

**Prac 4.5**

[S2008/S2008-101]

The graphic (from the *New York Times*, April 17, 2008) shows the fitted values from a model of the survival of babies born extremely prematurely.



*Caption: “A new study finds that doctors could better estimate an extremely premature baby’s chance of survival by considering factors including birth weight, length of gestation, sex and whether the mother was given steroids to help develop the baby’s lungs.”*

Two different response variables are plotted: (1) the probability of survival and (2) the probability of survival without moderate to severe disabilities. Remarkably for a statistical graphic, there are three explanatory variables:

1. Birth weight (measured in pounds (lb) in the graphic).
2. The sex of the baby.
3. Whether the mother took steroids intended to help the fetus’s lungs develop.

Focus on the survival rates without disabilities — the darker bars in the graphic. Estimate the effect of giving steroids, that is, how much extra survival probability is associated with giving steroids?

- A No extra survival probability with steroids.
- B About 1-5 percentage points
- C About 10 to 15 percentage points
- D About 50 percentage points
- E About 75 percentage points

For the babies where the mother was given steroids, how does the survival probability depend on the birth weight of the baby:

- A No dependence.
- B Increases by about 25 percentage points.
- C Increases by about 50 percentage points.
- D Increases by about 25 percentage points per pound.
- E Increases by about 50 percentage points per pound.

Prac 4.5-2

For the babies where the mother was given steroids, how does the survival probability depend on the sex of the baby?

- A No dependence.
- B Higher for girls by about 15 percentage points.
- C Higher for boys by about 20 percentage points.
- D Higher for girls by about 40 percentage points.
- E Higher for boys by about 40 percentage points.

Prac 4.5-3

Describe the evidence given in the graph for an interaction between birth weight and sex in accounting for survival.

It's claimed that the data in the graph give *no evidence* for a substantial interaction between steroid use and baby's sex in accounting for survival. Explain what features of the graph support this claim.