The Impact of the Fukushima Accident in Date City

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Mayor of Date City

February 20, 2014

1. Date City - information

Population of Fukushima Prefecture: around 2 million

Population of Date City: around 65 thousand

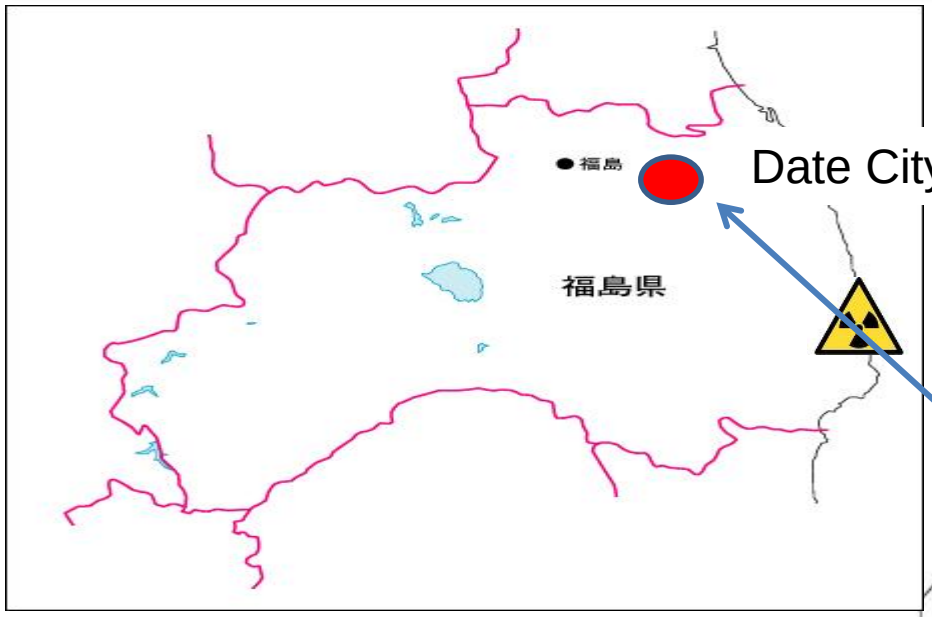
The number of households: around 22 thousand

Local Specialties: peaches, apples, dried persimmons(known as “Ampo Gaki”) and others

Damaged by the earthquake:

