



## Surveillance for Zoonotic Diseases in Agricultural Workers in Minnesota



### PROJECT PERSONNEL

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### MAJOR FINDINGS AND OUTCOMES OF THE PROJECT:

- ✓ Enteric diseases represent a significant and previously underestimated source of zoonotic disease for agriculture workers and those associated with agriculture.
- ✓ Retrospective data housed in multiple independent databases was centralized through a new multi-pathogen surveillance system to track cases going forward.
- ✓ The risk of acquiring a zoonotic enteric pathogen was **7.9 times greater** for people living on or working with food production animals compared to other Minnesotans.
- ✓ **Campylobacter** was the largest contributor of enteric disease in people who lived or worked on a farm, comprising 62% of the cases in this group.
- ✓ **Cryptosporidium parvum** was the pathogen with the largest percentage of cases indicating direct animal contact with 60% of cases having animal contact.
- ✓ 17% of people with diagnosed zoonotic enteric disease were hospitalized, 43% had bloody stools and 17 people developed acute kidney failure known as Hemolytic Uremic Syndrome (HUS).



### PROJECT OVERVIEW

Agriculture is an important part of Minnesota's economy, but its workers are at risk for injuries and illness. While the risk of fatal injuries is clear, the risk of zoonotic diseases (i.e., diseases passed between animals and humans) is less clear. This UMASH research project developed a system for identifying which enteric zoonoses show up in agricultural workers and how often. This team developed a population-based surveillance system to identify the most frequent and important zoonotic diseases among agriculture workers (including forestry), their families, and others exposed to agricultural work environments.

#### The project's goals included:

- This study aimed to improve zoonotic disease surveillance, particularly concerning agricultural exposures. The project's long-term objective was to reduce exposure to, and illness from, zoonotic diseases. These objectives were addressed through the following specific aims:
1. Analyze historical data from MDH surveillance conducted since 1996 to identify zoonoses of importance to agricultural workers in Minnesota.
  2. Prospectively determine the statewide incidence of laboratory-confirmed zoonotic infections in agricultural workers.
  3. Detect and characterize emerging zoonotic diseases related to agricultural exposures.
  4. Identify risk factors for the acquisition of zoonotic diseases by agricultural workers.
  5. Develop, implement, and evaluate measures to prevent zoonotic disease in agricultural workers.
  6. Survey all veterinary personnel in Minnesota regarding work-related illness and injury.

## RESEARCH BRIEF:

# Surveillance for Zoonotic Diseases in Agricultural Workers in Minnesota



To accomplish these goals, study cases were categorized into three different tiers: Tier 1 – those living and/or working on a farm, Tier 2 – visiting a private farm and, Tier 3 – visiting a fair, petting zoo, agritourism farm or other public agriculture venue. Data from multiple sources were centralized into one database, allowing researchers to analyze a comprehensive collection of reported diseases.

Over five years, the project revealed some agents caused little disease, while others were a larger threat than previously estimated:

### Larger threat

- *Campylobacter*
- *Cryptosporidium parvum*
- *Salmonella*
- Shiga toxin-producing *E. coli*

### Minimal threat

- Community-associated *Clostridium difficile*
- Methicillin-resistant *Staphylococcus aureus* (MRSA)
- Blastomycosis
- Vectorborne diseases

The risk of acquiring a zoonotic enteric pathogen was 7.9 times greater for people living on or working with food production animals than other Minnesotans.



## WHAT'S NEXT? WHAT ARE THE POSSIBLE SOLUTIONS OR RECOMMENDATIONS?

The multi-pathogen surveillance system is being used on an ongoing basis to monitor enteric disease. With continued surveillance, trends can be followed and educational materials and interventions created to prevent zoonotic enteric disease in agricultural populations.



## WHAT DOES IT MEAN FOR AGRICULTURAL HEALTH AND SAFETY?

This study demonstrated that zoonotic enteric infections (that were not part of an outbreak) are more common in agricultural workers than in the general public. **Several basic prevention measures can reduce infection risk:**

1. **Wear dedicated work clothing and remove your work boots when you come into your home.**
2. **Wash your hands with soap and water before you eat, drink, smoke, or use chewing tobacco, and before you go home at the end of the day.**
3. **Do not eat or drink around animals (i.e. keep the barn out of the employee breakroom).**

Additionally, while there were more cases of zoonotic enteric disease than expected in this, only laboratory-confirmed cases were included. Therefore, **the findings likely underestimate the true burden of disease in this population.** The findings of this study inform prevention strategies for populations and farm environments with specific risk factors for zoonotic enteric disease. This project has already resulted in efforts to increase agricultural communities' awareness of these risks.

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