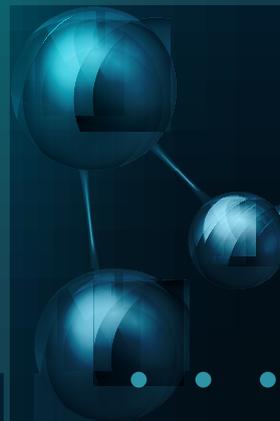




World Health
Organization

Framework for the use of systematic review in chemical risk assessment



Framework for the use of systematic review in chemical risk assessment

Framework for the use of systematic review in chemical risk assessment

ISBN 978-92-4-003448-8 (electronic version)

ISBN 978-92-4-003449-5 (print version)

© World Health Organization 2021

Some rights reserved. This work is available under the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 IGO licence (CC BY-NC-SA 3.0 IGO; <https://creativecommons.org/licenses/by-nc-sa/3.0/igo>).

Under the terms of this licence, you may copy, redistribute and adapt the work for non-commercial purposes, provided the work is appropriately cited, as indicated below. In any use of this work, there should be no suggestion that WHO endorses any specific organization, products or services. The use of the WHO logo is not permitted. If you adapt the work, then you must license your work under the same or equivalent Creative Commons licence. If you create a translation of this work, you should add the following disclaimer along with the suggested citation: "This translation was not created by the World Health Organization (WHO). WHO is not responsible for the content or accuracy of this translation. The original English edition shall be the binding and authentic edition".

Any mediation relating to disputes arising under the licence shall be conducted in accordance with the mediation rules of the World Intellectual Property Organization (<http://www.wipo.int/amc/en/mediation/rules/>).

Suggested citation. Framework for the use of systematic review in chemical risk assessment. Geneva: World Health Organization; 2021. Licence: CC BY-NC-SA 3.0 IGO.

Cataloguing-in-Publication (CIP) data. CIP data are available at <http://apps.who.int/iris>.

Sales, rights and licensing. To purchase WHO publications, see <http://apps.who.int/bookorders>. To submit requests for commercial use and queries on rights and licensing, see <http://www.who.int/about/licensing>.

Third-party materials. If you wish to reuse material from this work that is attributed to a third party, such as tables, figures or images, it is your responsibility to determine whether permission is needed for that reuse and to obtain permission from the copyright holder. The risk of claims resulting from infringement of any third-party-owned component in the work rests solely with the user.

General disclaimers. 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 WHO 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 and dashed 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 WHO 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 WHO 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 WHO 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 stated policy of the World Health Organization.

This document was produced with the financial assistance of the European Union. The views expressed herein can in no way be taken to reflect the official opinion of the European Union.

Design and layout by Inis Communication

Contents

Preface	v
Acknowledgements	vi
Abbreviations	vii
1. Purpose	1
2. Introduction to systematic review and evidence integration	3
2.1 What is systematic review?.....	3
2.2 Origins of systematic review.....	4
2.3 Why is systematic review of importance in chemical risk assessment?.....	7
2.4 Expertise and resources required for conducting a systematic review.....	9
2.5 Typical steps of a systematic review.....	10
References.....	11
3. Problem formulation and protocol development	15
3.1 Introduction.....	15
3.2 Problem formulation.....	15
3.3 Protocol development.....	20
References.....	22
4. Search, selection and extraction	25
4.1 Identification of records or studies.....	25
4.2 Screening the literature.....	30
4.3 Data extraction.....	31
References.....	33
5. Appraisal of individual studies	35
5.1 Multiple aspects of critical appraisal.....	35
5.2 Examples of threats to internal validity and sensitivity.....	37
5.3 Process for evidence appraisal.....	38
5.4 Use and reporting of critical appraisal of individual studies in the review.....	39
References.....	41
6. Evidence synthesis and evidence integration	45
6.1 Introduction.....	45
6.2 Evidence synthesis.....	47
6.3 Evidence integration.....	51
6.4 Overall uncertainty assessment.....	52
6.5 Conclusions for hazard identification or risk assessment.....	53
References.....	55
7. Expectations for the reporting of systematic reviews	57
Resources to help with reporting systematic reviews.....	61
8. Future directions	63
8.1 Conducting systematic reviews with limited resources and the automation of systematic review.....	63
8.2 Evolving applications of systematic review in risk assessment.....	64
References.....	64
Annex. WHO Chemical Risk Assessment Network	65

