

# Intramammary infections – prevalence and causes at dry-off and calving

Orla Keane<sup>1</sup>, Jim Flynn<sup>2</sup> and Pablo Silva Boloña<sup>2</sup>

<sup>1</sup>Teagasc, Animal & Grassland Research and Innovation Centre, Grange, Co. Meath; <sup>2</sup>Teagasc, Animal & Grassland Research and Innovation Centre, Moorepark, Fermoy, Co. Cork

## Summary

- This study investigated intramammary infection dynamics over the dry period in two research herds.
- The levels of infection varied between herds at dry-off (17% to 32%) and at calving (13% to 19%).
- *Staphylococcus aureus* caused most infections (over 95%).
- Intramammary infection was present in 30% and 20% of first lactation cows in the two herds at calving. Around 55% of those infections were caused by *S. aureus*, while most others were caused by coagulase negative staphylococci. It is recommended to house and calve first lactation cows separate from older cows.

## Introduction

The dry period is one of the most important periods when it comes to mastitis management. Most new intramammary infections (IMI) occur during the first two weeks after the cows have been dried-off and within the two-week periods before and after calving. Therefore, management practices around these times need to be optimised to reduce the risk of cows being exposed to mastitis-causing bacteria.

In Ireland, the majority of infections are attributed to *Staphylococcus aureus*. This bacterium is a contagious pathogen. Its main reservoir is the mammary gland of infected cows and is typically spread during milking when uninfected quarters are exposed to contaminated milk. This can happen through the milking cluster, the milkers' hands or cloths and paper towels. In the scientific literature, there are usually very few reports of new infections with this bacterium during the dry period (when cows are not milked) and in first lactation cows shortly after calving. However, Teagasc research in commercial herds has found a high rate of new infections shortly after calving (which could be attributed to dry period infections) and in first lactation cows with *S. aureus*. Therefore, the objectives of this study were to establish prevalence and type of infections at dry-off and calving for first lactation and older cows.

## Experimental design

In total, 134 first lactation, 378 second and older lactation Holstein Friesian cows from two Teagasc spring-calving research herds were sampled for convenience for this study. Herd 1 had an average bulk tank Somatic Cell Count (SCC) of less than 150,000 cells/mL in 2022, while Herd 2 had a bulk tank SCC between 200,000-250,000 cells/mL. All cows were quarter milk sampled at dry-off and at calving (before the cow's first milking after calving to ensure infections were not picked up in the parlour). Quarter samples were cultured in the laboratory to detect the presence of bacteria. If a quarter sample from a cow had growth of a mastitis-causing bacteria, the cow was classified as "infected". The level of infection at dry-off and at calving, and the bacteria most commonly causing it were assessed in each herd. With that information, we determined: 1) dry period cure rates (cows infected at dry-off and uninfected at calving), 2) new infections in the dry period (cows uninfected at dry-off and infected at calving) 3) persistent dry period infections (cow infected at both dry-off and calving), and 4) infections at calving in first lactation cows.

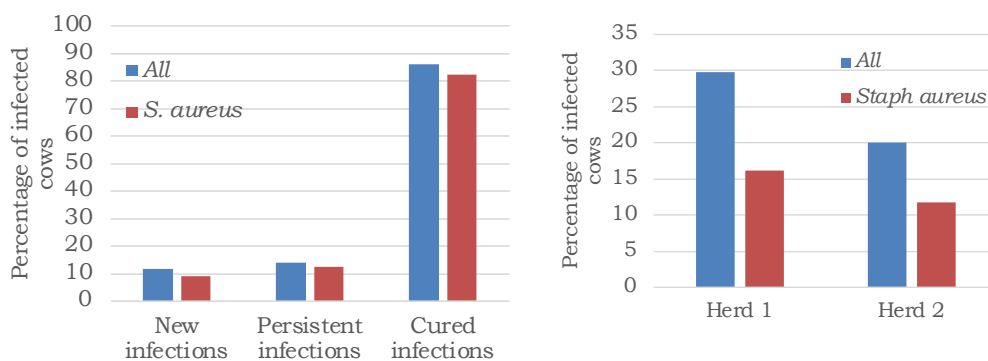
## Results

The infection level at dry-off were 17% for Herd 1 and 32% for Herd 2. *S. aureus* caused over 95% percent of infections in both herds. At calving, 12% of cows were infected in Herd 1 and 20% in Herd 2. *S. aureus* caused 73% of the infections in Herd 1 and 75% of infections in Herd 2. Coagulase-negative staphylococci, *E. coli* and *Streptococcus uberis* caused the rest of infections.

Of the cows that were infected at dry-off, 91% had no infection at calving in Herd 1 and 84% in Herd 2. Herd 1 treated some cows with teat sealant alone at dry-off, whereas Herd 2 dried off all the cows using antibiotic. Target cure rates over the dry period should always be above 85%. Persistent infections were 9% and 16% for Herds 1 and 2, respectively. Ninety-one percent of persistent infections were caused by *S. aureus*.

New infection rate over the dry period was 8% in Herd 1 and 15% in Herd 2. Eighty percent of new infections were caused by *S. aureus* in Herd 1 and 78% in Herd 2.

For first lactation cows, 29.7% were infected at calving in Herd 1 and 20% in Herd 2. First lactation cows were housed and calved together with older cows. The infections were caused by *S. aureus* in 54.5% and 59.1% of the cases in Herd 1 and Herd 2, respectively. The second most common cause of infection in first lactation cows was coagulase-negative staphylococci, with 36% and 20% of infections in Herd 1 and Herd 2, respectively. This information is shown in Figure 1.



**Figure 1.** **Left:** New infection (not infected at dry-off but infected at calving), persistent infection rate (infected at dry-off and calving) and cured cow (infected at dry-off but uninfected at calving) with any bacteria or with *S. aureus* for the two studied herds. **Right:** Percentage of infected first lactation cows at calving with any bacteria or with *S. aureus*

## Conclusion

We found that *S. aureus* caused the majority of intramammary infections in the studied herds. Heifers had a high level of infection at calving. This group had higher percentage of infections caused by bacteria other than *S. aureus* (*S. aureus* is still the most common bacterium). First lactation cows should be managed separately from older cows. Infection levels at calving and at dry-off were high mainly due to the high percentage of persistently infected cows. Therefore, farmers need to make decisions around their persistently infected cows as they are reservoirs for bacteria and are spreading the infection to uninfected cows.

## Acknowledgements

We acknowledge Teagasc farm staff who participated in this study, Travis Coomey, Alice Walsh and Sharon Curtin for their contribution to data collection and processing.