



WORLD HEALTH ORGANIZATION
REGIONAL OFFICE FOR EUROPE
COPENHAGEN

53723

EUR/ICP/EHAZ 94 01/MT01(S)
03245
Original: English
EUR/HFA target 20
23 March 1995

HEALTH RISKS FROM MARINE POLLUTION IN THE MEDITERRANEAN

(WHO/UNEP joint project, MED POL Phase II)

Summary Report on a WHO Consultation

Malta, 30 November–3 December 1994

ABSTRACT

The risks to human health from marine pollution are acknowledged worldwide. Such risks normally arise from bathing in polluted seawater and from consumption of contaminated seafood, and are accentuated in those regions where climatic conditions result in relatively long bathing seasons and/or where seafood consumption is high. WHO and UNEP convened a Consultation to review and finalize the draft document on the assessment of health risks from marine pollution in the Mediterranean. The participants extensively discussed revisions and additions and agreed on the final wording. It was also agreed to divide the document into two separate parts: one for policy-makers and the other for the scientific community.

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TARGET 20

WATER QUALITY

By the year 2000, all people should have access to adequate supplies of safe drinking-water, and the pollution of groundwater sources, rivers, lakes and seas should no longer pose a threat to health.

Keywords

WATER QUALITY
SEAWATER
RISK FACTORS
ENVIRONMENTAL EXPOSURE
WATER POLLUTION
(1) UNEP

Introduction

The risks to human health from marine pollution are acknowledged worldwide. Such risks normally arise from bathing in polluted seawater and from consumption of contaminated seafood, and are accentuated in those regions where climatic conditions result in relatively long bathing seasons and/or where seafood consumption is high.

One particular geographical area of concern is the Mediterranean, where the sea provides the main recreational amenity both for local populations and the millions of tourists who visit the area annually. Seafood consumption is high, especially in coastal areas.

Governments of the area adopted the Mediterranean Action Plan in February 1975. The plan includes a legal component – the 1976 Barcelona Convention for the Protection of the Mediterranean Sea against Pollution and its related protocols, and a component on environmental assessment, including comprehensive monitoring.

During the last decade, a number of assessments of the state of pollution of the Mediterranean Sea by specific substances have been made. On the basis of such assessments, measures have been taken by Mediterranean governments to reduce pollution by these substances within the framework of the 1980 Protocol for the Protection of the Mediterranean Sea against Pollution from Land-based Sources. Each assessment has contained the appropriate component on risks to human health, but an overall assessment of health risks has not yet been carried out.

Under its regular programme and budget, and as part of its contribution to the Mediterranean Action Plan, the WHO Regional Office for Europe considered that the twentieth anniversary of the Mediterranean Action Plan in 1995 would provide a suitable opportunity to assess the overall health risks in the Mediterranean arising from marine pollution, with a view to encouraging implementation of further control measures if necessary. To this end a draft document, which incorporates all relevant experience gained, has been prepared by the WHO/EURO Project Office for the Mediterranean Action Plan in Athens and was recently reviewed by two expert consultants from the region.

It was decided to organize a Consultation, in collaboration with the United Nations Environment Programme (UNEP). The Consultation was attended by eight temporary advisers from seven Mediterranean countries and one non-Mediterranean country in Europe, one representative of the European Commission and three representatives of the WHO Regional Office for Europe. The participants were mainly microbiologists, epidemiologists or environmental engineers engaged in studies of the association between the quality of recreational and shellfish

waters and effects on the health of exposed population groups.

The objectives of the Consultation were:

- to review and finalize the draft document on health risks from marine pollution in the Mediterranean;
- to make appropriate recommendations for action, which could then be incorporated into the final document;
- to hold an informal discussion on the scope, format and content of the forthcoming WHO guidelines on recreational water and bathing beach quality.

Review of the draft document

During extensive discussion of the contents of the proposed document it became clear that two audiences needed to be addressed: the scientific community and policy-makers. The level of technical detail of the draft text was geared to microbiology laboratory staff, marine and food scientists, toxicologists, public health specialists, environmental engineers, epidemiologists and clinicians. What was needed in addition was a concise document for policy-makers to raise awareness of the health risks associated with marine pollution in recreational and seafood-growing waters. Subsequently, the participants agreed that the main title of the document should be altered to "Health risks from marine pollution in the Mediterranean" and be divided into two parts, the first for policy-makers entitled "Implications for policy-makers" and the second for the scientific community "A review of hazards and health risks".

