

Survey targets are asked to fill in inquiry sheets and send them back. From the FY2016 survey, responses can also be submitted online.

Included in this reference material on March 31, 2013
Updated on December 1, 2017
[Survey procedures]

Survey targets

Main survey
Approximately 1 year after reporting pregnancy

Follow-up survey
Approximately 4 years after delivery

Major survey items
- Pregnant women’s mental health conditions
- Present living conditions and status of child rearing
- Developments concerning pregnancy and delivery
- Attitude toward the next pregnancy

Sending of inquiry sheets
Consultations by phone or mail

Sending of inquiry sheets for the follow-up survey
Consultations by phone or mail

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

Details of the responses are compiled by the Radiation Medical Science Center for the Fukushima Health Management Survey to detect people considered to be in need of support. * If there are any people who are considered to be in need of support, midwives, public health nurses, doctors or other specialized staff members offer consultations or other support to such people by mail or by other means.

* Respondents who replied that they tend to feel depressed and that they are not interested in things, or respondents who are considered to be in need of support based on the content of their free remarks (such as those who are in need of help, who are severely depressed, who need support for child rearing, who are worried about radiation doses, or who directly made requests or are requiring concrete answers)

Included in this reference material on March 31, 2013
Updated on December 1, 2017
<table>
<thead>
<tr>
<th>Fiscal year</th>
<th>Number of people who received support by phone</th>
<th>Percentage of those who received support among all respondents</th>
<th>Number of people who received support by phone</th>
<th>Percentage of those who received support among all respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY2011</td>
<td>1,401 people</td>
<td>15.0%</td>
<td>Survey following up the FY2011 survey</td>
<td>375 people</td>
</tr>
<tr>
<td>FY2012</td>
<td>1,104 people</td>
<td>15.4%</td>
<td>Survey following up the FY2011 survey</td>
<td>255 people</td>
</tr>
<tr>
<td>FY2013</td>
<td>1,101 people</td>
<td>15.2%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FY2014</td>
<td>830 people</td>
<td>11.6%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FY2015</td>
<td>913 people</td>
<td>13.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FY2016*</td>
<td>782 people</td>
<td>12.9%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Provisional values (as of April 30, 2017)

<table>
<thead>
<tr>
<th>Topics of the consultations by phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY2011</td>
</tr>
<tr>
<td>--------</td>
</tr>
<tr>
<td>1st</td>
</tr>
<tr>
<td>2nd</td>
</tr>
<tr>
<td>3rd</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Prepared based on the material for the 27th Prefectural Oversight Committee Meeting for Fukushima Health Management Survey

Immediately after the earthquake, the most frequent topic was worries over radiation and its effects, but the percentage of such consultations is declining over time. Since FY2012, consultations on mothers’ mental and physical health and matters concerning child rearing have increased and now rank high.

Regarding the survey following up the FY2012 survey, those who required support accounted for 12.7% of all respondents, showing a decrease from the percentage at the time of the survey following up on the FY2011 survey (14.7%). The most frequent topic was mothers’ mental and physical health (44.9%). Consultations concerning worries over radiation and its effects accounted for 13.3%, considerably lower than at the time of the survey following up on the FY2011 survey (25.6%).

Included in this reference material on March 31, 2013
Updated on December 1, 2017
Pregnancy and Birth Survey: What Has Become Clear (1/2)


[Percentages of premature births, low birth-weight babies, and congenital abnormalities or anomalies]

Percentages of premature births, low birth-weight babies, and congenital abnormalities or anomalies obtained through the Pregnancy and Birth Survey were almost the same as the general level and those obtained through nationwide surveys.

<table>
<thead>
<tr>
<th>FY Year</th>
<th>Percentage of premature births</th>
<th>Percentage of low birth-weight babies</th>
<th>Percentage of congenital abnormalities or anomalies</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Main survey</td>
<td>Nationwide survey</td>
<td>Main survey</td>
</tr>
<tr>
<td>FY2011</td>
<td>4.8</td>
<td>5.7</td>
<td>8.9</td>
</tr>
<tr>
<td>FY2012</td>
<td>5.7</td>
<td>5.7</td>
<td>9.6</td>
</tr>
<tr>
<td>FY2013</td>
<td>5.4</td>
<td>5.8</td>
<td>9.9</td>
</tr>
<tr>
<td>FY2014</td>
<td>5.4</td>
<td>5.7</td>
<td>10.1</td>
</tr>
<tr>
<td>FY2015</td>
<td>5.8</td>
<td>5.6</td>
<td>9.8</td>
</tr>
</tbody>
</table>

