

Define the model

```
model = @model begin
  @param begin
    tvcl ∈ RealDomain(lower=0, init = 4.0)
    tvv ∈ RealDomain(lower=0, init = 70)
    pmoncl ∈ RealDomain(lower = -0.99, init= -0.7)
    Ω ∈ PDiagDomain(init=[0.09,0.09])
    σ_prop ∈ RealDomain(lower=0,init=0.04)
  end

  @random begin
    η ~ MvNormal(Ω)
  end

  @pre begin
    CL = tvcl * (1 + pmoncl*isPM) * (wt/70)^0.75 * exp(η[1])
    V = tvv * (wt/70) * exp(η[2])
  end
  @covariates wt isPM

  @dynamics ImmediateAbsorptionModel
  #@dynamics begin
  #   Central' = - (CL/V)*Central
  #end

  @derived begin
    cp = @. 1000*(Central / V)
    dv ~ @. Normal(cp, sqrt(cp^2*σ_prop))
  end
end
```

Let's suppose that there was clinical trial for a new drug XYZ. We collected the patient's data and observed the concentrations but there was a problem, now we think that the dosage we were giving, say 100mg was not sufficient, we did not see the kind of response we wanted to see.

The question arises, what if I increase the dose to say, 200mg, does that fix the problem?

To answer this question we would have to run the entire clinical trial again with the 200mg dose. That slows us down and costs a lot!

So how do we answer this question?