



# Dairy Research Review™

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Issue 15 – 2018

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## Welcome to the fifteenth issue of Dairy Research Review.

Leading this issue are two companion papers reporting results from a study that investigated pre- and post-mating bull breeding soundness examinations in southern Australian dairy herds. Other papers featured in this issue include the attitudes of Dutch vets to dry cow therapy and reducing antimicrobial use, persistency of internal teat sealants and risk of new intramammary infection, and issues of antibiotic use and antimicrobial resistance associated with non-aureus staphylococci. We hope that you enjoy this issue of **Dairy Research Review**. Your feedback is appreciated so please keep sending us your comments and suggestions.

Kind regards

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Research Review thanks AgriHealth for their sponsorship of this publication, and their support for ongoing education for animal health professionals.

## An assessment of dairy herd bulls in southern Australia: 1. Management practices and bull breeding soundness evaluations

**Authors:** Hancock AS et al.

**Summary/comment:** This cross-sectional study investigated dairy bull management practices, causes of reduced fertility in dairy herd bulls, causes of bull removal by herd managers during mating, and possible associations between bull management practices and bull fertility. Bull breeding soundness examinations (BBSE) were performed on 256 bulls from 32 dairy farms in southwest Victoria before and after the bull mating period. The BBSE here did not include serving ability testing. At the pre-mating BBSE, 19.5% of bulls were classified as being at high risk of reduced fertility and at the end of the mating period 36.5% were classified as being at high risk of reduced fertility. Of the bulls used in the mating period, 15.9% were removed during mating mainly due to lameness and injuries. At the pre-mating BBSE, a questionnaire was completed regarding the management history of the bulls and a second questionnaire was completed at the post-mating BBSE about management of bulls during the mating period. The pre-mating questionnaire showed some differences to what we in NZ might think of as normal, e.g., 38% of bulls were over 4-years-old, 94% of bulls were grouped together for more than 2 months prior to use, and 50% of bulls were on farms that reared some or all of their own bulls (39.8% of bulls were reared on farm). Only 6% of the herds were vaccinating bulls against bovine viral diarrhoea virus (BVD) [3% tested bulls for BVD antigen] and 44% of herds shared bulls with other herds. Managers culled their bulls at an average age of 4.7 years. At the pre-mating BBSE, 11.3% of bulls were classified as being at high risk of reduced fertility on the physical exam (exam of reproductive organs, body condition score, leg scores, locomotion, and vision) and this accounted for about half of the bulls classified as high-risk so the addition of semen evaluation to look for abnormal semen traits does seem necessary in this population but it needs to be remembered that over 90% of bulls passed the crush side semen evaluation and the morphology test pre- and post-mating. At the post-mating, BBSE lameness made up two-thirds of bulls classified as high-risk. This study has a population of bulls that is quite different to that used on farms that my practice deals with but does highlight the importance of a physical exam as it seems it will likely detect the majority of faults that will cause a bull to be classified as being at high risk of reduced fertility.

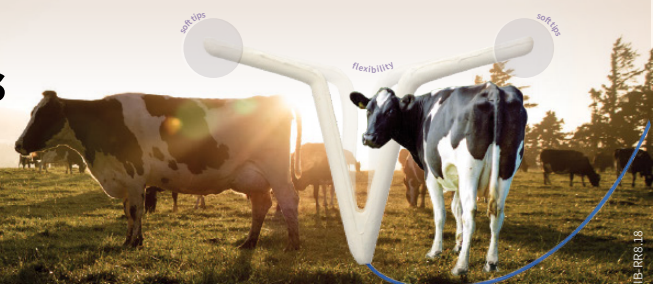
**Reference:** *J Dairy Sci.* 2016;99(12):9983–9997

[Abstract](#)

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## An assessment of dairy herd bulls in southern Australia: 2. Analysis of bull- and herd-level risk factors and their associations with pre- and postmating breeding soundness results

Authors: Hancock AS et al.

