

Health Effects of Kanemi Oil Disease (Yusho) on the Next and Subsequent Generations

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I. Background

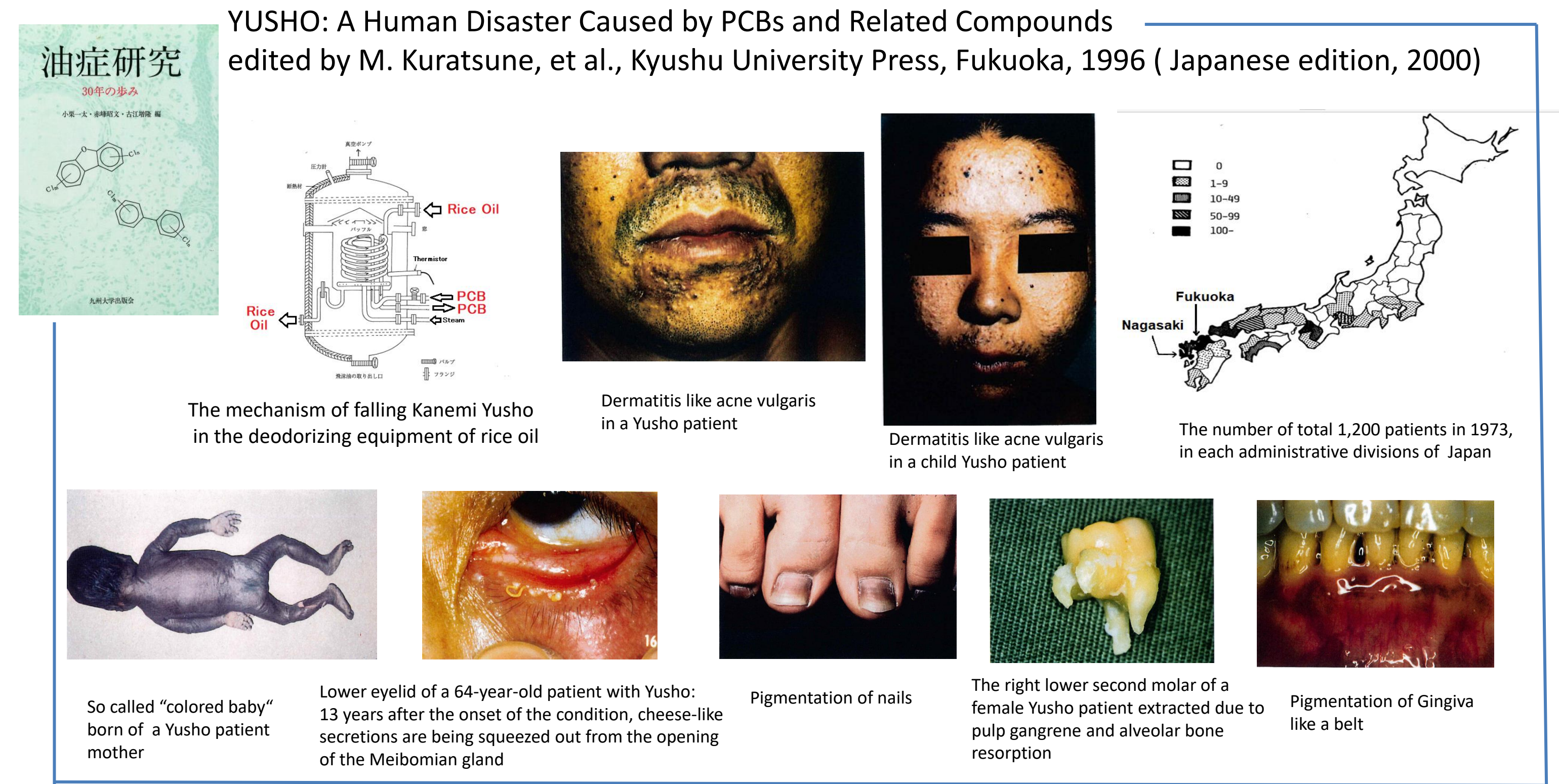
In the Kanemi oil disease (Yusho) incident in 1968, rice bran oil of Kanemi Soko Co. became contaminated by large amounts of PCB (Polychlorinated biphenyls) during the manufacturing process, causing a large-scale poisoning. While 14,627 persons reported to the public health center, only 913 (6.2%) had been certified as Yusho patient by strict diagnostic criteria, focusing on skin symptoms in July 1969.

