Interpreting MSHMP's Chart 1 for PRRS and PEDv

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Key Points:

- **Incidence is calculated as the proportion of *herds* at risk that become infected during a period of time.**
- **Since incidence is a relative measurement, it accurately reflects the risk of new infections in herds in each specific year.**
- **As our number of MSHMP participants continues to increase, comparisons of incidences between different years should be interpreted with caution.**

In the MSHMP report, both the pages for PRRS and PED have a Chart 1 also known as the Cumulative Incidence chart. This chart shows the cumulative incidence of the disease for specific years and the current year's weekly incidence. We wanted to take the opportunity to refresh our readers on how to read these graphs.

Incidence

Incidence refers to new cases within a specific population over a period of time (Dohoo et al., 2010). Incidence risk, also referred to as cumulative incidence, is the observed risk of infection in the population of herds in the time period studied. In the case of Chart 1 for both PRRSv and PEDv, the graph summarizes both the cumulative incidence (e.g. colored lines) and the weekly incidence (e.g. black lines). The former is the cumulative percentage of MSHMP herds (farms) that broke within the year. The latter is the percentage of herds that broke within the week. It is important to remember that a single herd can contribute multiple cases of PRRS or PEDv. In other words, one herd can break multiple times within the space of a year.

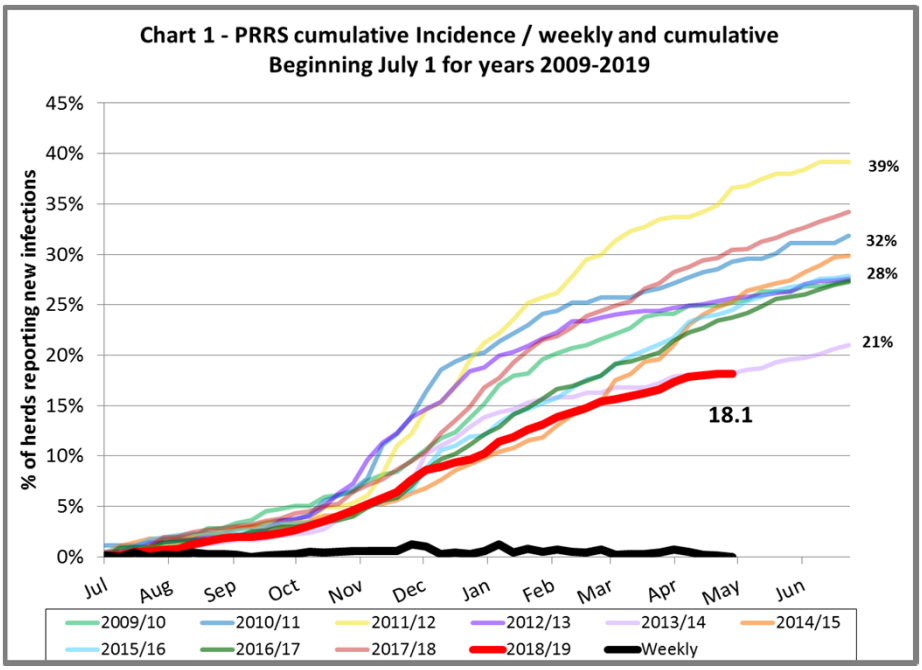
Population and Time Period

MSHMP is always enrolling new participants who may contribute data both prospectively and retrospectively. It is also important to mention that MSHMP participants' system size change over time. These factors cause the population to vary across years, which ultimately makes yearly comparisons difficult.

The time period graphed is the MSHMP year, which runs from July 1st through June 30th of the following year. When a new year starts, the cumulative incidence count is set back to 0 until new cases start accumulating from July 1st onwards. Herds that broke the previous year and continue to be classified as MSHMP status 1 (infected) will not be counted as a new case on the new MSHMP year unless they report a break with a new strain. Interpretation of the weekly cumulative incidence is slightly different from the annual. In this case, the time period in which we want to know how many herds break is one week. That means the incidence count is set to zero in the beginning of each week and the number of herds that broke during that week is divided by all herds.

Reading the Chart

With an understanding of incidence and the specific population and time periods being studied, we can see that Chart 1 shows us the cumulative percentage of MSHMP herds that broke within a given year for each year of the project. The period in which we observed the highest PRRSv incidence so far was 2011/12 (e.g. yellow line) ending with a total cumulative incidence of 39%. The year with the lowest incidence was 2013/14 (e.g. light purple line) with a cumulative total of 21%. The current year 2018/19 (e.g. red line) incidence is 18.1% currently with 2013/14 during the same week.



These yearly markers provide a good sense of the industry's status of PRRSv each year. At the same time, it is very important to be careful when comparing incidence across years. Since incidence is a relative measurement (percent of new cases among all tracked herds), it is not directly affected by the addition of new herds. However, herds added can differ from herds that were being followed previously in relation to exposure to PRRSv (e.g. either by being more or less exposed or susceptible). Depending on how many new herds are being introduced and how different they may be from previously enrolled herds, a change in trends of both cumulative and weekly incidences can occur. Additionally, if certain years have a smaller herd population compared to others, or the population is geographically clumped, they may not be as representative of the industry as a whole. Thus the need for cautious interpretation and comparison between years.

References: Dohoo, I., Martin, W., and Stryhn, H. (2010). Veterinary Epidemiologic Research, 2nd edition. VER Inc., Charlottetown, Prince Edward Island, Canada.

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