

Guidelines on use of sensors for animal health and productivity; a New Zealand initiative

Claudia Kamphuis

Wageningen University, the Netherlands

Claudia.Kamphuis@wur.nl

The continuous increase in dairy herd sizes is driving a need for sensor technologies that support daily management decisions to improve animal health and productivity. Scientific research on sensor technologies has focused on assessing their ability to detect events of interest (e.g., mastitis or oestrus events) using epidemiological terms like sensitivity and specificity. However, these performance indicators are meaningless for farmers, who are end-users of these sensor technologies. Moreover, comparing performance indicators between studies, and thus between sensor technologies, is extremely difficult since studies have used (1) a variety of gold standards, (2) different in- and exclusion criteria to create data sets for model development and validation, and (3) different time windows in which alerts for events of interest are considered true positive or false positive. Lastly, studies often used a limited number of (research) farms to collect data, and thus, there is little to no evidence of field performance. To overcome the difficulties of interpreting performance indicators and the lack of uniform performance information, DairyNZ developed protocols to field-evaluate performance of in-line mastitis detection systems. The protocols are aimed at providing: (1) robust and uniform information on performance of in-line mastitis detection systems against criteria of importance to farmers to support more informed investment decisions, and (2) an evaluation framework to help sensor technology providers develop or improve their products. However, protocols require support from both sensor technology providers and the wider industry in order for them to be accepted and regularly used. Although New Zealand sensor technology providers have expressed general support for the proposed protocols for in-line mastitis detection systems, an international approach would be beneficial to refine and gain agreement on the proposed protocols. Furthermore, protocols for sensor technologies targeting other events of interest (e.g., estrus detection) would benefit technology development and adoption. The DairyNZ approach can be used as a starting point to gain agreement on guidelines, definitions, and approaches for sensor evaluation in general. By doing so, it is expected that improved sensor technologies will be developed that offer improved management support. IDF established a working group to progress the development of these guidelines.

Acknowledgements

This article is based upon work from COST Action FA1308 DairyCare, supported by COST (European Cooperation in Science and Technology, www.cost.eu). COST is a funding agency for research and innovation networks. COST Actions help connect research initiatives across Europe and enable scientists to grow their ideas by sharing them with their peers. This boosts their research, career and innovation.