

## ***Salmonella* Heidelberg Infections in Dairy Calves Can Be Deadly: What Producers Need to Know**

*Salmonella* Heidelberg (*S. Heidelberg*) is a bacterium that can cause severe illness in calves and humans.<sup>1</sup> Calves infected with *S. Heidelberg* may develop diarrhea or die abruptly without any clinical signs.<sup>2</sup> People infected with *S. Heidelberg* can develop diarrhea, fever, and abdominal cramps, which typically last from 4 to 7 days.<sup>1</sup>

An outbreak of multidrug-resistant (MDR) *S. Heidelberg* was recognized in Wisconsin dairy calves in 2016. To date, this MDR *S. Heidelberg* has been isolated from dairy calves in several States, with the majority of calves originating in Wisconsin.<sup>1</sup> The *S. Heidelberg* strains isolated from dairy calves are different from those found in swine and poultry.

Currently, no approved antimicrobial drugs are effective against the *S. Heidelberg* strains isolated from calves.<sup>3</sup> Therefore, affected calves should receive supportive care, including fluid and electrolyte therapy. Calves should continue to be fed milk during the course of the disease, in addition to receiving electrolyte therapies. Withholding milk can lead to death.<sup>4</sup>

### **How to prevent a potential outbreak**

Operations that acquire calves from dealers, sale barns, auctions, or markets are more likely to experience an outbreak of *S. Heidelberg*. This is likely because transport stress makes calves more susceptible to infection and more likely to shed *S. Heidelberg*<sup>5</sup> and commingling of calves from multiple sources increases the risk of exposure for naïve animals.

To help prevent an outbreak, producers are advised to maintain a closed herd (i.e., do not bring cattle onto the operation). If that is not possible, however, producers should take the following precautions:

- Obtain calves only from trusted sources,
- Confirm all purchased calves have adequate passive transfer (IgG >10 g/L),
- Minimize transportation distance, and
- Confirm that all transport vehicles are washed and disinfected between each calf load.<sup>6–8</sup>

Visitors—for example, calf haulers and rendering personnel/vehicles—also can introduce *S. Heidelberg* to an operation. Producers who have cattle being transported off the operation are advised to move them to a perimeter location. This area should be considered dirty, and all personnel from the operation and all visitors should disinfect boots and change coveralls both when entering and when leaving the area.

### **How to identify a potential outbreak**

*S. Heidelberg* infections typically cause high death rates (25 to 50 percent) in dairy calves, particularly dairy beef calves less than 3 weeks of age. Some calves may show signs, such as diarrhea, and die quickly—within 4 to 8 hours. Other calves might not show any signs and be found dead. *S. Heidelberg* has rarely been associated with disease in adult cattle.

### **How to maintain effective biosecurity**

To help prevent an *S. Heidelberg* outbreak or to minimize transmission of the disease during an outbreak, producers are encouraged to use the following biosecurity practices.

- Always wear personal protective equipment (PPE) when cleaning animal areas. To avoid potential exposure to pathogens, such as *S. Heidelberg*, wear a mask, gloves, and boots when cleaning calf areas.
- Properly clean calf areas.
  - Clean the facility with low-pressure foam that contains an alkaline detergent (pH 11–12) and a proper disinfectant between calves to decrease the likelihood of spreading *S. Heidelberg*.<sup>2</sup>
  - When cleaning, avoid high-pressure steam/foam, which can aerosolize and spread the organism.<sup>2,8</sup> Use low-pressure foam to capture the bacteria and a proper disinfectant to kill them.
  - Always clean contaminated equipment. After cleaning the calf-raising area, throw away any disposable PPE such as masks or gloves. Disinfect boots and clothing prior to using them again.

*Produced by personnel from USDA–APHIS–VS–CEAH; Wisconsin Department of Agriculture, Trade and Consumer Protection; WI Department of Health Services; and the WI Veterinary Diagnostic Laboratory.*

## What to do for suspected *S. Heidelberg*

A producer who suspects an *S. Heidelberg* outbreak is occurring should contact a veterinarian. To aid diagnosis, the veterinarian might recommend necropsying calves that have died and submitting tissue samples to a diagnostic laboratory. The veterinarian should request serotyping of any *Salmonella* isolates, as well as antimicrobial susceptibility testing.

The veterinarian and producer should discuss treatment options for sick calves; as noted above, supportive care is critical for affected calves. Also, it would be helpful for the producer and veterinarian to review the calves' vaccination program. Although commercial *Salmonella* vaccines are available, their efficacy against *S. Heidelberg* is unknown. The veterinarian can also help develop effective cleaning protocols that follow the biosecurity practices above.

After the environment is cleaned, it might be useful to submit samples to ensure that cleaning and disinfection methods eliminated the organism. Special boot covers that collect bacteria from the environment can be worn throughout the calf-raising area after it is cleaned and can then be submitted to the laboratory for culture.

## How to keep people safe during an outbreak

*S. Heidelberg* appears to be easily passed from sick or dead calves to people. The organism can be passed via direct contact with infected calves or via indirect contact, such as through cleaning the calf area.<sup>1</sup> To avoid human infection with *S. Heidelberg*, producers should take the following precautions.

- Wear PPE when handling sick or dead calves, or when cleaning the calf-raising area.
- Always wash hands and clean or change footwear and coveralls after handling calves or working in the calf area.
- Prevent young children, adults over 50, pregnant women, or immunocompromised individuals from having direct contact with sick or dead calves.

For more information on keeping people safe, please view the WI Department of Health Services Web site: <https://www.dhs.wisconsin.gov/publications/p01711.pdf>

## Conclusion

*S. Heidelberg* can cause severe illness in calves and people, and it can be deadly for calves. *S. Heidelberg* is resistant to antimicrobials approved for calves, so supportive care is the recommended treatment.

To minimize potential exposure and help prevent an outbreak, producers are advised to maintain a closed herd or purchase all calves from trusted sources; properly clean and disinfect calving and calf-raising areas; and use PPE.

If an outbreak is suspected, producers should work with their veterinarian to submit samples for diagnosis, treat sick calves, and implement cleaning and biosecurity practices to prevent further spread.

## References

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