277 Management practices for male calves on Canadian dairy farms. D. L. Renaud*, T. F. Duffield, S. J. LeBlanc, D. B. Haley, and D. F. Kelton, Department of Population Medicine, University of Guelph, Guelph, ON, Canada.

Morbidity, mortality, and antimicrobial use and resistance are major concerns in the rearing of male dairy calves, so information to support disease prevention is important. The objective of this cross-sectional study was to describe management practices associated with the care of male calves during their first days of life on Canadian dairy farms. A survey completed by dairy producers across Canada from March 1 to April 30, 2015. The survey had 192 questions covering producer background, farm characteristics, biosecurity practices, disease prevalence, calf health, animal welfare, lameness, milking hygiene, reproduction and internet/social media use. A total of 1,025 surveys were completed online, by telephone, or by mail, representing 9% of all dairy farms in Canada. Five percent of respondents (n = 49) answered that they had euthanized at least one male calf at birth in the previous year and blunt force trauma was used commonly in these cases. The majority of respondents always fed colostrum to male calves, however 9% (n = 80) did not always feed colostrum. Nearly 40% (n = 418) of respondents reported always dipping the navels of male calves, 12% (n = 123) vaccinated male calves and 17% (n = 180) did not provide the same quantity of feed to male calves as heifer calves. The care of male calves differed greatly depending on geographical region of the respondents. However, some regional effects may be confounded by economic conditions and the logistics of marketing male dairy calves in different parts of the country. Herd size was another important variable, with larger herd size being associated with using an appropriate method of euthanasia at birth, but with larger farms also being less likely to always feed colostrum to their male calves, or feed them the same as female calves. Familiarity with the Code of Practice for the Care and Handling of Dairy Cattle by respondents was associated with better care of male calves on dairy farms. The results of this survey suggest that there is variable treatment of male dairy calves on Canadian dairy farms and that there are opportunities to improve health management of male calves on the farms of origin.

Key Words: male calf, management, mortality


The objective of this study was to determine neonatal management risk factors on dairy farms associated with mortality on veal farms. From April to October 2016, 52 dairy farms that supply male calves to 2 veal operations were visited. During the visit, a questionnaire was administered covering all areas of calf management, calves 1–10 d of age were examined using a standardized health scoring system and blood was collected to test for passive transfer of immunoglobulins. The veal calf mortality risk for each dairy farm was calculated based on the number of calves shipped and the number that died during 2016. To adjust for differences in calf mortality at the 2 veal operations, a facility-adjusted mortality rate was calculated for each dairy farm, and the farms were classified as high or low mortality farms. Using the high and low mortality risk outcome, a logistic regression model was used to assess farm risk factors. Suppliers to veal farm 1 had a mean mortality risk of 9% in 2016 and 39% of calves (n = 27) examined on the dairy farms supplying veal farm 1 had an identifiable health abnormality. In contrast, suppliers to veal farm 2 had a mean mortality risk of 3% in 2016 and 29% of calves (n = 33) examined on the dairy farms supplying veal farm 2 had an identifiable abnormality. The proportion of calves with failure of passive transfer on all dairy farms was very low, with only 13% of calves (n = 24) tested having a serum IgG < 10 mg/mL. Feeding stored (refrigerated or frozen) colostrum (P = 0.03) compared with fresh colostrum, bedding male calves on wood shavings (P = 0.03) or chopped straw (P = 0.04) compared with long straw on the source dairy farm, and the herd veterinarian not frequently asking about the health and performance of the calves (P = <0.01) were all positively associated with the dairy farm being classified as a high mortality farm. Checking the calving pen less frequently during the day (P = 0.02) compared more frequently during the day was negatively associated with being classified as a high mortality dairy farm. The results of this study suggest that male calf management practices on dairy farms have an impact on mortality during the growing period on veal farms.

Key Words: male calf, management, mortality

279 Aluminized reflective covers: Effect on calf behavior, health, and performance during summer. D. Manriquez*,1, H. Valenzuela2, S. Paudyal1, A. Velasquez1, J. Velez2, and P. Pinedo1,1Colorado State University, Fort Collins, CO,2Aurora Organic Dairy, Boulder, CO.

