

Introduction

Animal source foods provide **essential micronutrients** and improve nutrition outcomes, especially in young children.

Livestock production presents **environmental and health challenges** including zoonotic diseases and foodborne illnesses. Therefore, a more **efficient and humane livestock production** is needed in order to meet increasing demands for animal source foods in tandem with a better understanding of livestock's environmental footprint.

In 2016, a Feed the Future funded study found that calf mortality ranged from 9 - 29% across the three major production systems of Ethiopia¹. These findings directly informed the design of the YSM project, which is in alignment with national efforts to prioritize the **reduction of young stock mortality**².



Map of project areas in Ethiopia, courtesy of SEBI, Univ. Edinburgh.

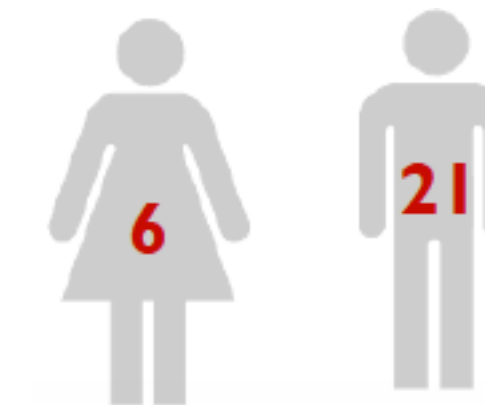
Purpose

To generate key **epidemiological information** on the major causes of youngstock morbidity and mortality that hampers livestock productivity in Ethiopia:

- Data collection on animal husbandry practices, farm factors, disease conditions, and socio-demography of livestock producers.
- **Risk factor analysis** for youngstock mortality.
- Build **human** and institutional **diagnostic and research capacities** at different Ethiopian institutions.

Methods

- Project activities ran from Oct 2016 to Sep 2020.
- Tested 3,544 young livestock from 1,005 households.
- Engaged 27 graduate students.



Tested for **diarrheal** and **respiratory pathogens**:

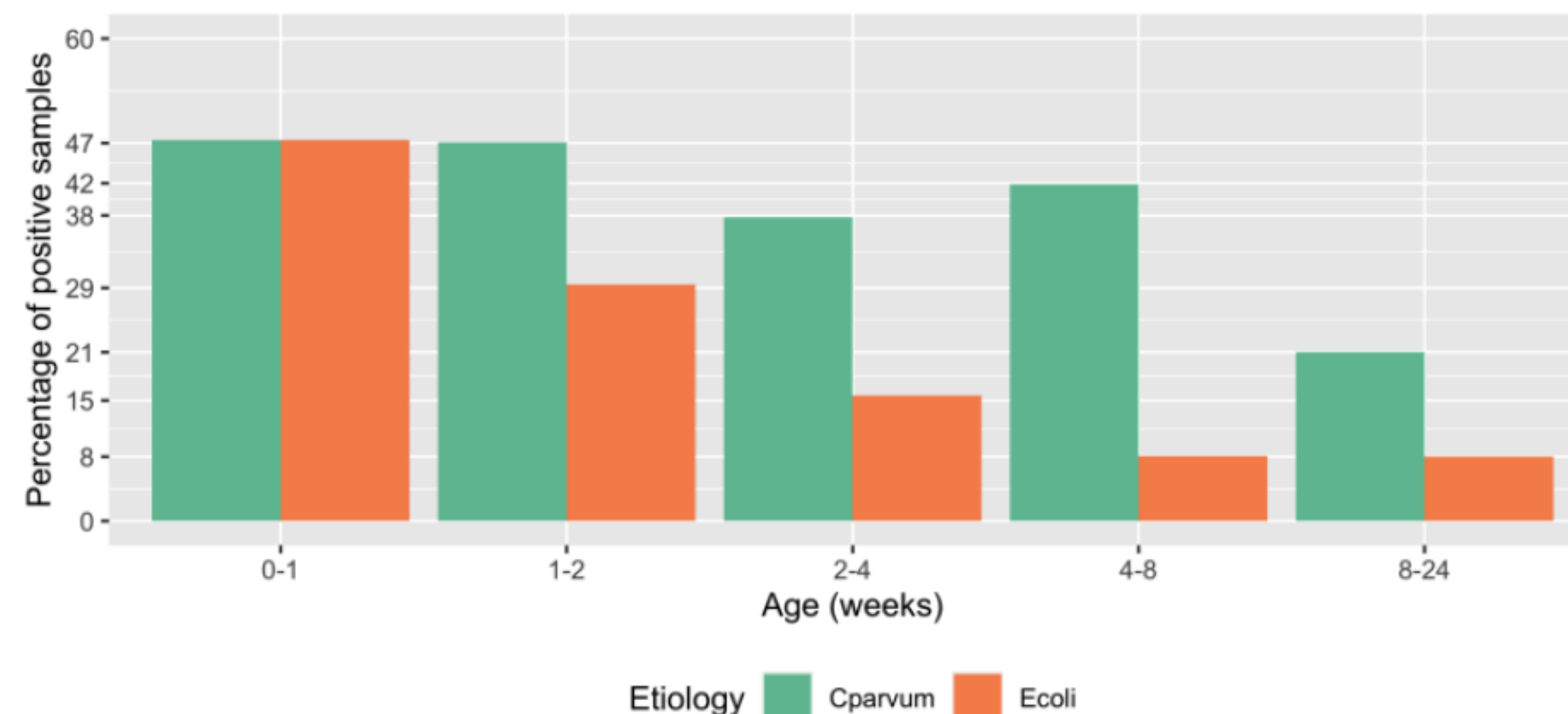
- Pathasure[®] Enteritis 4 ELISA
- Bacterial culture and sensitivity
- Fecal flotation
- Cytology
- Radial immunodiffusion assay (IgG)
- Serology (IBR, PIV-3, BRSV, ADV, BVDV)
- BVD Ag. ELISA

