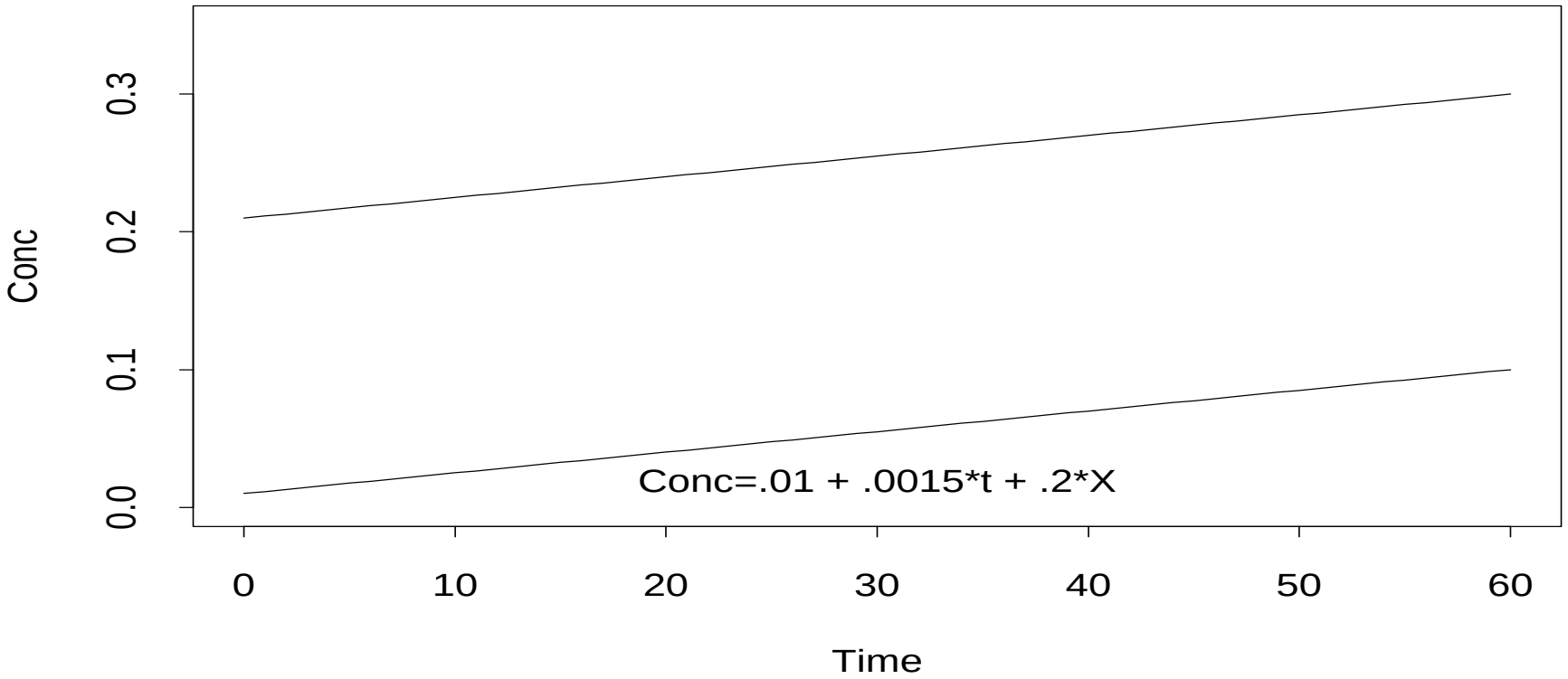
Types of (Linear) Regression Models

- There are many possible model forms.
- Choosing the best one is a complicated process.
- The predictors can be continuous variables, or counts, or indicators.
- Indicator or "dummy" variables take the values 0 or 1 and are used to combine and contrast information across binary variables, like gender.
- Some examples are shown below.

One continuous and one binary predictor: (section 8.1)

