Meta-Analysis Data Types Technical Guide

1. Binary Outcomes

Used when the outcome is a 'yes/no' event (e.g., dead/alive, cured/uncured). This is the most common data type in clinical trials.

يُستخدم عندما تكون النتيجة حدثًا 'نعم/لا' (مثل: وفاة/نجاة، شفاء/عدم شفاء). (هو النوع الأكثر شيوعًا في التجارب السريرية.

Best For:

Comparing the odds or risk of an event occurring between two groups.

Example Scenario:

"Antibiotic vs Placebo for clinical cure."

Data Entry Template:

Study Name	Trt Events	Trt Total	Ctrl Events	Ctrl Total
Al-Harbi et al. 2019	45	60	30	60
Peterson 2020	52	75	38	75
Chen & Wang 2021	22	40	15	40
Martinez et al. 2022	80	100	55	100
O'Connor 2023	35	50	25	50

2. Continuous Outcomes

Measurements on a continuous scale like weight, blood pressure, or score on a scale. Requires Means and Standard Deviations (SD).

قياسات بمعدلات مستمرة مثل الوزن وضغط الدم والمجموع في المقاييس .يتطلب المتوسط الحسابي والانحراف المعياري.

Best For:

Evaluating changes in numerical variables across populations.

Example Scenario:

"Keto vs Standard diet for weight loss (kg)."

Data Entry Template:

Study	Trt Mean	Trt SD	Trt N	Ctrl Mean	Ctrl SD	Ctrl N
Rossi et al. 2018	-4.5	1.2	45	-2.1	1.5	45
Smithson 2019	-3.8	1.4	60	-1.8	1.3	60
Lee & Kim 2020	-5.1	1.1	35	-2.5	1.6	35
Dubois 2021	-4.0	1.5	80	-2.0	1.4	80
Gupta et al. 2023	-4.2	1.3	55	-2.2	1.2	55

3. Generic Effect Sizes

When studies don't provide raw counts/means but report pre-calculated effect sizes like Hedges' g or Cohen's d with SE.

عندما لا توفر الدراسات الأرقام الخام ولكنها تبلغ عن أحجام تأثير محسوبة مسبقًا مع الخطأ المعياري.

Best For:

Combining results that were calculated in different formats originally.

Example Scenario:

"Anxiety reduction pre-calculated metrics."

Data Entry Template:

Study Name	Effect Size (g)	Standard Error (SE)
Johansson 2017	0.45	0.12
Miller et al. 2018	0.52	0.09
Tanaka 2020	0.38	0.15
Silva & Costa 2021	0.61	0.11
Ahmed et al. 2022	0.49	0.14

4. Regression Coefficients

Pooling the Beta (β) coefficients from adjusted regression models to see the independent impact of a variable.

دمج معاملات بيتا من نماذج الانحدار المعدلة لمعرفة التأثير المستقل لمتغير ما مع ضبط العوامل الأخرى.

Best For:

Meta-analyzing observational studies with multiple adjusted variables.

Example Scenario:

"Impact of education on income adjusted for age."

Data Entry Template:

Study Name	Beta Coefficient	Standard Error (SE)
Anderson 2016	0.12	0.03
Zheng et al. 2018	0.15	0.02
Kumar 2019	0.09	0.04
Williams 2021	0.14	0.02
Becker 2022	0.11	0.03

5. Hazard Ratios (Survival)

Used for 'Time-to-event' data. It measures how fast an event happens compared to a control group over time.

يُستخدم لبيانات 'وقت الحدث'. يقيس مدى سرعة حدوث الحدث مقارنة بمجموعة التحكم بمرور الوقت.

Best For:

Analysis of cancer recurrence, time to failure, or mortality over years.

Example Scenario:

"Chemotherapy vs Standard care for recurrence time."

Data Entry Template:

Study Name	Hazard Ratio (HR)	Lower 95% CI	Upper 95% CI
Takahashi 2018	0.65	0.52	0.81
Meyer et al. 2019	0.72	0.58	0.89
Lopez 2020	0.59	0.45	0.77
Ivanova 2021	0.68	0.55	0.84
Davies et al. 2023	0.75	0.61	0.92

6. Incidence Rate Ratios

Deals with 'Count data' divided by 'Person-time'. Ideal for rare events or repeated events.

يتعامل مع 'بيانات العد 'مقسومة على 'وقت الشخص .'مثالي للأحداث النادرة أو المتكررة.

