

"Genomic testing allows Holstein breeders to gain a more accurate insight into their animals' genetic potential at a much earlier age than what we have been able to estimate in the past. That knowledge can help you decide which animals to use as the genetic foundation for your herd, thereby aiding you in breeding a better herd of Holstein cows."-Holstein Association For a list of the other Genetic Diseases, please refer to our website.

## Understanding Genetic Diseases







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## Bovine Brachyspina Syndrome

- Brachyspina is a fairly new syndrome found in Holstein Cattle.
- It is defined as a congenital lethal syndrome, and has been found to be an autosomal recessively inherited disorder.
- This means both parents must carry the allele and pass it on to the offspring for the condition to occur.
- If only one parent passes on the trait, the offspring will be a carrier and show no visible signs of the syndrome.
- Calves are born after a prolonged gestation period.
- Lesions consist of growth retardation, shortening of the spine, slender limbs, a shortened upper jaw, and a well-defined hump between their shoulder blades.

## Complex Vertebral Malformation (CVM)



- CVM is a Lethal Syndrome found in Holstein Cattle.
- These calves are malformed when they are born, they are either spontaneously aborted, or die shortly after birth.
- This disorder is caused by a mutant gene that is recessive, therefore only homozygous individuals are affected.
- Heterozygous individuals, who carry one normal gene and one faulty gene, have no symptoms, but can pass this disease to their offspring.
- The Bull where this disease originated, was exceptional in milk production. Therefore this disease is correlated with high milk production.

## Fertility Haplotypes (HH1, HH2, HH3, HH4, HH5)

- When Homozygous, these all result in embryonic death.
- Unlike the other diseases, no calves are born alive.
- A way to avoid this, is to breed to sires that aren't carriers.
- Another way to avoid this, is to eliminate inbred matings in breeding programs.

Name	Key Sire Fathers	Haplotype Frequency	Timing of Pregnancy Loss
HH1	Chief, Mark, Lindy, Formation, Finley, Throne, Jordan-Red, Palemo	4.5%	All Stages
HH2	Outside, Boulet Charles, Colby, Million, Mr Burns	4.6%	Before Day 100
HH3	Glendell, Rotate, Emory, O Man, Boss Iron, Snowman	4.7%	Before Day 60
HH4	Besne Buck, Jocko Besne	0.7%	Unknown
HH5	Thornlea Texal Supreme	4.8%	Before Day 60
JH1	Top Brass, Sooner, Beretta, Hallmark, Paramount, Jace, Louie	23.4%	Before Day 60
BH1	Stretch Improver, Emory, Prelude, Even, Earnest T, Peeless, Vigor	14.0%	Before Day 100
BH2	Rancho Rustic My Design	20.5%	Stillborn Calves
AH1	Sellwood Betty's Commander	26.1%	Unknown

- Above is a table from Select Sire, it is showing the different fertility haplotypes, key sire fathers, haplotype frequencies, and timing of pregnancy loss.
- For a list of carriers, please visit the Select Sire website: http://www.selectsires.com/resources/healthdocs/i mpactingfertility.html?version=20160420

Please refer to our website for a full list of references.