Nationwide surveys: Percentages based on the Vital Statistics

Premature births: Babies born at a gestational age from 22 weeks to less than 37 weeks
Low birth-weight babies: Babies born smaller than 2500g

Prepared based on the material for the 26th Prefectural Oversight Committee Meeting for Fukushima Health Management Survey

The number of babies born in Fukushima Prefecture decreased temporarily after the earthquake, but the number increased in FY2013 and FY2014 compared with FY2012. Radiation effects on newborn babies had been worried about, but percentages of premature births, low birth-weight babies, and congenital abnormalities or anomalies in Fukushima Prefecture after the earthquake were found to be almost the same as generally available data, including Vital Statistics collected nationally.

A report of a FY2013 Ministry of Health, Labour and Welfare (MHLW) Grant Research, "Research on the Incidence of Congenital Anomalies in Japan and Effect Factors (Including Effects of Radiation Exposure and Prenatal Diagnoses) through Monitoring Analysis," states that the incidence of congenital anomalies detected among 17,773 babies born at 36 maternity hospitals in Fukushima Prefecture after the earthquake shows similar outcomes to nationwide surveys, with no notably higher outlying events when compared with other prefectures.

Included in this reference material on March 31, 2015
Updated on December 1, 2017
For questions concerning pregnant women's depressive tendencies, respondents who replied that they tend to feel depressed and/or that they are not interested in things have been decreasing but such tendencies are still strong.

According to the “Healthy Parents and Children 21” (a national campaign to promote improvement of health standards of mothers and children), the percentage of postnatal depression evaluated using the Edinburgh Postnatal Depression Scale was 9.0% in 2013. On the other hand, that percentage using the same scale and calculated from the results of the FY2016 Pregnancy and Birth Survey (provisional values) was 11.2%, higher than the national average.

The FY2016 Pregnancy and Birth Survey (provisional values) also revealed that respondents considering another pregnancy accounted for 53.3%. Since the FY2012 survey, more than half of the respondents wish to have more children. For reference, according to the Fourteenth Japanese National Fertility Survey in 2010, respondents who are married for less than ten years and plan to have a child accounted for 58% (or 51% among those who already have any children).
Based on estimates by SPEEDI on March 23, 2011, the Local Nuclear Emergency Response Headquarters conducted the Childhood Thyroid Examination to ascertain health effects of radiation on children in response to a request from the Technical Advisory Organization in an Emergency of the Nuclear Safety Commission of Japan (dated March 23 and 25). The figure shows the results for 1,080 children for whom measurement was conducted properly, out of 1,149 survey targets. The figure excludes the results for 66 children for whom simplified measurement was not appropriate due to environmental doses at their measuring spots (proper evaluation based on simplified measurement was difficult due to high ambient dose rates) and for three children whose ages were unknown. However, for all children who received the examination, measured values were below 0.2 μSv/h, which is set as the standard screening level by the Nuclear Safety Commission of Japan.

Included in this reference material on March 31, 2013
Updated on March 31, 2017
A whole-body counter is a device to measure γ-rays emitted from the body. As γ-ray energy differs by radionuclide, if a specific amount of energy, for example, 1,461 keV, which is the γ-ray energy of radioactive potassium (K-40), is counted, this can be interpreted as γ-rays emitted from K-40 in the body. The γ-ray energy of Cs-137 is 662 keV.

Potassium is an essential element for a living organism and approximately 0.01% of it is radioactive. Radioactive potassium is mainly dissolved in cellular water and exists in muscles but not so much in fat cells that contain little water.

As radioactive cesium spreads all over the body, the internal dose of cesium is measured using a whole-body counter.
Targeting the residents of the Evacuation Areas and the areas where internal and external exposure doses are likely to be higher than in other areas based on the results of the environmental monitoring survey, etc. (Yamakiya District in Kawamata Town, Iitate Village and Namie Town), the internal exposure measurement using a whole-body counter commenced on June 27, 2011. The targeted areas were expanded sequentially, and measurements were conducted for a total of 328,354 people by November 30, 2017. For over 99.9% of them, committed effective doses due to Cs-134 and Cs-137 were below 1 mSv and even the maximum measured value was below 3 mSv. Measured values were all unlikely to cause any health effects.