Our objective was to evaluate the effect of commercial aluminized reflective covers (ARC) for polyethylene hutches on behavior, health, and performance of pre-weaned Holstein calves during summer in Northern Colorado. Hutch interior THI and inner wall temperature were also assessed. Heifers (n = 195) enrolled at 1 d of life and housed in individual hutches with (n = 97) or without (n = 98) ARC were monitored until 60d of life. Behavior, health, rectal temperature, respiratory rate, and hutch wall temperature were measured twice per week between 12:00 and 2:00 p.m. Calves were weighed at birth and at 60d. Ambient and hutch temperature and humidity were continuously recorded using automatic loggers (4 covered and 4 control empty hutches). Fecal, nasal, eye, ear, and hydration abnormalities were assessed using a health score system. Days were categorized according to max ambient THI as low (<72 units) and high. Behavior and health scores were analyzed using logistic regression analysis. Temperature, THI, rectal temperature and respiratory rate were evaluated as repeated measures. Use of ARC and ambient THI were associated with calf behavior (P = 0.02 and P < 0.0001). The odds of remaining inside the hutch were 1.3 times greater for calves in control hutch vs. those in covered hutes. When THI >72 the odds of remaining inside of the hutch were 2 times greater. Health scores were not associated with use of ARC. Rectal temperature and respiratory rate did not differ among calves in covered and control hutches (39.2 ± 0.02 vs. 39.2 ± 0.02°C and 61 ± 1.2 vs. 58 ± 1.2 breaths/ min). ADG did not differ between covered and control hutches (0.54 ± 0.02 vs. 0.53 ± 0.02 kg/day, respectively). The average ambient THI was 66.8 (min 43.2, max 81.1 units). THI was greater in covered (64.8 ± 0.05) compared with control (64.1 ± 0.05) hutches (P < 0.001). Inner wall temperature was lower in covered vs. control hutches by 1°C (P < 0.001). Even though ARC effectively reduced wall temperature, this effect was not sufficient to have a positive impact on calf health and performance under these study settings. Higher THI in covered hutches

Key Words: male calf, management, mortality
may explain differences in behavior, where control calves preferred to stay inside the hutches on high THI periods.

Key Words: reflective, cover, calf

280 Associations of management practices and calf health on dairy farms using automated milk feeders in southern Ontario.
C. Medrano-Galarza1,2, S. J. LeBlanc1,3, A. Jones-Bitton1, T. J. DeVries2,3, A. M. de Passillé1, J. Rushen3, M. I. Endres4, and D. B. Haley1,3, 1Department of Population Medicine, University of Guelph, Guelph, ON, Canada, 2Department of Animal Biosciences, University of Guelph, Guelph, ON, Canada, 3Faculty of Land and Food Systems, University of British Columbia, Vancouver, BC, Canada, 4Department of Animal Science, University of Minnesota, St. Paul, MN, 5Campbell Centre for the Study of Animal Welfare, University of Guelph, Guelph, ON, Canada.

Data on management practices with automated milk feeders (AMF) are needed to identify determinants of calf health and welfare. Seventeen dairy farms with AMF in Ontario (Canada) were visited 4 times, seasonally, over 1 year. All calves (n = 1488) in pens (n = 35) with AMF were health scored to identify number of calves with diarrhea (CD) and bovine respiratory disease (BRD). Data on calf, feeder, and pen management practices were analyzed using mixed-effects negative binomial regression models. Overall calf-level prevalence of CD and BRD were 23% and 17%, respectively. Median (IQR) within-pen prevalence of CD and BRD was 17% (7–37) and 11% (0–28), respectively. Median age (IQR) for diarrheic calves was 25 d old (12–42), while for calves with BRD was 43 d old (21–60). Predictors associated with reduced within-pen prevalence of CD were the feeding of probiotics (risk ratio [RR] = 0.5, P = 0.01), cleaning feeder houses daily compared with weekly (RR = 0.53, P < 0.03), and individual-housing (vs. group-housing) before introduction to the AMF pen (RR = 0.6, P = 0.07). In contrast, use of maternity pens other than for calving tended to be a risk factor (RR = 1.6, P = 0.07). Predictors associated with increased within-pen prevalence of BRD were sharing air with cattle 5–8 mo old (RR = 3.4, P = 0.01) or 1+ year (RR = 2.0, P = 0.07), and introduction to the AMF pen after 9 d old compared with < 3 d (RR = 2.1, P = 0.04) or 3 to 6 d (RR 2.0, P = 0.02). Increased total solids in milk replacer (RR = 0.93, P = 0.04) and dry top bedding over a wet bedding pack no deeper than 5 cm (RR = 0.6, P = 0.04) were protective. To conclude, isolation from older animals, and frequent cleaning of the feeder and pen may help reduce disease in group-housed calves fed with an AMF.

