

(This is provisional translation. Please refer to the original text written in Japanese.)

**Survey of Dietary Intake of Radionuclides (September to October 2012)
(Annual Radiation Dose from Radionuclides in Foods)**

The Ministry of Health, Labour and Welfare (MHLW) surveyed the dietary intake of radionuclides in more than ten areas across Japan in the September–October 2012 period and estimated the annual radiation dose (committed effective dose) from radionuclides derived from standard meals. The survey was conducted by commissioning the National Institute of Health Sciences.

The MHLW already carried out two surveys (targeting three areas in the September–November 2011 period and twelve areas in the February–March 2012 period).

3 areas: Miyagi Prefecture, Fukushima Prefecture (Nakadōri), Tokyo

12 areas: Hokkaido, Iwate Prefecture, Fukushima Prefecture (Hamadōri, Nakadōri, Aizu), Tochigi prefecture, Ibaraki Prefecture, Saitama Prefecture, Kanagawa Prefecture, Niigata Prefecture, Ōsaka Prefecture, Kōchi Prefecture

1. Survey protocol

Target areas (15): Hokkaido, Iwate Prefecture, Miyagi prefecture, Fukushima Prefecture (Hamadōri, Nakadōri, Aizu), Tochigi prefecture, Ibaraki Prefecture, Saitama Prefecture, Tokyo, Kanagawa Prefecture, Niigata Prefecture, Ōsaka Prefecture, Kōchi Prefecture, Nagasaki Prefecture

Target foods: Products that were distributed in the target areas between September and October 2012. For perishable foods, locally-grown products were chosen wherever possible, or the products produced in neighboring prefectures were purchased.

Measurement and estimation method: Estimation was based on the market basket samples (MB samples).*

- A) Average portions that were expected to be consumed were calculated for each product according to target areas, based on the 2008 National Health and Nutrition Survey by the MHLW.
- B) Collected products were roughly divided into 14 food groups (including cereal grains, fruits, fish/shellfish, processed foods, and drinking water) and they were served as MB samples as they were or after cooked.
- C) Radioactive cesium (Cs-134, Cs-137) and radioactive potassium (K-40: natural nuclide) in the MB samples were measured consecutively for 22 hours using a germanium semiconductor detector. The detection limit, which varied depending on samples, was about 0.1 Bq/kg as the sum of Cs-134 and Cs-137.
- D) Measured values were corrected for attenuation and background to estimate the radiation dose, mSv/year, from radionuclides using the committed effective dose coefficient (the factor used to convert from Bq (becquerel) to Sv (sievert)) based on the assumption that standard meals were eaten for a year. Measurements below the detection limit were calculated as a half of the limit.

Note: Market basket samples (MB samples)

The Market Basket Method is designed to prepare samples that are used to estimate the daily intake of various chemicals. Food products are divided into 14 groups by their compositional properties. Each group usually contains more than 10 different products, except the rice category and the drinking water category—"rice" and "drinking water" make independent categories respectively, separating from other soft drinks and other cereal grains. As a result, the MB samples contain in total more than 200 different types of products. Target foods to be collected are determined in terms of kind and amount for each group, purchased from retailers, then processed or cooked as they would be normally (boiled, fried, otherwise treated), and mixed uniformly.

2. Results

A) Annual radiation dose from radionuclides in foods (Table 1)

The estimated annual radiation doses from radioactive cesium in foods collected in the 15 areas in the September–October 2012 period were in the range of 0.0009–0.0057 mSv/year. They were below 0.6% of 1 mSv/year as the basis of setting of the current limits.

The annual radiation doses from radioactive potassium, which naturally occurs in foods, were in the range of 0.14–0.22 mSv/year. There were no significant

changes found when compared with conditions before the accident at Fukushima Daiichi Nuclear Power Plant.

B) Time-dependent changes in annual radiation doses (Figure 1)

The radiation doses from radioactive cesium were found to be decreasing over time. The estimated doses in the 15 areas in September–October 2012 period were lower than the previous estimates: 0.0024–0.019 mSv/year in the September–November 2011 period and 0.0009–0.0094 mSv/year in the February–March 2012 period.

The estimated doses in Fukushima Prefecture (Nakadōri Area) was 0.0038 mSv/year, down from 0.019 mSv/year in the September–November 2011 and from 0.0066 mSv/year in the February–March 2012 period (Shown in the dotted arrow).

There were no significant changes in radiation doses from radioactive potassium in all the target areas, when compared with the previous two surveys (0.18–0.21 mSv/year in the September–November 2011 period and 0.16–0.20 mSv/year in the February–March 2012 period).

3. Discussion

The survey showed that the annual radiation doses from radionuclides in foods were way below 1 mSv/year, which was used as basis of establishing the current limits.

In addition, it was found that the radiation doses from radioactive cesium have been decreasing over time.

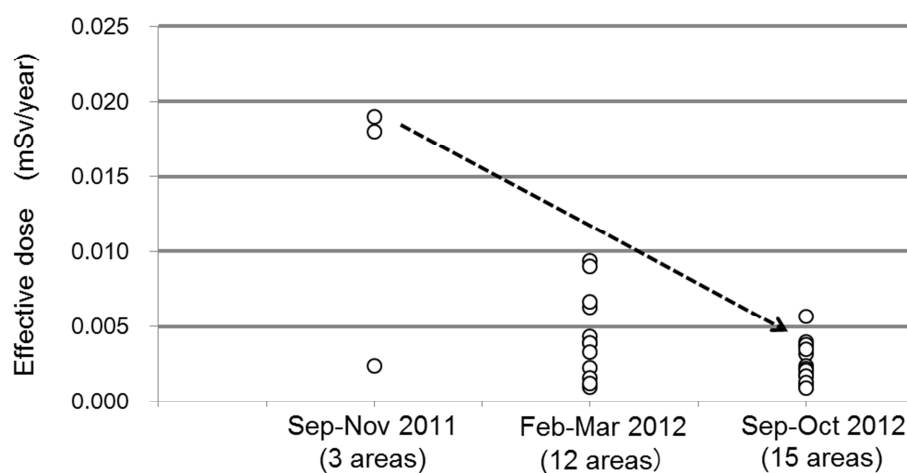
**Table 1. Annual Radiation Dose from Radionuclides in Foods
(Committed effective dose based on MB samples)**

Area (Prefecture)	Cs-134 & Cs-137 (mSv/year)	K-40 (mSv/year)
Hokkaidō	0.0010	0.152
Iwate	0.0040	0.218
Miyagi	0.0057	0.198
Fukushima (Hamadōri)	0.0018	0.198
Fukushima (Nakadōri)	0.0038	0.196

Fukushima (Aizu)	0.0038	0.203
Tochigi	0.0032	0.205
Ibaraki	0.0035	0.209
Saitama	0.0024	0.181
Tokyo	0.0022	0.188
Kanagawa	0.0021	0.174
Niigata	0.0017	0.189
Ōsaka	0.0012	0.154
Kōchi	0.0013	0.139
Nagasaki	0.0009	0.141

For conversion from Bq to Sv, the committed effective dose coefficient (Sv/Bq) for adult given in ICRP (International Commission on Radiological Protection) Publication 72 was used.

Figure 1. Time-dependent changes in annual radiation doses



The dotted line indicates the changes of the estimated doses in Fukushima Prefecture(Nakadōri Area), decreasing time-dependently from 0.019 mSv/year(Sep-Nov 2011), 0.0066 mSv/year(Feb-Mar 2012), and finally down to 0.0038 mSv/year(Sep-Oct 2012).