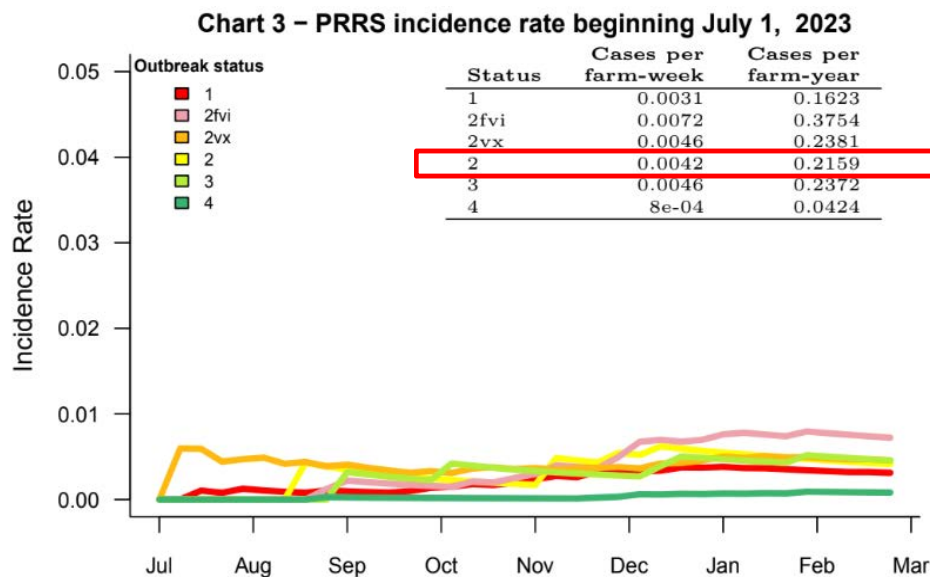# Chart 3 description: PRRS incidence rate by status at break
MSHMP Team

In this science page we would like to review one of our charts that tends to be more difficult to interpret, yet it conveys a valuable interpretation of the MSHMP data. Chart 3 - PRRSv Incidence rate can be tricky to interpret at first because it reflects the dynamic nature of swine herd health and, consequently, the MSHMP data. Since PRRSv health statuses are not static over time, a farm can experience PRRSv status changes throughout the year. This happens in a variety of ways, such as moving towards a naïve status, introducing vaccine(s), or experiencing a new PRRSv outbreak. The situation becomes more complex by the fact that a farm listed as having recently moved to a PRRSv status 1 can break again with another PRRSv strain. Therefore, we consider each farm as at risk for breaking with PRRSv regardless of its current status.

Chart 3 calculates the PRRS *Incidence Rate* according to the health status farms had at the beginning of the MSHMP year (Jul 1st). This chart addresses the question: "How frequently do farms that started the MSHMP year in each of the different PRRSv health status break with PRRSv throughout the year?". Therefore, Chart 3 estimates the number of outbreaks within each status while taking into account the time at risk (i.e. number of weeks in that given status). For instance, if 10 sites started the year as status 2, one breaks with PRRSv within 5 weeks and a second one breaks within 20 weeks, while the rest remain with no PRRSv breaks throughout the year, their time at risk (i.e., time in the original status) is 5 (for the first site), 20 (for the second site), and 52 (for each of the remaining 8 herds) weeks, respectively. The incidence rate would be 2 (total number of breaks) divided by 441 farm-weeks (5+20+(8*52)), or an incidence rate of 0.0045. This means that, on average, the 10 hypothetical sites that started the year in status 2 experience PRRSv breaks at 0.0045 breaks per week. Farm-week is the nomenclature of the standardization of the different contribution times of each site. Similarly, the contribution time can also be standardized to represent years instead of weeks.

Using the Chart 3 example below, the incidence rate for PRRS status 2 farms is 0.0042 cases per farm-week or 0.2159 cases per farm-year. Alternatively, we can multiply those rates by 1,000 and have an incidence rate of 4.2 cases per 1,000 farm-week or 215.9 cases per 1,000 farm-years. In other words, if 1,000 farms are in status 2 in a given week, approximately 5 are expected to experience a PRRSv outbreak (0.0042 x 1,000 farm-weeks). Or annually, if 1,000 farms are in status 2 during the year, then approximately 216 farms are expected to experience a PRRSv outbreak (0.2159 cases x 1,000 farm-years).

Chart 3 − PRRS incidence rate beginning July 1, 2023

Status	Cases per farm-week	Cases per farm-year
1	0.0031	0.1623
2fvi	0.0072	0.3754
2vx	0.0046	0.2381
2	0.0042	0.2159
3	0.0046	0.2372
4	8e-04	0.0424

Although weekly incidence rate is not visually intuitive, it allows a more nuanced and accurate reflection of the rate in which a site might break with PRRSv given its initial PRRSv status at the beginning of the year. Chart 3 in the MSHMP reports allows us to notice that sites in status 2fvi have an overall higher incidence rate than sites in status 4. Also, it also allows us to quickly notice any drastic change in patterns, such as sudden incidence rate increases in a particular status of interest as it is currently the only swine health monitoring metric that provides an objective measure of disease occurrence since it does have a farm denominator. If you have any comments or questions about the MSHMP PRRSv Chart 3, please do not hesitate to contact Cesar Corzo at corzo@umn.edu.