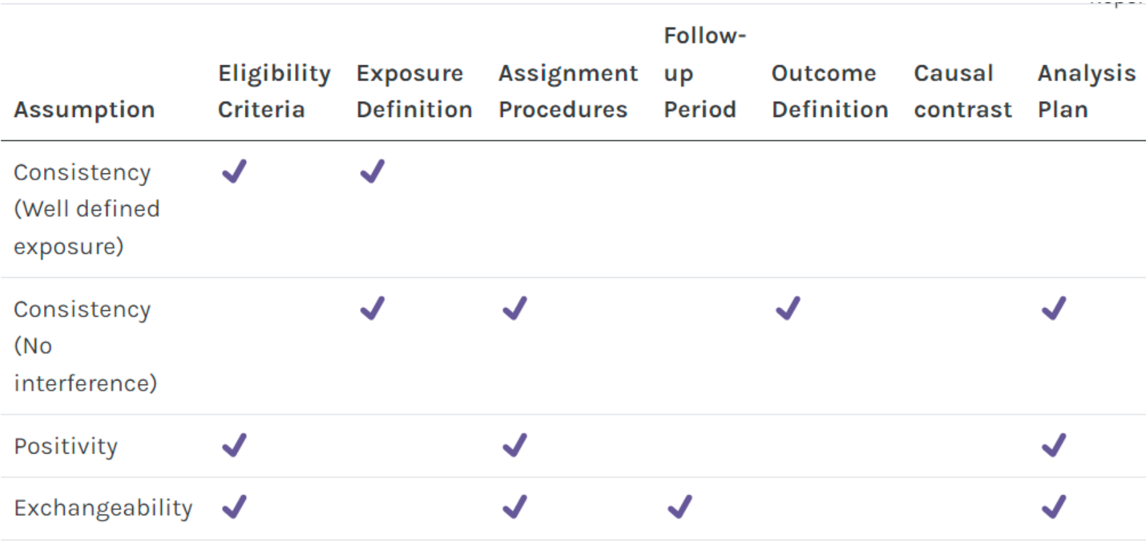
ATE/risk difference: , risk ratio: , odds ratio:

Assumptions: Consistence: well defined exposure (no differ in exposure) and no interference (subjects’ outcomes are independent), Exchangeability: , , Positivity:

Study design: randomized trials vs target trials (observational studies)

Observational studies: Cohort studies/Prospective/X→Y vs Outcome based sampling/ case-control studies/Retrospective/Y→X

Key elements in protocol: eligibility criteria, exposure definition (intervention&control), assignment procedures, follow-up period, outcome definition, contrast of interest, analysis plan

PS aims: overlap between exposure groups, balance the data

Propensity score: , package function: svydesign, svyglm

d-separation: path p is d-separated by {Z} ⇔ chain in {Z}/fork in {Z}/collider and descendants not in {Z}

Backdoor criterion: adjustment set {Z} to X on Y satisfies: descendants of X not in {Z}, {Z} d-separates (blocks) all paths between X and Y that contain an arrow into X (backdoor paths). Distribution of PS in groups should overlap, no PS values close to 1 or 0.

G-computation: Model Calculate for each individual: Estimate

,

,

Variables: outReg: confounders, var only ~ Y, no mediators, no var only ~ X, PSM: confounders, var only ~ Y, no var only ~ X

Weights: ATE: if exposed, if unexposed; ATT: 1 if exposed, if unexposed

MCAR: , estimates consistent, se larger, imputation valid (consider only for efficiency gain)

MAR: , estimates consistent, se larger, imputation valid

MNAR: , , estimates inconsist, se larger, imputation invalid

MAR/MNAR but not dependent on outcome: complete cases may still be unbiased for some analyses, consider multiple imputation for efficiency gain

MAR with dependency on outcome: multiple imputation; MNAR with dependency on outcome: sensitivity analysis