



Children's Exposure to Mercury Compounds

A photograph of a woman in a grey sweater and orange wrap carrying a child on her back. The child is wearing a yellow shirt. The background is slightly blurred, showing another person in a patterned dress.

World Health
Organization

Children's Exposure to Mercury Compounds



**World Health
Organization**

WHO Library Cataloguing-in-Publication Data

Children's exposure to mercury compounds.

1.Mercury - adverse effects. 2.Environmental exposure. 3.Methylmercury compounds - toxicity. 4.Mercury poisoning - pharmacokinetics. 5.Environmental pollutants. 6.Food chain. 7.Health facilities. 8.Equipment and supplies - adverse effects. 9.Biological markers - diagnostic use. 10.Child I.World Health Organization.

ISBN 978 92 4 150045 6

(NLM classification: QV 293)

© World Health Organization 2010

All rights reserved. Publications of the World Health Organization can be obtained from WHO Press, World Health Organization, 20 Avenue Appia, 1211 Geneva 27, Switzerland (tel.: +41 22 791 3264; fax: +41 22 791 4857; e-mail: bookorders@who.int). Requests for permission to reproduce or translate WHO publications – whether for sale or for noncommercial distribution – should be addressed to WHO Press, at the above address (fax: +41 22 791 4806; e-mail: permissions@who.int).

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

The mention of specific companies or of certain manufacturers' products does not imply that they are endorsed or recommended by the World Health Organization in preference to others of a similar nature that are not mentioned. Errors and omissions excepted, the names of proprietary products are distinguished by initial capital letters.

All reasonable precautions have been taken by the World Health Organization to verify the information contained in this publication. However, the published material is being distributed without warranty of any kind, either expressed or implied. The responsibility for the interpretation and use of the material lies with the reader. In no event shall the World Health Organization be liable for damages arising from its use.

This publication contains the collective views of an international group of experts and does not necessarily represent the decisions or the policies of the World Health Organization.

Printed by the WHO Document Production Services, Geneva, Switzerland.

Contents

Contributors and Reviewers _____	1
Abbreviations _____	4
Preface _____	6
Foreword _____	7
Summary _____	9
Introduction _____	12
Special vulnerability of children to mercury _____	13
Geochemical cycling of mercury in the environment _____	15
Introduction _____	15
Mercury in the atmosphere _____	16
Mercury in the hydrosphere _____	18
Freshwater systems _____	19
Marine systems _____	19
Mercury in soils and sediment _____	20
Pathways from sources to fish: exposure of children to methylmercury _____	21
Introduction _____	21
Biomethylation in freshwater systems _____	22
Biomethylation in marine systems _____	23
Methylmercury accumulation in aquatic species _____	23
Exposures of children to mercury compounds _____	25
Introduction _____	25
Exposures over childhood _____	28
Prenatal exposures _____	28
Exposures during infancy _____	29
Mercury in breast milk _____	29

Childhood exposures _____	30
Puberty/adolescent exposures _____	31
Sources of children's exposure to mercury _____	31
Methylmercury in diets of children _____	31
Fish _____	31
Shellfish _____	34
Marine mammals _____	34
Other foods _____	35
Mercury in health care and children's exposure _____	37
Medicinal agents _____	37
Dental amalgams _____	39
Thimerosal or thiomersal _____	40
Thermometers, switches, and gauges _____	40
Accidental exposures to mercury from equipment in health care settings _____	41
Consumer Goods _____	42
Soaps _____	43
Cosmetic creams _____	43
Mercurial fungicides and pesticides _____	43
Traditional practices _____	44
Intended and unintended uses of products containing mercury _____	44
Accidental mercury spills _____	44
Deliberate misuse _____	45
Exposures to mercury in residential settings _____	48
Mercury in paints _____	48
Exposure to mercury from coal burning in homes _____	49
Fluorescent light bulbs _____	49

Antiques in the home _____	50
Exposures to mercury through residential building contamination _____	50
Occupational exposure _____	51
Children in mining _____	51
Waste scavenging and recycling _____	57
Parental exposures _____	58
Toxicokinetics of mercury in children _____	59
Placental transmission _____	60
Elemental mercury _____	62
Inorganic mercury _____	63
Methylmercury _____	63
Toxicokinetics of ethylmercury in children _____	64
Application of toxicokinetics to biomarkers of Hg exposures _____	65
Introduction _____	65
Biomarkers of exposure _____	67
Hair mercury _____	67
Blood mercury _____	68
Hair and blood mercury compared _____	69
Tissue mercury levels _____	72
Urinary mercury _____	73
Nails _____	73
Biomarkers of susceptibility _____	74
Glutathione-related genes as biomarkers of susceptibility ____	75
MT polymorphisms _____	76
Heme biosynthetic pathway enzymes _____	76
Co-exposures as susceptibility factors _____	78
Biomarkers of effect _____	78

Conclusion	_____	79
References	_____	81

Contributors

Ismail Afandiyev, Republican Toxicological Center of Azerbaijan Republic, Baku, Azerbaijan

Alessandro Alimonti, Italian National Institute for Health, Rome, Italy

Fernando Barbosa Jr., Department of Clinical, Toxicological and Bromatological Analyses, Faculty of Pharmaceutical Sciences of Ribeirão Preto, University of Sao Paulo, Ribeirão Preto, Brazil

Nida Besbelli, World Health Organization, European Region, Bonn, Germany

Stephan Bose-O'Reilly, University for Health Sciences, Medical Informatics and Technology, Hall in Tirol, Austria

Lilian Corra, International Society of Doctors for the Environment, Buenos Aires, Argentina

Marcelo Conti, SPES Development Studies Research Centre, Università 'Sapienza', Rome, Italy

Zeinol Danbayev, Committee of Water Resources, Ministry of Agriculture of Republic of Kazakhstan, Karaganda, Kazakhstan

Paul Dargan, Poisons Unit, Guy's and St Thomas NHS Foundation Trust, London, United Kingdom

Jose L. Domingo, Laboratory of Toxicology and Environmental Health, School of Medicine, Rovira i Virgili University, Reus, Spain

Gustav Drasch, Institut für Rechtsmedizin der Ludwig-Maximilians-Universität, Munich, Germany

预览已结束，完整报告链接和二维码如下：

https://www.yunbaogao.cn/report/index/report?reportId=5_29059

