Cornell University College of Veterinary Medicine
Animal Health Diagnostic Center
Quality Milk Production Services

2018 Annual Report
# Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Director’s Notes</td>
<td>3</td>
</tr>
<tr>
<td>Personnel Change</td>
<td>4</td>
</tr>
<tr>
<td>Service Metrics</td>
<td>5</td>
</tr>
<tr>
<td>Training, Outreach, Research, &amp; Development</td>
<td>8</td>
</tr>
<tr>
<td>College of Veterinary Medicine Updates</td>
<td>9</td>
</tr>
<tr>
<td>Animal Health Diagnostic Center Updates</td>
<td>12</td>
</tr>
<tr>
<td>Invited Talks &amp; Publications</td>
<td>13</td>
</tr>
<tr>
<td>Contact Us</td>
<td>18</td>
</tr>
</tbody>
</table>
In 2017 and into 2018, Quality Milk Production Services (QMPS) continued its mission to help dairy herds profitably produce high quality milk through integrated field services, laboratory diagnostics, applied research, and teaching/extension despite the sustained low milk prices at the farm gate. We interacted with over 1,000 different NYS farms and 175,000 cows supporting total dairy management and disease control that hamper production efficiency primarily through the control of mastitis and the avoidance of antibiotic residues.

Our expert staff has continued to expand our milking time and parlor services throughout the state and country. In addition to equipment testing, we have increased our labor training and milking procedures monitoring services as well. Many farms have seen the value in us helping them continuously monitor milk harvest factors as opposed to waiting for an emergency.

In the laboratory, we continue to refine the use of MALDI-TOF (matrix assisted laser desorption/ionization – time of flight) technology, which assists in decreasing the time involved in final diagnoses of pathogens and increases accuracy. It uses mass spectroscopy of 16S ribosomal proteins and compares the data to an enormous library of known pathogens. QMPS saw a substantial volume of samples that were processed in all four of our locations, thanks to the hard work of our dedicated staff.

We have been leaders in economical and prudent use of antimicrobials related to udder health. Whether implementing computer derived treatment protocols with farm management and the veterinarian of record where we make the mastitis diagnosis or supporting on-farm culture we have estimated that QMPS is supporting pathogen based treatment of clinical mastitis of over 100,000 cows statewide. This leads to both higher cash flow for dairy farmers as well as decreased antibiotic use by 50%. In addition to working towards judicious use for clinical mastitis we have also implemented selective dry cow therapy in a few herds and are working to refine this practice to expand it to farms that are ready to implement this management strategy.

Our staff has been involved in education throughout the year. We have worked in many countries helping improve dairy practices worldwide. In 2018 we are one of the organizing hosts of the regional NMC in Italy. In addition, QMPS staff have given invited talks and seminars regarding udder health in the past year at international meetings such as NMC and American Association of Bovine Practitioners as well as regional meetings like Northeast Dairy Producers Association and Academy of Veterinary Consultants. We continue to train PhD students while conducting research important to the dairy industry and dairy product consumers.

Please enjoy reading through our annual report. We are happy to share our accomplishments with you and look forward to working with the dairy community in the coming years. Please let us know where we can provide better services with our current activities or if you have ideas of things we can provide that we are currently not offering.

Daryl V. Nydam, DVM, PhD
Director, Quality Milk Production Services
Personnel Change

In June of 2018, Dr. Frank “Google” Welcome officially retired from Cornell University. Dr. Welcome started his career in private practice in 1971 after attaining his Doctor of Veterinary Medicine degree, with high honor, from Michigan State University. For 28 years, Dr. Welcome was partner in a four-person practice providing medical, surgical, and production medicine services to central New York dairy producers. While working in private practice, Dr. Welcome earned Diplomat status through both the American College of Theriogenologists and the American Board of Veterinary Practitioners, Dairy Practice. In January of 2000, Dr. Welcome left private practice to join the Quality Milk Production Services team as an Extension Veterinarian.