Figures

Figure 2.1 How systematic review methods integrate with the overall risk assessment process.....	4
Figure 2.2 Stages of chemical risk assessment.....	5
Figure 2.3 Brief timeline of the development of systematic review methods with respect to chemical assessments.....	8
Figure 3.1 Conceptual demonstration of how a general problem formulation conducted for risk assessment may involve multiple questions.....	18
Figure 3.2 Demonstrative example of a PECO-based analytical framework for evaluation of hazard in a risk assessment.....	19
Figure 4.1 Search, selection and data extraction process flow.....	25
Figure 4.2 Example of a literature flow diagram summarizing the results of the screening process.....	31
Figure 5.1 Example of risk of bias heatmap for experimental animal studies in a systematic review	40
Figure 6.1 Workflow in evidence synthesis and evidence integration.....	52
Figure 6.2 Schema outlining how systematic review analyses can contribute to overall risk assessment findings.....	54

Tables

Table 4.1 Examples of bibliographic databases relevant to systematic reviews on chemical risk assessment health topics.....	26
Table 4.2 Example of search string used in PubMed to identify research on PFOA or PFOS and immune effects	28
Table 4.3 Example tools for data identification and data extraction.....	29
Table 4.4 Databases and resources, by category.....	32
Table 5.1 Example risk of bias rating and rationale for each rating for DeWitt 2008.....	40
Table 7.1 Systematic review: reporting expectations and explanations.....	58

Boxes

Box 2.1 Examples of initiatives to utilize systematic review methods in chemical risk assessment processes	6
Box 3.1 Questions faced during problem formulation	16
Box 3.2 Benefits of making a protocol publicly available.....	21
Box 4.1 Grey literature.....	27
Box 6.1 Definitions of terms for evidence synthesis and evidence integration.....	46

Preface

The use of systematic review in decision-making for environmental health issues is growing. Systematic review approaches have the potential to improve decision-making in chemical risk assessment, in particular where there is conflicting evidence and where there is significant uncertainty.

This publication uses a high-level overview to provide guidance to chemical risk assessors who are not currently familiar with systematic approaches, without being prescriptive or endorsing any existing published methods. This framework will assist chemical risk assessors to understand assessments conducted by other institutions that have used systematic approaches, and will also assist in understanding the issues, limitations and challenges involved if institutions are considering using systematic review approaches in their own assessments.

Acknowledgements

This publication was prepared by a drafting group consisting of experts associated with institutions that participate in the World Health Organization (WHO) Chemical Risk Assessment Network. The members of the drafting group were Elisa Aiassa (European Food Safety Authority, Italy); Anna Beronius (Karolinska Institute, Sweden); Brandy Beverly (National Toxicology Program, United States of America); Elaine Faustman (University of Washington, USA); Barbara Glenn (Environmental Protection Agency, USA); Annika Hanberg (Karolinska Institute, Sweden); Andrew Rooney (National Toxicology Program, USA); Nicolas Roth (Swiss Centre for Applied Human Toxicology, Switzerland); Christopher Weis (National Institute of Environmental Health Sciences, USA); Paul Whaley (University of Lancaster, United Kingdom of Great Britain and Northern Ireland); Daniele Wikoff (ToxStrategies, USA, through work undertaken in collaboration with the Office of Health Assessment and Translation of the National Toxicology Program, USA); Martin Wilks (Swiss Centre for Applied Human Toxicology, Switzerland); and Johanna Zilliacus (Karolinska Institute, Sweden). Angelika Tritscher (former WHO staff member) also contributed to this publication. Prior to the initial drafting of the manuscript, a questionnaire was sent to institutions that participate in the WHO Chemical Risk Assessment Network in order to assess the level of knowledge of and interest in systematic approaches within institutions undertaking chemical risk assessments, and the feedback from responses to that questionnaire informed the initial development of this publication (see Annex). Logistical support for developing this publication was provided by MDB Inc., through a contract funded by the PAHO/WHO Collaborating Centre for Environmental Health Sciences at the National Institute of Environmental Health Sciences, National Institutes of Health, USA.

Drafting of the manuscript was assisted by a meeting of drafting group members on 28–30 October 2019, hosted by the PAHO/WHO Collaborating Centre for Environmental Health Sciences at the National Institute of Environmental Health Sciences, National Institutes of Health, Research Triangle Park, North Carolina, USA.

The draft publication underwent international peer review from participants in the WHO Chemical Risk Assessment Network and organizations active in the development of systematic approaches. Peer review comments were received from the following: Dinara Kenessary (Kazakhstan Medical University, Kazakhstan); Mary Gulumian (National Institute for Occupational Health, South Africa); Kathryn Guyton and Iciar Indave (International Agency for Research on Cancer, France); Kyriakoula Ziegler-Skylakakis (MAK Commission, Germany); Yadvinder Bhuller, Salma Iqbal, Benny Ling, Sara Mohr, Samira Roufik, Kavita Singh and Alexander Tsertsvadze (Health Canada, Canada); Heather Schaefer (Food and Drug Administration, USA); Homa Kashani and Masud Yunesian (Tehran University of Medical Sciences, Islamic Republic of Iran); Jessica

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_23524

