



# How do dairy companies use Cell Check?

The concentration of somatic cells in raw milk is a key indicator of milk quality and is an integral part of most purchasing specifications world-wide. For many countries, purchasing standards begin at the farm gate. The European Community is a case in point where it specifies that raw milk must have a somatic cell count below 400,000 cells per millilitre to be used in the production of drinking milk or other milk-based products (92/46/EEC).

In a comprehensive review of the systems supporting Australian dairy exports in 2000, a team from the European Community found Australian dairy product “safe for human consumption” but noted that factories did not have documentation showing that supply from individual herds complied with the European Community cell count directive. Cell Check was developed by the dairy industry to enable export dairy establishments to clearly demonstrate compliance with directive 92/46/EEC.

Cell Check enables dairy processing companies to identify herds whose geometric average would exceed the European Community cell count reporting requirement of 400,000 cells per millilitre. Companies that incorporate the cell count requirement into their existing raw milk quality control provide the Australian Quarantine Inspection Service with a solid foundation to certify this aspect of dairy produce for export to relevant markets.

Cell Check provides companies exporting dairy produce with a framework for complying with Directive 92/46/EEC.

This FAQ Sheet describes the Cell Check measure, how it assists dairy company quality control and the options available to advisers responsible for managing high cell count herds. It also explains why it is appropriate to calculate cell count averages on a geometric, rather than arithmetic, scale.

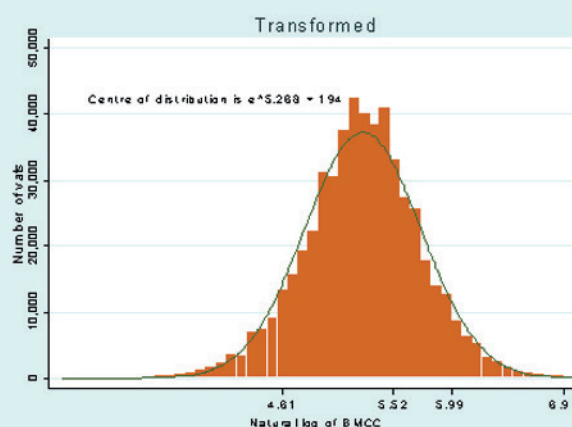
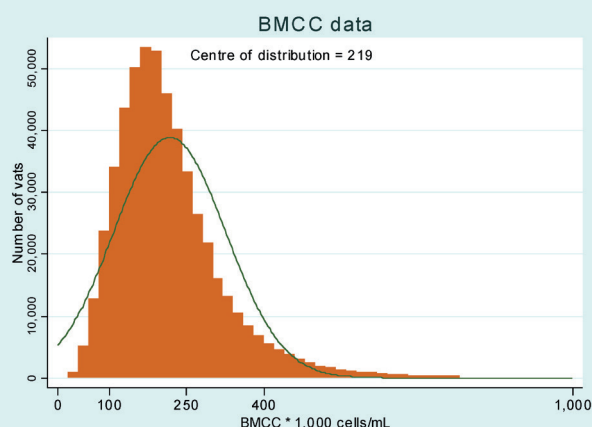
## Summarising cell count data

A single BMCC figure is often used to summarise the milk quality of a herd or nation. The method of calculation affects the final value.

As a rule, arithmetic averages do not describe the centre of cell count distributions because they can be inflated

by a small proportion of high cell counts. Transforming cell count data to a geometric (logarithmic) scale lessens the impact of occasional high cell counts. Reporting of the geometric average and standard deviation is the internationally recommended method of summarising cell count data (Smith 1997).

### The centre of skewed BMCC data is best described by the geometric average



Geometric averages describe the centre of cell count distributions, whereas arithmetic averages tend to overestimate it.

## The Cell Check measure

The cell count measure specified by the European Community directive is a geometric average of Bulk Milk Cell Counts (BMCC) over the previous three months with at least one vat sample being tested each month.

Given the method of calculation, Cell Check measures are not the same as:

- Daily BMCCs (the test result of individual vat samples).
- BMCC averages reported by factories (often arithmetic averages weighted by milk volume calculated over a 10 day period).
- BMCC triggers generated in Countdown Downunder Mastitis Focus (indices alerting farm managers to potential mastitis problems).
- The dairy industry goal of having all vats with cell counts below 400,000 cells/mL.

This list demonstrates the variety of ways in which cell count information is reported and used. To produce measures consistent with the European Community cell count requirement, Cell Check calculates the volume-weighted geometric average cell count for the three months before a test date and identifies suppliers with values above 400,000 cells per millilitre.

The seriousness of exceeding the Cell Check threshold cannot be understated. The European Communities Council Directive states that the cell count standards are "to be met at the time of collection from the production holding for acceptance of raw milk at treatment or processing establishments".

The Cell Check software and user's guide are available from Countdown Downunder.