During his 18 years with QMPS, Dr. Welcome has helped expand QMPS services by developing new programs, partnering with federal and state agencies, and using his extensive knowledge of dairy practices to better understand our client’s needs. Fortunately, Dr. Welcome will continue to work with QMPS part-time, while in retirement, by providing client service, teaching, representing QMPS and regional, national, and international conferences, and by mentoring the next generation of QMPS field veterinarians, including Dr. Matthias Wieland and Dr. Anja Sipka. Dr. Wieland and Dr. Sipka will perform surveys, offer consultative services, and prepare extension reports out of Ithaca, and will work collaboratively with Canton, Cobleskill, and Warsaw.
The Animal Health Diagnostic Center has processed over 200,000 submissions since January 1, 2018, 44% of which were submitted by New York State clients. More than 10% of submissions received during 2018 included testing related to bovines.

The number of specimens tested by the Animal Health Diagnostic Center during 2018 was close to 615,000. Quality Milk Production Services tested approximately 193,000 of these specimens, which correlates to contact with over 180,000 animals. The top three species tested by the Animal Health Diagnostic Center include bovines, equines, and canines.
The number of QMPS submissions is down slightly compared to 2017, but is still trending upward compared to previous years.

Over the past ten years, QMPS has seen a decline in the number of specimens testing positive for both Staphylococcus aureus and Streptococcus agalactiae.
In 2018, QMPS began offering a comprehensive Sand Bedding Analysis test, which includes bacterial identification, total organic matter, and sand bedding particle size. The report includes a graph comparing the submitted material to certified mason sand.

<table>
<thead>
<tr>
<th>Sieve Opening (mm)</th>
<th>Certified Mason Sand</th>
<th>Bedding</th>
<th>% Material between these sieves</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.36</td>
<td>100.0</td>
<td>86.7</td>
<td></td>
</tr>
<tr>
<td>1.00</td>
<td>96.0</td>
<td>61.4</td>
<td></td>
</tr>
<tr>
<td>0.60</td>
<td>85.0</td>
<td>37.4</td>
<td></td>
</tr>
<tr>
<td>0.30</td>
<td>57.0</td>
<td>12.3</td>
<td></td>
</tr>
<tr>
<td>0.13</td>
<td>22.0</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>0.08</td>
<td>9.2</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>Pan</td>
<td>2.0</td>
<td>0.0</td>
<td></td>
</tr>
</tbody>
</table>

**All results on this page are given on a DRY MATTER BASIS**
QMPS continued to offer various training opportunities in 2018, including *Assessing Udder Health Opportunities* courses and the *Summer Dairy Institute: Milk Quality Week*.

QMPS also teamed up with students from the Cornell University Computer Science master degree program to begin developing a herd survey field application for on-farm use. The students were able to learn more about the dairy industry while observing the survey process first hand at the Cornell Teaching Dairy Barn.

In 2018, QMPS continued to offer various laboratory and farm services to clients, including Bulk Tank Monitoring, Laboratory Proficiency Testing, Farm Surveys, Language Services, Equipment Cleaning Evaluation Services, and Diagnostic Testing Services, while expanding courier services in all four locations.

Additionally, QMPS saw an increase in research and development projects over the past year related to bedding, bulk milk, Lactococcus, teat dip, external teat sealant, and antibiotic usage, to name a few. QMPS also worked on a number of comparison studies related to liners and on-farm diagnostics during 2018.
Class Expansion Project:

After five years of construction, state officials and members of the university community commemorated the class expansion of the College of Veterinary Medicine with a celebratory ribbon-cutting ceremony outside of Schurman Hall June 8, 2018.

“These high-tech upgrades will transform the renowned college, improve the local economy and help strengthen New York’s diverse academic opportunities,” said Gov. Andrew Cuomo. “The completion of this expansion project signifies a new era for the Cornell University College of Veterinary Medicine, as it continues to support the regional economy while helping the Southern Tier soar.”

The class expansion complements the state of New York’s Southern Tier Soaring plan, the region’s blueprint to generate economic growth and community development. The state government has invested more than $4.6 billion in the region since 2012 to lay the groundwork for the plan. The $91.5 million Cornell project aimed to fulfill key goals for the college, including expanding its capacity to enroll more students, updating teaching spaces, improving navigation through the college’s many facilities as well as shaping a visual identity.