**Summary/comment:** This companion paper to that described above identifies associations between individual bull- and herd-level management factors and bull fertility as measured by pre- and post-mating bull breeding soundness examinations (BBSE) performed on 256 bulls from 32 dairy farms in southwest Victoria. In this study, lameness, or not, did not cause a significant change in sperm motility or morphology at either the pre- or post-mating BBSE. During pre-mating about 25% of bulls had rubber blocks attached to all four feet prior to breeding. This practice was not significantly associated with reduced odds of lameness at the post-mating BBSE but there was a trend for bulls that were blocked to have abnormal leg joints at the post-mating BBSE. No blocks were present at the post-mating BBSE, so perhaps if they fell off claws at different times there may have been abnormal weight bearing resulting in stress on the joints. Or perhaps the herds that elected to use blocks historically had a greater problem with lameness. Jersey bulls were more likely to have abnormal sperm morphology at either BBSE compared with Holstein bulls, but Holstein bulls were more likely to have abnormal joints post mating. Bulls greater than 4 years of age were more likely than younger bulls to be classified as high risk of reduced fertility at the pre-mating BBSE. At the herd level, bulls that were fed grain in the 3 months prior to mating had 3-times the odds of being classified as being at high risk of reduced fertility. I think the take home message of this paper is that if you are thinking about doing a full BBSE on a herd's bulls, if there are older bulls, Jerseys, very straight legged Holstiens, or bulls fed concentrates, it is more likely to be of value.

Reference: *J Dairy Sci.* 2016;99(12):9998–10008

[Abstract](#)

## Feeding fodder beet (*Beta vulgaris* L.) with either barley straw or pasture silage to non-lactating dairy cows

Authors: Waghorn GC et al.

**Summary/comment:** There is a lack of published information concerning the digestibility, rumen function, and nitrogen excretion by cows fed diets dominated by fodder beet. This study looked at two diets that are representative of "normal" dry period diets for the majority of South Island dairy cows: the first diet was 85% fodderbeet and 15% Barley straw (straw diet) and the second diet was 65% fodderbeet and 35% pasture silage (silage diet). There were eight cows in each diet group and five cows in each diet were in late pregnancy (>200 days). One cow was removed from the silage diet as she refused to eat the fodderbeet bulbs and five cows were removed from the straw diet due to acidosis (four on the first day and one seven days into the trial). There was a net loss of N, P, Ca, Mg, and Cu by cows fed the straw diet. Metabolic energy intakes on the diets were 69 and 100 MJ/day for the straw and silage diets, respectively, and cows were offered enough of their diet mix so that they were leaving 10 to 15% of what was offered after six hours. Requirements for a cow in late-stage pregnancy were quoted as 90 MJME/day. After reading this paper, it is tempting to think fodderbeet feeding is crazy, but it was a small trial (nine days duration with small number of cows) and we see thousands of cows apparently "doing well". What this paper does is highlight the nutritional deficiencies of a diet that has a high proportion of fodderbeet and if we want to improve the management of cows that do winter on fodderbeet it has highlighted problems that can be addressed.

Reference: *N Z Vet J.* 2018;66(4):178–185

[Abstract](#)

## Robustness and sensitivity of a blueprint for on-farm estimation of dairy cow energy balance

Authors: Thorup VM et al.

**Summary/comments:** This investigation, which was undertaken by a group of French researchers, used multiple datasets to better understand how regular weighing data from milking cows can be used to measure energy balance. Daily weighing is available with walk-over scales in many sheds now, but the data does not really get used either in real time or at the individual cow level in my experience. If you do have clients using daily weighing data effectively please can you contact me? While this paper does not look at any association with rates of change in weight or timing of when cows start to gain weight post calving with any outcomes such as disease or resumption of cycling, it does give some solutions on how to deal with the data to account for changes in feeding and residual gut fill and advancing pregnancy, etc. Residual gut fill increased with days in milk as intakes increased. With greater understanding of the variation in weight between weighings, and cows, automatically collected weighing data has the potential to identify issues with under-feeding at the herd level or perhaps more importantly individual cows that are struggling for whatever reason. One potential use of the data is an alert for cows that fail to reach positive energy balance by a predetermined number of days in milk. With the likelihood of inline milk meters (yield, composition, and somatic cell count) becoming more common in some sheds in the near future, there will be a massive amount of data generated for each cow almost daily. I suppose in the future we will have to increase our understanding of how the data is dealt with to allow us to understand what it means (and what it can't tell us).


Reference: *J Dairy Sci.* 2018;101(7):6002–6018

[Abstract](#)

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## Veterinarians' attitudes toward antimicrobial use and selective dry cow treatment in the Netherlands

Authors: Scherpenzeel CGM et al.

