

Scientific Evidence Code System

- **Bias (EBMO:00001)**(False Certainty) = A systematic distortion in research results (estimation of effect, association, or inference).
 - **Selection Bias (EBMO:00002)** = A bias resulting from methods used to select subjects or data, factors that influence initial study participation, or differences between the study sample and the population of interest.
 - **Participant Selection Bias (EBMO:00003)** = A selection bias resulting from methods used to select participating subjects, factors that influence initial study participation, or differences between the study participants and the population of interest.
 - **Inappropriate selection criteria (EBMO:00004)**(Selection bias due to inappropriate selection criteria) = A selection bias resulting from inclusion and exclusion criteria used to select participating subjects that could result in differences between the study participants and the population of interest.
 - **Inappropriate sampling strategy (EBMO:00005)**(Biased sampling strategy, Inappropriate sampling frame, Inappropriate sampling procedure, Selection bias due to inappropriate sampling strategy) = A selection bias resulting from the sampling frame, sampling procedure, or methods used to recruit participating subjects that could result in differences between the study participants and the population of interest.
 - **Inappropriate data source for participant selection (EBMO:00014)** (Participant selection bias due to inappropriate data source for sampling frame)= Participant selection bias due to inappropriate data source for sampling frame.
 - **Non-representative sample (EBMO:00006)**(Selection bias due to non-representative sample, Unrepresentative sample, Nonrepresentative sample)= A selection bias due to differences between the included participants and the population of interest that distorts the research results (estimation of effect, association, or inference), limiting external validity or applicability.
 - **Inadequate enrollment of eligible subjects (EBMO:00008)** (Selection bias due to inadequate enrollment, Non-representative sample due to inadequate enrollment)= A selection bias in which insufficient enrollment of eligible subjects results in differences (recognized or unrecognized) between the included participants and the population of interest that distorts the research results.
 - **Non-representative sample due to timing or duration of exposure (EBMO:00012)**(Mismatch in start of

intervention and start of follow-up) A selection bias in which the timing or duration of exposure influences the outcome, and the timing or duration of exposure in the sample does not represent that of the population of interest. This selection bias may occur when the selection for study participation is not coincident with the initiation of the exposure or intervention under investigation.

- **Depletion of susceptibles (EBMO:00013)**(Prevalent user bias, Non-representative sample due to depletion of susceptibles)= A non-representative sample due to exclusion of susceptible participants who have already had an outcome due to prior exposure. For example, the inclusion of prevalent users of a medication misrepresents the initial adverse effects rate by excluding persons who do not tolerate the medication.
- **Post-baseline factors influence enrollment selection (EBMO:00009)** (Participant selection bias due to post-baseline factors)= A selection bias in which factors observed after study entry, baseline, or start of follow-up influence enrollment.
- **Factor associated with exposure influences enrollment selection (EBMO:00010)** (Participant selection bias due to factor associated with exposure) = A selection bias in which a factor associated with the exposure under investigation influences study enrollment.
- **Factor associated with outcome influences enrollment selection (EBMO:00011)** (Participant selection bias due to factor associated with outcome)= A selection bias in which a factor associated with the outcome under investigation influences study enrollment.
- **Study Selection Bias (EBMO:00015)**= A selection bias resulting from factors that influence study selection, from methods used to include or exclude studies for evidence synthesis, or from differences between the study sample and the population of interest.
- **Confounding Covariate Bias (EBMO:00016)** = A situation in which the effect or association between an exposure and outcome is distorted by another variable. For confounding covariate bias to occur the distorting variable must be (1) associated with the exposure and the outcome, (2) not in the causal pathway between exposure and outcome, and (3) unequally distributed between the groups being compared.
 - **Allocation Bias (EBMO:00032)** = A confounding covariate bias resulting from methods for assignment of the independent variable by the investigator to evaluate a response or outcome.

