Health Data for Healthy Cows Project (HDHC)

Collection of data for the genetic improvement of health traits in Australian dairy cattle

Mary Abdelsayed

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Why dairy health?

Healthy cows:
• More productive
• Easier to manage/less intervention
• Improved animal welfare
• Contribute to **profitability** by reducing production costs

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Holstein AUSTRALIA
What is the problem?

- **Australia**: industry collection of health data lacking = no ability to provide breeding values

  Before providing Australian farmers with breeding values for common health disorders:
  - Understand extent of health data recording in Australian dairy industry & collect health data

  **Health Data for Healthy cows Project (HDHC)**

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HDHC Objectives

1. Understand health data collected/storage methods that occur on farm
2. Estimate incidence of common diseases /health occurrences on dairy farms
3. Estimate antibiotic usage on farms
4. Calculate provisional genetic parameters for health traits
5. Estimate accuracy of genomic selection achievable

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Health data source

100 GINFO HERDS

Genomic information nucleus (Ginfo)

Genotyped reference population

**Advantage:** opens up new opportunities for new breeding values

Dairy health traits

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2/3 VIC
1/3 rest

Good herd recorders

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HDHC Plan of Action

Understand health data collection and storage methods that occur on farm:

100 GINFO HERDS

Health Data for Healthy Cows Project (HDHC)

Survey Questions:

1. Just approximately how many cows (%) out of your herd get health problems per lactation?

2. Do you record cases of the following disease categories (Please circle)?
   a. Mastitis
   b. Lameness (e.g. Foot rot, laminitis, sole ulcer, claw disorders etc.)
   c. Reproductive diseases (e.g. metritis, retained placenta, cystic ovaries)
   d. Metabolic disorders (e.g. milk fever, displaced abomasum, ketosis, acidosis)

3. Do you regularly record health events?
   a. Electronically
   b. On paper
   c. Not regularly

4. Who is your primary vet

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Ginfo Survey findings

• 91 surveys returned out of 103 Ginfo herds

• The main on farm software used by Ginfo herds included:
  – Easy Dairy
  – Mistro (cloud based)
  – On Farm Automation-Dairy ID
  – Jantec

• Most herds recorded health data:
  - Daily (as they occur)
  - Electronically
Ginfo Survey findings

Mastitis, Lameness, Reproductive, Metabolic diseases

What health data farmers “said” they record

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Obtaining health data I

- Contacted herd test centres (DPC) and obtained 116 health data files for each of the herds = 0 ???

“ALARM BELLS”

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Obtaining health data III

- On farm software

EASY DAIRY
DAIRY ID
JANTEC

DAIRY DATA vet/ farm health records

DIF 116
(health file)

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Obtaining health data III

- Paper based records
THERE IS HEALTH DATA OUT THERE!

91 GINFO herds = 487,503 health only records

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Health data

• Health file database = Healthy + Diseased cow records = 785,990
• Health data categorised into 9 disease categories:
  - Mastitis
  - Lameness
  - Reproductive disorder
  - Metabolic diseases
  - Udder
  - Calving disorders
  - Abortions
  - Miscellaneous
  - Management

• Data edits:
  - Herd-Years less 50 cows
  - Herd-Years with no disease cases
  - Removal of treatment records prior to calving date
  - Duplicate records
  - Used Data from 2000 to 2015 = 492,291 records (healthy + diseased)
Major health diseases

Survey findings from farmers match health data collected.

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Health data recording

Increase coincides with transition to electronic recording

Mastitis records across years

Antibiotic usage across Ginfo herd

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Disease incidence calculation

Incidence rate = \frac{\text{No. of disease events}}{\text{Cow-time at risk}}

Cow-time = \text{Time (days) between calving date and dry off date (sum number of days together for that disease then divide by 365 to give a cow-year time frame at risk)}

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Disease incidence-Mastitis

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Disease incidence - Lameness

2 cases per 100 cows

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Disease incidence - Reproductive

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10 cases per 100 cows
Disease incidence-Metabolic

2 cases per 100 cows

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Disease incidences per parity

<table>
<thead>
<tr>
<th>Parity</th>
<th>Incidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3 to 6</td>
<td>7+</td>
</tr>
<tr>
<td>7+</td>
<td></td>
</tr>
</tbody>
</table>

- Lameness
- Mastitis
- Metabolic
- Reproductive

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## Antibiotic Usage

Percentage of cows being treated with antibiotics for the different disease categories

<table>
<thead>
<tr>
<th>Disease Category</th>
<th>% Cows</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mastitis</td>
<td>20</td>
</tr>
<tr>
<td>Lameness</td>
<td>0.04</td>
</tr>
<tr>
<td>Reproductive</td>
<td>3</td>
</tr>
<tr>
<td>Metabolic</td>
<td>0.39</td>
</tr>
<tr>
<td>Udder</td>
<td>0.003</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>14</td>
</tr>
<tr>
<td>Management</td>
<td>93</td>
</tr>
</tbody>
</table>

Percentage of cows being treated with antibiotics per parity

<table>
<thead>
<tr>
<th>Parity</th>
<th>% cows</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>44</td>
</tr>
<tr>
<td>2</td>
<td>45</td>
</tr>
<tr>
<td>3to6</td>
<td>52</td>
</tr>
<tr>
<td>7+</td>
<td>41</td>
</tr>
</tbody>
</table>

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Antibiotic Usage across Herds

- Variation in health records = depended on farm software used

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Disease recording across herds

- Variation in herd health recording >> some herds better than others

Good recorders?
Or
More diseased cows?

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Before HDHC – No data available for ADHIS to calculate ABVs
Large amount of data is promising for calculating

>>> Disease incidence & genomic analysis

Mastitis is most occurring disease in Ginfo herds
Health records depended on farm software used
Under recording: some Ginfo herds better health recorders than others

Where to next?
Calculate disease incidences across Ginfo herds/herd-years
Validate: Good recorders? Or Diseased cows? (SCC, cull codes etc)
Genetic analysis – genetic parameter /breeding value estimation

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The Perfect Cow

- Shows heat and conceives when bred
- Produces a live calf without assistance
- Resists Mastitis
- Walks/stands comfortably, rarely needs trimming
- Few metabolic disorders, maintains body condition
- High milk yield, correct composition, feed efficient, low maintenance costs

HEALTH!!!
What are the benefits?

- Improved reliability
  Mastitis resistance breeding value

- Genetic analysis for potential **NEW** traits = Lameness

- Multi-trait genetic analysis model = $\uparrow$ reliability/confidence **Fertility** breeding value

- New individual or integrated **Health** breeding values

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Thank you

Happier Cows

Dr Jennie Pryce
Dr Matthew Shaffer
Paul Douglas
Liz Weaver
Herd Test Centres
Ginfo farmers
Holstein Australia staff

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