Key Words: calf, health, automated milk feeder

281 Factors associated with veal calf morbidity on an Ontario grain-fed (red) veal operation.
K. Scott*, D. Renaud, T. Duffield, and D. Kelton, University of Guelph, Guelph, ON, Canada.

Canada has approximately 11,280 dairy farms and 959,100 dairy cows producing 479,800 male calves per year. The majority of male calves in Ontario are transported to a veal-rearing facility, with approximately 220,000 veal calves entering Ontario’s red meat industry every year. Currently, there is very little research on the factors that influence the morbidity and overall wellness of these male calves entering the veal industry. The objective of this ongoing study is to assess the impact of calf specific health attributes measured at arrival on the animal’s morbidity risk and average daily gain (ADG). Using a calf-scoring program (Calf Health Scorer App) developed by McGuirk et al. (2014) and supplemental scoring adapted from Wilson et al. (2000), Holstein and crossbred calves (n = 131) of unknown age were evaluated immediately upon arrival at a grain-fed veal rearing facility in Southwestern Ontario. The results from the period of January to February 2017 were tabulated using Stata 14 (StataCorp College Station, Texas). Thus far 4.6% of the Holstein and crossbred male calves were diagnosed to have respiratory disease at the time of arrival. More specifically, 9.9% induced at least a single cough with tracheal stimulation, 11.5% were dull or depressed animals, failure of passive transfer of immunoglobulin’s was identified in 14.5%, fever (rectal temperature greater than 39°C) in 14.5%, signs of clinical dehydration 25.2% (based off of visual appearance, suckle reflex and skin tent), diarrhea in 25.8%, enlarged navel with pain and or moisture 27.5%, and lack of subcutaneous fat or emaciated appearance in 63.4%. In addition to the visual assessment, a Kestrel 5200 Professional Environmental Meter was placed within the trailer during transport of the calves to determine the environment during transport. There was a varying range of temperatures from −5.3°C to 7.0°C, wind speeds of 0m/s to 2.7m/s, and a humidity range of 1.8% to 4.3%. With the information gathered so far it suggests that there are many improvements that can be made within the grain-fed veal industry to improve the well-being and morbidity of these animals.

Key Words: male calf, health screening

282 Behavior activity detected via 3D acceleration before diarrhea events in neonatal dairy calves.
J. F. Castillo*,1,2, F. Rosa2, J. J. Loor3, J. S. Osorio2, and F. C. Cardoso3, 1Escuela Agrícola Panamericana El Zamorano, El Zamorano, Honduras, 2South Dakota State University, Brookings, SD, 3University of Illinois, Champaign-Urbana, IL.

