Assessment of the capacity for the monitoring of antibiotic resistance, epizooties and zoonoses by bulk milk samples

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Key words
Bulk-tank milk, epizootics, zoonoses, antibiotic resistance, surveillance programme, cost-effectiveness.

Aim of the study
The main aim was to identify candidate epizootic and zoonotic pathogens which could be surveyed or eradicated through bulk-tank milk BTM testing and assess the feasibility of BTM surveillance for antibiotic resistance. Another aim was to explore the potential to reduce the costs and to increase the benefits or effectiveness from current surveillance programmes for epizootics and zoonoses using BTM or combinations of current sampling procedures and BTM.

Material and methods
To reach these objectives, a literature review on surveillance systems using BTM and on currently available diagnostic tools was conducted. Today, many surveillance programs have to be done in accordance with international agreements, therefore in parallel the possibility of BTM sampling according to international agreements was also evaluated. To investigate the potential use of BTM testing in surveillance of epizooties, a cost-effectiveness analysis of BTM testing for surveys to demonstrate freedom from infectious bovine rhinotracheitis (IBR) and bovine enzootic leucosis (EBL) in Switzerland was performed. To identify candidate zoonotic pathogens to be surveyed through BTM surveillance a prioritisation of zoonoses transmitted through milk with a panel of Swiss experts was conducted. This prioritisation identified a major zoonotic pathogen, which was Listeria monocytogenes. For the study, Salmonella spp. was also chosen as another potential zoonotic pathogen to be screened with BTM on farm-level to identify potentially infected herds. Therefore, cost-effectiveness analyses of surveillance programmes for Listeria monocytogenes and Salmonella spp in dairy cattle based on BTM samples were conducted. A brief summary of the feasibility and a literature review on antibiotic resistance monitoring with BTM were also carried out. (Formatvorlage Standard)

Results and significance
The literature review showed the potential of BTM in epizootics and zoonoses surveillance programmes in several countries. Many diagnostic tests were described. The cost-effectiveness of BTM for epizooties was assessed by a financial comparison between the current surveillance programme for IBR and EBL with blood sampling and a modified surveillance programme including BTM samples. An assessment of the savings generated through BTM surveillance was established by this cost comparison. The costs were halved, without compromising the power of the surveillance programme. The potential of surveillance of zoonotic pathogens was evaluated with the two candidate pathogens Listeria monocytogenes and Salmonella spp., but such surveillance programmes were not cost-effectives under current conditions in Switzerland. The feasibility of antibiotic resistance monitoring through BTM was assessed.

Publications, posters and presentations
Reber A., Reist M., Schaeren W., Graber H., Hänni A., Schwermer H. (2009 and 2010) „Beurteilung des Potenzials der Überwachung von AB-Resistenzen, Tierseuchen und Zoonosen mittels Tankmilchproben". Oral Presentation at the annual conference of the VPHI, ILS und EPI in Berne

Reber A., Reist M., Schaeren W., Graber H., Hänni A., Schwermer H. (2011) " Tankmilchproben". Poster Nutri 11

Reber A., Reist M., Graber H., Hänni A., Schwermer H. (2011) "Cost-effectiveness of bulk-tank milk testing for surveys to demonstrate freedom from infectious bovine rhinotracheitis and bovine enzootic leucosis in Switzerland" Article submitted to Schweizer Archiv für Tierheilkunde

Reber A., Reist M., W., Graber H., Hänni A., Schwermer H. (2011) „Beurteilung des Potenzials der Überwachung von AB-Resistenzen, Tierseuchen und Zoonosen mittels Tankmilchproben“. Doctoral thesis, Faculty of Veterinary Medecine, University of Berne.

2 additional scientific publications in preparation

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