“This wonderful project will propel the students, faculty and staff in the College of Veterinary Medicine into the 21st century, and enable Cornell University to provide the best veterinary education in the world to even more students,” said Provost Michael Kotlikoff. Kotlikoff advocated for and planned the initial stages of the expansion during his tenure as dean of the college from 2007-15.

Working with the architectural firm Weiss/Manfredi of New York City, the college partnered with the state and private donors to fund the project. Completion of the class expansion will also support the needs of the New York State Veterinary Conference hosted by Cornell each year, which attracts nearly 1,000. The final stage of the project was completed in June with the opening of the Cornell Small Animal Community Practice, a 12,000-square-foot facility that functions as a full-service practice for cats and dogs, run primarily by Cornell DVM students. The new facilities have increased energy efficiency and are Leadership in Energy and Environmental Design certified.

“Through our outreach that ranges from rabies prevention efforts to healthy pet clinics, from invasive aquatic species tracking to shelter medicine consultations, from Buffalo to Brooklyn, our college works tirelessly to give back to the state that so generously supports our programs,” said Lorin Warnick, Ph.D. ’94, the Austin O. Hooey Dean of Veterinary Medicine.

“This project reaffirms the college’s position as a global leader as it fosters an innovative and collaborative research environment, while providing much-needed services to the local community,” said SUNY Chancellor Kristina Johnson. The College of Veterinary Medicine has been part of the state system since its founding in 1894.

“This transformative project will enable the school to advance research while offering cutting-edge curriculum for training future practitioners and researchers, leading to innovations in the fields of veterinary medicine and biomedical science,” said Howard Zemsky, Empire State Development president, CEO and commissioner.

Full article written by Melanie Greaver Cordova is available here: http://news.cornell.edu/stories/2018/06/vet-college-celebrates-completion-class-expansion-project
Strategic Plan:

Dr. Lorin D. Warnick, the Austin O. Hooey Dean of the College of Veterinary Medicine, unveiled the College’s new strategic plan to the community in his annual State of the College address on November 29.

Developed with input from every corner of the College, the strategic plan represents the views and voices from faculty, students, staff, alumni and friends. Under the theme, *Solving the World’s Most Pressing Health Challenges*, it charts a course for the next five years and focuses on six concepts:

- Education innovation and career readiness
- Business and entrepreneurship
- Transformative Research
- Advances in animal, human, and ecosystem health
- Health begins here (focusing on diversity, wellness and professional development)
- Strengthening our foundation (focusing on infrastructure and communication)

Warnick introduced the plan with a pertinent reminder: “Global and professional challenges require innovative, timely, and bold approaches to advance animal and human health, and to ensure a thriving veterinary medical profession. Our strategic plan offers such a vision.”

This vision involves new approaches to education, including new models for structuring clinical rotations; a student competency dashboard; increased endowed scholarship funds, new internal faculty grant programs; and the establishment of the Cornell Center for Veterinary Entrepreneurship & Innovation.

It also focuses on focusing on ‘Radical Collaboration’ research in areas such as infection biology and genome biology; expanding the MPH program; and establishing Wildlife Health Cornell. The College states a commitment to ensuring that diversity, wellness and professional development are key priorities moving into the future.


Conferences:

The College hosted several conferences during 2018 including ‘Strategies for One Health antimicrobial resistance data sharing.’ The goals for the meeting included assessing current capacities for antibiotic susceptibility testing and whole genome sequencing, banking isolates, and reporting results; promoting One Health surveillance and facilitating discussion on effective models and best practices for exchange of information; discussing issues of client confidentiality and barriers to data exporting; producing a report with assessment of current collection capabilities and gaps.

The event was sponsored by the New York Integrated Food Safety Center of Excellence (NY CoE), which is a collaboration between the New York State Department of Health and Cornell University. Operating from the premise that no one organization has a monopoly on best practices, ideas, or strategies, the NY CoE aims to engage jurisdictions in the northeast and mid-Atlantic to establish and facilitate a sustainable “Food Safety Learning Collaborative” to achieve shared food safety goals.

