



One Health, Herd Health, and the Small Farmer: The Use of Health and Wellness to Improve Small Farmer Production Efficiency



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Introduction

Herd Health applications are designed to address improving livestock herd productivity through general husbandry, nutritional management, pathogen control strategies, vaccination, disease surveillance and environmental management. Livestock are important in supporting the livelihoods of limited resource consumers, traders and laborers throughout the world. Diseases affecting livestock can have a significant impact on animal productivity and production, on trade in live animals, meat and other animal products, on human health zoonosis, and, consequently, on the overall process of economic development. Each livestock herd's productivity is directly impacted by the health of the animals in the operation. Not only can diseases reduce efficiency, illness outbreaks are detrimental to animal welfare and consumer confidence. Control measures largely depend on the knowledge base of cattle and small ruminant producers for their success. Small limited resource producers play a critical role in the implementation and success of disease control programs.

The Small Farmer

Small farms, which are diverse, represent an important segment of the agricultural sector and rural communities [1,2]. These farms are numerous, contributing to agricultural output and controlling a substantial share of assets. Small farms have been facing several problems over the years that continue to challenge their viability [3]. Even though minority small farm operators don't produce the same volume as many of the larger farmers, they are no less important to their states as producers of high-quality products. Small, limited resource farmers have been looking for more efficient ways to safeguard herd health for a long time. Traditional veterinary medicine with healing, curing and treating of single animals or entire herds has lost its importance and will eventually be replaced by preventive measures and health management. Because animal or herd-health information is important not only to the farm business but potentially also to animal welfare and public health, an understanding by farmers,

extension agents and researchers of the types of sources of animal/herd health that farmers can utilize is important [4].

Disease Management

A systematic herd investigation strategy for disease management is pivotal to define the problems, understand important risk factors, develop a plan, and make accurate recommendations. A review of records, feeding routines, housing, routine procedures, vaccination, and treatment protocols begins the investigation and determines which diagnostic procedures and testing strategies are most useful for an operation. Disease management is most effective when the problem source is well defined and the exposure can be limited. Screening examinations performed regularly or done at strategic times improves detection of disease and can be used to monitor treatment outcomes and can avoid disease outbreaks. Careful recordkeeping must be done to monitor the program's progress. In any livestock production system, certain diseases and production constraints can be anticipated based on accumulated experiences. Herd health management and preventive medicine programs are designed to minimize potential adverse effects of these predictable constraints and to protect against unexpected ones. Some producers may expect a complete program to include reproductive examinations, vaccination and therapeutic procedures, and nutritional and selection consultation. Others may request a less sophisticated program. In any case, the consulting veterinarian should have a basic plan that is flexible enough to be applicable for any herd.

Importance of Investigation

Disease surveillance can help determine the most important diseases of a farm operation and, can present clinical approaches that can improve detection, diagnosis, and treatment of herd-based problems. Few studies have considered in detail the range of herd health management practices undertaken on cattle farms. In a study conducted by Brennan and Christley, 56 cattle

farmers in a 100 km² area of north-west England were questioned regarding their on-farm biosecurity practices, including those relating to animal movements, equipment sharing and companies and contractors visiting the farms. There was great variation between farms in terms of the type of, and the extent to which biosecurity was carried out [5]. For example, most farmers did not isolate stock brought onto the farm, but a small proportion always isolated stock.

Many farmers administered treatments post-movement, primarily vaccinations and anthelmintics, but very few farms reported carrying out health checks after moving animals onto the farm. In addition, there appeared to be much variation in the amount of biosecurity carried out by the different companies and contractors visiting the farms. Dead stock collectors and contracted animal waste spreaders, although likely to have a high potential for contact with infectious agents, were reported to infrequently disinfect themselves and their vehicles. These findings suggest that although certain biosecurity practices are undertaken, many are carried out infrequently or not at all. This may be due to many factors, including cost (in time and money), lack of proven efficacies of practices and lack of relevant education of veterinarians, producers and other herd health specialists. Further research exploring the reasons for the lack of uptake is imperative if preventive medicine is to be utilized fully by the farming industry.

A study by Van Leuken [6] reported that hotspots (areas most likely to contain the actual source) could be identified during the early outbreak stages based on the earliest 2-10% of the case notifications in Q fever outbreaks in the Netherlands. Distances between the hotspots and suspected goat farms varied from 300-1500 m. In regional likelihood rankings that included all large dairy farms, the suspected goat farms consistently ranked first. The model they developed identified the most likely location of sources in an airborne pathogen outbreak area, even at early stages [7]. This model can help to reduce the number of potential sources to be investigated by microbial testing and allow rapid implementation of interventions to limit the number of human infections and reduce the risk of source-to-source transmission.

The Southern University Institute for One Health One Medicine

The Southern University Institute for One Health One Medicine was established in 2017. The mission is to promote, improve, and defend the health and well-being of all species through enhanced cooperation and collaboration to advance the concept of one health with the ultimate goals of protecting and saving lives in future generations by accelerating research discoveries, enhancing public health efficacy, expeditiously expanding the scientific knowledge base, and improving medical education and care. The institute is in the process of developing new strategies to control economically important diseases of livestock and advance the body of knowledge of limited resource farmers in both basic and applied research on disease surveillance and biosecurity

for farm operations. Two centers within the institute, the Center for One Health Research and the Center for Animal Health and Zoonosis focuses on animal and herd health.

These centers support research that increases the understanding of biological processes and lays the foundation for advances in disease diagnosis, treatment and prevention. It has been estimated that over 75% of pathogens in humans have their origin in animals. This Center provides preventive veterinary education and care to the animals of those in need. As an agricultural institution created to serve, we are charged ethically with promoting public health and protecting animal health and welfare. The Center has a great interest in the surveillance, prevention, control, and treatment of disease. Through these efforts, we improve not only the health of the animal, but also support the physical and emotional well-being of their owners or guardians and contribute to protecting public health. The Southern University Institute for One Health One Medicine endeavors to be nationally and internationally recognized for exemplary biomedical and agricultural research to advance the theory and practice of disease diagnosis, treatment and prevention.

Conclusion

The goal of a herd health program is to limit or eliminate diseases affecting livestock that can have a significant impact on animal productivity and production, on trade in live animals, meat and other animal products, and human health zoonosis. The Southern University Institute for One Health One Medicine is endeavoring to understand the science of production limiting diseases in livestock operations to acquire knowledge that will be used to improve the position of small farmers in Louisiana, other states in the southern region, the US and globally. The knowledge that we gain through investigations will give the Institute and the Southern University Agricultural Research & Extension Center prominence and leadership in an area that will be useful to other institutions that deal with similar clientele. It will also build a strong foundation for future scientific endeavors.

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