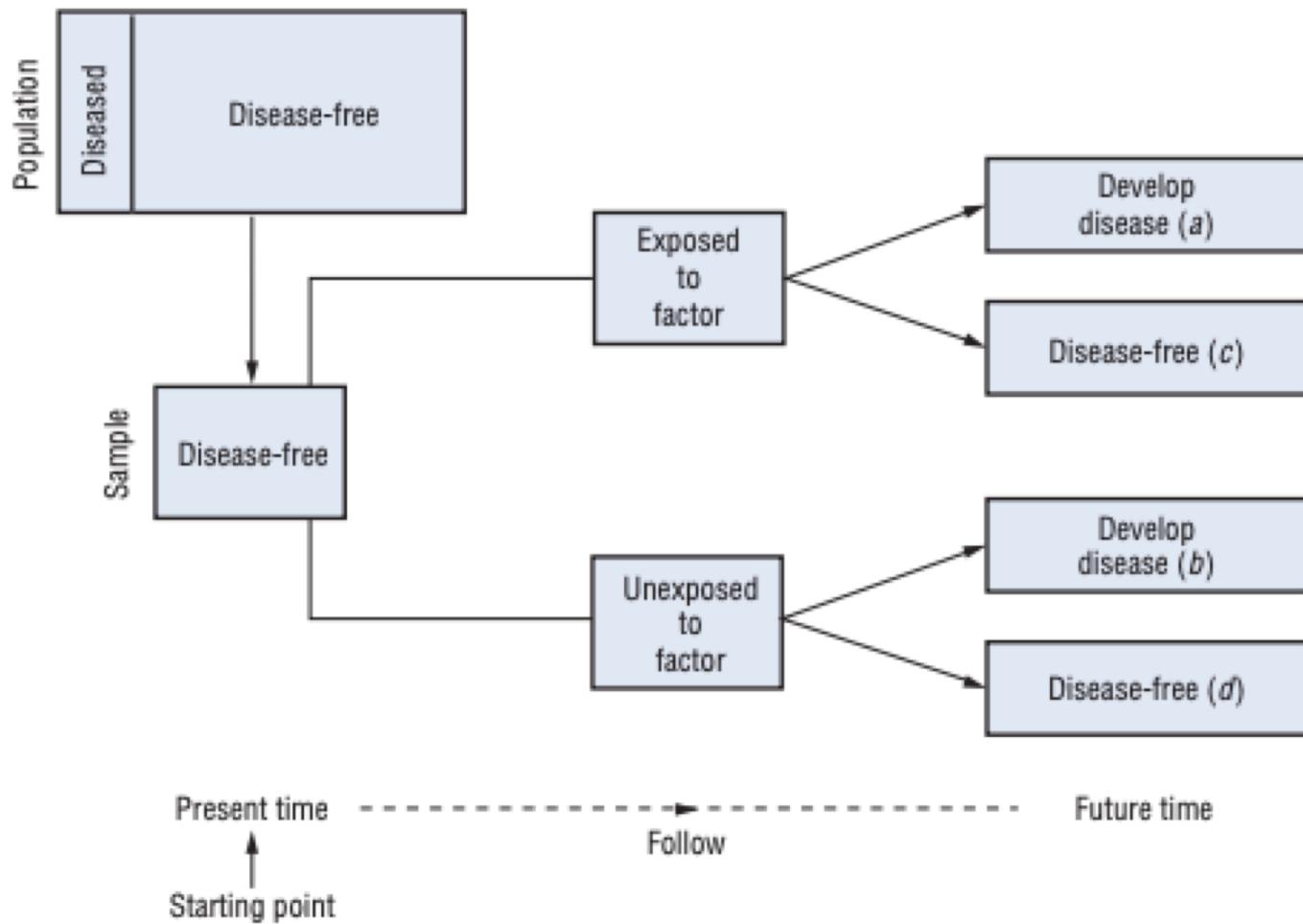
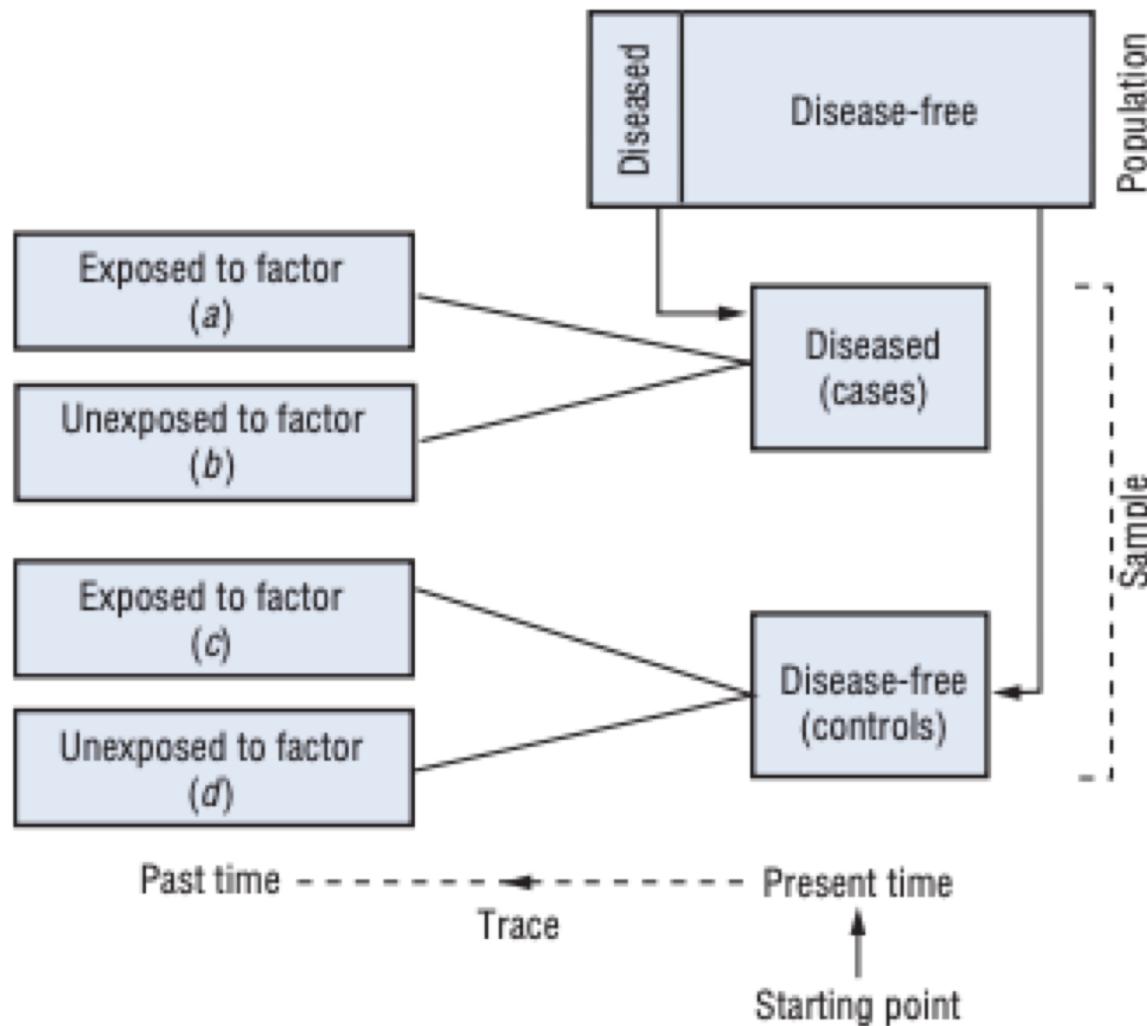


