

# Heifer Conception Rate (HCR)

Introduced in 2009, Heifer Conception Rate PTA predicts the expected difference in conception rate of daughters as maiden heifers, relative to the breed base. HCR was updated for the August 2026 evaluation and beyond to account for service sire breed, mating type and short cycling. Genomic and genetic evaluations for HCR are provided for Ayrshire, Brown Swiss, Guernsey, Holstein, Jersey, and Milking Shorthorn (traditional only) males and females.

## Benefits of Trait

- Improves genetic selection for successful conception in replacement heifers
- Supports timely age at first calving and efficient heifer development
- Reduces breeding costs associated with repeated inseminations
- Complements cow reproductive performance traits by capturing reproductive performance before first calving

## Heritability

HCR has a heritability of 1.4%. This level is typical for reproductive performance traits, indicating that genetic progress is gradual but cumulative over time.

## Description of Trait

HCR utilizes inseminations (0 for failure; 1 for success) (maximum of seven services). These inseminations are adjusted for mating type, service sire breed, and short cycle then used to calculate a conception rate by dividing by the total number of inseminations required.

## Inclusion in Selection Indexes

HCR has been included in the lifetime merit indexes since 2014. As of the April 2025 update to the indexes, HCR has the following relative emphasis in each:

- Net Merit \$: 0.5%
- Cheese Merit \$: 0.5%
- Fluid Merit \$: 0.5%
- Grazing Merit \$: 0.9%

These values represent HCR's economic importance to reproductive efficiency and herd profitability. The August 2026 modifications to HCR do not affect these emphases because the weights on traits in the lifetime merit indexes are based on economic values that are not being updated. Animal variations in NM\$, CM\$, FM\$, and GM\$ that are expected with the updates to HCR will be due to changes in PTA values because of the revisions, not the relative emphasis of the trait in the index.

## Correlations with Other Traits

Within the reproductive performance trait portfolio, HCR is moderately correlated with Cow Conception Rate (+0.52), Daughter Pregnancy Rate (+0.56), and First Service to Conception (+0.47). These correlations allow information from related reproductive performance traits to improve evaluation accuracy, particularly when data is limited.

## How to Interpret the Trait

HCR is best for a producer who wants to improve conception rate success per service in the maiden heifer population since this trait reflects how many inseminations are needed.

PTAs are interpreted based on the breed average and expressed as percentages. A positive HCR PTA is desirable.

## Reliability Ranges

Reliability varies by animal and is influenced by the amount of available information. Young animals typically have lower reliability, while proven sires with extensive daughter records have higher reliability.

	"A" Status Bulls
Ayrshire	32% to 87%
Brown Swiss	50% to 95%
Guernsey	19% to 69%
Holstein	19.4% to 99%
Jersey	41.4% to 99%
Milking Shorthorn	27.7% to 49.9%

## Data Source

The data to calculate this trait is stored in the National Cooperator Database. HCR utilizes reproductive records for maiden heifers, including insemination events, pregnancy diagnoses, and subsequent calving confirmations reported through U.S. dairy records programs.

Producers can help continue to improve reproductive performance traits by recording key information in on-farm software.

- Ensure animal ID is unique and recorded correctly
- Confirm each animal has sire, dam, and date of birth
- Properly record service sire with the NAAB code or bull ID for each reproductive event
- Record ET births

## Resources and Research



Published research supporting this trait and the 2026 reproductive revisions is available by scanning this QR code.

Listen to The CDCB CowCast for a conversation with lead researcher Dr. Taylor McWhorter about the 2026 revisions to reproductive traits. Available on YouTube and podcast platforms on May 12.

## Range of Population

Most animals cluster near zero, with positive values indicating a higher-than-average genetic ability for successful conception per insemination in heifers and negative values indicating a lower-than-average ability relative to the breed base. These PTA values are calculated during a pre-release analysis. Some variation is expected in the August 2026 evaluation.

	Active A.I. Bulls ("A" Status Bulls)			Genomic Bulls ("G" Status Bulls)			Bulls born since 2000 (≥ 90% reliability)		
	PTA Range	Mean PTA	SD	PTA Range	Mean PTA	SD	PTA Range	Mean PTA	SD
Ayrshire	-0.7 to +10.2	+3.38	3.78	-1.7 to +2.5	+0.60	0.95	-1.7 to +8.1	+3.91	4.11
Brown Swiss	-5.6 to +3.7	-0.02	1.74	-2.9 to +4.2	+0.54	1.27	-5.6 to +4.3	-0.41	2.55
Guernsey	-2.8 to +3.4	+0.48	1.65	-2.7 to +3.7	+0.22	1.59	***	***	***
Holstein	-5.3 to +4.6	+0.22	1.50	-4.9 to +5.1	+0.77	1.22	-7.9 to +6.0	-0.31	1.83
Jersey	-3.4 to +4.2	-0.03	1.58	-3.9 to +3.6	+0.32	1.26	-7.0 to +5.7	-0.52	2.06
Milking Shorthorn	-2.3 to +2.0	-0.53	1.54	---	---	---	***	***	***

\*\*\* – Insufficient number of bulls to calculate statistics.

Approximately 68% and 95% of observations fall within one and two standard deviations (SD) of the mean, respectively. The following example demonstrates how these proportions apply to active Holstein and Jersey bulls.

	PTA Standard Deviations ("A" Status Bulls)			
	-2	-1	+1	+2
Holstein	-2.78	-1.28	+1.71	+3.21
Jersey	-3.19	-1.61	+1.54	+3.12

## Frequently Asked Questions

### How does the revised version of HCR compare to the legacy version?

Heifer Conception Rate PTA continues to predict the expected difference in conception rate of daughters as maiden heifers relative to the breed base. The model used to calculate HCR was revised to account for service sire breed as well as mating type and short cycling.

### How do the PTA values of the revised HCR compare to the legacy values?

The changes in PTA ranges, mean PTA, and standard deviations between versions of HCR are due to the updated model and variance components. These differences reflect rescaling of the traits, rather than a true increase or decrease in underlying genetic variation.

	Revised HCR PTA ("G" Status Bulls)			Legacy HCR PTA ("G" Status Bulls)		
	PTA Range	Mean PTA	SD	PTA Range	Mean PTA	SD
<b>Holstein</b>	-4.90 to +5.10	+0.77	1.22	-5.50 to +5.70	+0.88	1.37
<b>Jersey</b>	-3.90 to +3.60	+0.32	1.26	-4.40 to +3.80	+0.33	1.36

### How should farmers use the updated HCR trait?

HCR is best for a producer who wants to improve conception rate success per service in the maiden heifer population since this trait reflects how many inseminations are needed.

### What is the average number of inseminations per conception for U.S. heifers?

According to data stored in the National Cooperator Database and used in genetic evaluations, the average Holstein heifer that calved in 2024 in the United States is bred 1.77 times per conception. U.S. Jersey heifers that calved in the same year were bred 1.85 times per conception on average.