



# New Genetic Evaluations for Health Traits

## Frequently Asked Questions

### March 2018 (Update)

#### What new health traits will be provided by CDCB?

- Hypocalcemia, or milk fever (MFEV)
- Displaced abomasum (DA)
- Ketosis (KETO)
- Mastitis (MAST)
- Metritis (METR)
- Retained placenta (RETP)

#### Why were these six traits selected?

CDCB selected six of the most common, costly health events impacting dairy herds. Other decision factors included preliminary research, incidence rate, reporting consistency, cost and heritability.

#### ABOUT THE TRAITS

#### How will these genetic evaluations be presented?

The traits are defined as *disease resistance*. Health evaluations will be presented as percentage points of event resistance above or below the breed average, with evaluations of cows born in the base year averaging zero. Favorable values for resistance to the health event will receive positive values.

#### For what breeds will the new health traits be available?

Initially, Holstein animals will be evaluated. Other breed evaluations can be provided as data becomes available.

#### What is the data source for the CDCB health evaluations?

CDCB health trait evaluations were developed using producer-recorded data collected through Dairy Herd Information (DHI) affiliates from herds across the U.S. Strict editing was applied to ensure only the most reliable data was included for the development of genetic evaluations. These health records are used with lactation data available in the CDCB cooperator database.

Health Trait	No. Records	No. Cows
<b>Hypocalcemia (MFEV)</b>	1.2 M*	0.7 M
<b>Displaced abomasum (DA)</b>	1.9 M	1.0 M
<b>Ketosis (KETO)</b>	1.3 M	0.7 M
<b>Mastitis (MAST)</b>	2.5 M	1.4 M
<b>Metritis (METR)</b>	2.0 M	1.2 M
<b>Retained placenta (RETP)</b>	2.0 M	1.1 M

\*M = Million

#### What are expected reliabilities of these traits in Holsteins?

Average genomic reliability ranges from 40 to 49 in young animals and 44 to 56 in progeny-tested animals, depending on the trait. As more data are accumulated, the reliability values are expected to increase.

Health trait	Progeny-tested animals		Young animals	
	Traditional	Genomic	Traditional	Genomic
<b>Hypocalcemia (MFEV)</b>	20	44	11	40
<b>Displaced abomasum (DA)</b>	26	47	15	42
<b>Ketosis (KETO)</b>	24	46	13	41
<b>Mastitis (MAST)</b>	33	56	18	49
<b>Metritis (METR)</b>	28	48	15	42
<b>Retained placenta (RETP)</b>	26	47	14	42

**Hypocalcemia:** typically results after calving due to low total blood calcium levels; also referred to as milk fever

**Displaced abomasum:** enlargement of the abomasum with fluid and/or gas causes movement to the left or right of the abdominal cavity and usually requires veterinary intervention

**Ketosis:** build-up of ketone bodies that typically occurs due to negative energy balance in early lactation

**Mastitis:** infectious disease that causes inflammation of the mammary gland; one of the most common and costly disease of dairy cattle

**Metritis:** infection of the endometrium, or lining of uterus, after calving

**Retained placenta:** retention of fetal membranes more than 24 hours after calving

## What are the heritabilities of these traits?

Heritability was calculated on the observed scale, which results in lower heritabilities when compared to equivalent estimates on the underlying liability scale (with threshold model).

Health trait	Heritability
Hypocalcemia (MFEV)	0.6%
Displaced abomasum (DA)	1.1%
Ketosis (KETO)	1.2%
Mastitis (MAST)	3.1%
Metritis (METR)	1.4%
Retained placenta (RETP)	1.0%

## How do these new traits correlate with traits currently available?

As far as correlation of these health traits to other CDCB traits, these are the highlights:

- Many health traits have significant correlations with productive life (PL), livability (LIV), daughter pregnancy rate (DPR) and cow conception rate (CCR).
- The strongest correlation is between somatic cell score (SCS) and mastitis (MAST).
- Displaced abomasum (DA) has the largest correlation with livability (LIV), meaning animals with displaced abomasum are much less likely to survive in the herd.
- There are no significant correlations with protein yield.

Health trait	Protein	PL	LIV	SCS	DPR	CCR	HCR
Hypocalcemia (MFEV)	0.18	0.15	0.19	-0.29*	0.003	0.01	0.02
Displaced abomasum (DA)	0.23	0.35*	0.47*	-0.13	0.32*	0.28*	0.24
Ketosis (KETO)	0.03	0.33	0.27	-0.19	0.59*	0.49*	0.07
Mastitis (MAST)	0.06	0.39*	0.22*	-0.68*	0.20*	0.21*	0.06
Metritis (METR)	0.05	0.32*	0.26*	-0.09	0.46*	0.41*	0.23*
Retained placenta (RETP)	-0.03	0.17*	0.13*	-0.10	0.14*	0.13*	0.12*

\*Significant at  $P < 0.05$

## Will the health traits be incorporated into Net Merit or any other indexes?

The date to incorporate the new health traits into Net Merit is not yet determined. The initial focus is on the launch, analysis and education about individual traits.

## How can the economic impact of these traits be described?

Research published in 2017 provides the direct cost estimates, which range from \$34 per case of hypocalcemia to \$197 for displaced abomasum. These estimates do not include associated costs already accounted for in Net Merit, such as declines in production or fertility.

Health event	Direct cost estimate (per case)*
Hypocalcemia	\$34
Displaced abomasum	\$197
Ketosis	\$28
Mastitis	\$75
Metritis	\$112
Retained placenta	\$68

\*Liang et al., 2017; Donnelly et al.