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How big of a problem is adult cow mortality?

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Adult cow mortality rates in the dairy industry are much higher than those in the cow-calf and feedlot industries. They have been studied very intensively, and estimates are quite variable. Mortality rates reported on the basis of producer response to survey questions are lower than those obtained from dairy record systems, which suggests that dairy producers often underestimate death loss on their operations.

The USDA:APHIS:VS National Animal Health Monitoring System (NAHMS) Dairy 2007 survey reported that 5.7% of cows die on farms across the country each year – an increase from 4.8% of the January 2002 inventory and 3.8% of the January 1996 inventory. These rising levels represent a problem in terms of both financial losses and compromised animal welfare.

Information from computerized dairy record systems suggests that adult cow mortality rates have continually increased over the last 10 years. In some states it exceeds 10% per year. Very few formal studies have focused on this issue; most have come from outside the U.S. Studies here have focused primarily on culling and herd turnover rates rather than death losses per se.

The 2007 national survey of dairies in the U.S. showed that approximately 23.6% of dairy cows left herds permanently during 2007. Approximately 5.5% were sold to other dairies, and 94% were culled (i.e. sold and not returned to milk production, sent for slaughter). The reasons cows were culled included mastitis and udder problems (23% of culled cows), lameness or in-

jury (16%), other disease (3.7%), reproductive failure (26.3%), and poor milk production not related to these other problems (16%). Other miscellaneous reasons accounted for about 8% of culling.

Therefore, on average, the overwhelming majority of dairy cows leaving farms are not fit for sale as milk production animals and approximately half of them are leaving because of disease or injury problems, rather than being selectively removed because of low fertility or milk productivity.

Dairy cattle death losses are an extremely important problem. Not only are they an economic disaster, they also represent substantial problems with animal well-being. This would seem to be an issue requiring substantial veterinary attention, but at present it does not appear that veterinarians or producers have the information required to manage the problem appropriately.

Why do dairy cows die?

Adult cow death losses appear to be attributable to similar reasons why cows are culled. A recent literature review identified 19 studies between 1965 and 2006 that focused on dairy cow mortality in countries with relatively intensive dairy production. While 10 of the studies provided information about causes of death, none of the diagnoses were founded on necropsy evaluation. Only a single study discriminated between cows that were euthanized or died unassisted. Recorded causes of death were relatively uniform across studies and were categorized as accidents, calving disorders, digestive disorders, locomotor disorders, meta-



bolic disorders, udder/teat disorders, other known reasons, and unknown reasons.

The NAHMS Dairy 2007 survey recorded causes of death similarly to those established through the literature review, documenting the percentage of cow deaths due to calving problems (15.2%); scours, diarrhea or other digestive problems (10.4%); euthanasia due to lameness or injury (20.0%); mastitis (16.5%); respiratory problems (11.3%); poison (0.4%); lack of coordination or severe depression (1.0%), other known reasons (10.2%); and unknown reasons (15.0%).

Cause of death entered in dairy record systems is based upon producer assessment and diagnosis. It appears that relatively few veterinarians are involved in the diagnosis of cause of death. Relatively few U.S. dairy operations perform necropsies to determine the cause of cow death. The NAHMS Dairy 2007 study reported necropsies were performed at only 13% of dairies, and only 4.4% of cow deaths received a thorough postmortem exam. Therefore, virtually all studies to date of dairy cow mortality are based on producer assessment rather than veterinary diagnosis. Deter-

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mining the cause of death provides invaluable information for preventing future deaths and improving herd health.

At present no specific reason has been identified for the increase in dairy cow death rates. Producers and veterinarians appear to have attributed them to a variety of causes. Some have questioned whether new federal regulations regarding downer cows and neurologic disease may have artificially increased recorded death rates. This seems unlikely since death rates had been increasing prior to the implementation of this rule, and there was not a sharp increase in recorded death rates after the rule was implemented.

Others have suggested that specific disease problems such as hemorrhagic bowel disease may be increasing death rates. Again, this seems unlikely because the increased mortality rates far exceed the incidence of any specific disease problem. Any conjectures on the cause of increased mortality are difficult to validate without specific diagnoses.

Dairy record systems appear to be an unreliable source of information concerning cause of death. We have been studying the phenomenon of dairy cow mortality over the last couple years. Our findings suggest that dairy producer assessment of proximate cause of death is inaccurate at least 50% of the time. They also show that there are multiple causes of dairy cow death.

Mortalities tend to occur much more frequently in the early part of lactation, coincident with increases in other health problems. Increased disease rates on dairies appear to be closely related to increased death rates. It seems reasonable to suggest that numerous health problems in dairy cows are not recognized early enough or not treated properly to promote optimal outcome. Furthermore, without good descriptors and records of the reasons that cows die, preventive measures that should decrease disease and death are not modified or improved to address the problem.