Results

This study identified a variety of pathogens that cause diarrhea and respiratory disease in young calves.

Cryptosporidium parvum infection was the most common diarrheal pathogen identified in calves. A zoonotic pathogen, it can cause diarrhea in children and adults.

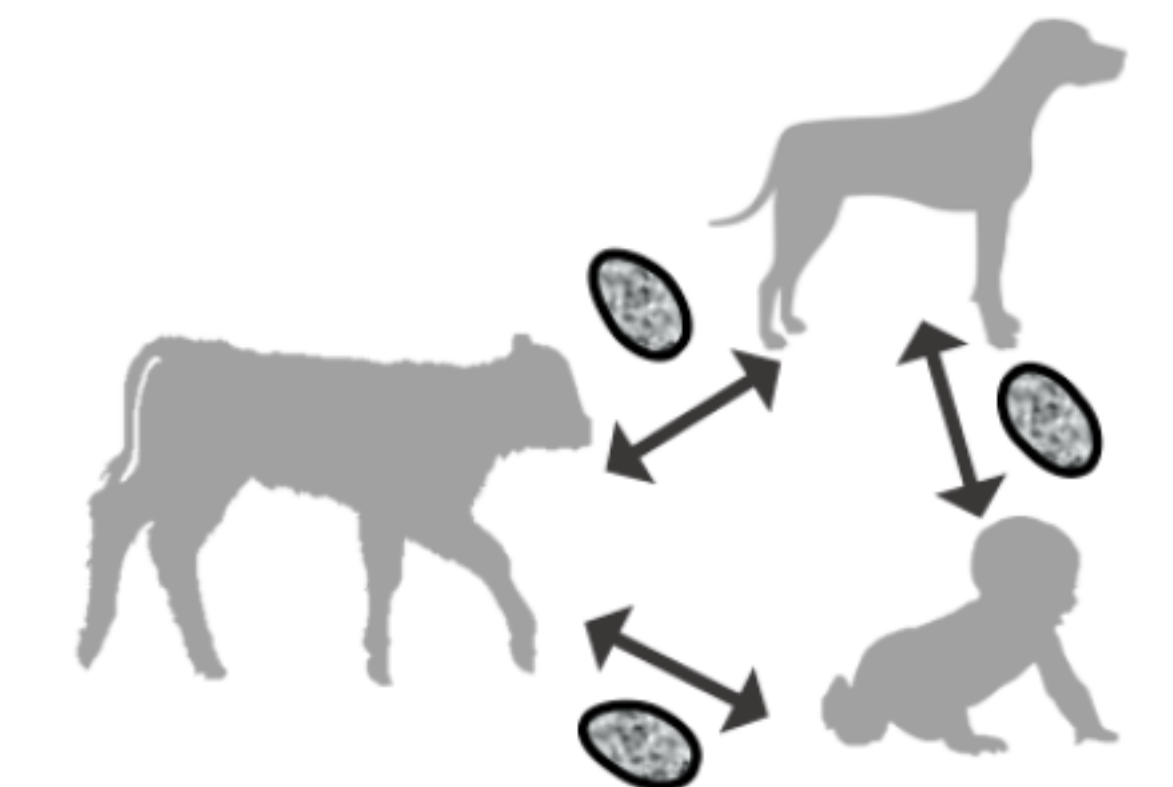
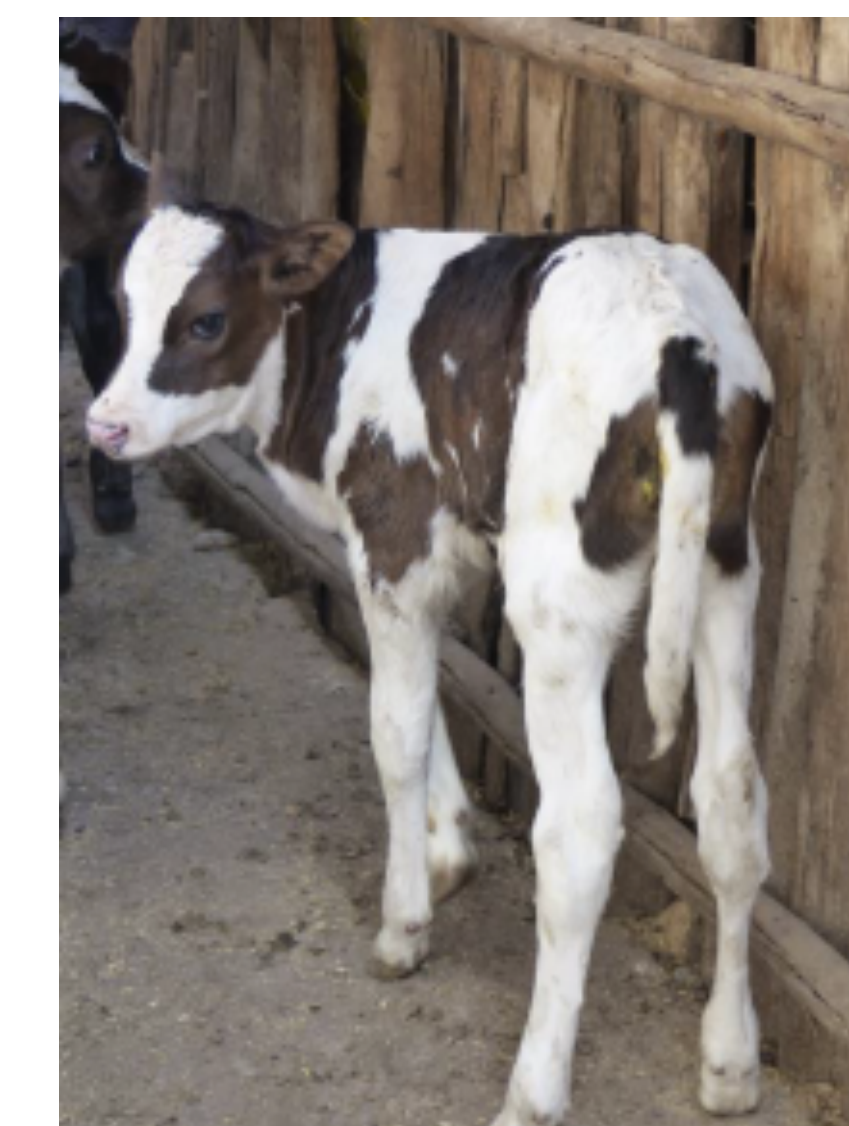
Proportion of positive samples to *E. coli* and *C. parvum* by age group



