

# Current challenges in global dairy farming: cattle diseases

## Abstract

The article covers the main health issues in North American and European dairy herds. Mastitis-causing agents responsible for human cases of infection, including the STEC group, as well as current programs for the control of diseases affecting dairy cattle are described.

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## Editorial

Dairy industry is very vulnerable. Facilitated global trade, increase in population and related growth in milk and meat production have contributed to redistribution of pathogens, vectors and infected hosts, and changed the pattern of many diseases.<sup>1</sup> Increased international trade in live animals is being complicated by faster transmittance of pathogens. In addition to that, new pathogens and diseases have appeared. For example, *Schmallenberg virus* was discovered in 2011 in Germany and later isolated in some other European countries. It is an *orthobunya virus* which affects cattle, sheep, and goats, causing congenital malformations and stillbirths.<sup>2</sup>

Two current main health issues in North-American dairy herds are mastitis and John's disease (paratuberculosis). The problem of mastitis has been under close attention of researchers and practitioners for many years, but continues to be a great challenge due to a wide range and diversity of factors and pathogens accounting for its development. Some of those pathogens are relatively new. In Canada, every year dairy producers in total lose about \$300million due to mastitis.<sup>3</sup> Economic losses caused by mastitis in the U.S. are around \$200 per cow per year. In the Netherlands, the losses due to clinical and subclinical mastitis vary between €17 and €198 per cow per year.<sup>4</sup> Mastitis inevitably leads to reduced milk production, increased veterinary and labor costs. Economic losses also include those in processing industry, which are due to the increase in SCC, enzymatic breakdown of milk protein and fat, decreased production of lactose and casein, production of off-flavours, longer renneting time, less stability of cheese texture and taste, reduction of shelf-life of the products.<sup>5</sup>

A number of the mastitis-causing agents are responsible for human cases of infection (*Brucella*, *Campylobacter*, *Listeria*, *E.coli*) and intoxications which include food poisoning (e.g. caused by the toxins produced by *S. aureus*). Shiga toxin-producing *Escherichia coli* (STEC) is an important enteric bacterial pathogen, leading in some cases to bloody diarrhoea and hemolytic uremic syndrome.<sup>6</sup> Although it is caused most often by the consumption of ground beef, cases of contamination through raw milk have been reported.<sup>7-9</sup> The most well studied member of the STEC group is *E. coli* O157:H7. In the US, Shiga toxin-producing *E. Coli* in 2012 caused 29 outbreaks and 500 illnesses with 98 hospitalization.<sup>10</sup> In one Brazilian study, 5.8% of milk samples from cows with mastitis contained *E. Coli* strains, and 64.5% of them belonged to the STEC group.<sup>11</sup>

John's disease (tuberculosis) is difficult to control on farms; it is resulting in significant financial and welfare consequences.<sup>3</sup> This disease is of high concern to some European countries as well. According to the National Farmers' Union, the UK, this disease affects up to 35% of the herds.<sup>12</sup>

Programs for the control of diseases affecting dairy cattle include proper identification of the pathogens, observance of the practices that reduce the risk of milk contamination with antibiotic residues,<sup>13</sup> and effective vaccines.<sup>14</sup> The measures aimed at preventing or minimizing the spread of infectious diseases between farms (farm biosecurity) is of high importance.<sup>15</sup> In Europe, the Guidelines for the EU co-funded programmes of eradication, control and surveillance of animal diseases and zoonoses have been recently prepared for 2015-2017. EU co-funding covers such cattle diseases as bovine tuberculosis, brucellosis, bluetongue in endemic or high risk areas, transmissible spongiform encephalopathies (TSE), and *salmonellosis*.<sup>16</sup> In 2010/11, the UK government spent £91million compensating farmers for bovine tuberculosis.<sup>17</sup> Raw milk from infected cows can be a source of infection for humans. This disease is a significant zoonosis listed in the World Organisation for Animal Health Terrestrial Animal Health Code.<sup>18</sup>

In the US, reports on *E. Coli* O157 and non-O157 STEC that cause human illness are notifiable to the Nationally Notifiable Diseases Surveillance System.<sup>6</sup> Creation of a "virtual radar screen" for real-time monitoring of important pathogens, vectors and hosts has been discussed.<sup>1</sup> A "One Health" approach has been developed by FAO to address multidimensional linkages between livestock production, public health and wild animals, and to enable international cooperation and partnership in disease prevention, detection and eradication.<sup>19</sup>

**The Journal of Dairy, Veterinary and Animal Research** gives all dairy researchers and veterinarians a great opportunity to collaborate and contribute with their expertise, look at the problems from the perspective of different countries, find solutions to various issues in science, industry, and practice.

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## Conflict of interest

Author declares that there is no conflict of interest.

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