DAIRY CATTLE EXPOSURE AND ZOONOTIC DISEASE IN NEW ZEALAND

Leah Grout, University of Otago, Wellington
Enteric Zoonoses

- Enteric diseases pose a substantial public health and economic problem in NZ
- Annual incidence rates in NZ are high by comparison to other industrialized nations
- Dairy cattle are a known reservoir for a number of pathogens that can cause human illness, including:
  - *Campylobacter*
  - *Cryptosporidium*
  - *Giardia*
  - *Salmonella*
  - *Shiga toxin-producing E. coli (STEC)*
Potential Transmission Pathways

- Foodborne Transmission
- Waterborne & Indirect Transmission
- Direct Transmission
- Foodborne Transmission

Potential pathways include:
- Wild Animals (WILDLIFE)
- Natural Environment (NATURAL ENVIRONMENT)
- Excreta (EXCRETA)
- Dairy Cattle (DAIRY CATTLE)
- Humans (HUMANS)
- Food (FOOD)
Methods

■ Data were assembled on livestock densities, disease rates, and population estimates for small areas (meshblocks and census area units)

■ Dairy cattle numbers were obtained from the Agribase™ database for the years 2000, 2006 and 2014

■ Population estimates were obtained from Statistics New Zealand for census years 2001, 2006, and 2013

■ Notified cases of campylobacteriosis, cryptosporidiosis, giardiasis, salmonellosis, and STEC infection from 1997-2015 in New Zealand were obtained from ESR

■ Series of maps were produced in ArcGIS
Dairy Cattle Density Over Time
Change in Dairy Density 2000-2014
Change in Exposure to Dairy Cattle 2000-2014
Interface Between Humans and Dairy Cattle
Cryptosporidiosis Rates

5-Year Average Cryptosporidiosis Rates by Meshblock, New Zealand 1997-2001

5-Year Average Cryptosporidiosis Rates by Meshblock, New Zealand 2002-2006

5-Year Average Cryptosporidiosis Rates by Meshblock, New Zealand 2009-2013

Data Source: EpiSure, ESR
STEC Infection Rates

5-Year Average VTEC/STEC Infection Rates by Meshblock, New Zealand 1997-2001

5-Year Average VTEC/STEC Infection Rates by Meshblock, New Zealand 2002-2006

5-Year Average VTEC/STEC Infection Rates by Meshblock, New Zealand 2009-2013

Spatial Empirical Bayes Smoothed
5-Year Average Case Rates per 100,000

Data Source: Epilab, ESR
Conclusions

■ The increase in dairy cattle densities may represent a substantial increase in exposure to zoonotic pathogens, especially in rural and peri-urban areas in NZ

■ Initial comparisons between dairy cattle density and zoonotic enteric disease rates were inconclusive and are complicated by multiple transmission pathways

■ Next Steps
Questions?

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