

The effects of Chernobyl in Finland

European antinuclear conference

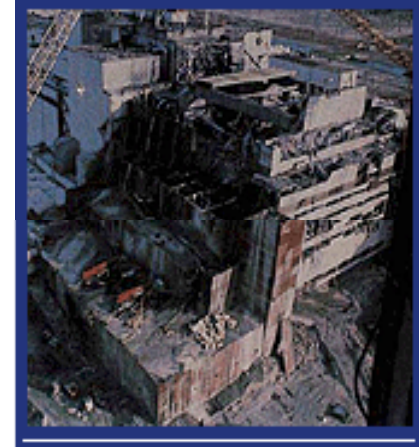
Helsinki 10th of November 2007

Ulla Slama



Chernobyl accident 26th of April 1986

- Ukraine
- Belarus (Gomel)
- Russia



- The most serious nuclear accident in history
- The fourth reactor exploded and started burning
- Fire continuing for 10 days
- Radioactive material spread all over Europe

Year 2007



- Friday 2 November 2007
- **Bomb threat at US nuclear facility**
- **The largest nuclear power plant in the US has been put into "lockdown" after a suspicious device was found in the lorry of a worker, officials said.**
- The incident occurred at the Palo Verde site in Wintersburg, about 30 miles (48km) west of Phoenix in Arizona
- The Nuclear Regulatory Commission classes the incident as an "unusual event" - which tend to occur every few days.

Russian Plant Reports Radiation Leakage

October 30, 2007 10:30 a.m. EST

- Moscow, Russia (AHN) - Russia has confirmed on Tuesday that there has been a radiation leak at a nuclear reprocessing plant in the Ural mountains east of Moscow.
- A faulty tap allowed radioactive waste to leak from a tank onto a stretch of road at the Mayak plant last Thursday, according to local emergency officials
- Incidentally, the Mayak plant, a top secret Soviet atomic weapons facility also figured in a major nuclear accident in 1957.
- While the latest incident, pinpoints a violation of safety rules as the cause for the leak, Russian prosecutors are still not ruling out the possibility of initiating a criminal case.



- **News - Japan earthquake**
- At the Kashiwazaki **nuclear plant**, a fire broke out in an electricity transformer and a small amount of water containing radioactive material leaked into the sea, officials said.
16 Jul 2007



- En kubikmeter radioaktivt processvatten välldes ut ur en tank i en av reaktorernas avfallsstationer på Oskarshamns kärnkraftverk i förra veckan.
- Varför tanken svämmade över är oklart. Händelsen rapporterades till Statens strålskyddsinstitut SSI i fredags, skriver Barometern/Oskarshamns-Tidningen.
- Några risker för driften förelåg dock inte. En besvärlig sanering väntar nu.
- Enligt Oskarshamns kraftgrupp, OKG, är det inte tillfredsställande "att radioaktiva ämnen konstateras på ett ställe där de inte förväntas".
- **Thursday 2 febr 2007**

STUK (Säteilyturvakeskus-Radiation and Nuclear Safety Authority) report

- Eastern Uusimaa: Today's dose rates

Station	Dose rate	Day	Time
Sipoo	0,14	6.11.2007	20-21
Loviisa	0,21		
Pernaja	0,13		
Ruotsin- pyhtää	0,20		
Lapinjärvi	0,17		
Porvoo	0,13		

ETA European Thyroid Association

Hot thyroidology

- Published survey August 2006 20 years after Chernobyl
- Chernobyl beyond 20 years and thyroid cancer
- Shunishi Yamashita, Department of Health and Environment, WHO, Genova
- Atomic Bomb Disease Institute, Nagasaki University

