

# The effect of failed transfer of passive immunity on disease risk in pre-weaned calves: A systematic review and meta-analysis

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## Introduction

Calves that fail to absorb maternal antibodies, termed failed transfer of passive immunity (FTPI), are more susceptible to infectious disease, but estimates of the strength of association between FTPI and disease risk vary widely.

## Materials and methods

A systematic review and meta-analysis were performed to evaluate the measure of association (risk ratio, RR) between FTPI and disease in pre-weaned beef and dairy calves. Databases (Scopus and PubMed) were searched for studies that evaluated calves for FTPI at  $\leq 8$  days of age and recorded preweaning disease incidence. Summary RR and 95% confidence interval were calculated when  $\geq 3$  studies had a homogenous RR as evidenced by a non-significant Q-test ( $P > 0.10$ ).

## Results

Twenty-five of 126 references were relevant. Twelve studies evaluated the effect of FTPI on morbidity, 20 on mortality, 8 on diarrhea, and 8 on pneumonia. Forty-four of 49 studies (89.9%) reported higher RR for disease among calves with FTPI. The RR for FTPI was heterogeneous across studies until studies were grouped by type of disease. The RR for calves with FTPI differed by the type of disease (e.g. enteric versus respiratory). Also, the RR for mortality was heterogeneous across studies with high ( $> 5\%$ ) mortality but homogeneous in studies with low ( $\leq 5\%$ ) mortality.

## Significance

Calves with FTPI have increased risk for infectious diseases, but the measure of association depends on the type of disease and disease burden in the herd. These results indicate that maternal antibodies are more protective against some diseases than others and protection is variable when the disease burden is high.