2 large scale primary schools collapsed
8,000 houses damaged
0 dead

Location of Date City



Date City

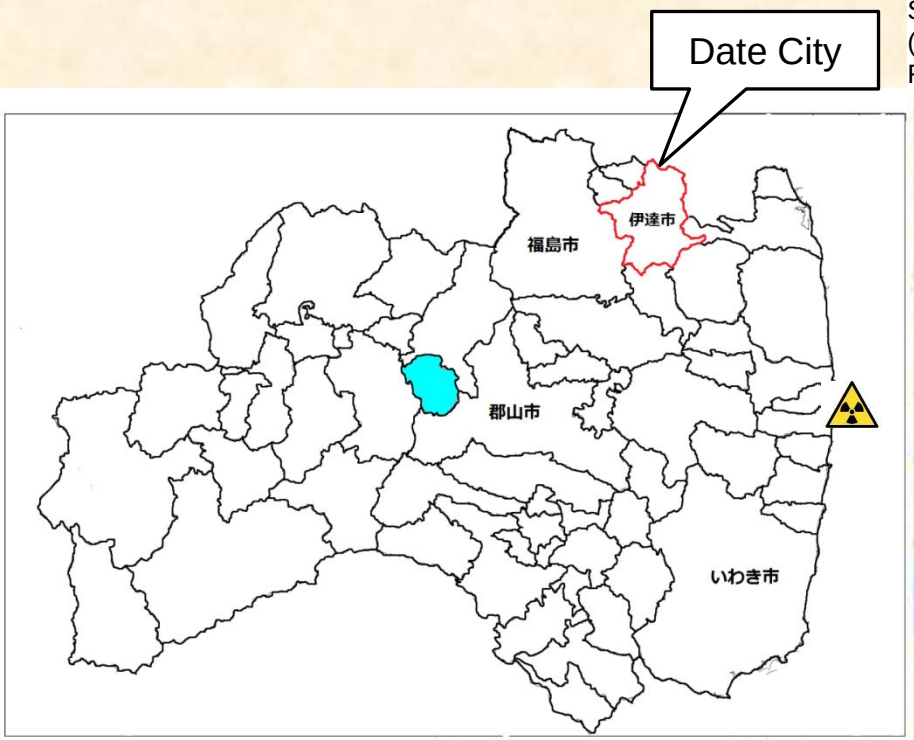
Fukushima

Tsunami

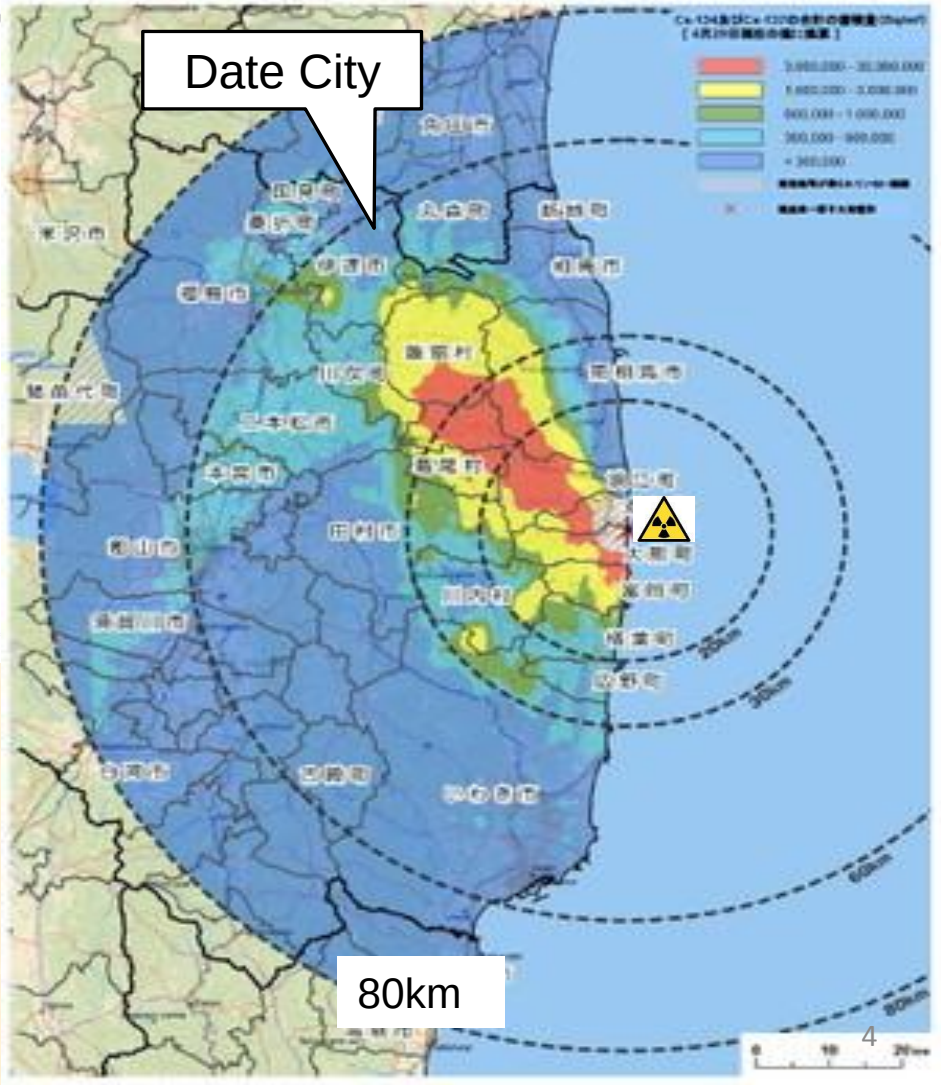
Pacific Ocean

Tokyo

Radioactive materials released to the environment due to Fukushima Daiichi NPS Accident