Diarrhea is the single most common source of morbidity and mortality in preweaning dairy calves with significant economic losses for the dairy industry. Therefore, automated in-line systems that can identify calves at risk to develop diarrhea can have a substantial impact in diminishing the negative impacts of this disease. Therefore, the aim of this experiment was to assess various behaviors (e.g., standing and lying time) via the use of 3D accelerometers (Onset; Pocasset, MA) mounted in the rear left leg of neonatal dairy calves during a diarrhea event. Twenty-eight Holstein neonatal calves were housed in individual hutches from birth to 7 wk of age at the University of Illinois Dairy Cattle Research Unit. Milk replacer, starter, fecal score (FS), and rectal temperature was recorded daily. BW and withers height was measured weekly. Data loggers of 3D acceleration were set to record every 60-s during the trial. The overall fecal score (FS) for all calves reached a maximal point at 10 d (FS = 2.3 ± 0.10) or 2 wk of age, therefore, all the accelerometer data were analyzed within the first 15 d of life. Calves were classified by a retrospective analysis of FS as healthy (non-Scour; FS ≤ 2; n = 18) or scour (Scour; FS > 2; n = 10). As expected FS was greater (P < 0.01) in the scour group (1.25 ± 0.05) from birth to 7 wk of age. Rectal temperature tended (P = 0.12) to be greater in the scour group in comparison to the non-Scour. Starter intake tended (P = 0.15) to be greater (0.76 vs 0.91 kg/d) in non-Scour calves. Although neither BW (P = 0.28) nor withers height (P = 0.27) were affected by scour, ADG tended (P = 0.10) to be greater (0.54 vs 0.65 kg/d) in the non-Scour group. Overall standing and lying time were not affected (P = 0.72) by diarrhea. Standing bouts tended (P = 0.15) to be greater in Scour calves, while a trend (P = 0.08) for greater left side lying duration was observed in non-Scour calves. Interestingly, the latter effects occurred mainly during the days (3–7 d) leading to maximal scour at 10 d of age. This suggests that these behaviors could be potentially used to identify calves at risk to develop diarrhea.

Key Words: accelerometer, behavior prediction, calf scour
Colostrum is the first mammary glands secretion at parturition. In ruminants, the neonates are born agammaglobulinemic because there is no Ig transfer through the placenta. Thus, passive immunization through the colostrum helps the newborn to contend pathogens and survive the first weeks of life. The gold standard of Ig and/or Ig isoforms: IgG1 & IgG2, IgM and IgA is their determination by an immunoassay such as ELISA. However, these assays require laboratory equipment, are time consuming and therefore not applicable under farm conditions. On site, rapid assays such as Colostrometer or Brix refractometer are used. To date, many dairy farms are equipped with on-line computerized data acquisition systems. The aim of the study was to calibrate data collected on-line for evaluating the level of immunoglobulins in the colostrum. The study included 4 dairy farms with parlors equipped with an on-line computerized AfiMilk Herd Management system including AfiLab milk spectrometer (AfiMilk, Israel). Samples were tested by Colostrometer and by Brix calibrated for Ig. Total IgG was determined by ELISA BIO k 165/2 kit (Bio-X Diagnostics S.A., 5580 Rochefort, Belgium). In total, 205 samples were collected from 127 cows representing first, second and third milking postpartum. Correlations were calculated for 2 scenarios. (A) with first, second and third milking colostrum, and (B), only with first milking. The correlation of IgG level to Colostrometer (R²) measurement was 0.79 for A and 0.58 for B, for IgG level to Brix it was 0.76 and 0.43 respectively. The automated in parlor real time analysis of Ig levels with the AfiLab spectrometer correlations were 0.7 for A and 0.53 for B. Assuming practice of dichotomic IgG cutoff at 50 mg/mL, the sensitivity was 88.2 and specificity 87.9%. In conclusion, it was shown that AfiLab milk spectrometer provided information on the quality of colostrum immunoglobulins in real time milking, more sensitive than Colostrometer and Brix determinations. Thus, it is possible to create a “bank” of ‘good’ colostrum by compiling the data obtained by the AfiLab analyzers, which is now implemented into the AfiMilk system.

Key Words: online analysis, colostrum, immunoglobulin G

284 Validation of commercial luminometry swabs for enumeration of total bacteria and coliform counts in colostrum feeding equipment. D. L. Renaud*, T. F. Duffield, D. B. Haley, S. J. LeBlanc, and D. F. Kelton, Department of Population Medicine, University of Guelph, Guelph, ON, Canada.