### Results of the Internal Exposure Measurement Using a Whole-body Counter

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Less than 1 mSv</td>
<td>15,384 people</td>
<td>312,944 people</td>
<td>328,328 people</td>
</tr>
<tr>
<td>1 mSv</td>
<td>13 people</td>
<td>1 person</td>
<td>14 people</td>
</tr>
<tr>
<td>2 mSv</td>
<td>10 people</td>
<td>zero</td>
<td>10 people</td>
</tr>
<tr>
<td>3 mSv</td>
<td>2 people</td>
<td>zero</td>
<td>2 people</td>
</tr>
<tr>
<td>Total</td>
<td>15,409 people</td>
<td>312,945 people</td>
<td>328,354 people</td>
</tr>
</tbody>
</table>

*Committed effective dose: Assuming that until the end of January 2012, a person ingested radiation once on March 12, 2011, and, from February 2012 onward, a person orally ingested the equal amount of radiation every day from March 12, 2011, to the day preceding the measurement date, the person’s lifetime internal doses are calculated by summing up the doses for fifty years in the case of an adult and for the years elapsed until becoming 70 years old in the case of a child.

Prepared based on the website of Fukushima Prefecture, “Results of the Internal Exposure Measurement Using a Whole-body Counter”

Targeting the residents of the Evacuation Areas and the areas where internal and external exposure doses are likely to be higher than in other areas based on the results of the environmental monitoring survey, etc. (Yamakiya District in Kawamata Town, Iitate Village and Namie Town), the internal exposure measurement using a whole-body counter commenced on June 27, 2011. The targeted areas were expanded sequentially, and the measurements were conducted for a total of 328,354 people by November 30, 2017. For over 99.9% of them, committed effective doses due to Cs-134 and Cs-137 were below 1 mSv and even the maximum measured value was below 3 mSv. Measured values were all unlikely to cause any health effects.

Included in this reference material on March 31, 2013
Updated on December 31, 2017
Radioactive cesium is eliminated from the body over time. The internal exposure measurement using a whole-body counter being conducted at present examines the effects of radiation that is ingested orally on a daily basis. Measured values exceeding 1 mSv are considered to be mostly caused by radiation derived from wild plants or animals. Since March 2012, values exceeding 1 mSv have not been detected.


Q. What if the measurement using a whole-body counter detected any value exceeding the detection limit?
A. The relevant person may have eaten a lot of foods – not allowed in commercial markets – that contain radioactive cesium at high concentrations, e.g., wild mushrooms, wild plants, wild bird and animal meat (wild boars, bears, etc.).

Prepared based on the following:

As radioactive cesium is eliminated from the body over time, the radioactive cesium that people ingested immediately after the earthquake has mostly been eliminated. The internal exposure measurement using a whole-body counter being conducted at present examines the effects of radiation that is ingested orally on a daily basis. Measured values exceeding 1 mSv per year are considered to be mostly caused by radiation derived from wild plants and animals. As long as people eat only foods distributed through regulated commercial marketplaces, their annual internal doses will not exceed 1 mSv. If the annual internal dose exceeds 1 mSv, the relevant person may have eaten a lot of foods – not allowed in commercial markets – that contain radioactive cesium at high concentrations. In particular, cases have been reported where wild mushrooms are suspected to cause high internal doses.

Included in this reference material on March 31, 2013
Updated on December 31, 2017
Self-Protection against Internal Exposure

• **General** protection against radioactive cesium
  It is very effective to
  → Have knowledge on foods that contain a high level of radioactive cesium
  → Avoid eating the same food continuously
  → Try to eat a variety of foods produced in diverse areas.

• Current status in Fukushima
  → Continued ingestion of radiation is unlikely except from foods.
  → There is no significant difference whether one selects foods and water produced locally or selects those produced in other areas.

• Obtaining accurate information is extremely important.

In order to avoid further internal exposure, it is effective to have knowledge on foods that contain a high level of radioactive cesium, avoid eating same food continuously, and try to eat a variety of foods produced in diverse areas. Obtaining accurate information is extremely important.

Included in this reference material on March 31, 2013
Updated on March 31, 2016