Additionally, the College co-sponsored the annual New York State Fall Veterinary Conference. The three-day continuing education opportunity provided attendees with high-impact professional development, offering up to 22 RACE CE credits per person. This year’s conference included new interactive case studies and hands-on labs, with a diversity of species tracks.
Outreach:

The Cornell University Dairy Center of Excellence (DCOE) connects over 100 faculty and staff at Cornell with expertise in the dairy industry. These faculty and staff engage in research, extension outreach, and teaching, and come from departments across the university. The goals of the DCOE include facilitating research collaboration, enhancing the visibility of dairy expertise at Cornell, and improving teaching and the dairy education experience for both students and stakeholders within and beyond our land-grant colleges.

Each year, the DCOE holds an interdisciplinary symposium for the Cornell community, farmers and colleagues. The objectives of this year’s event were to show the extent to which our dairy community is engaged in environmental sustainability and to engage with colleagues and community that are part of the broader environmental sustainability community at Cornell, focusing on the Food, Water, and Energy nexus. Innovative farmers and companies were paired with Cornell researchers demonstrating solutions that reach far into the living laboratory of central NY dairy farms and beyond. Discussion revolved around environmental impact, energy regulation, and willingness of farmers to engage with innovative technology, in addition to topics pertinent to the dairy industry that have further reaching relevance, like energy and nutrient recapture in manure and food waste. Given pressing needs to feed a rapidly expanding population on a finite planet we must address increasingly efficient production while reducing impact on the planet.

The DCOE hosted a twice monthly seminar series covering a broad range of dairy industry topics such as preventative medicine and herd health, dairy production management, food safety, epidemiology, worker training, industry relations and more, during the spring of 2018. Seminar speakers included Cornell faculty and invited guests; presentations are available for viewing by navigating to the following webpage and clicking on the topic title:

http://dairy.cornell.edu/seminars/dcoe-seminar-series2018/
Animal Health Diagnostic Center Updates

The Animal Health Diagnostic Center (AHDC) at Cornell University is one of the most comprehensive veterinary diagnostic laboratories in the country, offering services in anatomic and clinical pathology; microbiology (sections of bacteriology, virology, parasitology, molecular diagnostics, and serology); toxicology; endocrinology, and comparative coagulation. The AHDC includes the Quality Milk Production Services (QMPS) with laboratories in Canton, Cobleskill, Ithaca and Warsaw; the Avian Health Program including the Duck Research Laboratory on Long Island, and the Wildlife Health Program, funded through a Department of Environmental Conservation grant. Faculty in the Veterinary Support Services group provide consultation and assistance to clients on test selection, sampling and testing strategies, interpretation of results and incorporation of diagnostics in disease prevention, surveillance and control programs. Close to one third of the $27 Million operational budget of the AHDC is funded through contract with the NYS Department of Agriculture and Markets to support its function of NYS Veterinary Diagnostic Laboratory, as established by law (New York Code – AGM – Article 5 §73-b) to support “the health of food and fiber producing animals, companion animals, sport and recreational animals, exotic animals and wildlife.”

Diagnostic testing in particular of livestock and poultry specimens supports and protects a vibrant component of the NYS agricultural economy, providing effective surveillance of endemic and epidemic disease events in the state and beyond. The AHDC has been designated a Level 1 laboratory in the National Animal Health Laboratory Network, based on its accreditation status, infrastructure and functional laboratory information management system, its high level of emergency preparedness, surveillance capabilities and continuous surveillance output, the value and level of animal commodities in its service areas, and its active organizational contribution to the network. The AHDC has 4,677 ft² BSL-3 functional space that is fully commissioned and has proficiency tested personnel and capability to test for avian influenza and exotic Newcastle disease, classical swine fever, chronic wasting disease and scrapie, foot and mouth disease, and swine influenza, which all are high impact and/or foreign animal diseases.

QMPS and the AHDC uniquely support high quality milk production in the state of New York through control of mastitis and the avoidance of antibiotic residues in milk and meat through integrated field and laboratory diagnostic evaluations and recommendations. QMPS has the expertise to support New York State dairy farmers in prudently and economically using antibiotics on dairy farms. Data from NYS farms indicate that by using rapid and accurate pathogen identification at QMPS to develop for mastitis treatment plans with the herd veterinarian of record and farm management can reduce antibiotic use by 40-60%, leading to gains of $30,000/1,000 cows from lower drug expenditures and increased saleable milk.