Colostrum feeding is an integral component of neonatal calf care with many effects on calf health and productivity, yet failure of passive transfer remains common on many dairy farms. A sufficient quantity and quality colostrum must be fed quickly to the newborn calf. Colostrum with a total bacteria count (TBC) > 100,000 cfu/mL may impair IgG absorption and contribute to disease. The objective of this study was to validate Hygiena AquaSnap (AS) and MicroSnap (MS) swabs for detection of elevated bacterial counts in colostrum-feeding equipment. AS and MS swabs offer a potential rapid calf-side alternative to traditional bacterial culture. The reagents in the swabs produce a light-generating reaction when in contact with bacterial adenosine triphosphate, which is quantified in relative light units (RLU) with a luminometer. From April to October 2016, 18 esophageal tube feeders, 49 nipple bottles and 6 pails from 52 dairy farms in Ontario were evaluated for cleanliness. Sterile physiological saline (15 mL) was poured into each piece of equipment, mixed for 2 min to ensure total surface coverage and poured into a sterile collection container through the feeding end. All wash fluid was split into equal aliquots, with one being evaluated by the by conventional culture and the other evaluated using both the AS and MS swabs. Non-parametric receiver operator curves were generated using STATA 14 for each of AS and MS, comparing the RLU to bacterial counts. The area under the curve (AUC) comparing the AS swab to TBC (cut point > 100,000 cfu/mL) was 0.89 (95% Confidence Interval: CI) 0.8–1.0 and using a cut point of 631 RLU correctly classified 84% of samples with a sensitivity of 88% and a specificity of 77%. The AUC comparing the MS swab to total coliform count (cut point > 100,000 cfu/mL) was 0.85 (95% CI: 0.7–1.0) and using a cut point of 44 RLU correctly classified 89% of samples with a sensitivity of 83% and a specificity of 90%. The results suggest that the AS and MS swabs can be used as an alternative to traditional lab bacterial counts to evaluate cleanliness of colostrum-feeding equipment.

Key Words: robotic milking, illness detection, health

Johne’s disease (JD), caused by Mycobacterium avium ssp. paratuberculosis (MAP), affects approximately 70% of all US dairies. To determine if JD prevalence on PA organic dairy farms is different than that of conventional dairy farms; to identify differences in management practices between organic and conventional farms; and to identify risk factors associated with a higher prevalence of JD. Fifty PA dairy farms (26 certified organic, 24 conventional) participating in DHIA testing were included. Individual milk samples were tested for MAP antibodies via ELISA. Information regarding management practices was gathered during a farm visit. Univariable statistical comparisons were made by use of logistic and linear regression. Multivariable analysis was employed to look for risk factors and associations. A total of 2,739 cows were included in the study. Organic herds had a median of 39 lactating cows (range, 20–211 cows); while conventional herds had a median of 58 lactating cows (range, 20–114 cows) (P = 0.02). Average daily milk production was significantly higher in the conventional group (mean, 32.3 kg/d) versus the organic group (mean, 22.3 kg/d) (P = 0.05). Prevalence between herd types was not statistically different with 13/26 (50%) positive organic herds versus 14/24 (58%) positive conventional herds (P = 0.16). Among positive herds, the proportion of JD+ cows was higher (though not statistically different) for organic herds (2.3%) versus conventional herds (1.6%) (P = 0.24). Risk factors associated with JD+ on organic farms included: lack of routine vaccination, sharing of pasture and water source between adult cows and replacement heifers, and use of nurse cows. Risk factors associated with JD+ on conventional farms included: purchasing of animals, sharing of pasture and water source between adult cows and replacement heifers, feeding of whole milk to calves, and use of group maternity pens. The prevalence of JD on PA organic farms is no different than that of conventional farms matched by size. Although differences in management practices were identified between herd types, these differences did not have a significant effect on JD prevalence.

Key Words: Johne’s disease, organic dairy farm, conventional dairy farm

Dry cow treatment, antimicrobial residues in colostrum, and resistance in new born calves. A. G. J. Velthuis*,1 M. A. Gonggrijp,2 A. E. Heuvelink1, C. Kappert1, D. Mevius2, and T. Lam1,2,1GD Animal Health, Deventer, the Netherlands, 2Utrecht University, Department Farm Animal Health, Utrecht, the Netherlands.