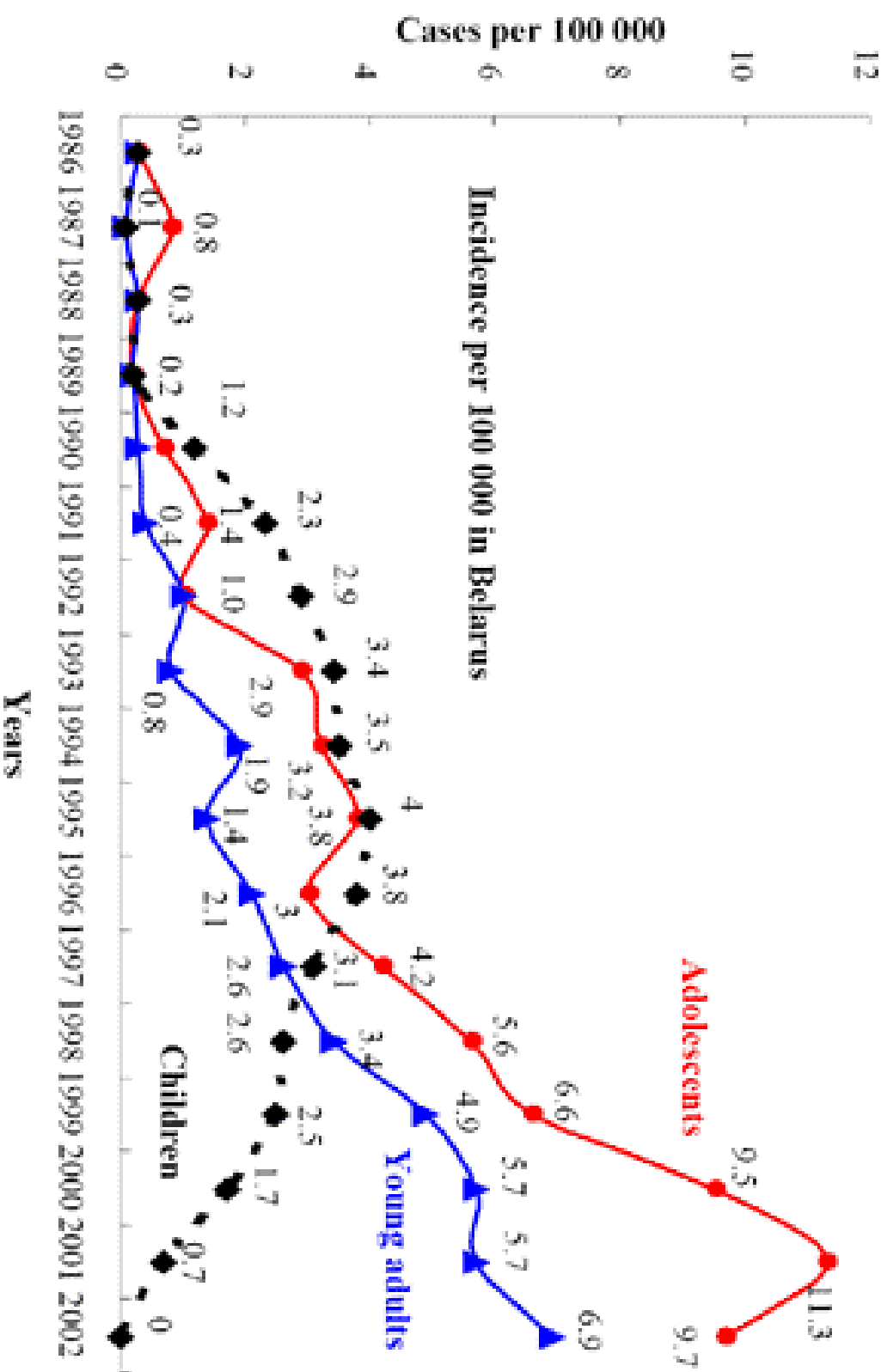
- Thyroid cancer is associated with external ionizing radiation exposure
- Especially if irradiation occurs in neonates, infants and children
- 1990 – 2005 about 5000 childhood and adolescent thyroid cancers around Chernobyl
- Only 20 deaths

- Post Chernobyl thyroid cancer occurred in individuals 5 year old or less at the time of the accident (born ~ 1981-1986)
- Still no clear evidence that the incidence of thyroid cancer has increased among those who were adult in 1986
- The subjects of younger age at the time of radiation exposure had, and continue to have, an elevated risk of developing thyroid cancers