- **Outcome Detection Bias (EBMO:00042)** = A detection bias due to distortions in how an outcome is determined.
 - **Cognitive Interpretive Bias for outcome determination (EBMO:00047)** = An outcome detection bias due to the subjective nature of human interpretation.
 - **Lack of blinding for outcome determination (EBMO:00048)**(Lack of blinding during outcome assessment) **[Draft Term]** (Lack of blinding during outcome assessment) = A cognitive interpretive bias for outcome determination due to the outcome assessor's awareness of the participant's status with respect to the exposure of interest. {Comment for application: If the type of bias (lack of blinding during outcome assessment) is not likely to influence the results (e.g. the outcome is objectively measured and not subject to cognitive interpretive bias), the rating corresponding to the type of bias can be "absent" or "no serious concern".}
 - **Observer bias for outcome determination (EBMO:00049) [Draft Term]** = A cognitive interpretive bias for outcome determination due to subjective interpretations in the process of observing and recording information. {Comment for application: Multiple types of bias can overlap. Observer bias is different than lack of blinding with respect to the exposure. Observer bias is about the influence of the observer's interpretation of what they are observing, whether or not the observer is aware of the participant's exposure.}
 - **Recall bias for outcome determination (EBMO:00050)** = A cognitive interpretive bias for outcome determination due to differences in accuracy or completeness of recall of past events or experiences.
 - **Apprehension bias for outcome determination (EBMO:00051)**(Hawthorne effect for outcome determination) **[Draft Term]** (Hawthorne effect for outcome determination) = A cognitive interpretive bias for outcome determination due to a study participant's responding or behaving differently when aware of being observed.
 - **Diagnostic suspicion bias for outcome determination (EBMO:00052)[Draft Term]** = A cognitive interpretive bias for outcome determination in which knowledge of a subject's prior exposures or personal biases may influence both the process and the outcome of diagnostic tests.
 - **Hypothetical bias for outcome determination(EBMO:00053) [Draft Term]** = A cognitive interpretive bias for outcome determination in which a distortion that arises when an individual's stated behavior

or valuation differs to that of their real behavior or valuation.

- **Mimicry bias for outcome determination (EBMO:00054) [Draft Term]** = A cognitive interpretive bias for outcome determination in which an innocent exposure may become suspicious if, rather than causing disease, it causes a benign disorder which resembles the disease.
- **Previous opinion bias for outcome determination (EBMO:00055)[Draft Term]** = A cognitive interpretive bias for outcome determination in which the results of a previous assessment, test result or diagnosis, if known, may affect the results of subsequent processes on the same participant.
- **Perception bias for outcome determination (EBMO:00056) [Draft Term]** = A cognitive interpretive bias for outcome determination in which the researcher's or participant's tendency to be subjective about people and events causes biased information to be collected in a study or biased interpretation of a study's results.
- **Unacceptability bias for outcome determination (EBMO:00047) [Draft Term]** (Unacceptable disease bias for outcome determination) = A cognitive interpretive bias for outcome determination in which a participant's assessment of "unacceptability" of an outcome results in systematic differences in response values, response rates or uptake of tests.

- **Outcome Ascertainment Bias (EBMO:00058)** (Ascertainment bias for outcome determination) = An outcome detection bias due to distortions in how the data are collected.
- **Outcome Measurement Bias (EBMO:00059)** (Measurement bias for outcome determination) = An outcome detection bias due to distortions in how the data are measured.
- **Outcome Misclassification Bias (EBMO:00060)** (Misclassification bias for outcome determination) = An outcome detection bias due to distortions in how the data are classified.
 - **Outcome Classification System Bias(EBMO:00061) [Draft Term]** (Definition bias for outcome determination, Outcome definition bias) = An outcome misclassification bias related to ...
 - **Outcome Classification Process Bias (EBMO:00062) [Draft Term]** (Classification process bias for outcome determination) = An outcome misclassification bias related to ...

“statistic” does not include the inference for which the statistic is used—that would be found in the variable specification, and does not include the model characteristics.)

- **Count (STATO:0000047)**
- **Sum**
- **Maximum Observed Value**
- **Minimum Observed Value**
- **Ancillary Statistic**
 - **Maximum Possible Value**
 - **Minimum Possible Value**
 - **Cutoff value**
 - **Degrees of Freedom(STATO:0000069)**
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- **Measure of Central Tendency(STATO:0000029)**
- - **Mean (STATO:0000573)**(Arithmetic Mean, Average)
 - **Geometric Mean(STATO:0000396)**
 - **Median (STATO:0000574)**
 - **Mode (STATO:0000033)**
- **Difference**
 - **Count Difference**
 - **Mean Difference (STATO:0000457)**
 - **Standardized Mean Difference (STATO:0000100)**
 - **Cohen’s d statistic**
 - **Strictly standardized mean difference(STATO:0000135)**
 - **Hedges’s g (STATO:0000319)**
 - **Glass’s delta (STATO:0000320)**
 - **Median Difference**
 - **Risk Difference (STATO:0000424)**
 - **Relative Risk Difference**
- **Reciprocal of Difference**
 - **Number Needed to Treat (NNT, Number needed to treat to benefit, NNTB)**
 - **Number Needed to Screen (NNS)**
 - **Number Needed to Diagnose (NND)**
 - **Number Needed to Harm (NNH, Number needed to treat to harm, NNTH)**
- **Ratio (STATO:0000184)**
 - **Percentage**
 - **Proportion**
 - **Incidence (STATO:0000413)** (Cumulative Incidence, Incidence Proportion) (Conditional Risk)
 - **Prevalence (STATO:0000412)**(Period Prevalence, Point Prevalence, Lifetime Prevalence)
 - **Sensitivity (STATO:0000233)**
 - **Specificity(STATO:0000134)**

