Supplementary A

Ozone exposure and health effects: a protocol for an umbrella review and effect-specific systematic maps

Contents

Table S1 PRISMA-P for the umbrella review

PRISMA-P (Preferred Reporting Items for Systematic review and Meta-Analysis Protocols) 2015 checklist: recommended items to address in a systematic review protocol*

Section and topic	Item No	Checklist item		
ADMINISTRATIVE INFORMATION			**RESPONSE**	**COMMENTS**
Title:				
Identification	1a	Identify the report as a protocol of a systematic review	Yes	Title
Update	1b	If the protocol is for an update of a previous systematic review, identify as such	N/A	It is an original protocol.
Registration	2	If registered, provide the name of the registry (such as PROSPERO) and registration number	Yes	PROSPERO: CRD42019123064
Authors:				
Contact	3a	Provide name, institutional affiliation, e-mail address of all protocol authors; provide physical mailing address of corresponding author	Yes	Title page
Contributions	3b	Describe contributions of protocol authors and identify the guarantor of the review	Yes	Contributors
Amendments	4	If the protocol represents an amendment of a previously completed or published protocol, identify as such and list changes; otherwise, state plan for documenting important protocol amendments.	Yes	Subsection 2.3. Umbrella review
Support:				
Sources	5a	Indicate sources of financial or other support for the review	Yes	Funding
Sponsor	5b	Provide name for the review funder and/or sponsor	Yes	Funding
Role of sponsor or funder	5c	Describe roles of funder(s), sponsor(s), and/or institution(s), if any, in developing the protocol	Yes	Funding and Competing interests
INTRODUCTION				
Rationale	6	Describe the rationale for the review in the context of what is already known	Yes	Introduction
Objectives	7	Provide an explicit statement of the question(s) the review will address with reference to participants, interventions, comparators, and outcomes (PICO)	Yes	Introduction and subsection 2.3.1. Eligibility criteria
METHODS				
Eligibility criteria	8	Specify the study characteristics (such as PICO, study design, setting, time frame) and report characteristics (such as years considered, language, publication status) to be used as criteria for eligibility for the review	Yes	Subsection 2.3.1. Eligibility criteria

Information sources	9	Describe all intended information sources (such as electronic databases, contact with study authors, trial registers or other grey literature sources) with planned dates of coverage	Yes	Subsection 2.3.2. Information source and search strategy
Search strategy	10	Present draft of search strategy to be used for at least one electronic database, including planned limits, such that it could be repeated	Yes	Subsection 2.3.2. Information source and search strategy
Study records:				
Data management	11a	Describe the mechanism(s) that will be used to manage records and data throughout the review	Yes	Subsection 2.3.3. Study management and selection
Selection process	11b	State the process that will be used for selecting studies (such as two independent reviewers) through each phase of the review (that is, screening, eligibility and inclusion in meta-analysis)	Yes	Subsection 2.3.3. Study management and selection
Data collection process	11c	Describe planned method of extracting data from reports (such as piloting forms, done independently, in duplicate), any processes for obtaining and confirming data from investigators	Yes	Subsection 2.3.3. Study management and selection, and 2.3.4. Data extraction
Data items	12	List and define all variables for which data will be sought (such as PICO items, funding sources), any pre-planned data assumptions and simplifications	Yes	Subsection 2.3.4. Data extraction
Outcomes and prioritization	13	List and define all outcomes for which data will be sought, including prioritization of main and additional outcomes, with rationale		
Risk of bias in individual studies	14	Describe anticipated methods for assessing risk of bias of individual studies, including whether this will be done at the outcome or study level, or both; state how this information will be used in data synthesis	Yes	Subsection 2.3.5. Study assessment
Data synthesis	15a	Describe criteria under which study data will be quantitatively synthesised	Yes	Subsection 2.3.6. Data analysis
	15b	If data are appropriate for quantitative synthesis, describe planned summary measures, methods of handling data and methods of combining data from studies, including any planned exploration of consistency (such as I^2, Kendall's τ)	Yes	Subsection 2.3.6. Data analysis
	15c	Describe any proposed additional analyses (such as sensitivity or subgroup analyses, meta-regression)	N/A	There is no meta-analysis process involved in out umbrella review.
	15d	If quantitative synthesis is not appropriate, describe the type of summary planned	Yes	Subsection 2.3.5. Study assessment
Meta-bias(es)	16	Specify any planned assessment of meta-bias(es) (such as publication bias across studies, selective reporting within studies)	N/A	There is no meta-analysis in out umbrella reivew.
Confidence in cumulative evidence	17	Describe how the strength of the body of evidence will be assessed (such as GRADE)	Yes	Subsection 2.3.6. Data analysis

