Calves are considered more susceptible to Mycobacterium avium subsp. paratuberculosis (MAP) infection than adult cows. It is generally accepted that the young heifer group should be targeted to reduce the transmission of MAP in infected herds.

The objective of this study was to systematically review the scientific literature concerning risk factors associated with MAP transmission to calves using 5 questions:

1) Is there a relationship between the characteristics of the immediate neonatal calves’ environment and risk of infection with MAP?

2) What is the risk of MAP transmission through colostrum ingestion?

3) What is the risk of MAP transmission through milk ingestion?

4) Does group-housing calves increase the risk of MAP transmission?

5) Is there an increased risk of MAP transmission when calves have contact with adult cow’s feces?

An electronic search of PubMed and CAB was conducted in December 2009. Papers published in non-peer-reviewed journals, not relevant to any of the five questions or in a different language than English, French or Spanish were eliminated. The articles selected were reviewed by 3 authors.

Twenty-one articles (years of publication: 1992-2009; origin: 10 different countries) were included in the systematic review. The majority of the study designs was cross-sectional (n=15). For question 1 (n = 16), 9 found a significant association between the neonatal environment and MAP transmission and 1 an inverse association according to common thinking. For question 2 (n = 11 papers), 4 found a significant association between feeding colostrum (pooled, from MAP positive cows, unpasteurized) and transmission of MAP. For question 3 (n = 11 papers), 2 found a significant association with feeding raw milk and using foster cows with the risk of MAP transmission, 2 found an inverse association according to common thinking and for 1 study the risk was not evaluable since all the calves were fed unpasteurized milk. For question 3 (n=11 papers), 3 found that group-housing calves increased the risk of MAP transmission and 1 that that raising calves in individual pens decreased the risk of MAP transmission. Finally for question 5 (n = 13 papers) 5 found a significant association between contact with adult cow's feces and an increased risk of MAP transmission.

This systematic review revealed that multiple risk factors for MAP transmission to calves are possible. It seems that the major risk is when calves are in contact with adult cow's feces.