

**NIMBioS AMR Working Group: “Evaluating the Association between Shifts in Antimicrobial Use Practices and Antimicrobial Resistance Resulting from FDA’s Risk Mitigation Strategy”**

**The overall objective:** To develop a systems approach to identify specific conceptual approaches, analytical methods, and quantitative data sources that are appropriate for **associating population-level changes in antimicrobial use in livestock with population-level changes in antimicrobial resistance.**

**The specific aims:**

- 1) Review the risk pathway(s) associated with **antimicrobial use in food-producing animals and antimicrobial resistance (our first meeting).**
- 2) Assess **current and possible future monitoring systems (our first meeting).**
- 3) Identify and develop a **proposed analytic methodology (current meeting).**
- 4) Identify a prioritized list of **useful, quantitative variables to analyze the relationship between observed changes in antimicrobial use practices in food-producing animals and antimicrobial resistance patterns (current and future meetings).**

**In-person Meeting #2 (Knoxville, TN, February 23-25, 2015)**

**Objectives:**

- 1) Reach agreement on scope of project
- 2) Identify data needs for each component
- 3) Outline steps to develop each component to “completion”
- 4) Clarify how components fit together

## Day 1 (Monday February 23, 2015): Scope and Status

Brief presentations followed by group discussion, focused on identifying the following for each modeling method:

1. Data needs
2. Consequences if needed data unavailable
3. Outline of work remaining to complete method development
4. Areas for subgroup/breakout session work

- 8:00-8:40 Breakfast and Registration
- 8:40-9:00 Welcome: NIMBioS Directors
- 9:00-9:30 Introductory remarks: (Craig Lewis)
- Review Working Group Objective:  
"To develop methods to assess the impact of FDA Guidance 213 on population-level changes in antimicrobial use in livestock on population-level changes in antimicrobial resistance."
  - Update on USG activities
  - Introduce Agenda
  - Logistics
- 9:30-9:45 Review master document (Yrjo Grohn)
- 9:45-10:00 Coffee Break
- 10:00-11:00 1.1. **Spatial Risk Mapping** (Thomas Van Boekel)
- 11:00-12:00 1.2. **Dynamic Bayesian Network** (Yrjo Grohn)
- 12:00-13:00 Lunch at NiMBioS
- 13:00-14:00 1.3. **Evolutionary Genetics Perspective** (Michael Stanhope)
- 14:00-15:00 1.4. **Ecological/evolutionary Models** (José Miguel Ponciano)
- 15:00-15:15 Coffee Break
- 15:15-17:30 **Discussion: Meeting Objectives**
1. Areas for subgroup/breakout session work
  2. What we want to accomplish by the end of Day 3
- 17:30-18:30 Reception at NIMBioS

Dinner on own

## **Day 2 (Tuesday February 24, 2015): Special Topics**

Brief presentations and group discussion on special topics related to our work, with flexible time built in for group or subgroup work depending on needs identified in Day 1

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| 8:00-8:30   | Breakfast   |
| 8:30-8:45   | Organizer remarks: Recap Day 1                                |
| 8:45-9:15   | 2.1. <b>Data Integration</b> (Carolee Carson)                 |
| 9:30-10:00  | 2.2. <b>Drug Use and Pharmacokinetics</b> (Victoriya Volkova) |
| 10:15-10.30 | Coffee Break  |
| 10:30-11:00 | 2.3. <b>USDA-APHIS Update</b> (Kathe Bjork)                   |
| 11:15-11:45 | 2.4. <b>Systems View</b> (Laura Pullman)                      |
| 12:00-13:00 | Lunch at NiMBioS  |
| 13:00-14:30 | [TBD, based on outcomes of earlier discussions]               |
| 15:00-15:30 | Coffee Break  |
| 15:30-17:30 | [TBD, based on outcomes of earlier discussions]               |

### **Day 3 (Wednesday February 25, 2015): Synthesis and Planning**

Flexible time built in for group or subgroup work depending on needs identified in Days 1-2, concluding with discussion of project plan, summary of meeting outcomes, and identification of next steps.

- 8:00-8:30 Breakfast
- 8:30-8:50 Organizer remarks: Recap Day 2, Summarize report from groups From Day 1 and 2, Review “group charge”
- 9:30- 10:00 [TBD, based on outcomes of earlier discussions]
- 10:00-10:30 Coffee Break
- 10:30-12:00 [TBD, based on outcomes of earlier discussions]
- 12:00-13:00 Lunch at NiMBioS
- 13:00-14:30 Discuss Project Plan
- 14:30-15:00 Summarize meeting outcomes and next steps
- 15:00-15:30 Departures

## Participants

<b>Name</b>	<b>Affiliation (including departments)</b>	<b>Areas of PhD; Areas of expertise most relevant for the Working Group</b>
Craig Lewis	DHHS/FDA/CVM	DVM/MPH; food-animal production medicine, veterinary preventive medicine, public health, public policy
Yrjo T. Grohn	Cornell University (College of Veterinary Medicine, Department of Population Medicine and Diagnostic Sciences)	DVM, MPVM, MS, PhD (Veterinary Medicine, Epidemiology, Genetics, respectively); food supply veterinary medicine, analytical epidemiology and modeling
Laura Hungerford	DHHS/FDA/CVM	DVM/MPH/PhD (Veterinary Epidemiology); veterinary epidemiology, public health
Beth Karp	DHHS/CDC/OID	DVM, MPH; public health, veterinary preventive medicine
Carole Carson	Laboratory for Foodborne Zoonoses, Public Health Agency of Canada	DVM/PhD (Veterinary Epidemiology; antimicrobial use and resistance modelling); quantitative risk assessment, antimicrobial use and resistance surveillance
José Miguel Ponciano	University of Florida, Department of Biology	PhD (Bioinformatics and Computational Biology); stochastic models, parameter fitting for stochastic models
Cristina Lanzas	University of Tennessee in Knoxville (College of Veterinary Medicine, Department of Comparative Medicine)	DVM/PhD (Animal Sciences); Mathematical modeling, infectious disease epidemiology, food safety, quantifying the effect of control strategies
Laura Pullum	Oak Ridge National Laboratory (Computational Data Analytics Group)	DSc (Systems Engineering and Operations Research); software-intensive system dependability and intelligent systems
Ian Spicknall	DHHS/CDC/OID - ORISE fellow	PhD (Mathematical Modeling) Environmental Determinants of Infectious Disease
Victoriya Volkova	Kansas State University, (College of Veterinary Medicine)	DVM, PhD (Veterinary Medical Sciences); pharmacokinetic modeling, modeling dynamics of infection and genetic transfer
Kathe Bjork	USDA/APHIS/VS/CEAH	DVM/PhD (biostatistics); public health and analysis of antimicrobial resistance data
Thomas Van Boeckel	Princeton University (Department of Ecology and Evolutionary Biology)	PhD; statistical and epidemiological models to characterize spatio-temporal distribution of the disease, calculate risk maps, and evaluate potential intervention scenarios
Michael Stanhope	Cornell University (College of Veterinary Medicine, Department of Population Medicine and Diagnostic Sciences)	PhD; (Evolutionary Ecology and Molecular Population Genetics); the application of molecular evolutionary biology principles and techniques to issues of epidemiology, comparative genomics, and population genomics within various groups of bacterial pathogens

Shigui Ruan	University of Miami Florida (Department of Mathematics)	PhD (applied mathematics); differential Equations, dynamical systems, and mathematical biology; nonlinear dynamics in structured biological and epidemiological models; mathematical modeling of the superspreaders of antibiotic-resistant bacteria
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