



Consultation Meeting on Health Effects of
Methylmercury in the Mediterranean Area
(WHO/FAO/UNEP Joint Project, MED POL Phase II)

Athens, 15-19 September 1986

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SUMMARY REPORT

Introduction

The Consultation Meeting was organized jointly with FAO and UNEP. It was attended by 23 temporary advisers from seven Mediterranean countries and one from a non-Mediterranean country, one representative each from the Intergovernmental Oceanographic Commission (ICC), the International Atomic Energy Agency (IAEA) and FAO, two representatives from UNEP and four staff members from WHO headquarters and the Regional Office for Europe. The participants represented a range of professional backgrounds relevant to the subject, including epidemiology, toxicology, paediatrics, nutrition, neurology, psychiatry and organic chemistry.

A project to evaluate methylmercury in Mediterranean populations and health hazards related to it was developed by WHO in collaboration with the Food and Agricultural Organization of the United Nations (FAO) and the United Nations Environment Programme (UNEP) within the framework of the Long-term Programme for Pollution Monitoring and Research in the Mediterranean Sea (MED POL Phase II) at a consultation meeting in Athens in September 1982. The project was developed after an assessment of the pollution by mercury in the Mediterranean Sea, in which the conclusion was that, although the general population could not be considered at risk, certain population groups in the Mediterranean area may have an intake of methylmercury through seafood in excess of tolerable levels.

The first phase of the project began in Yugoslavia in 1984 and in Greece and Italy in 1985. In each case, pilot areas were selected where there appeared to be evidence of relatively high seafood consumption. The following studies were undertaken:

- an analysis of the mercury content of seafood;
- a dietary survey on a sample population;
- an analysis of human hair from mercury on the same sample population.

During a consultation meeting in Zagreb in September 1984, a draft protocol for clinical epidemiological studies on individuals within sample populations showing positive indications was discussed and the necessary elements for the revision of the protocol identified.

At their fourth ordinary meeting in Genoa in September 1985, Mediterranean governments, as contracting parties to the Convention for the Protection of the Mediterranean Sea and its related protocols, adopted interim environmental quality criteria for mercury, comprising the taking into consideration of the provisional tolerable weekly intake proposed by the FAO/WHO Joint Expert Committee on Food Additives (JECFA) to establish, if national circumstances so required, standards for maximum concentrations of mercury in seafood.

The Consultation Meeting was held:

- to review the results of studies carried out by participating institutions as part of Phase I of the project;
- to review and finalize the revised draft protocol on clinical epidemiological studies of effects of methylmercury on health;
- to finalize institutional arrangements for Phase II of the project, as well as the extension of Phase I to other areas;
- to make appropriate recommendations on any revisions necessary to the interim environmental quality criteria for mercury.

Discussion and conclusions

The review of ongoing studies within the project was based on progress reports from the principal investigators. Two areas with high concentrations in Italy and three in Yugoslavia had been selected. In Greece, individuals from industrialized and non-industrialized areas were initially selected by means of a dietary survey based on a simplified questionnaire. The overall averages of methylmercury levels in seafood were twice as high in the areas in Italy as the averages found for the areas in Yugoslavia. The data obtained provided the opportunity to compare the different approaches, but, in view of the small number of individuals screened so far, more data were required before any firm conclusions could be drawn.

A total of 250 samples of human hair from Greece, Italy and Yugoslavia were analysed for levels of total mercury and methylmercury. In addition, levels of selenium were determined in 25% of these samples. Methylmercury levels in the hair of Greeks, Yugoslavs and non-exposed Italians were, with one exception, lower than 4 ppm. This seemed to indicate that the varying degrees of mercury pollution in areas in Greece and Yugoslavia did not result in significant differences in the concentrations found in the hair.

The hair samples from seven fishermen in Italy showed high levels (two above 4 ppm and four above 10 ppm), but, with one exception (36 ppm in a person consuming approximately 20 seafood meals per week), low levels were found in the samples from 17 Greek fishermen. Although the differences between the two groups could not be explained, an extremely high consumption of seafood was the only common feature linked with high methylmercury levels in the hair, regardless of country.

