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Heifer mastitis is all too common

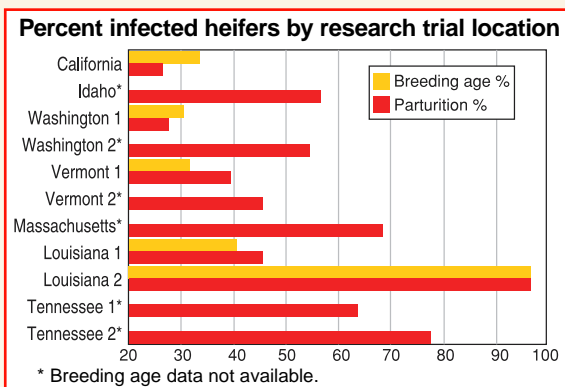
Infected heifers milk less and can spread contagious mastitis to your other cows. Focus your control on fighting flies and using mastitis treatments before freshening.

by Christopher B. Norman, William E. Owens, Richard L. Boddie, and Bruce F. Jenny

WHAT are the chances your herd may have a problem with heifer mastitis? Heifers as young as 6 months can have infected quarters. These infections usually go unnoticed but can persist through the first lactation and beyond.

The bar chart shows prevalence of mastitis in heifers across the country. The percentage of infected heifers ranged from a high of more than 90 percent in a Louisiana study to about 30 percent in California and Washington. Your heifers can calve with mastitis no matter where you are located.

Heifer mastitis is a problem for several reasons. First, intramammary infections in heifers can pre-



vent proper development of milk secreting cells in the udder. This lack of development or damage can affect future milk production. Second, infected heifers can introduce contagious mastitis pathogens, such as *S. aureus*, into herds that otherwise have proper protocols to prevent mastitis.

Causes other problems . . .

Third, heifers infected at first calving may be at higher risk for problems related to subclinical/clinical mastitis. These include poor reproductive performance, greater likelihood of higher somatic cell counts, and early culling. Preliminary work at our mastitis research laboratory showed higher levels of milk ketones in heifers having at least one *S. aureus* infected quarter, compared to heifers without a *S. aureus* infected quarter. Having mastitis at an early age can prevent heifers from reaching their genetic potential for productive life.

A 1972 Cornell University study found that first-calf heifers with one *S. aureus* infected quarter gave 1,700 pounds less milk per lactation than uninfected herdmates. Another Cornell study in 1997 estimated the cost of infection with *S. aureus* at \$185.51, based on 305-day mature equivalent milk yield. A recent University of Tennessee study found that heifers treated 14 days before calving with lactating cow antibiotics generated an average of \$175 higher net income during their first lactation.

What's the cause?

Research indicates that about 90 percent of all intramammary infections in prepartum heifers are caused by *Staphylococcus spp.*, including *S. aureus*. Of this 90 percent, the majority are due to coagulase negative staphylococci (nonaureus staph). Research has shown that these infections have a high spontaneous cure rate around calving time and do minimal damage.

Staphylococcus aureus causes about 2 to 46 percent of all infections in heifers near parturition. This organism is more virulent enabling it to

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elude the heifer's own immune response within the udder and even infused antibiotics. *Staphylococcus aureus* is of the greatest concern to us because of its contagious nature, ability to cause chronic infections that are refractive to antibiotic treatment, and high cell counts in infected quarters.

How heifers get mastitis . . .

Bacteria considered to be normal skin flora on a heifer's udder and teats can colonize on the teat end and orifice under proper conditions. Additionally, bacteria found in the mouth of one calf may spread to the udder of another calf if they are allowed to suck each other. Risk of transmission by this mechanism is greater if calves are fed mastitic milk.

Bacteria in the heifer's environment also may influence the number of infections. Wet or dirty housing conditions boost bacterial counts at the teat end, while cold, dry conditions may cause chapped, irritated skin providing conditions for colonization by *S. aureus*.

