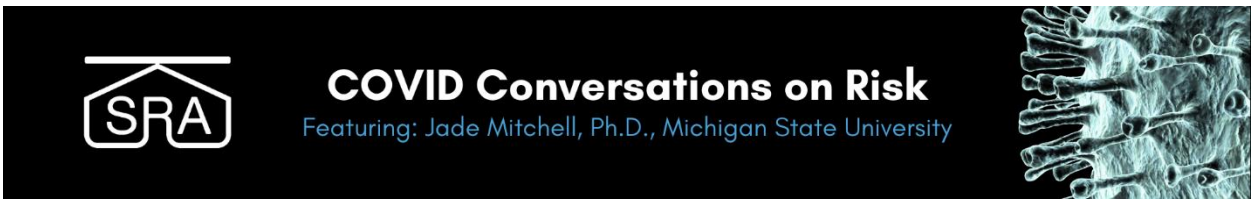

How do we address the risk associated with pathogens?

In order to assess the risk associated with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the virus responsible for COVID-19, we follow the quantitative microbial risk assessment process. This process follows the conventional four step paradigm: hazard identification, exposure assessment, dose-response assessment and risk characterization.

- **Hazard identification** serves to identify types of microorganisms and disease endpoints. We know that COVID-19 is mainly a respiratory disease, that can sometimes produce mild GI symptoms.
- An **exposure assessment** is conducted to collect monitoring data and to use indicators and modeling to address transport/transfer of the pathogens to quantify exposure.
- The **dose-response** assessment fits a mathematical relationship between exposure dose and risk of infection (this relationship is still unknown for SARS-CoV-2, but there are models for SARS and other enteric viruses).
- **Risk characterization** serves to determine the magnitude of the risk, uncertainty and variability of the pathogen. Research in this step is still ongoing.

For food products specifically, we conduct a farm to fork risk assessment, which evaluates the processes along the pathway between production of the food and consumption of the food and all points in between where contamination could occur.

With this pathway, the primary concern is surfaces – surfaces that are in contact with infected individuals or with untreated waste that could result in cross contamination with food products themselves. In addition to the virus' excretion rate, we would need to look at the percentage of the virus that we would expect to be viable at the point of contact, the distance from the surface to the excretion point, flow rates, air exchange rates, time from excretion to exposure, and transfer rates. There has been some data presented about potential survival times on different surfaces, but we are actually more interested in the decay rates:

- Air: 1.1-1.2 hour median half life (viable viruses detected for duration of three hour study)
- Stainless steel: 5.6 hour median half life
- Plastic: 6.81 hour median half life

These values come from lab studies that are done at specific conditions, and we should consider the dependencies on temperature and humidity. We have also deduced surrogate transfer rates that give

you an idea of the amount that can be transferred when you come into contact with an infected surface. The results gathered thus far show that there is a very low contamination risk.