The results obtained in the project so far revealed no other cases of high exposure. This confirmed that a highly selective approach to a large population should be adopted to identify potential groups at risk in the Mediterranean area.

Recent findings indicated that only relatively small groups of adult men and of mothers of newborn infants whose hair had methylmercury levels exceeding 25 ppm and 6 ppm respectively were likely to be identified in the Mediterranean area as suitable for a clinical epidemiological study. The discussion of the draft protocol for such a study therefore emphasized the need for the most comprehensive methodology possible to detect relevant clinical and subclinical effects, along with the feasibility of the eventual implementation of the protocol. The participants agreed on the elements to be incorporated into the final version.

The participants recognized that one of the groups at highest risk is fishermen whose main source of food at sea is fish. It was agreed that follow-up activities within the project should aim at identifying two suitable target population groups (fishermen and mothers of newborn infants) with high methylmercury levels in their hair. This would show whether such groups were large enough to establish a relationship between exposure to methylmercury and impairment of the central nervous system.

The programme for the rest of the first phase, which will involve 500 hair samples each from Greece, Italy and Yugoslavia (from both fishermen and mothers of newborn infants), will include:

- selecting areas with a high probability of population groups that consume seafood, such as islands and coastal areas;
- selecting people who consume a high amount of seafood (at least three meals per week for mothers with newborn infants and four meals per week for fishermen);
- hair sampling according to the protocol;
- analysing hair for total mercury and identifying mothers of newborn infants with levels exceeding 6 ppm and adult men with levels exceeding 25 ppm;
- analysing hair for levels of methylmercury exceeding these thresholds;
- compiling extensive information about patterns of food consumption (particularly the amount and type of seafood consumed) and about methylmercury levels in seafood, to identify the source of methylmercury in groups at high risk;
- assessing the data to evaluate the size of population groups with elevated methylmercury levels and to establish the feasibility of undertaking a clinical epidemiological study.

After considering similar projects in progress in other areas, the participants concluded that coordination and cooperation with such projects was highly desirable. It also appeared feasible that the immediate follow-up work in the Mediterranean could share some basic components with related programmes in other areas.

The Consultation Meeting acknowledged that the JECFA provisional tolerable weekly intake of 0.2 mg methylmercury with 0.3 mg total mercury for a person of 70 kg bodyweight remains a valid recommendation in the light of available data. In view of recent epidemiological data and the relatively small safety factor built into the provisional tolerable weekly intake, however, strict adherence to this limit is of critical importance, particularly for women of childbearing age.

Recommendations

1. The aim of the eventual epidemiological study in the Mediterranean, if feasible, should be to measure the occurrence of effects of the exposure of fishermen to methylmercury by means of a cross-sectional study on adults, and of the effects of prenatal exposure of children by means of a follow-up study.
2. The follow-up activities of the present pilot phase should, if possible, include testing, training and harmonization of the examinations indicated in the protocol of the epidemiological study.
3. WHO, FAO and UNEP should ensure that an adequate financial allocation from the MED POL budget is made available for the continuation of the pilot phase of the project. This should include the geographical extension of the project through performance of the preliminary components in other Mediterranean countries.
4. Endeavours should be made to obtain other financial resources from both national and international sources to ensure the coverage of later stages of the project.
5. In view of the need to investigate further the problem of neurotoxicity in children, a working group should perhaps be convened to develop a core battery of neurodevelopmental tests for infants and preschool children for use in epidemiological studies.
6. The conclusions drawn at this meeting, as well as the results obtained from the continuation of the pilot studies, should be used when submitting recommendations of suitable measures to reduce both environmental levels of mercury and the exposure of people to mercury through seafood to the Mediterranean governments at their next meeting in September 1987. If necessary, a small expert group should be convened to formulate such recommendations.