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Innovative Calf Warming Boxes Reduce Disease Transmission

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Introduction

For the last 6 years, the Michigan State University Dairy Cattle Teaching and Research Center (MSU Dairy Herd) has actively engaged in a Johne's disease (JD) control program. The ultimate goal is to eliminate the disease from the herd. Johne's disease is a chronic disease caused by the bacteria *Mycobacterium avium* subspecies *paratuberculosis* (MAP). The disease is transmitted from adult to young animals primarily through feces, colostrum and milk. Control of the disease requires long-term diligence in maintaining management changes designed to slow down the risk of disease transmission.

Recently, a team from Michigan State University completed a multi-year research study looking at control and prevention of JD in cattle herds. One of the key findings from this study was the need to stop the transmission of the disease in the maternity pen. Anything that can be done to reduce calf exposure to MAP in the maternity pen is highly beneficial to preventing the spread of the disease.

Key to Controlling MAP

An environmental study of farms enrolled in the Michigan Johne's Disease Control Project showed that 17% of cultures taken from maternity floors were positive for MAP. In addition, another study in which swab cultures from the skin of cows in maternity or close-up dry cow pens showed that MAP could be cultured from 6 of the 7 animals tested, even though only one of those cows was test-positive (fecal and blood) for MAP. Therefore, the risk of exposure in the maternity pen is high; the longer time spent by the newborn calf in that pen increases the risk of JD infection. A key management strategy for controlling MAP transmission in dairy operations is to remove the calf from its dam as soon as possible after birth.

To facilitate rapid removal of calves from their dam at birth, the Dairy Cattle Teaching and Research Center staff designed and built neonatal calf warming boxes to provide a means to care for newborns and reduce the opportunity for pathogen exposure. Essentially, these "calf incubators" allow for rapid removal of calves from their dams immediately after birth, even when they are still wet. This protected environment allows for the calf to dry rapidly while protecting it from pathogens that often are transmitted in the maternity pen. The boxes are located immediately next to the maternity pens to facilitate the rapid movement of calves into them.

Each box is built to hold one calf. Dimensionally, they are 2 ft W x 4 ft H x 4 ft D (see Figures 1 and 3). They are completely made of plastic material to allow for easy cleaning and disinfecting between calves. The floor is made of rubber coated expanded metal grating to facilitate drainage of urine and feces. The front panel is clear Plexiglas which allows for easy observation. Each box has its own thermostatically controlled heater to maintain an air temperature of 72° F. The list of construction materials is in Table 1 on page 18.

At birth, calves are towel-dried and moved to the warming boxes using a calf sled (available from www.foxworthysupply.com). While in the boxes, calves receive 1 gal of high quality colostrum and other neonatal health procedures. Calves remain in the boxes for approximately 24 hr at which point they are moved to outside calf hutches. The number of boxes needed may vary depending on breeding programs, but roughly, 1 box/ 25 cows is a starting place.

While it may not be practical, to remove every calf this soon, consider times and situations where the importance of this option is increased; such as the case when calving into a pen with more than one cow or when JD test-positive dams calve. In these instances, the risks are higher and the need to protect the calf is greater.

Advantages of Warming Boxes

Farm personnel and veterinarians have identified several advantages with the warming boxes. First, a significant drop in the incidence of calf scours has occurred. This is likely a result of the rapid removal of the calf from an environment where it could become exposed to a multitude of pathogens (*E. coli*, *cryptosporidium*, salmonella, etc.) that cause calf diarrhea.

Personnel also have noticed that calves from dystocia occurrences seem to respond better when put into the boxes, presumably because of the added warmth provided. Although it is too early to tell if the calf boxes are advantageous in the JD control program, our understanding of the biology of the disease has convinced us that early removal of calves from adult cow environments, including the maternity pen, will reduce the risk of MAP transmission. The major disadvantage of the boxes is that they need to be cleaned and disinfected which obviously requires added labor. The staff estimates that 30 to 60 minutes is needed to clean all four boxes.

Protecting the health of the next generation of replacement animal is critical. The use of calf warming boxes is another tool in what should be a comprehensive control program on farms. No one practice can substitute for improperly maintained maternity pens or failure to implement other key strategies such as not feeding the colostrum of test positive dams. However, innovative solutions such as the one described here helps to ensure early calf health which can translate into superior health and performance as adults.

Table 1: Construction materials, sources, and costs for one calf box.

| Material | Source | Cost Estimate (January 2011) |
|---|---|------------------------------|
| 2 - 4 ft x 8 ft x ½ inch plastic wood | Plastic Lumber Yard www.plasticlumbaryard.com | \$318.00 |
| 1 - 2 ft x 4 ft x ½ inch clear acrylic sheets - Item # 44386 | US Plastics http://www.usplastic.com/ | \$124.63 |
| 4 - 2 inch x 4 inch x 8 inch plastic dimensional wood | Plastic Lumber Yard www.plasticlumbaryard.com | \$70.40 |
| 1 - 2 inch x 6 inch x 10 inch plastic dimensional wood | Plastic Lumber Yard www.plasticlumbaryard.com | \$35.20 |
| Rubber coated expanded metal grating | Foxworthy Supply www.foxworthysupply.com/ | \$105.70 |
| 1500 Watt Heater - Item # PD 95-92 | Foxworthy Supply www.foxworthysupply.com/ | \$105.70 |
| Thermostatically controlled extension cord - Item # 2E535 | Grainger Supply www.grainger.com | \$91.50 |
| Galvanized pan head bolts | Local hardware | -- |
| Door handle - Item # 1WAE9 | Local hardware | -- |
| 2- Safety hasp - Item # 1RBP7 | Local hardware | -- |

Figure 1: Drawing of calf warming boxes constructed at Michigan State University Dairy Cattle Teaching and Research Center.

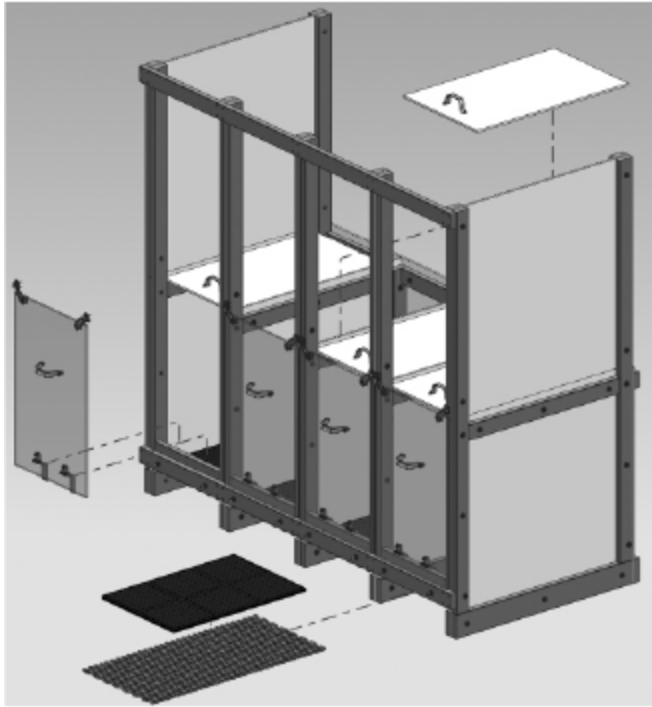


Figure 2: Calf warming box in action at Michigan State University Dairy Cattle Teaching and Research Center.



Figure 3: Dimensions of an individual calf warming box as built at Michigan State University Dairy Cattle Teaching and Research Center. (Note: Top panel is slightly shorter than sides and bottom to allow for top ventilation).