However, later it was determined that the main cause of Yusho was due to far more toxic PCDF (polychlorinated dibenzofurans, a kind of dioxin), that was contaminated at the same time .

In 2004, the residual concentration of 2,3,4,7,8-PeCDF was determined as the diagnostic criteria for Yusho (50 pg/g lipids). So, this substance must be proved to be high from patient's blood 36 years after contamination.

Afterward, without medical investigation, a clause, "uncertified Yusho patients who had lived in the same house with certified Yusho patients regard as Yusho patients, was added to the diagnostic criteria for Yusho in 2012.

So, the greater number of victims, who had not Yusho patients in their family, was excluded from Yusho patients. At the same time, many children who were born after the Yusho incident, so called the 2nd generation, were excluded from Yusho patients, even if their father and/or mother are Yusho patients. There were only 344 patients who had been certified as Yusho from 2012 to 2023 by the clause. Even with that addition, the total number of patients officially recognized as Yusho is 2,372 peoples (Dec 2023).



II. Introduction (Purpose)

Presently, whether or not Kanemi Yusho causes harm to the 2nd and 3rd generations have been an important issue in the medical field.

We have been carrying out the health survey of an unverified victim in Kitakyushu City, Nagoya City and Naru Town, Goto City, Nagasaki from 2014.

In this session, we report on those of these survey subjects who were able to survey their surviving children and grandchildren (3 parents, 10 children, and 3 grandchildren). We also report on one case from a study family in Goto City, who had already died but had three malformations and for whom dioxin levels in the umbilical cord had been measured.

III. Materials and Methods

They are mother A (4 of 4 children) in Kitakyushu City, mother B (4 of 5 children and 3 of 3 grandchildren) in Nagoya, and father C (2 of 2 children) who were interviewed and examined, including dental x-rays.

We have investigated Yusho victims in 2015, who ate Kanemi oil in Naru Town and certified in the 2012 relief law : sister (born 1950, 65yrs. old at the time of investigation, as follows), brother (born 1954, 61yrs. old) and each of their children(2nd generation), 6 in total (1st daughter, 2nd daughter, 1st son, 3rd daughter, 32~42yrs. old, 1st son, second son, 24yrs. old, 22yrs. old), sister's grandchildren (2nd daughter's children-3rd generation), 3 patients (1st son, 2nd son, 1st daughter, 6~19yrs. old). We have performed dental panoramic radiography on 8 of the 2nd and 3rd generations in 2016 and 2018, excluding the brother's 1st son. Furthermore, the brother's wife, that is the mother of the children (born 1954, 61yrs. old) who is from the same town as the father of the children, is uncertified. However, we have diagnosed her as Kanemi Yusho victim.

We report clinical information obtained from parents in 2016 about a death case in Naru Town, Goto City with three malformations and measured umbilical cord dioxin levels measured by Yusho Research Group.

IV. Results and discussion

Ms. A was born in 1957, was exposed to the disease since 1965, and suffered from many serious health problems, but she died without certification in 2021. She married at 23 yrs. old. She had eight pregnancies after marriage, four miscarriages and stillbirths, and all four children were born with abnormal deliveries. However, all of them were sickly having many symptoms of diagnostic criteria for Kanemi Yusho.