Finally, flies can transfer bacteria from cows to heifers and from heifer to heifer. In Louisiana and other areas of the country, horn flies are common during summer. These biting flies can cause scabs to develop on the teats and teat ends. Research at the Hill Farm Mastitis Laboratory has demonstrated a direct link between horn fly population and incidence of *S. aureus* mastitis in heifers. *Staphylococcus aureus* is an opportunistic pathogen and will colonize on damaged skin.

A dedicated fly control program will help reduce scabbing at the teat end and bacterial transfer. Proper dietary levels of vitamin A, copper, zinc, beta-carotene, vitamin E, and selenium can improve immune function. Make sure you provide a clean, dry place for heifers to lie down and protection from the weather.

On farms with significant losses from heifer mastitis, vaccination and prepartum treatment with antibiotics will decrease infection rates. Vaccines can bolster antibodies against *S. aureus* and lower new infection rates in heifers.

Intramammary infusion of commercially prepared antibiotics will reduce the number of heifers infected at calving. The table shows the efficacy for treating prepartum heifers with either a dry cow or lactating cow antibiotic preparation. When using lactating cow antibiotics, the number of infected quarters dropped by between 79 and 97 percent. Comparatively, the use of dry cow antibiotics in prepartum heifers lowered the number of infected quarters by between 53 and 97 percent. Note that the number of infected quarters

Mastitis cure rates in prepartum heifers				
Location	Drug type	% change in infected quarters ¹		Treatment date (days before calving) ²
		treated	control ³	
Tennessee	Lactating	-79	-16	14
Tennessee	Lactating	-83	-29	7
	Lactating	-97	-29	7
Louisiana	Dry cow	-60	20	2nd trimester
	Dry cow	-53	8	3rd trimester
Louisiana	Dry cow	-97	-51	84 thru 98
	Dry cow	-95	-51	84 thru 98

¹ Values indicate the percent change in quarters infected at time of treatment versus the number infected at calving.
² Treatment quarters sampled for microbial analysis and treated. Control quarters were sampled only.
³ In control quarters, negative values indicate spontaneous recovery and positive indicate an increase in infected quarters at calving versus treatment date.

in the control group actually went up in some of the studies. This indicated new infections were acquired around calving in untreated heifers.

Prepartum treatment with antibiotics using the partial insertion technique has many advantages over treatment during lactation. With prepartum administration, there is less dilution of antibiotic by milk and colostrum, and a higher concentration of the antibiotic per unit weight of mammary tissue due to the heifer's smaller udder size. Also, the antibiotic has a longer contact time with the mammary tissue and bacteria.

Finally, early treatment can eradicate infection before significant formation of scar tissue. Scar tissue can allow some microorganisms such as *S. aureus* to hide from infused antibiotics and the heifer's own immune system. The first pregnancy also is the time when the greatest growth and development of mammary tissue occurs. Early prepartum treatment is the best way to protect developing mammary tissue and minimize damage to milk secreting cells.

Dry versus wet treatment . . .

Both dry and wet cow mastitis preparations have advantages and disadvantages. Dry cow antibiotic preparations can be administered at any time during a heifer's pregnancy. This gives you the important advantages of flexibility in time of ad-



EASILY HALF OF HEIFERS FRESHENING in many herds will have one or more infected quarters.

ministration and the ability to tackle infections before damage to the milk-secreting cells of the udder has occurred. Dry cow preparations also have the secondary advantage of providing higher drug concentration in the udder. The major disadvantage of using a dry cow treatment is a greater possibility of antibiotic residues in the milk if administered less than 45 days before calving.

Use of a lactating cow preparation has advantages of similar cure rates compared to dry cow preparations, while being more forgiving if administered close to calving. Heifers could be treated when they are moved into the close-up dry or springing heifer group at 7 to 21 days before calving.

The disadvantage of prepartum lactating cow treatment is that some infections already may have done their damage by the time the drug is administered. Overall, both of these methods will reduce mastitis in heifers when administered using proper technique and sanitation.

It also should be noted that use of these products as described constitutes an extra-label use of the drug and administration. It should be undertaken after discussion and recommendation by your herd veterinarian. In addition, all milk from treated heifers should be tested for antibiotic residue before being placed in the bulk tank. 🐄