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Managing large databases: Using data to make decisions and support changes in health programs

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The need for a database

Serology, tissue diagnostics, mortality summaries, vaccine/medication event changes, farm staff turnover, changes in processes, ventilation changes, barn hi/low temps. These are all events/information that are routinely recorded in a site or barn. This data is often briefly reviewed during a farm visit, but rarely used again. Such information is important and valuable lessons can be learned from it, but how do we close the gap between collection, entry, and retrieval? A database can store information, link it together, and organize it for rapid retrieval.

This is not a novel idea—in fact, at last year's Leman Conference Dr. Spencer Wayne described the need for a database to organize diagnostic information in his production system. As a follow-up to that discussion, I will describe some situations in which I have used stored diagnostic information to support a decision or track a change and its influence on performance.

Using information for decision support

Case 1: PRRS seroconversion linked with mortality in a finisher flow

A multisite nursery finisher system with all-in—all-out by site groups was experiencing high mortality in the finisher phase. Serial serology was being done monthly to determine prevalence of Swine Influenza Virus (SIV), Porcine Reproductive and Respiratory Syndrome Virus (PRRS), and *Mycoplasma hyopneumoniae* (Mhyo). This is done in conjunction with monitoring vaccine compliance and performance. The graph in figure 1 depicts PRRS ELISA serology plotted in comparison to weekly mortality for one group of pigs.

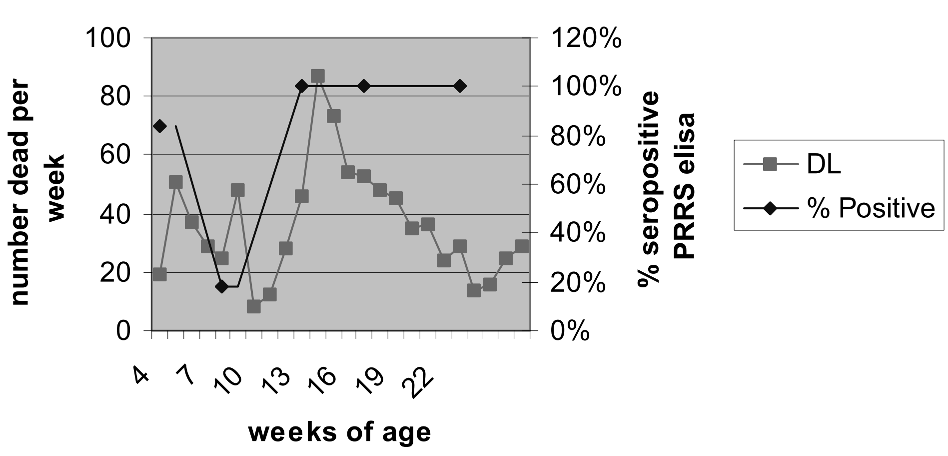
Several groups were monitored with the same sampling technique and the information was similarly detailed.

Out of twelve groups only one did not follow the above pattern with the spike in mortality within a week of seroconversion to PRRS. Understanding that the pigs did not die from the PRRS virus, but typically from another respiratory agent, I used tissue diagnostic cases submitted from pigs in this system to evaluate the most common bacteria isolated (figure 2). Clinically, the pigs were experiencing a cough followed, typically, by inappetance, ulcer formation, and death.

Using the same dataset a table can be created with the sensitivity of the most common isolates, in this case *Pasturella multocida* is indicated (see figure 3). This information was used to set an antibiotic protocol for the farm with continued monitoring and diagnostics.

The diagnostic bacterial sensitivity information can also be used to support AMDUCA decisions. Tracking resis-

Figure 1. PRRS seroconversion compared to mortality



tance of an organism in a particular herd can provide valuable support information for extra-label drug use.

Understanding trends

Tracking information across our system has allowed us to compare influences that may be seasonal or environmental and not under management control. One case has been sow mortality (figure 4). Looking at three different geographical regions over time there has been a consistent trend in sow mortality. When evaluating this type of information, keep in mind that management process changes such as culling procedure can influence it.

With region 3 being the most mildly affected, there is a clear pattern to periods of high and low mortality. We have attempted to use historical and environmental information to explain why May–August 2001 was so drastic compared to the same time frame in other years.

