

# Three-wave panel: common biases

Bias	Causal Graph
1 <b>Problem:</b> Residual confounding. <b>Response:</b> Sensitivity analysis.	
2 <b>Problem:</b> Post-baseline confounding. <b>Response:</b> Condition on $L_1$ if not a mediator.	
3 <b>Problem:</b> Conditioning on post-treatment confounder. <b>Response:</b> Do not condition on $L_1$ (a mediator).	
4 <b>Problem:</b> Confounding by common cause of treatment and outcome in the censored. <b>Response:</b> Inverse Probability of Censoring Weighting (IPCW) subject to assumptions, sensitivity analysis.	
5 <b>Problem:</b> Confounding by common cause of treatment and attrition. <b>Response:</b> IPCW subject to assumptions, sensitivity analysis	
6 <b>Problem:</b> Treatment affects censoring. <b>Response:</b> IPCW subject to assumptions, sensitivity analysis.	
7 <b>Problem:</b> No treatment effect when outcome causing censoring: <b>no bias</b> . <b>Response:</b> Sharp null never ensured. Hence, we perform IPCW subject to assumptions and sensitivity analysis.	
8 <b>Problem:</b> Treatment effect when outcome causes censoring <b>bias</b> . <b>Response:</b> IPCW subject to assumptions, sensitivity analysis.	
9 <b>Problem:</b> Treatment effect and effect-modifiers differ in censored (restriction bias without confounding). <b>Response:</b> IPCW subject to assumptions, sensitivity analysis.	

**Key:**  $A$  denotes the treatment;  $\mathcal{R}$  Denotes randomised to treatment assignment;  $Y$  denotes the outcome;  $L$  denotes a confounder;  $U$  denotes an unmeasured source of bias;  $(X)$ : Unmeasured/mismeasured treatment, outcome, or effect-modifier;  $\longrightarrow$  asserts causality;  $\longrightarrow$  biased path suggesting or distorting treatment effect;  $\dashrightarrow$  biased path for treatment effect in the target population;  $\boxed{X}$  indicates conditioning on variable  $X$  eliminates or reduces;  $\boxed{X}$  indicates that conditioning on  $X$  introduces bias;  $F \longrightarrow Y$  indicates effect modification of  $A \longrightarrow Y$  by  $F$ ;  $U_{\Delta F} \longrightarrow Y$  indicates effect modification of  $A \longrightarrow Y$  by  $U_{\Delta F}$ .