Result of monitoring from airplane by Ministry of Education, Culture, Sports, Science and Technology and the US DOE.
(Cumulative quantity of cesium 134 and 137 within 80km radius from Fukushima Daiichi NPS)



2. Background regarding our Initial Perceptions on the Radiation Disaster - 1

March 11, 2011 14:46 pm The Great East Japan Earthquake occurred

19:03 Announcement of "Radiation Emergency"

➡ Judged that no harmful effects would occur around Date City

21:23 Evacuation Instruction on the area within 3km radius from the NPS,

Waiting- Indoors Instruction on the area within 10km from the NPS

March 12 05:44 Expansion of the evacuation –instructed area (to the area within 10km)

15:36 Hydrogen explosion of the Unit 1 of the NPS

18:25 Expansion of the evacuation –instructed area (to the area within 20km)

March 14 11:01 Hydrogen explosion of the Unit 3 of the NPS (Radioactive plume moved to the direction of Date City)

March 15 6:00 Hydrogen explosion of the Unit 4 of the NPS

11:00 Expansion of the waiting- indoors –instructed area (to the area within 20-30km)

March 21 City report on disaster countermeasure (vol. 1)

➡ Described that "don't worry, because Date is located out of 30km area".

2. Background regarding our Initial Perceptions on the Radiation Disaster - 2

March 23 Disclosure of SPEEDI Data (became aware of radiological contamination possibility)

➡ Possibility of the impact in Date City?

March 30 First measurement of radiation dose in Date City

➡ the first detection (3μSv/h）

April 7 Became aware that radiation dose in school grounds were high

➡ Needs of countermeasures to protect children

April 22 Establishment of “Deliberate Evacuation Area” (ex. Iitate village)

April 27 Announcement by the Chief Cabinet Secretary: “There are areas in Date which are contaminated with the same level as Iitate”

➡ Needs of evacuation and decontamination in Date

June 4 Support measures on voluntary evacuation for 44 households in Date

June 30 Designation of 113 households in Oguni district, etc. as the “Specific Spots Recommended for Evacuation” by the national government

3. Background regarding Date City's Policy on Decontamination - 1

(1) Decision Making and Demonstration Tests for Decontamination

- "When can we return?": a question derived from the discussion on evacuation
  ➡ Needs of decontamination ➡ Demonstration tests
- Speed was important for protective countermeasures
  ➡ Measures were independently conducted in Date City ahead of national government's instruction
- National government can't take prompt action if it does not have established precedent. "To prepare completely even if the starting time would be delayed" is a policy.
- Announcement of the standards for outdoor activities as 3.8 μSv/h (20 mSv/y) by the Ministry of Education, Culture, Sports, Science and Technology on April 18, 2011.
  ➡ Needs of decontamination to reduce the radiation exposure on the school grounds
- Demonstration tests to remove surface soil on April 21, and 27, 2011
  ➡ Cesium seemed to exist in the top soil within 5 cm depth

3. Background regarding Date City's Policy on Decontamination - 2

- Decontamination work on the school grounds in Oguni and Tominari Primary Schools areas where radiation dose were relatively high at the end of April, 2011

  ⇨ Positive effects were recognized.

  Storage of removed soils? - - -> stored on school grounds

- Appealed for the needs of decontamination at the Committee on Education, Culture, Sports, Science and Technology of the House of Representatives in the National Diet on May 18, 2011
- Started an independent decontamination work on school grounds of all the primary and junior high schools/kindergartens from June, 2011

  - - -> removed soils were stored under the grounds (temporary storage)
- Conducted decontamination tests on the swimming pools of schools in July. Parents of students participated in the project under the instruction by Dr. Shunichi Tanaka(current Chairman of Nuclear Regulation Authority)

  ⇨ Children were able to swim again. ⇨ Recovery of the trust on the experts
- Conducted decontamination tests on the 3 houses in a relatively high contamination area in July
- Installed the first temporary storage site in October (with the consent of the local community) ⇨ Based on the premise to transport soils to the Interim Storage Facility in future