**Summary/comment:** Since November 2012, the preventative use of antimicrobials has been prohibited in the Netherlands and selective dry cow therapy (SDCT) has become the norm. In 2015, all the vets in the Netherlands that are registered as cattle veterinarians (n=648) were invited to participate in an online questionnaire on their attitudes to SDCT and prudent use of antimicrobials. A total of 181 completed questionnaires were included in the analysis. This study classified cattle vets as having an unfavourable, neutral, or favourable attitude towards reduction of antimicrobial use (AMU) and towards SDCT based on their opinion towards four statements. Vets that were classified as having an unfavourable attitude towards reduced AMU tended to be older and been graduated for longer. The vast majority of vets (88%) actively encouraged their farmers to reduce their AMU, and 89% believed the advice they gave on SDCT was the best possible approach but only 68% were convinced their farmers applied this approach. Only about 50% of vets believed that other dairy vets had a positive attitude to SDCT, but then I don't think I have met any vet who thinks they are a worse than average driver either. This survey suggests that Dutch vets are all "singing off the same hymn sheet", at least in public, but there were many comments about "profiting auditors" and so on. The top perceived benefits of reduced AMU were an increased awareness of animal health and vet medicine use (80%), improved image of the dairy industry (58%), reduced antimicrobial resistance (40%), and the chance to add value to the dairy farmer (40%). The top negative aspects were a higher risk of sick cows (73%), limited choice of antimicrobials (60%), and a lack of clarity about any improvement in public health (36%). Vets who agreed with the statement "I feel pushed to follow the rules, although I do not agree with the policy" as one of the most important negative aspects to the reduction of AMU were 10-times less likely to be classified as having a favourable attitude to reduced AMU and SDCT. No doubt this will resonate with some of us or at least remind us of a colleague?

Reference: *J Dairy Sci.* 2018;101(7):6336–6345

[Abstract](#)



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## An observational cohort study on persistency of internal teat sealant residues in milk after calving in dairy cows

Authors: Kabera F et al.

**Summary/comment:** This Canadian study looked at the prevalence of observable internal teatsealant (ITS) at the first milking, and risk factors for it being visibly present or not. They also examined whether the presence, or not, of ITS at the first milking resulted in a different risk of having a new infection acquired over the dry period. The average dry period was 50 days long (range 35 to 73 days). Most quarters (83%) had a teatsealant plug present at first milking and residues were found for on average four days (range 0 to 12 days). Rear quarters had 2.1-times the odds of having a teatseal plug present than front quarters and quarters that received teatsealant alone were 2.6-times more likely to have a teatsealant plug present than quarters that received combination therapy. The proportion of quarters defined as having acquired a new intramammary infection (NIMI) over the dry period was 16% while 11% were classified as having a NIMI caused by an environmental pathogen. There was no difference in the prevalence of NIMI with all pathogens or environmental pathogens in quarters that had a teatsealant plug at first milking or not. With more and more teatsealants being used in MA cows at drying off it was reassuring to see in this study that milk production at drying off did not appear to affect persistence of teatsealant over the dry period. The yield at dry off averaged 24.7L.

Reference: *J Dairy Sci.* 2018;101(7):6399–6412

[Abstract](#)

## Low colostrum yield in Jersey cattle and potential risk factors

Authors: Gavin K et al.

**Summary/comment:** This paper looked at factors that may be associated with a syndrome in North America usually seen during the autumn and winter where little or no colostrum is produced. Over the year that the study ran (June 2016 to May 2017), 2988 calvings occurred in a Jersey herd from Texas and colostrum yield was immediately measured after calving. The cow was milked into a test bucket using a portable milking machine and this colostrum was weighed and analysed using a Brix refractometer. Colostrum yield for multiparous cows was dichotomised as greater or less than 2.7kg as this was the volume of adequate quality colostrum needed to provide a jersey calf with adequate passive immunity. The average colostrum yield was 4.6kg (range 0 to 26.5kg). Primiparous cows on average produced larger weights of colostrum (4.92 vs 4.09kg) and better-quality colostrum (26.6% vs 25%) than second calvers. The proportion of multiparous cows that produced no colostrum at the first milking was 6% compared with 0.3% of primiparous cows. The amount of colostrum declined from June to December from 6.6 kg/cow to 2.5 kg/cow. Multiparous cows' yields decreased at 0.22 kg/week compared with primiparous cows which decreased at 0.08 kg/week. By December, 35% of multiparous cows did not produce colostrum at the first milking (1% for first calvers). After December, yields trended upwards. There was no cause identified for the patterns described above but there was in multiparous cows a strong correlation with photoperiod in the month prior to calving. For a farm experiencing this syndrome, having cows producing no colostrum means that colostrum banking has to occur. Does anyone recognise this syndrome in town supply herds or split calving herds?

