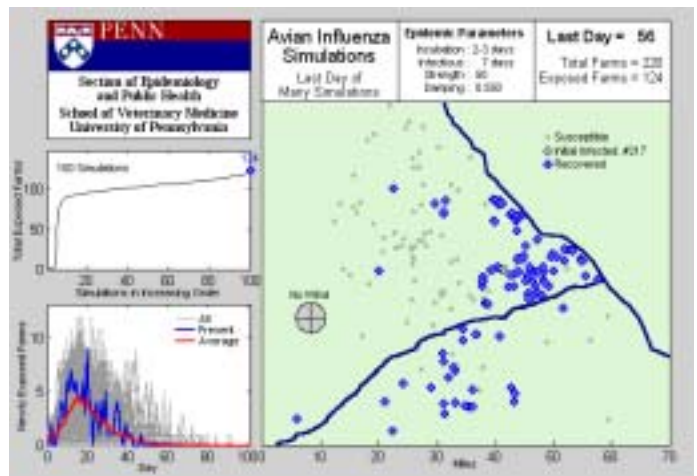


### How GIS methods help us devise control strategies for Avian Influenza and other infectious diseases

Geographical Information Systems (GIS) methods involve much more than just putting dots on maps! It is obvious that the size and location of a farm, and the number and type of livestock on that farm, are very important determinants of the risk that it will suffer some serious disease outbreak. But until GIS methods came along, we had no good way of including this information in our models for disease control. In fact, we usually ignored it! Then along came the 2001 Foot and Mouth epidemic in Britain and, suddenly, scientists found they could improve their predictions by over **40%** by including data on the size and location of susceptible farms. This was an astonishing increase in accuracy. But it was only possible because the scientists had access to good geographical information about where the farms were, how big they were and how many animals each farm had.

We have adapted these methods for Pennsylvania (although all the maps you see here are completely imaginary) and present a few examples of what GIS methods can do.

(1) **Epidemics are chancy things!** You never quite know what will happen and it's often difficult to decide whether all the hard work of control is actually doing any good. A combination of GIS methods and "stochastic" modeling can at least help you decide in advance whether or not a particular control strategy is likely to work "on average". The map on the right shows just one of the possible scenarios when Avian Influenza strikes first at an imaginary farm shown as a white cross.



(2) **Targeted control** There are some facilities that are much more likely to be involved in an Avian Influenza epidemic (irrespective of where the infection first occurs). Size and location are especially important in this respect. We can use GIS and modeling methods to work out which might be the facilities at highest risk and use this as a basis for planning targeted control programs. In the map on the right, the high risk facilities are shown as dark dots.