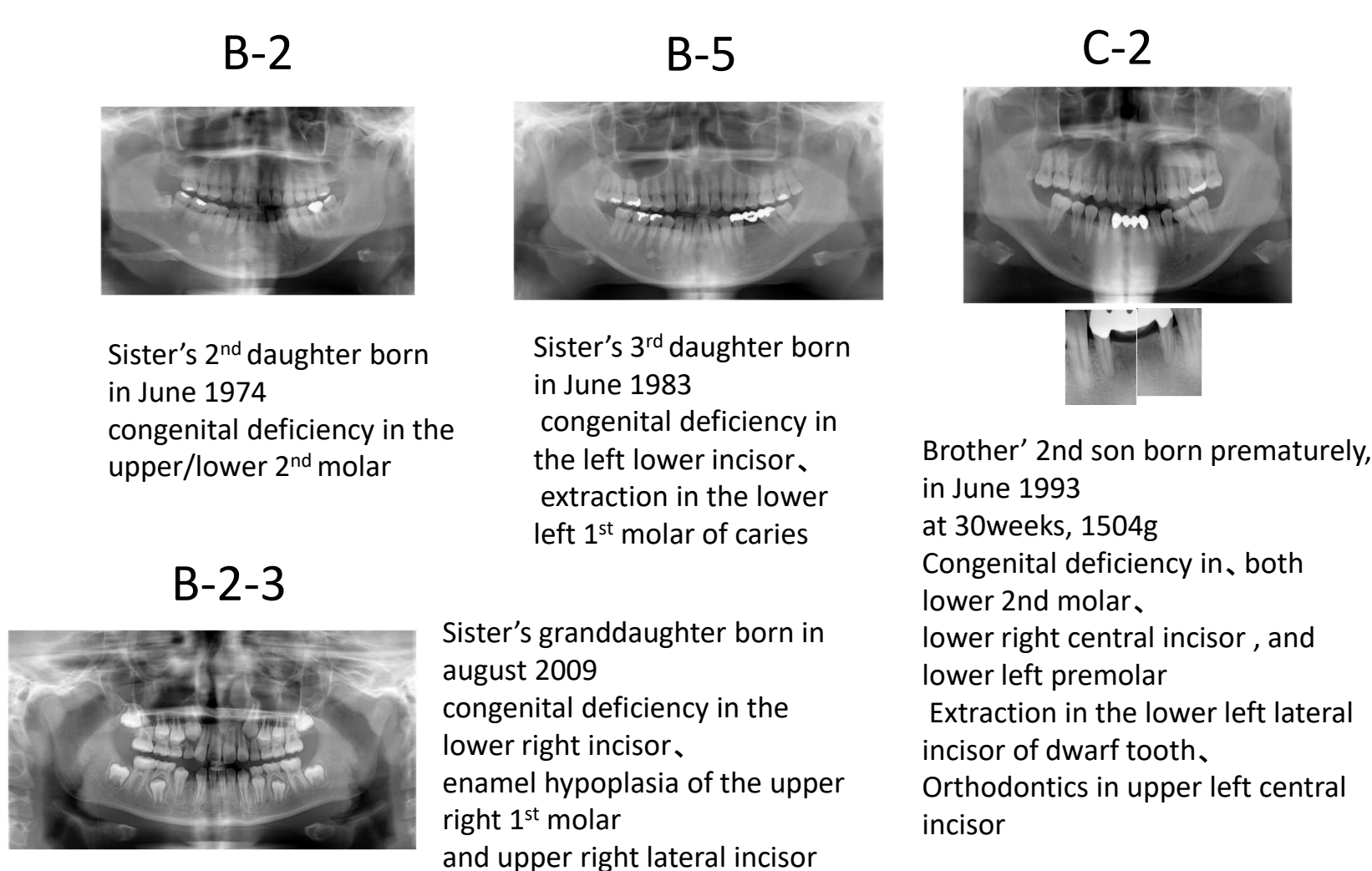
	Premature birth	Early rupture of the membrane	Uterine inertia	Prolonged labor delivery	Forceps delivery	Abruption of placenta
1st son	—	—	○	○	○	—
1st daughter	○	—	—	○	—	—
2nd daughter	—	—	—	○	—	—
2nd son	○	—	—	—	—	○

