QScout® MLD

SCOUT INFECTION.

Advanced Animal Diagnostics
Information that counts®

Expose hidden mastitis in your herd and generate an extra $250 per infected cow*

Mastitis costs the U.S. dairy industry $2 billion annually, or about $200 per cow per year. Don't succumb to the mindset that mastitis is a cost of doing business. With early detection you can reduce that cost – and put more money in your pocket.

With the data provided by QScout® MLD (milk leukocyte differential), an on-farm rapid diagnostic test that accurately detects subclinical mastitis in individual quarters, you can achieve:

- Higher milk production
- More lucrative milk quality premiums
- Lower mastitis incidence
- Increased cow longevity
- Enhanced reproductive performance
- Reduced transmission of mastitis pathogens
- Improved animal welfare
- More precise use of antibiotics

Subclinical mastitis often goes undetected and squeezes your bottom line. Exposing hidden mastitis early in lactation and following appropriate treatment protocols could boost profitability by as much as $50 per cow per year.

Developed by Advanced Animal Diagnostics, QScout MLD uniquely exposes subclinical mastitis by measuring and assessing the cow's immune response to infection, and providing a positive or negative diagnosis for each quarter – all in just minutes per cow.

QScout MLD gives you the data you need, when you need it, to confidently make real-time mastitis management decisions.

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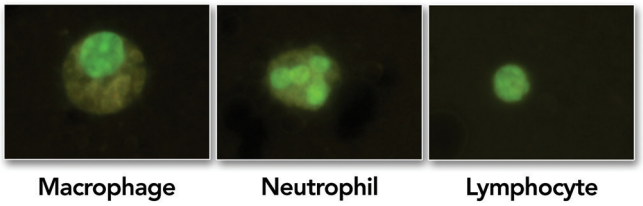
Decoding the immune system for earlier, more accurate detection

Modeled after the blood leukocyte differential, a test routinely used in humans and companion animals to detect infection, QScout® MLD identifies and differentiates leukocytes (white blood cells) in milk. Each of the three white blood cell types (described below and shown in Figure 1) play a key role in fighting infection, and each has a different function in the immune system.

Figure 1. *Fluorescent imaging differentiates cell types*



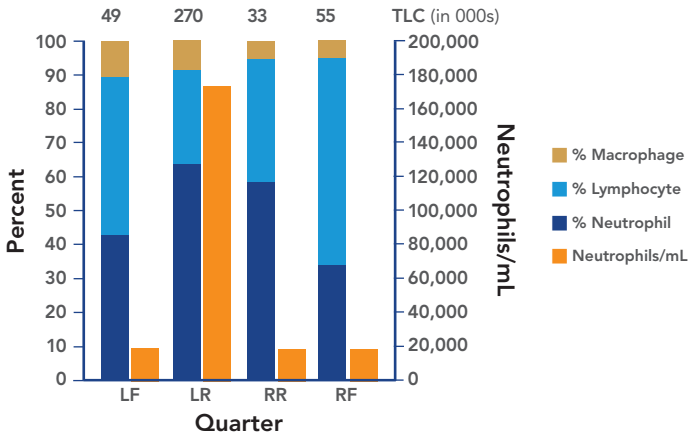
The immune system's first responders: Lymphocytes and macrophages scout for pathogens. Neutrophils fight infection by releasing enzymes that kill bacteria. Macrophages engulf and digest cellular debris and pathogens

Understanding the roles and ratios of these cell types allows for more accurate detection of subclinical mastitis.

The QScout MLD test, read by the portable QScout Farm Lab, scouts for combinations of leukocytes that indicate immune system status. For instance, an elevated percentage and number of infection-fighting neutrophils is a sure sign of subclinical mastitis.

Unlike somatic cell count (SCC), a relatively crude estimation of immune system status, QScout MLD drills deeper, analyzing individual cell types and translating findings into data you can act on. The test also provides a total leukocyte count (TLC), closely correlated with SCC.

Figure 2. *Predominance of neutrophils in left rear quarter indicates infection*



Find subclinical mastitis hiding in a quarter

Unlike composite milk samples, which can blend away subclinical mastitis hiding in a quarter, QScout MLD looks at each quarter individually for elevated neutrophil levels that signal infection. For example, a composite SCC of 123,000 would indicate a "healthy udder" (no mastitis, quality milk), but QScout MLD discovers high neutrophils in a quarter (270,000 TLC), pointing to the hidden infection (see Figure 2).

