



Module A: Produce Safety, the Human Pathogen SARS- CoV-2 and COVID-19

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Learning Outcomes

- Differentiate between SARS-CoV-2 and COVID-19
- Describe common ways SARS-CoV-2 can be spread during production, harvest, postharvest, transport and at the market
- Identify strategies to prevent and reduce risks of SARS-CoV-2 contamination along the supply chain.
- Recognize the value of implementing additional SARS-CoV-2 food safety practices in your operation

SARS-CoV-2 and COVID-19 Addendum to the PSA Curriculum

- This is **NOT** a replacement for the PSA Curriculum that covers the FSMA Produce Safety Rule requirements and includes GAPs and does not meet § 112.22(c)
- This is **NOT** a replacement for recommendations from the federal, state or local health departments or the CDC.
- This is additional training for growers and handlers of produce on accounting for SARS-COV-2 and COVID-19 food safety issues for produce.

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Notes:

- This training NOT a way to meet § 112.22(c) which requires that at least one supervisor or responsible party from a farm subject to the FSMA Produce Safety Rule must have successfully completed food safety training at least equivalent to that received under standardized curriculum recognized as adequate by the Food and Drug Administration.
- They also need to stay in contact with local and state health departments to make sure they are following the local and state regulations which vary.
- Consider taking the Produce Safety Alliance (PSA) training, to lessen a grower's risk and to make sure they are complying with the law.

Resources:

- COVID-19 – CDC - <https://www.cdc.gov/coronavirus/2019-ncov/index.html>
- Coronavirus Disease 2019 (COVID-19) – CDC - <https://www.cdc.gov/media/dpk/diseases-and-conditions/coronavirus/coronavirus-2020.html>
- State, Territorial, Local and Tribal Health Department Search – CDC - <https://www.cdc.gov/coronavirus/2019-ncov/php/hd-search/index.html>
- Food Safety Modernization Act (FSMA) – FDA - <https://www.fda.gov/food/guidance-regulation-food-and-dietary-supplements/food-safety-modernization-act-fsma>

- Produce Safety Alliance – PSA - <https://producesafetyalliance.cornell.edu/>



Relevance of COVID-19 to your Agricultural Operation

- You can prevent and reduce the risks of getting COVID-19 in your agricultural operation
- You know your operation and practices the best, but you may not know the consequences of your current practices on produce safety risks
- Actions you take now and, in the future, will directly impact food safety along with the health of your staff and customers as well as the financial viability of your operation

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Notes:

- Just like with PSA training, producers and their staff are the key to growing and distributing safety on and off the farm, thus making the decision to do something on the farm is up to them.
- Producers know their operation the best—what they produce, how they produce, who works on the farm, who comes on the farm, how the produce is moved off the farm, and all of the other details that go into running a successful operation.
- Thus, it is the person or people who make production, marketing and purchasing decisions for the operation and know the day-to-day activities that MUST be involved in assessing food safety risks and developing the farm's food safety plan which must include dealing with COVID-19 and any future pandemics.
- Actions to reduce food safety risks not only impact the financial viability of farms, but also the health and safety of those who work on the farm, as well as those who come on the farm in associated industries and those that consume the produce grown.

Resources:

- COVID-19 Update: USDA, FDA, Underscore Current Epidemiologic and Scientific Information Indicating No Transmission of COVID-19 Through Food

or Food Packaging <https://www.usda.gov/media/press-releases/2021/02/18/covid-19-update-usda-fda-underscore-current-epidemiologic-and>

- COVID-19 Response Plan Template for Fruit and Vegetable Farms
https://docs.google.com/document/d/12sLifH-6Dm48lm_s2OIM3rIrN54Fv_z_i52Mvy5yGA/edit
- Agricultural Employer Checklist for Creating a COVID-19 Assessment and Control Plan <https://www.cdc.gov/coronavirus/2019-ncov/community/pdf/Agricultural-Employer-checklist.pdf>

What is SARS-CoV-2 and COVID-19?

- SARS-CoV-2 is the virus that causes the disease COVID-19
- SARS = Severe Acute Respiratory Syndrome
 - ❖ Family of viral respiratory diseases caused by a SARS-associated coronavirus
- COVID-19 = CO for corona, VI for virus and D for disease with 19 for the year this was identified
 - ❖ Symptoms include a fever, cough, shortness of breath or difficulty breathing, chills, muscle pain, sore throat, or new loss of taste and smell.

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Notes:

- SARS is caused by a virus that takes over your body's cells and uses them to make copies of itself. The SARS virus is from a group known as coronaviruses, which also cause the [common cold](#).
- This family of viruses includes MERS-CoV and SARS-CoV, which are two earlier coronaviruses affecting humans
- SARS can spread when people who have it [cough](#) or [sneeze](#), spraying tiny droplets of liquid with the virus to other people within 2-3 feet. Other people may get the virus by touching something those droplets hit, then touching their nose, [eyes](#), or [mouth](#).
 - Some staff may be at a higher risk including older adults and people with certain underlying medical conditions.

