PRRS incidence rate trends from 2015 to 2019 in the United States

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Key Points:

- Overall PRRS weekly incidence rate appear to have increased from 2015 to 2019, mostly due to the effect of a group of systems that joined the project after 2013.
- PRRS weekly incidence rate has been decreasing slightly since 2015 in the cohort of the 13 systems that initiated the project.
- The reasons for the apparent increase in the weekly incidence rate in a group of systems are largely unknown and should be further investigated.

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The Morrison's Swine Health Monitoring Project (MSHMP) monitors PRRS incidence in the US. Although last MSHMP year (July, 2018-June, 2019) PRRS cumulative incidence was one of the lowest on record (21.8%), the long-term trend of the weekly incidence rate has not been assessed. In this analysis we used data recorded from January, 2015 to August, 2019 to assess the change in incidence rate observed over the years. We described the weekly incidence rate observed in the entire database of 38 systems and a subset composed of the 13 initial systems that started the MSHMP project versus the cohort of 25 systems that were added after the project was initiated.

Incidence rate was calculated as the cumulative number of PRRS cases in a given week divided by the cumulative number of weeks at risk. Weeks at risk is equal to the number of active farms per week multiplied by the total number of weeks tracked. Results are expressed as number of cases per 100 farm-weeks at risk and PRRS cases per 100 farm-years at risk (by multiplying the weekly estimate by 52). This can be interpreted as the risk of PRRS in 100 farms that completed an entire week or year at risk of infection.

In the entire database, PRRS incidence rate increased slightly from 0.51 cases per 100 farm-weeks (26.4 cases per 100 farm-years) in January of 2015 to 0.53 cases per 100 farm-weeks (27.5 cases per 100 farm-years) in August, 2019. It is important to remember that several systems were added through time during this window of time which play a role when assessing incidence rate.

When PRRS incidence rate was assessed in the cohort of the 13 systems that started the MSHMP, a slight decrease from 0.58 cases per 100 farm-weeks (29.9 cases per 100 farm-years) in January, 2015 to 0.54 per 100 farm-weeks (27.8 cases per 100-farm-years) in August, 2019 was seen. Figure 1 shows PRRS weekly incidence rate over the years in 13 systems. The decrease in incidence rate occurred mostly from mid-2018 onwards.

Figure 2 shows an increase in the PRRS incidence rate between 2016 and 2018 together with the yearly seasonal pattern of PRRS occurrence for the 25 systems that joined MSHMP through time.

The peak of PRRS incidence during the fall and winter of 2018-2019 was not as marked as in previous seasons. PRRS incidence rate increased form 0.36 cases per 100 farm-weeks (18.8 cases per 100 farm-years) in January, 2015 to 0.52 cases per 100 farm-weeks (27.2 cases per 100 farm-years) in August, 2019.

Figure 1 (Top): PRRS incidence rate from 2015 to 2019 from the 13 systems that started the MSHMP.

Figure 2 (Bottom): PRRS incidence rate from 2015 to 2019 from the cohort of 25 systems that started reporting data to the MSHMP after 2013.

Although distinct incidence rate patterns can be observed between the 13 systems that started the MSHMP and the 25 systems added after the project was initiated, it is difficult to fully explain these as there are differences between those two cohorts (e.g. number of farm, location density, air filtration). PRRS incidence rate as per August 2019 was still slightly higher in the cohort of 13 systems that initiated the project (27.8 cases per 100-farm-years) comparted to that in the rest of 25 systems (27.2 cases per 100 farm-years).

While we traditionally report annual PRRS incidence (cumulative number of PRRS cases divided by the cumulative number of farms in one year), PRRS incidence rate (which takes into account time at risk) allows for more direct risk comparisons between farms that contributed for different amount of time. The difference in trend direction from cumulative incidence to incidence rate is due to the fact that cumulative incidence is reset to zero yearly while incidence rate is recalculated weekly in a continuous flow, allowing for better trend visualization.
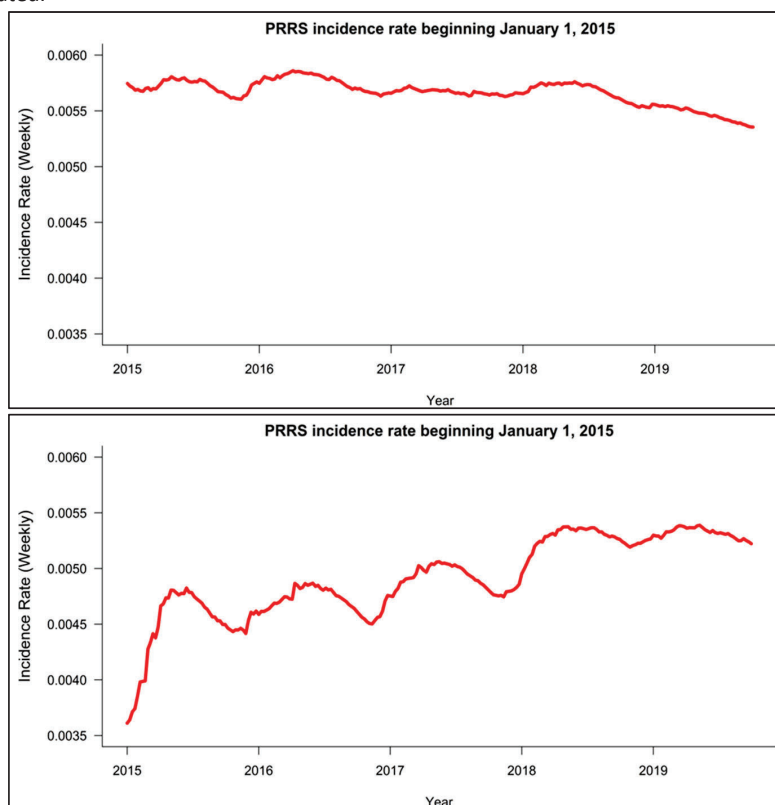
The reason for the change in incidence rate deserves further analysis. Thus, incidence rate by region and/or individual systems overtime will be assessed in further investigations.