Great East Japan Disaster 2011.3.11

We would like to offer silent prayer in sorrow for the victims of the disaster.

A deep sense of gratitude for

Great Support from All over the World

Japan deeply appreciates for the assistance offered from **156** countries and regions and **41** international organizations

Rescue teams were sent from **28** countries, regions and international organizations

US Navy/US Pacific Command (Operation Tomodachi)

(As of May 9th,2011)

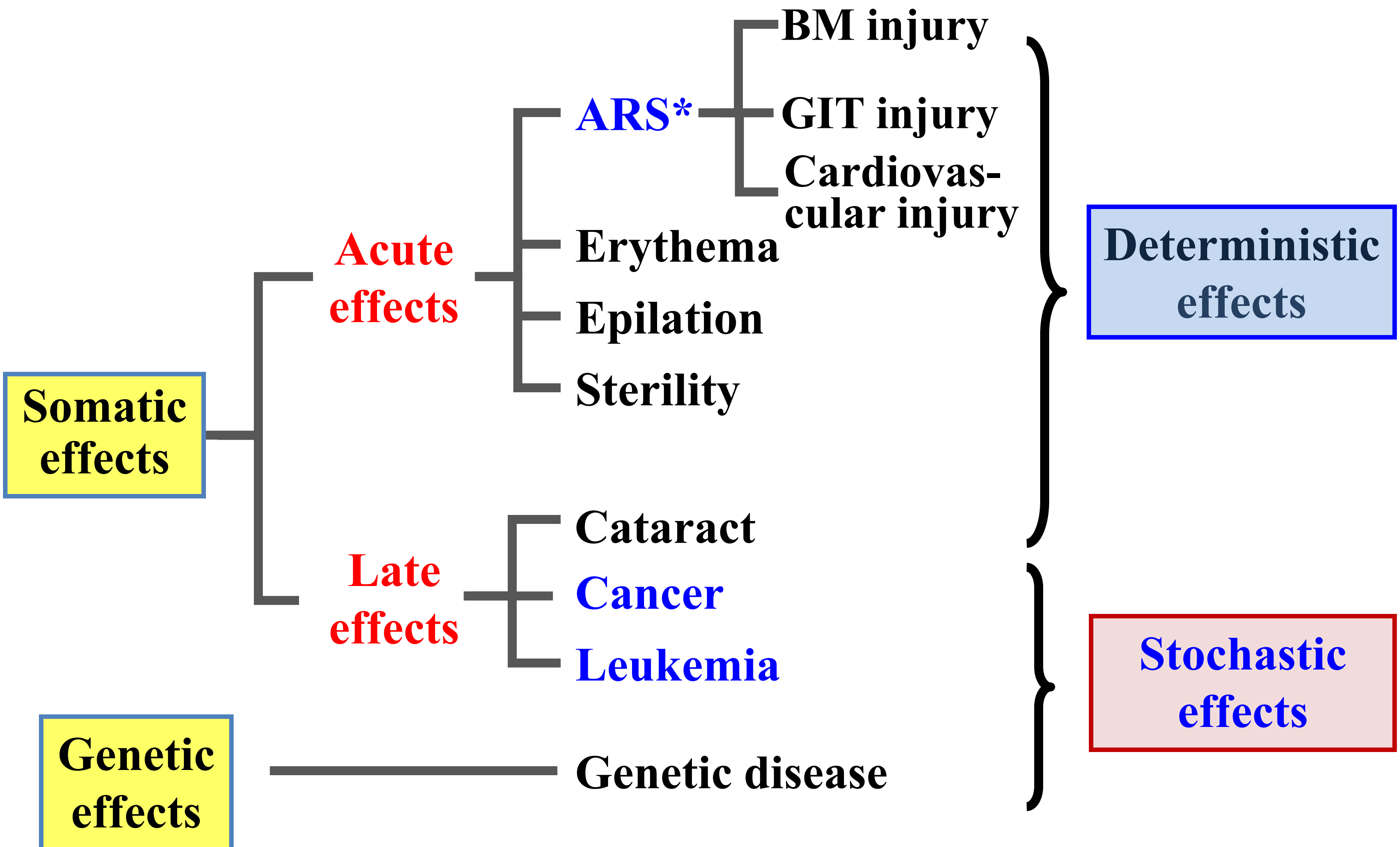
Fukushima Nuclear Power Plant Accident and Comprehensive Health Risk Management

ふくしまから
はじめよう。
Future From Fukushima.

To aid a recovery on behalf of the Fukushima Medical University group

Shunichi Yamashita, MD, PhD, *Nagasaki University*
Radiation Medical Science Center for the Fukushima Health Management Survey, *Fukushima Medical University*

Human Health Effects of Radiation Exposure

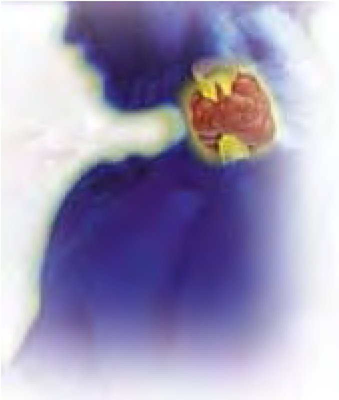


* acute radiation syndrome

Radiation Dose Response (Stochastic effects)

Background

- **Limitation of low-dose epidemiological studies related to Atomic bomb survivors data and even from Chernobyl because of various type of heterogeneity in population and non-specificity of radiogenic cancer**
- **Limitation of science for contribution to risk assessment for the uncertainty because of no direct evidence of radiation-induced cancers**



Radiation epidemiology

Radiation exposure of the thyroid at young age is the most clearly defined environmental factor associated with thyroid cancer

External radiation exposure

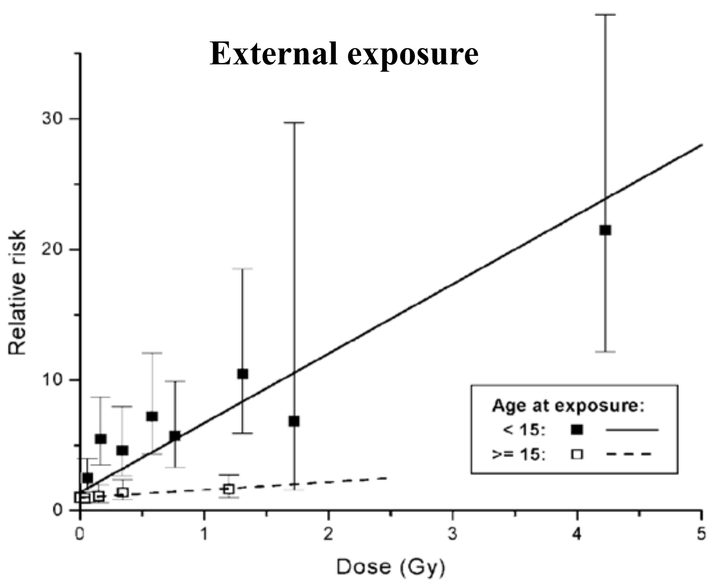
- A-bomb survivors
- Marshall Islanders (fall-out)
- Children exposed to EBT

ERR/Gy~7.7 [1.1 – 32]

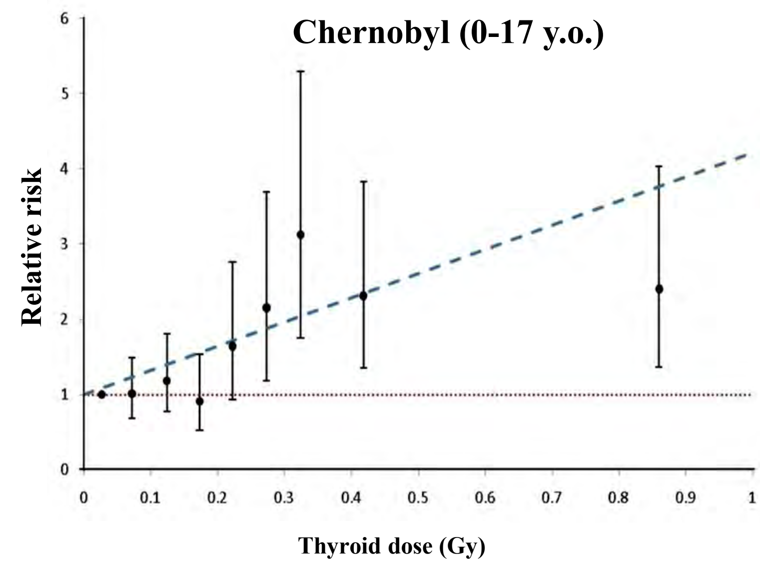
Internal radiation exposure

- Therapeutic radioiodine
- Hanford (fall-out)
- Chernobyl

OR at 1 Gy~5.5 – 8.4 [ERR/Gy 1.9 – 19]



E.Ron 2002

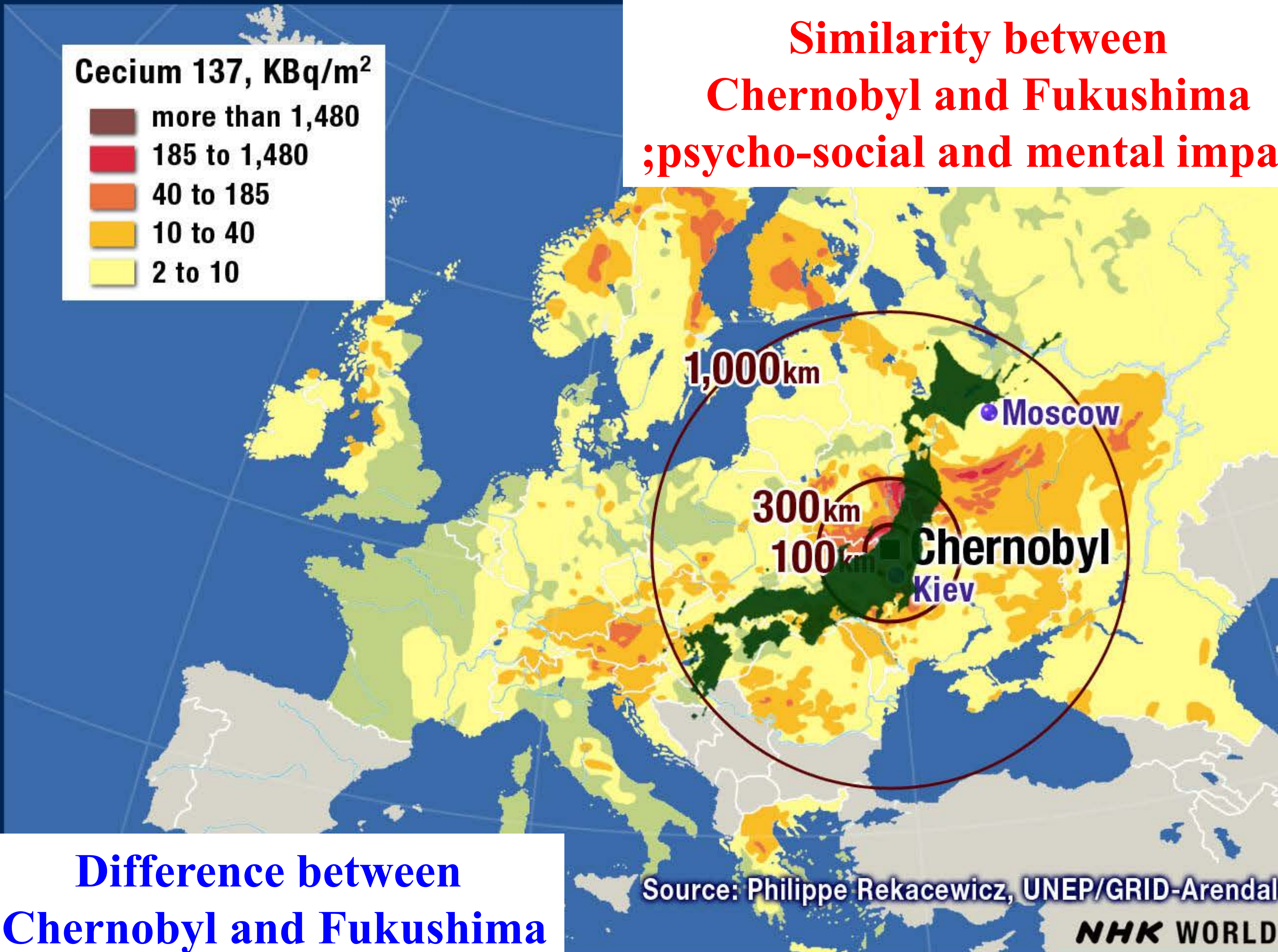


V.Ivanov 2010

Lesson Learned from Chernobyl to Fukushima

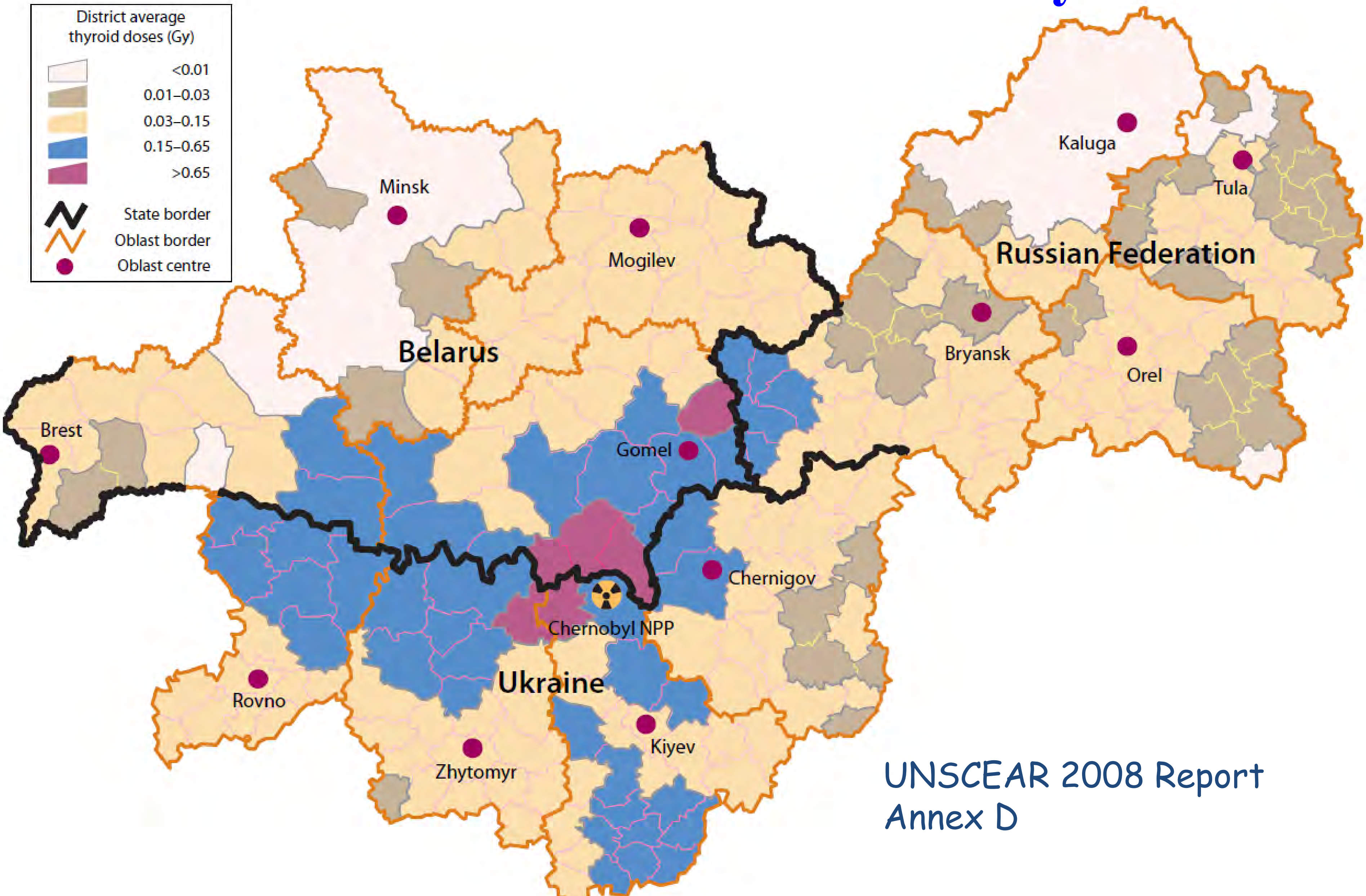
- **Information Blockade during the Cold War**
- **Man-made Disaster**
- **Not well done for *public protection against short-lived radioactive iodines and internal exposure subsequently by radioactive cesiums***
- **Breakdown of the USSR**
- **Psycho-social and Mental Consequences**

Similarity between Chernobyl and Fukushima ;psycho-social and mental impact



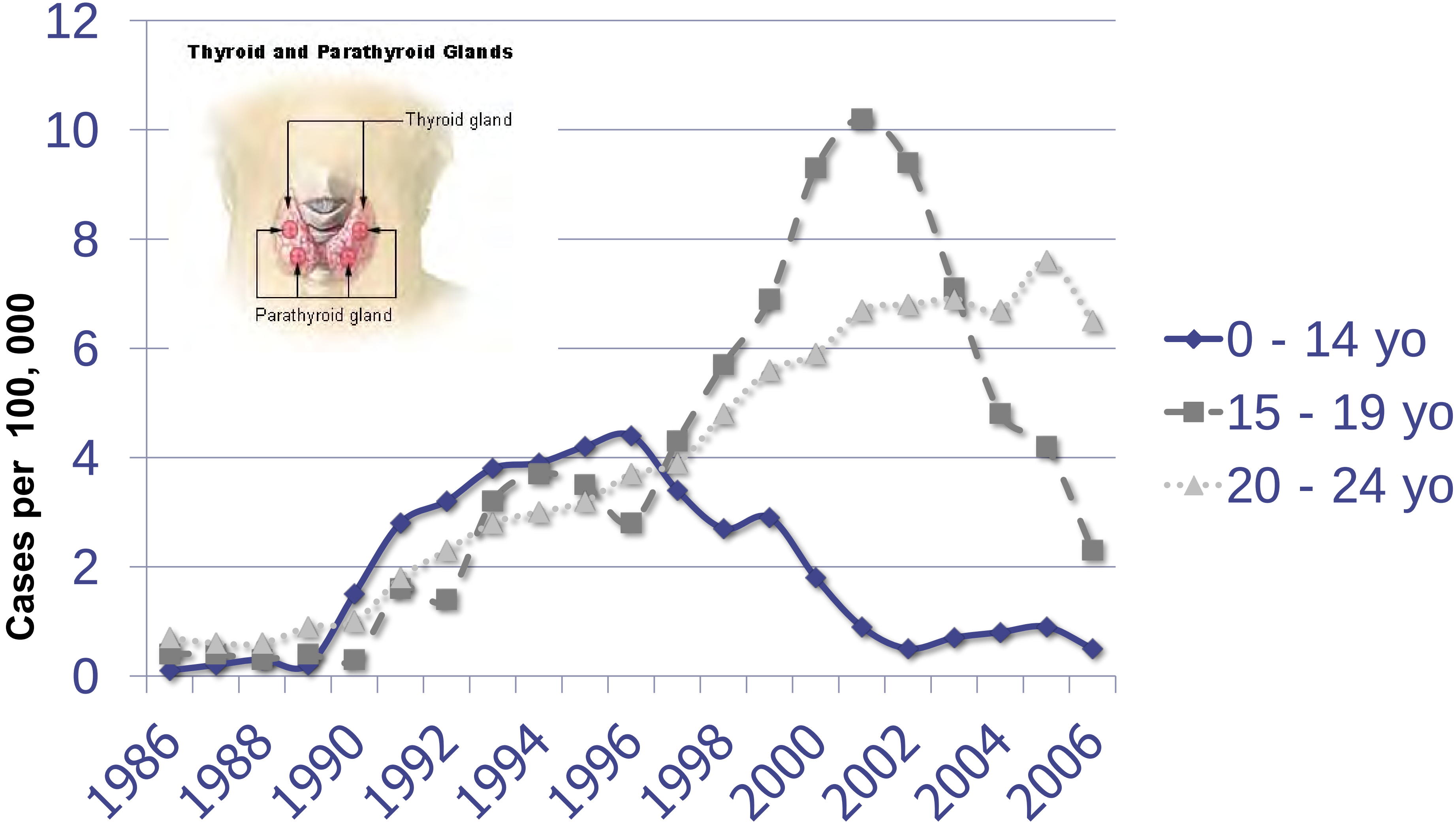
Difference between Chernobyl and Fukushima

