# GARDINER FOUNDATION

# Health Data for Healthy Cows: Project Short Report

Developing Breeding Values for Health Traits

## Key Points

- Mastitis is by far the most occurring disease in study herds.
- Main health traits recorded by farmers were mastitis, lameness, reproductive and metabolic disorders.
- Potential for a combined, single health trait.
- Health traits are unfavourably linked to milk production (litres and solids).
- Health traits have low heritability; on-going management is also important.
- Accessing health data is a barrier to developing health breeding values.
- The inclusion of mastitis records in health breeding values will enhance farmers' ability to select for mastitis resistance.
- Further research is under way to develop reliable health breeding values.
- In the meantime, farmers can use the Cell Count ABV (to breed for mastitis resistance) and the Longevity ABV (as healthy cows last longer in the herd).

### Ginfo: Australia's National Reference Herd

This study drew upon data and additional information from Ginfo herds. Ginfo – short for Genetic Information – is a national database of more than 100 commercial Australian dairy herds (30,000 cows) with excellent records (performance and genotypes). Ginfo herds are located across Australia's eight dairying regions and their data pool provides a rich source for research and development.

The study drew upon genetic and performance information from Ginfo herds.

### Healthy Cows

Every dairy farmer wants healthy cows. Healthy cows contribute more to farm profit because they are more productive, easier to manage, have lower treatment costs, last longer in the herd, and of course have better animal welfare.

# Developing Breeding Values for Health Traits

## Selecting for Heath

In the past there has been no Australian Breeding Value (ABV) that directly reflects health. Instead, farmers have been able to select indirectly for health traits using the Cell Count ABV (as a proxy for mastitis) and the Survival/Longevity ABV (because unhealthy cows are less likely to survive a long time in the herd).

A major barrier to developing ABVs for health traits was the inability of researchers to access sufficient herd health performance records kept by farmers and vets. The establishment of the Ginfo project created the opportunity to access health records for genotyped cows and develop genomic predictions for health traits.

Gardiner's strategic project 'Health Data for Healthy Cows' collected and analysed health data from Ginfo herds to determine the feasibility of developing health trait ABVs. This project provided the foundation for the future development of new (health-related) ABVs.

In the past dairy farmers have been able to select indirectly for health traits, for example using the Cell Count ABV as a proxy for mastitis).

## Impact of Selection for Health

The study found a favourable relationship between the four health traits (mastitis, lameness, reproductive and metabolic disorders). This suggests that a single, combined health breeding value could be effective.

The study also found a favourable relationship between health traits, fertility and survival/longevity. This means that selection for health would also improve genetic merit for fertility and survival/longevity (and vice versa).

There was an unfavourable relationship between health traits and milk production (litres and solids). This means there is a risk that high selection pressure for production could compromise genetic merit for health (similar to the genetic trend in fertility before 2011).

### Genetic Relationships – Health Traits

**Favourable link with fertility & survival**

**Unfavourable link with production**

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## The Importance of Management

The Australian population contains a lot of genetic variation for health traits which gives scope for genetic selection to improve health. However, the study determined that health traits have low heritability. This means both genetics and environmental conditions (including management) have significant influence over dairy cow health. Genetic selection should be just one of a number of management tools used by dairy farmers for improving mastitis and other herd health issues. Best practices such as those outlined in Countdown 2020 and InCalf will continue to be important.

➡ **Heritability is an estimate of the level of genetic control for a trait.**



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## Project Outputs

Gardiner's strategic investment in the Health Data for Healthy cows project was a foundation study which delivered:

- A system for editing and summarising dairy health treatment records in Australia for calculating incidence and breeding values.
- Identification of gaps in available health data and challenges in accessing it.
- A concept and options for a combined disease or health trait.

## Where to Now?

Two initiatives that are currently under development should address the data access challenges identified by the project. A smart phone app is being developed to provide an easy way for farmers to record animal health events and treatments and for the data to be made accessible to the genetic evaluation system. DataGene is developing a Centralised Data Repository which will make data easier to access.

A 5-year follow up study by DairyBio (funded by Dairy Australia and the Victorian Government) began in July 2016, part of the research planned is to:

- Utilise health data as more becomes available.
- Write programs for routine handling of health data for calculating health ABVs.
- Develop the methodology to use health data records for calculating health ABVs.
- Develop a way to monitor trends to prevent a repeat of another fertility trend (i.e. selecting for a priority trait such as milk production at the expense of a priority trait such as fertility).



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The Gardiner Dairy Foundation would like to thank Dairy Australia, Holstein Australia, the Victorian government, the Australian Dairy Herd Improvement Scheme (ADHIS) and the DairyFutures CRC for support in delivering this project.

## Thank You

Thank you to the Ginfo herds for keeping excellent records and making them available to create a national reference herd. Special thanks to those herds who gave up their time to allow the HDHC team to source additional health records.

This project is a component of a strategic investment in national herd improvement by Gardiner Dairy Foundation. The Gardiner Dairy Foundation is a not-for-profit organisation that invests in research, development and extension programs across the supply chain for the benefit of the Victorian and the Australian dairy industry. Established in 2000, Gardiner has invested more than $56 million into 715 projects to stimulate growth and profit for the Victorian dairy industry.

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