- Today new cases are mainly found in 20 to 30 year old patients

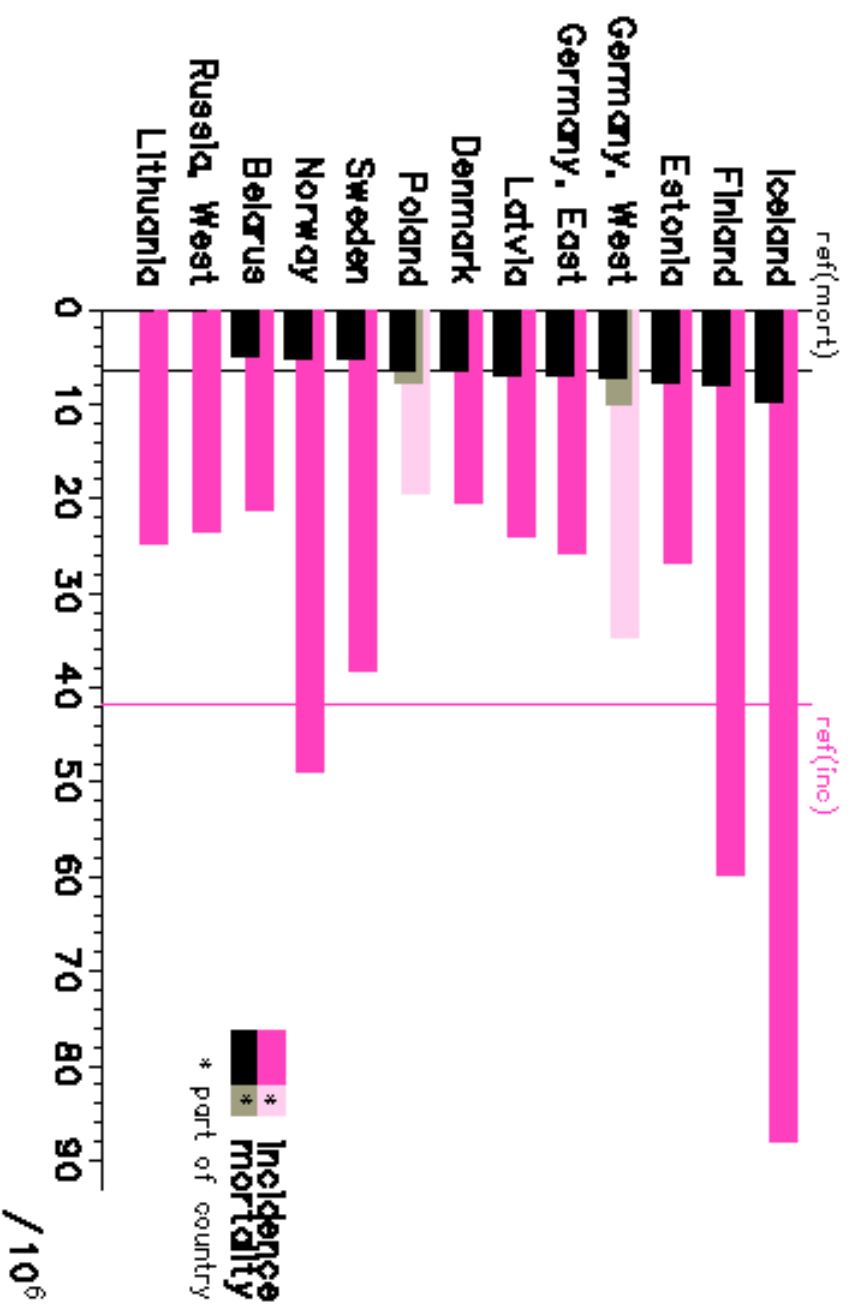
- Papillary thyroid cancer most frequent
- High doses of ionizing radiation induce cell death
- Low doses induce chromosomal instability
- Two types – early after irradiation -late
- RET/PTC rearrangements in young patients
- BRAF mutation similar in thyroid cancers around Chernobyl and other regions
- Still understanding of markers to distinguish between radiation-induced and sporadic papillary cancer is limited

- The latest study in Hiroshima and Nagasaki Bomb survivors has indicated that a biological effect from a single brief external exposure to ionizing radiation 60 years in the past still occurs and can be detected,
- In childhood, once exposed even to low doses of ionizing radiation either externally or internally, the cancer prone damage within the thyroid gland can be preserved for a long time.



