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# An economic analysis of the barriers to achievement of improved economic performance of the dairy farm sector



**Key external stakeholders:**  
Dairy Farmers, Dairy Processors, AHI, DAFM

**Practical implications for stakeholders:**  
Potential for the introduction of a set of incentive schemes through milk pricing to reduce cell count at farm level  
The Cost Check calculator was developed in this project and is available for use by dairy farmers to determine the impact of SCC on farm profitability

## Main results:

There is a significant cost associated with elevated mastitis levels

- **Farm Level:** As bulk somatic cell count in a herd increase from <100,000 cells/ml to >400,000 cells/ml the overall net farm profit decreases by €19,504 for a 40 hectare with a 100 cows or 3.6c/l
- **Processor Level:** As bulk somatic cell count increases, milk price payable decreases and the values per kg of fat and protein decreases. There is a difference of 0.96 cents per litre between milk supplied with a bulk somatic cell count of between ≤100,000 cells/mL and milk supplied with a BMSCC of >400,000 cells/mL
- A payment system which reflects this, either in the form of a penalty or bonus or both directly related to SCC is one of the most effective tools available to the industry to reduce the national SCC profile.

## Opportunity / Benefit:

The analysis presented in this study shows that the national average cell count has the potential to have a strong negative impact on farm and processor profitability. If mastitis is not actively managed at farm and processor level the unrealised potential of the national industry will be even greater as the industry expands.

## Collaborating Institutions:

Rural Economy and Development Programme, Teagasc, Athenry, Co Galway Ireland

**Teagasc project team:** Laurence Shalloo (Project Leader/PI)  
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**External collaborators:** Dairy Processors,  
Animal Health Ireland and dairy farmers

### 1. Project background:

The improved economic performance of farms and the adoption of output enhancing technologies are critical to achieving the Food Harvest 2020 target to increase dairy production by 50% by 2020. This project explores the barriers to achieving improved economic performance at the farm level. In this study animal health practices in relation to SCC levels in the dairy herd are examined. The study involves both, economic analyses of the costs and benefits of best practice and social science research to identify drivers and barriers of the adoption of best practice in relation to these two case studies. The Moorepark Dairy Systems Model and the Moorepark Dairy Processing Model were used to quantify the costs and benefits of reducing SCC levels at the farm, national and processor level. The overall objective was to quantify the potential at farm, processor and ultimately at national level from reducing the SCC levels in the Irish dairy herd.

### 2. Questions addressed by the project:

There are three separate and distinct questions addressed in this project.

- What is the impact of mastitis on farm profitability?
- What is the impact of mastitis on processor profitability and ultimately on the price that the processor can pay for milk
- What is the overall industry impact of reducing the national SCC profile

### 3. The experimental studies:

- **Farm Profit** - To examine the impact of mastitis on farm profitability data on the farm specific costs of mastitis on Irish dairy farms were collected and incorporated into the Moorepark Dairy Systems Model (MDSM). The MDSM then calculated (i) total farm costs, (ii) total farm receipts, (iii) net farm profit and (iv) the margin per litre for a 40 hectare farm. Five distinct BMSCC categories were examined in the analysis;  $\leq 100,000$ , 100,001-200,000, 200,001-300,000, 300,001-400,000 and  $>400,000$  cells/mL.
- **Processor Profit** - To examine the impact of mastitis on processor profitability we first needed to understand the relationship between BMSCC and (i) raw milk composition, (ii) cheese processing and (iii) cheese composition. To do this a number of international studies were pooled together and analysed in a meta analysis.
- **Industry Profit** - A national cell count reduction scenario was set up in the model to simulate the effect across farm and processor the effects of reducing national SCC levels.
- **Cost-Check Mastitis** cost calculator was developed in Microsoft excel with a visual basic interface.

### 4. Main results:

**Farm** - Five bulk milk somatic cell count (BMSCC) categories of the national milk supply from  $\leq 100,000$  cells/mL to  $>400,000$  cells/mL were examined in the analysis. The net farm profit was calculated for an average 40 ha farm, accounting for the farm specific costs of mastitis. The national BMSCC profile for Irish milk was used to estimate the volume of milk supplied nationally within each BMSCC category. The net farm profit for each BMSCC category and the volume of milk supplied within each BMSCC category were used to calculate the overall effect of mastitis on industry profitability. A movement of producers from one cell count category to the next lower cell count category was examined in the scenario analysis. A 10% movement of producers to the next lowest cell count category saw the national average BMSCC decrease by 9,670 cells/mL and resulted in a combined increase in farm and processor profitability of €6.6 million per annum. Similarly, a 20% movement of producers to the next lower cell count category resulted in the national average BMSCC decrease by 19,340 cells/mL and resulted in a combined increase in farm and processor profitability of €19.4 million per annum.

**Processor** - The impact of mastitis on the profitability of the Irish milk processing sector was examined using a processing sector simulation model. Changes in raw milk composition, cheese production and composition, skim milk powder (SMP) production and composition and whole milk powder (WMP) production and composition as bulk milk somatic cell count (BMSCC) increased were incorporated into the model. To

determine the impact of elevated somatic cell count (SCC) on raw milk composition, cheese production and cheese composition, a meta-analysis was carried out using data from 53 peer reviewed scientific articles. The available literature was investigated and pooled to allow the meta-analysis to detect significant effects of SCC. The protein, fat and lactose content of raw milk were significantly affected by SCC. In cheese production, SCC had a significant negative effect on protein recovery. Regarding cheese composition, the moisture content of cheese increased significantly as SCC increased and the protein content of cheese significantly decreased as SCC increased. The analysis found that as BMSCC increased the quantity of product produced reduced. When scaled to a national level as BMSCC increased from <100,000 cells/mL to >400,000 cells/mL net milk value decreased by €51 million per annum or €0.0096/l.

#### 5. Opportunity/Benefit:

- Reducing the Irish national SCC levels will result in increased profitability at farm level as well as resulting in a situation where a higher milk price can be paid by the processors as well as increasing the reputation of Irish milk on the world stage.

#### 6. Dissemination:

*Cost Check Mastitis calculator* <http://www.agresearch.teagasc.ie/moorepark/docs/costcheck-booklet.pdf>

#### Main publications:

Geary, U., Lopez-Villalobos, N., O'Brien, B., Garrick, D.J. and Shalloo, L. (2014). Estimating the impact of somatic cell count on the value of milk utilising parameters obtained from the published literature. *Journal of Dairy Research* 81: 223 - 232

Geary U., Lopez-Villalobos N., O'Brien B. Garrick D.J. and Shalloo L. (2013). Examining the impact of mastitis on the profitability of the Irish dairy industry. *Irish Journal of Agricultural and Food Research*, Vol 52: Number 2, Page 119-134

Geary U., Lopez-Villalobos N., O'Brien B. Garrick D.J. and Shalloo L. (2013). Meta-analysis of the impact somatic cell count has on raw milk composition, cheese production and cheese composition. *Irish Journal of Agricultural and Food Research*, Vol 52: Number 2, Page 135-150

#### Popular publications:

Geary U and Shalloo L (2012). Cost check: A way to save money. In proceedings of the Teagasc National Dairy Conference. Page 53-63. Bandon Hotel Tralee and Mullingar Park hotel 20th and 21st of November

Geary U (2013). Examining the impact of mastitis on the profitability of the Irish dairy industry. *Animal Health Ireland. A cornerstone of sustainable and profitable farming. Conference proceedings. Wednesday 23rd October 2013, Rochestown Park Hotel. Page 13-18*

#### 7. Compiled by: Laurence Shalloo