Conditional logistic Regression

What type of study is this?



What type of study is this?



What type of study is this?



Population

Infertility example

- ▶ I want to study the effect of induced abortion and miscarriage on the risk of subsequent infertility.
- ▶ Age, parity, and education level may be potential confounding factors.

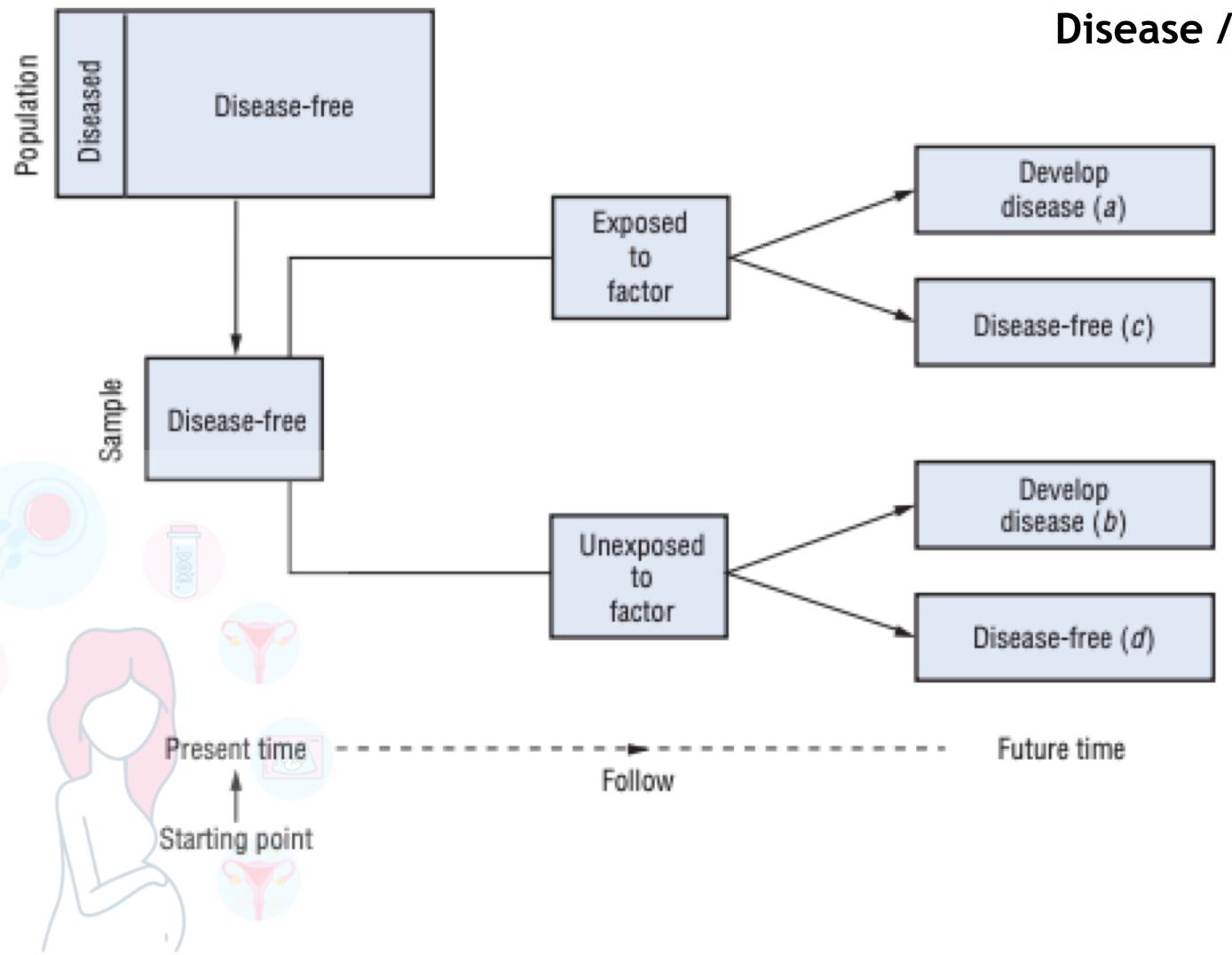


What study design should I use?

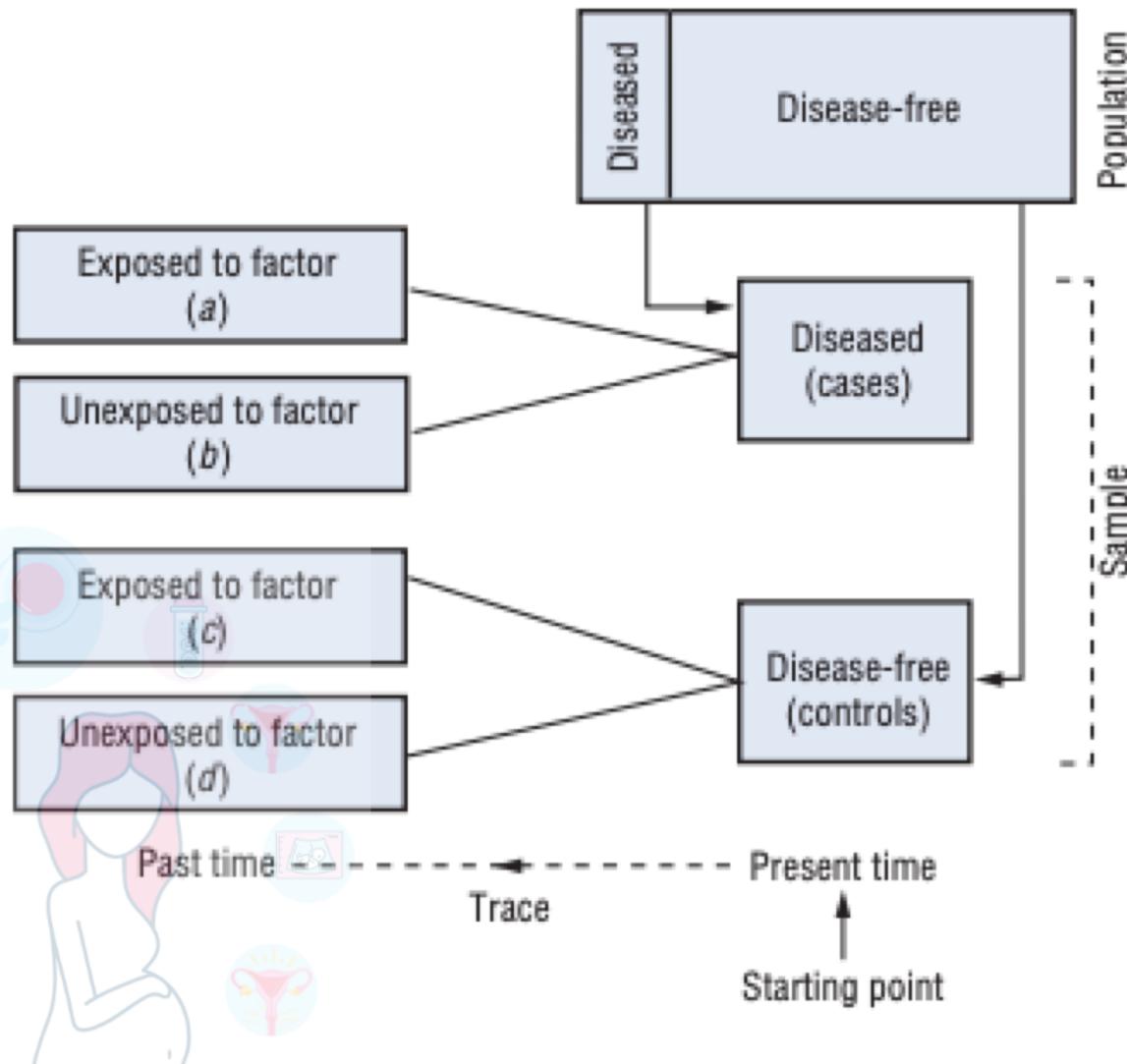
What type of study is this?

