

## INFLUENCE OF ENVIRONMENTAL HEALTH IN THE COW-CALF DYAD SYSTEM

### INFLUÊNCIA DO AMBIENTE SANITÁRIO NA FORMAÇÃO DA DÍADE NO SISTEMA VACA-BEZERRO

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Health factors influence the cow-calf dyad system in the postpartum period until the first suckling. The use of maternity paddock is a recommended management to facilitate the monitoring of parturient cows and calves. However, side effects occur due to environmental health conditions of maternity paddock that can affect the behaviour of the cow and result in the separation of calf from the mother, undermining sucking and the formation of the cow-calf dyad. To improve the understanding of this complex and dynamic system we built a conceptual model using the technique of causal loop diagram, Figure 1. By hypothesis, the environmental variables that act in maternity paddock influence the variable "Sources of pathogens in maternity". Those sources present a positive effect (in the same direction) in the infection process of the calf and cow. Thus, a recommended practice is exposing the parturient cow to pathogens in maternity for sufficient period to stimulate their immune system and build disease resistance. That process contributes to improve the quality of colostrum that will be consumed by the calf during the first hours postpartum which has the function of increasing calf immunity, minimizing the occurrence of infections. In the model, sanitary environmental factors work in two Balance feedback loops (B1 and B2). The B1 cycle refers to the production of a healthy cow with a low level of infection by means of the variables: "Vaccine", "Stimulation of cow immune system" and "Health resistance" with delay. The variable "Cow infection" has a negative influence (in the opposite direction) in the "Maternal behaviour", thus the more infected the cow, the less investment will occur in maternal behaviour. The B2 cycle refers to the calf's health condition, which is positively influenced by "Calf infection" which, in turn, has positive influence, contributing to the increase of "Calf diseases". The increase in "Calf diseases" generates an increase in "Health care". The more health care, the lower the degree of the "Calf diseases". However, the "Health care" requires "Separation Calf-Cow" that interferes with the stimulus needed to form the dyad, immediately after birth (imprinting). Therefore, two balance cycles act in stabilizing the health of the cow and calf to avoid undesirable influences on cow-calf dyadic behaviour. We conclude that the variable "Stimulation of cow immune system" is a leverage point in the maternity paddock system.

Key words: animal behaviour, maternity paddock, system dynamics.

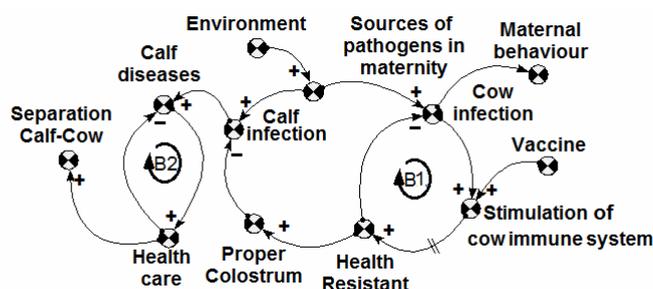


Figure 1. Conceptual model of the health environment effects on cow-calf dyad behaviour