Rischio mercurio by Roberto Miniero is a well-balanced mix of environmental health literacy and public health advocacy aimed at raising public awareness on the burden of disease related to methylmercury exposure caused by fish consumption in Italy.

Cinnabar (mercury sulphide) is largely present in the Mediterranean area and has been extensively mined and processed, in order to obtain mercury, since ancient times. Methylmercury is an organometallic compound widely present in aqueous environment as consequence of the activity of anaerobic organisms on cinnabar ore. Methylmercury in the marine environment migrates in living organisms thus contaminating the food chain, especially with respect to predatory fish like swordfish and tunafish. While natural methylmercury contamination of fish is ubiquitous, localized hotspots can be explained by the presence of specific industrial sites, like petrochemical plants that used mercury cathode cells for the chlorine soda process.

Considering firstly the abundance of naturally occurring mercury and the contributions from mines and industries, we can easily understand the statement made by Professor Aristeo Renzoni of Siena University already in 1998: “In consideration of the high content of mercury in Mediterranean fish, there is a higher risk for those who live in this basin and consume large amounts of local sea-food, with respect to others residing in different areas of the world. This risk seems to specifically concern fishermen and their families, who maintain traditional eating habits and eat, on average, more than four fish meals by week”.

The health impact of methylmercury in humans has been dramatically discovered in the Fifties in Minamata (Japan), where a chemical industry that used mercury cathode cells released large amounts of methylmercury in the sea, thus contaminating the environment and the food chain. Local fish was extensively consumed by fishermen, their families and the resident population. The most affected segment of the population was constituted by children whose mothers were exposed to methylmercury during their pregnancy. A severe neurologic syndrome affected infants and children, with a high fatality rate and a devastating impairment of the health of survivors. In the subsequent years several independent studies performed in other parts of the world confirmed the causal link between exposure to methylmercury and severe neurological damage.

Subsequently to this first series of studies, focused on “extreme” settings, a large number of investigations was performed on populations of families of fishermen, whose diet was largely based on fish consumption. These “second generation” studies detected adverse effects of methylmercury at levels much lower than those that determined death or severe neurological disease. These adverse effects were mainly constituted by cognitive impairment in children, and also by cardiologic diseases. From this body of evidence regulatory agencies defined exposure levels regarded as “tolerable”, that eventually decreased over time inasmuch as the available scientific evidence increased in quality and quantity. In the early Nineties, the European regulation indicated a common limit of 0.5 microgram per gram of fish for all species, except tunafish and swordfish whose limit value was 1 microgram per gram.

A large Italian survey conducted between 2004 and 2007 showed an average concentration of methylmercury of 0.190 micrograms per gram of fish. Twenty per cent of fish had a methylmercury concentration exceeding 0.5 micrograms per gram. These findings provided the rationale for a subsequent thorough review of the Italian situation that showed noncompliance of the mercury limit levels in 36% of the fish being distributed.

In addition to these findings, that represent an important indication of a potential hazard for human health, several studies have investigated the actual body burden of mercury in the Italian population by measuring the concentration of mercury in hair.

The maximum level of mercury regarded as tolerable by the international agencies corresponds to 1 microgram per gram of hair. A value higher than 4 micrograms per gram of hair is regarded as a threshold separating “low” exposures from “high” exposures. On average, the Italian population has an exposure level of 0.42 micrograms per gram of hair, which is complying with international standards. Frequent tunafish consumers have an average exposure level of 9 micrograms per gram of hair, about 20 times that of the general population. All other population subgroups whose average exposure values exceed 4 micrograms per gram of hair are mainly constituted by fishermen. Among the population subgroups that exceed the tolerable level of 1 microgram per gram of hair, several studies document the presence of sub-
jects resident in the Eastern coast of Sicily where a major industrial settlement released large amounts of mercury (municipalities of Augusta, Priolo and Melilli).

In light of the abovementioned available evidence, the Italian situation can be summarized as follows: the great majority of the population has a level of mercury exposure complying with international standards. Major departures from this level are shown for fishermen, high fisher consumers and communities resident near industrial settlements characterized by (previous) uncontrolled release of mercury in the sea water.

These are the population subgroups within which an observable burden of mercury-related disease can be regarded as certain, even if no systematic ad hoc study has so far been realized.

Mercury-caused health impact on fishermen and high consumers is a so-called invisible disaster. Considerations of health equity and environmental justice should first of all trigger a national health survey on these population subgroups aimed at detecting mercury victims and providing support to them and their families.

In the meanwhile, a major prevention and information initiative is badly needed. This campaign should be carried on in Italian coastal areas with a main focus on fishermen and their families. The aim should be to find modes of fish consumption that ensure all the ascertained benefits of this precious resource without implying excessive mercury absorption. This means, among else, an active involvement of general practitioners who should advice their patients on how to meet these two objectives taking into account variables such as age, gender and phase of reproductive life.

By reading the rich reference list on which this book is based, the leading role of the Author in investigating the issue of mercury-related disease in Italy becomes quite clear. Dr Miniero, together with his colleagues has spent twenty years addressing this issue, and now he provides us with this exhaustive and remarkable publication, that will hopefully be endorsed by our national health Authorities.

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