

1. D-separation still applies after intervention.

$$(Cancer \perp\!\!\!\perp Asthma | Smoke)_{G_{\overline{X}}} \implies P(Cancer | do(Smoke), Asthma) = P(Cancer | do(Smoke))$$

2. If there are no backdoor paths from  $X$  to  $Y$  then intervention  $\equiv$  observation.

$$(\hat{X} \perp\!\!\!\perp Cancer | X, Poverty)_{G^\dagger} \implies P(Cancer | do(Smoke), Poverty) = P(Cancer | Smoke, Poverty)$$

3. If there are only backdoor paths from  $X$  to  $Y$  then intervention doesn't change  $P(Y)$ .

$$(\hat{X} \perp\!\!\!\perp Diet)_{G^\dagger} \implies P(Diet | do(Smoke)) = P(Diet)$$

