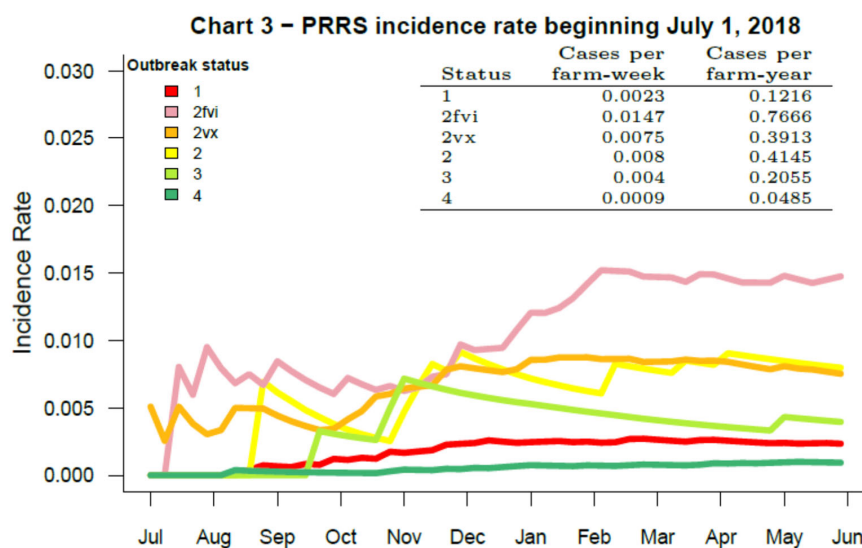# Chart 3 description: PRRS incidence rate by status at break
MSHMP Team

We wanted to review one of our charts that tends to be more difficult to read, but that expresses a valuable assessment 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 therefore of the MSHMP data. Because 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 by moving towards a naive status, introducing vaccine, or by breaking with a new virus. This becomes further complicated by the fact that a farm listed as status 1 can break again with a new PRRSv strain. Therefore, we consider each farm is 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 (July 1st). This chart addresses the question, "How frequently do herds in each of the 6 PRRSv health status break with PRRSv throughout the year?". It estimates the number of outbreaks within each status, but with the time at risk (i.e. number of weeks in that given status) taken into account.

For example, if 10 herds started the year as status 2, one herd broke with PRRS within 5 weeks and a second one broke within 20 weeks, while the others did not experience any PRRS breaks, their time at risk (i.e. time in the original status) is 5 (x1 site that broke), 20 (x1 site that broke), and 52 (x8 sites that did not break) weeks, respectively. The incidence rate would be 2 (total number of breaks) divided by 441 farm-weeks (5+21+(8*52)), or an incidence rate of 0.0045. This means that of the 10 hypothetical sites that started the year in a status 2, they are breaking with PRRS at an average of 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 2018-2019 chart example below (Figure 1), the incidence rate of status 2 farms is 0.008 cases per farm-week or 0.4145 cases per farm-year. Alternatively, we can multiply those rates by 1,000 and have an incidence rate of 8 cases per 1,000 farm-week or 415 cases per 1,000 farm-years. In other words, if 1,000 farms are in status 2 in a given week, 8 are expected to experience a PRRSv outbreak (0.008 x 1,000 farm-weeks). Or annually, if 1,000 farms are in status 2 during the year, then approximately 415 farms are expected to experience a PRRSv outbreak (0.4145 cases x 1,000 farm-years).

Chart 3 – PRRS incidence rate beginning July 1, 2018

Status	Cases per farm-week	Cases per farm-year
1	0.0023	0.1216
2fvi	0.0147	0.7666
2vx	0.0075	0.3913
2	0.008	0.4145
3	0.004	0.2055
4	0.0009	0.0485

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 PRRS given its initial PRRSv status at the beginning of the year. The above chart allows us to notice that farms in status 2fvi have an overall higher incidence rate than sites in status 4. However, it also allows us to quickly notice any drastic change in patterns, such as sudden incidence rate increases in a particular status of interest. 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.