Official Journal of the Animal Science and Production Association (ASPA)

ISSN 1594-4077
eISSN 1828-051X

www.aspajournal.it

Italian Journal of Animal Science
2015; volume 14
supplement 1

# italian journal of animal science

## ASPA 21st Congress

**Milano, June 9-12, 2015**

## Book of Abstracts

**Guest Editor: Giovanni Savoini**

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and Production Association

ISSN 1594-4077
eISSN 1828-051X



**Publisher**

PAGEPress Publications
via Giuseppe Belli 7
27100 Pavia, Italy
Tel. +39.0382.1751762 – Fax: +39.0382.1750481
info@pagepress.org – www.pagepress.org

Italian Journal of Animal Science

ISSN: (Print) 1828-051X (Online) Journal homepage: http://www.tandfonline.com/loi/tjas20

# Proceedings of the 21st ASPA Congress, Milano, June 9-12, 2015

**To cite this article:** (2015) Proceedings of the 21st ASPA Congress, Milano, June 9-12, 2015, Italian Journal of Animal Science, 14:sup1, 1-177

**To link to this article:** http://dx.doi.org/10.4081/ijas.2015.s1

## C-078

### Predicting survivors of neonatal calf diarrhea using logistic regression or gradient boosting

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Neonatal calf diarrhea is a serious welfare problem and a cause of economic loss due to mortality, treatment costs and poor growth. Moreover, it is a good example of a complex and multifactorial disease, resulting from the interaction between the calf, the environment, the nutrition and the different infectious agents. The objective of this retrospective study was to use clinical data and ancillary test examination findings from dairy calves diagnosed with NCD to predict the outcome of the disease. Data refer to medical records of 131 Holstein calves (males=16, females=115), affected by NCD and hospitalized from January 2006 until August 2014 at the Clinic For Ruminants, Swine and Management (CRSM) of the Large Animals Veterinary Teaching Hospital, University of Milan. Age, emogas analysis, total protein, dehydration and vitality scores and rectal temperature were available for each calf. Logistic Regression (LR) and Gradient Boosting Machine (GBM) were used to estimate the probability of the disease outcome (coded as 0 or 1 if the calf survived or died, respectively) based on the available medical records. The effect of sex and month of hospitalization were also fitted. To build the predictive model a cross validation procedure was adopted. First, the 131 records were randomly split in a training and a testing datasets including 75% (n=92) and 25% (n=39) of the observations, respectively. Then, the training dataset was used to build the predictive model with a 5-fold cross validation scheme. Finally, the obtained predictive model was used to predict the probability of the disease outcome (dead/survived) in the testing data. Before implementation of the cross-validation procedure data were checked for multicollinearity and standardized. The following statistics were obtained: 1) the Accuracy (AC), i.e. the proportion of the total number of predictions that were correct 2) the Sensitivity or true positive rate (TPR), and 3) the Specificity or True Negative Rate (TNR). The absolute value of the t-statistic for each parameter included in the predictive model was used for estimating its contribution to the model itself. The AC, TPR and TNR were 0.70, 0.74 and 0.58 and 0.54, 0.63 and 0.33 for LR and GBM, respectively. Total protein and Anion Gap were the major factors associated with mortality. These results represent a first attempt to assist the veterinarian in defining a more accurate prognosis and choosing the best therapeutic protocol.

## C-079

### The hidden costs of animal health in dairy cattle breeding: evidences from a case study

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Inaccurate management of dairy cattle health entails problems of animal health and represents a cost that need to be correctly evaluated in order to ensure the economic success of breeding activity. In term of organizational and accountancy aspects, the agricultural sector seems to be underdeveloped compared to technologically advanced food firms, and farmers likely underestimate these costs. The present research aims at quantifying the economic loss due to animal health and focusing on the "hidden costs" of sanitary treatments in dairy cattle breeding. According to accounting theory, the costs of animal health management are divided into two parts: explicit and implicit costs. In our analysis, the former include the amount of money required for the purchase of veterinary medicinal products, while the latter result from the revenues' losses due to milking suspension of treated cows. We refer to implicit costs as "hidden costs", because they do not imply a tangible expenditure, but they rather need to be accounted as income losses. In the present research, a sample of farms have been analyzed calculating the real (explicit) and estimated (implicit/hidden) accountable costs due to pathologies occurred over two years. The analysis proposes an economic efficiency index of veterinary cost per livestock unit (€/LU) in order to evaluate the total costs of sanitary treatments in dairy cattle breeding and compare different farms' performance. Results shows that farmers can spend from 89.43 to 211.98 €/LU per years due to cows' pathologies, and sometime hidden costs (i.e. implicit costs) overcome explicit expenditures. The study suggests the importance of managing and monitoring in order to provide targeted interventions. No process monitoring, i.e. lack of information, implies difficulties related to problem solving and decision-making issues. Considering that the case study focuses on a small sample of farms, results may not be generalizable to the dairy cows sector. Nonetheless, the calculated losses should encourage farmers in introducing an accurate plan for collection and processing of sanitary data in order to: (1) assess the health status of the herd; (2) identification of the priority animal care action area; and (3) optimization of resources and maximization of profits.