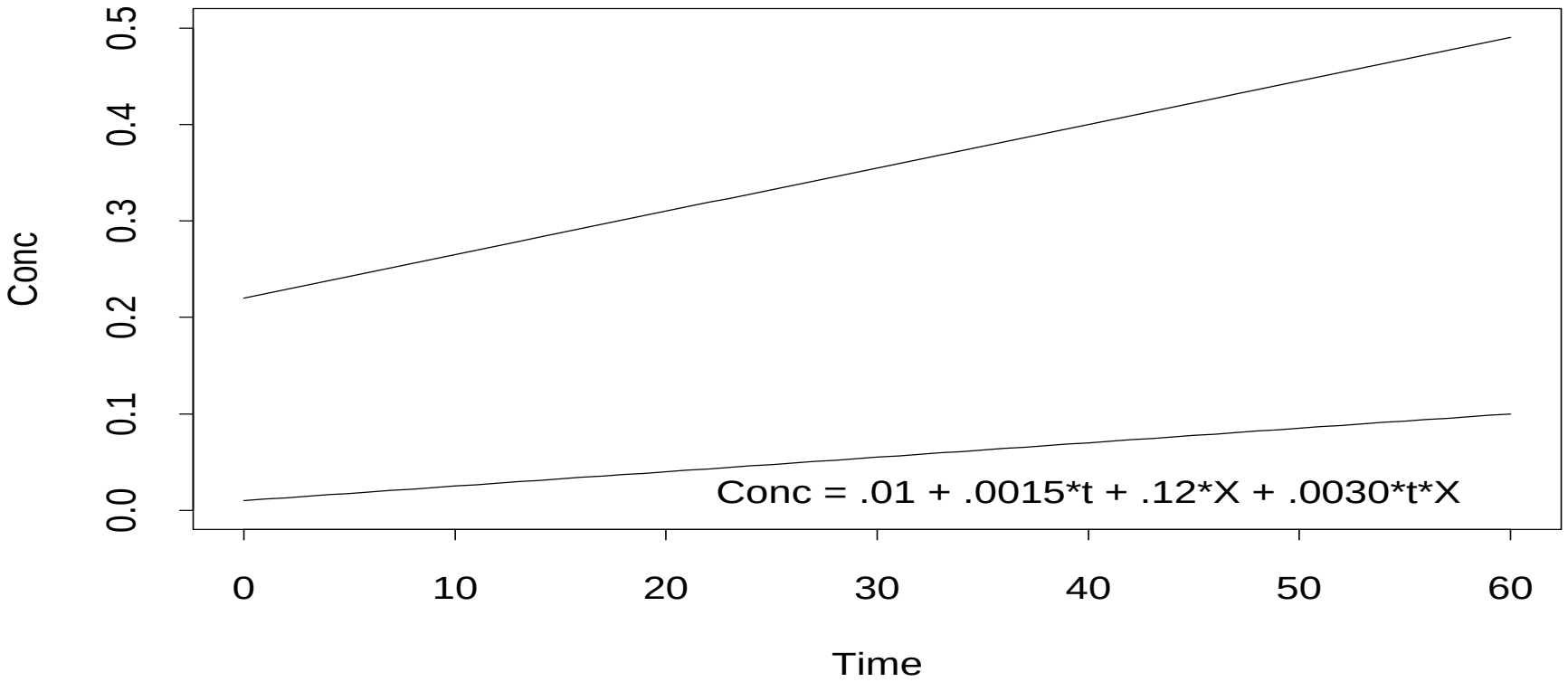
Two parallel lines (section 8.1)

- $Conc = \beta_0 + \beta_1 time + \beta_2 X$, where X = 0 for Males, 1 for Females



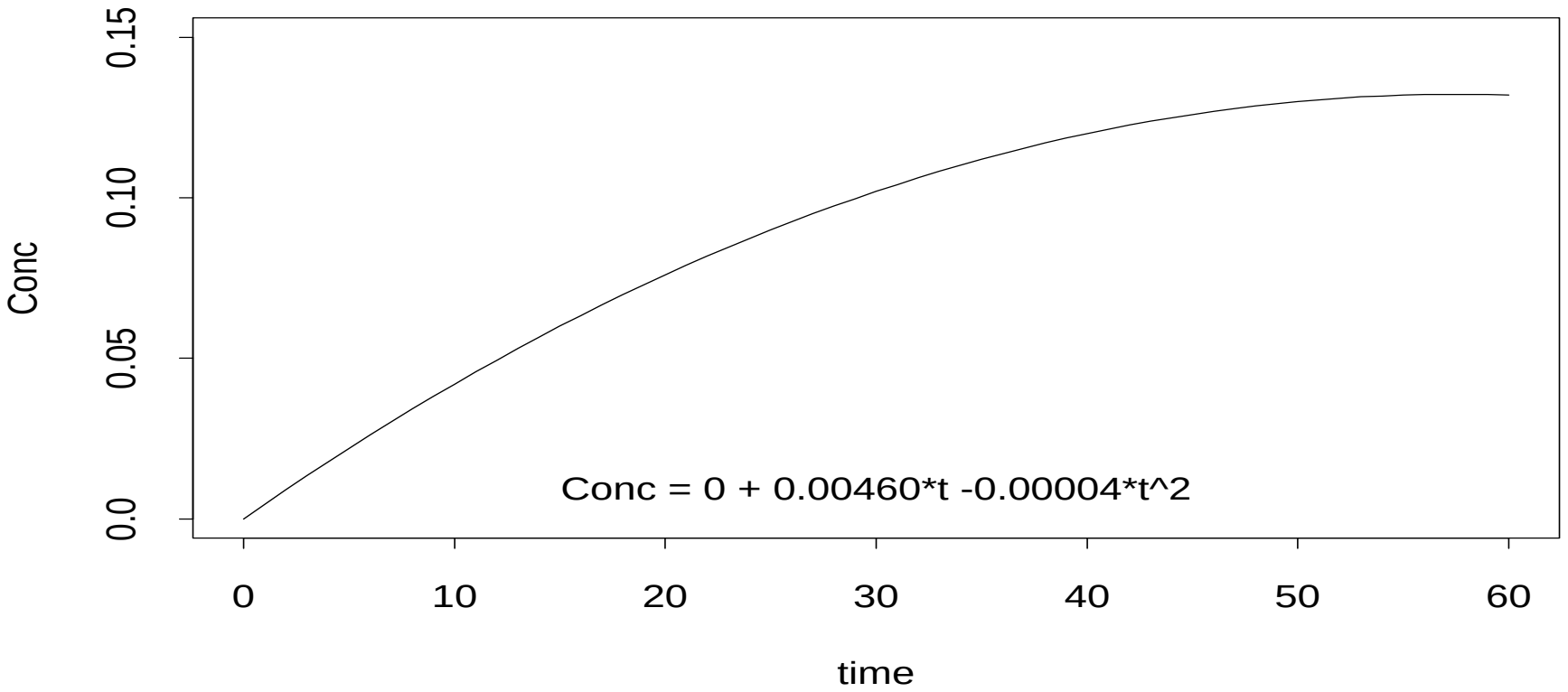
Two nonparallel lines (section 8.1)

