MSCS Mess

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Department of Mathematics, Statistics and Computer Science — May 2, 2008

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This Week's Colloquium

Title	**Modeling and Bio-security: A Case Study in Anthrax**
Presenter:	Dr. Ron Brookmeyer
Date:	Tuesday May 6
Time:	1:30 pm
Location:	SC 170

Abstract: The threat of bioterrorism is of increasing public health concern. Yet we have very limited modern experience with diseases such as anthrax and smallpox which are considered some of the major biological weapons threats. In the face of this uncertainty, the problem is how to devise rational public health policy in the event of a bio-security breach. In this talk, I discuss the case of anthrax and how statistical models, novel data sources, and efficient use of information can be brought together to address some critical public health questions.

The work was motivated by the 2001 anthrax outbreak in the United States that occurred because letters contaminated with anthrax were mailed through the postal system. A huge public health intervention was initiated that involved the mass distribution of antibiotics to thousands of persons in the hopes of preventing disease. Two questions are addressed in this talk: Was the public health intervention successful? Are there lessons to learn about antibiotic use in the event of another bio-security breach?

We develop statistical models to address these questions. For example, one model is a mechanistic model that accounts for the pathogenesis of infection. We show that these mechanistic considerations lead to a relatively simple competing risks model that provides insight into how long persons infected with anthrax should remain on antibiotics.

In order to calibrate the models, we use data and information from multiple sources including the 2001 anthrax outbreak in the United States, an anthrax outbreak in Russia, and studies from primates. The talk illustrates how statistical reasoning, models, and novel data sources can help develop effective public health response policies in the event of future intentional or naturally occurring outbreaks.

Bio: Dr Ron Brookmeyer is Professor of Biostatistics at the Johns Hopkins University Bloomberg School of Public Health where he is also chair of the Johns Hopkins Master of Public Health Program. Dr. Brookmeyer's research is at the interface of biostatistics, epidemiology and public health. He uses the tools of the statistical and informational sciences to address global public health problems such as the HIV/AIDS epidemic, biosecurity issues such as anthrax, disease surveillance, and the health challenges of aging populations. Dr. Brookmeyer has authored over 150 peer reviewed articles. He has written and edited three books including *AIDS Epidemiology: A Quantitative Approach.*

Congratulations

Brianna Hirst is one of two students in the nation to receive this year's prestigious Gertrude M. Cox Award from the American Statistical Association. Congratulations, Brianna!

Event Reminders

MSCS End of Year picnic!

When: Sunday May 4th

Time: Noon

Place: Sechler Park in Northfield

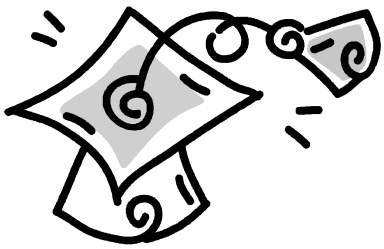
Bring any softball equipment you have!

Senior Banquet

When: Wednesday May 7th

Time: 6:00pm

Place: Kings Room



Carlson Contest Solution

Solution to Carlson Contest #6

If f(x) = x9 - 15x8 - 35x7 + 15x6 + 35x5 - 15x4 - 35x3 + 15x2 + 35x - 15, find f(17).

Solution: There are some clever ways to factor this, but the easiest method (which has a name that Prof. Smith knows, but which I forget) is to 'nest' the substitution, essentially plugging in for only one 'x' at a time.

f(x) = (((((((x-15)x-35)x+15)x+35)x-15)x-35)x+15)x+35)x-15, which easily calculates f(17)=2.

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If you would like to submit an article or math event to be published in the Math Mess, e-mail tummers@stolaf.edu.