**Additional file 4 Examples of risk of bias tools and checklists for specific study designs**

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| **Study design** | **Tools and checklists** | **Sources of bias covered in tool or checklist** |
| **Randomised controlled trials** | Cochrane risk of bias tool (1) | ● Selection bias (selection & allocation of participants) ● Performance bias (deviations from intended interventions)● Detection bias (measurement of the outcome)● Attrition bias (missing outcome data)● Reporting bias (selection of the outcome and/or reported result) |
| Cochrane RoB2 tool (2) | ● The randomisation process ● Baseline confounding ● Deviations from intended interventions● Measurement of the outcome ● Missing outcome data ● Selection of the reported result |
| Cochrane EPOC checklist (3) | ● Random sequence generation● Allocation concealment● Baseline outcome measurements similar● Baseline characteristics similar● Incomplete outcome data ● Knowledge of the allocated interventions adequately prevented during the study● Protection against contamination● Selective outcome reporting |
| NIH tool for controlled intervention studies (4) | ● Baseline similarity of groups ● Random sequence generation ● Allocation concealment ● Participant and investigator blinding ● Outcome assessor blinding ● Dropout (including intention to treat and crossover)● Confounding with other interventions● Outcome measures assessment |
| **Randomised and non-randomised comparative environmental studies** | CEE critical appraisal tool (prototype) (5) | ● Confounding● Post-intervention/selection biases● Misclassified comparison biases in observational  studies (deviation from exposure)● Performance biases in experimental studies (deviation from intervention)● Detection biases ● Outcome reporting biases● Outcome assessment biases (biases in statistical  methods) |
| **Non-randomised studies of interventions** | Cochrane ROBINS-I tool (6)  | ● Confounding ● Selection of participants● Deviations from intended interventions (includes performance bias in experimental studies)● Measurement of the outcome ● Missing outcome data ● Selection of the reported result |
| **Human experi-mental study** | OHAT (2015, 2019) (7, 8) | ● Selection bias● Performance bias● Attrition/Exclusion bias● Detection bias● Selective reporting bias |
| **Controlled before-after studies** | Cochrane EPOC checklist (3) | Same criteria as Cochrane EPOC criteria above for randomised controlled trials  |
| **Non-randomised trials** | Cochrane EPOC checklist (3) | Same criteria as Cochrane EPOC criteria above for randomised controlled trials |
| **Non-randomised experimental studies** | JBI checklist for quasi-experimental studies (9) | ● Selection of groups● Measurement of the outcome● Missing outcome data● Statistical analysis |
| **Non-randomised studies (general)** | Wells et al. (2013) (10) | ● Selection of the outcome and/or reported result● Selective analysis reporting● Confounding |
| **Experimental animal studies** | Hooijmans et al. (2014) (11)OHAT (2015, 2019) (7, 8)Rooney et al. (2014) (12)Krauth et al. (2013) (13) | ● Selection of groups● Deviations from intended interventions / exposures● Measurement of the outcome● Missing outcome data● Selection of the outcome and/or reported result● Confounding |
| **Diagnostic test accuracy studies** | QUADAS (14) and QUADAS-2 (15) tools | ● Specific named biases inherent in test accuracy studies |
| **Behavioural ecological studies** | Stuber et al. (2013) (16) | ● Measurement of the outcome (NB this is an example, not a checklist) |
| **Interrupted time series** | Greenhalgh et al. (2005) (17) | ● Secular changes (i.e. confounding trends)● Measurement of the outcome● Missing outcome data |
| Cochrane EPOC checklist (3) | ● Intervention independent of other changes● Shape of the intervention effect pre-specified● Intervention unlikely to affect data collection● Knowledge of the allocated interventions adequately prevented during the study● Incomplete outcome data adequately accounted for● Selective outcome reporting |
| **Case control studies** | Viswanathan et al. (2013) (18)OHAT (2015, 2019) (7, 8)CASP checklist (19)JBI checklist (20)NIH tool for case control studies (4) | ● Selection of groups● Measurement of the exposure● Measurement of the outcome● Exposure/risk measure implementation● Exposure/risk assessor blinding● Confounding● Statistical analysis |
| **Cohort studies** | Viswanathan et al. (2013) (18)OHAT (2015, 2019) (7, 8)Jarde et al. (2013) (21)CASP checklist (22)JBI checklist (23) | ● Selection of groups● Measurement of the outcome● Missing outcome data● Confounding● Statistical analysis |
| **Observational cohort and cross-sectional studies** | NIH tool for observational cohort and cross-sectional studies (4) | ● Similarity of source populations● Exposures measured prior to outcomes● Sufficient timeframe to detect an association● Appropriate levels of exposure● Exposure assessed more than once over time● Blinding of outcome assessors● Missing data● Key potential confounding variables |
| **Cross-sectional studies** | Viswanathan et al. (2013) (18)OHAT (2015, 2019) (7, 8) | ● Selection of groups● Measurement of the outcome● Confounding |
| **Questionnaires or surveys** | Choi & Pak (2005) (24)Sedgwick (2013) (25) | ● Selection of participants● (Non-) response● Recall● Missing outcome data● Other sources of bias inherent in surveys |
| **Case series** | Viswanathan et al. (2013) (18)OHAT (2015, 2019) (7, 8)JBI checklist (26)NIH tool for case series (4) | ● Selection of cases● Comparability of cases● Measurement of the outcome● Adequacy of follow-up● Confounding● Statistical analysis |
| **Prevalence studies** | JBI checklist (27) | ● Selection of participants ● Measurement of the exposure● Statistical analysis |
| **Case reports** | JBI checklist (28) | Bias is difficult to assess; focus on likely plausibility, clarity, applicability of the reported result |
| Note that some tools include other constructs besides risk of bias (internal validity), e.g. precision, or clarity of reporting. Only the internal validity items are summarised here.  |

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This additional file is part of the article *Principles and framework for assessing the risk of bias for studies included in comparative quantitative environmental systematic reviews.* Environmental Evidence journal 2022.