

EURADOS SURVEY ON IN-VIVO MONITORING DATA OF EXPOSED FOREIGNERS IN JAPAN, OBTAINED IN THEIR RESPECTIVE COUNTRIES AT EARLY STAGE AFTER THE NUCLEAR ACCIDENT OF FUKUSHIMA DAIICHI NUCLEAR POWER PLANT

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EURADOS Survey: > 300 foreigners in Japan when Fukushima, in-vivo monitored in their countries. **176 contaminated persons** were evaluated from **Belgium, Canada, Czech Rep., Finland, France, Germany, Greece, Hungary, Norway, Poland, Sweden, UK and Ukraine**

(1) HP Ge detectors for gamma emitters in Total Body:

IRSN Mobile Unit:

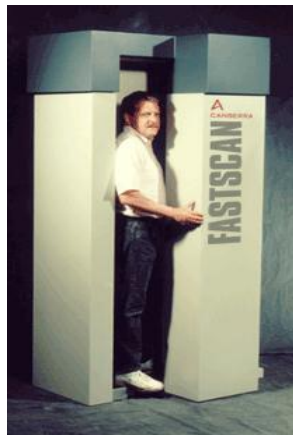


WBC- Shielded Rooms: Chair and bed counting geometries:



(2) NaI(Tl) detectors:

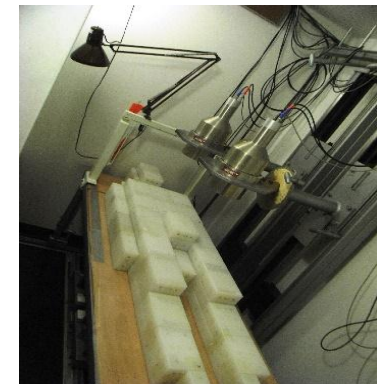
**FASTSCAN WBC:
2 NaI(Tl)
Total Body &
Thyroid
Monitoring, also
in Fukushima
site**



**NaI(Tl) detector:
 ^{131}I , ^{132}I in Thyroid**



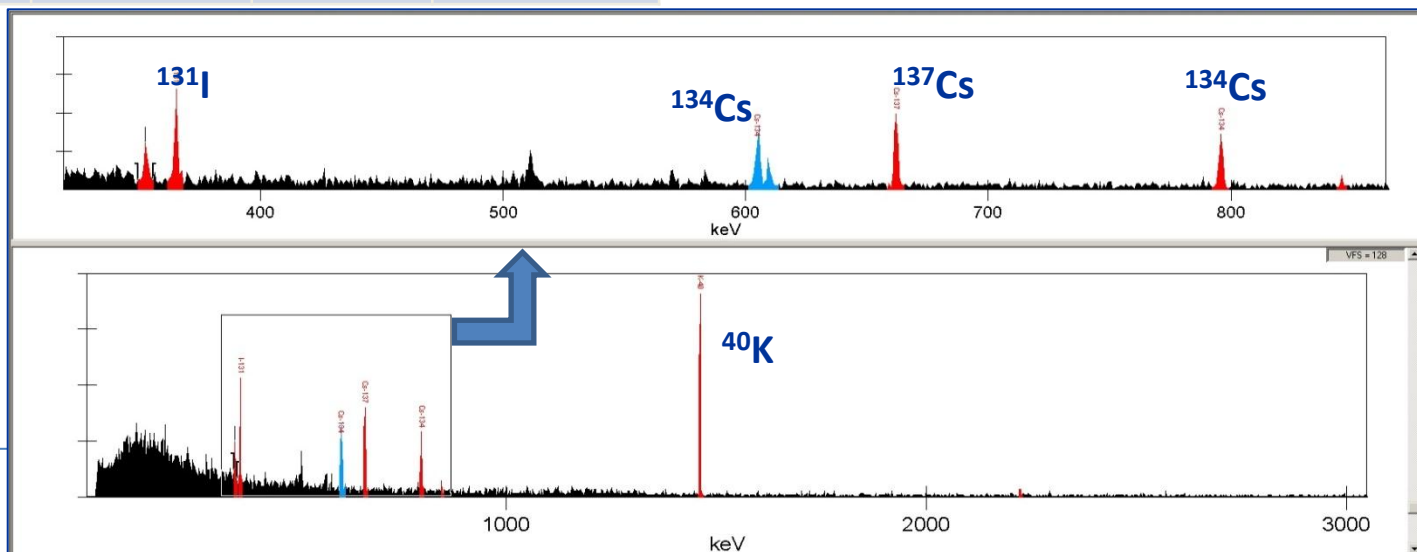
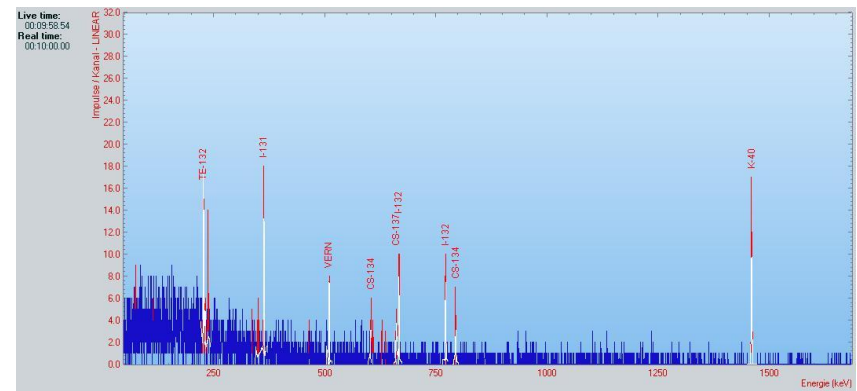
**(3) NaI(Tl) + HPGe detectors:
shielded room, Total Body**