- Positive Predictive Value
 - Negative Predictive Value
 - Odds
 - Rate
 - Incidence Rate (Incidence Density) (Average Hazard Rate)
 - Hazard Rate (Hazard, Hazard Function, Instantaneous Hazard Rate)
 - Ratio-based Measure of Association
 - Hazard Ratio
 - Incidence Rate Ratio (IRR)
 - Standardized Incidence Ratio (SIR)
 - Odds Ratio (STATO:0000182)
 - Prevalence Ratio
 - Risk Ratio (STATO:0000245)(Relative Risk)
 - Likelihood Ratio Positive (STATO:0000411)
 - Likelihood Ratio Negative (STATO:0000410)
 - Positive Clinical Utility Index
 - Negative Clinical Utility Index
 - Ratio-based Measure of Agreement
 - Diagnostic Accuracy (STATO:0000415)
 - Diagnostic Odds Ratio
 - Kappa
 - Bennett's Kappa
 - Cohen's Kappa
 - Scott's Kappa
 - Misclassification Rate
 - F1-score
- Measure of Correlation
 - Covariance (STATO:0000301)
 - Pearson Correlation Coefficient (STATO:0000280)
 - Regression Coefficient (STATO:0000565)
 - Spearman Rank-Order Correlation Coefficient (STATO:0000201)
 - Matthews Correlation Coefficient (STATO:0000524)
 - Kendall Correlation Coefficient (STATO:0000240)
 - Goodman and Kruskal's Gamma
 - Calibration
 - Mean calibration
 - Calibration-in-the-large
 - Calibration intercept
 - Calibration slope
- Measure of Dispersion (STATO:0000028)
 - Range (STATO:0000035)
 - Interquartile range (STATO:00000164)
 - Standard deviation (STATO:0000237)
 - Standard deviation for population
 - Standard deviation for sample

- Sampling standard deviation
 - Variance (STATO:0000113)
 - Variance for population
 - Variance for sample
 - Sampling variance
 - Gini index
 - Measure of Dispersion of Statistic
 - Standard error
 - Standard error of the mean
 - Standard error of the median
 - Standard error of the proportion
 - Standard error of the difference between means
 - Standard error of the difference between proportions
 - Credible interval
 - Confidence interval
 - Measure of Discrimination
 - Area Under the Curve (AUC)
 - C-statistic
 - Measure of Heterogeneity
 - Chi square for homogeneity
 - Cochran's Q statistic (Chi squared for heterogeneity)
 - I-squared
 - Tau squared
 - Hypothesis Testing Measure
 - Chi square for independence
 - Chi square for trend
 - P-value
 - Z-score
 - T-score
 - Modifier Code
 - Predicted Data Item – add to any other Statistic Type code to note predicted form (not observed form) of that statistic type
- Hypothesis test attribute
 - alpha setting
 - alpha setting with subtype unspecified
 - individual test alpha without multiple testing adjustment
 - overall alpha with multiple testing
 - individual test alpha with multiple testing adjustment
 - one-tailed test (one threshold)
 - two-tailed test (two thresholds)
- Statistical Model(STATO:0000107) [Draft term](Statistical model characteristic)=An Information content entity which is a formalization of relationships between variables in the form of mathematical equations. A statistical model describes how one or more random variables are related to one another or more

other variables. The model is statistical as the variables are not deterministically but stochastically related.