Estimated average thyroid doses to children and adolescents around Chernobyl



UNSCEAR 2008 Report
Annex D

Increase of Childhood Thyroid Cancers in Belarus



(Demidchik Yu, Saenko V, Yamashita S. ABEM 2007 51:748-62)

Frequency of Childhood Thyroid Cancer in the Gomel region of Belarus (1998-2000)

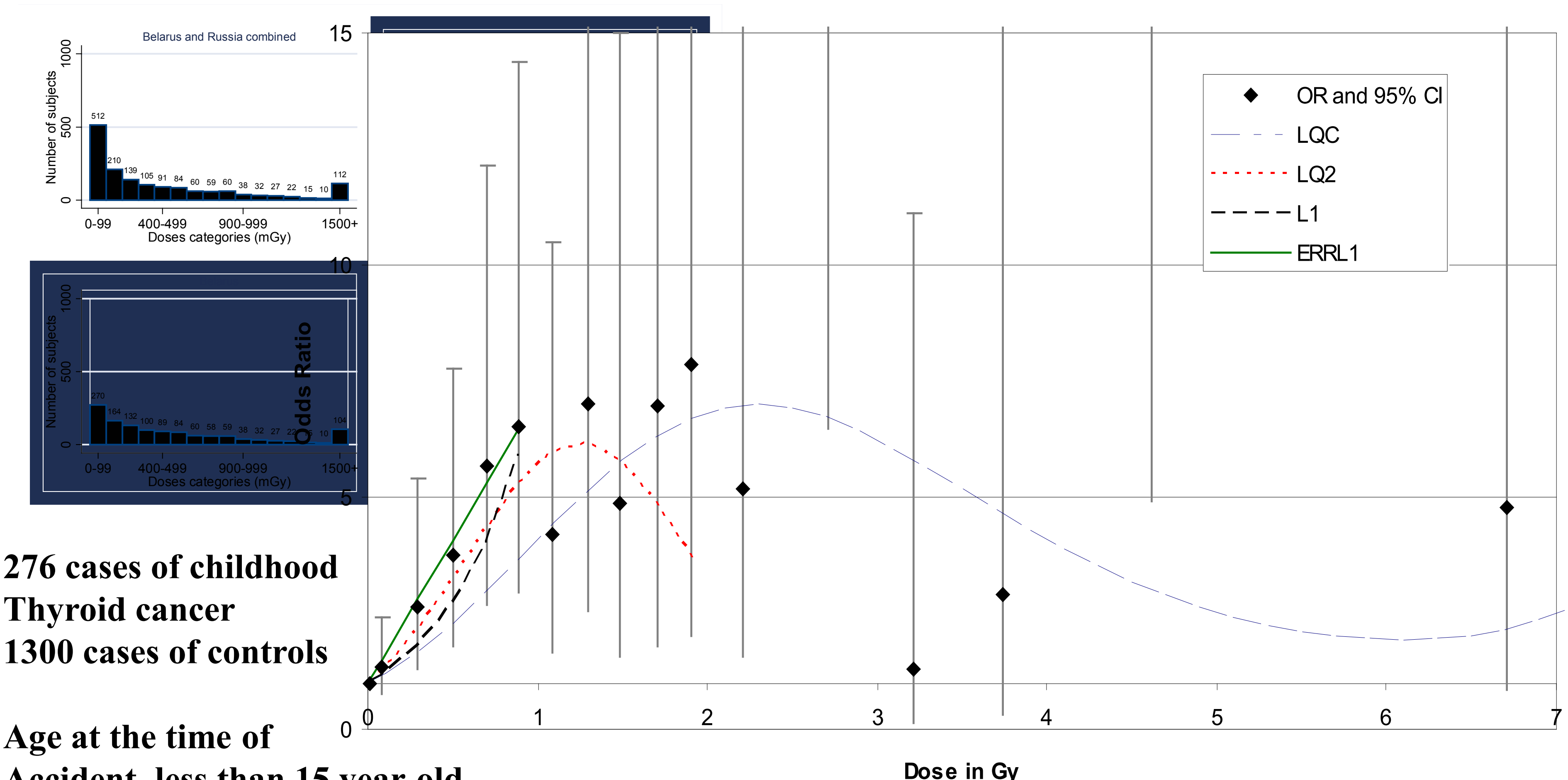
Date of Birth		
1 Jan 1983～ 26 Apr 1986	27 Apr 1986 ～31 Dec 1986	1 Jan 1987～ 31 Dec 1989
31 / 9720	1/ 2409	0 / 9472

Number of thyroid cancers/number of children screened

Y. Shibata & S. Yamashita. Lancet 358:1965-66, 2001

No evidence of Cs-137-induced solid cancer risks including thyroid cancers

Risk of Childhood Thyroid Cancer around Chernobyl

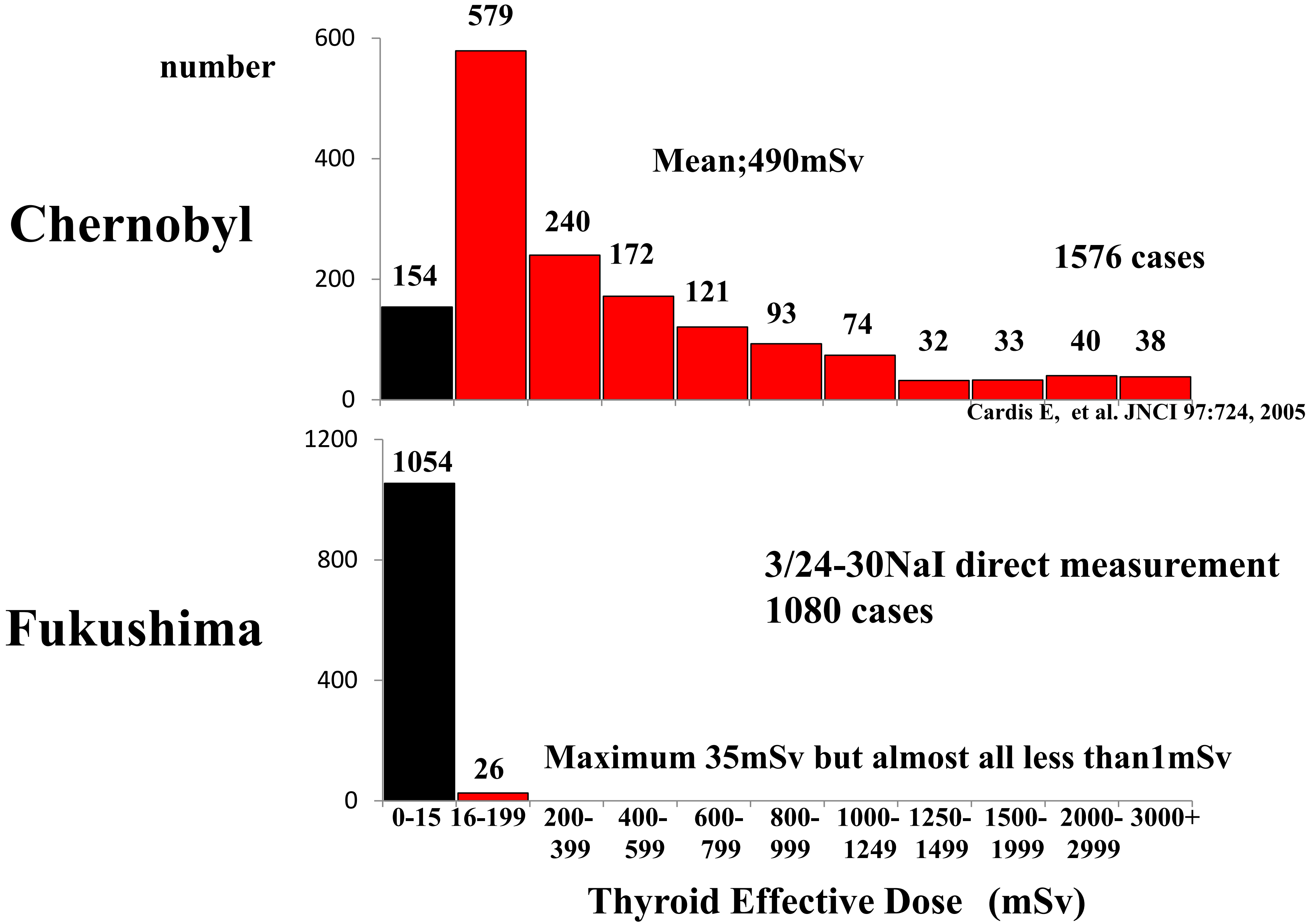


276 cases of childhood Thyroid cancer
1300 cases of controls

Age at the time of Accident, less than 15 year-old

(Cardis E et al; J Natl Cancer Inst. 97(10):724-32, 2005)

Thyroid dose in the children between Chernobyl and Fukushima



Effect of iodine deficiency and of stable iodine consumption

Table 4. Estimated risk of developing thyroid cancer after a radiation dose of 1 Gy, by level of soil iodine in the settlement of residence at the time of the accident and by potassium iodide (i.e., antistrumin) consumption status (analyses restricted to subjects with radiation doses to the thyroid of less than 2 Gy)*

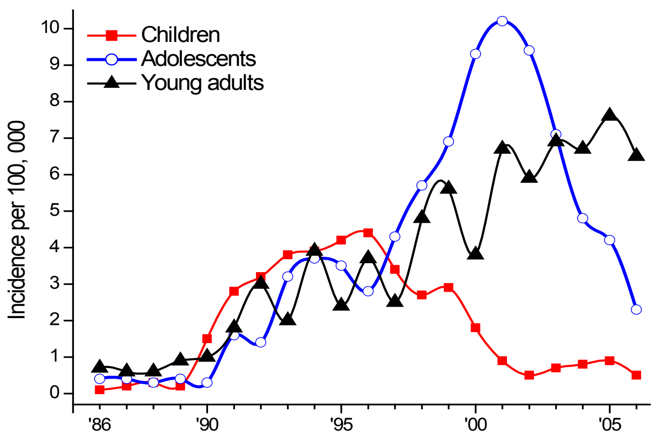
	OR at 1 Gy (95% CI)	
Consumption of potassium iodide	Highest two tertiles of soil iodine	Lowest tertile of soil iodine
No	3.5 (1.8 to 7.0)	10.8 (5.6 to 20.8)
Yes	1.1 (0.3 to 3.6)	3.3 (1.0 to 10.6)

*Levels of iodine in soil in settlement of residence at time of accident were divided into tertiles. OR = odds ratio at 1 Gy compared with no exposure; CI = confidence interval.

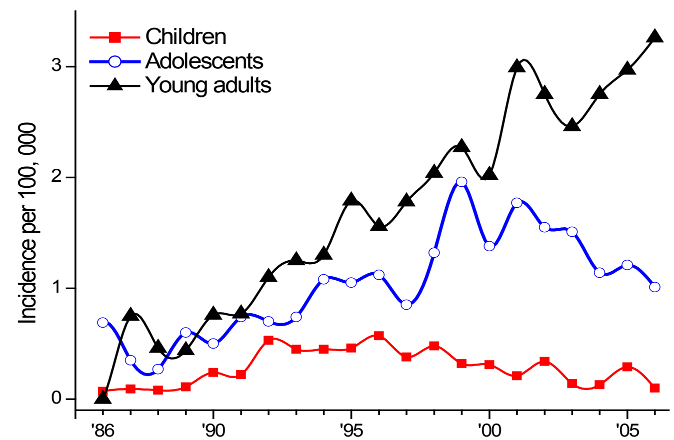
Cardis 2005

Incidence of thyroid cancer in residents of radiocontaminated territories

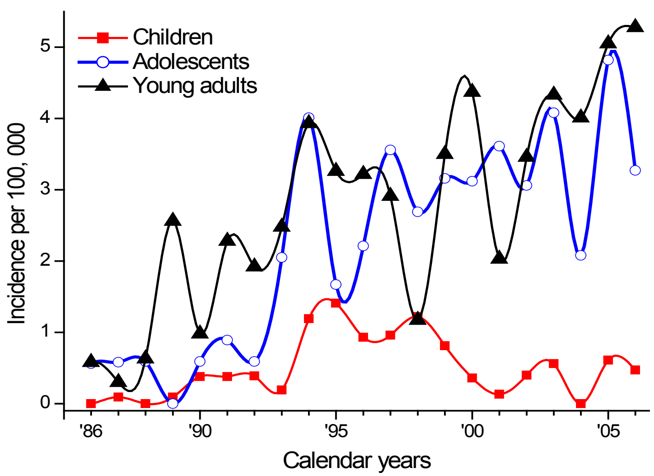
Belarus



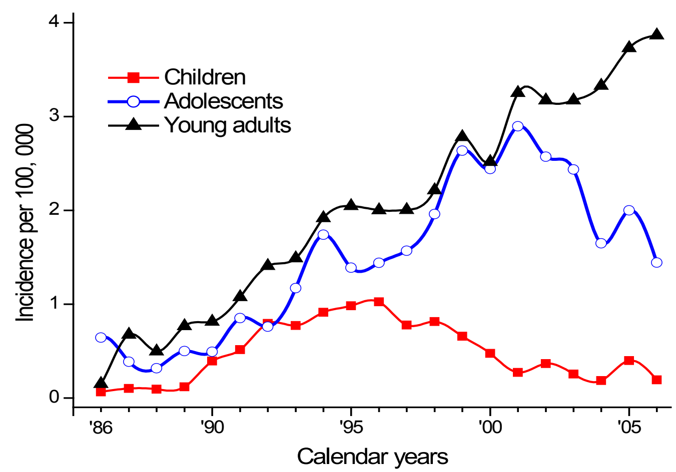
Ukraine



Russia

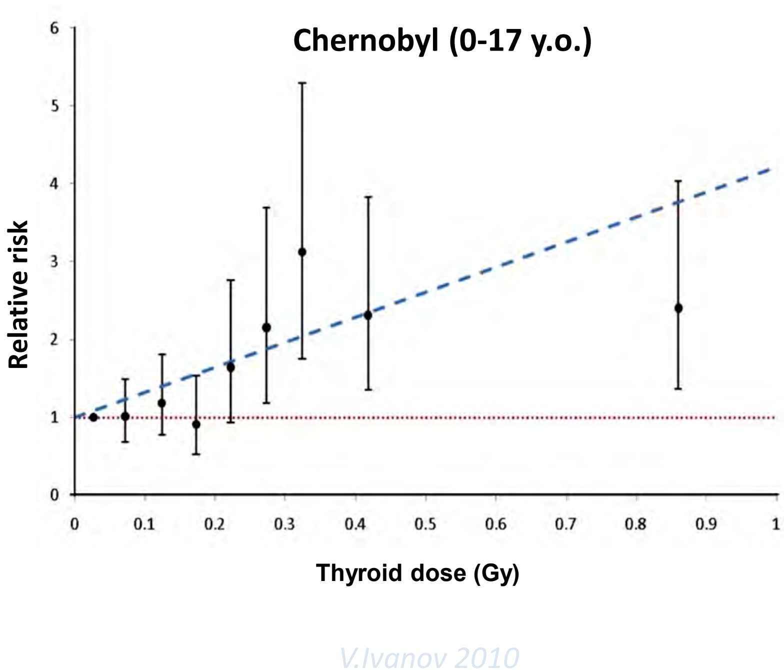


Three countries



Major radiation epidemiology conclusions

OR at 1 Gy~5.5 – 8.4 [ERR/Gy 1.9 – 19]



Dose-response relationship (up to 2 Gy)
Young age at exposure is a risk factor (0-5 y.o.)
Latency may be short (4-5 years)
Iodine deficiency increases risk (~3-fold)
No significant risk for thyroid cancer for radiation doses below 100 mSv
No increase in cancer incidence in the population with accumulated doses <100 mSv during 25 years
No increase in cancer incidence in emergency workers with doses <150 mSv

Characteristics of Chernobyl Thyroid Cancers

Chernobyl Tissue Bank
www.chernobyltissuebank.com

24 international projects

From: October 1998
To: March 2011

3139 cases

- Russia N=1160
- Ukraine N= 1979

- Born before Chernobyl N=2668 (85%)
- Born after Chernobyl N=471 (15%)

- PTC N=1996 (64%)
- FTC N=99 (3%)
- MTC N=59 (2%)
- Other TC N=74 (2%)
- FA N=74 (19%)

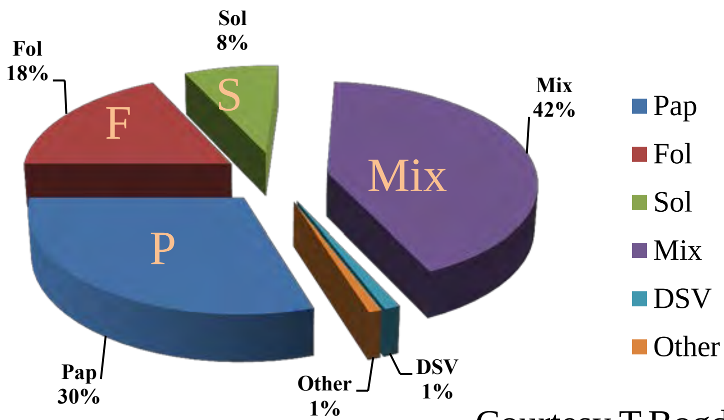
- the best possible diagnostic service
- specimens of thyroid cancer are properly described and sampled
- archive of data generated from research studies carried out

Funding: EU, NCI (USA), SMHF (Japan)

http://www.chernobyltissuebank.com

Pathological and clinical characteristics of Chernobyl PTC

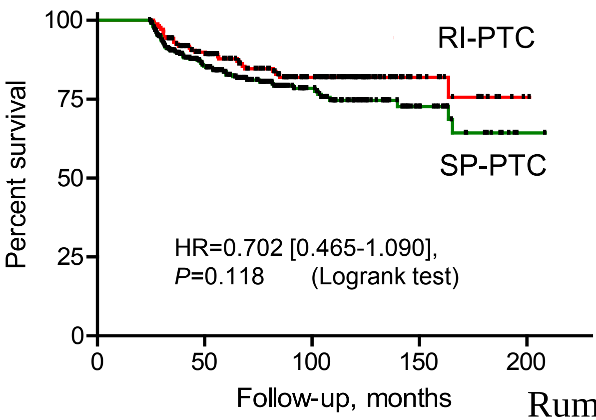
Pathology: 2478 PTC cases from Ukraine



Courtesy T.Bogdanova

Clinics: risk for recurrence

497 PTC cases from Russia
(172 Rad + 325 Spor, matched)



- **No etiology-specific risk factors for recurrence**
- **Chance of recurrence is comparable in RAD and SPOR PTC**