Removal of Surface Soil at School Yards

April 29, 2011

Tominari Kindergarten

3.96 μSv/h
↓
0.91 μSv/h
（50cm height）

Oguni Primary School

5.35 μSv/h
↓
0.88 μSv/h
（50cm height）

Intensive Decontamination at Tominari Primary School -1

July, 2011

Surface : 2～3 μSv/h → 0.7～1μSv/h

Decontamination of paved area by shot blasting

Surface : 3～5 μSv/h → 1～1.5μSv/h

Decontamination by volunteers from around the country

Shot blasting machine

Vacuum suction machine

Intensive Decontamination at Tominari Primary School - 2

July, 2011

Decontamination of swimming pool by parents

Decontamination waste from school yard

3. Background regarding Date City's Policy on Decontamination - 3

(2) Decontamination in the housing area

The decontamination implementation plan was established in October 2011 in which three areas of A, B and C were designated based on the radiation levels in order to implement decontamination works with rapidity.

- A. area（over 20mSv/y）: 2,555 households (including those in the specific spots recommended for evacuation), \ 14,900 million for expenses (\ 6.5 million per household), started in May 2012 and completed in August 2013
- B. area (20～5mSv/y) : 3,700 households, \ 9,000 million for expenses (\ 2.5 million per household), started in October 2012 and planned to be completed in March 2014
- C. area (under 5 mSv/y) : 16,000 households (70% at the City), \ 1,000 million for expenses (\ 60,000 per household) → Being implemented decontamination work. Main method is to remove soils of so called hot-spots (radiation levels are over 3 μSv/h at 1cm height) in a limited way by the Decontamination Promotion Center, etc., and planned to be completed in March 2014

Decontamination Promotion Center

Removed Soil and etc. from Decontamination Work in Temporary Storage Site

Temporary Storage Site in Yanagawa Branch Office

Temporary Storage Site in mountainous region

Decontamination Work at Hot Spots

Surface decontamination at a garden

Partial decontamination under a drainage

3. Background regarding Date City's Policy on Decontamination - 4

(3) Safety and Security Issues after decontamination

- Security standards for citizens seem to be whether intensive decontamination work is implemented or not, regardless of radiation levels

  ➡ For citizens, "Security" is NOT equal to "Safety"

  Voice of mothers and grandparents: "Not to be able to feel safe unless intensive decontamination is conducted."

  Such voice asking for more decontamination comes especially from low-contaminated area (= C area).

- Intensive decontamination work has been implemented in relatively high-contaminated areas. → Citizens in the areas consequently tend to be satisfied for the results even if the air dose rate was reduced to around 0.8μSv/h.

- Although individual dose of 1 mSv/y is a long-term goal, that value is regarded as "should be achieved" for citizens.

- Citizens seem to take 0.23 μSv/h of air dose rate as equivalent to1 mSv/y , that is why they ask for the reduction less than 0.23 μSv/h by decontamination.

4. Countermeasures to protect Children

- Parents' Concerns: "The potential impact of radiation on children is more serious than that on the adult !?"

- From around April 2011, children began to go to schools, wearing long-sleeved shirt, caps/ hats, and masks. Windows were not opened and the parents did not allow their children to play outside.

- Mayer's decision on countermeasures and budget of \ 1,000 million for children on May 26, 2011. (installation of air conditioners in class rooms, distribution of glass budges, and decontamination on school grounds)

  → Recovery of the trust on the City administration

- Operation of school buses as a protective measure for students instead of walking to school to avoid the risk of exposing

- Release from anxiety regarding radiation

  ⇨ Summer school in a remote area (as a total of 2,050 students）

- Establishment of indoor play facilities

5. Health Management Measures regarding External Exposure

- Distribution and collection of glass budges

  From June 2011: Citizens of 15,000 (those live in the A area, pregnant women and children)

  From July 2012 to June 2013: All citizens of Date City (65,000)

  From July 2013: All the pregnant women and children(age of 0-15), all the citizens living in the A & B area(above age of 16), selected people in the C area, and those who were interested in the C area (the total of 27,000 people)

- Development and distribution of a dose map of the City based on the monitoring every four months in a 1 km measurement mesh