*** It is strongly recommended that this checklist be read in conjunction with the PRISMA-P Explanation and Elaboration (cite when available) for important clarification on the items. Amendments to a review protocol should be tracked and dated. The copyright for PRISMA-P (including checklist) is held by the PRISMA-P Group and is distributed under a Creative Commons Attribution Licence 4.0.**

From: Shamseer L, Moher D, Clarke M, Ghersi D, Liberati A, Petticrew M, Shekelle P, Stewart L, PRISMA-P Group. Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015: elaboration and explanation. BMJ. 2015 Jan 2;349(jan02 1):g7647.

Table S2 Search strategy for the umbrella review

Database	Search string
PubMed	(((“ozone” [tiab] OR “O3” [tiab]) AND (“systematic review”[tiab] OR “systematic”[tiab] OR “meta-analysis”[tiab] OR “meta”[tiab])) AND (“English” [Language] OR “German” [Language])) OR (((“ozone”[mesh]) AND (“systematic review”[Publication Type] OR “meta-analysis”[Publication Type])) AND (“English”[Language] OR “German” [Language])) OR (((“ozone”[mesh]) AND (“systematic review”[tiab] OR “meta-analysis”[tiab])) AND (“English” [Language] OR “German” [Language]))
Web of Science	((((TS=("ozone" OR "O3")) OR (TI=("ozone" OR "O3"))) AND ((TS=("systematic review" OR "meta-analysis" OR "systematic" OR "meta")) OR (TI=("systematic review" OR "meta-analysis" OR "systematic" OR "meta")))) *AND* **LANGUAGE:** (English)) OR ((((TS=("ozone" OR "O3")) OR (TI=("ozone" OR "O3"))) AND ((TS=("systematic review" OR "meta-analysis" OR "systematic" OR "meta")) OR (TI=("systematic review" OR "meta-analysis" OR "systematic" OR "meta")))) *AND* **LANGUAGE:** (German))

Table S3. List of relevant institutes for grey literature*

Relevant Institutes	Website
Agency for Toxic Substances and Disease Registry	www.atsdr.cdc.gov
ATS - American Thoracic Society	www.atsjournals.org/series/ajrccm-conference
Bayerisches Landesamt für Gesundheit und Lebensmittelsicherheit	www.lgl.bayern.de
Bayerisches Staatsministerium für Umwelt und Verbraucherschutz	www.stmuv.bayern.de
Bundesamt für Umwelt – Schweiz	www.bafu.admin.ch
Bundesinstitut für Risikobewertung	www.bfr.bund.de
Bundesministerium für Umwelt, Naturschutz, Bau- und Reaktorsicherheit	www.bmub.bund.de
Bundesministerium für Verkehr und digitale Infrastruktur	www.bmvi.de
California Environmental Protection Agency	www.calepa.ca.gov
Canadian Environmental Assessment Agency	www.ceaa.gc.ca
Centers for Disease Control and Prevention	www.cdc.gov
Deutsche Gesellschaft für Epidemiologie	www.dgepi.de/jahrestagungen.html
Deutsche Gesellschaft für Medizinische Informatik, Biometrie und Epidemiologie	www.gmds.de
Environmental Health and Toxicology	www.sis.nlm.nih.gov/enviro.htm
ERA-ENVHEALTH Network	www.era-envhealth.eu
European Environment Agency	www.eea.europa.eu
Health Effects Institute	https://www.healtheffects.org/
International Institute for Applied System Analysis	www.iiasa.ac.at
ISEE – International Society of Environmental Epidemiology	www.iseepi.org www.ehp.niehs.nih.gov/isee
Italian National Institute for Environmental Protection and Research	www.isprambiente.gov.it/en/ISPRA
Karolinska Institutet	www.ki.se
King's College London	www.kcl.ac.uk
Landesamt für Natur, Umwelt und Verbraucherschutz Nordrhein-Westfalen	www.lanuv.nrw.d e
National Institute of Environmental Health Sciences	www.niehs.nih.gov
RIVM - National Institute for Public Health and the Environment	www.rivm.nl/en
Robert-Koch-Institut	www.rki.de
Umweltbundesamt Deutschland	www.umweltbundesamt.de
Umweltbundesamt Österreich	www.umweltbundesamt.at
U.S. Environmental Protection Agency	www.epa.gov
World Health Organization	www.who.int

