



WHAT LESSONS CAN WE LEARN FROM PAST PANDEMICS?

THE MORTALITY RATE OF THE 1918 INFLUENZA PANDEMIC WAS SEVERAL TIMES HIGHER THAN FOR COVID-19. AT THE UNIVERSITY OF MISSOURI, US, TAYLOR VAN DOREN AND PROFESSOR LISA SATTENSPIEL ARE INVESTIGATING THE IMPACTS OF THE 1918 PANDEMIC IN NEWFOUNDLAND, CANADA, FROM A BIOLOGICAL ANTHROPOLOGY PERSPECTIVE. THEIR RESEARCH SHEDS LIGHT ON THE SIGNIFICANT ROLE THAT SOCIAL INEQUALITIES PLAY IN DETERMINING THE OUTCOMES OF A PANDEMIC

TALK LIKE A BIOLOGICAL ANTHROPOLOGIST

INFLUENZA (FLU) – a potentially-fatal viral infection that commonly causes fever, body aches and pains, and coughing

MORTALITY RATE – a statistical measure of deaths per unit of time, scaled to the size of a population

OUTPORT – a coastal community in Newfoundland, Canada

PNEUMONIA – inflammation of tissue in the lungs, caused by bacteria, viruses or fungi

QUALITATIVE ANALYSIS – the analysis of textual data

QUANTITATIVE ANALYSIS – the analysis of numeric data

TUBERCULOSIS (TB) – a potentially fatal bacterial infection which commonly causes fever and coughing

The 1918 influenza pandemic was the deadliest pandemic in recent history. With 50 to 100 million deaths in a global population of about 1.8 billion people, the mortality rate was several times higher than for COVID-19 so far. As is typical for influenza, very young and very old individuals died at relatively high rates. However, very unexpectedly, younger adults (aged ~20-44) died at much higher rates than normal for their age. Some of the hardest hit regions were the world's remotest places, as they did not have access to medical care.

Studying the 1918 influenza pandemic enables social scientists to better understand how social inequalities contribute to different mortality outcomes. In light of the social inequalities highlighted by COVID-19, this knowledge has never been more important. The social sciences have a very important role to play in uncovering the causes and consequences of pandemics, past and present, and preparing us for pandemics of the future. "Knowledge from social sciences can be combined with knowledge from life sciences to produce a whole that is greater than the sum of its parts," says Taylor van Doren, emphasising the importance of social science research for our understanding of global pandemics.

Taylor is a PhD candidate at the University of Missouri, working under the supervision of Professor Lisa Sattenspiel. She is investigating

how the 1918 influenza pandemic affected the remote island of Newfoundland in Canada, from a biological anthropology perspective.

WHAT WAS NEWFOUNDLAND LIKE IN 1918?

"Life in early 20th century Newfoundland was very difficult," says Taylor. Most people lived on the coast in small, geographically isolated fishing communities called 'outports', with the largest settlement, St John's, on the eastern tip of the island. As only a small fraction of the island was suitable for growing crops, there was not much variety of foods, especially in the winter, and this resulted in malnourishment. Very little medical care was available across the island, so it was typical for people to go for years without seeing a doctor. Sanitation was poor, so water-borne illnesses and deaths were common.

"The 1918 influenza pandemic was primarily spread around the world through the movement of soldiers returning home at the end of World War I," says Lisa. It arrived in Newfoundland in the summer of 1918, and initially caused only a mild wave of influenza on the island. The second, much more severe wave, hit in the winter of 1918, and a final wave occurred much later, in 1920.

GATHERING DATA

Taylor and Lisa use death records as their main

source of quantitative data for their research. These hold a wealth of valuable information, including the person's age at death, sex, cause of death and place of residence. Censuses provide reports of the population size and structure of each outport, and hospital records contain accounts of those who were ill with influenza but survived.

Qualitative data are also extremely important, as they provide insights about social organisation, behaviour and social inequalities that will explain interesting patterns revealed by quantitative death record analyses. Archival records include newspapers, government reports, personal and official correspondence, and journal entries. "In the fall of 1918, there were a lot of telegrams that were sent from St John's to the outports to warn of the coming influenza," says Taylor. "There were likewise telegrams seeking doctors to visit the outports for people who were very ill."

QUANTITATIVE AND QUALITATIVE ANALYSES

Once data have been extracted from these archival sources, Taylor and Lisa use a combination of quantitative and qualitative analyses, known as a 'mixed methods' approach, to address their research questions. Taylor uses various statistical modelling techniques to look for patterns within the quantitative data. For example, she calculates mortality rates for different districts to explore the geographical aspects of the pandemic and she compares mortality rates between males and females.