The four QMPS laboratories (Ithaca, Canton, Cobleskill, and Warsaw) are strategically placed across the state with approximately two thirds of the states 600,000 lactating cows within one hour’s drive of one of the labs. Pathogen based management depends on rapid, less than 24-hour return of accurate test results offered seven days a week for prudent antibiotic use decision making for clinical mastitis. Moreover, we are furthering implementation of selective dry cow therapy with external agribusiness partners to increase economical antibiotic stewardship.
Invited Talks:

Mastitis prevention through proper management of the milking system. XX Chilean Congress of Veterinary Medicine in Termas de Chillan, Chile. November 2018

Nutrition and production diseases in dairy cattle. XX Chilean Congress of Veterinary Medicine, Termas de Chillan, Chile. November 2018

Milk quality programs and judicious antimicrobial use for mastitis. Wisconsin Veterinary Medical Association, Madison, WI. October 2018

Evaluation of on-farm diagnostic assays for the detection of pathogens in milk. Mastitis Research Workers meeting. October 2018

Bulk tanks, milk cultures and milk quality. Annual Certified Milk Inspector Regulatory Update. Syracuse, NY. September 2018

Systematic Approach to Monitoring the Milking Center. Presentation at DeLaval dealer meeting in Madison. Wisconsin. September 2018

Systematic Approach to Troubleshooting the Milking Center and Milking Routine Evaluation Using the Lactocorder and DC305. AABP Preconference Seminar in Phoenix, AZ September 2018

What to do with a BioChemistry degree: Veterinary Epidemiology and Dairy Production Medicine. SUNY Geneseo, Geneseo, NY. September 2018

Economic and Prudent use of antibiotics in clinical mastitis and dry cow therapy. Preconference Seminar in Phoenix, AZ September 2018

Milking Your Milk Sample. Empire Farm Days. Seneca Falls, NY. August 2018

Energy balance and hyperketonemia, strategies for management. Progressive dairy consultants group. Santiago, Chile. July 2018

Monitoring and managing metabolic diseases in the transition dairy cow. Austral University seminar series. Valdivia, Chile. July 2018

Selective Dry Cow Therapy. Summer Dairy Institute. Ithaca, NY. July 2018

How to Interpret Analytical Results and DHIA Data Seminar. National Mastitis Council. Milano, Italy. June 2018

Invited Talks continued:

Key Performance Indicators and Monitoring the Milking Center. Two webinars to GEA dealers across the US. June 2018

Mastitis Risk Assessment and Data Analysis Workshop for Veterinarians. Turin, Italy. June 2018

Performance evaluation of an on-farm qPCR-diagnostic test to detect mastitis pathogens in dairy cows. Cornell Center for Advanced Technology and New York State Division of Science, Technology and Innovation Annual Awardee Showcase. June 2018


Bedding and bulk tank pathogens. CNYAFP. Syracuse, NY. May 2018

Identifying mastitis and standard operating procedures. Pro-Dairy Webinar (in Spanish). Ithaca, NY. May 2018

Managing Selective Dry Cow Therapy with Somatic Cell Counts. Arizona DHIA. Phoenix, AZ. May 2018

Transition Cow Monitoring Programs for Dairy Herds. Minnesota Dairy Health Conference. St. Paul, MN. April 2018

Decreasing Antimicrobial Use in Mastitis Management. Pacific Northwest Dairy Veterinary Group. Ellensburgh, WA. April 2018

Bedding and bulk tank pathogens. Northeast Dairy Production Medicine Symposium. Syracuse, NY. March 2018

Culture and Mastitis Records Entry and Analysis. Lectures for QMPS Spring Course: Assessing Udder Health Opportunities: Bugs and Treatment. Ithaca, NY, March 2018

Selective dry cow therapy and culture based lactating mastitis therapy. New England Dairy Nutrition Conference. Hartford, CT. March 2018

Key Performance Indicators and Monitoring the Milking Center. Lecture to group of Latin America GEA dealers in Fresno, CA. February 2018

Recognizing and managing the challenges of catabolism in transition dairy cows. 1st ever Recent Graduate American Association of Bovine Practitioners Conference. St. Louis, MO. February 2018