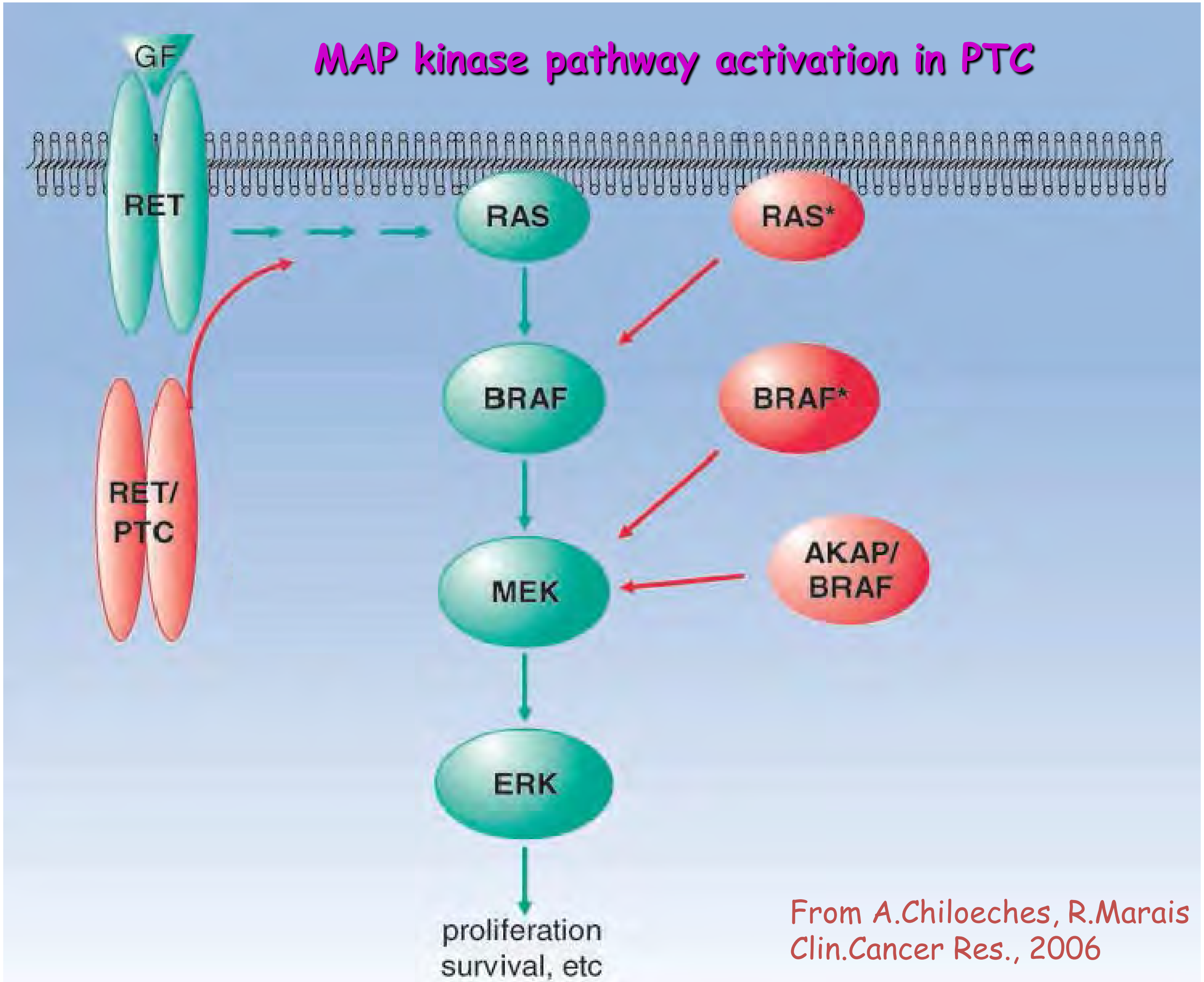
Rumyantsev et al., 2011

Time-related trends
Prevalence of less differentiated structures (solid component) decreases
Pathological aggressiveness (extrathyroidal extension, vascular invasion and nodal disease) declines
Proportion of encapsulated and small tumors increases
Age-related trend
Pathologically, the aggressiveness declines in the row children > adolescents > adults
Radiation-induced PTC may be pathologically more aggressive than sporadic PTC in age-matched groups

Variables	Comparison	*P*	HR	Wald's CI
Radiation exposure	yes *vs* no	0.104	0.54	0.26–1.13
Tumor size >10 mm	yes *vs* no	0.472	1.47	0.51–4.20
pN	Na+Nb *vs* N0	0.0053	5.21	1.63–16.7
Tumor capsule	yes *vs* no	0.0003	0.17	0.06–0.45
Treatment according to the Guidelines	yes *vs* no	0.0002	0.16	0.06–0.42

Radiation-induced thyroid cancer is suggested to be treated and followed in the same way as sporadic thyroid cancer

Molecular characteristics of PTC

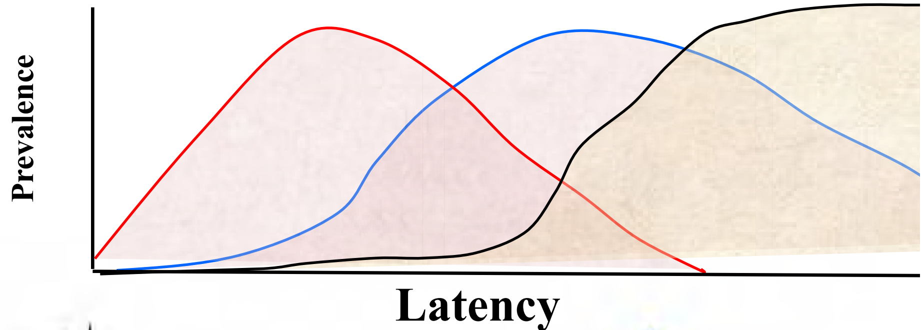


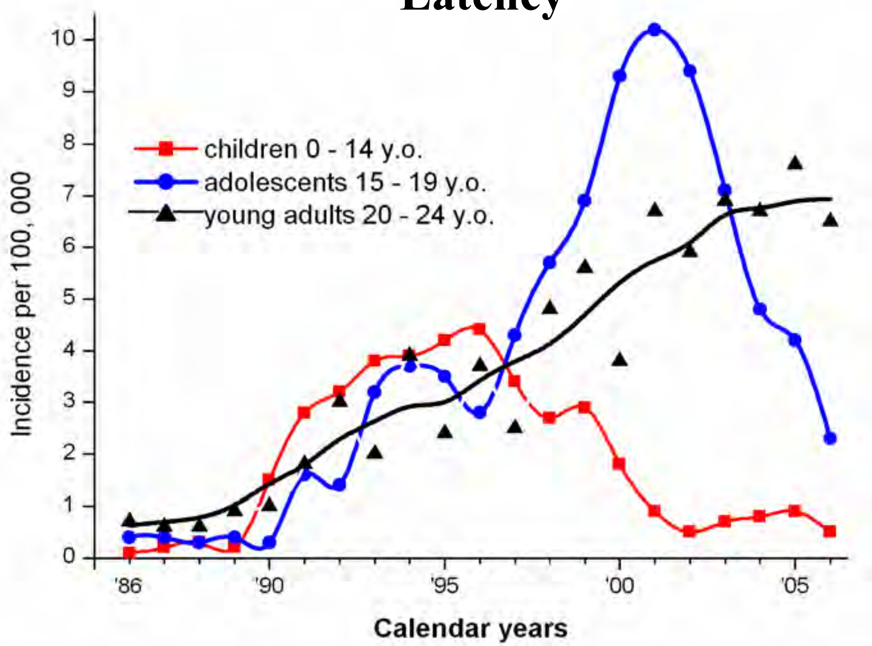
Evolution of mutational events in time

Chernobyl

RET/PTC3 RET/PTC1 BRAF, RAS

Williams 2008

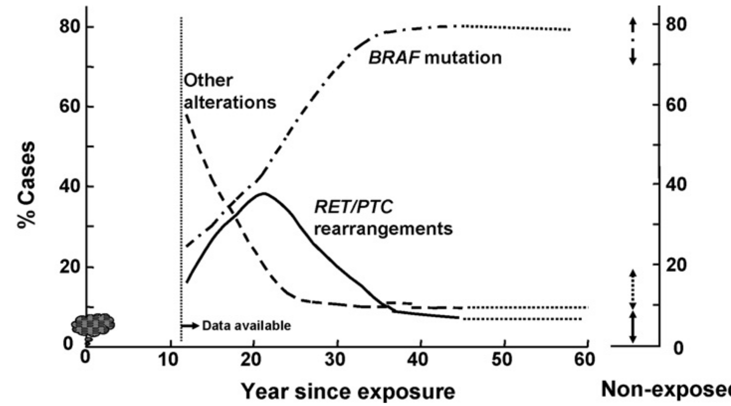




Morphology	Sol, Sol-Fol	Classic	Classic, Encaps
Clinical course	Aggressive↑	Typical	Aggressive↓
Latency, years	4 - 10	7 - 17	15 - …

Japanese Hibakusha

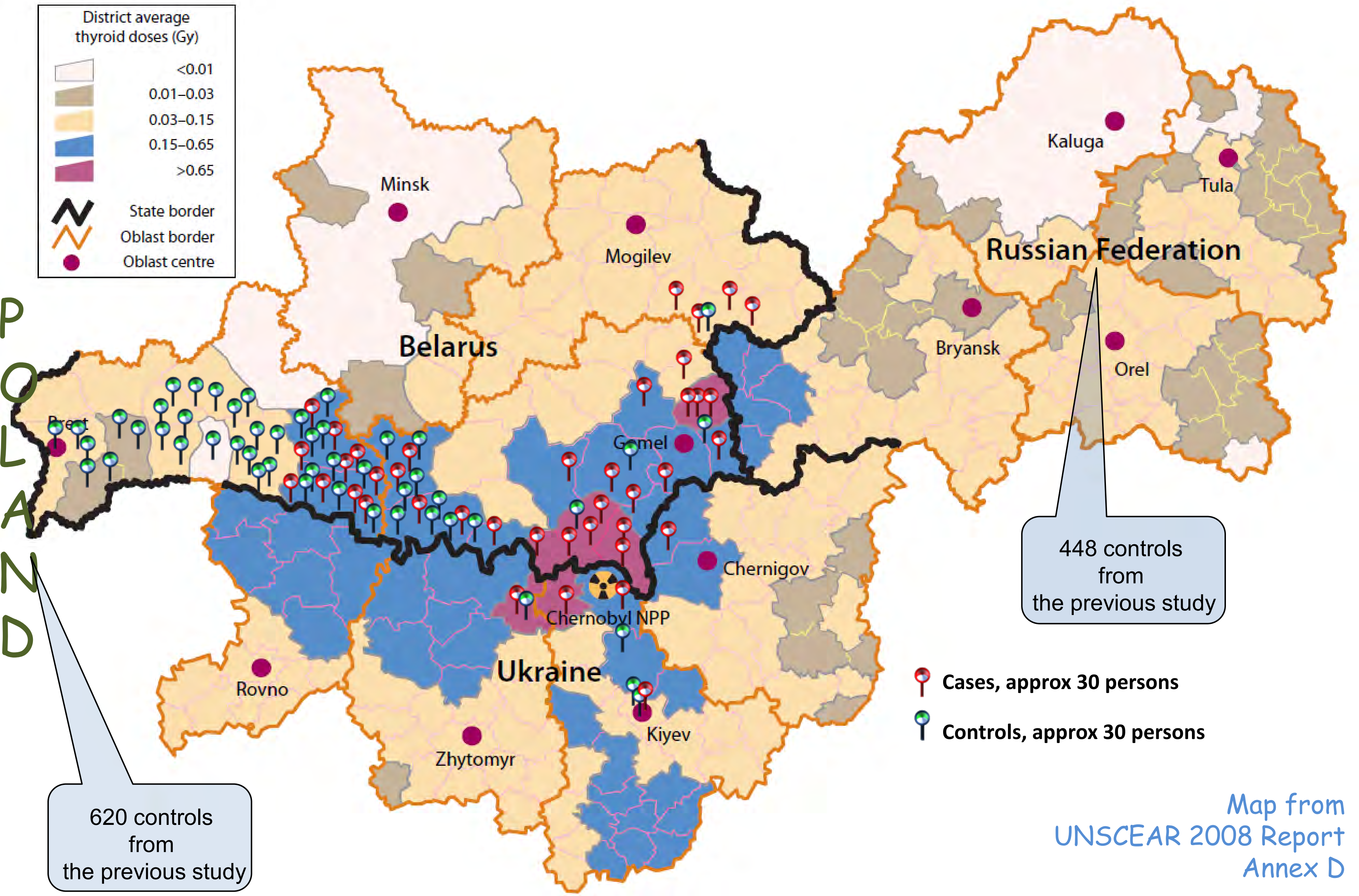
Nakachi 2006



Major oncogenic events in PTC

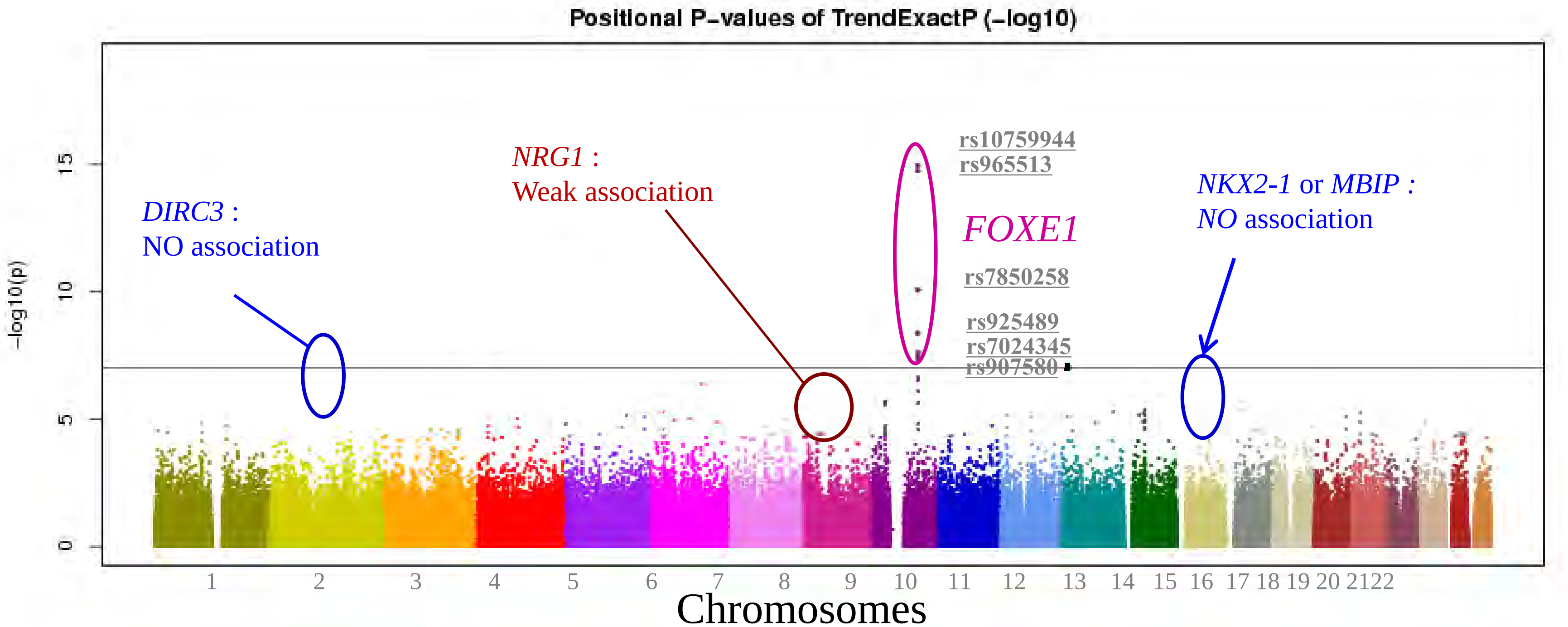
Alteration	Chernobyl PTC	Sporadic PTC
RET/PTC	50-86%	13-43%
NTRK1	3%	5-13%
AKAP9/BRAF	11%	1%
BRAF^{T1799A}	0-16%	29-69%
RAS family	0-10%	0-21%

Molecular Epidemiological Studies on Chernobyl Thyroid Cancers



Map from UNSCEAR 2008 Report Annex D

Result: pooled analysis



FOXE1 **locus at 9q22.33 is confirmed as the strongest**

NO association with 2q35 (*DIRC3*) and 14q13.3 (*NKX2-1* or MBIP)

Weak association with *NRG1* at 8p12

All SNPs associating with radiation-induced PTC also associate with sporadic PTC

Final analysis

Cases: 953(Bel) + 145(Ukr) = **1098 (1057 after QC)**
Controls: 1084(Bel) + 157(Ukr) + 448(Rus) + 620(Pol) = **2309 (2287 after QC)**

rs#	Chr	Gene	GWAS 837 Cs + 1,242 Ctr	Validation 220 Cs + 1,045 Ctr	Meta	OR (95% CI)	OR published	Etiology
rs965513	9q22.33	FOXE1 upstream	1.13E-16	3.62E-04	5.80E-19	1.69 (1.51-1.90)	1.75 / 1.69	Sp & Rad
rs1867277	9q22.33	FOXE1 5'UTR	7.50E-03	3.75E-04	1.38E-05	1.52 (1.26-1.83)	1.49	Sp & Rad
rs944289	14q13.3	NKX2-1 or MBIP	0.0208	0.093	4.50E-03	1.17 (1.05-1.30)	1.37	Sp
rs116909374	14q13.3	MBIP	0.0438	0.0756	0.0169	2.19 (1.15-4.16)	2.09	Sp
rs2439302	8p12	NRG1	8.85E-04	0.0182	9.11E-05	1.35 (1.16-1.57)	1.36	Sp & Rad
rs966423	2q35	DIRC3	0.235	0.316	0.125	1.9 (0.98-1.21)	1.34	Sp
			Candidates in Chernobyl PTC					
rs6920544	6q21	LOC442245	4.71E-07	0.645	6.03E-06			
rs4697477	4p15.2	ATP5LP3	1.19E-05	0.417	5.03E-05			
rs10455038	5q23.2	PPIC	2.57E-06	0.0703	1.55E-03			
rs7666030	4p15.3-p15.1	SOD3	1.13E-04	0.618	7.59E-04			
rs3014966	13q14.13	COG3	5.33E-06	0.190	8.67E-04			
rs11197463	10q26	ATRNL1	1.60E-04	0.371	4.97E-03			
rs7199669	16p13.12	ERCC4	4.42E-05	0.505	1.31E-04			
rs7861296	9p21.2	LRRN6C	7.40E-07	0.716	1.01E-05			
rs7241128	18q11.2	LOC390843	2.15E-05	0.944	1.90E-04			
rs2691546	7q21	MAGI2	4.59E-05	0.624	1.21E-03			
rs2691542	7q21	MAGI2	1.08E-05	0.710	9.41E-05			

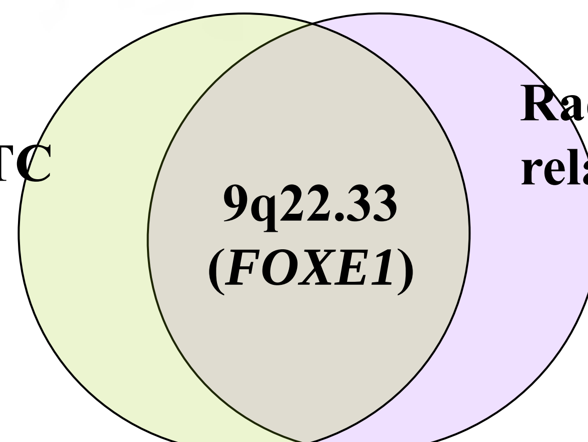
Human Molecular Genetics, 2010, Vol. 19, No. 12 2516–2523
doi:10.1093/hmg/ddq123
Advance Access published on March 29, 2010

The *FOXE1* locus is a major genetic determinant for radiation-related thyroid carcinoma in Chernobyl

Meiko Takahashi[1,2,†], Vladimir A. Saenko[3,†], Tatiana I. Rogounovitch[4], Takahisa Kawaguchi[1,2], Valentina M. Drozd[5], Hisako Takigawa-Imamura[1], Natallia M. Akulevich[4], Chanavee Ratanajaraya[1], Norisato Mitsutake[4], Noboru Takamura[4], Larisa I. Danilova[6], Maxim L. Lushchik[5], Yuri E. Demidchik[7], Simon Heath[8], Ryo Yamada[1], Mark Lathrop[8,9], Fumihiko Matsuda[1,2,*] and Shunichi Yamashita[3,4]

[1]Center for Genomic Medicine and [2]Institut National de la Santé et de la Recherche Médicale (INSERM) Unit U852, Kyoto University Graduate School of Medicine, Kyoto 606-8501, Japan, [3]Department of International Health and Radiation Research and [4]Department of Molecular Medicine, Atomic Bomb Disease Institute, Nagasaki University Graduate School of Biomedical Sciences, Nagasaki 852-8523, Japan, [5]Department of Thyroid Disease Research, [6]Department of Endocrinology and [7]Belarusian Medical Academy for Postgraduate Education, Minsk 220013, Republic of Belarus, [8]Centre National de Génotypage, Institut Génomique, Commissariat à l'Énergie Atomique, Evry 91000, France and [9]Fondation Jean Dausset-CEPH, Paris 75010, France

Received January 18, 2010; Revised and Accepted March 17, 2010



Genetic susceptibility of thyroid carcinogenesis based on a common genetic background and environmental factor

FOXE1 and NKX2-1 loci with sporadic and Chernobyl thyroid cancer

Findings	*FOXE1* (9q22.33)	*NKX2-1* (14q13.3)
Study: Gudmundsson 2009, Nat Genet; European decent		
MAF Cases/Controls	0.490 / 0.352	0.650 / 0.558
OR (95% CI)	1.75 (1.59, 1.94)	1.37 (1.24, 1.52)
P-value	1.7×10^{-27}	2.0×10^{-9}
Our Study: Matsuse 2011, J Med Genet; Japanese		
MAF Cases/Controls	0.090 / 0.057	0.466 / 0.411
OR (95% CI)	1.69 (1.29, 2.21)	1.21 (1.04, 1.39)
P-value	1.3×10^{-4}	0.012
Our study: Takahashi 2010, Hum Mol Genet; Chernobyl		
MAF Cases/Controls	0.474 / 0.357	0.616 / 0.583
OR (95% CI)	1.65 (1.43, 1.91)	1.13 (0.95, 1.36)
P-value	4.8×10^{-12}	0.17

“Great East Japan Earthquake” Triple Disasters in Fukushima

1,301 deaths were disaster-related deaths.

