Table 1. Mediation Estimand Definitions, Descriptions, and Assumptions

Estimand	Description	Identifying Assumptions in Addition to Positivity and Consistency
Controlled direct effect $E(Y_{a,m}) - E(Y_{a^*,m})$	Difference in the expected value of Y setting A to a versus a^* and in both cases setting M to m	1. No unmeasured confounding between A and Y $(A \perp Y_{a,m} \mid W)$. 2. No unmeasured confounding between M and Y $(M \perp Y_{a,m} \mid W, A)$.
Natural direct effect $E(Y_{a,M_{a^*}}) - E(Y_{a^*,M_{a^*}})$ Natural indirect effect $E(Y_{a,M_a}) - E(Y_{a,M_{a^*}})$	Difference in the expected value of Y setting A to a versus a^* and in both cases letting M be the value that it would naturally be under a^* Difference in the expected value of Y in both cases setting A to a and contrasting M under a versus a^*	1. No unmeasured confounding between A and Y $(A \perp Y_{a,m} \mid W)$. 2. No unmeasured confounding between M and Y $(M \perp Y_{a,m} \mid W, A)$. 3. No unmeasured confounding of $A - M$ $(A \perp M_a \mid W)$. 4. No measured or unmeasured posttreatment confounding of the $M - Y$ relationship $(M_{a^*} \perp Y_{a,m} \mid W)$. 5. Y_a is equivalent to Y_{a,M_a}.
Interventional direct effect $E(Y_{a,g_{M\|a^*,W}}) - E(Y_{a^*,g_{M\|a^*,W}})$ Interventional indirect effect $E(Y_{a,g_{M\|a,W}}) - E(Y_{a,g_{M\|a^*,W}})$	Difference in the population average of Y setting A to a versus a^* and in both cases drawing the value of M from a distribution of M conditional on $A = a^*$ and the individual's set of covariate values, W Difference in the population average of Y in both cases setting A to a and contrasting drawing the value of M from a distribution of M conditional on $A = a$ versus $A = a^*$ and the individual's set of covariate values, W	1. No unmeasured confounding between A and Y $(A \perp Y_{a,m} \mid W)$. 2. No unmeasured confounding between M and Y $(M \perp Y_{a,m} \mid W, A)$. 3. No unmeasured confounding of $A - M$ $(A \perp M_a \mid W)$.

Abbreviations: A, treatment; M, mediator; W, covariates; Y, outcome.