## Guidelines for collection of bovine respiratory disease data

## Economics of BRD

- Leading cause of mortalities in the beef industry
- In 1997, Dr. Griffin estimated losses to the industry as $750 million per year
- In a 1996 report, loss of production and carcass value resulting from BRD averaged over $92/head (McNeill et al.)

## Using an EPD for susceptibility in a genetic improvement program

- Incidence of BRD ~7 times more important in a terminal sire index than WW, PWG or feed intake
- 2-3 times more important than marbling score and yield grade.
- Van Eenennaam and MacNeil (2011)

## BRD Guidelines Committee

- Dr. Dee Griffin, University of Nebraska
- Larry Kuehn, USDA MARC
- Dr. Jim Lowe, University of Illinois
- Holly Neibergs, Washington State University
- Chris Seabury, TAMU
- Alison Van Eenennaam, UC Davis
- R. Mark Enns, Colorado State University

## What are feedlots recording now?

- Drs. Lowe and Griffin
- Two widely-used feedlot software programs
  - Animal Health International
  - Micro Technologies (Micro Beef Technologies)
- Production Animal Consultation provided summaries of reporting rates

## Diagnosing BRD

Cattle Treatment Guide, 2004

Cattle Disease Guide, 2001

Others are more difficult…

## Data reporting rates for two feedlot recording systems:

- Lot info
  - In date (100%)
  - Out date (100% if closed)
  - Sex (100%)
  - Owner (74%)
  - Buyer (41%)
  - Origin (71%)
  - Starting average weight (100%)
  - Ending average weight (100% if closed)
  - Starting head (100%)
  - Ending head (100% if closed)
  - Risk (1%)
  - Breed (0%)

## Treatment information recording rates

- Date (100%)
- Weight (99%)
- Temperature (74%)
- Severity score (41%)
- Products applied (100%)
- Cost of products applied (69%)
- Pen rider (6%)
- Doctor (4%)
- Diagnosis (100% – doesn't mean it isn't unknown or other occasionally)

## Phenotypic data

- The data is being recorded at the feedlot level
- How can we use/leverage this for genetic improvement?

## Guidelines

- Recommendations for "performance" recording
- Recommendations for use of data in genetic evaluation
- First attempt at BIF Guidelines for a disease trait

## Guidelines for BRD recording

- Suggesting a tiered approach to recording
  - Different levels of data "comfort"
- Enables flexibility in use of data for genetic evaluation
  - Will enable more detailed genomic research should DNA samples be available
- Envision use of both phenotypic and genomic data in the genetic evaluation

## Low-detail observations (trait one)

- Animal ID (need IDs of all animals in lot)
- Lot information: In and out dates, sex, owner/origin
- Treatment information (tied to animal)
  - Date pulled, temperature (if available, 74% recording rate), diagnosis
  - Animal info: date died/railed
- Used to create a "binary" observation
  - Treated→ yes/no

## High-detail observations

- Presumed BRD (pBRD; same as trait 1):
  - Increased respiratory rate and/or effort, depression, lack of gut fill (reduced feed intake)
- Active BRD (trait 2):
  - pBRD plus temperature over 104—active inflammatory response
- Chronic BRD (trait 2):
  - pBRD plus temperature below 104—lack of active inflammatory response
- Confirmed BRD (trait 3):
  - aBRD or cBRD pluse evidence of lung pathology consistent with pneumonia
    - Thoracic ultrasound
    - >1 score on Whisper automated auscultation system
- Not levels of severity, but levels of specificity—likely a different trait analysis
- Other contemporary group information

## Contemporary group dilemma

- Pen will likely be important environmental factor
  - Most likely vectors for shedding and transmission will be pen mates
  - Historically, add pen to contemporary group definition
    - Birth weight CG + weaning CG + arrival date + origin + pen
- Concern: overspecifying/subdivising CG so that little variability exists.

## Contemporary group approaches

- Fit pen(lot) as separate main effect outside of contemporary group structure
- Fit pen(lot) as a random rather than fixed effect
  - Pen effects will be regressed relative to the information content
  - Epidemiology is not completely understood
    - This approach would allow correlations to be fit based on pen proximity (if that data were available)
    - Larry Kuehn

## Summary

- There is opportunity for genetic improvement in susceptibility to bovine respiratory disease.
- Considerable data is currently being recorded in the feedlot
- Board has approved guidelines
  - Given the relatively new nature of the trait complex, we fully expect changes with evolution of collection.
- We expect that data for EPDs and genomic tests will start rolling in as breeds develop commercial cattle programs