- $Conc = \beta_0 + \beta_1 time + \beta_2 X + \beta_3 time * X$, where X = 0 for Males, 1 for Females



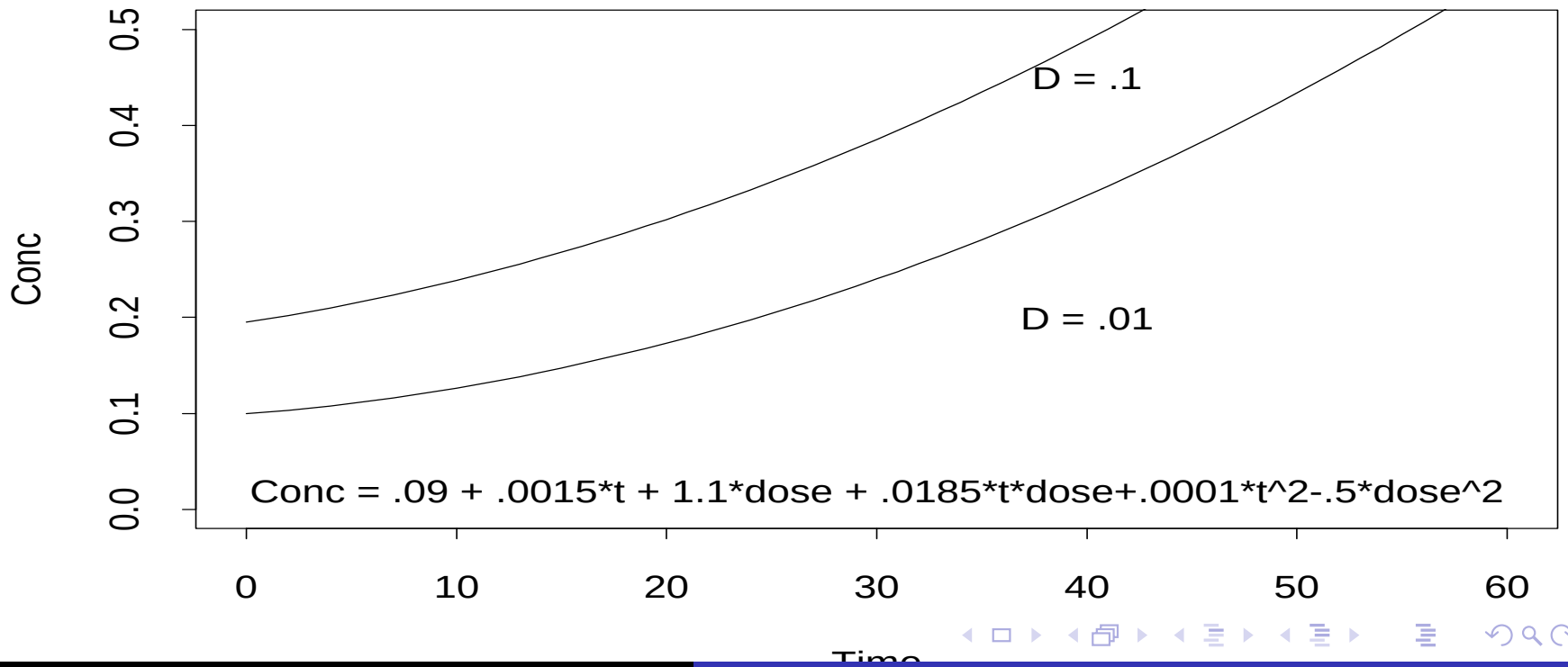
Quadratic in one variable (section 7.1)