"Archival analyses are very different and require separate skill sets that ultimately contribute another dimension of understanding to the quantitative analyses," Taylor says. She uses qualitative analysis software to conduct 'thematic coding', allowing her to organise ideas and themes that appear throughout the archival documents in a structured and easy-to-reference way. She looks for patterns within these themes and connects them with trends observed in the quantitative data.

HOW DID SOCIAL INEQUALITIES INFLUENCE MORTALITY OUTCOMES?

The outcomes of the 1918 influenza pandemic were more severe in the outports of Newfoundland than they were in St John's. "Social inequalities are likely the primary contributors to differences in mortality rates,"

explains Taylor. This was not just the case in Newfoundland in 1918 but has also been observed during the COVID-19 pandemic and is a factor in many other infectious diseases in modern times.

It is important to note that influenza was not the only respiratory disease circulating in Newfoundland in 1918. Pneumonia and tuberculosis (TB) were also prevalent, and patients were commonly infected with more than one disease at the same time. All three diseases were influenced by social inequalities across the island.

Access to medical care was a key factor that contributed to the differences in mortality. The southern coast of the island was (and still is) inaccessible by land, so doctors had to travel to outports by boat, meaning they often arrived too late to treat patients. There was also a class difference in mortality. Wealthy merchants living in St John's did not need to come into contact with many people on a daily basis, so were less likely to become infected. In contrast, fishermen from the outports could not afford to lose a day fishing and so were forced to continue working even if they were ill, thereby spreading infection.

While exploring the sex-based differences in influenza mortality during the pandemic, Taylor discovered that females were consistently more likely to die from influenza on the southern coast of the island than in any other region. She also discovered that females died of TB at much higher rates than males. She attributes this to greater social cohesion among women in the community, along with their responsibility to care for each other when someone falls ill. "It's important to point out that gender-based determinants are some of the most understudied social inequalities in infectious disease research," says Taylor. "The roles of socially constructed gender identity that determine behavior have tremendous implications for social interactions and infectious disease transmission."

Taylor and Lisa's research highlights the important role that social sciences have to play in understanding pandemic determinants, impacts and consequences. Biological anthropology investigations provide key knowledge about past pandemics, which can be applied in the present to address COVID-19 and utilised to prepare for the future.



TAYLOR VAN DOREN

PhD Candidate, University of Missouri,
US



**PROFESSOR
LISA SATTENSPIEL**

Professor of Anthropology, University of
Missouri, US

FIELD OF RESEARCH

Biological Anthropology

RESEARCH PROJECT

Investigating the impacts of social
inequalities on the outcomes of the 1918
influenza pandemic in Newfoundland

FUNDERS

National Science Foundation (NSF)
Grant Number 1919515, Government
of Canada-Canada Studies Faculty
Research Grant Program, MU Research
Council, University of Missouri
Research Board, University of Missouri
Department of Anthropology H. Clyde
Wilson Opportunities for Excellence in
Cultural Anthropology

*The contents are solely the responsibility
of the authors and do not necessarily
represent the official views of the funding
organisations.*



ABOUT ANTHROPOLOGY

Anthropology is the study of what makes us human. In the US, anthropology is sub-divided into biological anthropology, cultural anthropology, linguistic anthropology and archaeology. Each subfield can be applied to solve real world problems using anthropological methods and ideas.

WHY USE BIOLOGICAL ANTHROPOLOGY TO UNDERSTAND INFECTIOUS DISEASES?

“Biological anthropology is one of the few disciplines in which you will get a very strong background in both biology and culture,” says Lisa. “We need people with expertise in both fields to understand how one affects the

other.” Studying the 1918 influenza pandemic has taught Taylor and Lisa the importance of investigating historical pandemics to prepare for the future. “Despite the wealth of knowledge we can glean from past pandemics, the world was still surprised by how social inequalities were reflected in differences in susceptibility and mortality during COVID-19,” says Taylor. “Based on past pandemics, this should never have been a surprise.”

Studying the 1918 influenza pandemic from a biological anthropology perspective will help prepare public health officials, medical professionals and the public for the consequences of the next inevitable pandemic.

WHY STUDY ANTHROPOLOGY?

“Studying anthropology will provide you with a worldview that you simply cannot get from any other discipline,” says Taylor. She emphasises that you will understand humans more comprehensively from almost every angle after your anthropology classes than you did before. You will learn to understand others’ worldviews and respect them for their individuality and importance. You will learn to think critically, read effectively, and write impactfully. If you want to understand how we live and interact and apply your skills and knowledge to improve peoples’ lives, then anthropology could be you!