	Important view			Symptom that become of the reference Yusho criteria			
	pigmentation	acne-like skin	general fatigue	headache	inconstant stomachache	menstrual disorder	cough, sputum
1st son	○	○	○	○	○	○	—
1st daughter	○	—	○	○	○	○	○
2nd daughter	○	○	○	○	○	○	○
2nd son	○	○	○	○	○	○	—

Ms. B and Mr. C were certified as having Kanemi oil disease, while Mr. C's wife, who was not certified, we diagnosed as having Kanemi oil disease due to multiple disabilities. Dental radiographs were performed on seven of the succeeding generations, and congenital absence of teeth was found in three of four (75%) of the next generation and in one of three (33%) of the third generations.

In the Kanemi oil disease diagnostic criteria, dental abnormalities (delayed eruption of permanent teeth) due to direct exposure in childhood are considered a reference finding. It is possible that this health effect may have affected the next or subsequent generations.

In addition, all five of Ms. B's children (including uninvestigated second son) and two of her grandchildren had nosebleeds in childhood. And all five children and one grandchild had been formally diagnosed with Glanzmann thrombasthenia in the past by Nagoya University Hospital. Thrombasthenia is a disease of autosomal latent (recessive) inheritance and is considered an unusual genetic effect. Especially, these health problems have occurred across generations.



Congenitally missing permanent teeth deficiency using dental radiography Comparison with Japan Pediatric Dentistry Academic Committee Report by examining 15,544 people*

Appearance frequency: 4 out of 8 (50%/10.09%)
The number of deficiencies: 4-tooth1; (12.5%/0.50%), 2-tooth;1 (12.5% /2.93%), 1-teeth; 2 (25%/5.22%)

In tooth type: the 2nd daughter's girl, upper 2nd molar (right 0.55%, left 0.52%); 3rd daughter's girl, lower incisor (1.74%); Brother's 2nd son's, lower 2nd molar (right 0.07%, left 0.11%); boy lower right central incisor (0.75%), lower left 2nd premolar (3.12%), the 3rd generations, sister's grandchildren's, girl, lower right incisor (2.54%)

*Yamashita, Y., et al.: Frequency of Congenitally Missing Teeth in Japanese Children, J. Ped. Dent., 48(1): 29-39, 2010