In-vivo monitoring of radionuclides incorporated into the body mainly by inhalation, emitting X-ray and γ radiation: Activity (Bq) retained in Total Body & Thyroid

Radionuclide	$T_{1/2}$	E (keV)	Yield (%)
I-131	8.02 days	364.49	81.7
I-132	2.30 h	49.72	15.10
		228.83	88.12
		667.70	98.7
		772.6	75.6
Te-132	3.20 days	228.3	88.1
Cs-134	2.07 years	604.72	97.6
		795.86	85.53
		569.33	15.38
Cs-137	30.17 years	661.66	85.1

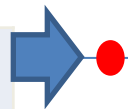
Gamma Spectrum with HP Ge detectors:
Accurate identification/quantification of contaminants, excellent discrimination of contributions from all radionuclides



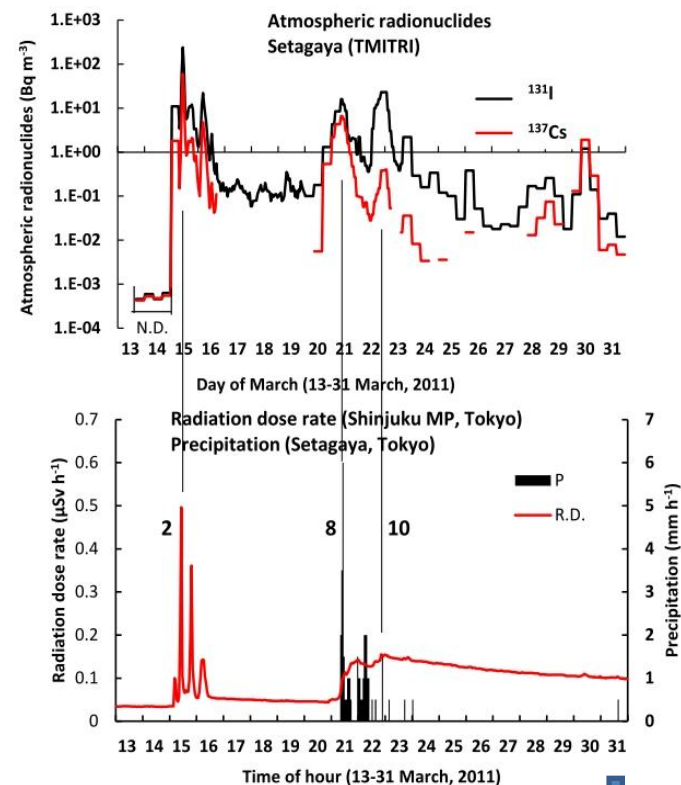
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<u>EARLY MEASUREMENTS (MAR- APR 2011)</u>	No. of cases
Akita	1
Sendai	32
Yonezawa	2
Fukushima City	18
Minamisoma	1
Koriyama	4
Centre (around NPP)	9
Tamura	1
Iwaki	6
Utsunomiya	1
Mito	7
North of Tokyo	2
Chiba	3
Tokyo	49
Osaka	3
Hiroshima	1

<u>LATE MEASUREMENTS (≥ MAY 2011)</u>	No. of cases
Miyagi Pref.	1
Sendai	1
Fukushima City	5
Koriyama	1
Tamura	1
NPP	4
Utsunomia	1
Hitachi	3
Tsukuba	1
Ushiku	1
Tokyo	5
Chiba	2
Yokohama	2

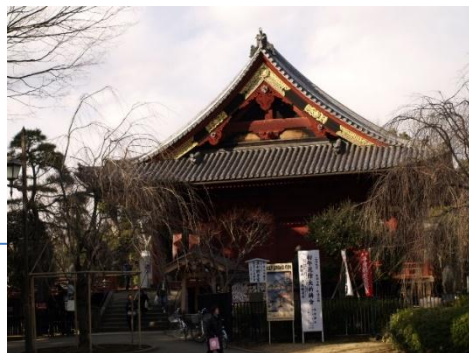


Places of contamination:



(4) Setagaya (TMITRI)

H. Tsuruta 2012, 1st NIRS Symposium
Reconstruction of Early Internal Dose after Fukushima



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Total body Monitoring

Contaminant	No. of cases	Activity (Bq)
^{137}Cs	77	Max: 670
		Min: 18
^{134}Cs	40	Max: 637
		Min: 24
^{131}I	45	Max: 890
		Min: 6
^{132}I	26	Max: 953
		Min: 41
^{132}Te	26	Max: 744
		Min: 24

Thyroid Monitoring

Contaminant	No. of cases	Activity (Bq)
^{131}I	100	Max: 644
		Min: 9
^{132}I	2	Max: 86
		Min: 3
^{132}Te	7	Max: 744
		Min: 24

- **EURADOS Survey 2013: > 300 foreigners in-vivo monitored from 15 countries**
- **176 contaminated persons from Belgium (9), Canada (1), Czech Republic (8), Finland (1), France (76), Germany (58), Greece (5), Hungary (2), Norway (3), Poland (7), Sweden (1), UK (1) and Ukraine (4)**

**Committed Effective Doses E(50):
< 1 mSv**

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