EXPLORE A CAREER IN ANTHROPOLOGY

- As an anthropologist, you could conduct research and teach in a university as an academic. However, the skills that you gain through studying anthropology are transferrable to a broad range of careers. You could find yourself working for an NGO, a museum, the health service or in community organisations.
- The American Anthropological Association has a wealth of information on its website, including information about careers in anthropology and listings of fieldwork and internship opportunities: www.americananthro.org
- For specific information about careers in biological anthropology, visit the American Association of Biological Anthropologists: www.physanth.org
- For news and podcasts about anthropology in general, explore *Sapiens* (www.sapiens.org), or for biological anthropology, visit the Human Biology Association (www.humbio.org).

PATHWAY FROM SCHOOL TO ANTHROPOLOGY

- Taylor and Lisa recommend having a strong science background and a wide exposure to social sciences. Take a range of classes at school and university to expand your horizons.
- “There are so many different directions to go in anthropology,” says Lisa. “Statistics and math are real assets no matter what path you choose to take.”
- “No matter what subfield of anthropology interests you, knowledge of computer programming languages will be essential for conducting data analysis,” says Taylor. “Critical thinking, creativity and strong writing skills are also extremely important.”
- Many universities will offer degrees in anthropology. You will be able to specialise in biological anthropology as you progress through your studies.
- The American Anthropological Association (www.americananthro.org) publishes the *AnthroGuide* (guide.americananthro.org), a searchable database of anthropology courses at colleges and universities throughout the country.



A typical small island community off the coast of Newfoundland. Image credit: Stephen Booth



HOW DID TAYLOR BECOME AN ANTHROPOLOGIST?



TAYLOR'S TOP TIPS

01 If you find yourself interested in something, pursue it! See where your interests take you.

02 Always be open to change. Sometimes, in life or in research, things happen that you cannot control, but this doesn't mean they are bad.

03 Don't be afraid to reach out to professors for research opportunities to gain experience.

I had so many interests when I was younger, to the point where it was really difficult for me to decide what to study or where I wanted to go with my life. I was always interested in science, specifically in biology and the natural world. As I got older, I started to become interested in health and infectious diseases, so I considered a career in medicine. I have always been interested in asking questions and pursuing answers, which ultimately led me to research.

I was never exposed to anthropology at high school, so I didn't know what the subject entailed. But I knew I wanted to become an anthropologist after attending my very first college class, Introduction to Cultural Anthropology. An anthropological perspective helped my interests in biology and behavior click into place, and my love for anthropology soon exceeded my desire to pursue medicine, so I switched paths.

I spent 15 years as a competitive swimmer, and this is a significant part of my identity. Athletics teaches young

people about dedication, professionalism, teamwork and humility. At times it was challenging to balance the responsibilities of training, competing and studying, but having a structured plan allowed me to achieve highly across all areas.

One of the best things about my PhD journey so far has been the opportunities for international travel.

Before graduate school, I had never left the United States. Now, I have attended research conferences in Sweden, Canada and Norway. I am extremely proud to have earned an NSF grant to travel to Newfoundland for my research. Graduate school has opened the doors to the world for me.

I am a mom to a wonderful and adventurous two-year-old daughter, and I love watching her grow, learn and try new things. I also love to cook, which is something I only picked up within the last year. When I have time, I love to exercise, read and go for long walks.

HOW DID LISA BECOME AN ANTHROPOLOGIST?



LISA'S TOP TIPS

01 Find one or two topics that captivate you and learn everything you can about them. Then, think about how other topics relate to these.

02 Don't feel you have to do everything on your own – talk to other people about what you are interested in and ask for their advice.

Growing up, I played tennis and the French horn. I also loved math, so thought I would major in math or music when I went to college. But I discovered I didn't like theoretical math and that music needed to be a hobby, not a profession.

When I went to college, my older brother recommended I take an anthropology class. I did, alongside a class in population biology, and I loved them both. I decided to design my own undergraduate major in human evolution, which combined coursework in anthropology, population biology, human genetics and mathematics. I knew I wanted to continue studying humans at the population level at graduate school, which was much easier to do within anthropology than within biology.

I am intrigued by the relationship between humans and pathogens. The ecological interactions are

fascinating, requiring biological knowledge of both humans and pathogens as well as an understanding of the environment in which both are living and the behaviors they exhibit.

My hopes for the future are that we will continue to increase our understanding of infectious diseases in fundamental ways, and that detailed understanding of how humans promote or hinder their spread will become just as important to the world of scientists as developing the next vaccine or studying how diseases affect individual human bodies.

I still enjoy playing the French horn. I also read a lot of novels and I am currently learning Norwegian in preparation for a research visit to Norway. I love to spend time with my kids and grandkids. They live far away, but I visit them when I can.