

# Disease investigations: Review and update

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## Abstract

Bovine practise in the 21<sup>st</sup> century has changed from an emphasis on individual animal diagnosis and treatment to a diagnosis and management of a herd or a cohort of that herd. That change has meant a more comprehensive examination of the animals, environment, and the cattle management on that premises is indicated. A system of diagnostic support in a herd situation is even more important and extensive than on an individual bovine. A necessity for a herd diagnosis is a site visit and the creation of a database that includes a history, individual animal exams and their diagnostic support, necropsies, and environmental scans. A definitive clinical-pathological diagnosis is often not made, but a good clinical or epidemiological diagnosis may lead to improved cattle management that will eliminate or minimize the specific herd problem.

**Key words:** bovine, herd, population, diagnosis

## Résumé

La pratique bovine du 21<sup>e</sup> siècle s'est éloignée du diagnostic et du traitement d'individus pour passer au diagnostic et à la gestion d'un troupeau ou d'une cohorte de ce troupeau. Ce changement implique qu'un examen plus approfondi des animaux, de l'environnement et de la gestion des bovins sur les lieux est requis. Un système de soutien en matière de diagnostic dans le cas d'un troupeau est encore plus important et plus élaboré que dans le cas d'un simple bovin. Pour le diagnostic au niveau du troupeau, il est nécessaire de faire une visite sur le site et de créer une banque de données incluant les antécédents, les examens individuels et leur soutien en matière de diagnostic, les nécropsies et les analyses de l'environnement. Un diagnostic clinique-pathologique final n'est pas toujours possible mais un bon diagnostic clinique ou épidémiologique peut mener à une meilleure gestion des bovins qui éliminera ou minimisera le problème spécifique du troupeau.

## Introduction

Historically, veterinarians working in agriculture were asked to deal with problems on individual cattle or horses. With mechanization of agriculture that included the use of tractors and other self-propelled equipment, agricultural equine practice almost disappeared. Veterinarian practice then changed to more involvement with cattle, both beef and dairy. In Canada, this change was accentuated in the 1970s

with the importation of the large European beef breeds. Veterinarians, who could now be correctly called "Buiatricians", spent most of their time dealing with dystocias and neonatal disease. Veterinary practises in rural areas flourished.

Several events with international trade have changed the daily workload of the buiatricians. Canada synchronized our grading system with our neighbors which meant producers changed their breeding program to meet these new grading specifications. However, in so doing, they significantly reduced the veterinary workload associated with parturition previously seen in western Canadian cow herds. Similarly, the diagnosis of Bovine Spongiform Encephalopathy meant the value of the livestock was drastically reduced. In many situations, there no longer was a cost benefit to use a veterinarian.

Currently producers call a buiatrician to attend to a problem of the group. Examination of the herd, cohort or group on the property not only entails individual bovine examinations, but very quickly resembles an epidemiological investigation. Indeed, the "threshold of concern" that producers have for the cattle in their charge has shifted from individual animals to group of animals. Some of our veterinary textbooks have begun to reflect that change, and describe the examination of the group as well as the examination of the individual.

## Herd Examination

It is often said that the first task of a disease investigation is to determine if this is an outbreak or merely random events. A formal examination of the herd is the only way to make the distinction.

A history of the problem should indicate or outline how a herd examination should proceed. Clinical exams of individuals will help to characterize the disease event. If there are dead animals, extract all the information the cadaverous material can provide. Never overlook the importance of a written document that describes the investigative effort.

A site visit is considered a critical imperative. It would allow for an evaluation of the level of biosecurity on the property and facilitate an examination of the environment and an evaluation the management. Such a visit may also show differences in the problem between various classes of cattle on the property, and that alone may help with a diagnosis. Additionally, a farm visit would help with an evaluation of behavior. Cattle seeking shade during a heat wave would increase the livestock density that might facilitate transfer of pathogen (e.g. *Moraxella* spp) between individuals. Wild cattle would disguise the degree of lameness.

## Herd Examination Protocol

While the examination of an individual cow would basically attempt to look at all body systems, the methodology for examination of the herd is much more extensive. Little has been published on how to examine the herd, so the common protocol followed very closely resembles the rules of journalism.

A description of the problem, with clinical description and number of animals affected, would be the first question, or the journalistic equivalent of “what”! Included in the category could simply be a summary of; e.g. reproductive exams.

“Who” are the affected animals that may need statistical effort to demonstrate that differences between “affected” and “non-affected” groups are actually different and not simply a random effect. Often age of animals can help lead to a more definitive description and how management of an age group is different.

“When” the problem occurs, is critical. Oftentimes a tight cluster of animals clinically affected or even dead can suggest a toxic event. A common practice that arises when a feedlot necropsy is done will be to compare the time of first treatment to the extent and age of the pulmonary pathology.

Cattle struck by lightning are often found under a tree or in a fence line. In these situations the “where” of the problem often provides the only critical component of the diagnosis.

Easily, the most complicated part of a herd examination protocol is in finding a definitive answer to the “why” question.

Then, if an answer to the questions of what, who, when, and where is present, this usually leads to a tentative diagnosis of “why”.

### Cases with no Definitive Diagnosis

In spite of extensive efforts it may be that no definitive clinical-pathological diagnosis is determined.

Examples of such “unknown” diagnoses are presented in Table 1. Often, even if an etiological diagnosis is not definitive, a clinical or epidemiological diagnosis alone may assist with change in management. If heifers in early spring suffer sudden deaths in a paddock with sloughs, the management change might be to delay grazing that paddock until mid-summer.

**Table 1.** Clinical and epidemiological diagnoses made without a clinical-pathological diagnoses.

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Outbreaks of severely traumatized tongues in cattle (2)
Megacolon mortality in “shooter” Elk bulls
Calf-crop loss to congenital joint laxity & dwarfism (2)
Blind neonatal calves, an outbreak over 2 years
Weak calves immediately after birth (2)
Outbreak of mortality in mature bison cows

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### Reasons for No Diagnosis

The most common reason for “no diagnosis” is the same in many situations. Without sufficient information and material, a result is often that the problem is not described in its entirety.

If the history is incomplete and the site visit is overlooked or compromised, a diagnosis may remain unmade. Additionally, if the material used for diagnostic support is unsuitable, contaminated or insufficient, a diagnosis of the problem is seriously compromised.

Crop agriculture has undergone many recent changes and associated with those changes are many emerging concerns, like mycotoxicoses, that our diagnostic labs may not have the available laboratory capabilities to be definitive.

Commonly the cost of such examinations can become the fundamental issue and often determines whether a diagnosis is made or not.

The problem may have naturally gone away and/or the enthusiasm to make a final diagnosis has waned. A disease investigation is not really defined, and producers who are used to asking their veterinarians to complete a specific task will often consider that seeking a diagnosis on a herd problem to be an almost never-ending task.

### References

1. Constable PD, Hinchcliff KW, Done SH, Grunberg W, eds. *Veterinary medicine*, 11<sup>th</sup> ed. St. Louis, MO: Elsevier, 2017.
2. Radostits OM, Leslie KE, Jetrow J, eds. *Herd health; food animal production medicine*. 2<sup>nd</sup> ed. W.B. Saunders Company, 1994.