

# Diagnosing subclinical mastitis with QScout® MLD fosters more efficient use of antibiotics in selectively treating infection by quarter at dryoff

## Quick Read

- Selective dry cow therapy (DCT) at the quarter level fosters judicious use of antibiotics.
- Trial results show a 59% reduction in antibiotic use when only quarters harboring mastitis at dryoff receive treatment.
- Accurate diagnosis of infection is necessary to maximize successful implementation of selective DCT.
- On-farm, milk leucocyte differential (MLD) diagnosis provides increased accuracy and speed of inflammation diagnosis compared to somatic cell count (SCC).
- QScout Farm Lab provides on-farm diagnosis of subclinical mastitis by analyzing ratios of white blood cell types that fight infection.
- QScout MLD is a new tool that makes quarter-level, DCT feasible.

## Introduction

Undetectable to the naked eye, subclinical mastitis is often missed and negatively impacts a cow's immune status, reproductive performance, productivity and profitability. Traditionally, many dairy producers proactively treat all quarters in all cows with long-acting antibiotics at dryoff to treat infected quarters and prevent mastitis in the subsequent lactation. While generally considered effective, blanket DCT involves giving antibiotics to potentially healthy quarters, which can be viewed as overuse and/or irresponsible use of antibiotics. Additionally, this practice adds costs.

However, without accurate and timely mastitis diagnosis, the proactive strategy of blanket DCT has typically been recommended.<sup>1,2</sup> Researchers have suggested that selective antibiotic therapy at dryoff is effective and justified, as long as infected quarters can be accurately identified.<sup>3</sup>

Selective DCT is described as only treating cows that have an infected quarter – either at the cow or quarter level. This practice offers dairy producers a cost- and labor-saving management option, if mastitis can be detected accurately



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and quickly. This can be done with QScout MLD, a new, rapid, on-farm test developed by Advanced Animal Diagnostics. QScout MLD reliably diagnoses hidden mastitis in individual quarters by performing an MLD test. The MLD is modeled after the blood leukocyte differential, which has been used in humans and companion animals for decades.

The selective DCT study<sup>4</sup> presented at the 2013 American Dairy Science Association Annual Meeting compared blanket DCT (treated all four quarters of all cows) with selective DCT, where researchers treated all four quarters of cows testing positive for a subclinical infection in at least one quarter based on the QScout MLD diagnosis. Cows free of mastitis (in all four quarters) were not treated with antibiotics. This strategy resulted in a 47% reduction in antibiotic use at dryoff compared to the traditional group. All four quarters of all cows received an internal sealant (Orbeseal\*) at dryoff.

After calving, researchers tested both groups of cows for mastitis using culture. The study's results showed that withholding dry cow treatment from cows with four healthy quarters based on QScout MLD testing did not result in an increase in infection rate, nor did it decrease udder health in selectively treated cows compared to blanket-treated cows.

With the ability of QScout MLD to detect mastitis in individual quarters, researchers next took selective DCT to the quarter level. In the most recent study,<sup>5</sup> only infected quarters at dryoff were treated. For example, if only the left front quarter harbored mastitis, then only the left front quarter was treated with a long-acting antibiotic at dryoff. Treatment decisions were based on QScout MLD test results.

### Study design

Within 24 hours of dryoff, investigators collected quarter-level milk samples from 328 first- and second-lactation Holstein cows that were randomly assigned to blanket (n=162) or selective (n=166) groups. Cows' milk, by quarter, was tested using QScout MLD. Cows in the blanket group were treated in all four quarters; cows in the selective group were only treated in quarters diagnosed positive by MLD. The treatment used was Dry-Clox\*. In the selective treatment group, 269 quarters received antibiotic treatment. Cows on this study did not receive an internal sealant.

### Quarter-level selective dry cow trial design

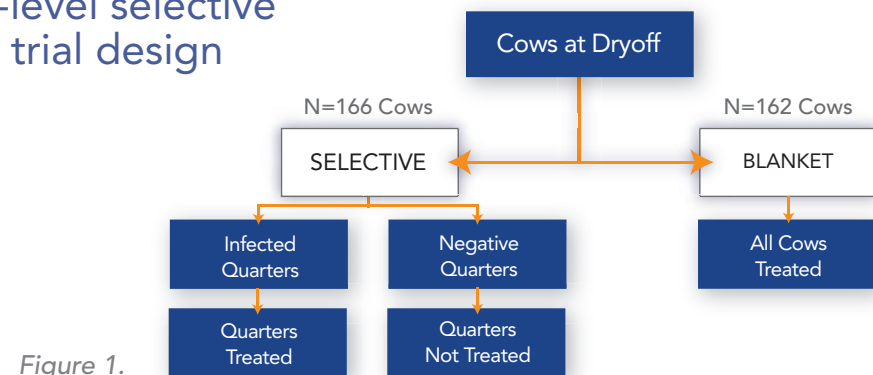


Figure 1.