Monitoring vaccine compliance: Herd protection

Storing serologic information can be useful for monitoring herd antibody levels and determining vaccine compliance on the farm. In this case we were vaccinating sows prefarrow with two single strain SIV vaccines given at 1/2 dose. The process was changed to a bivalent product given at full dose. The serological data collected before and after the change proved that the product and process change resulted in more consistent antibody titers (figure 5). This, in turn, will result in more consistent

Figure 2. Bacteria isolated from multisite finishing system

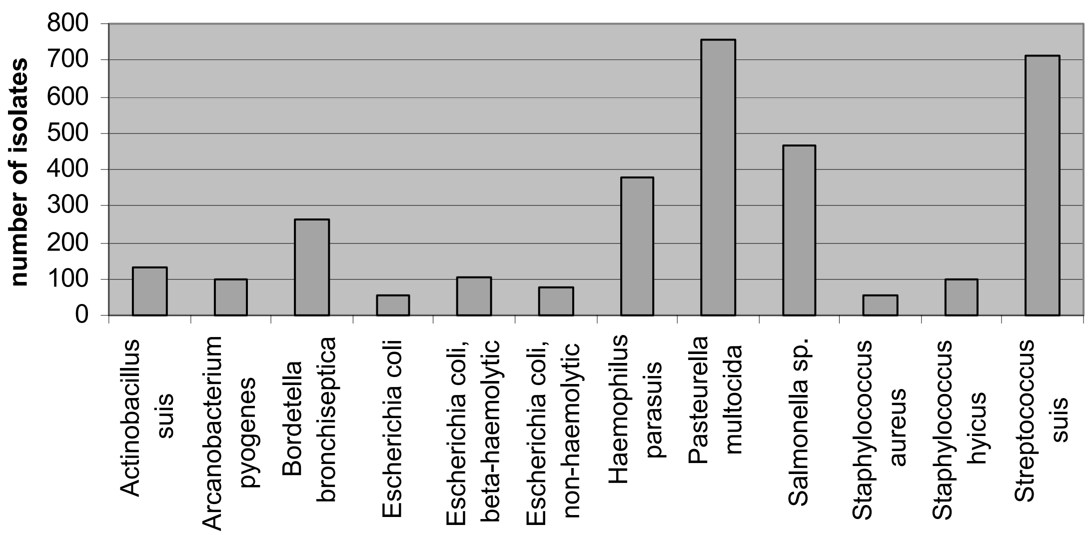
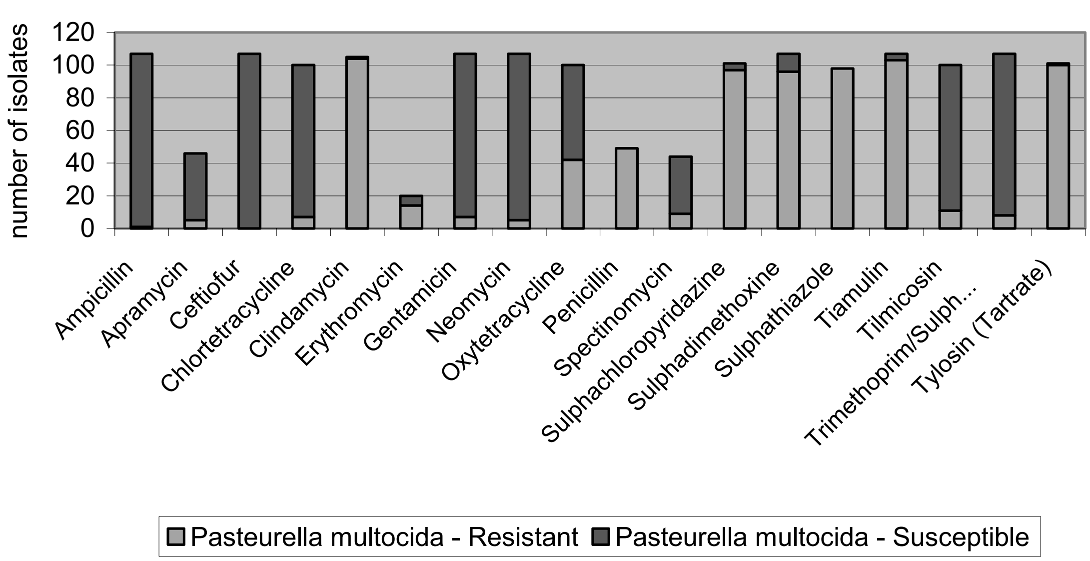


Figure 3. *Pasturella multocida* susceptibility



Disease

maternal antibody transfer to pigs. With more consistent titers in the sows prefarrow, it will be less challenging to calculate maternal antibody decay curves and decrease the effects of maternal antibody interference when timing vaccine strategy in the nursery.