Dioxin concentration in the preserve umbilical cord from Yusho patients

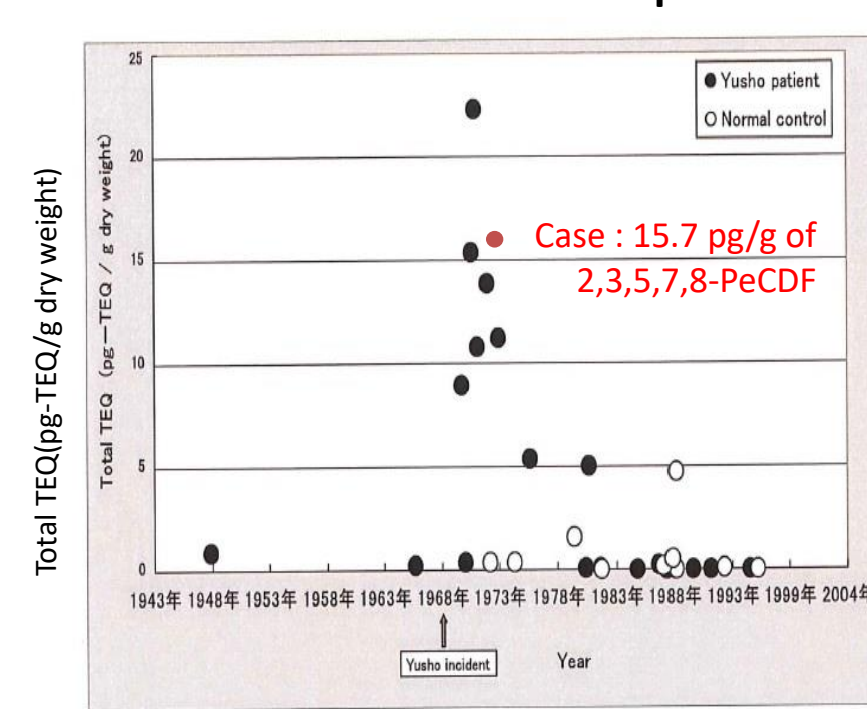


Fig. 1. Dioxin concentrations in the preserved umbilical cords of Yusho patients and normal controls. J. Kajiwara, et al.: Dioxin concentration in the preserved umbilical cord from Yusho patients; Fukuoka Acta Med.100(5): 179-182, 2009

Report of a case with three anomalies in Goto City

Male. August 1973, born in full term, in Naru Town Goto City. Mother bore him at the age of 24. Birth weight 2600g, cyanosis in whole body, not colored. Having malformation of heart (VSD or ASD), anorectal anomaly, cleft lip/palate.

He had been hospitalized, however, died approximately four months.

15.7pg/g dry weight of 2,3,5,7,8-PeCDF was detected in his umbilical cord in 2013. (Mean of 14 babies born in 1970-1992 detected in 2007 was 13.47 pg/g)