- Today, special attention should be paid to a high risk group of individuals who have been exposed to radioactive iodines just after Chernobyl accident and who are now 20 to 30 years old.

Thyroid gland females



Autoimmunity

- Autoimmune chronic inflammation in the thyroid gland causes destruction of thyroid cells
- The production of thyroid hormone decreases
- Hypothyroidism – reduces metabolism in human body
- Symptoms: Fatigue, reduced heart action, constipation, hair loss, cold intolerance, depression
- Diagnosis: Increase of thyroid antibodies in blood, ultrasound of thyroid gland

Radioactive radiation increases thyroid antibody rate

- Study in Italy and Belarus:
- Tygl-Ab and TPOAb rate of 13 year old children 8 years after Chernobyl accident
- Cesium radiation 5,4 Ci/km versus 0,1 Ci/km
- Antibodies 19,5 % versus 3,8 %
- Age over 13 years antibodies by girls 19 %, boys 9,6 %
- Estrogene hormone might influence higher susceptibility
- Lancet 1998:352:763-766, Pacini-Vorontsova-Molinaro. Prevalence of thyroid antibodies in children and adolescents from Belarus exposed to the Chernobyl radioactive fallout

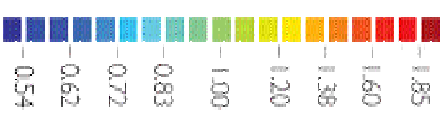
- 12 % of children with newly diagnosed diabetes mellitus type I have positive thyroid antibodies
- Finland high rate of diabetes mellitus

Thyroid cancer in Finland

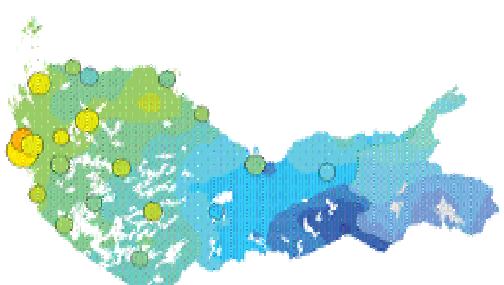
- Yearly incidence in Finland about 350 cases

Naisten eräiden syöpämuotojen yleisyyden suhteellinen vaihtelu Suomessa 1995-2004. Koko Suomen keskarvo = 1,0. Kartat perustuvat kunnittaisiin lukuihin.