## Incorporating Cell Check into dairy company quality control

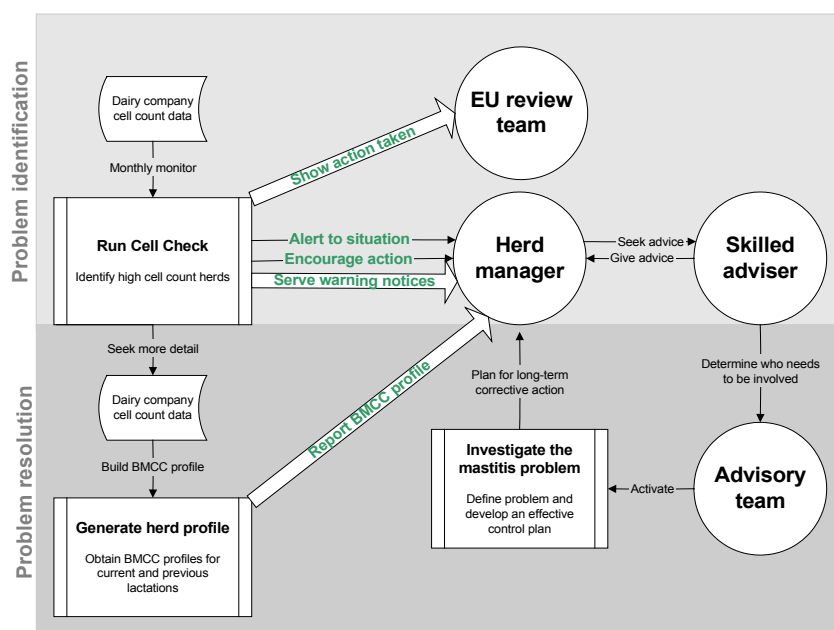
For companies exporting dairy produce to the European Community, the cell count requirement involves calculating a geometric average cell count for individual suppliers once a month and showing that appropriate action is taken when a result falls outside the acceptable limit.

The ability to trace product and demonstrate procedure is being followed are essential components of quality assurance programs. Each dairy company has its own policy and procedures for high cell count herds. A typical factory response when suppliers exceed the Cell Check threshold might involve:

- alerting the herd manager of the situation and the export implications;
- encouraging corrective actions through special company strategies and recommending herd managers seek professional advice;
- serving warning notices; and
- assisting mastitis investigations.

Given the lag period between implementing corrective action (based on an effective mastitis control plan) and achieving its outcome (lower cell counts), it is important that suppliers exceeding the threshold for the first time are alerted immediately to the situation and are shown a path forward. An important role of factory field officers, or their counterparts, is to instill herd managers with a sense of priority and purpose.

It is important to immediately notify managers of herds which exceed the Cell Check threshold to minimise the lag period between corrective action and resolution of the problem.



Flow of information through the Cell Check system.

There is no 'quick fix' for high cell count herds.

Technote 11 explains how BMCC can be used to estimate the level of mastitis in a herd.

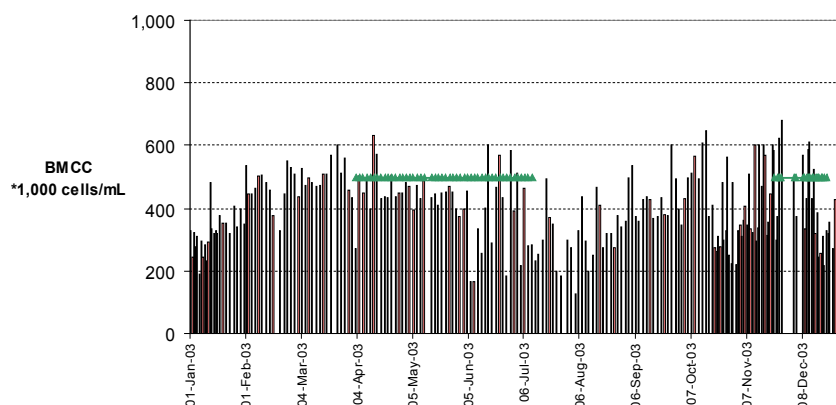
## The path forward for high cell count herds

Herds exceeding the Cell Check threshold tend to fall into two categories (1) those with chronically high BMCC and (2) those whose BMCC increases to high levels in the latter half of the lactation. Either way, a significant proportion of the herd must have been infected with mastitis over the previous three months to exceed the Cell Check threshold. This is highly unlikely to be a management glitch or a self-correcting event - these herds have a mastitis problem and need professional advice.