Reference: *J Dairy Sci.* 2018;101(7):6388–6398

[Abstract](#)

### Independent Commentary by Hamish Newton.

Hamish Newton graduated from Massey University with a BVSc in 1998 and started working in mixed practice at the Veterinary Centre – Oamaru.

For full bio [CLICK HERE](#).



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### The cost-benefit of genomic testing of heifers and using sexed semen in pasture-based dairy herds

**Authors:** Newton JE et al.

**Summary/comment:** This Australian paper models the cost benefit of using genomic testing of commercial heifers. Genomic testing of commercial heifers should result in better decisions about selecting replacements and the correct assignment of parentage as well as allow for more target breeding objectives and earlier identification of heifers to use in embryo or high value AI programmes. It then goes on to look at the benefit of using sexed semen as well. One of the reasons stated for a lack of uptake of genomic testing of heifers is the need to keep most heifers as replacements but this could well change with an increase in the uptake of using sexed semen. A herd's reproductive and replacement rates and availability of estimated breeding values (EBV) derived from accurate parentage data had the biggest influence on whether genomic testing is profitable at current prices. Using current figures for costs and the reduced pregnancy rates, the usage of sexed semen in conjunction with genomic testing is likely to be profitable in heifers only (due to their higher conception rates).

**Reference:** *J Dairy Sci.* 2018;101(7):6159–6173

[Abstract](#)

### Performance of human observers and an automatic 3-dimensional computer-vision-based locomotion scoring method to detect lameness and hoof lesions in dairy cows

**Authors:** Schlageter-Tello A et al.

**Summary/comment:** This Dutch study looked at the agreement between human observers and a 3-dimensional computer vision automatic locomotion scoring (3D-ALS) system. The 3D-ALS system was also evaluated to see if it could differentiate the cause of lameness, e.g., horn lesions, skin lesions, or a combination of both. All cows in a herd were scored by two observers and the 3D-ALS on two occasions and all four hooves checked for lesions. Cows were scored by two humans on a rating scale from 1 to 5 with a score  $\geq 3$  being classified as lame. The 3D-ALS used an Xbox 3D camera suspended 3.45m above a corridor the cows walked down after milking. This data was then transformed into a value between 0 and 1. An average locomotion value was calculated for each cow when there were five values collected in a seven-day period. Lameness was defined as a value  $>0.334$ . The 3D-ALS assessed the curvature of the back whereas the human observers would have been evaluating gait and head movements, etc. This resulted in the 3D-ALS classifying more cows as lame. Cows with horn lesions were more likely to be classified as lame than cows with skin lesions inferring that horn lesions are more painful than skin lesions. The authors describe issues with cows bunching up as they entered the field of view of the camera that could be resolved with an automatic sorting gate prior to entering the camera area. It seems that with all automated disease detection systems, low specificity is a recurring theme and it results in a large number of false positives. However, using them as a screening tool would seem to be a good approach. If you can tweak the kids' Xbox to routinely measure lameness and BCS then you are onto a winner.

**Reference:** *J Dairy Sci.* 2018;101(7):6322–6335

[Abstract](#)

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### Antimicrobial resistance in non-aureus staphylococci isolated from milk is associated with systemic but not intramammary administration of antimicrobials in dairy cattle

**Authors:** Nobrega DB et al.

**Summary/comment:** This Canadian paper looks at the relationship between antimicrobial resistance found in non-aureus staphylococci (NAS) and herd level of antimicrobial use and route of administration. NAS isolates (n=1702) from 89 farms had their resistance profiles against 23 antibiotics evaluated. NAS were examined as these are the most commonly isolated bacteria from bovine milk. Antimicrobial use was measured over two years by regularly collecting all the empty drug containers used on each farm and converting this into antimicrobial daily doses (ADD). Antimicrobials were classified by route of administration as either systemic, intrauterine, or intramammary. The key finding was that the systemic use of penicillin, third-generation cephalosporins, and macrolides resulted in increased odds of resistance for each increase of one ADD per cow-year by 1.55, 1.36, and 4.81, respectively. The odds of finding increased resistance did not increase with increased usage of antibiotics either via the intramammary or intrauterine routes. This finding is probably explained by systemically administered antibiotics reaching the udder at a concentration below the minimum concentration required to prevent resistance amplification (e.g., the concentration termed "mutant prevention concentration"). This paper is a very sobering read, and although we don't know if NAS pose a direct risk to human health they could act as a reservoir for resistance genes.

**Reference:** *J Dairy Sci.* 2018;101(8):7425–7436

[Abstract](#)

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