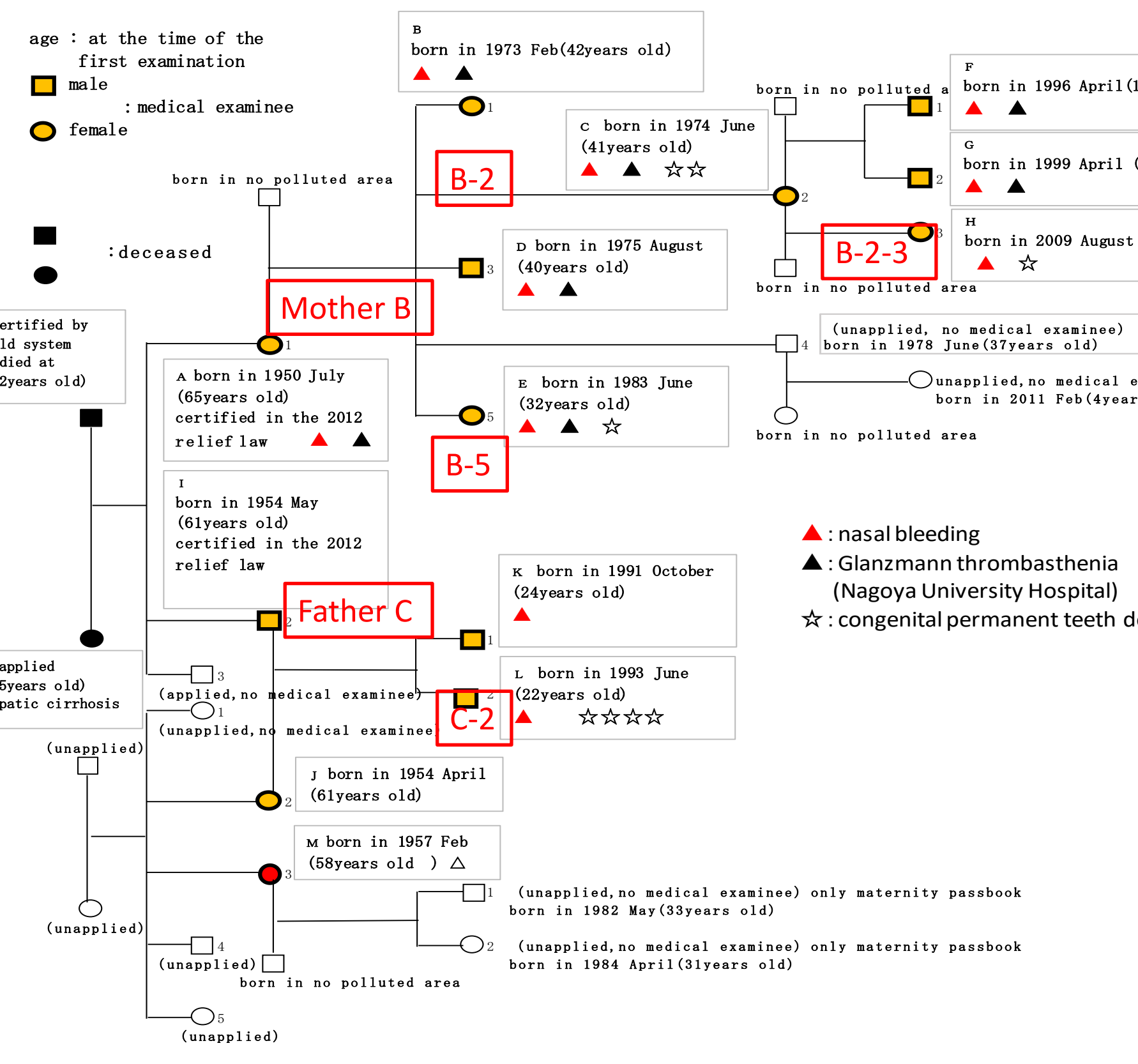
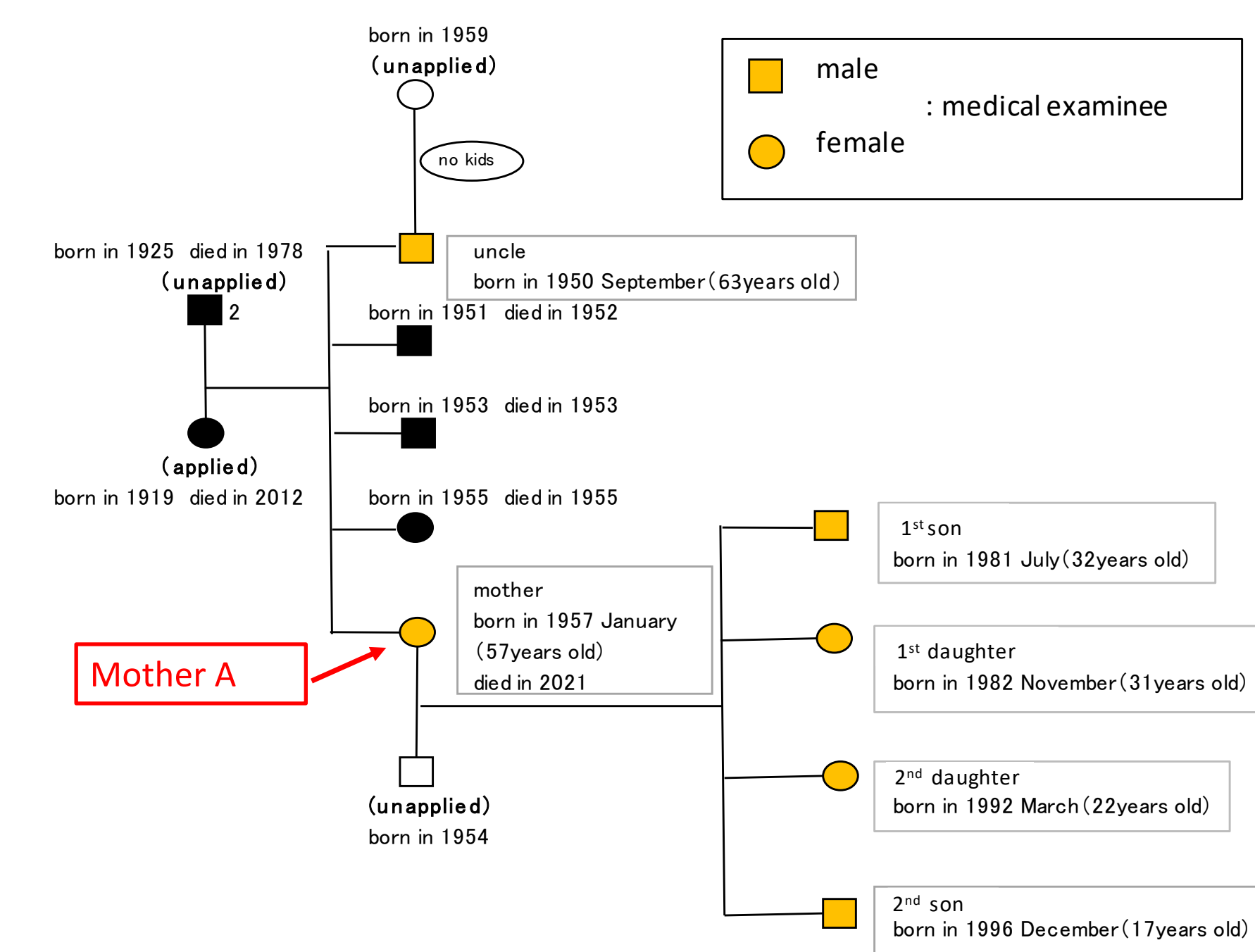
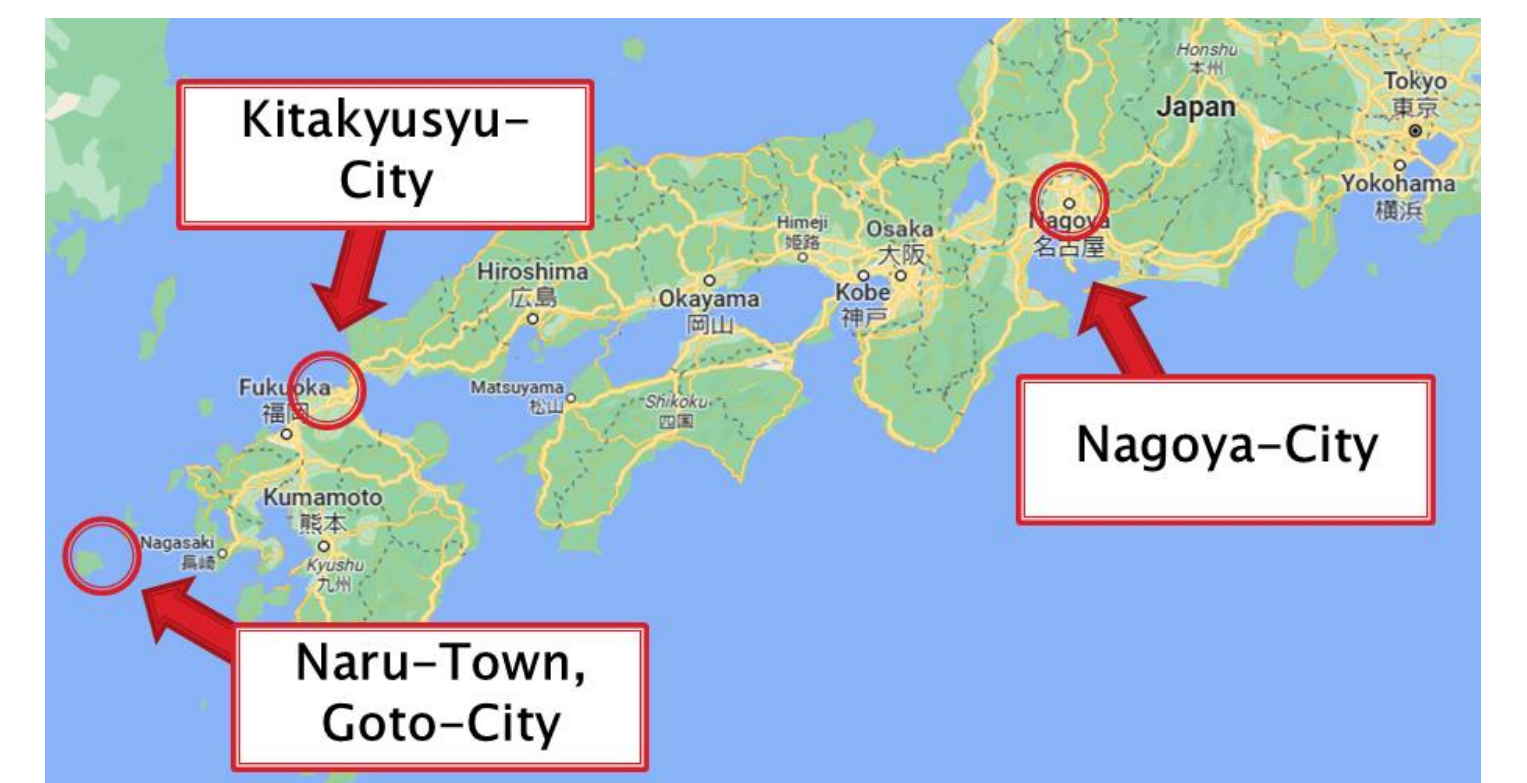
According to the literature: An autopsy finding of the stillborn female, in full term baby in March 1975 by verified mother showed congenital malformation of the heart (VSD, remarkable RVH/D). By the same mother in Oct. 1968 stillborn female was the first case of so-called colored baby. (Kuratsune T.: Autopsy findings of the Yusho patients and the stillborn babies, The study on Yusho, Kyushu University Press, 2000, p237-239)

