Optimum milking management requires the cow, milker and milking machine to be operating in harmony. A key element of the Teagasc programme in the coming year will be a management survey on 20 farms which will assess the interactions of these factors on Irish dairy farms.

Teat dimensions will be recorded prior to milking unit attachment. Mouthpiece chamber vacuum and teat end vacuum will be measured during milking, non-invasively using the Bio-Control VaDia. The VaDia is a battery-operated data logger, which is small and light enough to be taped to a teatcup during milking (figure 1). Post-milking teat condition will be assessed by a number of visual observations. This kit can be used by a trained advisor or researcher and is used mainly as a research tool at the moment. But it may become more widely available in the future. For example, many advisors in Norway use the device as an on-farm diagnostic test. It is a milking time test device, as opposed to a dry test device or milking simulator device. Therefore, if the standard set of dry tests fail to detect a problem (eg a problem during milking of a cow), then this is a useful tool.

How it works
VaDia logs the vacuum data at four points during milking. The data can be downloaded and analysed to identify any vacuum irregularities, to identify where the milking equipment and milking routine are underperforming.

The over-milking period for a teat is identifiable by the point where the mouthpiece chamber (MPC) vacuum increases sharply toward the end of milking (figure 2). Analysis of on-farm data shows that herds without cluster removers are prone to over-milking towards the end of lactation. During the over-milking period, short milk tube vacuum can approach system vacuum causing congestion (or swelling) of the teat tissue and hence delayed closure of the teat canal after milking.

Classification of cow teat condition can be used to assess the effects of milking management, milking equipment or environmental factors on teat tissue and the risk of new intramammary infections. Short-term changes in teat condition in response to a single milking can be used to diagnose faults in milking machines or milking management. These short-term changes include firmness of the teat-end after milking and swelling at or near the base of the teat. These changes can be assessed after milking. Factors commonly associated with teat-barrel swelling include over-milking and teat-cup crawling. Factors commonly associated with swelling near the teat-end include over-milking, high vacuum, pulsation failure or insufficient rest phase of pulsation.

Longer-term changes in teat-end condition can be monitored by assessing the degree of hyperkeratosis (or roughness of the teat-ends) in the herd. Apart from seasonal weather conditions, major factors affecting teat-end hyperkeratosis include teat-end shape, production level, stage of lactation and interactions between milking management and machine factors (ie slow milking and over-milking).

Teat-end hyperkeratosis can be made worse by disinfectants that cause chemical irritation to teat skin or may be alleviated by the use of a disinfectant with a high concentration of emollient.

Combining milking time tests with teat condition assessment provides useful information for assessing milk-
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There are large variations in the price of a unit of electricity (eg from 18.3 to 13.8 cent per kWh of day rate electricity).

An average size farm can save over €700 per year by changing electricity suppliers. OTE.IGHTRATEELECTRICITYISAGOODlT for all dairy farms. There is no charge from ESB networks to install a night rate meter. The meter standing charges increase from approx. €0.46 per day to €0.60 per day after moving to night rate electricity. This means that a minimum of 1.5 units of electricity would need to be used each night to offset the extra charges.

Researchers from Teagasc, the UK, Denmark and Australia met at the UW-Madison in early April 2015 for 10 days of discussions and experimentation on the interaction between the milking machine liner and the teat of the cow.

One important goal for the group was to clarify and simplify advice on how to optimise three of the key physical influences (e.g. average and peak milk flow rates) and teat condition. Those three key influences are milking vacuum, pulsator settings and liner compression.

Results of a series of recent studies at UW-Madison indicate that the relative effect of each of these factors on milk rate is approximately 20% for milking vacuum, 20% for liner compression and 10% for pulsator settings.

This collaboration between Teagasc and UW-Madison has developed a method of assessing teat end and teat barrel congestion through analysis of milk flow rate from a teat using a quarter milking device.

The milking machine research programme at Teagasc Moorepark will use these techniques to quantify the congestive effects on the teat induced during milking with various combinations of vacuum level, pulsation settings and liner compression levels.

The aim is to provide refined guidelines for milking machine settings and liner suitability for different herds with the goal of minimising teat-tissue congestion during milking. Minimising teat-tissue congestion will reduce the risk of bacteria passing through the teat canal after milking, thereby reducing new mastitis infection risk.

Figure 1: VaDia device fitted to the rear left (RL) teacup of the cluster. Recording points for short milk tube (SMT) vacuum and mouthpiece chamber (MPC) vacuum can be clearly seen.

Farmers in the US are very much focused on the number of cows milked per hour. Hence, they train their staff to operate as efficiently and methodically as possible.

Figure 1: Transition from main milking period to over-milking period. Short milk tube (SMT) vacuum in blue and mouthpiece chamber (MPC) vacuum in red. Pulsation chamber vacuum is shown in green. The liner is open when the pulsation chamber vacuum is high.