1,599 died and 211 are still lost due to Earthquake and/or Tsunami.

Earthquake | **Tsunami** | **Nuclear Power Plant Accident**

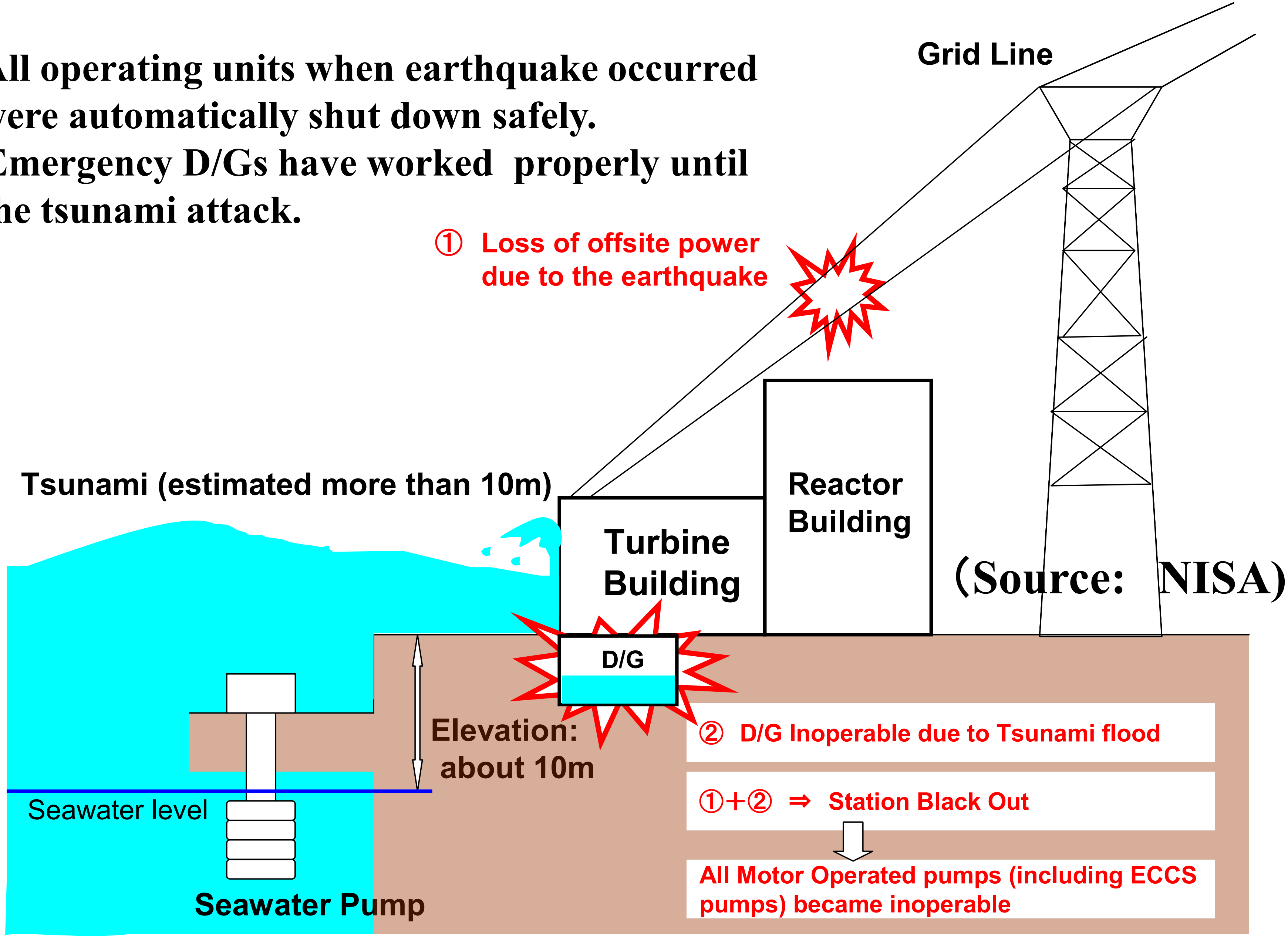
Fukushima City

Minami-soma City

Fukushima Dai-ichi Nuclear Power Plant

Fukushima Daiichi-Nuclear Power Plant

- All operating units when earthquake occurred were automatically shut down safely.
- Emergency D/Gs have worked properly until the tsunami attack.



Evacuations and Sheltering at the Initial Period Successfully handled by the Government

1) Instructions of Evacuation, etc. Issued by the Director General of the Nuclear Emergency Response Headquarters Regarding Fukushima Dai-ichi Nuclear Power Station

March 11 [21:23]

Evacuation 3km

Sheltering 3-10km

Instruction of evacuation to the residents living within a radius of 3 km from the NPS was issued.

Instruction of stay in-house to the residents living within a radius of 3 to 10 km from the NPS was issued.

March 12 [05:44]

Evacuation 10km

Instruction of evacuation to the residents living within a radius of 10 km from the NPS was issued.

[18:25]

Evacuation 20km

Instruction of evacuation to the residents living within a radius of 20 km from the NPS was issued.

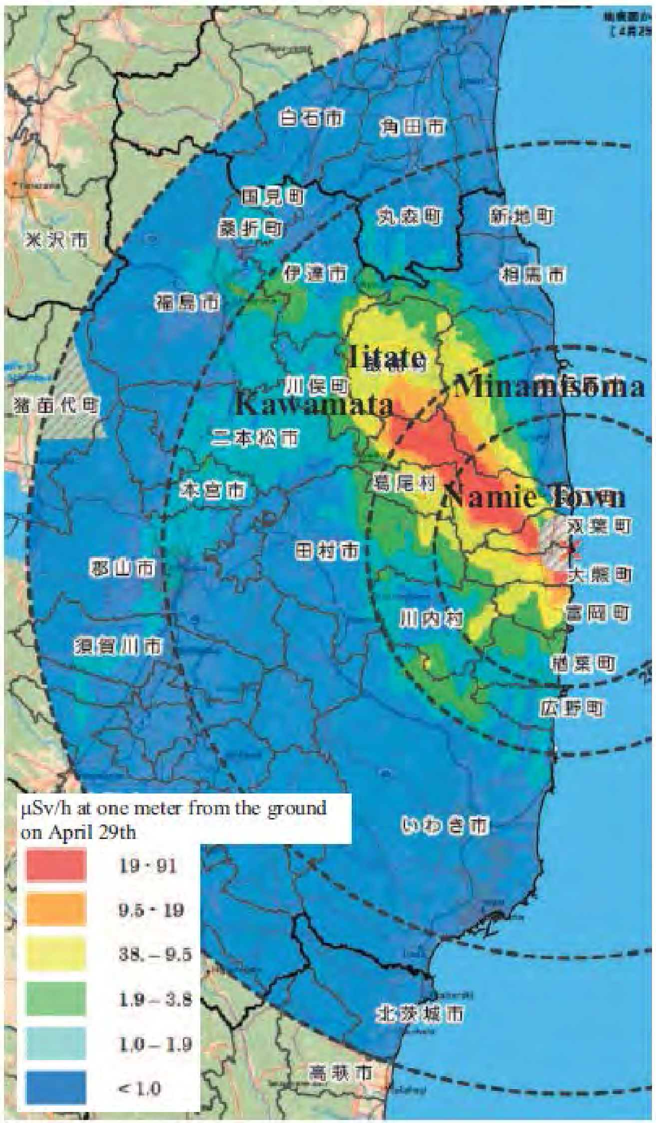
March 15 [11:00]

Sheltering 20-30km

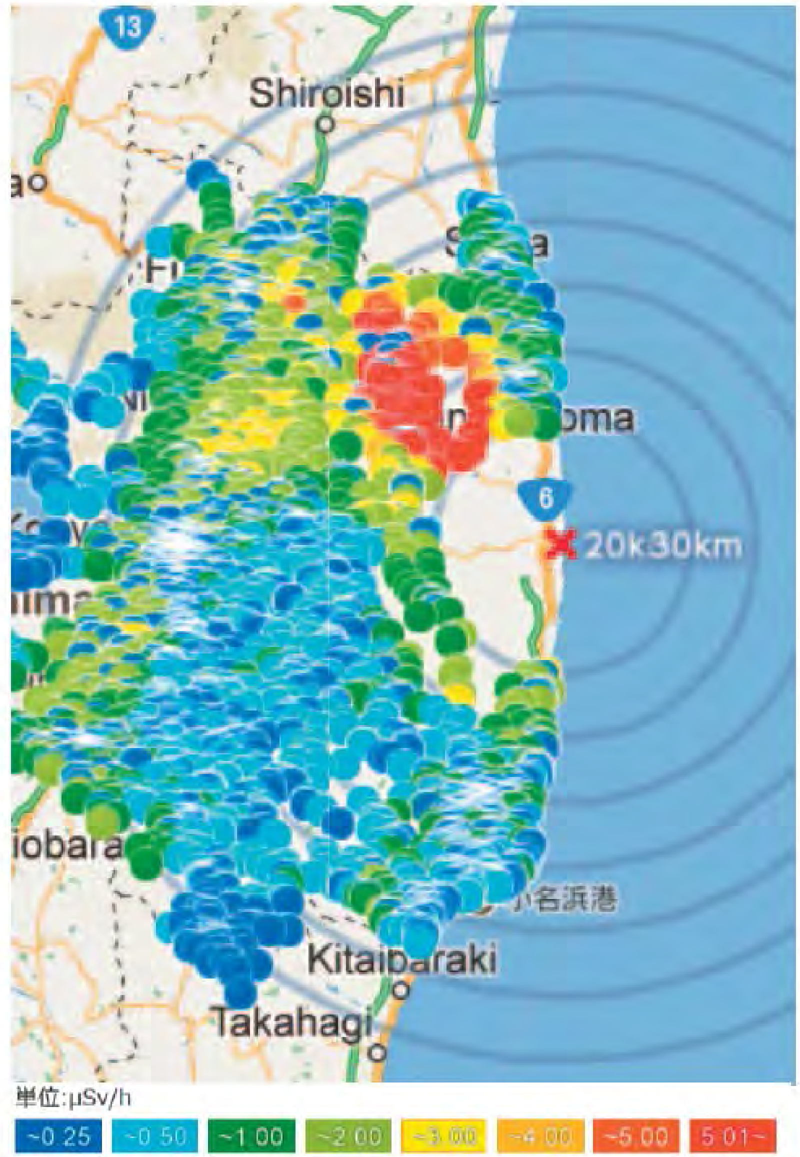
Instruction of stay in-house to the residents living within a radius of 20 to 30 km from the NPS was issued.

Radioactive Materials on the Ground
Radioactivity expressed as μSv/hour at 1 m from the ground

Airborne monitoring on April 29th



Monitoring points in Fukushima in April



After the great earthquake and tsunami in eastern Japan, the NPP(Fukushima-Daiichi) was severely damaged and a significant amount of radioactive material was released to the environment. (*Industrial Crisis and Environmental Damage*)

In order to limit and reduce the exposures, countermeasures including evacuation from surrounding area, sheltering, restrictions on consumption of water and certain food products were taken by the government in an appropriate manner.

With regard to the workers, operational staff and emergency response personnel were exposed to certain levels of radiation in managing the emergency situation.

Since there has been much concern about the levels of exposure and effects both on general public and workers, we are prepared to collect and offer further information to the world.

- **Public concerns about the long-term health effects of radioactive contamination have increased considerably since March 11, 2011, sparking *anger, anxiety and distrust* towards the government's handling of the crisis and fueling support for renewable energy alternatives.**
- **Bans on food shipments from contaminated areas due to anxieties about food safety are ruining farmers' livelihoods and raise concerns about their ability to resume their livelihoods.**
- **The role of experts and academic societies are important but reliability/creditability has been lost by confusion and misunderstanding partly due to an inappropriate and immature media literacy.**

Fukushima Medical University

clinical divisions 31

central clinical facilities 14

hospital beds 778

number of patients per day

- in-patients 623
- out-patients 1,553

number of hospital staff1661

- doctors 498
- nurses 743
- technicians 198
- officers, etc. 222

Earthquake and Tsunami Victims

(Hospital Entrance Hall)

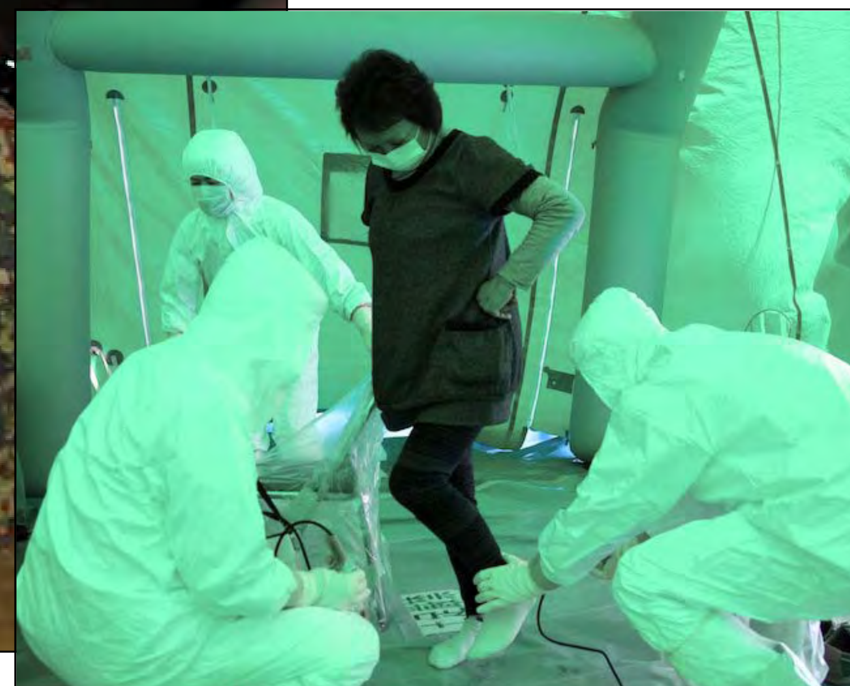
(Hospital Hallway)

180 medical professionals of 35 DMAT team +
FMU doctors, interns, nurses, technicians and students

168 cases of triage (93 Green, 44 Yellow, 30 Red, and 1 Black) over 3 days and more than 500 evacuees accepted and triaged.

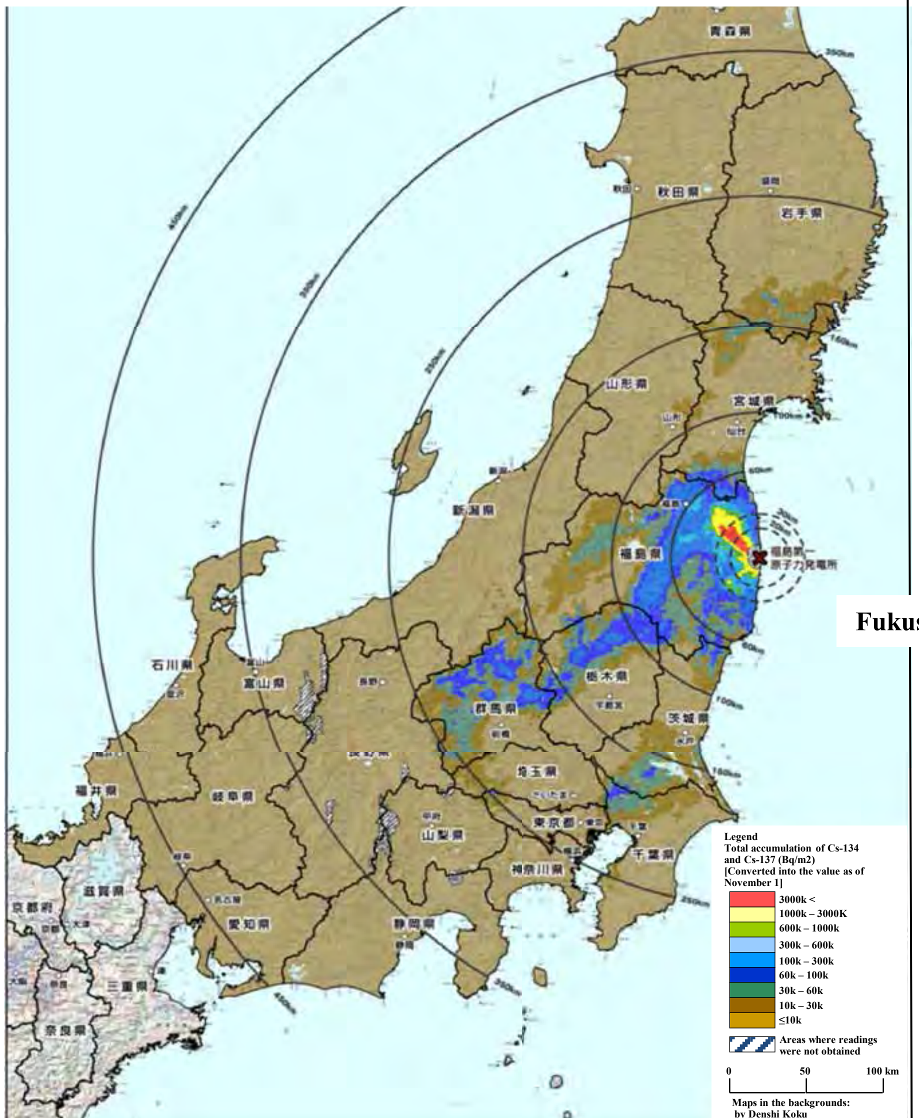
Larage-scale patient transfer and screening of radiation exposure

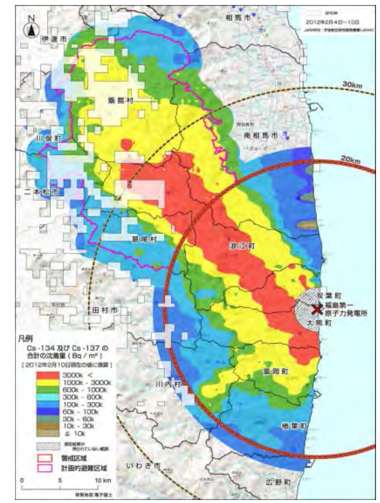
175 patients were temporary accepted
(of which 125 were hospitalized)



ca. 500 people were screened,
of which 10 were decontaminated

Results of the Airborne Monitoring Survey by MEXT as of November 1, 2011 (Total accumulation of Cs-134 and Cs-137 on the ground surface)