What can be done to decrease dairy cow deaths?

Most decisions in a low-cost production dairy model are made with input cost as the primary driving force, and potential negative impacts on the animals are seen as problems that must be managed as a consequence of the necessary change. For example, it is common that large scale expansion of a dairy will capture production cost efficiencies, but it is also most common that expansions are accompanied by substantial problems with animal health.

During the time that large numbers of animals are being imported into the herd it is also routine that disease introduction is occurring. Numerous animal health problems remain prevalent and even increase with time. Because there are compelling reasons for dairies to expand there is a real need for the dairy industry and veterinarians to reevaluate management systems with a focus on optimum animal health.

An overview of the health challenges faced by dairy cows needs to recognize that some changes in the modern dairy industry

could lead to systematic problems with animal care. The labor force on most dairies is primarily composed of low wage workers without extensive, preexisting dairy cow management skills. Their ability to adequately identify disease in individual animals and respond with prompt individual animal attention is limited by the extent of their experience and training.

The overwhelming majority of sick cows on dairies are identified, diagnosed, and treated by farm workers rather than veterinarians. Poor outcomes could be an issue of poor clinical disease management in addition to any preexisting problem with cow physiology. Furthermore, record keeping systems are not focused on assessment of health challenges or causes of cow health problems. While these systems are very good at generating 'to-do' lists and monitoring cow production and cow status in the herd, they are not designed to assess cause and effect of health problems.

Therefore, most producers do not have good access to the information they need to monitor health performance and identify effective management changes that would improve cow health outcomes. Components of a program for decreasing adult cow mortality would include education of workers, monitoring of processes that are used, and monitoring of outcomes to identify trends.

Farm necropsy should be an invaluable tool to help assess cause of adult cow death. Record systems that monitor cause of death will be very important. Our studies suggest that at least 50% of cow death losses are attributable to causes that could be mitigated with proper management.

However, necropsy examination of dead animals to assess and monitor cause of death is rarely performed on dairies. This is in sharp contrast to other intensive livestock management systems, including poultry, swine, and feedlot enterprises, where necropsy monitoring is routine. Most dairy veterinarians focus considerable effort on reproduction, but little time on mortality evaluation. This presents a very significant liability to the dairy industry because efforts to effectively decrease mortality losses are hampered by a lack of monitoring and information that provide accurate assessment of the problem.

We believe that dairy workers could be

trained to more effectively monitor death losses and to perform on-farm necropsy examinations in consultation with veterinarians when they cannot be present to perform the examination on a freshly dead carcass. We have presented this recommendation to producer groups and produced an on-line training program for that purpose on our website at http://www.cvmb.colostate.edu/ilm/outreach/necropsy/_notes/INDEX.HTML. Very few producers or veterinarians have pursued this approach, attesting to the notion that monitoring actual cause of death has not been seen as a valuable pursuit.

We also need to develop new recording systems that allow necropsy results to be recorded as usable information. On their own, necropsy diagnoses provide great detail about the specific cause of death, but do not necessarily provide information about why that specific cause occurred. Therefore, necropsy information needs to be combined with other historical information about the affected animals to help direct management changes.

Because of the complex nature of dairy management systems a variety of causes are responsible for high disease and mortality rates, with different rates of occurrence on different operations. The wide range of lactational incidence risk for common diseases (milk fever: 0.03%-22.3%, RP: 1.3%-39.2%, metritis: 2.2%-37.3%, ketosis: 1.3%-18.3%, LDA: 0.3%-6.3%, lameness: 1.8%-30%) attests to the complexity of the system. To adequately address such a problem requires more accurate information about current losses, followed by management alterations that address the underlying problems. This will require changing the nature of information used in dairy management systems. An example of mastitis prevalence can illustrate this point:

The specific infectious organism that causes a clinical mastitis case can have a dramatic impact on outcome, and appropriate preventative or therapeutic measures need to be tailored to the specific cause, e.g. gram negative vs. gram positive, environmental vs. contagious, *Escherichia coli* vs. *Staphylococcus aureus*.

Assessments and record systems that track generic "mastitis" without identifying other specific details do not provide sufficient information to promote effective interventions. Similarly, monitoring death losses with generic terms such as "lameness" or "mastitis" and performing this monitoring on the basis of presumption will not allow correction of management problems that may underlie the death.

There will not be a single simple answer to the problem of high cow mortality on dairies, but we believe it is a manageable problem. The first step is to recognize and define the problem, improve information systems to provide details necessary to take action, and then monitor appropriate metrics that promote ongoing attention to management corrections.

To learn more about this subject attend the Western Dairy Management Conference March 11-13 in Reno, Nevada. For program information visit <http://www.wdmc.org>

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