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KNOWN AND SUSPECTED EFFECTS OF ENVIRONMENTAL EXPOSURES ON HUMAN HEALTH AND WELL-BEING

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Introduction:

This report is intended to provide factual information for technical and political leaders from varying countries and from the UN specialized agencies.

From the very earliest stage of international health work, antedating the United Nations, there have been a series of international agreements on the control of the transmission of major epidemic diseases. In the twenty year history of the World Health Organization new steps have been undertaken including international efforts and assistance for the eradication of malaria, smallpox and yaws. WHO's programme also supports among other activities the provision of engineering assistance for community water supplies, sewage and waste disposal, involvement in study and control of infectious diseases, collection and analysis of vital statistics, and the provision of medical and public health services of many sorts.

In the light of the various resolutions of the UN General Assembly and the World Health Assembly, it is clear that there is now a need for international agreements and international programmes to provide for better control of environmental factors which impair health.

In different regions of the world, environmental problems are substantially different in their impact and the countries in different regions have varying capacities to deal with these problems. The World Health Organization, through its regional offices, is well suited to respond to environmental health problems, which affect different climatic and cltural regions differently. In addition, with its extensive experience in assisting countries in technical development projects, the World Health Organization is familiar with the use of multilateral assistance for technical development and is generally familiar with both the potential for reducing environmental risks associated with such

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In the meantime documents describing the basis for air quality criteria have been issued by the United States, for sulfur oxides, particulate matter, carbon monoxide, photo-chemical oxidants and hydrocarbons, along with control documents that are relevant. A symposium on the Epidemiologic and Toxicologic Bases for Air Quality Criteria, has been published in the September, 1969, issue of the Journal of the Air Pollution Control Association. Additional criteria are under investigation in the United States for oxides of nitrogen, and particularly nitrogen dioxide, for fluorides, for polynuclear hydrocarbons, odorous material, asbestos and lead.

The Royal Society of Medicine (U.K.) has issued its report on Air Pollution and Health - 1970. The health effects of water inadequacy and/or contamination have been reviewed by Miller in 1962 for the U.S. Agency for International Development.

(This section is not complete and probably should be rewritten.)

Topics not covered by this Report

Regardless as to whether they ought to be included as environmental problems or agents, the present report excludes consideration of accidents and of drug use and abuse; it excludes health effects of alcohol and tobacco; it excludes considerations of natural environmental disasters such as hurricanes, tornadoes, tidal waves, and so on. It excludes for the moment considerations of food additives and food constituents and the occupational health programme will be asked to prepare a systematic consideration of occupational health problems.

The problem of scale

Even though an effect of environmental exposure is a known and documented one, it may occur very rarely or affect a small number of people. Accordingly, it is important in evaluating these statements to have an estimation of the scale and severity of the effects. One would like to know both how frequently such

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development and the use of such resources to provide protection against environmental risks.

The documentary basis for the present report

In connection with the Organization's work in community water supply, water quality standards have been developed for the European region and for other international use. The water quality standards reflect a stage in logic which goes beyond the evaluation of the effects of exposure to water of a specific quality on the health of the people who use it, since the standards represent, also, a judgment concerning feasibility. Behind the various documents on water quality standards, in several countries there have been published documents on water quality criteria. These criteria documents reflect the relationship between the use for various purposes of the waters of a given quality and the possible consequences to health and well-being. Some of the water quality criteria refer to the agricultural, fiseries, recreational and industrial use of water.

Work on air quality criteria by WHO has first been planned in 1956, and has continued with such support as is available up to the present time. In 1963 the Inter-Regional Symposium on Air Quality Criteria and Methods of Measurement put down a number of definitions, concerning the concept of air quality criteria, and indicated several classes of effects or possible effects to be used as guidelines for establishing these criteria. These principles are still valid, but appear elsewhere. (Report on Environmental Quality Criteria and Guides.) Work has proceeded on standardization of methods of measurement of atmospheric pollutants and documents have been circulated on carbon monoxide, sulfur dioxide, sulfuric acid, aerosol, and particulate matter. A review of air pollution in urban areas led to an expert committee whose report has been published. Meetings are planned in the near future to review possible air quality criteria so that they may be recommended for international adoption.

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events have been shown to occur or are likely to occur, and how many people are affected. In addition, it is helpful to know something about the types of people affected and to what extent the effect is a grave one threatening life, or productivity or health. We shall use a logarithmic scale in the two dimensions of frequency of occurrence and number of persons affected. Thus for convenience we will consider a five year time base and a per million population base. The exponents will then roughly have the following significance:

Exponent	Frequency Exponent for Acute Events	Prevalence Exponent	
0	Doubtful to about each 10 years	Occasional case to 9 cases	
1	From once/5 years to 1x/year	10	99
2	1x/year to about 4x/year	100	999
3	About 4x/year to about monthly	1000	9999
4	About monthly to about weekly	10000	99999
5	About weekly to continues for several (either) weeks/year every few days	$\leq$ (10%) 100000 and more	
6	Almost every day	Affects nearly all eligible in majority of population	

For long-term or chronic effects, no frequency exponent is appropriate but for numerical reasons, the prevalence exponent will be reduplicated.

The data presented will refer to the period of maximum frequency and/or severity anywhere (if there are multiple 5 year periods in the last 20 with valid data) and the maximal prevalence which is documented. Documentation either is available and is or can be cited.

Such a system may be applied across a single area, and an example for air pollution in San Francisco is appended. An environmental health damage function for an area would consist of such an estimate for each relevant environmental parameter, to which the community had applied some relevant economic or other value system. (Cf. Lafontaine).

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The problem of Severity

The problem of severity of established effects is dealt with to some extent in the document on definitions of criteria and standards. In general four levels are recognized:

I ... Level above Detectability Threshold

II ... Level above Damage Threshold

III ... Level of Health Impairment

IV ... Life-threatening level

In dealing with "Suspected Effects", since frequency of events and prevalence cannot be estimated, a severity grade is inserted. Such a grade would also be inferred from the statements in the "Known Effects".

The qualitative nature of the present conclusions

In order to make a present report reasonably compact, the quantitative effect between the magnitude of the exposure and the intensity, severity or magnitude of the effect will not be given specific treatment as it often is in setting environmental exposure criteria or in developing environmental exposure standards. This will ultimately be needed, but this present report is concerned solely with the question of whether or not a given type of exposure is able to produce some effect on human health and well-being, and about how many people have been involved and about how frequently. The Environmental Exposure Criteria Reports to be developed are a better basis for expressing such results in quantitative terms.

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