Fukushima Dai-ichi NPP

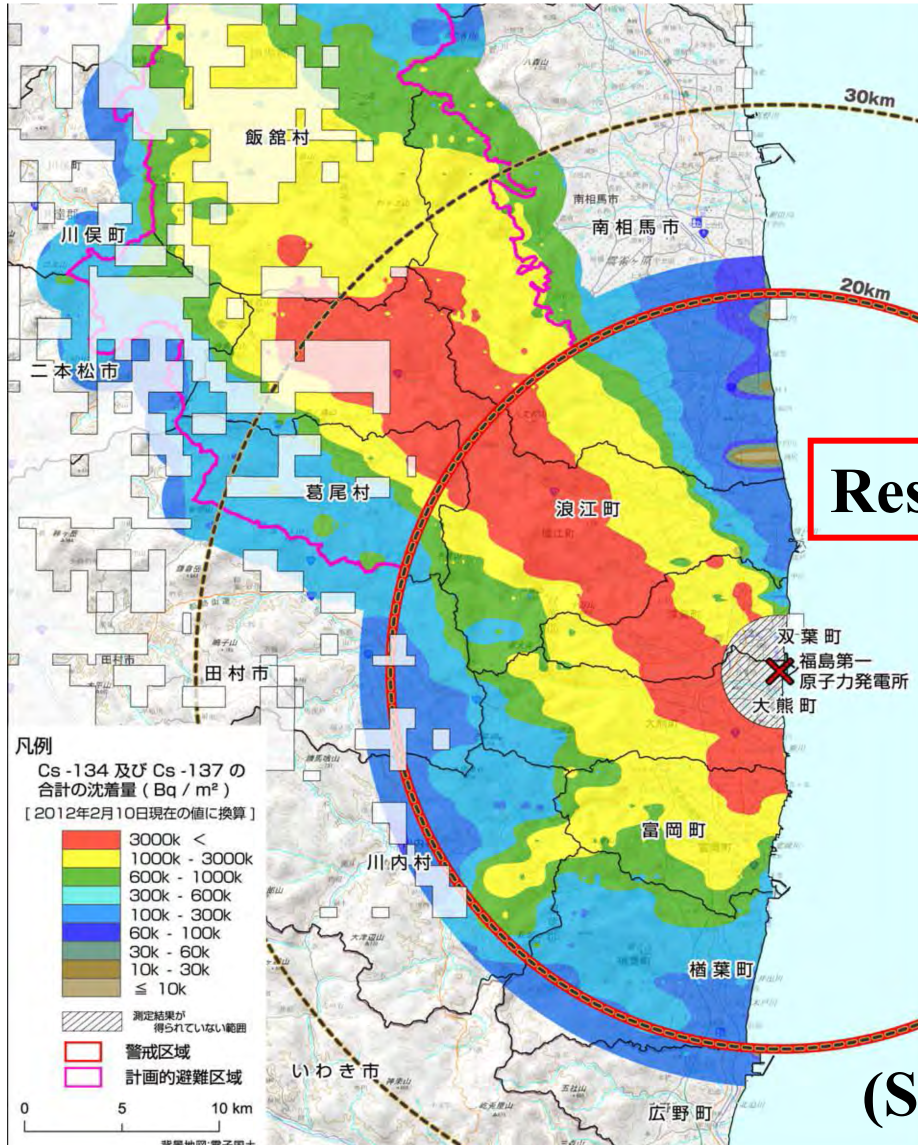
Bq/m^2

3,000K<
1,000-3,000K
600-1,000K
300-600K
100-300K
60-100K
30-60K

(Source: MEXT)

Results of the Airborne Monitoring Survey by MEXT as of February 1, 2012 (Total accumulation of Cs-134 and Cs-137 on the ground surface)

Deliberate Evacuation Area

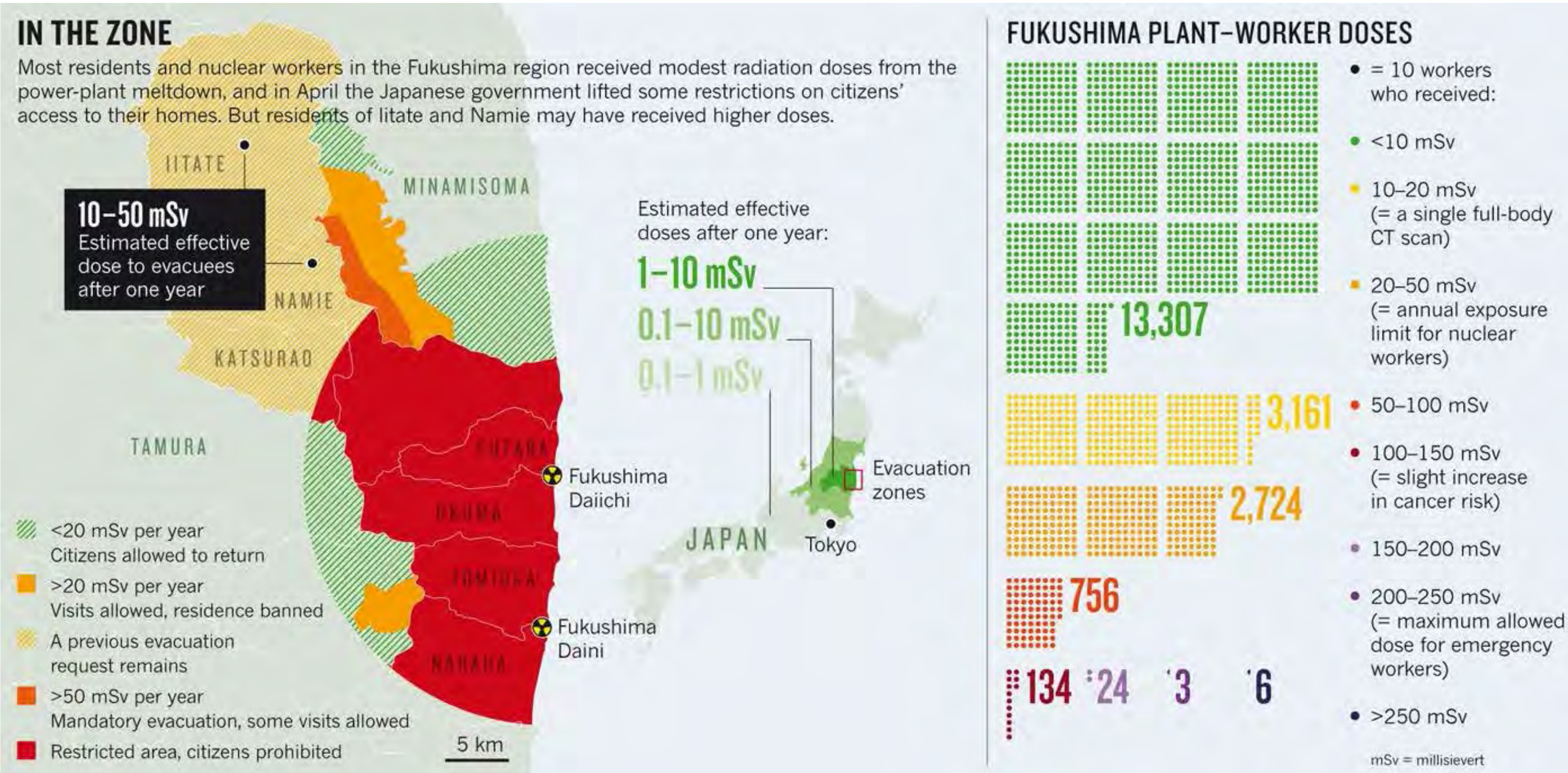


Restricted Area

Bq/m²

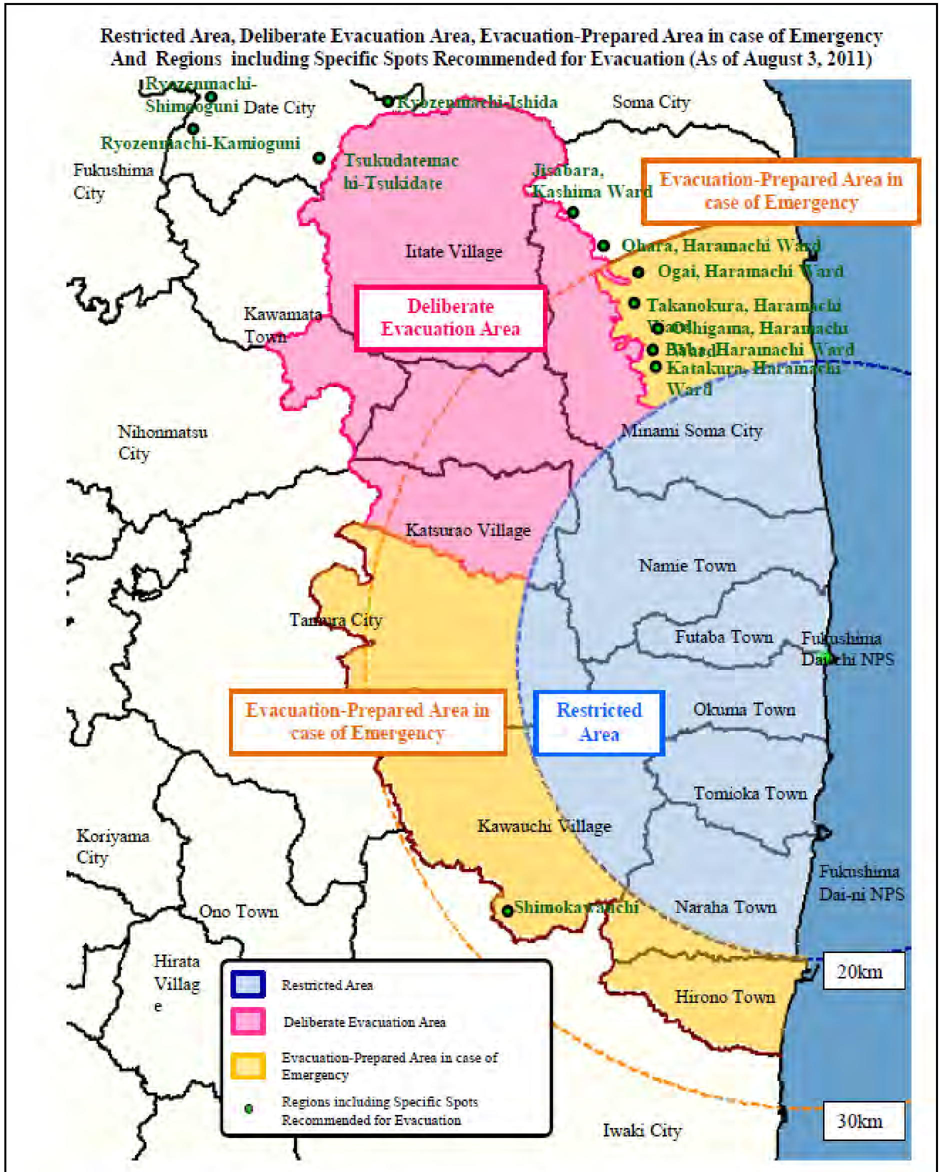
- 3,000K<
- 1,000-3,000K
- 600-1,000K
- 300-600K
- 100-300K
- 60-100K
- 30-60K

(Source: MEXT)



Preliminary report on dose estimation by WHO, May 2012

Evacuation Status of Residents in Fukushima



Number of evacuees from designated evacuation areas:

- **Restricted Area:**
  about 77,000
- **Deliberate Evacuation Area:**
  about 10,000
- **Evacuation-Prepared Area:**
  about 26,000

Total: about 113,000

(Source: Cabinet Office, Feb 2012)

Countermeasures on different targets

Object	Situation	Contents
Plant workers	High risk in radiation exposure & contamination, accident	Radiation Emergency Medicine
Emergency responder	High risk in radiation exposure & contamination	Consultation clinic for mental, physical, radiation
Residents	Chronic low dose exposure, stress/fear for risks	education/communication/information

Fukushima Disaster causes

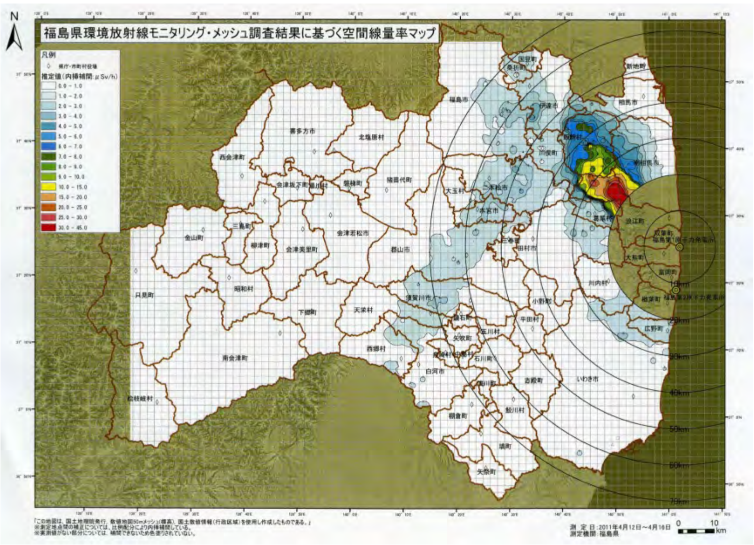
- **Uncertain health effects; ~~acute and~~ chronic?**
- **Psychological and metal effects; anxieties, anger, sleep disturbance, post-traumatic stress diseases**
- **Environmental effects; soil and food contamination contiuened**
- **Social and economical effects; decontamination, compensation, safeguard**

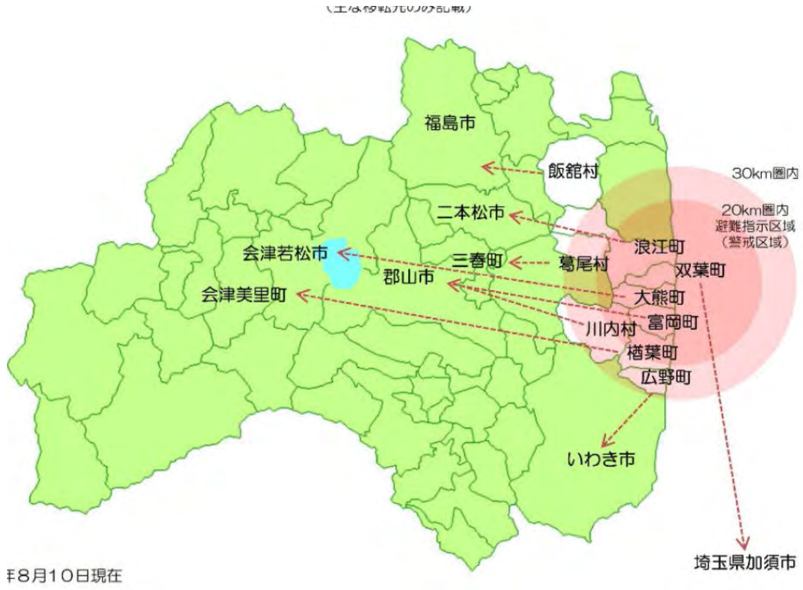
Radiation Health Risk Control

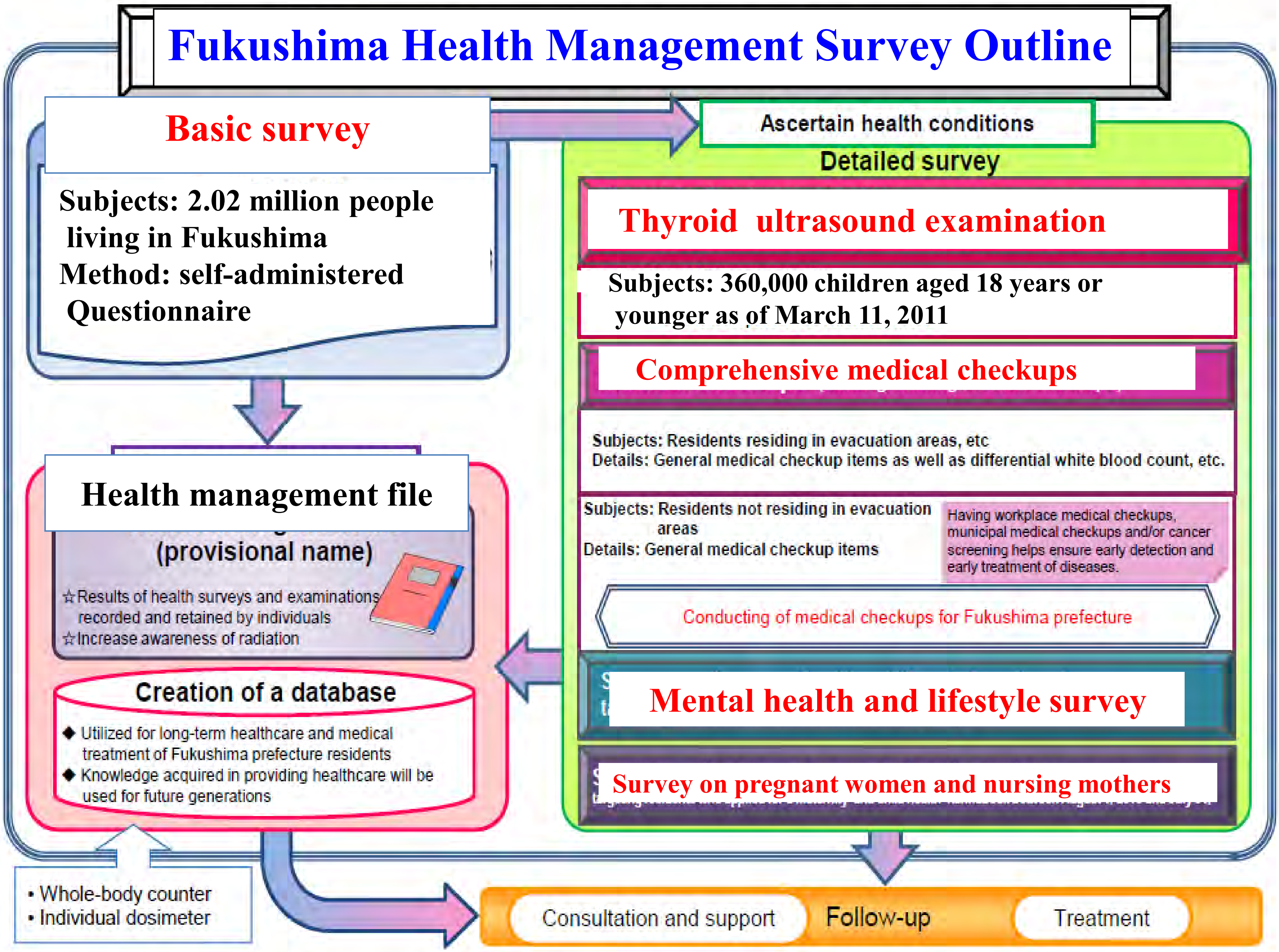
- **There are uncertainties about the risks of chronic low-dose radiation exposure for human health but *no alternative than to take responsibility to monitor health condition* of local residents in Fukushima and to *promote their health* based on the common concept of early diagnosis and treatment for any radiation-related disease exists.**
- **This is an unprecedented health management program for a 2 million population for almost whole lifespan.**

The Fukushima Health Survey

- The design of the health management is divided into two categories: a basic survey medical sheet for all the residents and further examination of target populations.






