

# Ways to Improve Cow Hygiene

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Maintaining the cleanliness of a lactating herd is a key management aspect for the continued production of high-quality milk as indicated by low somatic cell counts. This relationship was established close to a decade ago by researchers from the University of Wisconsin, who confirmed that somatic cell counts were associated with udder and leg hygiene scores. Their data demonstrated that cows with “dirty” udders (scores of 3 or 4 on a 1-4 scale with 1 being the cleanest and 4 being the dirtiest) were one and a half times more likely to be infected with a major pathogen relative to cows with “clean” udders (scores of 1 or 2). Farmers seeking ways to improve the hygiene scores of their herd should benefit from making changes in the following aspects of management.

## Freestall design

There are multiple factors within a freestall that can affect cow hygiene. Research from the University of British Columbia demonstrated that the distance from the curb to the neck rail might alter both udder hygiene and stall usage. Locating the neck rail farther back from the curb decreased udder hygiene but increased the length of time cows spent standing within the stall. These responses were likely related to one another. Increasing the time a cow will stand completely within a freestall makes it more likely that she will defecate on the base of that stall. This, in turn, will likely result in her udder, or the udder of the next occupant of that stall, becoming soiled when she shifts from standing to lying. Similarly, two aspects of freestall design that cows were found to prefer by the researchers at the University of British

Columbia, the removal of brisket board and greater stall width, might put them at a greater risk for poorer hygiene scores indirectly. While a brisket board was designed to keep the freestall cleaner by positioning the cow closer to the curb, cows preferred lying in a freestall without a brisket board (68 percent of their total resting time) when given a choice. In theory, this would place those cows at a greater risk of soiling within the freestall. Similarly, increased stall width (106 to 126 cm) increases lying time by approximately one hour, but again, might decrease hygiene scores if the stalls are wide enough to allow for a diagonal lying posture, resulting in greater amounts of feces being deposited in the stall.

On the other hand, a recent Danish study found that lost lying time was associated with poorer hygiene. The researchers found that for each 30-minute decrease in lying time cows were increasingly likely to have poor hygiene. These studies suggest that farmers need to find a balance between stall designs that promote lying time, large spacious stalls that minimize contact with the hardware of the freestall, and the cleanliness of these stalls.

## Freestall design management

A complex relationship between freestall base and cow hygiene also exists. A survey across the Upper Midwest by researchers from Colorado State University determined that cows housed with sand bedding were dirtier (approximately 26 percent scored at 3 or 4 on a 1-4 scale) than those on mattresses (approximately 15 percent) or waterbeds (approximately 19 percent). This difference may

be explained more by the frequency at which fresh bedding was delivered than as a true difference between stall bases. The same survey established that farmers added bedding to the mattresses or waterbeds approximately four times per week compared to the approximately two times per week for sand.

A similar survey in Germany concluded that straw bedding resulted in the highest somatic cell counts, whereas sawdust resulted in the lowest. In a designed study from researchers in Finland, Canada and Denmark, sand resulted in cleaner cows relative to straw bedding. This finding reinforces that ultimately stall maintenance might be more important for maintaining cow cleanliness than a specific bedding surface.

Finally, a comparison of mattresses and solid rubber mats conducted by researchers from the United Kingdom suggested that cows' udders were cleaner on mats but more comfortable overall on mattresses. Part of this dynamic may be explained by the difference in hygiene scores, which are both statistically significant but numerically very small. This combination can indicate there may not be an observable effect within a commercial dairy facility. The numeric difference between the two bases was only 0.06 units on a scale of 1-4. The overall increase in comfort was established from the greater time spent ruminating, lying, and lying while ruminating for cows housed on mattresses. The conflicting responses to stall base or bedding in these studies suggests that farm management likely has a large role in the relationship between this factor and mastitis and milk quality.

Beyond the specific bedding material used, overstocking of freestalls can lead to poor hygiene. A Norwegian survey determined that cows housed in overstocked freestall barns (defined only as more cows than available stalls) were three and a half times more likely to be classified as dirty (hygiene scores of 3 or 4 on a 1-4 scale) compared to those housed in less crowded housing pens. In a designed study

conducted at the Miner Institute, increasing stocking density up to 142 percent did not affect cow hygiene. However, stocking densities were evaluated over a period lasting only two weeks. The different conclusions drawn from the data collected during these two studies suggest that it may be difficult to evaluate the effects of management practices on cow hygiene in short-term research trials. Overcrowding of freestalls will likely reduce the hygiene of dairy cows, and overstocked farms with milk quality or mastitis issues should benefit from reducing the stocking rate of their facility.

## Managing alleyways

A study conducted in Sweden evaluated the effects of the use of mechanical alley scrapers when compared to the use of only slatted floors for manure removal. The scrapers were run every two to three and a half hours throughout the day, and their usage was assessed by the amount of manure accumulating within the areas of the alleyways and udder hygiene. The use of the scrapers reduced manure accumulation directly behind the freestalls and along the back wall of the feed alley. They also improved the cleanliness of the cows' udders. The differences in manure accumulation across specific areas of the housing area can most likely be attributed to the lower cow traffic occurring in these areas compared to the others (behind the feed barrier and in the middle of the alleys throughout the pen) evaluated. Regardless of the limited changes in manure accumulation, they were sufficient enough to improve udder cleanliness, which is key for improving milk quality or lowering mastitis.

## Other facility considerations

Despite these differences related to freestall design, freestall management and alley management, the overall approach to housing (i.e., type of barn utilized) may have a limited effect on cow hygiene, milk quality and

mastitis. Cows housed in compost-bedded barns were dirtier than those housed in naturally ventilated freestall barns and crossventilated freestall barns, but this difference did not affect the prevalence of mastitis among farms surveyed across Minnesota. As previously discussed, this finding may have been due to the small numeric differences in hygiene scores — less than 0.5 on a scale of 1-5, suggesting that any well-designed, well-managed facility can provide an environment that is suitable for maintaining cow hygiene and producing high quality milk.

One consideration that should be made for confinement systems is the provision of access to pasture. A Danish survey observed that cows housed without pasture access were 3.75 times more likely to be dirtier than those with access.

In summary, farmers exploring opportunities to improve milk quality or lower the prevalence of mastitis through better cow cleanliness have multiple factors to consider. If designing a new barn, farmers should select the approach to housing that fits with their management philosophy and strategy, as the primary options for facilities should be suitable. If a new facility or renovation of an existing facility will include freestalls, then consider the the location of the neck rail, presence of the brisket board, and width of the stalls. A well-designed freestall will only function as intended with proper maintenance of the bedding surface and when cows are provided sufficient access (i.e., not overcrowded). Managing alleyways also has a major influence in that investing in automatic scrapers would be beneficial.



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