Genomic ASSETS for Livestock:
Changing the face of antimicrobial use decisions for livestock

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Genomic ASSETS

Antimicrobial
Stewardship
Systems from
Evidence-based
Treatment
Strategies

Laboratory Testing

Antimicrobial use is necessary for animal health and welfare. Diagnostic data informs precision pen medicine:

✓ **Right Drug**
✓ **Right Animals**   =   **Antimicrobial Stewardship**
✓ **Right Time**

Benefits to Canada

Enhanced Sustainability: improved antimicrobial use and welfare of beef cattle
Improved Disease Management: informed prevention and treatment strategies
Applications to all livestock: sampling strategies, genomics, bioinformatics and risk assessment (Prairie Diagnostic Services network laboratory hub)
Market advantage: addresses World Health Organization guidelines[1] and prevents trade restrictions[2]

Phase 1

Laboratory and bioinformatic workflows for field nanopore metagenomic sequencing and recombinase polymerase amplification of BRD pathogens.

Phase 5

Economic analysis to inform the value of applying genomics to inform prudent AMU in beef feedlot
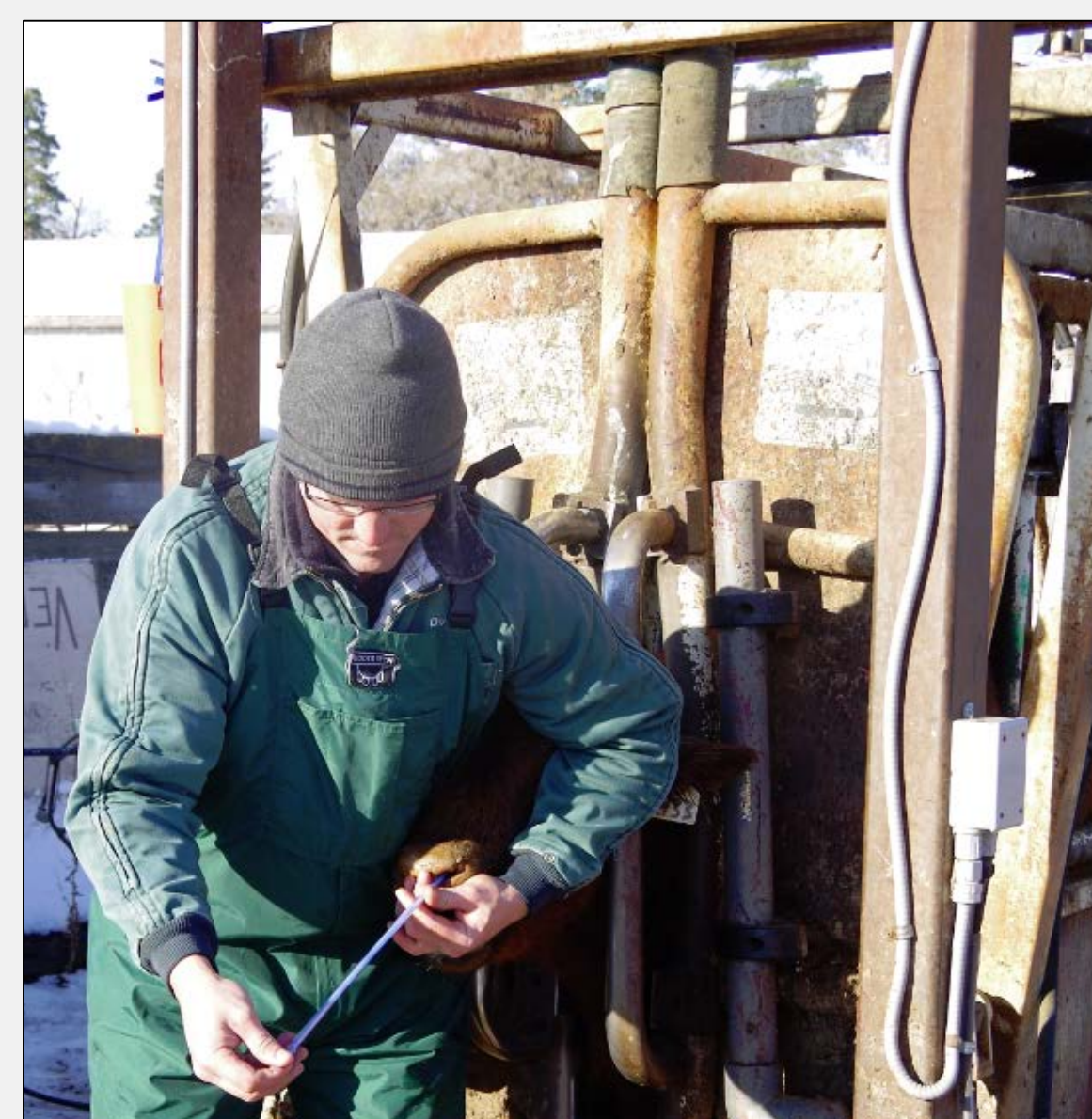
Phase 4