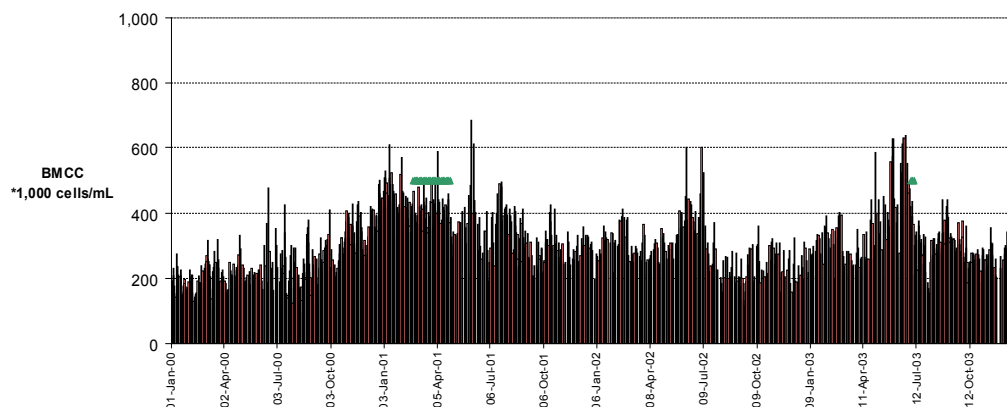
For example, in seasonal and split calving herds whose BMCC increases to high levels in late lactation (like BMCC profile '2'), the opportunity to cure the whole herd with antibiotic at drying-off usually gets them 'off to a good start' at the beginning of the next lactation. However to prevent the whole infection cycle starting again, it is essential to know what bacteria is causing the problem to ensure appropriate antibiotic treatment and culling strategies are implemented and to minimise spread from reservoirs of infection.

**BMCC profiles of herds exceeding the Cell Check threshold. The days these herds were above the Cell Check threshold are shown in green.**

### (1) Chronic problem – cell counts shown for one year



### (2) Recurrent problem – cell counts shown for four years



### Problem resolution

The only way of determining the bacteria causing a mastitis problem in a herd is by assessing an adequate set of milk cultures. Once the bacteria are identified, advisers can investigate the likely sources and method of spread in the herd and plan for its control. In most situations, several factors contribute to any one problem. Many mastitis investigations require the co-ordinated input of different professions, commonly skilled veterinarians and milking machine technicians. Countdown Downunder has established a protocol for mastitis investigations that has been used repeatedly and successfully on farms (described in detail in Technote 13) and maintains a current list of skilled professionals for each dairying region in Australia.

Resolving the problem not only satisfies the dairy produce export requirements, it also financially benefits individual farmers. Estimates from the Countdown Downunder Mastitis Model show that herds above 400,000 cells per millilitre, who reduce their BMCC by 100,000 cells per millilitre, will increase the net return per cow by about \$200 each year.

Dairy companies may develop strategies to encourage corrective action in high cell count herds. Some ideas that have been suggested include suspending milk payment penalties to suppliers who commit to a mastitis investigation, subsidizing the culture of milk samples from individual cows to define the mastitis problem in the herd, or helping farmers achieve milestones negotiated between the company and the supplier.

### Options to enable milk supply to continue in the short-term

While the fundamental problem is being identified and resolved, measures may need to be taken to enable milk supply to continue in the short-term. The most appropriate way of immediately lowering BMCC is guided by the particular problem in the farm. For example:

- With a small number of high cell count cows, it is feasible to identify cows and withhold their milk.
- A large number of high cell count cows and Strep ag is causing the mastitis problem in the herd, mid-lactation antibiotic treatment may be considered.
- High cell counts in cows nearing the end of their lactation, it may be appropriate to dry-off high cell count cows or quarters early.
- Many clinical cases, clinical case management needs to be reviewed.

Although they provide relief in the short-term, these options can be costly and complex to manage and do not resolve the fundamental problem. Problem resolution is still important to maintain supply of quality milk over a long term.

### Key papers

92/46/EEC European Economic Commission Council Directive Annexe A Chapter IV, Commission Document 392L0046 available at [http://europa.eu.int/eur-lex/consleg/pdf/1992/en\\_1992L0046\\_do\\_001.pdf](http://europa.eu.int/eur-lex/consleg/pdf/1992/en_1992L0046_do_001.pdf) in September 2004.

Smith KL. Recommendations for presentation of mastitis-related data. Part 1: Somatic cell count. In: Bulletin of the International Dairy Federation No. 321, Brussels, Belgium 1997:10-15.

Technote 13 gives a detailed description of the process for undertaking mastitis investigations in herds.

Contact details of dairy professionals who have completed the Countdown Downunder Adviser Short Course can be viewed at [www.countdown.org.au](http://www.countdown.org.au).

An electronic version of the Countdown Downunder Mastitis Investigation Pack is available from the website [www.countdown.org.au](http://www.countdown.org.au). Use a new copy of the pack for each investigation.

Technote 12 discusses options for dealing with high cell count cows.

The 'Strep ag' FAQ sheet describes the intricacies of treating subclinically infected cows with antibiotic during lactation.

Technote 16 gives the background and practicalities of drying-off abruptly.

Technote 4 details the issues around successfully diagnosing and treating clinical cases.

