

Problem Solving II: Modelling herpes virus

- **Biological details:**
 - **When hosts (people) initially become infected with herpes virus they usually have sores (oral or genital) for an average of 4 days (range 3-8) days. These sores heal and the virus is no longer present on the skin, but resides in the body of nerve cells.**
 - **Periodically (on average every 12 days, and possibly facilitated by factors such as stress, sunlight, abrasions, other illness), herpes virus leaves nerve cells and begins to replicate in skin cells, causing the host to be infectious. Viral “shedding” again usually lasts 4 days.**
 - **Transmission of herpes virus from infected mothers to their babies is rare.**
- 1) **Write down a box and arrow diagram and then equations that capture the biology of a population of people with herpes virus over a 50 year period. Justify any assumptions you make. Define each process/rate in the model, and indicate its numerical value if you have data to measure it – if not, say so.**
 - 2) **Extra credit: Derive an expression for R_0 . You will need to use the longer way of finding R_0 (see summary slides), and you’ll need to do some algebra, and maybe even use another equation to eliminate a variable. This is a very challenging problem. If you get an answer, interpret it biologically!**