Fukushima Health Management Survey Outline
Basic survey
Subjects: 2.02 million people living in Fukushima
Method: self-administered Questionnaire
Ascertain health conditions
Detailed survey
Thyroid ultrasound examination
Subjects: 360,000 children aged 18 years or younger as of March 11, 2011
Comprehensive medical checkups
Subjects: Residents residing in evacuation areas, etc
Details: General medical checkup items as well as differential white blood count, etc.
Subjects: Residents not residing in evacuation areas
Details: General medical checkup items
Having workplace medical checkups, municipal medical checkups and/or cancer screening helps ensure early detection and early treatment of diseases.
Conducting of medical checkups for Fukushima prefecture
Mental health and lifestyle survey
Survey on pregnant women and nursing mothers
Health management file
(provisional name)
☆Results of health surveys and examinations recorded and retained by individuals
☆Increase awareness of radiation
Creation of a database
◆ Utilized for long-term healthcare and medical treatment of Fukushima prefecture residents
◆ Knowledge acquired in providing healthcare will be used for future generations
• Whole-body counter
• Individual dosimeter
Consultation and support
Follow-up
Treatment

Fukushima Health Management Survey May 2011

Objectives:

- **To monitor long-term health condition of resident in Fukushima and to promote their health**
- **To investigate whether a long-term low-dose radiation exposure has an effect on their health**

Contents:

1. **Basic survey (subjects: 2 million all resident in Fukushima)**
2. **Detailed survey**
   - **Thyroid examination by ultrasonography (360,000; 0-18 y/o)**
   - **Comprehensive medical checkups (210,000 ; Evacuees)**
   - **Mental health and lifestyle survey (210,000 ; Evacuees)**
   - **Survey on pregnant women and nursing mothers (16,000)**

Basic Survey

- **Estimated External Dose from 12 Mar to 11 July 2011**
- **Annual estimation dose＝（a）first 4 M＋ (b) remained 8 M**

Air dose rate in Fukushima city

(from Mar 2011 to Mar 2012)

Basic Survey

Estimation of individual radiation dose as baseline data for the long-term health

Fukushima Health Management Survey

Survey Questionnaire (Record of movements)

Study period: 11 March 2011 – 11 July 2011 (four months)

Target population:

-Residents of Fukushima officially registered between 11 March and 11 July 2011

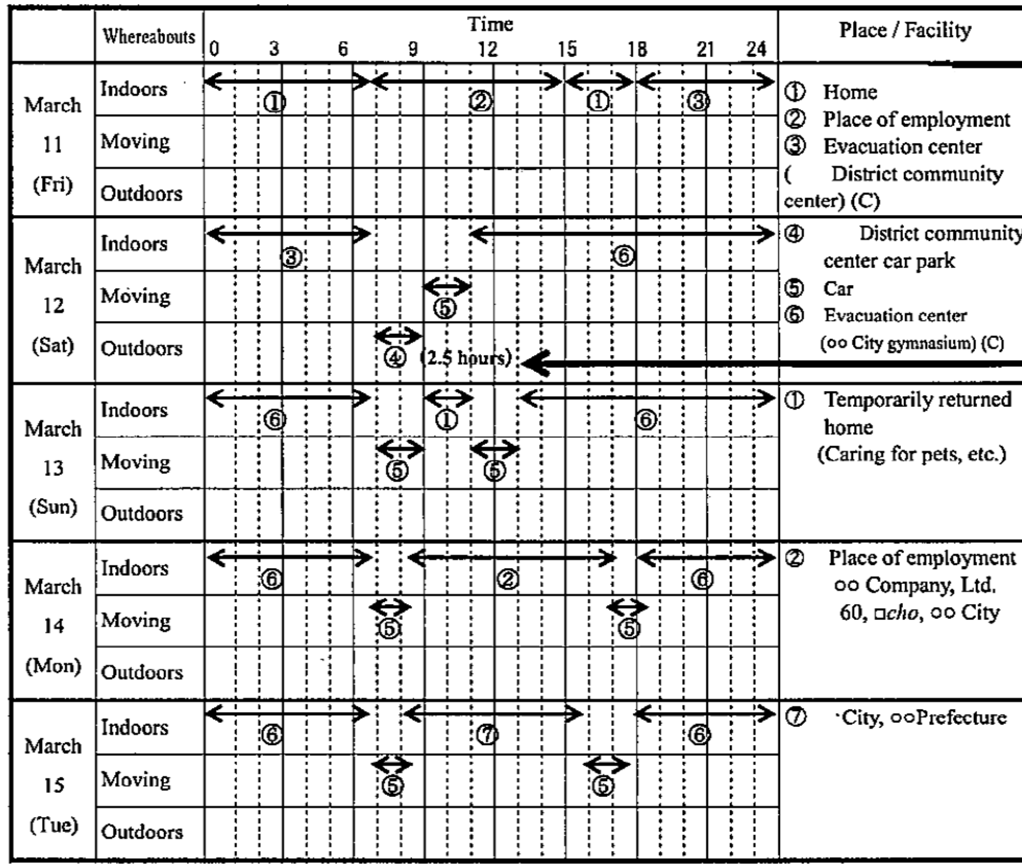
-Residents of other prefectures who stayed, worked or studied in Fukushima between 11 March and 11 July 2011 (upon request)

-Visitors to Fukushima between 11 and 25 March 2011 (upon request)

Target area:

Preceding Survey: Yamakiya; Namie; and Iitate (29,000 people)

Full-scale Survey: Rest of Fukushima



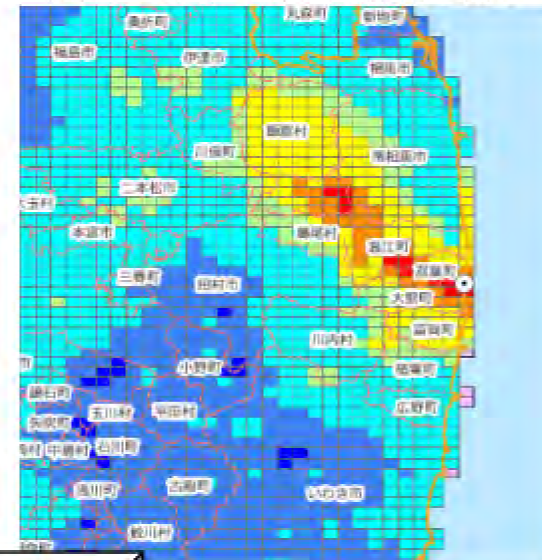
Individual external exposure was estimated using the for external exposure dose assessment developed by the National Institute of Radiological Sciences.

How to analyze radiation dose

Questionnaire

Movement & behavior

Time-course of air dose map



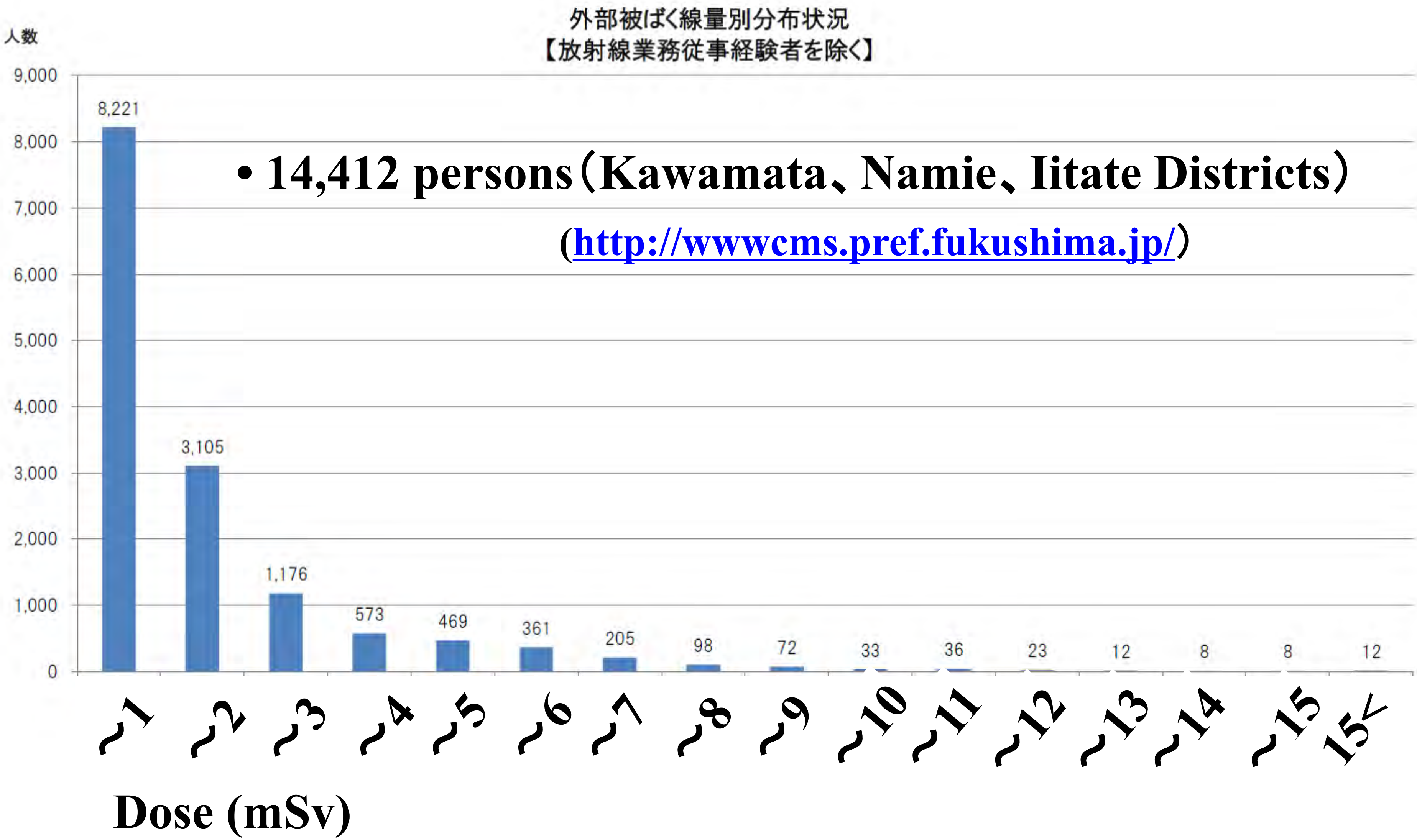
Estimation dose calculating combined above two information by NIRS

To help understanding of individual first 4M dose

To help understanding of radiation-related health risk

To establish database for long-term health management

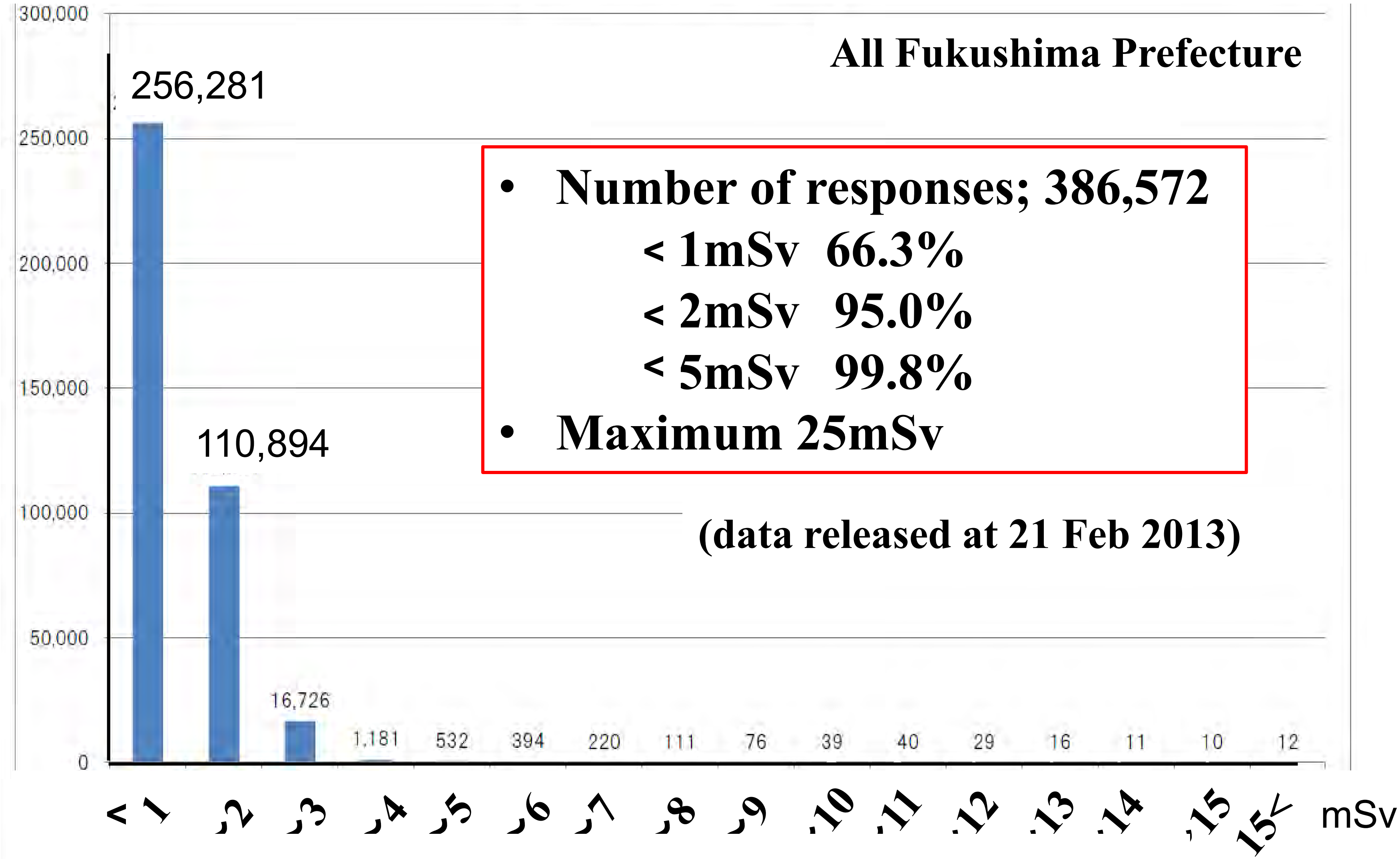
Distribution of External Exposure Dose (mSv) (Cumulative effective dose from March 11 to July 11)



- 14,412 persons（Kawamata、Namie、Iitate Districts）

(http://wwwcms.pref.fukushima.jp/)

Distribution of External Exposure Dose (mSv)
(Estimated Cumulative effective dose from March 11 to July 11)



Estimated from location and time course on questionnaire

A. Ohtsuru

RADIATION RESEARCH 177, 229–243 (2012)
0033-7587/12 $15.00

DOI: 10.1667/RR2629.1

Studies of the Mortality of Atomic Bomb Survivors, Report 14, 1950–2003: An Overview of Cancer and Noncancer Diseases

Kotaro Ozasa,[a,1] Yukiko Shimizu,[a] Akihiko Suyama,[a] Fumiyoshi Kasagi,[a,b] Midori Soda,[a] Eric J. Grant,[a] Ritsu Sakata,[a] Hiromi Sugiyama[a] and Kazunori Kodama[c]

[a] *Department of Epidemiology and* [c] *Chief Scientist, Radiation Effects Research Foundation, 5-2 Hijiyama-koen, Minami-ku, Hiroshima, 732-0815, Japan; and* [b] *Institute of Radiation Epidemiology, Radiation Effects Association 1-9-16, Kaji-cho, Chiyoda-ku, Tokyo, 101-0044, Japan*

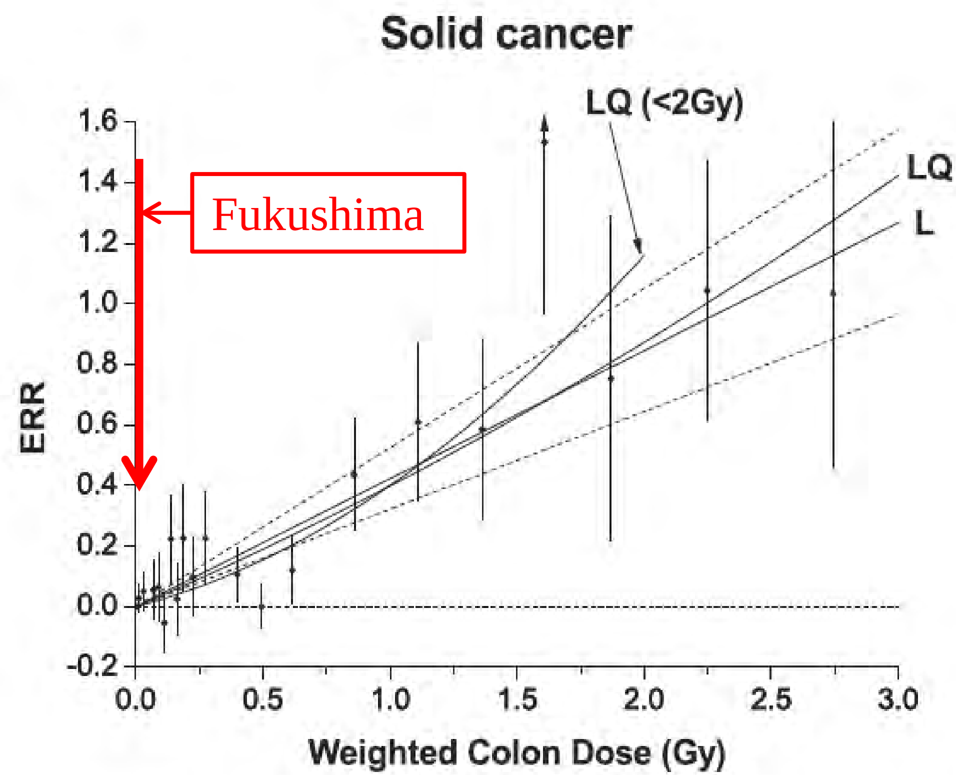
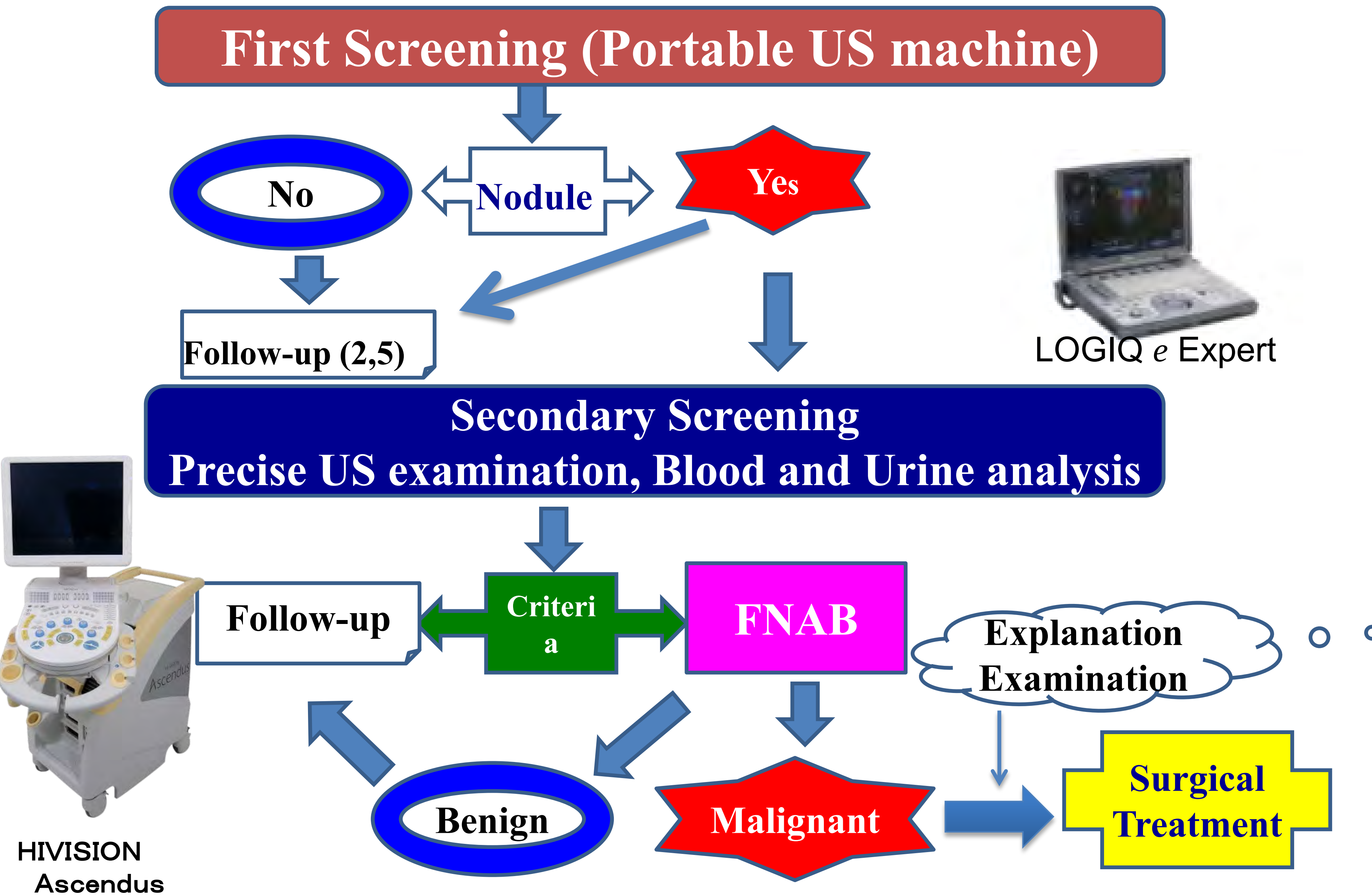


FIG. 4. Excess relative risk (ERR) for all solid cancer in relation to radiation exposure. The black circles represent ERR and 95% CI for the dose categories, together with trend estimates based on linear (L) with 95% CI (dotted lines) and linear-quadratic (LQ) models using the full dose range, and LQ model for the data restricted to dose <2 Gy.