** Informed by Schneider, A., et al., Quantifizierung von umweltbedingten Krankheitslasten aufgrund der Stickstoffdioxid-Exposition in Deutschland. Umweltbundesamt, Dessau-Roßlau, Germany, 2018. https://www.umweltbundesamt.de/publikationen/quantifizierung-von-umweltbedingten*

Table S4 PRISMA-P for the systematic map

Section and topic	Item No	Checklist item		
ADMINISTRATIVE INFORMATION			**RESPONSE**	**COMMENTS**
Title:				
Identification	1	Identify the report as a systematic map.	Yes	Title
Update	2	If the protocol is for an update of a previous systematic map, identify as such.	N/A	It is an original protocol.
Registration	3	If registered, provide the name of the registry and registration number.	Yes	PROSPERO: CRD42019123064
Authors:				
Contact	4	Provide name, institutional affiliation, and e-mail address of all protocol authors; provide physical mailing address of corresponding author.	Yes	Title page
Contributions	5	Describe contributions of protocol authors and identify the guarantor of the review.	Yes	Contributors
Amendments	6	If the protocol represents an amendment of a previously completed or published protocol, identify as such and list changes; otherwise, state plan for documenting important protocol amendments.	Yes	Subsection 2.4. Systematic map
Support:				
Sources	7	Indicate sources of financial or other support for the map.	Yes	Funding
Sponsor	8	Provide name for the map funder/s and/or sponsor/s.	Yes	Funding
Role of sponsor or funder	9	Describe roles of funder(s), sponsor(s), and/or institution(s), if any, in developing the protocol.	Yes	Funding and Competing interests
INTRODUCTION				
Rationale	10	Describe the rationale for the map in the context of what is already known.	Yes	Introduction
Objectives	11	Define primary and secondary questions for the systematic map.	Yes	Introduction and subsection 2.4.1. Eligibility criteria
METHODS				
Eligibility criteria	12	Specify the study characteristics and report characteristics to be used as criteria for eligibility for the map.	Yes	Subsection 2.4.1. Eligibility criteria
Information sources	13	Describe all intended information sources (e.g., electronic databases, contact with study authors, trial registers, or other grey literature sources) with planned dates of coverage.	Yes	Subsection 2.4.2. Information source and search strategy

Search strategy	14	Present draft of search strategy to be used for at least one electronic database, including planned limits, such that it could be repeated.	Yes	Subsection 2.4.2. Information source and search strategy
Study records:				
Data management	15	Describe the mechanism(s) that will be used to manage records and data throughout the review.	Yes	Subsection 2.4.3. Study management and selection
Selection process	16	State the process that will be used for selecting studies (e.g., two independent reviewers) through each phase of the review (i.e., screening, eligibility, and inclusion in meta-analysis).	Yes	Subsection 2.4.3. Study management and selection
Data collection process	17	Describe planned method of extracting data from reports (e.g., piloting forms, done independently, in duplicate), any processes for obtaining and confirming data from investigators.	Yes	Subsection 2.4.3. Study management and selection, and 2.4.4. Data coding strategy
Data coding strategy	18	List and define all variables for which data were sought and any pre-planned assumptions and simplifications made.	Yes	Subsection 2.4.4. Data coding strategy
Study quality assessment	19	If it is to be conducted, describe methods for assessing quality of individual studies.	Yes	Subsection 2.4.5. Study assessment and data mapping

**From: adopted from Environment International, https://www.elsevier.com/journals/environment-international/0160-4120/guidance-notes;*
The modified PRISMA-P report adapted from: Moher D, Shamseer L, Clarke M, Ghersi D, Liberati A, Petticrew M, Shekelle P, Stewart LA. Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols (PRISMA-P) 2015 statement. Syst Rev. 2015;4(1):1. and Environmental Evidence "Preparing your manuscript: Systematic Map" http://environmentalevidencejournal.biomedcentral.com/submission-guidelines/preparing-your-manuscript/systematic-map (retrieved 24 February 2017)