

PB HLTH 290 – Infectious Disease Modeling Seminar Fall 2019

Instructor: John Marshall

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Class hours: Wednesday 4-5pm, room: 2062 Valley Life Sciences Building

Office hours: By appointment: 5328 Berkeley Way West

Synopsis: In recent years, mathematical models have greatly enhanced our understanding of the epidemiology of infectious diseases. In this seminar, we will review the fundamental concepts and classic papers in infectious disease modeling. We will then move on to current papers covering some of the latest developments in the field. Examples will be drawn from HIV, TB, malaria, Ebola, Zika and diseases and methods of particular interest to class members.

Class structure: The class will take the form of a journal club:

- First 10 minutes:
 - Powerpoint presentation by class member on the paper
 - Propose questions for small groups to discuss (usually 3 questions)
- Middle 20 minutes:
 - Class divides into 3 groups & discusses questions
- Last 20 minutes:
 - Groups report back what they discussed
 - General group discussion of the paper

When it's your week to present:

- Email the instructor (john.marshall@berkeley.edu) by Monday 5pm with your proposed questions for that week's paper
- Prepare a presentation for the first 10 minutes of class that week

Grading: Class presentation: 50%, Participation in discussion: 50%

Papers and presentation schedule:

- All papers & discussion questions will be uploaded to bCourses (papers asap, discussion questions 24 hours before class).
- A possible sequence of papers is provided below with papers uploaded to bCourses.
- These are just recommendations. If you have any papers you'd like to see included, any methodology you'd like covered, or any infectious diseases you'd like included, please email the instructor by Monday 9th September.
- If there are any particular papers you'd particularly like to present, please email the instructor by Monday 9th September.
- The instructor will present the first and second papers (4th & 11th September) and a draft schedule for the rest of the semester (papers and presenters) will be handed out on 11th September.

Date: Paper (subject to change, dependent on student interests):

Sep 4 (John Marshall):

- [Bernoulli D & Blower S \(2004\) An attempt at a new analysis of the mortality caused by smallpox and of the advantages of inoculation to prevent it. Rev Med Virol 14: 275-288.](#)

Sep 11 (John Marshall):

- [Kermack WO & McKendrick AG \(1927\) A mathematical contribution to the theory of epidemics. Proc Roy Soc London A 115: 700-721.](#)

Sep 18:

- [Feng Z *et al.* \(2000\) A model for tuberculosis with exogenous reinfection. Theor Popul Biol 57: 235-247.](#)

Sep 25:

- [Lipsitch M *et al.* \(2003\) Transmission dynamics and control of severe acute respiratory syndrome. Science 300: 1966-1970.](#)

Oct 2:

- [Yakob L *et al.* \(2013\) Clostridium difficile exposure as an insidious source of infection in healthcare settings: An epidemiological model. BMC Infect Dis 13: 376.](#)

Oct 9:

- [Granich RM *et al.* \(2008\) Universal voluntary HIV testing with immediate ART as a strategy for elimination of HIV transmission: a mathematical model. Lancet 373: 48-57.](#)

Oct 16:

- [Funk S *et al.* \(2019\) Assessing the performance of real-time epidemic forecasts: A case study of Ebola in the Western Area region of Sierra Leone, 2014-15. PLoS Com Bio 15: e1006785.](#)

Oct 23:

- [Walker PW *et al.* \(2016\) Estimating the most efficient allocation of interventions to achieve reductions in Plasmodium falciparum malaria burden and transmission in Africa: a modelling study. Lancet Glob Health 4: e474-e484.](#)

Oct 30:

- [Cerdeira M *et al.* \(2015\) To treat or to prevent?: Reducing the population burden of violence-related post-traumatic stress disorder. Epidemiology 26: 681-689.](#)

Nov 6:

- [Maxian O *et al.* \(2017\) Zika virus dynamics: When does sexual transmission matter? Epidemics 21: 48-55.](#)

Nov 13:

- [Ratmann O *et al.* \(2012\) Phylodynamic inference and model assessment with approximate Bayesian computation: Influenza as a case study. PLoS Comput Biol 8: e1002835.](#)

Nov 20:

- [Boily MC *et al.* \(2007\) Evaluating large-scale HIV prevention interventions: Study design for an integrated mathematical modeling approach. Sex Transm Infect 83: 582-589.](#)

Nov 27: Thanksgiving (Holiday)

Dec 4:

- [Eaton *et al.* \(2015\) Assessment of epidemic projections using recent HIV survey data in South Africa: a validation analysis of ten mathematical models of HIV epidemiology in the antiretroviral therapy era. Lancet Glob Health 3: e598-e608.](#)

Dec 11 (Héctor M. Sánchez C.):

- Gaming for public health (no reading required).