Feature	QScout MLD	Culture	CMT	DeLaval SCC	DHI SCC
IDs Cell Types	Yes	No	No	No	No
Provides Cell Count	Yes	No	No	Yes	Yes
Time To Result	Minutes	24 h+	Minutes	Minutes	24 h+
Easy Sampling (No aseptic collection)	Yes	No	Yes	Yes	Yes
Sensitivity	High	Medium*	Low	Medium	Medium
Specificity	High	Medium**	Low	Medium	Medium
Quarter Result	Yes	Possible	Yes	Possible	No

*Clinical cows may be no growths **Depends on aseptic collection

Table 1. *Mastitis diagnostics comparison*

QScout MLD clearly outshines the other available mastitis diagnostic tools available today. It's the only test that can identify cell types. In addition, it is the most accurate tool, provides quick results and doesn't require specialized training.

Treat earlier with confidence

More accurate than CMT and SCC, and providing more rapid results than culture, QScout MLD is the fastest and most reliable on-farm test available for detecting mastitis before symptoms appear.

As the only on-farm diagnostic test that provides a differential cell count of infection-fighting leukocytes in individual quarters, QScout MLD gives you the confidence you need to treat mastitis with precision (see Table 1).

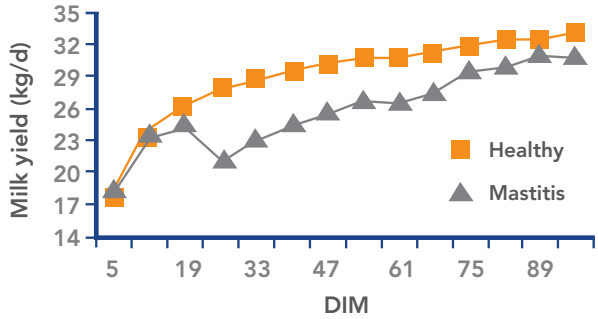
Prompt diagnosis pays

During early lactation, conduct the QScout MLD test 7 to 14 days in milk (DIM; second week of lactation). Nearly 40% of mastitis infections present on day 2 or 3 have been shown to be cured by the cow's immune system by 14 DIM, with little spontaneous cure occurring after that.[1]

Finding and treating mastitis early can prevent production losses, which is especially important when cows are approaching peak lactation.[2] As Figure 3 shows, milk production drops dramatically during the first three months after calving when a cow experiences a case of mastitis. This impact on early lactation milk production influences peak milk production and production for the remainder of that lactation – and typically into subsequent lactations.

continued on back...

Figure 3. *Early mastitis impacts milk yield throughout lactation*



Animals that experience mastitis early in lactation perform far below those that are mastitis free in early lactation.

QScout Farm Lab:

QScout® Farm Lab is a portable diagnostic analyzer that scans the disposable QScout MLD slides. After identifying and counting cells, it assesses the information based on an index of infection. The results show a color-coded diagnosis by quarter; green indicates no infection and red indicates inflammation indicative of mastitis infection.

QScout Farm Lab is customizable and its threshold for infection can be adjusted as desired, depending on how aggressively you want to treat subclinical mastitis. With a more aggressive infection threshold, more cows will be treated at lower mastitis infection levels.

Treatment lists and other reports can be printed or downloaded from the QScout Farm Lab or Internet. Look for additional diagnostic tests from Advanced Animal Diagnostics that can be run on the QScout Farm Lab.

Prompt diagnosis and treatment of subclinical mastitis improves a successful treatment outcome,[3] along with reducing the risk of clinical mastitis developing and contagious infections spreading throughout the herd.[4] Based on trial data,[5] cows diagnosed early and given follow-up treatment showed the following advantages, compared to a no-treatment group:

- 115,000 fewer somatic cells/ml across the lactation
- 1,325 more pounds of milk per cow at 305d ME
- 18% fewer services per conception
- 14 fewer days open, saving producers up to $84 per cow[6]

Plus, with selective dry cow therapy, QScout MLD has been shown to reduce antibiotic use by 47% at the cow-level[7] and 59% at the quarter-level[8] compared with traditional blanket dry cow therapy, in which all cows receive an approved dry cow antibiotic treatment at dry-off.

