

Bovi-Analytics: a platform to educate veterinary students on large data sets in dairy cows

M. Hostens, DVM, PhD; K. Hermans, DVM; J. De Koster, DVM; B. Van Ranst, DVM; J. Vandepitte, DVM; G. Opsomer, DVM, PhD

Department of Reproduction, Obstetrics and Herd Health, Faculty of Veterinary Medicine, Ghent University, Salisburylaan 133, 9820 Merelbeke, Belgium

Introduction

Originally the emphasis in veterinary medicine was on the individual cow affected with a clinical disease. However, about 30 years ago it was recognized that subclinical disease was the major cause of economic losses in dairy herds. The multifactorial origin of most subclinical disease was examined during regular herd visits by veterinarians. This turned out to be effective in improving the overall health status of the herd, hence profitability. The approach was called herd health management and has been taught to veterinary students over 3 decades in the Department of Reproduction, Obstetrics, and Herd Health (ROHH). The first computer was bought for the Faculty of Veterinary Medicine in the early 1980s and placed at ROHH to store data from cows subjected to examination during herd health visits. Over the last decades, technologies to collect and store data have been evolving at a quicker pace compared to the speed at which new insights in dairy science have been discovered. Nowadays, data is stored on farm with a focus on reproduction, production, and health parameters. Recently, this has been increased with a vast amount of data coming from new so called precision livestock farming (PLF) technologies. These PLF technologies includes rectal, vaginal, and ruminal temperature data loggers, accelerometers, automated weight scales, 3D-imaging technologies and many others. However, they commonly create large data sets, which are stored in on-farm databases that do not reach the veterinary community. The objective of the current initiative is to help re-establish that veterinary link to on-farm data by including large data set analysis in the veterinary curriculum.

Materials and Methods

In Belgium, as in other parts of the world, the number of herds is declining whereas the number of animals/herd is increasing. Although the individual physiological and pathophysiological principles remain valid in the current veterinary curriculum, herd health management is becoming more important. Furthermore, dairy herd managers are confronted with a reality influenced by contemporary economic

and environmental drivers. Within herd health management, efficiency of production needs to be included as a new topic. Herd dynamics are complex and the multifactorial origin of most subclinical diseases asks for profound analysis of the herd records. One of the main topics in herd health management is the analysis of production, reproduction, and health parameters to get insights in the herds' performance. Veterinary students are taught to interpret these parameters and benchmark against trade-offs. However, the "BigData", which is collected daily, contains much more information that should be included in the herd analysis.

Results

To the best of our knowledge, there is no integrated platform that allows educational access to dairy records. Bovi-Analytics is a new tool to allow veterinary students continuous access to up-to-date herd records on top of which analytical tools can be implemented. Efforts have been made to link the up-to-date data to Business Intelligence (BI) tools such as Power-BI and statistical tools (SAS and R-code). Business intelligence tools are a type of application software designed to easily retrieve, analyze, and report data for business intelligence in many industries. The tools generally read data that have been previously stored, often, though not necessarily, in a data warehouse or data mart. This enables students, researchers, and veterinarians to explore the data with commonly used software. This tool focuses on alleviating the technical hurdles veterinary students have reported earlier.

Significance

The overall goal remains to ease simple but non-simplistic interpretation of the large amount of data available in herd management software as well as other PLF databases.