Monitoring and Managing the Transition Cow Catabolic Armageddon; Dry Cow Immunity and Antibiotic Therapy; Mineral Metabolism Management. Ohio Dairy Vets Consulting Group. Columbus, OH, January 2018
Invited Talks continued:

Selective Dry Cow Therapy: What are the possibilities for North America? 57\textsuperscript{th} Annual Meeting of National Mastitis Council. Tucson, AZ, January 2018


Trade Publications:

Nydam DV, Royster E, Godden S, Gorden PJ, Ruegg P. Which antibiotic should I use to treat a cow with mastitis? Can susceptibility testing help me decide? Hoard’s Dairyman. December 2018

Vasquez A. Making Pathogen-based Mastitis Treatment Protocols Work for Many Dairies. The Manager. November 2018

Watters R, Wieland M, Virkler P. Milking 4x brings advantages and pitfalls. Hoard’s Dairyman. October 2018


Alanis V, Tomzai T, Ospina PA, Nydam DV. These eight farms shed light on mastitis. Hoard’s Dairyman. September 2018 p. 554

Moroni P, Curone G, Welcome F. Reduced exposure limits Klebsiella infections. Hoard’s Dairyman. August 2018

Ospina PA, Alanis V, Nydam DV, Santisteban C. Each bedding type comes with its own issues. Hoard’s Dairyman. July 2018 p. 416


Nydam DV. Why think about selective dry cow therapy now? Hoard’s Dairyman. May 2018 p. 351

Watters R, Wieland M, Virkler P. Make daily milking center maintenance checks part of milk quality routine. Progressive Dairyman. April 2018

Trade Publications continued:

Virkler P. Jake discovered the true value of milk quality. Hoard’s Dairyman. March 2018


Rauch B, Watters R, Welcome F, Nydam DV. Not all sand is created equal. Hoard’s Dairyman. January 2018 p. 64

Virkler P. Manage teat dip products to prevent dry teat skin. Progressive Dairyman. January 2018

Watters, R. A fresh look at the five-point mastitis control plan. Progressive Dairyman. January 2018 p. 41

Peer-Reviewed Publications:


++ Editor’s Choice manuscript


Tomazi T*, Ferreira GC, Orsi AM, Leonel J, Ospina PA, Nydam DV, Moroni P. Association of herd-level risk factors and incidence rate of clinical mastitis in 20 Brazilian herds. Preventive Veterinary Medicine. 2018 (accepted)


Peer-Reviewed Publications continued:


McCarthy MM, Overton TR, Mechor GD, Bauman DE, Jenkins TC, Nydam DV. Short communication: Field study to investigate the associations between herd level risk factors for milk fat depression and bulk tank milk fat percent in dairy herds feeding monensin. J Dairy Sci. 2018 Apr;101(4):3118-3125


Peer-Reviewed Publications continued:


Contact Us
qmps@cornell.edu

<table>
<thead>
<tr>
<th>Central Laboratory</th>
<th>Eastern Laboratory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Animal Health Diagnostic Center</td>
<td>111 Schenectady Ave.</td>
</tr>
<tr>
<td>240 Farrier Road</td>
<td>Cobleskill, NY 12043</td>
</tr>
<tr>
<td>Ithaca, NY 14853</td>
<td>518-255-5681</td>
</tr>
<tr>
<td>607-255-8202</td>
<td>877-645-5524</td>
</tr>
<tr>
<td>877-645-5522</td>
<td>(fax) 518-255-5682</td>
</tr>
<tr>
<td>(fax) 607-253-4000</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Northern Laboratory</th>
<th>Western Laboratory</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUNY Canton</td>
<td>36 Center St, STE A</td>
</tr>
<tr>
<td>Canton, NY 13619</td>
<td>Warsaw, NY 14569</td>
</tr>
<tr>
<td>315-379-3930</td>
<td>585-786-2555</td>
</tr>
<tr>
<td>877-645-5523</td>
<td>877-645-5525</td>
</tr>
<tr>
<td>(fax) 315-379-3931</td>
<td>(fax) 585-786-2550</td>
</tr>
</tbody>
</table>