USDA

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Animal and Plant Health Inspection Service
Veterinary Services

Animal Disease Spread Model

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The Animal Disease Spread Model (ADSM) is based on the North American Animal Disease Spread Model (NAADSM).

ADSM is available at
https://github.com/NAVADMC/ADSM/releases/latest

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OVERVIEW

The Animal Disease Spread Model (ADSM) is a freely available, open-source software application that simulates the spread of highly contagious animal diseases in susceptible populations. The model also integrates user-defined control measures to influence the outcome of disease outbreaks. ADSM has a user-friendly interface that users can quickly learn and implement for questions that are critical to their region.

APPLICATIONS

- Evaluate proposed disease control strategies for planning and policy decisions.
- Explore questions related to resources needed in the event of an outbreak.
- Provide input for emergency preparedness and surveillance plans and activities.
- Provide "what if" scenarios for outbreak planning exercises.
- Estimate consequences as part of the risk analysis process.
- Assess the potential economic impacts of disease and associated control measures.
- Create simple scenarios for an educational setting or complex scenarios for policy research.
- Communicate principles of epidemiology and disease control.
- Support researchers who incorporate disease modeling in their work.
- Offer outreach and training in the use of disease models in general, and of ADSM in particular, to scientific and veterinary communities.

KEY CHARACTERISTICS

- **ADSM is herd based.** Disease manifestation and transmission are represented at the level of a herd/flock of animals, rather than at the individual animal level.
- **ADSM is a state transition model.** Each infected herd transitions from a susceptible state to and infected state and back to an immune state.
- **ADSM is a stochastic simulation.** It mimics the random processes responsible for disease spread. Each simulated outbreak is the result of a unique series of random events and processes. When analyzed together, many simulated outbreaks represent a range of possible outcomes, given a set of shared assumption.
- **ADSM simulates spatial and temporal aspects of disease spread.** Each herd in a scenario is assigned a physical location and disease progression occurs in daily time steps.

REFERENCE

Harvey N., et al. 2007. The North American Animal Disease Spread Model: A simulation model to assist decision making in evaluating animal disease incursions. Prev Vet Med 82, 176–197.