This study aimed to quantify the prevalence and level of antibiotic residues (AR) of dry-cow therapies in colostrum fed to calves and in their feces and to evaluate the association between these residues and extended-spectrum β-lactamase- and AmpC-producing Escherichia coli in calf feces. On 10 dairy farms, colostrum samples were taken from the 1st to the 5th bucket (milking) that was fed to the new born calves. The colostrum originated from 87 cows: 20 cows dried off with 500 mg cloxacillin, 38 with 600 mg cloxacillin and 29 dried off with no antibiotics. Fecal samples were taken from then calves on 1, 7 and 14 d of age. The colostrum samples and the 7 fecal samples were evaluated for the presence and level of AR using a microbiological screening method and subsequently by LC-MS. All samples were screened for E. coli with non-wild-type susceptibility for cefotaxime (MIC>0.25 mg/L) and isolates were confirmed phenotypically as ESBL/AmpC-producing by the combination disc-diffusion test using cefotaxime and ceftazidime with and without clavulanic acid and cefoxitin. In 60% (CI 47–73%) of the colostrum samples of cows dried off with cloxacillin, cloxacillin residues were detected. The median concentration in the 1st milking was 148µg/kg and in a pooled sample of the 2–5th milking 67µg/kg. AR levels did not differ between cows treated with 500 or 600 mg cloxacillin. No AR were found in the fecal calf samples. Two out of 173 colostrum samples (2%, CI: 0–8%) tested positive for ESBL/AmpC E.coli, both were pooled samples from the 2–5th milking from cows treated with cloxacillin. ESBL/AmpC-E.coli were isolated from 12% (CI 6–20%) d 1 fecal samples, from 38% (CI 28–49%) d 7 samples, and from 35% (CI 24–47%) d 14 samples. No significant association was found between the dry cow treatment with cloxacillin or the presence of antimicrobial residues in the colostrum and the presence or amount of ESBL/AmpC E.coli in calf fecal samples. This in line with the fact that cloxacillin is not selecting for ESBL/AmpC-producing E. coli.

Key Words: antibiotic residue, colostrum, resistance

Lameness on Canadian dairy farms: Measured and farmer-perceived prevalence, and associations with management practices. S. L. Croyle*, C. Bauman, S. J. LeBlanc, and D. F. Kelton, University of Guelph, Guelph, ON, Canada.

The objectives of this study were to (1) estimate herd-level lameness prevalence (HLLP) on Canadian dairy farms, (2) compare the detected HLLP to the perceived lameness estimated by farmers, and (3) assess the associations between hoof-health management practice (HHMP) and HLLP. A cross-sectional study (National Dairy Study (NDS)) was conducted in the summer of 2015. The NDS consisted of a questionnaire and a follow-up farm visit. The questionnaire had an 11% response rate (n = 1,157) and contained farmer HLLP estimates, herd demographics, HHMP (e.g., use of a footbath). On-farm, HLLP was assessed using locomotion score (LS) for cows in freestall/pack farms, or in-stall lameness score (SLS) for cows in tie-stalls. The 14 assessors achieved a group inter-rater reliability Fleiss’s kappa score of 0.63 (substantial agreement), and a rater-expert Byrt’s Kappa of 0.73 (substantial agreement), ranging from 0.62 to 0.78. Lameness assessments were performed on a representative sample of milking cows on 374 farms across Canada. HLLP was determined by 1) the proportion of cows with LS ≥ 3 on a 5 point scale, where 1 = normal, 3 = mild, and 5 = severely lame or 2) the proportion of cows with SLS of ≥ 2 out of 4 behavioral indicators of lameness, where < 2 indicated a non-lame cow, and ≥ 2 indicated a lame cow. The mean HLLP was 29.2%, which was 2.8 times greater, on average, than the prevalence estimated (10.3%) by the farmers. In multivariable models, the use of deeper bedding was associated with lower HLLP. Pack barns were associated with lower HLLP (8.3%) when compared with freestall (20.1%), which was lower than tie stall (29.6%) (P < 0.05). Using a professional trimmer was associated with lower HLLP (8.5%) compared with freestall (20.1%), which was lower than tie stall (29.6%) (P < 0.05). Providing the milking herd pasture access at least part of the year was associated with lower HLLP compared with no pasture access (14.4% vs 21.2%, P < 0.05). Results from this study highlight the need to educate farmers on detecting lameness, and provide insight into HHMP that may reduce the HLLP across Canada.

Key Words: lameness detection, farmer estimate, bedding depth