

## **Helen Couclelis**

As a geographer interested in how space, time and events intersect with human behavior I feel challenged by the apparent intractability of the risks of bioterrorism and the major and novel issues of risk perception it raises. Health risks are generally associated either with particular kinds of environments or with individuals in particular kinds of situations, professions, behaviors, or states of health. Often environmental and individual health risks reinforce each other (e.g, a person with asthma in a smoggy environment). Space and time are clearly relevant dimensions in all these cases. Environmental health hazards usually have a spatial and temporal footprint that may be as fixed and well defined as a contaminated industrial site or as ill defined as the spatiotemporal incidence of the next extreme heat wave. Health risks associated with individuals move in space and time with the people who carry them and may be studied as spatiotemporal trajectories or as networks of contacts, especially in the case of contagious diseases. For many years spatial analysis has been used to study the distribution of health risk in space and time while behavioral geographers have looked at how the perception of, and response to risk by people correlates with its actual spatial distribution (not very well!).

Recently people in this country and elsewhere have been faced with health risks whereby both the spatiotemporal dimensions of the hazard and the characteristics of the at-risk population appear to be completely indefinable until after the fact. While risks of the conventional kind are frequently underestimated, risks of this more recent variety have the potential to lead to widespread panic quite out of proportion with the actual threat to the health of any particular individual. Thus the handful of deaths and non-fatal infections from anthrax in the winter of 2001-02 led to major disruptions in the country's functioning resulting in substantial psychological as well as economic costs. Bioterrorism, like most other forms of terrorism, works by creating the perception that anyone, anywhere, any time could be the next victim. What could be the spatial analysis approach to this kind of indeterminacy? I don't know the answer but hope that some other participants in this workshop will be interested in exploring this issue.