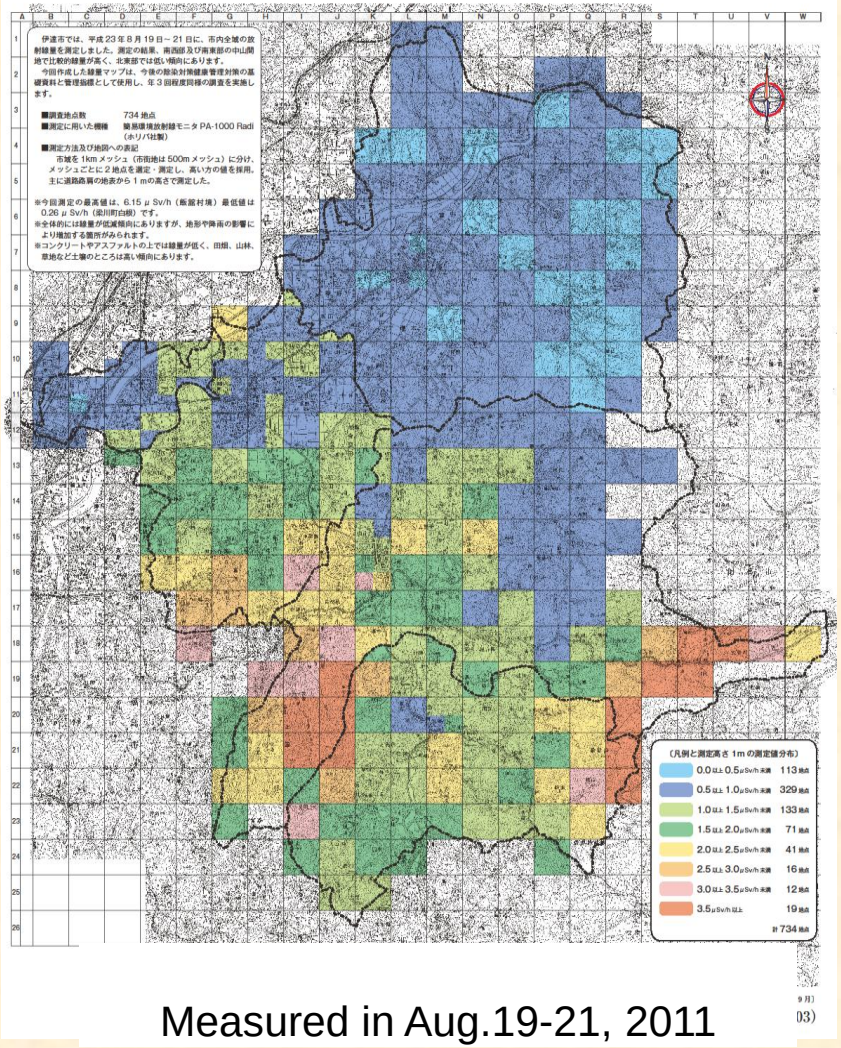
  → Reduction of air dose rate, because of the natural decay of cesium and decontamination, has been clearly demonstrated.

- Measurement and display of the air dose rate at public facilities

  → To lead citizens to the interest in the reduction of air dose rate in the living areas