- **Covariate term** [10]
- **Interaction term**
- **Fixed-effect model** (common-effect model, one true effect size)
- **Random-effects model** (random effects, true effect sizes are distributed)
- **Generalized Linear Mixed Model (GLMM)**
 - **GLMM with probit link**
 - **GLMM with logit link**
 - **GLMM with identity link**
 - **GLMM with log link**
 - **GLMM with generalized logit link**
 - **GLMM with subtype unspecified** [20]
- **GLM (Generalized Linear Model)**
 - **GLM with probit link**
 - **GLM with logit link** (Logistic Regression)
 - **GLM with identity link** (Linear Regression)
 - **GLM with log link**
 - **GLM with generalized logit link**
 - **GLM with subtype unspecified**
- **Regression Model Form**
 - **Linear Regression** (GLM with identity link)
 - **Logistic Regression** (GLM with logit link) [30]
 - **Log Linear Regression**
 - **Polynomial Regression**
 - **Cox Proportional Hazards**
- **Regression Model Distribution**
 - **Normal Distribution for Regression**
 - **Log Normal Distribution for Regression**
 - **Exponential Family of Distributions for Regression**
 - **Binomial Distribution for Regression** (Binomial Regression)
 - **Multinomial Distribution for Regression** (Multinomial Regression)
 - **Poisson Regression** (Poisson Distribution for Regression) [40]
 - **Negative Binomial Regression** (Negative Binomial Distribution for Regression)
- **Statistical model goal**
 - **Adjustment for clustering**
 - **Adjustment for covariates** [44]
- **Data transformation**
 - **Data imputation**
 - **Zero-cell adjustment with constant**
 - **Zero-cell adjustment with continuity correction**
 - **Meta-analysis**
 - **Meta-analysis with fixed-effect model**
 - **Meta-analysis using inverse variance method**
 - **Meta-analysis using Mantel-Haenszel method** [50]

- **Meta-analysis using Peto method**
 - **Meta-analysis with random-effects model**
 - **Meta-analysis using Dersimonian-Laird method** (correct the spelling for: meta analysis by DerSimonian and Leard method)
 - **Meta-analysis using Paule-Mandel method**
 - **Meta-analysis using Restricted Maximum Likelihood method**
 - **Meta-analysis using Maximum Likelihood method**
 - **Meta-analysis using Empirical Bayes method**
 - **Meta-analysis using Hunter-Schmidt method** (meta analysis by Hunter-Schmidt method)
 - **Meta-analysis using Hartung-Knapp-Sidik-Jonkman method** (may need to add synonyms of HKSJ method, Hartung-Knapp method, Sidik-Jonkman method)
 - **Meta-analysis using modified Knapp-Hartung method** (may have synonym of mKH method, modified Hartung-Knapp method) [60]
 - **Meta-analysis using Hedges method** [61]
- **Statistical hypothesis test**
 - **Between group comparison statistical test**
 - **ANOVA**
 - **multivariate ANOVA (MANOVA)**
 - **Multiway ANOVA**
 - ?? 3-way ANOVA
 - **One-way ANOVA**
 - **Repeated measure ANOVA**
 - **Two-way ANOVA** [70]
 - ?? 2-way ANOVA without replication
 - ?? 2-way ANOVA with replication
 - **Non-parametric test**
 - **Kruskal Wallis test**
 - **Log rank test**
 - **Mann-Whitney U-test** (?? Wilcoxon Rank-Sum test; U test; Wilcoxon rank-sum test; rank-sum test for the comparison of two samples)
 - **McNemar test** (move from information content entity)
 - **Sign test**
 - **Friedman test**
 - **Two sample t-test** (2-sample t-test, independent) [80]
 - **Two sample t-test with equal variance**
 - **Two sample t-test with unequal variance**
 - **Z test for between group comparison**
 - **Chi square test**
 - **Chi square test for homogeneity**
 - **Mantel-Haenszel method** (Cochran-Mantel-Haenszel Chi-Squared Test for Count Data)

- **Pearson's Chi square test of goodness of fit**
- **Pearson's Chi square test of goodness of independence between categorical variables**
 - **Yate's corrected Chi-Squared test**
- **Single-sample reference comparison statistical test [90]**
 - **One sample t-test (1-sample t-test)**
 - **Z test for single-sample**
- **Test of association between categorical variables**
 - **Cochran-Armitage test for trend**
 - **Fisher's exact test**
- **Within subject comparison statistical test**
 - **Paired t-test (2-sample t-test, dependent, matched pair t-test)**
 - **Wilcoxon signed rank test [98]**