

UBM Group Seminar Discussions: Grappling with Issues beyond the Curriculum

D. Brian Walton

Department of Mathematics and Statistics

JMM 2013, MAA Session on Trends in Undergraduate Mathematical Biology Education



UBM Overview

8 students per cohort (4 biology/4 mathematics)

4 research groups

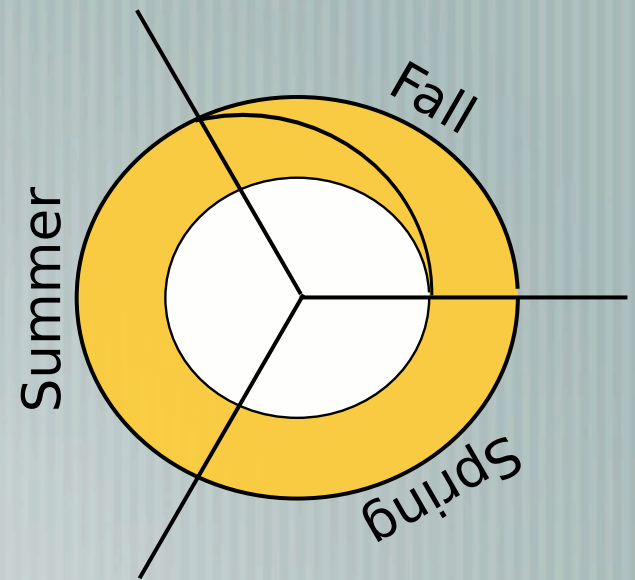
Fall–Spring Preparation

Summer Research Experience

Fall Wrap-Up

Mathematical Modeling in Biology

Introduction to Biometrics



Large Group Seminar

— [Faculty Presentations on Research Topics

— [Student Research Proposals

— [Final Student Research Presentations

— [Other Topics...

Literature Discussions

— [General Topics and Activities

— Eleusis

ELEUSIS EXAMPLE

- Collection: Infinite deck of ordinary playing cards (2-10, J, Q, K, A) in (hearts, diamonds, clubs, spades)
- Example Rule: Alternate in color. Start with 2 of diamonds (red)
- Sample play:
 - Propose 4 of hearts (red, reject)
 - Propose K of spades (black, accept)
 - Propose A of clubs (black, reject)
 - etc.