Discussion

Based on risk factor analysis, livestock producer knowledge regarding **colostrum feeding, farm hygiene, and husbandry practices** should be prioritized to address losses due to diarrheal diseases.

Improvements in hygiene and disease prevention have the added potential of **reducing enteric disease burden in humans**³.



Implications

Investigating enteric disease transmission pathways between livestock and humans is worthy of additional scientific inquiry and behavioral research.

Literature Cited

- ¹ Fentie T, Guta S, Mekonen G, Temesgen W, Melaku A, Asefa G, Tesfaye S, Niguse A, Abera B, Kiflewahd FZ, Hailu B. Assessment of Major Causes of Calf Mortality in Urban and Periurban Dairy Production System of Ethiopia. *Veterinary medicine international*. 2020 Feb 24;2020.
- ² Shapiro, B.I., Gebru, G., Desta, S., Negassa, A., Nigussie, K., Aboset, G. and Mechal, H. 2015. Ethiopia livestock master plan. ILRI Project Report. Nairobi, Kenya: International Livestock Research Institute (ILRI).
- ³ Tomley F.M. and Shirley M.W. 2009. Livestock infectious diseases and zoonoses. *Phil Trans. R. Soc. B* 364:2637-2642.

Acknowledgements

This work was funded in whole or part by the United States Agency for International Development (USAID) Bureau for Food Security under Agreement # AID-OAA-L-15-00003 as part of Feed the Future Innovation Lab for Livestock Systems. Additional funding was received from Bill & Melinda Gates Foundation. Any opinions, findings, conclusions, or recommendations expressed here are those of the authors alone.