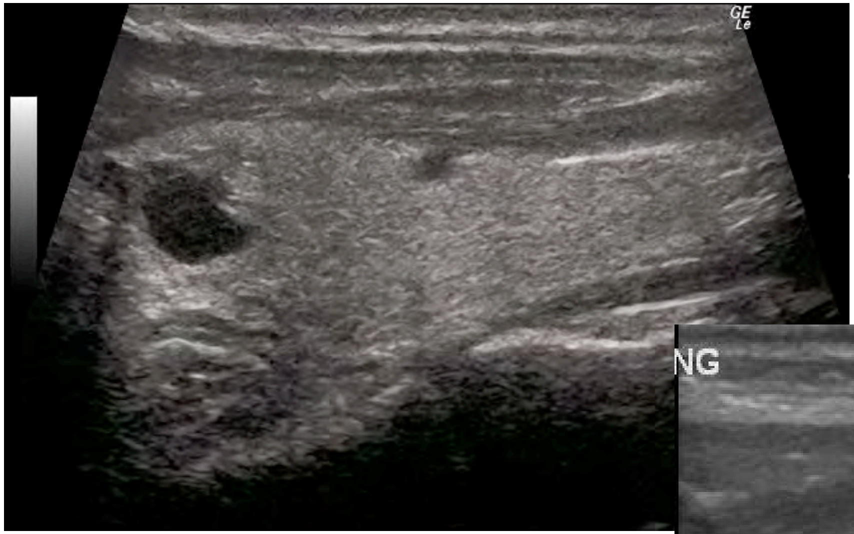
The Fukushima Health Survey (2)

- **Secondarily, further examination has been introduced for each different target population.**
- **The most important targets are children and pregnant women at the time of accident. The risk of radioactive iodines on the thyroid will be examined in all the children (age less than 18 years old, about 360,000 in population) by sophisticated *thyroid ultrasound screening* periodically. The bio-samples together with medical records will be collected after the informed consent.**

Flow Chart of Thyroid Ultrasound Examination

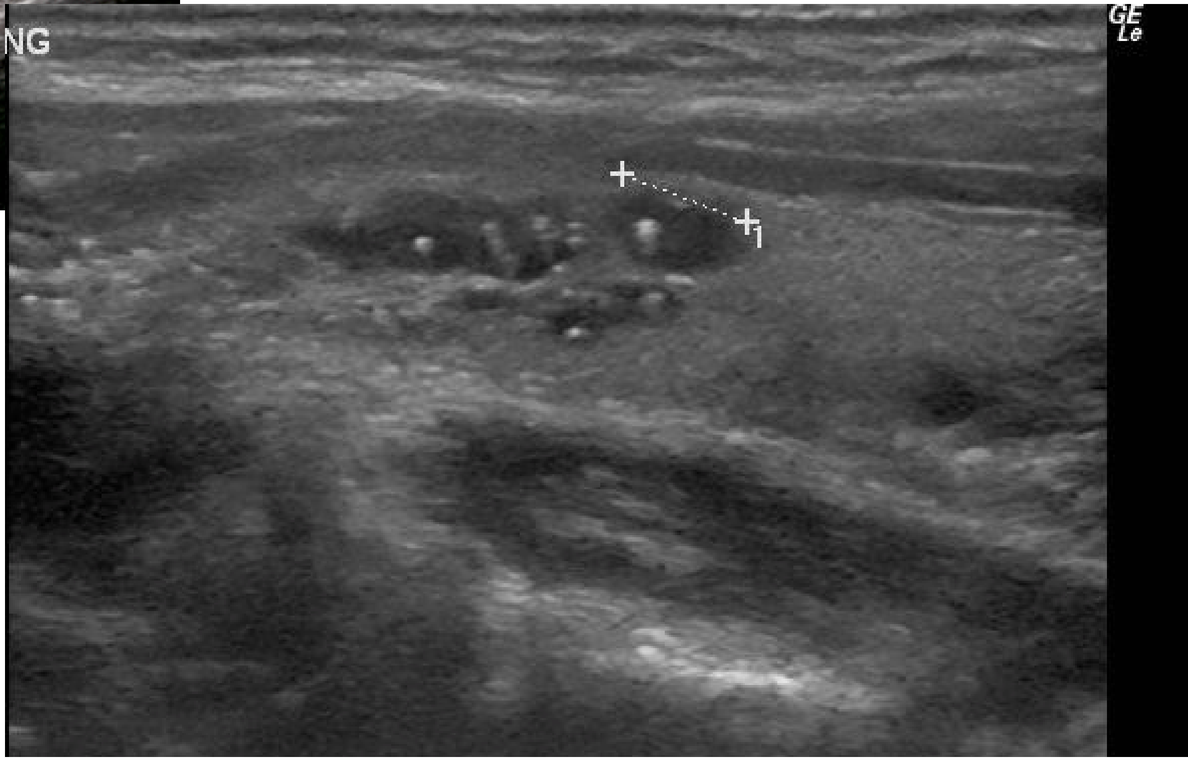


Childhood Cyst and Nodule

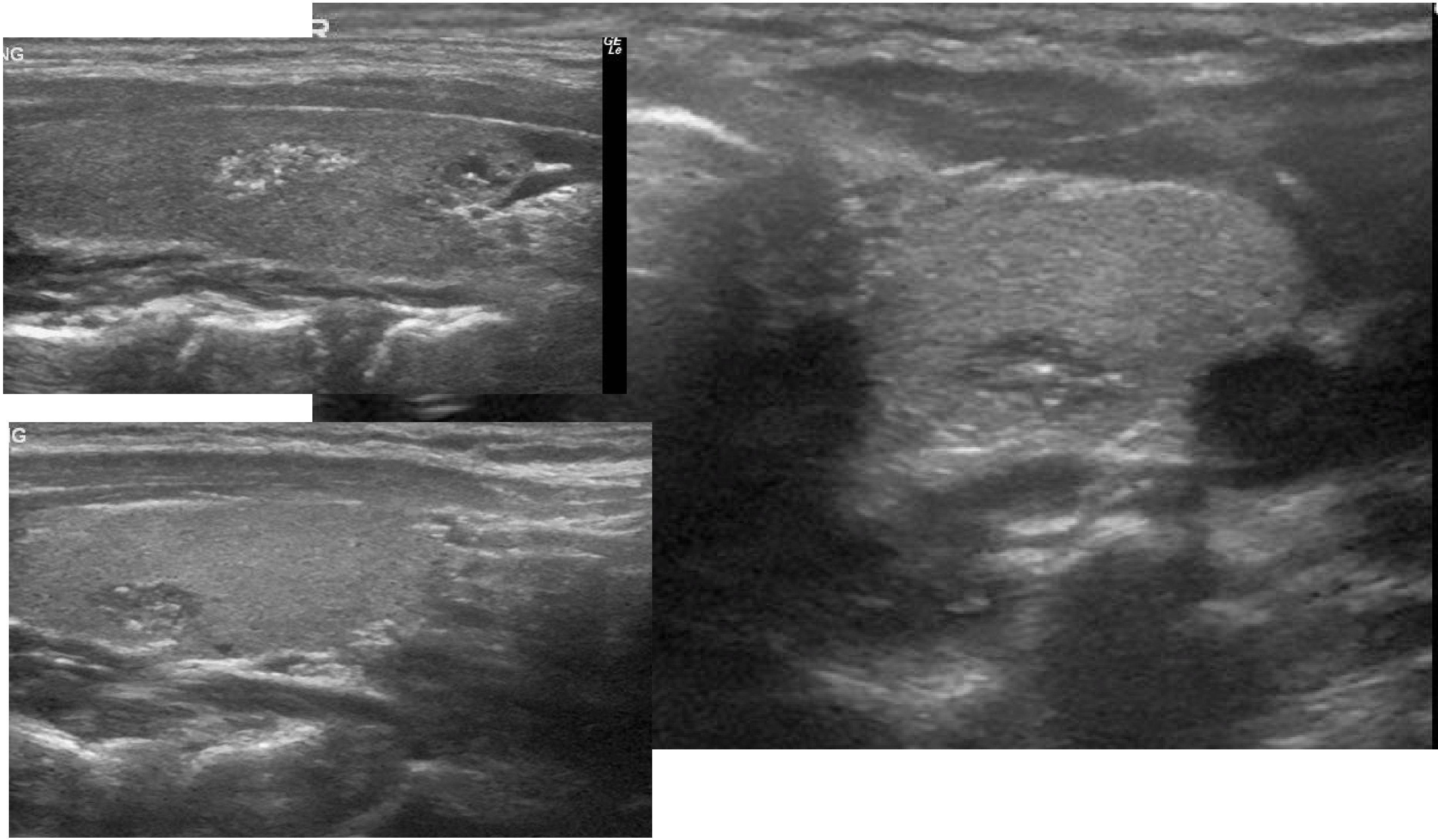


Solid finding within cyst judged as a nodule

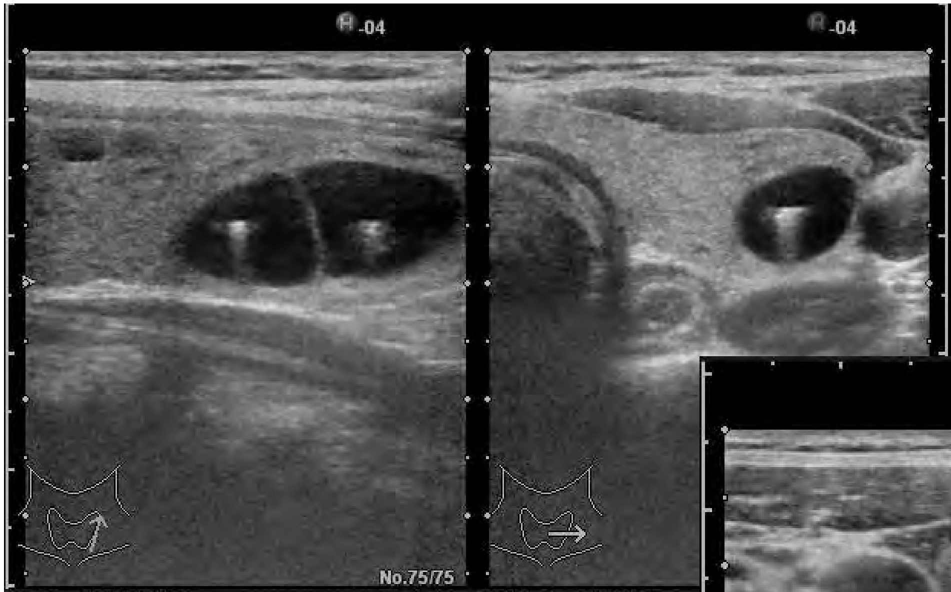
Colloid cyst less than 5 mm
Commonly seen as multiple cysts



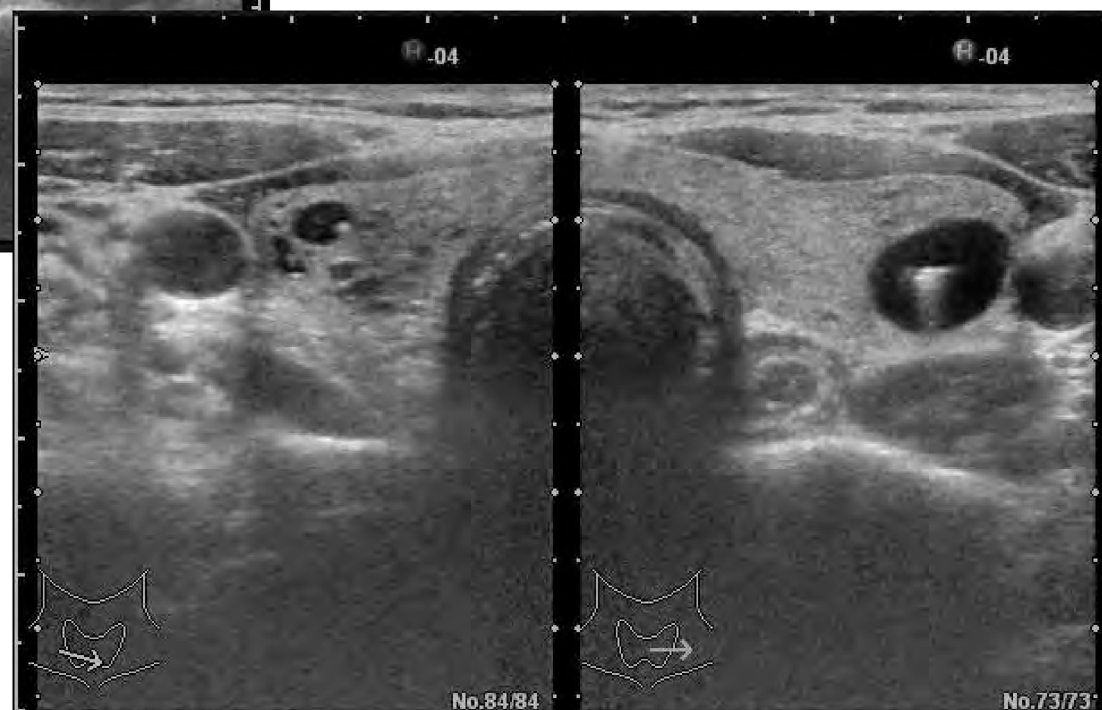
Residual or Ectopic Thymus suspected



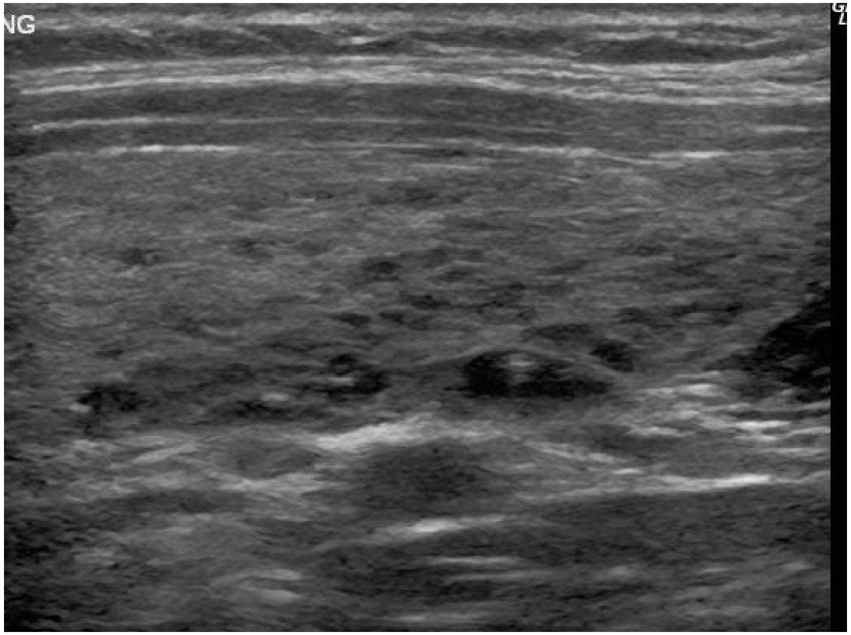
Colloid Cyst
(Cyst with Colloid Clot)

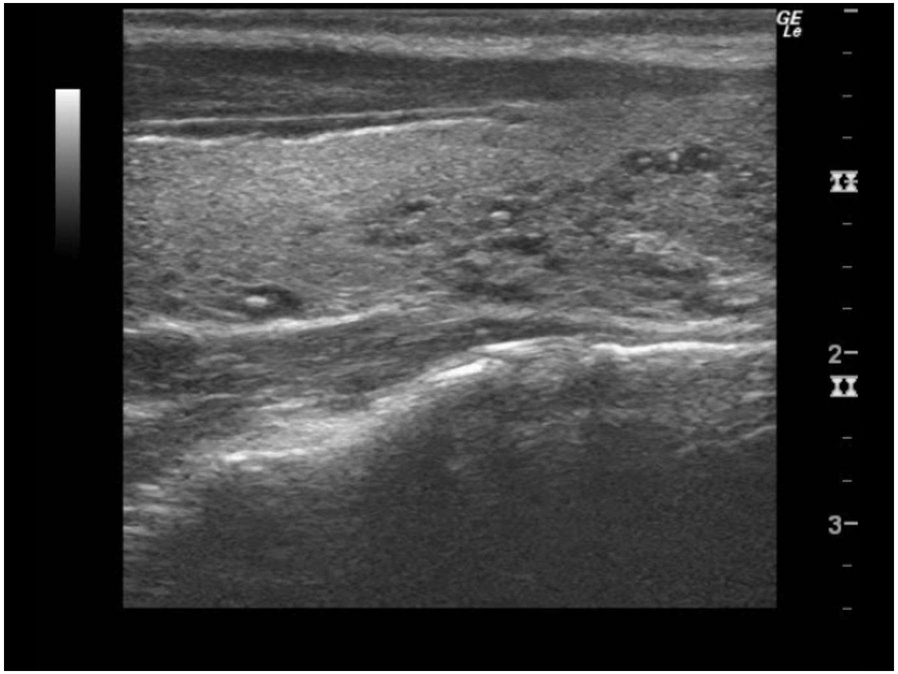


Comet Tail Sign

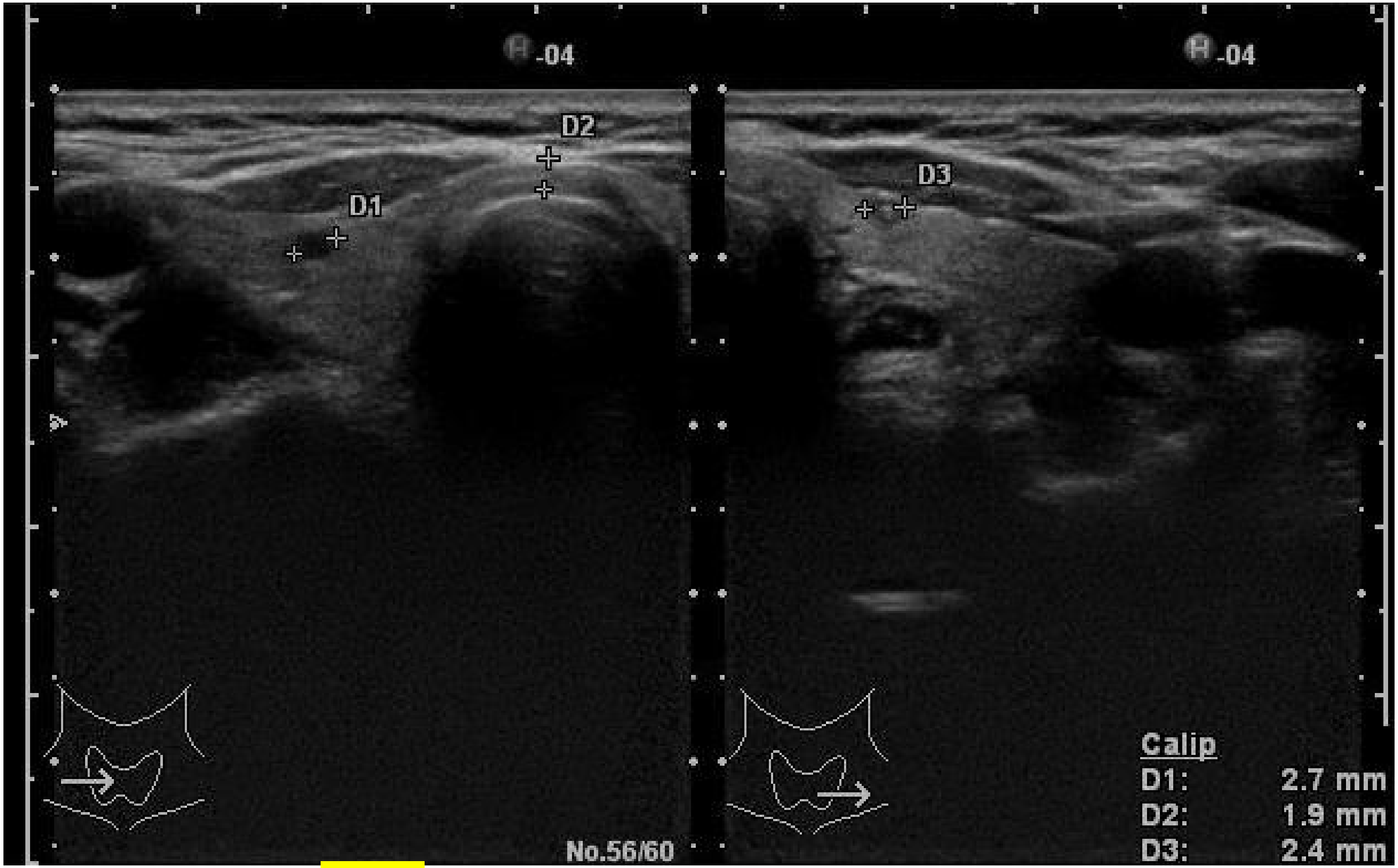


Colloid Cyst
(Cyst with Colloid Clot)



