Public Abstract
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M.A.
Anthropology
Agent-based Modeling of the Spread of the 1918-1919 Spanish Flu in Three Canadian Fur Trading Communities
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Graduation Term May 2006

The 1918-19 influenza pandemic killed millions as it raced around the globe at the close of World War I and was especially devastating for the remote Aboriginal fur trading communities of the central Canadian subarctic. However, historical data show that its impact within even relatively small regions such as this was highly variable. Over the last decade Sattenspiel and colleagues have used population-based models to help understand the observed epidemic patterns, and although many insights into the causes of these patterns have resulted, it has also become clear that the small community sizes and wide dispersal of families across the subarctic landscape require a shift to individual-based models to further knowledge about the impact of the epidemic. Consequently, an agent-based computer model has been constructed that incorporates a more realistic spatial distribution of families as well as a more realistic representation of movement between camps and fur trade posts and interpersonal contact. In this project, this single post model has been extended to create a three post version that is able to model the spread of the 1918-1919 flu epidemic both within and among three communities, and which can be more directly compared to the earlier three-community population-based model. Following extensive testing, the new Norway House, Oxford House, God's Lake (NHOHGL) model was used to investigate several important research questions. Data from the agent-based simulations indicate that social organization and mobility patterns can help to account for the different epidemic experiences in these three communities. Results also suggest that outcomes other than that observed in the historic record would have been highly improbable, and they indicate that the impact of the 1918-1919 flu epidemic would have been more severe if it had occurred in the summer, rather than in the winter. The findings of this agent-based model are contrasted with those of the earlier population-based model, providing an important comparison of the two modeling techniques that illustrates the advantages of agent-based models for the study of small populations. Further, they provide insights into the local-level epidemic patterns of this historical influenza pandemic that may prove useful in preparing for or controlling future outbreaks of influenza.