Accurate results in a few simple steps

QScout MLD testing is simple to implement with very little change to your dairy operation. Procedures can vary, depending on the number of samples being taken, but key steps include:

- Collect quarter samples in a Q4
- Snap on the QScout MLD slide, flip and tap
- Insert up to 20 slides into the QScout Farm Lab to run without supervision
- Let QScout provide objective results in just minutes per cow

Red means infected, and green means not infected. Work with your veterinarian to design treatment protocols based on QScout MLD results.

For your convenience, a variety of reports can be accessed from the QScout Farm Lab itself or online. Advanced Animal Diagnostics will work with you to understand the potential improvement in your herd based on an analysis of your herd records, and provide the data you need for benchmarking and managing your herd, even as your needs evolve.

While QScout MLD is simple to use, Advanced Animal Diagnostics offers bilingual training for your staff.

Bottom line: Gain $252 per infected cow

Not only is the QScout MLD accurate, simple and fast, it's economical – adding about $252 per infected cow per year. QScout MLD creates value by detecting mastitis early, which can lead to increased milk production, boosted milk quality premiums, reduced mastitis treatment costs, improved reproductive performance and enhanced cow longevity.

Economic Benefits of QScout MLD

	Per cow	*1,000-cow dairy*	*5,000-cow dairy*
Milk Improvement[1]	**$211**	**$31,746**	**$158,730**
SCC Premium[2]	$77	$11,540	$57,702
Reduced Days Open Savings[3]	$84	$12,600	$63,000
Total Revenue	$372	$55,887	$279,432
Total Investment[4]	$120	$17,980	$74,100
Total Return on Investment	$252	$37,906	$205,302

All based on 15% herd infection rate
[1] Assumes $22/cwt milk, 962 lbs/infected cow lactation milk improvement
[2] Premium based on SCC reduction of 115,000/infected cow
[3] 14 less days open/infected cow; cost of a day open past 100 DIM estimated at $6
[4] Includes antibiotic for 1.5 infected quarters/cow ($14.40); QScout MLD test cost of $7/cow, labor and amortized QScout Farm Lab cost

Hockett, M. 2014. Early lactation on-farm trials. In: Proc. 54th National Mastitis Council Annual Meeting, Memphis, TN. p. 239-240

Get started

For an on-farm demonstration of QScout MLD, or to simply learn more about how you can increase profits and peace of mind through earlier detection of subclinical mastitis in your herd, contact Advanced Animal Diagnostics at (855) Q2COUNT or visit QScoutLab.com.

012-BR-MLD-9-22

*varies from herd to herd, based on factors like incidence and severity of subclinical mastitis, cost of treatment, milk price and quality premiums

[1] Azizoglu, R. O., R. Rodriguez, R. Lyman, and K. L. Anderson, 2013. Assessment of early lactation screening time using microbiological evaluation of quarter milk samples. In: Proc. 52nd National Mastitis Council Annual Meeting, San Diego, CA. p. 119–120.
[2] Wilson, D. J., R. N. González, J. Hertl, H. F. Schulte, G. J. Bennett, Y. H. Schukken, and Y. T. Gröhn. 2004. Effect of clinical mastitis on the lactation curve: A mixed model estimation using daily milk weights. J. Dairy Sci. 87:2073–2084.
[3] van den Borne, B., G. van Schaik, T. Lam, & M. Nielen 2010. Therapeutic effects of antimicrobial treatment during lactation of recently acquired bovine subclinical mastitis: Two linked randomized field trials. J. Dairy Sci. 93(1), 218-233.
[4] van den Borne, B. H. P. 2010. Impact of bovine subclinical mastitis and effect of lactational treatment. PhD Diss. Ultrecht University, Uttrecht, The Netherlands.
[5] Hockett, M. 2014. Early lactation on-farm trials. In: Proc. 54th National Mastitis Council Annual Meeting, Memphis, TN. p. 239-24
[6] J.M. Bewley, M.D. Boehlje, A.W. Gray, H. Hogeveen, S.J. Kenyon, S.D. Eicher, M.M. Schutz. 2010. Stochastic simulation using @Risk for dairy business investment decisions. Agricultural Finance Review 70:1, p. 97-125.
[7] 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.
[8] 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.

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