Tracking pigflow changes and predictability

Recently we made a change in the pigflow in one system. We separated the gilt progeny from the P2+ progeny in the nursery and finisher. The maternal antibody protection passed on from gilts versus that of sows varies therefore the waning of those antibodies will be different for the progeny. Gilts also have a tendency to shed more

Figure 4. Sow mortality by month

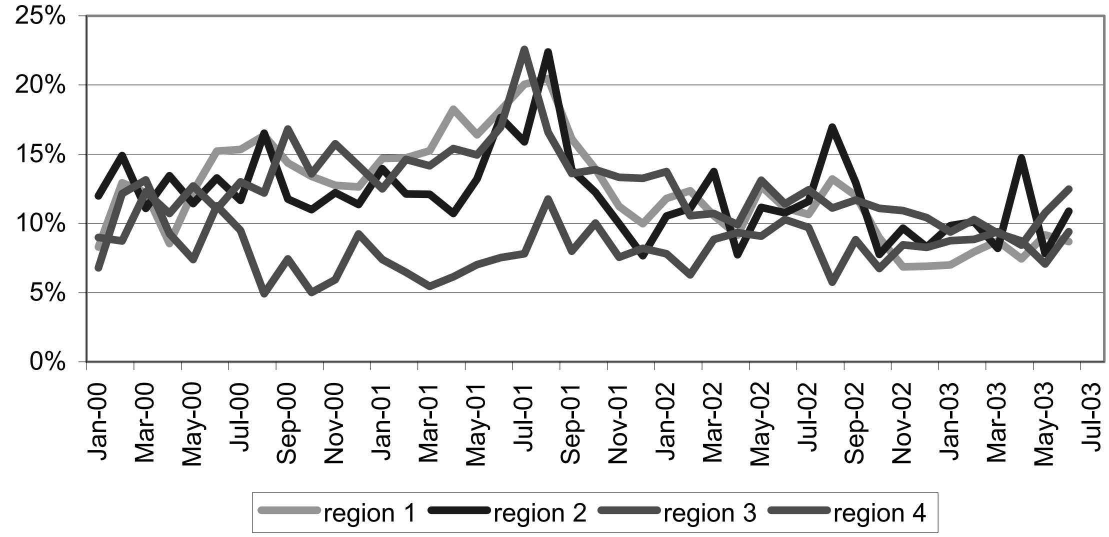


Figure 5. SIV HI titers

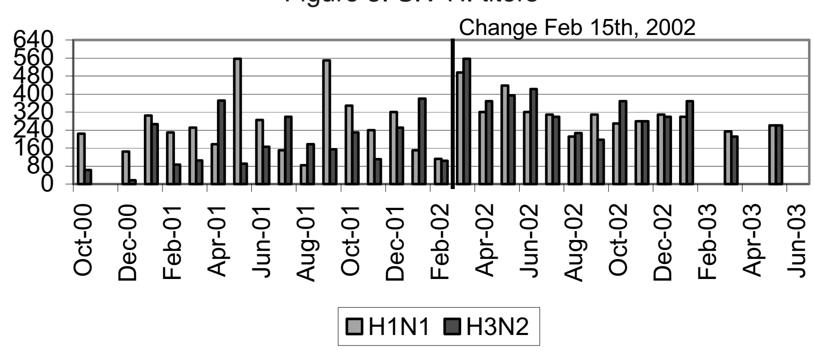
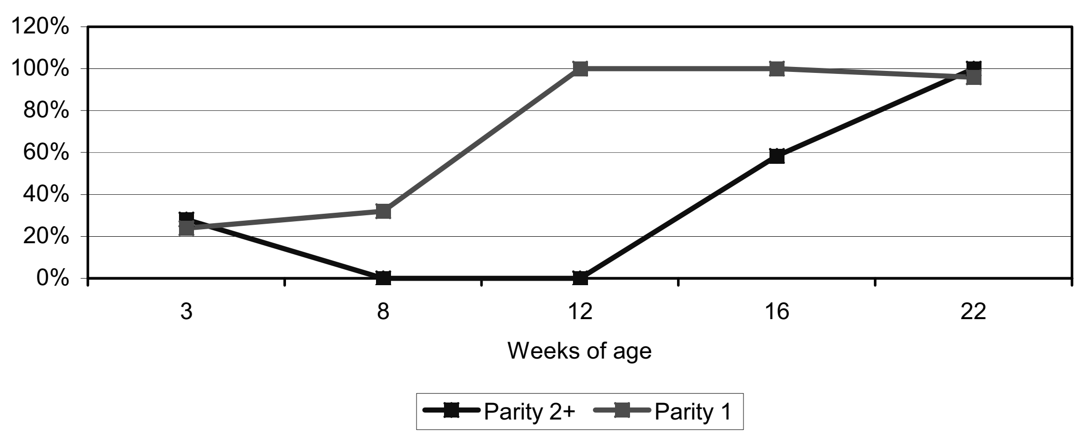


Figure 6. PRRS % seropositive ELISA (0.40)



Disease

organisms to their progeny hence some projects like a *Mycoplasma hyopneumoniae* eradication program require closing the herd to animals less than 10 months of age. With these variations in mind we see a difference in serologic pattern between our P1 and P2+ progeny pigflows. Figure 6 below illustrates this phenomenon.

Summary

In conclusion, there is a large amount of data available as a tool for support in making decisions or tracking changes. The challenge is correct interpretation and organization of the data to produce simplified information in a timely manner.