Two-stage field roll-out to commercial feedlots in Alberta and Saskatchewan. Test field sequencing, bioinformatics and reporting..

Canada's Beef Industry

Beef is Canada's largest livestock industry, contributing more than $17 billion to the economy from more than 60,000 farms[3]. Most Canadian beef is finished in large feedlots in western Canada (capacities 5,000 to > 25,000 head, in pens of 200-300 animals).
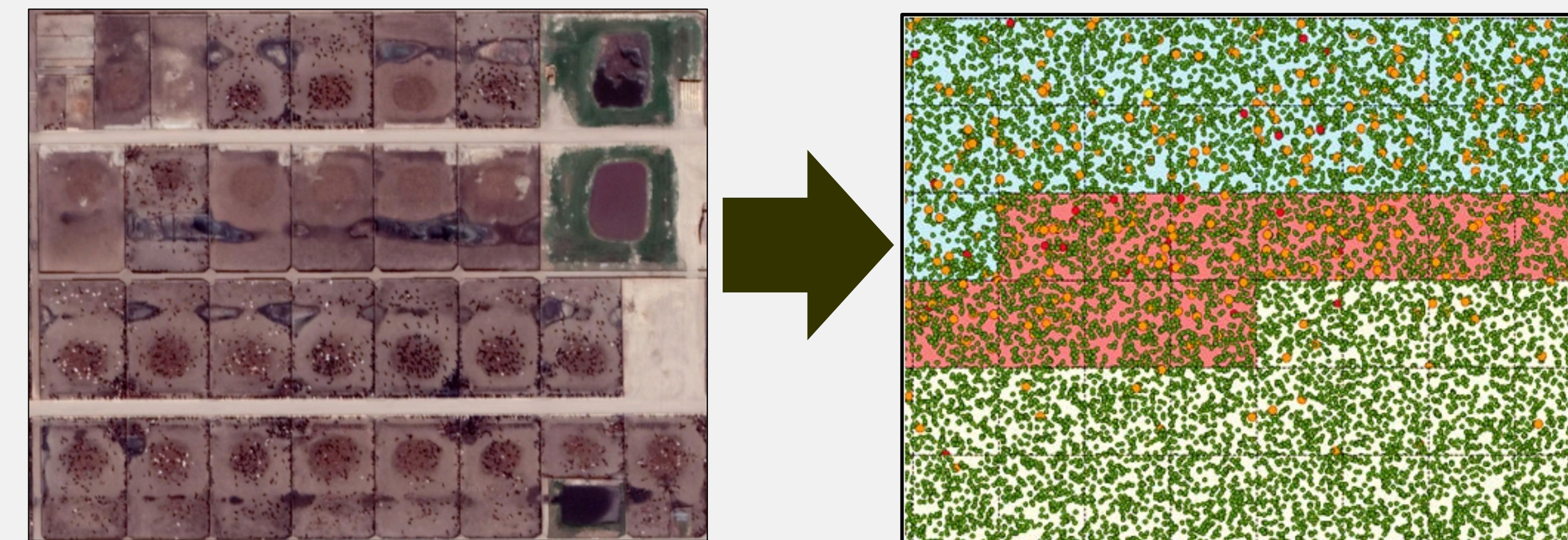
Bovine Respiratory Disease (BRD) is the largest cause of morbidity/mortality in feedlot cattle[4]. BRD is the most common reason for parenteral antimicrobial use in the feedlot[5].

Phase 2

Optimize the feedlot pen-level sampling strategies and bioinformatic pipeline to for data flow to Prairie Diagnostic Services for laboratory interpretation.

Phase 3

Dynamic risk assessment model incorporates genomic data to predict transmission of antimicrobial resistance and inform antimicrobial use for pens of feedlot calves.

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