9.6 College education and age at first birth

We mentioned in Problem 7.4 that first-time mothers in San Francisco are older than in other parts of the US. Besides geographic location, another predictor of age at first birth mentioned in the New York Times article is education level. {Bui, 2018 #1579} According to the article, "Women with college degrees have children an average of seven years later than those without — and often use the years in between to finish school and build their careers and incomes."

The exact methods used by the Times to arrive at this estimate are not included in the article, but it does say the analysis "was of all birth certificates in the United States since 1985 and nearly all for the five years prior."

Suppose for this problem that the only data source for the cited study was birth certificates, (which do include the mother's age and education level) and that the age of the women giving birth for the first time was 7 years higher for women with college degrees than for those without. Does this study allow you to infer that women who choose go to college defer childbearing? Explain, naming any potential biases in this study design.

Answer:
While the hypothesis that choosing to attend college causes women to delay child-bearing is plausible, a study with this design (looking at birth certificates only) can't address this question because women having babies younger may not yet have had the opportunity to go to college. This is immortal time bias, though in this case we could call it "infertile time bias."

The infertile time is the person-time of college-educated women before they have their first baby. If they had the baby before college, it would count as a baby born to a non-college educated woman. With birth certificates as the data source, there is no possibility for a college-educated woman to have her first baby before college! In order to avoid this bias, births to women who later went to college would need to count as births to women who chose to go to college. If the only data source for the study was birth certificates, there would be no way to capture *future* college education for women with only one child.