

# Oestrous cyclicality and uterine health: is there a link?

**TEAGASC** research is looking at whether there are associations between oestrous cyclicality, uterine health and body condition score in dairy cows.

After parturition, the nutritional requirements of dairy cows shift abruptly, as milk production increases rapidly. It is normal for energy demand (maintenance and milk production) to exceed dietary energy supply, and negative energy balance is common during the early postpartum period. During that period, cows must resume normal oestrous cyclicality (OC) and complete uterine involution in preparation for another pregnancy. Post-partum ovarian cyclicality, uterine infection and body condition score (BCS) are important factors affecting reproductive performance in dairy cows. The aim of this study was to examine the associations between OC, uterine health status (UHS) and BCS during early lactation in first and second parity seasonal calving dairy cows.

## Collection of cow phenotypes

Thirty-five dairy herds located in the province of Munster were enrolled in the study. All herds were managed as grass-based seasonal-calving systems. The study population included first (n=1,637) and second (n=1,074) parity Holstein-Friesian and Holstein-Friesian x Jersey cross cows. All enrolled cows calved during the spring season (February to April) of 2015 (n = 24 herds) or 2016 (n = 11 herds). Enrolled herds were visited every two weeks during the postpartum period, and data was captured on each cow at week 3 (14 to 28 days in milk) and week 7 (42 to 55 days in milk). The study data collection schedule is outlined in **Figure 1**. BCS was measured using a 1-5 scale in increments of 0.25. Transrectal ultrasound examinations were conducted to determine OC based on visualisation of corpus luteum (CL) and dominant follicle (DF) structures on the ovaries, and UHS based on visualisation of mucopurulent material in the uterine lumen. Cows were grouped into categories for BCS, OC and UHS according to the following criteria:

- BCS categories: low ( $\leq 2.5$ ), target ( $\geq 2.75$  and  $\leq 3.25$ ) and high ( $\geq 3.5$ );
- OC categories: cycling (CyC; CL present), anoestrous (AN; CL absent and DF present), and deep anoestrus (DA; CL and DF absent); and,
- UHS categories: healthy (H), low infection (LI), mild infection (MI), and severe infection (SI).

## Associations between week post calving, parity, BCS and oestrous cyclicality

The data analysis verified some already known associations:

- the proportion of cows that had resumed OC was greater at week 7 (92.4%) compared with week 3 (45%), highlighting the importance of early calving date to achieve a high proportion of cycling cows before the start of the breeding season;
- a smaller proportion of first parity cows had resumed cyclicality at week 3 and week 7 (43.4% and 74.1%, respectively), compared with second parity cows (48.7% and 78.7%, respectively); and,
- BCS affected resumption of OC, with the proportion of low, target and high BCS cows that had resumed OC at week 3 (42.9%, 46.0% and 34.8%, respectively) and week 7 (65.5%, 77.6% and 70.8%, respectively) highlighting the importance of nutritional management for early resumption of cyclicality.

## Associations between week post calving, parity, BCS and uterine health status

- The proportion of cows that had a uterus classified as H, LI, MI or SI changed substantially between week 3 (2.2%, 25.1%, 60.5% and 12.0%, respectively) and week 7 (27.3%, 48.3%, 23.3% and 0.8%, respectively), highlighting the importance of early calving date to allow time for uterine recovery post calving;

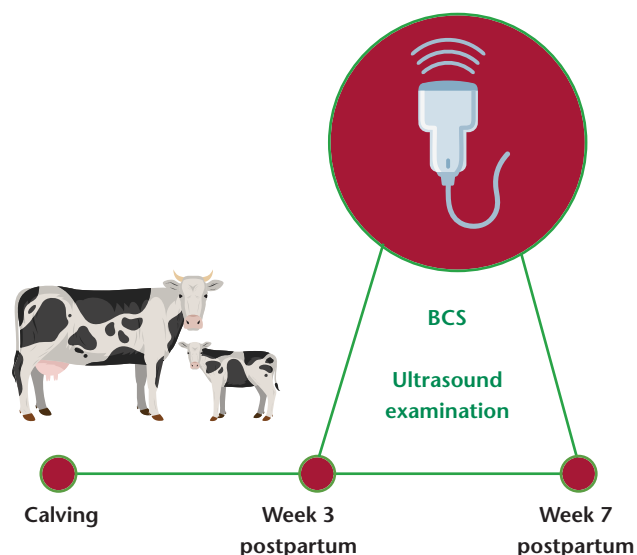


FIGURE 1: Diagram of data collection schedule. BCS: body condition score.

- the proportion of first parity cows that did not have any uterine infection (i.e., healthy uterus) was less than the proportion of second parity cows at both week 3 (1.5% vs 3.3%, respectively) and week 7 (25.6% vs. 30.1%, respectively); and,
- BCS was associated with UHS, with the proportion of low, target and high BCS cows that did not have uterine infection (i.e., healthy uterus) at week 3 (20.7%, 28.1% and 21.1%, respectively) and week 7 (21.4%, 28.5% and 12.5%, respectively) highlighting the importance of nutritional management for prompt uterine recovery after calving.

### Associations between oestrous cyclicity and uterine health status

An association between OC and UHS was detected, whereby cows that did not have uterine infection at week 3 and week 7 post partum (i.e., healthy uterus) had increased likelihood of having resumed OC compared with cows that were categorised as having mild or severe uterine infection (Figure 2). This could also be looked at the other way, whereby cows that had resumed OC by week 3 and week 7 had less likelihood of having uterine infection. The most common cause of uterine infection in cattle is bacterial contamination of the uterus in the immediate post-calving period. The bacteria produce endotoxins, which in turn attenuates secretion of gonadotropin-releasing hormone (GnRH) from the hypothalamus. Inadequate GnRH release prevents the frequent pulses of luteinising hormone from the pituitary gland that are required to promote follicular development and ovulation. Therefore, uterine infection may delay resumption of OC. On the other hand, each oestrus event causes uterine contractility, and helps to evacuate mucopurulent material from the uterus. Hence, early resumption of cyclicity may aid early clearance of uterine infection. The collective findings highlight the importance of achieving and maintaining a compact calving pattern in seasonal calving systems.

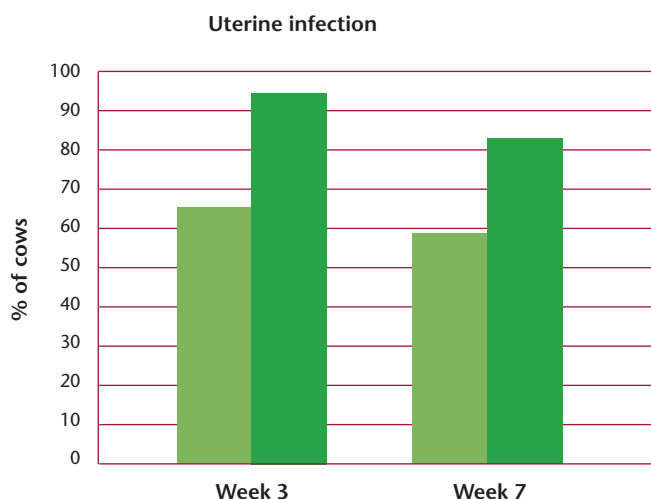


FIGURE 2: Incidence of uterine infection in cows that did or did not resume ovarian cyclicity at week 3 and week 7 postpartum.

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