Literature Discussions

- [General Topics and Activities

- Eleusis

- [Journal Articles

- Non-curriculum quantitative features

- Models relating to current events

- Interesting seeds for discussions

Literature Discussions

General Topics and Activities

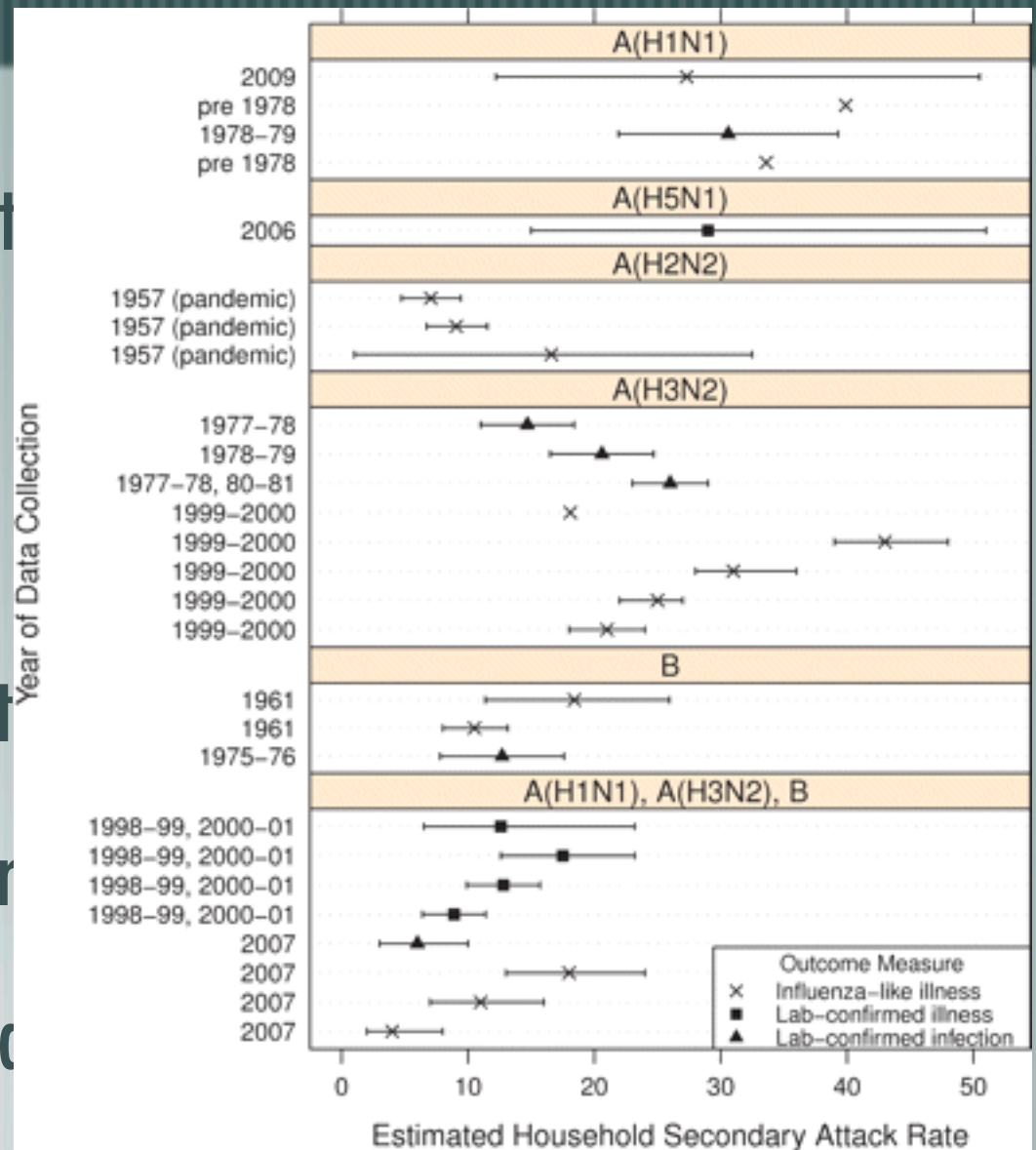
Eleusis

Journal Articles

Non-curriculum quantitative

Models relating to curriculum

Interesting seeds for curriculum



Yang et al., *Science* **326** (5953) pp. 729-733 (2009)
 DOI: 10.1126/science.1177373

Career Planning

— [Science, Special Issue on Mathematics in Biology
6 February 2004 (but links are broken)

<http://www.sciencemag.org/site/feature/misc/webfeat/mathbio/>



— [Nature, Careers & Recruitment:

"Biology is the new physics," Philip Hunter, (2010). doi:10.1038/embor.2010.55

"Count On It," Virginia Gewin, (2007). doi:10.1038/nj7130-946a

— [Science Careers (from the journal Science)

"Q&A: Taking Mathematics to Heart," Kate Travis, 29 April 2011

http://sciencecareers.sciencemag.org/career_magazine

Ethics

— [Ethics of Research (replaced by citiprogram.org training)

— [Role of Modeling and Ethics

— [Models and Public Policy

Modeling and Public Policy

news

doi:10.1038/35065263

Farmers act to avert foot-and-mouth crisis

Jim Giles, London

Beleaguered British farmers are reeling from another animal health crisis this week, after cases of foot-and-mouth disease were confirmed at locations across the country. It is the first major outbreak of the highly infectious disease to affect Britain in over 30 years.

The government acted quickly to halt movement of animals after vets from the



Slaughtering of livestock has already begun in Britain, as existing vaccines can stop symptoms but do not prevent animals from carrying or spreading the disease. “The virus can exist in vaccinated cattle for up to three years,” says the IAH’s Paul Kitching, “and trade restrictions reflect this. To resume trade a country has to be totally free of the disease.”

Making the vaccine, which requires large quantities of virus, is also risky. Outbreaks in production centres have forced European countries to end exports.

The role of mathematical modelling in the control of the 2001 FMD epidemic in the UK

Rowland R. Kao

doi:10.1016/S0966-842X(02)02371-5

Use and abuse of mathematical models: an illustration from the 2001 foot and mouth disease epidemic in the United Kingdom

R.P. Kitching ⁽¹⁾, M.V. Thrusfield ⁽²⁾ & N.M. Taylor ⁽³⁾

Rev. sci. tech. Off. int. Epiz., 2006, **25** (1), 000-000

Other Ideas?

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Departments of Mathematics and Statistics and Biology,
College of Science and Mathematics, James Madison University

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