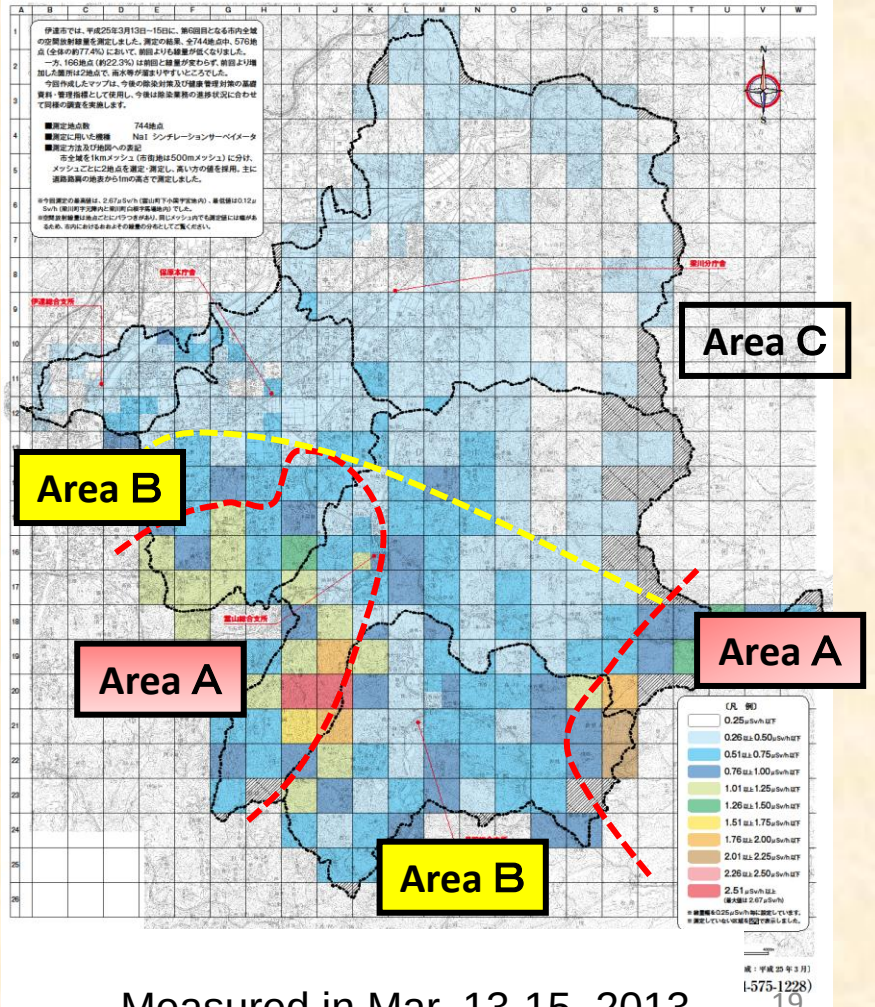
Dose Map in Date City

August, 2011



Measured in Aug.19-21, 2011

March, 2013



Measured in Mar. 13-15, 2013

6. Health Management Measures regarding Internal Exposure

- WBC – completed with all the residents in the city by March, 2013
  — in operation with the second check at present
- Food Inspection – Machines installed at 16 locations in the city in order for the citizens to check daily food
- The result of above is publicly announced on city reports to raise citizens' attention

Whole Body Counter (WBC)

