



State of the Science of Endocrine Disrupting Chemicals - 2012

Edited by

Åke Bergman, Jerrold J. Heindel, Susan Jobling,
Karen A. Kidd and R. Thomas Zoeller

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An assessment of the state of the science of endocrine disruptors prepared by a group of experts
for the United Nations Environment Programme and World Health Organization.

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Preface

The *State of the Science of Endocrine Disrupting Chemicals—2012*, is an update of the scientific knowledge, including main conclusions and key concerns, on endocrine disruptors as part of the ongoing collaboration between the World Health Organization (WHO) and the United Nations Environment Programme (UNEP) to address concerns about the potential adverse health effects of chemicals on humans and wildlife.

We live in a world in which man-made chemicals have become a part of everyday life. It is clear that some of these chemical pollutants can affect the endocrine (hormonal) system, and certain of these endocrine disruptors may also interfere with the developmental processes of humans and wildlife species. Following international recommendations in 1997 by the Intergovernmental Forum on Chemical Safety and the Environment Leaders of the Eight regarding the issue of endocrine disrupting chemicals (EDCs), WHO, through the International Programme on Chemical Safety (IPCS), a joint programme of WHO, UNEP and the International Labour Organization, developed in 2002 a report entitled *Global Assessment of the State-of-the-Science of Endocrine Disruptors*.

The Strategic Approach to International Chemicals Management (SAICM) was established by the International Conference on Chemicals Management (ICCM) in February 2006, with the overall objective to achieve the sound management of chemicals throughout their life cycle so that, by 2020, chemicals are used and produced in ways that minimize significant adverse effects on human health and the environment.

SAICM recognizes that risk reduction measures need to be improved to prevent the adverse effects of chemicals on the health of children, pregnant women, fertile populations, the elderly, the poor, workers and other vulnerable groups and susceptible environments. It states that one measure to safeguard the health of women and children is the minimization of chemical exposures before conception and through gestation, infancy, childhood and adolescence.

SAICM also specifies that groups of chemicals that might be prioritized for assessment and related studies, such as for the development and use of safe and effective alternatives, include chemicals that adversely affect, inter alia, the reproductive, endocrine, immune or nervous systems. A resolution to include EDCs as an emerging issue under SAICM was adopted in September 2012 by ICCM at its third session.

EDCs represent a challenge, as their effects depend on both the level and timing of exposure, being especially critical when exposure occurs during development. They have diverse applications, such as pesticides, flame retardants in different products, plastic additives and cosmetics, which may result in residues or contaminants in food and other products. Therefore, EDCs may be released from the products that contain them.

The protection of the most vulnerable populations from environmental threats is a key component of the Millennium Development Goals. As the challenge in meeting the existing goals increases, with work under way in developing countries to overcome traditional environmental threats while dealing with poverty, malnutrition and infectious disease, emerging issues should be prevented from becoming future traditional environmental threats. Endocrine disruption is a challenge that must continue to be addressed in ways that take into account advances in our knowledge.

UNEP and WHO, in collaboration with a working group of international experts, are taking a step forward by developing these documents on endocrine disruptors, including scientific information on their impacts on human and wildlife health and key concerns for decision-makers and others concerned. The well-being of future human and wildlife generations depends on safe environments.

UNEP and WHO convened, in December 2009, a meeting of the planning group for the development of an update to the 2002 IPCS “Global Assessment of the State-of-the-Science of Endocrine Disruptors”. This was followed by teleconferences and a planning meeting

in Geneva in June 2010. These meetings allowed for defining the scope, the outline, the development process and suggestions of main authors that would be integrated in the working group. Authors were identified because of previous peer-reviewed publications and according to their area of expertise. The following experts provided guidance and expertise for the planning stages:

- Åke Bergman, Stockholm University, Sweden
- Poul Bjerregaard, University of Southern Denmark, Denmark
- Niels Erik Skakkebaek, University of Copenhagen, Denmark
- Hans-Christian Stolzenberg, Federal Environment Agency, Germany
- Jorma Toppari, University of Turku, Finland

The working group consequently met in Stockholm in November 2010, in Copenhagen in May 2011 and in Geneva in December 2011, as well as through teleconferences, to develop and revise various drafts of the documents. Professor Åke Bergman led the working group and facilitated the development of the chapters with the main authors in coordination with UNEP and WHO.

The following international scientific experts were part of the working group that developed the documents:

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The development of these documents would not have been made possible without the significant contributions of the planning and working groups and the valuable leadership of Professor Åke Bergman, as well as of the lead authors of the main chapters Professor Susan Jobling, Dr. Jerrold J. Heindel, Professor Karen A. Kidd and Professor R. Thomas Zoeller. UNEP and WHO are very grateful for their extensive support and for the hard work of all.

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The working group members, scientific experts and contributors of text served as individual scientists and not as representatives of any organization, government or industry. All individuals who participated in the preparation of these documents served in their personal capacity and were required to sign a Declaration of Interest statement informing the Responsible Officer if, at any time, there was a conflict of interest perceived in their work. Such a procedure was followed, and no conflicts of interest were identified.

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