- $Conc = \beta_0 + \beta_1 t + \beta_2 t^2$



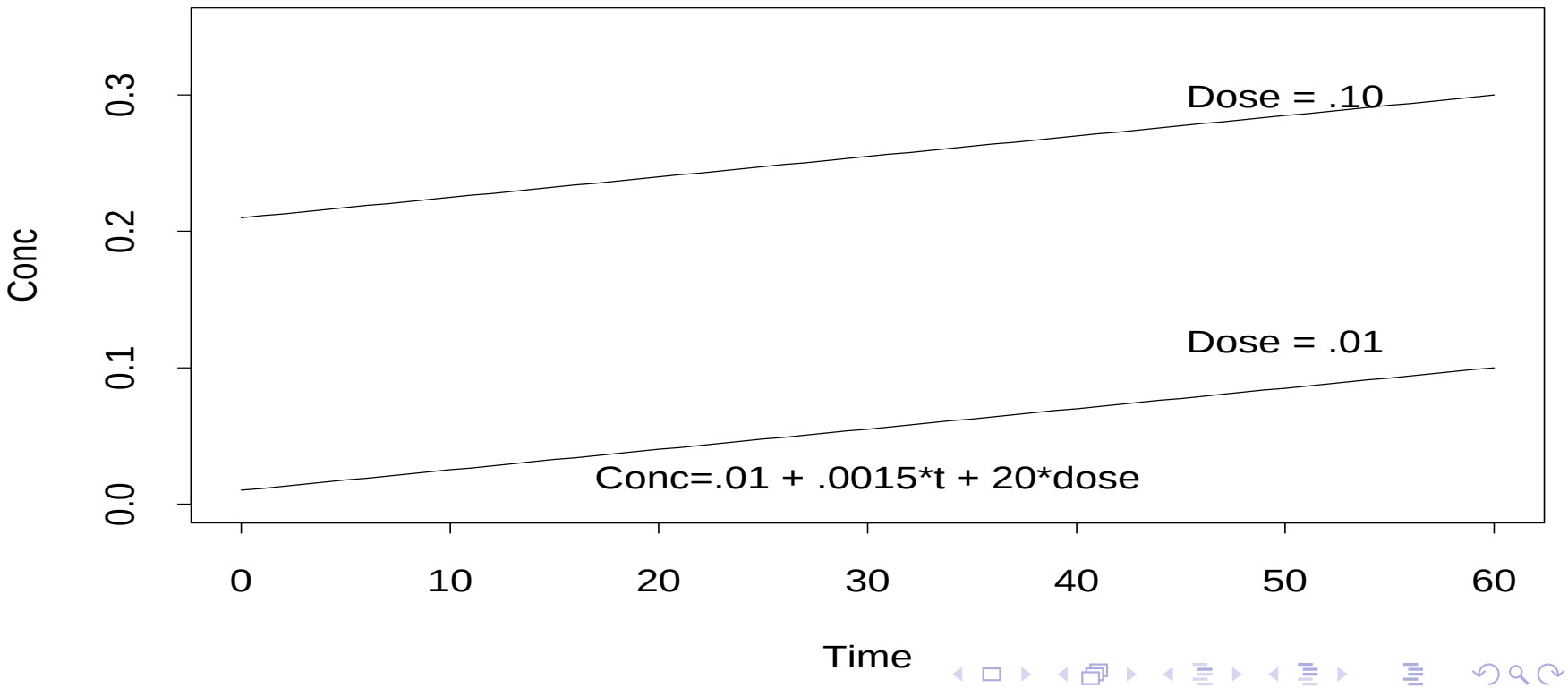
Full quadratic in two continuous predictors (section 7.2)

- $Conc =$
  $\beta_0 + \beta_1 Time + \beta_2 Dose + \beta_3 Time.Dose + \beta_4 Time^2 + \beta_5 Dose^2$
- Different quadratic relationship between *Conc* and *Time* for each value of *Dose*.



Two continuous predictors with first order relationship (chapter 3)

- $Conc = \beta_0 + \beta_1 time + \beta_2 Dose$
- Effect of dose is constant over time.



including an Interaction

- $Conc = \beta_0 + \beta_1 time + \beta_2 Dose + \beta_3 * time * dose$