



The SIR Model for Spread of Disease

Part 7: Summary

1. Explain briefly the modeling steps that lead to the SIR model.
2. Given a population and disease combination for which the SIR model is appropriate, what are the possible outcomes when a trace of infection is introduced into the population? How can you tell whether there will be an epidemic?
3. Does "epidemic" mean that almost everyone will get the disease? If so, what keeps the spread of disease going? If not, what causes the epidemic to end before everyone gets sick?
4. How can it happen that a large percentage of a population may get sick during an epidemic even though only a small percentage is sick at any one time?
5. Explain briefly the key idea for finding solutions of an SIR model without finding explicit solution formulas.
6. Describe briefly the meaning and significance of contact number.
7. Describe briefly the meaning and significance of herd immunity. How can an inoculation program lead to herd immunity?
8. The contact number for poliomyelitis in the U.S. in 1955 was 4.9. Explain why we have been able to eradicate this disease even though we cannot eradicate measles. Give a careful argument -- "smaller contact number" is an observation, not an explanation.



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