Exposure: abortions

Disease /outcome: infertility



What type of study is this?



Exposure: abortions

Disease /outcome: infertility

What type of study is this?

Exposure: abortions

Disease /outcome: infertility



Population



Logistic Regression

- ▶ **Logistic regression** analysis studies the association between a binary dependent variable and a set of (explanatory) variables using a logit model.
- ▶ **Conditional logistic regression** is a type of logistic regression generally employed when the observations are paired

Infertility example

- ▶ A study, conducted in Greece, estimated the effect of miscarriages and the effect of induced abortions on the risk of subsequent infertility.



Cases (n=100): women with infertility

Controls (n=200): 2 women were chosen from the same hospital matched by age, parity and education level for each case.

Infertility example

```
> library(survival)  
> data(infert)
```

- ▶ case:
 - ▶ 1=woman with infertility
 - ▶ 0=women without infertility
- ▶ spontaneous:
 - ▶ 0= without miscarriage;
 - ▶ 1= one miscarriage;
 - ▶ 2=two or more miscarriages
- ▶ induced:
 - ▶ 0=no induced abortions;
 - ▶ 1=one induced abortion;
 - ▶ 2=two or more induced abortions
- ▶ stratum: pairing between cases and controls (2 controls per case)

Infertility example

```
> infert$spontaneous0 <- ifelse(infert$spontaneous==0,1,0)
> infert$spontaneous1 <- ifelse(infert$spontaneous==1,1,0)
> infert$spontaneous2 <- ifelse(infert$spontaneous==2,1,0)

> infert$induced0 <- ifelse(infert$induced==0,1,0)
> infert $induced1 <- ifelse(infert$induced==1,1,0)
> infert $induced2 <- ifelse(infert$induced==2,1,0)
```

Infertility example

```
LRsimple <- glm(case~ spontaneous1 + spontaneous2 + induced1 + induced2, data=infert, family=binomial)

LAdj <- glm(case~ spontaneous1 + spontaneous2 + induced1 + induced2 + age + parity + education, data=infert, family=binomial)

condLR <- clogit(case~ spontaneous1 + spontaneous2 + induced1 + induced2 + strata(stratum), data=infert)

> exp(cbind(OR = coef(LRsimple), confint(LRsimple))) > exp(cbind(OR = coef(LRsimple), confint(LAdj))) > exp(cbind(OR = coef(condLR), confint(condLR)))
Waiting for profiling to be done... Waiting for profiling to be done... OR 2.5 % 97.5 %
(spontaneous1) 7.719547 3.177417 18.754669
(spontaneous2) 51.163142 12.363421 211.726763
(induced1) 4.000705 1.613303 9.921037
(induced2) 16.765432 3.967948 70.837542
(Intercept) 0.174779 0.01880879 5.3463063
(spontaneous1) 3.630192 3.52531760 17.3954754
(spontaneous2) 10.525317 18.12683171 227.8100033
(induced1) 1.585398 1.58498523 8.1573026
(induced2) 2.281856 0.96929816 5.3320078
(age) 0.174779 0.97812768 1.1076021
(parity) 3.630192 0.29001224 0.6317976
(education6-11yrs) 10.525317 0.07345333 1.7539053
(education12+ yrs) 1.585398 0.04675256 1.3103333
```