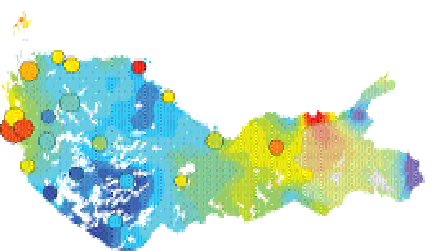
100 km



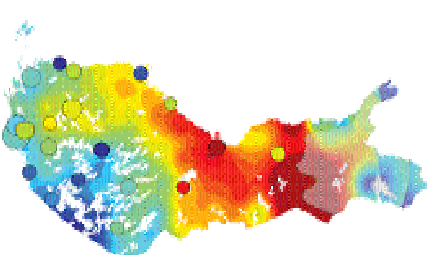
Kaikki syövät



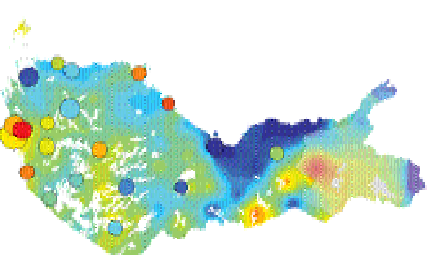
Rintasyöpä



Keuhkosyöpä



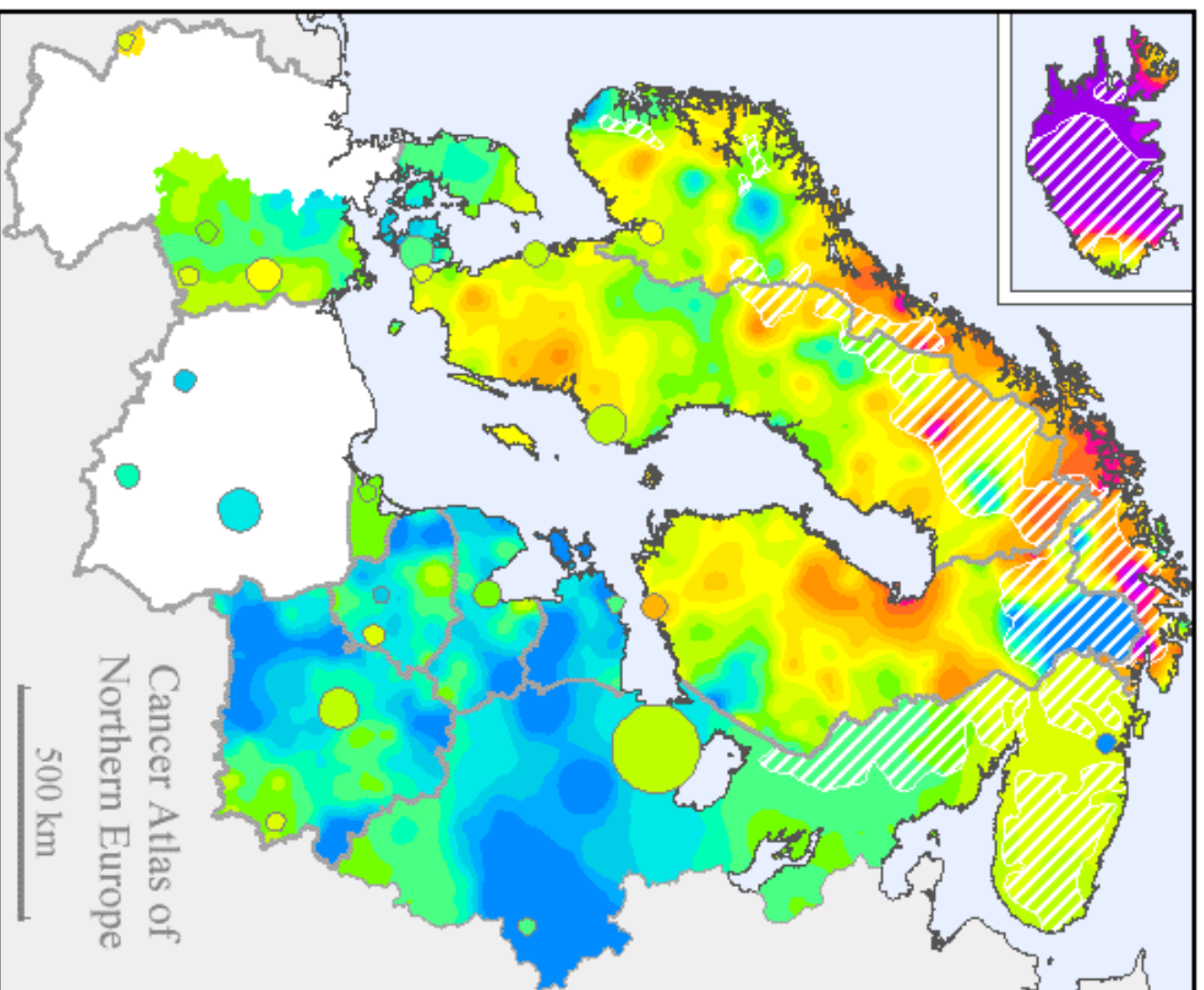
Kilpirauhassyöpä



Kohdunkaulan syöpä

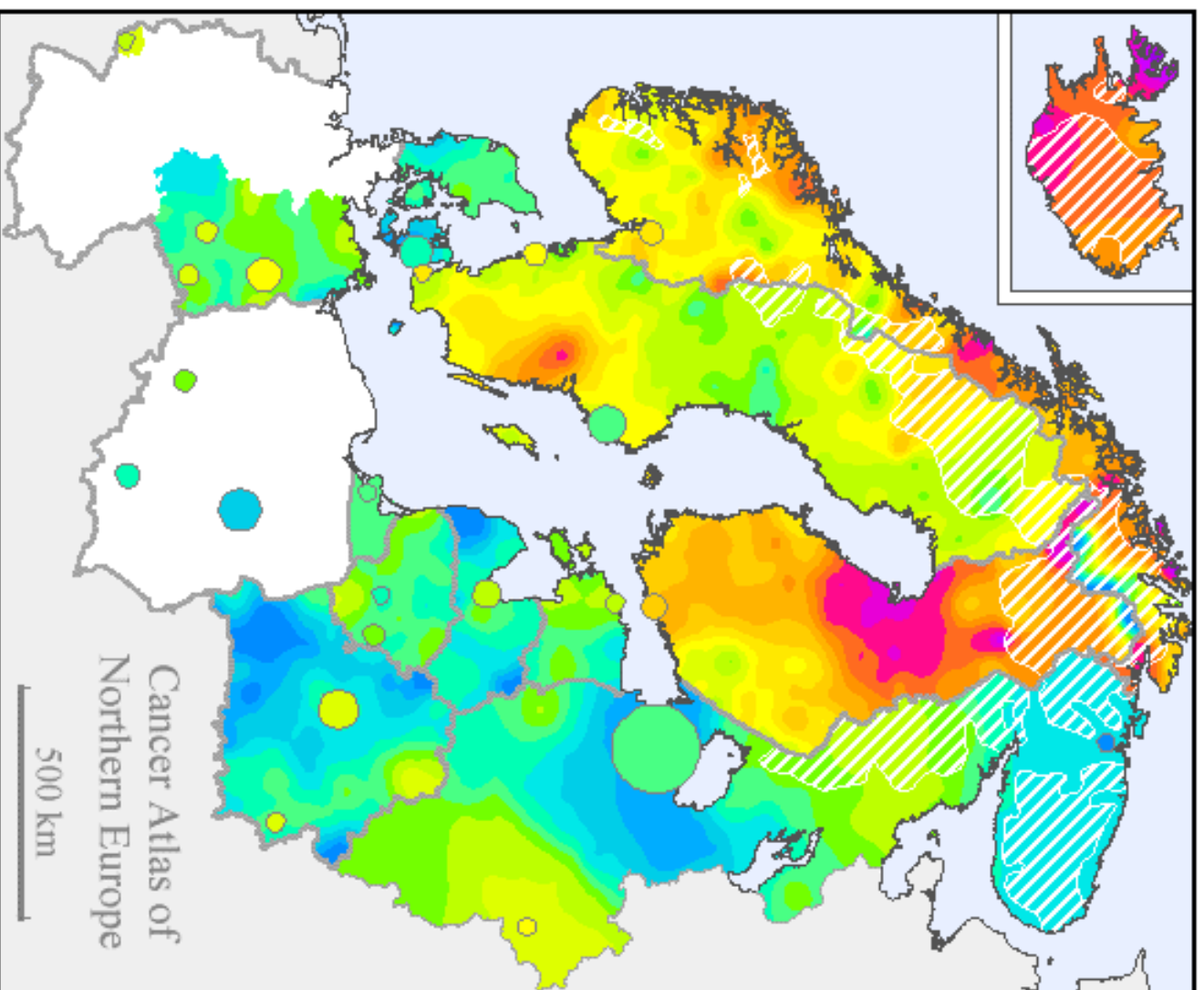
Cancer of the thyroid, males

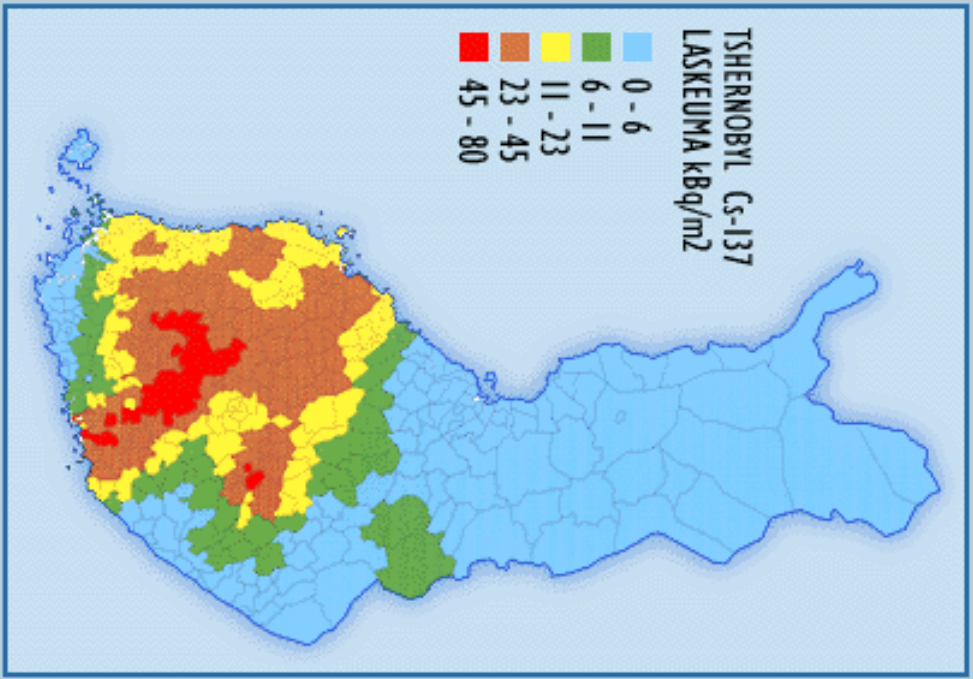
incidence/10⁶



Cancer of the thyroid, females

incidence/10⁶





Japan

- Hiroshima and Nagasaki
- Years 2003 and 2004
- Examination of thyroid gland of 4000 people
- 44,8 % thyroid disease
- Cancer, benigne tumours and cystic disease significantly increased in direct proportion to the distance from centre of explosion

- Exposition to nuclear radiation in childhood increases the risk of developing thyroid tumour disease during the whole life

Breast cancer incidence increased

- Exposition of > 40 milliSievert
- Breast cancer rate increased 11-15 years after accident
- Belarus 2,2 times
- Ukraine 1,8 times
- Risk higher by women younger than 45 years at the time of Chernobyl accident