It was agreed that the first part of the document should be based on material contained in a report on environmental epidemiology which was previously prepared for WHO by the University of Bristol, and on the draft document "Assessment of health risks from marine pollution in the Mediterranean". This document was prepared during the meeting by the Rapporteur and adopted after discussion by the participants. They all agreed that it should be published by WHO and widely distributed.

The participants spent a considerable amount of time in detailed discussion of Part II of the document so as to agree on specific wording for amendments, deletions and additions to the text. They also agreed that reference should be made in the text to:

- principal research findings since 1990;
- pathogenicity of *Vibrios*;
- aesthetic values as a component of recreational water;
- the recent British study on the association of faecal streptococci with gastrointestinal symptoms;
- rate of die-off of bacteria, expressed as T₉₀;

- problem of algal blooms and biotoxins;
- problems of outbreaks of hepatitis A associated with clams and other shellfish;
- the development and application of techniques involving bacteriophage indicators of recreational water quality.

Furthermore, after an introduction by WHO representatives of the background of the WHO guidelines on recreational water and bathing beach quality, which are being prepared, and on the difficulties experienced in the past, discussion followed regarding the application of these guidelines. The steps that need to be taken to finalize the guidelines include:

- inclusion of specific recommendations, including how they might vary in the light of local conditions, and specific requirements, particularly if there is reason to believe that health risks vary;
- completion of the document with fully referenced chapters;
- discussion of the draft with chapter managers;
- convening of an authoritative international review meeting.

Recommendations

1. Environmental conditions in the Mediterranean are different to those of temperate European water zones. Studies that have been undertaken in cooler European waters should therefore be done in the Mediterranean Sea, to examine and compare the survival times in warmer seawater of organisms such as faecal indicators (bacteria and bacteriophages) and pathogens (enteric bacteria, enteric viruses and parasites).
2. Studies on dose-response are needed to determine whether exposure of swimmers in microbiologically contaminated Mediterranean waters has led to adverse health effects. The studies should be done using a wide range of faecal streptococci concentration levels. They should also take into consideration the duration of exposure, the ambient temperature, general weather conditions and social behaviour of the bathers.
3. The pollution of receiving recreational waters by microorganisms such as fungi (e.g. *Candida* and dermatophytes) and bacteria (e.g. staphylococci) from human sources is little understood but of widespread interest. Attention should be given to microbiological studies of these anthropogenic sources and the potential for transmission between bathers. These studies should be undertaken to elucidate potential and actual health impacts, and identify any need to limit the density of users on a beach.
4. In areas where potential pollution sources exist, consideration should be given to establishing screening programmes to detect the concentration levels of trace metals, radionuclides and organic compounds in seafood flesh, and establishing control programmes as appropriate.
5. Wherever appropriate, and for both recreational and seafood-growing waters as well as for seafood, methods should be updated and accompanied by appropriate quality assurance programmes.
6. Wherever possible, and as a priority, simple and readily affordable but nevertheless reliable techniques for pollution measurement in shellfish, other seafood and recreational waters should be developed. For example, for viral pollution these methods may include molecular biological techniques such as polymerase chain reaction (PCR) and, as indicators, the recovery of bacteriophages.
7. The frequency and severity of health effects from exposure in different parts of the Mediterranean region to polluted shellfish and other seafood is not sufficiently documented. As a basis for routine monitoring and practical control measures, microbiological and toxicological studies should be undertaken to determine the nature and extent of the health hazards. Epidemiological studies should also be undertaken for any associated health risks to human populations.
8. The adequacy of available depuration techniques to ensure food safety in the Mediterranean for shellfish and other seafood is being questioned. These techniques should be reassessed and, if necessary, researched and appropriate remedial measures taken.
9. To ensure sustainable development, environmental health programmes, supported if necessary by a legislative framework, need to have clearly stated management systems that define immediate and long-term remedial actions to be taken when compliance with standards is not adhered to, and that will ensure the health and wellbeing of local and tourist populations from their exposure to seawater. In collaboration with WHO, the Mediterranean Action Plan should define criteria for the action thresholds and establish an integrated management system.
10. Biomonitoring, molecular epidemiology and analytical epidemiological studies should be promoted in order to evaluate long-term effects

on health resulting from pollution of the marine environment.

11. Appropriate studies should be undertaken in order to evaluate intermediate biomarkers in marine

organisms as early warning signals of marine pollution with compounds or complex mixtures that have toxicological relevance.