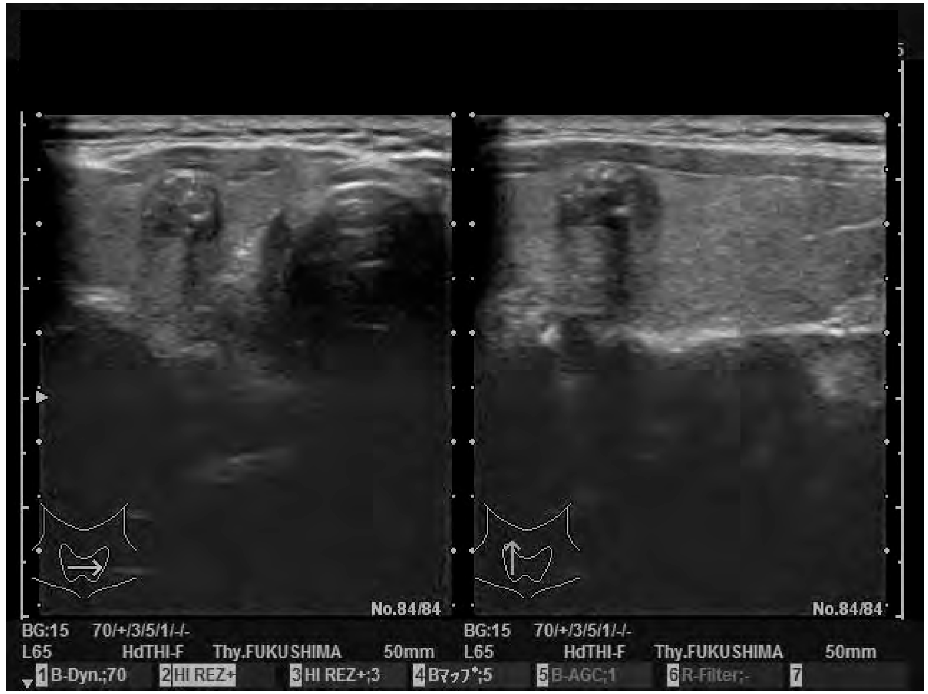


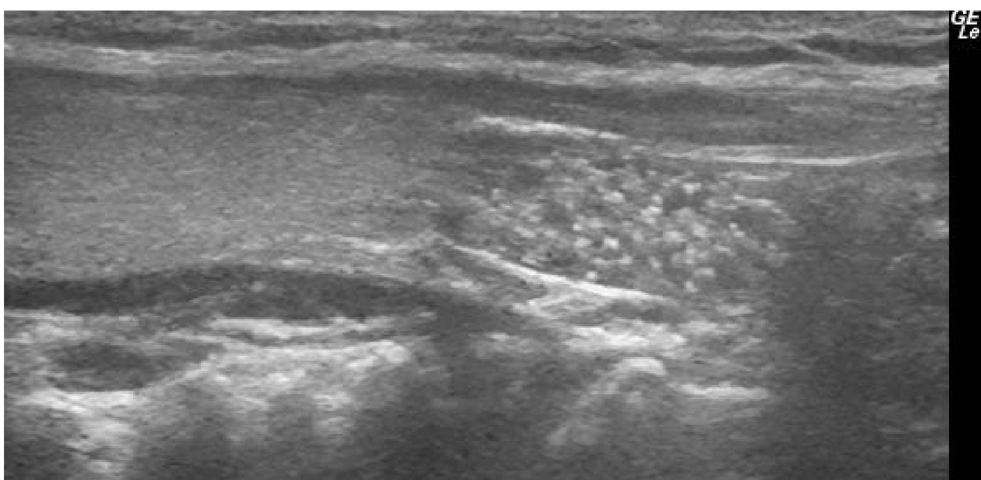
Case of 3-year-old girl

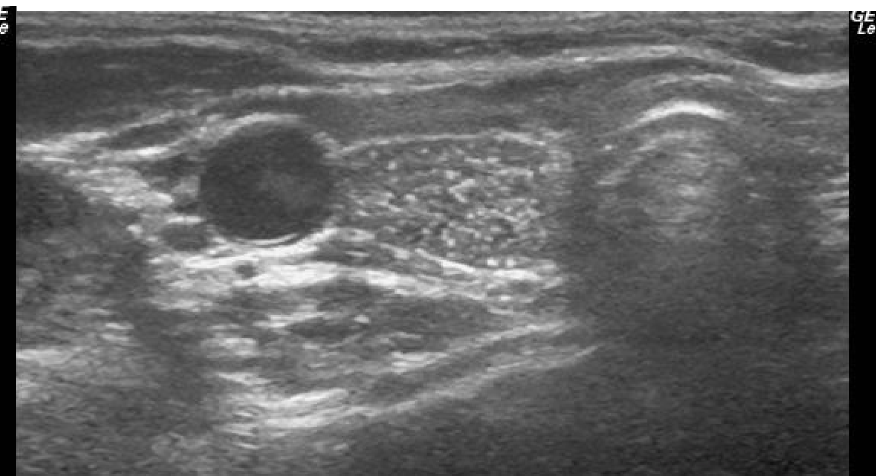


A2

Childhood Thyroid Cancer and Thymus







Results of Detailed Thyroid Survey by Ultrasonography Screening until the middle of January 2013

Judgment		Interpretation	N	(%)
A subtotal		Within normal range	132,354	99.5%
A	(A1)	No specific finding	77,497	58.3%
	(A2)	Nodule with ≤5.0mm or/and Cyst with ≤20.1mm	54,857	41.2%
B		Nodule with ≥5.mm or/and Cyst with ≥20.1mm Recommended 2nd Screening	734	0.5%
C		Needed further examination	1	0.001%
		Total	133,089	100%

(Data are available at http://wwwcms.pref.fukushima.jp/)

Results of First Screening of Preliminary Survey (1st Survey) from October 9, 2011 to the End of March 2012

Judgment		Interpretation	N	(%)
A subtotal			37,928	99.5%
A	(A1)	No nodule and/or Cyst	24,468	64.2%
	(A2)	Nodule with ≤5.0mm and/or Cyst with ≤20.0mm	13,460	35.3%
B		Nodule with ≥5.1mm and/or Cyst with ≥20.1mm	186	0.5%
C		Requires immediate examination	0	0%
		Total	38,114*	

(Data available at http://wwwcms.pref.fukushima.jp/)

** Participation rate :80%*

Secondary Examination (Confirmatory Examination)

started from March 2012

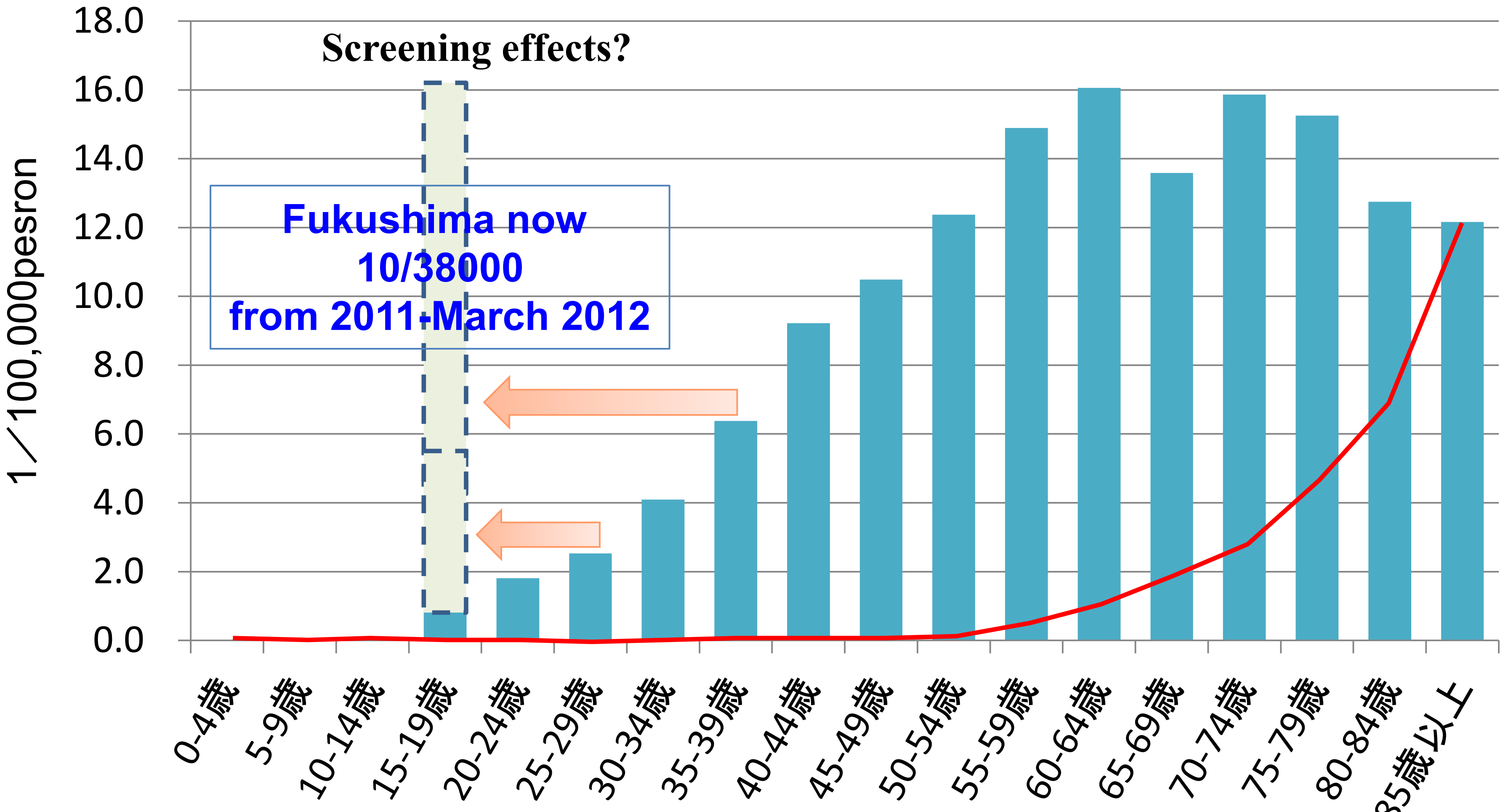
	No. of persons scheduled Secondary Examination (a)	No. of persons Performed Secondary Examination (b)	Implement-ation rate of Secondary Examination (%) (b/a)	No. of Re-examination	No. of Secondary Examination result decision						Total No. of Second Examination
						Down staging ※1		Follow up for usual medical examination※2			
						A1	A2	total	FNAC done	US alone	
1st Preliminary Survey	186	162	87.1	11	151	11	22	118	76	42	390
2nd Preliminary Survey	549	56	10.2	20	36	0	12	24	9	15	102
Total	735	218	29.7	31	187	11	34	142	85	57	492

※1 The cases recommended a next full scale survey starting April 2014 as they were re-judged by A1 and A2 to be without abnormal findings.
※2 The cases are going to shift to the usual medical examination and be re-consulted in six months or one year.

Of the 76 cases in which FNAC was performed in 1st Preliminary Survey, 10 cases were diagnosed as malignant or suspected for malignancy, and thyroid cancer was already confirmed in 3 of the 10 cases after thyroid surgery.

Incidence of Thyroid Cancer in Japan

−Estimated incidence rate stratified by age per 100,000−



（**Death** 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.1 0.1 0.1 0.3 0.8 1.1 2.0 2.8 4.8 7.7 12.2）

（National Cancer Center in JAPAN）

Sensational News by Media

- **Over a third of Fukushima children at risk of developing cancer (June 2012)**
- **Fukushima kids have skyrocketing number of thyroid abnormalities (February 2013)**

⇓

Sophisticated mass screening activities in Fukushima has lead to an increase in the incidence of thyroid nodules/cysts, and cancer due to earlier detection of non-symptomatic cases. It is therefore not be possible to compare the future observed thyroid cancer incidence with the figures of any previous report, as the baseline risk changes due to the screening activities.

Interim Results of Health Checkup for the Evacuees in Fukushima in 2011

- **The 2011 Comprehensive Health Check clarified the general health conditions of evacuees from the government-designated evacuation zone after the Great East Japan Disaster. Obesity and hyperlipidemia exist even at young ages and increase in both male and female adults. Liver dysfunction and hyperuricemia increase at relatively young ages in male. Furthermore, hypertension, glucose dysmetabolism, and renal dysfunction increase in adulthood and are most common at older ages.**
- **We compared the comprehensive health check results after the disaster with the results of health examinations performed before the disaster in children and adults. The results suggested that the rates of obesity, glucose metabolic dysfunction, hyperlipidemia, and liver dysfunction after the disaster were high, at least in part, compared with those before the disaster. Regarding the factors that contributed to these results, changes of lifestyle, diet, exercise, and other personal habits caused by forced evacuation are suggested, although there were interfering factors such as the difference of health check period, age distribution, region distribution and participation rate.**
- **Based on the results of the health check carried out in 2011, we are continuing the comprehensive health check long term and maintaining the system to prevent various diseases, including life-style related disease of participants.**

Interim Results of Mental Health and Life-style Survey for the Evacuees in Fukushima in 2011-2012

In children

- **The most remarkable issues are physical symptoms, *influences at school performance, irritation, anxiety & depression, and sensitivity to earthquakes & radiation* taken from the category of "Reactions amongst Children due to 3.11 Disaster".**

In adults

- **The most remarkable issues are *sleep issues, physical problems, depression, fear of future, and agitation, discount of evacuation life*, taken from the category of "Reaction to Self from the 3.11 Disaster".**

Interim Results of Survey of Expectant and Pregnant Mothers in the entire Fukushima in 2011-2012

- ***There are neither any increase of miscarriage nor artificial abortion*** **owing to the extensive efforts of the Japanese Medical Association, especially Obstetricians and Gynecologists.**
- **Furthermore by the Japan Association of Obstetricians and Gynecologists (JAOG), the congenital malformations were evaluated in babies delivered in Fukushima prefecture.**
- **There is** ***no obvious increased prevalence rate of congenital malformations*** **at the present time compared with the rate of Birth Defects Monitoring of JAOG. However, it is necessary to gather more cases to draw a conclusion.**

Fukushima Radiation and Health

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

ふくしまから はじめよう。

- Home
- Message from Director
- Who we are
- Fukushima Health Management Survey
- Results of Survey
- Message
- Contact us
- Donation
- Selected Publications
- News
- Upcoming Event

What's New

News

- 25-27 Feb 2013 International Academic Conference on Radiation Health Risk Management in Fukushima will be livestreamed via USTREAM.
- 23 Jan 2013 IARC/FMU Letter of Collaboration was signed.
- 27 Dec 2012 Preliminary Report of Fukushima Health Manage… released.
- 15 Dec 2012 NCKU-FMU Bilateral University Conference succ… concluded.
- 15 Dec 2012 Fukushima/IAEA MOC was ratified.
- 17-18 Nov 2012 Dr. Emilie van Deventer of WHO and Dr. Joac… IARC visited FMU.
- 02 Nov 2012 ICRP-FMU Joint Seminar successfully concluded
- 15-16 Oct 2012 Dr. Nestor Nicolas of Government of Buenos A…
- 04 Oct 2012 Dr. Zhanat Carr of WHO visited FMU.
- 13 Sep 2012 Delegation from Sweden visited FMU.
- 30 Aug 2012 Ministry of Environment Expert Discussion Sessi… FMU.
- 13 Aug 2012 Progress report of Fukushima Health Manageme… released.
- 31 … Sp…
- 22-24 Jul 2012 Thyroid specialists from Russia and Belarus vis…

福島県 Fukushima Prefecture　公立大学法人 福島県立医科大学　English Site (Fukushima Radiation and Health)

放射線医学県民健康管理センター

ふくしまから はじめよう。

大切なお知らせ

2012年11月12日
甲状腺検査についてのパンフレットの掲載をお知らせします（PDF）

2012年10月26日
基本調査問診票の書き方相談の日程をお知らせします

2012年10月22日
平成24年11月実施分の甲状腺検査のスケジュールをお知らせします

- 県民健康管理調査とは？
- 「基本調査」とは？
- 「甲状腺検査」とは？
- 「健康診査」とは？
- 「こころの健康度・生活習慣に関する調査」とは？
- 「妊産婦に関する調査」とは？
- よくあるお問い合わせ
- 放射線医学 県民健康管理センターとは？
- Foreign Language Questionnaire Form
- 関連リンク情報

あなたの健康、見守ります。

県民健康管理センターから甲状腺学会等、関連学会へ送付した文書について

県民健康管理調査「甲状腺検査」説明会 開催のお知らせ

福島県では原子力災害による放射線の影響を踏まえ、県民のみなさんの健康を長期にわたり見守っていきます。その基本となるのが「**県民健康管理調査**」です。

「**県民健康管理調査**」の内容は、次の5項目です。

1. 基本調査（問診票による被ばく線量の把握）
   基本調査問診票の再交付はこちら
2. 甲状腺検査
3. 健康診査
4. こころの健康度・生活習慣に関する調査
5. 妊産婦に関する調査

これらの調査は、「**福島県立医科大学 放射線医学県民健康管理センター**」が中心になって、県内、県外の医療・保健・福祉関係者の協力を得て実施しています。

それぞれの調査の内容については、左のボタンをクリックしてご覧ください。

福島県立医科大学
放射線医学県民健康管理センター
電話：**024-549-5130**（土日祝日を除く 9:00~17:00）
メール：kenkan@fmu.ac.jp

http://fukushima-mimamori.jp/

ISSUES to be newly discussed and changed after FUKUSHIMA

Issue 1: Emergency Planning Zones and Protective Action and Guidelines

Issue 2: Potassium Iodine (KI) Policy

Issue 3: Communications and Public Health Education (Countermeasures against *radiophobia*)

Issue 4: Reentry and Recovery Policy

In order to improve Global Radiation Protection Culture, Fukushima is now responsible as a focal point and world-leader to work together with NCRP and international related organizations and research/education university/institutes; radiation risk analysis, risk communication, risk management, health care, risk education/training…………

International Academic Conference on Radiation Health Risk Management in Fukushima

Organized by Fukushima Medical University
with the cooperation of Fukushima Prefecture and
the Subcommittee of Clincial Medicine;
"Radiation Protection and Risk Management",
Science Council of Japan

Scope of the conference:
Radiation health risk related to the Fukushima accident
will be discussed by the international experts.

Date 25 (Mon) – 27 (Wed) February 2013

Venue 3F West Building, Fukushima View Hotel
13-73, Ootamachi, Fukushima-shi, Fukushima 960-8068, Japan

Language: English (no simultaneous translation)

For further information please contact
Department of International Cooperation,
Radiation Medical Science Center for the Fukushima Health Management Survey,
Fukushima Global Medical Science Center,
Fukushima Medical University
Email: kenkani@fmu.ac.jp
Phone: +81-24-573-1501

Program

Day 1, Monday 25 February

7:30 –	Registration	
8:30 – 8:40	Welcome Address	Shin-ichi Kikuchi (President, Fukushima Medical University)
8:40 – 9:00	Opening Addresses	Yohei Sasakawa (Chairman, Nippon Foundation) Kozo Akino (Parliamentary Secretary of the Environment, Ministry of the Environment, Government of Japan)
9:00 – 9:15	Introduction	Mitsuru Munakata (Director, Fukushima Medical University and Fukushima Medical University Hospital)
9:15 – 10:05	Session 1	**Initial Medical Response to the Fukushima Nuclear Accident** **Co-chairs:** Kazuhiko Maekawa (University of Tokyo) Fred A. Mettler, Jr. (University of New Mexico, U.S.A.) **Speakers:** Koichi Tanigawa (Hiroshima University) Arifumi Hasegawa (Fukushima Medical University)
10:05 – 12:35	Session 2	**Current Actions of the Fukushima Health Management Survey** **Co-chairs:** Christopher Clement (ICRP) Shunichi Yamashita (Fukushima Medical University) **Speakers:** Seiji Yasumura (Fukushima Medical University) Akira Ohtsuru (Fukushima Medical University) Shinichi Suzuki (Fukushima Medical University) Mitsuaki Hosoya (Fukushima Medical University) Keiya Fujimori (Fukushima Medical University) Hiroki Yabe (Fukushima Medical University)
12:35 – 13:30	Lunch	
13:30 – 15:30	Session 3	**Coordination and Cooperation with Domestic Members (1)** **Co-chairs:** André Bouville (U.S. National Cancer Institute, retired) Reiko Kanda (National Institute of Radiological Sciences) **Speakers:** Noboru Takamura (Nagasaki University) Makoto Akashi (National Institute of Radiological Sciences) Ikuo Kashiwakura (Hirosaki University) Keiichi Akahane (National Institute of Radiological Sciences) Kenji Kamiya (Hiroshima University) Kazunori Kodama (Radiation Effects Research Foundation)
15:30 – 15:50	Coffee Break	
15:50 – 18:10	Session 4	**Coordination and Cooperation with Domestic Members (2)** **Co-chairs:** John D. Boice, Jr. (Vanderbilt University School of Medicine, U.S.A.) Toshiteru Okubo (Radiation Effects Research Foundation) **Speakers:** Tomohiro Matsumoto (Kyoto University) Nakahiro Yasuda (University of Fukui) Hideki Kakiuchi (Institute for Environmental Sciences) Ryuichi Shimizu (Japan Society for the Promotion of Science) Takayuki Takahashi (Fukushima University) Hokuto Hoshi (Hoshi General Hospital Foundation) Yasuhito Sasaki (Science Council of Japan)