Radioactivity in Food
Source of Radioactivity

- Naturally occurring radioactivity
- Nuclear power plant accident
- Nuclear weapon
Nuclear Power Plant Accident

- Radioactivity may be released into the surrounding area

- Ways of dispersion
  - Direct exposure
  - Winds
  - Rainfall
Food Contamination

- Radioactive substances are deposited on plants, soil or water
- They might enter food chain
- Plants and animals are contaminated by
  - surface contamination
  - tissue contamination after inhalation
  - ingestion of contaminated nutrients
- People are at risk after ingestion of the contaminated food
Possible Health Effects

- **Acute health effect**
  - nausea, vomiting, extreme tiredness, hair loss, skin burns and diminished organ function

- **Chronic health effect**
  - increase the risk of cancer
Radionuclides: Iodine-131 (I-131), Caesium-134 (Cs-134) and Caesium-137 (Cs-137)

- I-131, Cs-134 & Cs-137 do not naturally occur in food
- They are artificially produced fission products
- Presence in food due to possible contamination from nuclear reactor operations or military nuclear operations
CFS currently adopts the standards laid down by the Codex Alimentarius Commission in the Guidelines Levels for Radionuclides in Foods Contaminated following a Nuclear or Radiological Emergency (Guideline Levels)

<table>
<thead>
<tr>
<th>Radionuclides</th>
<th>Codex Guideline Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iodine-131</td>
<td>100 Bq/kg</td>
</tr>
<tr>
<td>Caesium-134</td>
<td>1,000 Bq/kg</td>
</tr>
<tr>
<td>Caesium-137</td>
<td>1,000 Bq/kg</td>
</tr>
</tbody>
</table>
Reduce the Level of Radionuclides in Food

- By suitable food preparation
  - e.g. Washing, brushing, scrubbing or peeling
- By storing contaminated food for prolonged times to allow radioactive decay of short-lived radionuclides
- But cooking in general cannot reduce the level of radioactive contamination in food
Food Surveillance

Import Level

- Inspect imported food by hand-held survey meter for surface contamination
Food Surveillance

**Import, Wholesale and Retail Level**

- Take food samples
- Use Contamination Monitoring System (CMS) for examination
Food Surveillance

Import, Wholesale and Retail Level

- Food consignment failing hand-held survey meter or CMS screening will be held
- Samples will be sent to Government Laboratory for further quantitative analysis
Testing on Radiation Level in Imported Food from Japan
Background

- Earthquake at Japan on 11 March 2011
- The earthquake triggered powerful tsunami
- Fukushima Daiichi Nuclear Power Plant was damaged by the tsunami
- Radioactive substances have been released in the environment
- Certain foods in a number of prefectures had been contaminated
- At levels hazardous to human health
Food Surveillance

- Since 12 March 2011, the Centre for Food Safety (FCS) stepped up surveillance on radiation level of imported food from Japan

- Including vegetables, fruits, milk, meat, aquatic products, milk powder and other processed foods
**Food Surveillance**

**Result of Tested Samples**

As at 31 July 2013, more than 143,000 samples have been tested

<table>
<thead>
<tr>
<th>Iodine-131 level in 3 samples exceeded the standards in the Guideline Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 White Radish</td>
</tr>
<tr>
<td>260 Bq/kg</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>47 samples contained low levels of radioactivity but not exceeding the Guideline Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 Vegetables</td>
</tr>
</tbody>
</table>
Section 78B Order

- Director of Food and Environmental Hygiene make an order under Section 78B of Public Health and Municipal Services Ordinance, Cap 132
- Prohibits import and supply of the following food harvested, manufactured, processed or packed on or after 11 March 2011 from the five affected prefectures in Japan, namely Fukushima, Ibaraki, Tochigi, Gunma and Chiba -
  - All fruits, vegetables, milk milk beverage and dried milk
  - All chilled or frozen game, meat, poultry, poultry eggs, live, chilled or frozen aquatic products, unless accompanied by a certificate issued by the competent authority of Japan certifying the radiation levels do not exceed the standards laid down by the Guideline Levels

<table>
<thead>
<tr>
<th>Unsatisfactory samples</th>
<th>Iodine-131 level in 3 samples exceeding the Guideline Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 White Radish</td>
<td>260 Bq/kg</td>
</tr>
<tr>
<td>1 Turnip</td>
<td>800 Bq/kg</td>
</tr>
<tr>
<td>1 Spinach</td>
<td>1,000 Bq/kg</td>
</tr>
</tbody>
</table>
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Section 78B Order

PUBLIC SATISFYING AN APPLICATION FOR PROHIBITION OR RESTRICTION ON THE USE OR HANDLING OF FOODSTUFFS

Order No.: CH/01/2011

Under the Section 78B of the Public Health andMiscellaneous Services Ordinance (Chapter 123), the Minister of Health, Food and Environmental Hygiene hereby orders that:

1. A person named [Redacted] who commits an offence of the nature specified in paragraph 2 of the Order in relation to the food specified in Annex A, within a period of three years from the date of this Order shall be prohibited from engaging in the sale, handling, preparation for consumption and consumption of the food for a period of not less than one year.

2. A person named [Redacted] who commits an offence of the nature specified in paragraph 2 of the Order in relation to the food specified in Annex A, within a period of three years from the date of this Order shall be prohibited from engaging in the sale, handling, preparation for consumption and consumption of the food for a period of not less than three years.

3. A person named [Redacted] who commits an offence of the nature specified in paragraph 2 of the Order in relation to the food specified in Annex A, within a period of three years from the date of this Order shall be prohibited from engaging in the sale, handling, preparation for consumption and consumption of the food for a period of not less than five years.

Note:

A person named [Redacted] who commits an offence of the nature specified in paragraph 2 of the Order in relation to the food specified in Annex A, within a period of three years from the date of this Order shall be prohibited from engaging in the sale, handling, preparation for consumption and consumption of the food for a period of not less than three years.

Deemed Date: 24 March 2011

[Redacted]

Minister of Health, Food and Environmental Hygiene

[Redacted]

Deputy Minister of Health, Food and Environmental Hygiene
Section 78B Order

- The Order has taken effect on 24 March 2011 and is still in force
- Contravene a term of the Order commits an offence and is liable on conviction to a fine of HK$100,000 and to imprisonment for 12 months
Certificate on Radiation Levels

- CFS agreed to accept certificate on radiation levels issued by the competent authority of Japan for importation of
  - aquatic products with effect from 8 November 2011
  - meat, poultry and poultry eggs with effect from 21 March 2012

- Thereafter, importation of such food with valid certificate from the five affected prefectures is allowed
Sample of Certificate on Radiation Levels

Sample of Certificate on radiation levels in aquatic products

Sample of Certificate on radiation levels in game, meat, poultry and poultry eggs
Conclusion

- The risk of Fukushima nuclear plant event has not been cleared.
- Radioactive isotope Caesium-137 has a half-life of several ten years.
- The order on prohibition of importation of food from the affected 5 prefectures in Japan is required to be maintained.
- To ensure the safety of imported food from Japan, CFS continues to monitor closely the situation in Japan and the radiation testing results of food samples in order to formulate surveillance programme according to risk assessment.