Researchers collected quarter samples aseptically from all cows 7 to 14 days (d) after calving for culture and SCC determination. Bi-monthly milk and SCC were recorded from DHIA reports and clinical event and culling data were recorded from farm records.

Figure 2. Culture positive rate for cows in treatment groups at dryoff and after calving (d10).

Group	# COWS	# QUARTERS	Quarter infection rate by culture (%)	
			DRYOFF	Day 7-14
BLANKET	162	632	16.1%	10.1%
SELECTIVE	166	648	19.2%	10.5%

<sup>1</sup>Between dryoff and 14 days in milk (DIM), 3 cows died and 1 cow was culled. Cow numbers represent those enrolled in the study. Quarter numbers represent cows that had a milk culture taken at dryoff and 7-14 DIM.

### Results

Quarter-level selective DCT based on QScout MLD diagnosis resulted in statistically similar milk, SCC, culling and clinical mastitis rates through d150 of the following lactation compared to blanket DCT.

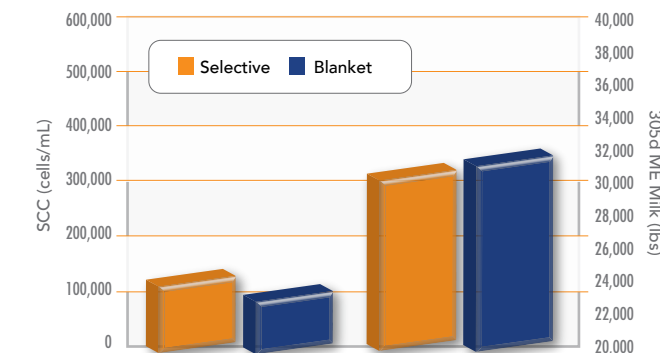


Figure 3. Monthly DHIA SCC and 305d ME milk of subsequent lactation for cows that were blanket or selectively dry treated, based on diagnosis by MLD.

Figure 4. Clinical event rate and cull rate through d150 of subsequent lactation for cows that were blanket treated (BLANKET) or selectively treated (SELECTIVE) at dryoff.

Group	# COWS WITH CLINICAL MASTITIS EVENTS	# CULLED FOR MASTITIS
BLANKET	17 (10.5%)	4 (2.5%)
SELECTIVE	17 (10.2%)	4 (2.4%)

## Discussion and conclusion

The objective of this study was to demonstrate QScout MLD's ability to detect subclinical infection at dryoff so dairy producers can save antibiotic cost and labor by not treating uninfected quarters. Like the previous selective DCT study, results from this quarter-level, selective DCT study demonstrate that withholding dry cow treatment from cows with four healthy quarters based on QScout MLD testing did not result in an increase in the infection rate, nor did it decrease udder health in selectively treated quarters when compared to cows in the blanket treatment group. **Taking selective DCT to the quarter level resulted in a 59% reduction in antibiotic use.** This strategy helps producers more judiciously use antibiotics and meet expectations to reduce antibiotic use.

On-farm use of QScout MLD allows dairy producers to confidently implement selective treatment strategies, enables judicious use of antibiotics and reduces treatment expenses at dryoff, without increasing infection rates after calving.

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<sup>1</sup>Robert, A., P. Roussel, N. Bareille, D. Ribaud, F. Serieys, V. Heuchel, and H. Heuchel. 2008. Risk factors for new intramammary infections during the dry period in untreated dairy cows from herds using selective dry cow therapy. *Animal*. 2(2): 247-254.

<sup>2</sup>Poutrel, B., and P. Rainard. 1981. California Mastitis Test guide of selective dry cow therapy. *J. Dairy Sci.* 64(2): 241-248.

<sup>3</sup>Rajala-Schultz, P. J., A. H. Torres, and F. J. DeGraves. 2011. Milk yield and somatic cell count during the following lactation after selective treatment of cows at dry-off. *J. Dairy Res.* 78(4): 489-499.

<sup>4</sup>Hockett, M., and R. Rodriguez. 2013. Evaluation of milk leucocyte differential diagnosis for selective dry cow therapy. In: *American Dairy Science Association Annual Meeting Proceedings*. Indianapolis, IN.

<sup>5</sup>Hockett, M., M. Payne, and R. Rodriguez. 2014. Milk leucocyte differential diagnosis as a tool to guide quarter-level, selective dry cow therapy. In: *National Mastitis Council Regional Meeting Proceedings*. Ghent, Belgium.

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## Technical Update