V. Conclusion

1. Congenital anomalies, abnormal births etc. in second generation of Kanemi Yusho and congenital permanent teeth deficiency, Glanzmann thrombasthenia in 2nd, 3rd generation of Kanemi Yusho which we have recognized indicate the possibility of Kanemi Yusho causing harm to the 2nd, 3rd generations.
2. These facts indicate the need for research on the potential of dioxin (PCDF) to disrupt epigenetics.
3. Regardless of the compensation issue, medical research must be properly conducted, correct diagnostic criteria must be established, and all victims must be helped.

YUSHO: A Human Disaster Caused by PCBs and Related Compounds

edited by M. Kuratsune, et al., Kyushu University Press, Fukuoka, 1996 (Japanese edition, 2000)



Next Generation Impacts - PCB and dioxin damage to the next generation

Reiko Mizuno, et al.: YSC, Kanemi Yusho, Past, present and future, Ryokufu Publishing, TOKYO, pp145-152, 2006

90 men and women whose exposure period was before marriage. Exposure ages ranged from 0 to 22 years. Of the 90, 63 married and 50 conceived children (total of 85 pregnancies); of the 85, 20 had miscarriages, stillbirths, or abortions, and 3 died as newborns. The symptoms of the 62 survived. Of these, 53 (85%) had one or more diseases or the symptoms, as follows:

- (1) Diseases of reproduction
amenorrhea, anovulation, sex chromosomal abnormality, severity of cramps, short and thick penis, irregular periods, atelia of the pelvic canal, abnormal bleedings from uterus from an early age, late menarche, phimosis, endometriosis.
- (2) Diseases of growth, bone, teeth, ear
short height, low weight, premature baby, no losing baby teeth, two deficiency of adult tooth, deformed nail, double nail, fracture easily, curved back spine, hip dislocation, auditory disturbance, Meniere's disease, cervical disc hernia, myeloma, otitis media, baby teeth was present before birth.
- (3) Diseases of nervous system, immune system, cancer and etc.
autonomic dystonia, neurosis, have no concentration, ADHD, LD, cardiac septal defect, Kawasaki disease, cardiac disease, gallbladder disease, weak eyesight, strabismus, abnormality of the eye, panic disorder, corneal cancer, urinary bladder cancer, obesity, loose hair.

As for the second generation's pregnancies reported above, four of the 20 pregnancies were miscarriages or stillbirths, one neonatal death and 15 (75%) survived.