- Breast gland contains iodine
- Eero Pukkala, Liudmila Gulak etc., Finnish Cancerregistry

- Stomach cancer and kidney cancer show a small increase in individuals with thyroid nodules
- Iodine containing tissues

- *A view into the future*
- Arrangements for preparing protection for the population are also in future necessary. Accidents and other disturbances in the nuclear plants might happen again.
- International terrorism and organized criminality should be considered in view of nuclear safety.
- However, we have today a little more knowledge about handling different irradiation situations than in the year 1986 and are hopefully prepared to use it.

Protection of thyroid gland by nuclear plant accident

- Recommendations by Food and Drug Administration, FDA
- Finland dr Juhana Idänpään-Heikkilä
- New recommendations after Tshernobyl catastrophe, earlier recommendations after Hiroshima

Jodix 130 mg

- Adult 130 mg - 1 tabl
- 3 years – 18 years 65 mg – $\frac{1}{2}$ tabl
- 1 month – 3 years 32 mg – $\frac{1}{4}$ tabl
- < 1 month 16 mg – $\frac{1}{8}$ tabl

- Atomkraftwerke sind nie sicher
- **Invitation to Conference: Science or Fiction – Is there a Future for Nuclear?**
- **8th November 2007, Vienna**



- **Zwentendorf an der Donau** is a small market [municipality](#) in [Lower Austria](#), with 3,280 inhabitants. It is located at [48°21'N, 15°54'E](#), in the [Tullnerfeld](#) on the southern bank of the [Danube](#).
- The place attained celebrity as the site of the only Austrian [nuclear power station](#), which was established here, but its start-up was prevented by a popular vote on [November 5, 1978](#). A breath-thin majority of 50.47% voted against the start-up.

- Marie Curie discovered radioactivity 1896



- Auf Besuch in Loosdorf
- Ein zwölfjähriges Mädchen, Diana Razdzhoy, ist das 1000ste Kind, das im Rahmen des Projekts Tschernobyl-Kinder von GLOBAL 2000 nach Österreich auf Erholungsurlaub gekommen ist. **Inklusive 2007 haben sich in den letzten zehn Jahren 1122 Kinder aus der Ukraine in verschiedenen Gemeinden in Niederösterreich, Burgenland und Salzburg erholt.**