Best For:

Measuring the frequency of events (e.g., number of attacks per year).

Example Scenario:

"Asthma exacerbations per person-year."

Data Entry Template:

Study Name	Trt Events	Trt Person-Years	Ctrl Events	Ctrl Person-Years
Okafor 2018	15	1000	25	1000
Nguyen et al. 2019	22	1500	35	1500
Cohen 2020	10	800	18	800
Patel et al. 2021	30	2000	45	2000
Fisher 2022	18	1200	28	1200

7. AUC / C-statistic

Standard metric for how well a diagnostic test or predictive model can distinguish between two groups.

المقياس المعياري لمدى كفاءة اختبار تشخيصي أو نموذج تنبؤي في التمييز بين مجموعتين.

Best For:

Pooling scientific validation of diagnostic models or AI algorithms.

Example Scenario:

"AI model predicting hospital readmission risk."

Data Entry Template:

Study Name	AUC	Standard Error (SE)
AI-Health Consortium 2020	0.82	0.03
Zhang et al. 2021	0.85	0.02
BioPredict 2022	0.79	0.04
ML-Med Group 2022	0.88	0.02
Carter et al. 2023	0.81	0.03

8. Prevalence / Proportion

Single-arm meta-analysis used to estimate the baseline occurrence of a condition in a population.

الميتا-أناليسيس أحادية الجانب المستخدمة لتقدير حدوث حالة في مجتمع معين.

Best For:

Wanting to know the percentage of people with a certain disease globally.

Example Scenario:

"Global prevalence of long-COVID symptoms."

Data Entry Template:

Study Name	Cases (Events)	Total Sample (N)
Euro-Survey 2021	225	1000
US Health Dept 2021	350	1500
Tokyo Med 2022	180	800
UK Biobank 2022	450	2000
Brazil Health 2023	290	1200

9. Correlations

Synthesizing the strength of a linear relationship between two variables across studies.

تأليف قوة العلاقة الخطية بين متغيرين عبر الدراسات.

Best For:

Determining if 'increase in X' relates significantly to 'increase in Y'.

Example Scenario:

"Screen time vs sleep quality relationship."

Data Entry Template:

Study Name	Correlation (r)	Sample Size (N)
Gonzalez 2018	-0.35	150
Wright et al. 2019	-0.42	200
Sato 2020	-0.28	120
Mueller 2021	-0.45	250
Al-Sayed 2022	-0.39	180

10. Diagnostic Test Accuracy

Advanced bivariate meta-analysis pooling Sensitivity and Specificity simultaneously.

تحليل ميتا ثنائي المتغير متقدم يدمج الحساسية والنوعية في آن واحد.

Best For:

Synthesizing test performance against a 'gold standard' reference.

Example Scenario:

"Rapid flu test vs PCR sensitivity/specificity."

Data Entry Template:

Study Name	TP	FP	FN	TN
Clinical Lab A 2019	88	5	12	150
Hosp Group B 2020	115	8	15	200
RapidTest Study 2020	65	3	10	110
Euro Diagnostics 2021	140	12	20	250
National Screen 2022	95	6	14	160

11. Network Meta-Analysis

Advanced method to compare multiple interventions (A vs B vs C) even if they weren't directly compared in a single trial.

طريقة متقدمة لمقارنة تدخلات متعددة حتى لو لم يتم مقارنتها مباشرة في تجربة واحدة.

Best For:

Ranking which drug is most effective among many options.

Example Scenario:

"3 BP drugs vs Placebo responders."

Data Entry Template:

Study Name	Treatment	Events	Total Sample
Alpha Trial 2018	Placebo	15	100
Alpha Trial 2018	Drug A	35	100
Beta Study 2019	Placebo	12	80
Beta Study 2019	Drug B	42	80
Gamma Med 2020	Drug C	55	120

12. Network DTA

Compares the diagnostic accuracy of multiple tests (MRI vs CT vs US) simultaneously in one network.

يقارن دقة التشخيص لاختبارات متعددة في شبكة واحدة.

Best For:

Determining the best initial diagnostic tool for a condition.

Example Scenario:

"MRI, CT, US for appendicitis accuracy."

Data Entry Template:

Study Name	Test	TP	FP	FN	TN
Rad-Study 1	US	45	15	10	80
Rad-Study 1	CT	52	8	3	87
Imaging Group	MRI	63	5	2	105
Peds-Scan	US	35	12	8	60
Euro-Rad	CT	80	12	5	128