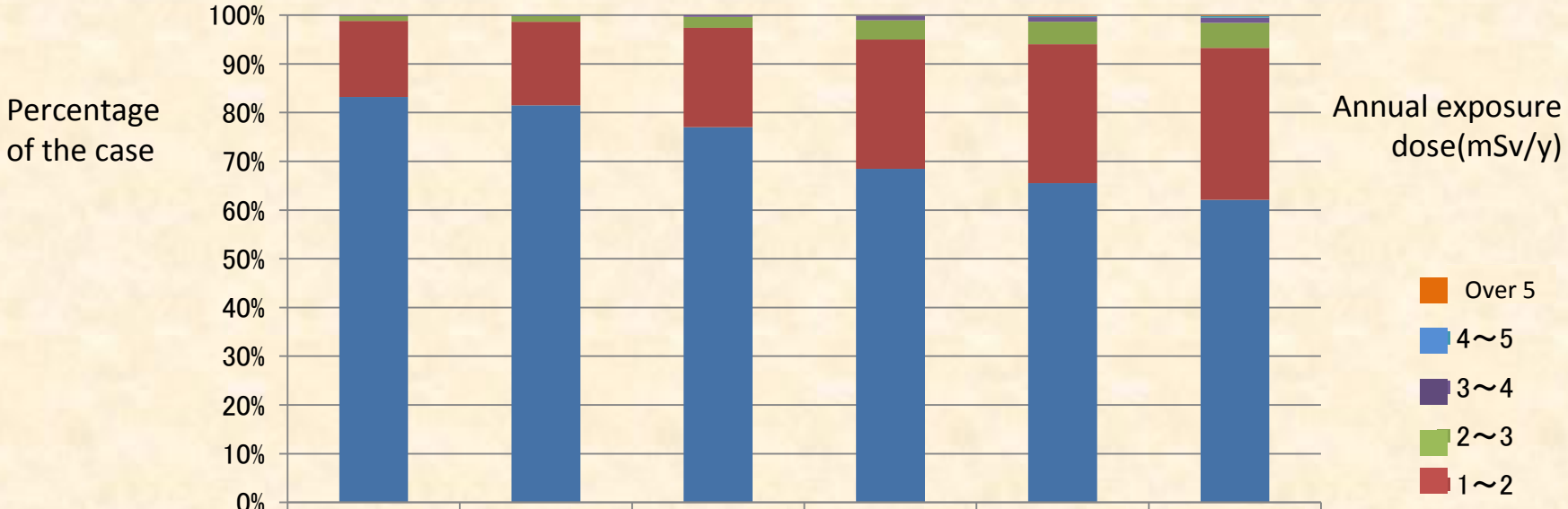
Food inspecting machine

7. Analytic Result Data with Glass Budges

- Implemented exposure measurement during a year from Jul., 2012 to Jun., 2013 of whole citizens of 65,000
- Obtained the data of 52,783 citizens who had been examined for the period on continuous basis
- Date City considers that the realistic target will be individual dose of 5mSv/y
- Exposure measurement indicated that 66% of the above citizens is less than 1mSv/y, 94% is less than 2mSv/y and 76 people are over 5mSv/y
- the actual radiation exposure dose is half of the estimated figure of radiation exposure dose derived from measured air dose rate using calculation method, indicated by the national government

  It became clear that even if there is a spot with double the figure of 0.23μSv/h, the actual radiation exposure dose does not exceed 1mSv/y
- Countermeasure for children was a success – There is not a single person who exceeded 4mSv/y among the children aged under 15

Chart 1: Annual Exposure Dose by Age



Age	0–6歳	7–12歳	13–15歳	16–20歳	21–60歳	Over 61
5以上	0.00%	0.00%	0.00%	0.04%	0.17%	0.17%
4～5	0.00%	0.04%	0.00%	0.08%	0.23%	0.35%
3～4	0.14%	0.11%	0.36%	0.93%	0.91%	1.06%
2～3	1.02%	1.20%	2.23%	3.93%	4.63%	5.09%
1～2	15.63%	17.13%	20.40%	26.52%	28.56%	31.20%
1未満	83.21%	81.53%	77.01%	68.49%	65.49%	62.12%

