

This Week's Citation Classic

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Kuratsune M, Yoshimura T, Matsuzaka J & Yamaguchi A. Epidemiologic study on Yusho, a poisoning caused by ingestion of rice oil contaminated with a commercial brand of polychlorinated biphenyls. *Environ. Health Perspect.* 1:119-28, 1972. [Dept. Public Health, Fac. Med., Kyushu Univ., Fukuoka, Japan]

In 1968, an epidemic of a peculiar disease similar to chloracne occurred in Japan. This paper presents the epidemiological evidence indicating that it was caused by ingestion of rice oil contaminated with polychlorinated biphenyls (PCBs). It also briefly refers to clinical aspects of this unique food poisoning, probably the first one ever experienced by man. [The *SCI*[®] indicates that this paper has been cited over 120 times since 1972.]

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"Early in June 1968, an American jet fighter crashed on our campus, causing utter chaos in the whole university which had already been suffering from a serious student riot. Later, in October 1968, an extensive epidemic of severe acne-like eruptions was reported in our prefecture and we were obliged to clarify its cause by organizing a research team in the school.

"Shibanosuke Katsuki, professor of internal medicine and chief of the team, was wise enough to organize the team with not only physicians, but also the staff of the faculties of pharmaceutical sciences, agriculture, and engineering. This multidisciplinary approach facilitated the study very much. Furthermore, strangely enough, the crisis at the school seemed to stimulate and firmly unite all these divergent professionals to achieve the goal.

"Katsuki, epidemiologically well minded, asked me to develop epidemiological investigations. Although I had not professionally been trained in epidemiology, I complied with his request and immediately designed and started extensive surveys with my associates and the staff of the local health de-

partments, simply following the principles and methods of epidemiology which I had already understood by reading a book.¹

"About ten days after the research team was organized, the chemical group discovered a large amount of PCBs (KC-400 produced by a company) in the rice oil used by patients as well as in their subcutaneous tissue. Thus, the chemical demonstration of toxic agents was very quick, but we continued the surveys for another four months trying to collect all the epidemiological evidence necessary for unequivocal proof of the cause. All the epidemiological evidence thus obtained fully agreed with the clinical and chemical features of the epidemic. Without the epidemiological approach and knowledge and without the devoted cooperation of my associates and many others, I am sure that this success would not have materialized.

"There was one thing, however, which I could not be very sure of, that is, the acnegenicity of pure PCBs in man. Oral administrations of KC-400 (pure PCB) did not yield acne in animals and a thorough check of the literature reporting occupational cases of chloracne as caused by PCBs revealed that the PCBs used were not pure at all, containing a large amount of chlorinated naphthalenes. Thus, there was no definite evidence for the acnegenicity of pure PCBs in man. Fortunately, I heard that Ichiro Hara at the Osaka Prefectural Institute of Public Health observed chloracnes among workers handling pure PCBs. I asked him to publish his observations and he did.² Thus, I finally became fully convinced of the cause of the epidemic.

"I cannot be completely sure of the reasons why our paper has been highly cited. I suppose that the good epidemiological evidence collected by us, the uniqueness of the poisoning, and the general serious concern about PCB pollution may be the main reasons. Recent work in this field has been published."^{3,4}

1. MacMahon B, Pugh T F & Ipsen J. *Epidemiologic methods*. Boston: Little, Brown, 1960. 302 p.

2. Hara I. Health supervision of workers exposed to chlorodiphenyl in an electric condenser factory. *Proc. Osaka Prefect. Inst. Public Health Educ. Ind. Health* 7:26-31, 1960.

3. Masuda Y & Kuratsune M. Toxic compounds in the rice oil which caused Yusho. *Fukuoka Acta Med.* 70:149-57, 1979.

4. Kuratsune M. Yusho. (Kimbrough R, ed.) *Halogenated biphenyls, terphenyls, naphthalenes, dibenzodioxins, and related products*. Amsterdam: Elsevier/North-Holland Biomedical Press, 1980. p. 287-302.