IMPLICATIONS OF THE PRECAUTIONARY PRINCIPLE FOR PUBLIC HEALTH PRACTICE AND RESEARCH

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In a press release from May 10, 1983, on the founding of the Collegium Ramazzini, Professor Irving J. Selikoff wrote: “Science is no stranger to uncertainty and incomplete data. The Collegium will utilize science to help unlock the rigidities of those fixed in legalistic and regulatory combats that prevent progress in environmental and occupational health”. It is in the spirit of Dr. Selikoff that we are meeting now almost 20 years later to assess the Precautionary Principle (PP) and its possible implications for prevention in occupational and environmental health practice and research.

The emphasis on precaution in public health is not a new phenomenon. Prudence has always suggested that the benefits of any doubt should befall the patient. As environmental health hazards have become increasingly complex and international in scope, the PP has been formally introduced into national and international legislation, most visibly in the European Union. Probably the most widely known definition is the one provided in the Rio declaration: “Where there are threats of serious or irreversible damage, scientific uncertainty shall not be used to postpone cost-effective measures to prevent environmental degradation” [1]. Other definitions include stronger wordings, e.g., by omitting that actions must be cost-effective, or by including a reverse burden of proof [2]. The exact definition must depend on the legal and cultural circumstances. Thus, at this conference we will mainly focus on the general public-health and research aspects.

The overall aim of the PP is to provide an approach to acting in the face of uncertainty. Like a single definition of the PP will probably not suffice, the various procedural aspects of the PP are currently being explored and discussed. This aspect is of particular interest at our conference. We need an in-depth analysis of the role of the PP within the greater realm of decision-making in environmental health. Because uncertainties will always remain in regard to environmental and occupational health, the PP could provide an important link between science and public-health action, thereby invigorating the impact of research on prevention.

Introduction of the PP into environmental health decisions is not free of controversy. A major critique that the PP will prevent progress in society is based on the misunderstand-
ing that the PP must necessarily stop new technologies [3]. Thus, decisions involving PP considerations will not lead to unavoidable bans of anything new. Because the overall purpose is to prevent harm, the use of new technology should aim at achieving the greatest possible benefits. A broad review of the evidence should therefore include an assessment of alternatives and aspects that are not easily translatable into toxicologic or economic terms. Because non-commensurable issues and values are important in this consideration, the process must involve stakeholder participation and be conducted in a transparent way as appropriate for decision-making in modern, democratic societies.

Past experiences, as most recently reviewed in a volume published by the European Environment Agency [4], document that the failure to act when scientific evidence is reasonably suggestive may cause severe harm to human health and the environment. Prevention needs to be instituted as early as possible, i.e., before human deaths and other suffering have accumulated to an extent that fully eliminates any doubt. Our current use of risk assessment represents evidence-based decision making, which is appropriate and valuable when sufficient information is available. However, this approach generally ignores risks that are uncertain and insufficiently documented, even though they may be of substantial importance.

Thus, the way that environmental health science has been applied for policy making in recent years has often worked implicitly against precaution. In such cases, lack of complete proof of a human health risk has been interpreted as an indication of safety, thereby disregarding the imprecisions imbedded in our scientific methods and our limited understanding of the environmental impacts on human health.

In contrast, when the information is incomplete, the PP allows evidence-building in connection with and as a result of the decision-making. As a further consequence of applying the PP, the needs for scientific information are likely to change. When incomplete scientific documentation in some cases will be regarded sufficient as basis for important decisions, an extension of the scientific database beyond a minimal requirement may no longer constitute a high priority. The PP has therefore been misunderstood as anti-science [3]. However, what has been called for is not an embargo of science, but rather the initiation of “new science” [2]. The PP will not rely less on the best available science as an input to public policy-making. In addition, application of the PP will necessitate intervention studies to determine the impacts and benefits of PP-based actions and whether the precautionary action needs to be revised. The ways in which science can support PP-based decisions is therefore likely to differ from the science that has supported traditional risk assessment. One consequence is a greater need for scientific guidance in the face of uncertainty rather than detailed documentation that strives to provide a virtually complete coverage of all relevant aspects. These considerations suggest that a new scientific paradigm may be needed.

One issue of general importance is the systematic bias of conventional scientific methods toward avoiding “false positives” and instead generating “false negatives”. Science has traditionally placed emphasis on replication, but this strategy inevitably penalizes false positives more than the false negatives. Perhaps more importantly, the tradition of using a 5% probability level for statistical significance has tended to rule out any appropriate conjecture about potential causality. Thus, uncertainties often lead to a dismissal of likely associations. An important goal is therefore to achieve a better characterization of these uncertainties as well as their implications. Overall, a better balance needs to be obtained between the producing false negative and false positive findings.

These issues deserve continued attention by the research community, regulatory authorities, research funding agencies, and stakeholders. Joint efforts should be initiated to develop revised scientific paradigms and strategies, research methodologies, means of presenting scientific results, and interactions between researchers, stakeholders and decision-makers. Hopefully, our discussions will increase our understanding of the impacts of the PP on prevention and research. Perhaps we will also identify additional roles that the Collegium might play to further the interest of prevention in occupational and environmental health.
REFERENCES