Over 5

Under 1

Chart 2: Correlation between Air Dose Rate and Annual Additional Exposure Dose

< at all ages >

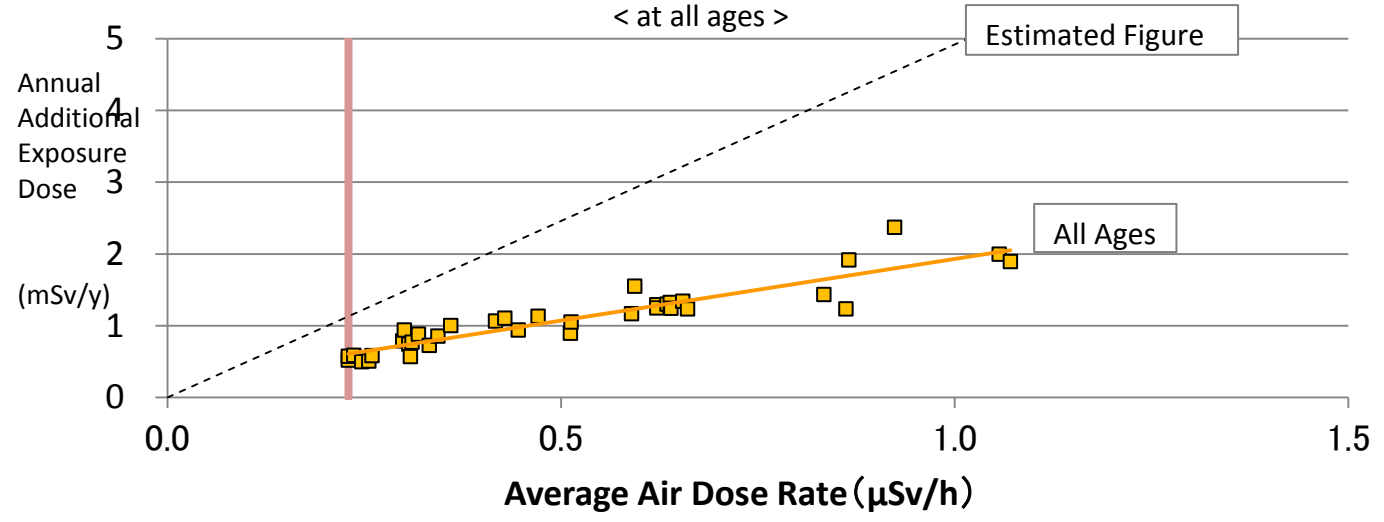
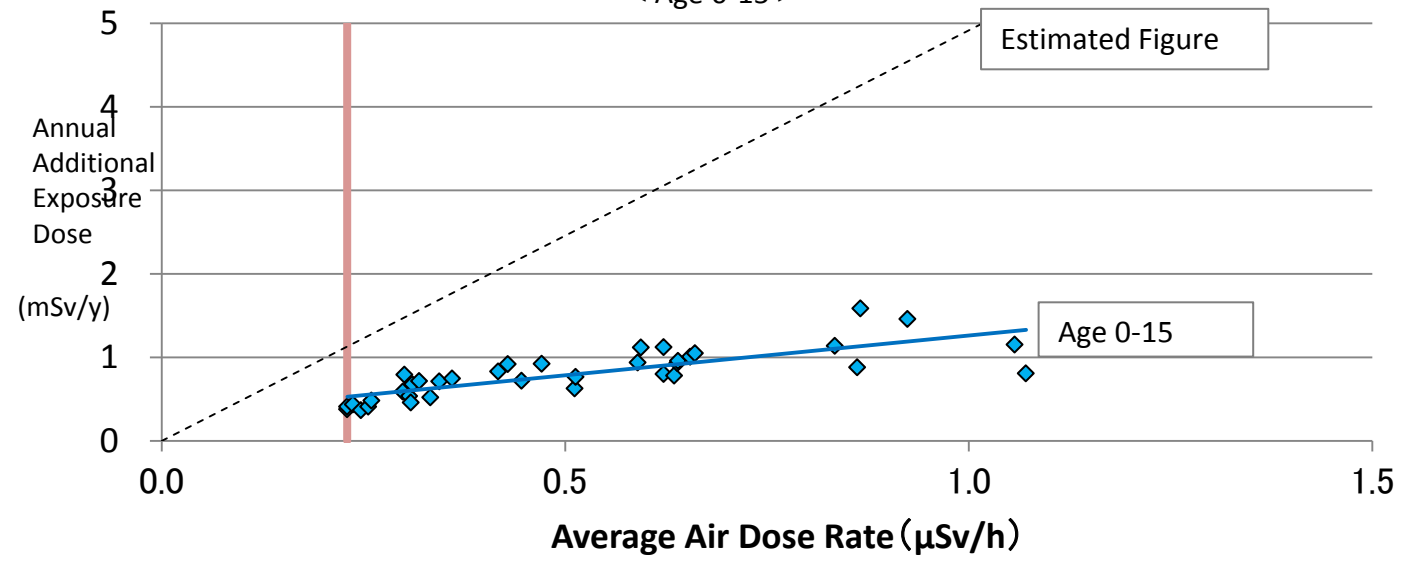


Chart 3: Correlation between Air Dose Rate and Annual additional exposure dose

< Age 0-15 >



8. Closing Comment

- We would like to express our deepest gratitude to IAEA for helping us with all the knowledge and supports

- IAEA's further advices for the health management standard of radioactivity(e.g. to recommend near-term safety standard as individual dose of 5mSv/y etc.) would be much appreciated