Resources:

- Coronavirus and COVID-19: What You Should Know <https://www.webmd.com/lung/coronavirus#:~:text=COVID%2D19%20is%20a,to%2Dperson%20contact>.
- Episode 2: SARS-CoV-2? COVID-19? What's the Difference – CDC - <https://youtu.be/VAX0he6vjU0>
- Mythbusters – CDC - <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public/myth-busters>
- What's the Difference between a Cold, the Flu and COVID-19 <https://www.cedars-sinai.org/blog/cold-flu-covid-19>

[differences.html#:~:text=The%20novel%20coronavirus%2C%20or,to%20COVID%2D19.](#)

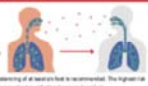
Transmission of SARS-CoV-2

- Person to Person – Most common
- Surface to Person – Possible but no reports
- Animals to Person – Rare situations
- Produce to Person – NONE

SARS-CoV-2 VIRUS TRANSMISSION


PERSON-TO-PERSON

- SARS-CoV-2 virus is spread primarily through person-to-person contact
- The virus is spread through respiratory droplets that are produced when an infected person coughs, sneezes, talks, sings, or breathes
- These droplets can land in the mouth, nose, or eyes of another person who is in close contact with the infected person
- Person-to-person contact is the most common way the virus is spread
- Person-to-person contact includes direct contact (e.g., coughing or sneezing into someone's face) and indirect contact (e.g., touching a surface that has been contaminated by an infected person)
- Wearing face coverings and avoiding close contact with others are recommended ways to reduce the risk of person-to-person transmission




SURFACES

- Surfaces have been shown to be a source of transmission, although probably much less than person-to-person transmission
- Person-to-surface transmission has been documented only in the case of surfaces contaminated with the virus
- The virus can survive on surfaces for hours to days, depending on the surface material, temperature, and other factors
- When a person touches a surface, not all of the virus on that surface will be transferred to their hands, which is part of why surface transmission is less likely than person-to-person transmission



FOOD

- There are no documented cases of COVID-19 being contracted from food, but there have been cases in which people who had eaten at a restaurant or food service facility later became ill
- No studies of whether food is a source of transmission or whether food has been observed to contain the virus
- The virus is not known to survive on food for long periods of time
- The virus must come in contact with a specific receptor that allows entry into the cell and cannot be released from the receptor until it is inside the cell
- It is not known if the virus can survive on food for long periods of time
- It is not known if the virus can be found in food, and it is not known if it can be found in food
- It is not known if the virus can be found in food, and it is not known if it can be found in food



<https://foodsafety.oregonstate.edu/wp-content/uploads/2020/08/SARS-CoV-2-Transmission.pdf>

Notes:

- ICMSF opinion on SARS-CoV-2 and its relationship to food safety (3 Sept 2020)
 - “SARS-CoV-2 should NOT be considered a food safety hazard since a true food safety hazard enters the human body with food via the gastrointestinal (GI) tract, where it can infect organs/tissues elsewhere in the human body.” Page 3
 - “. . . to date there has not been any evidence that food, food packaging or food handling is a source or important transmission route for SARS-CoV-2 resulting in COVID-19.” Page 3
 - “. . . it is prudent to emphasize to food producers, manufacturers and handlers the importance of using good food hygiene practices to minimize any possibility of food or food contact surfaces as a vector for SARS-CoV-2.” Page 4
- COVID-19 Update: USDA, FDA Underscore Current Epidemiologic and Scientific Information Indicating No Transmission of COVID-19 Through Food or Food Packaging – Feb 18, 2021.
 - “no credible evidence of food or food packaging associated with or as a likely source of viral transmission of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the virus causing COVID-19.”
- There are some rare instances of transfer of the virus from people to animals after close contact with a person with COVID-19.

- cats, dogs, ferrets, fruit bats, hamsters, tree shrews and some other mammals can be infected but we don't know all the animals that can be at this time.
- Most of these are pets that have become sick after contact with people with COVID-19
- Laboratory mice, pigs, chickens, and ducks do not seem to become infected or spread the infection based on results from studies.
- Several animals in zoos have tested positive including lions, tigers, puma, snow leopard, cougar and great apes.
- Reports of minks on mink farms that have reported COVID-19 but there may be a possibility (Netherlands and Denmark). There is guidance available from the USDA, CDC and state animal and public health partners on protecting work and animal health

Resources:

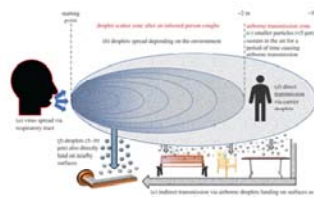
- How Coronavirus Spreads – CDC - <https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/how-covid-spreads>
- SARS-CoV-2 Virus Transmission – NCSU– <https://foodsafety.ces.ncsu.edu/wp-content/uploads/2020/08/SARS-CoV-2-TRANSMISSION-1.pdf?fwd=no>
- COVID-19 and Animals – CDC - <https://www.cdc.gov/coronavirus/2019-ncov/daily-life-coping/animals.html>
- Interim Infection Prevention and Control Guidance for Veterinary Clinics Treating Companion Animals During the COVID-19 Response – CDC - <https://www.cdc.gov/coronavirus/2019-ncov/community/veterinarians.html>
- Interim SARS-CoV-2 Guidance and Recommendations for Farmed Mink and Other Mustelids - https://www.aphis.usda.gov/animal_health/one_health/downloads/sars-cov-2-guidance-for-farmed-mink.pdf
- [Interim Guidance for Animal Health and Public Health Officials Managing Farmed Mink and other Farmed Mustelids with SARS-CoV-2pdf icon](https://www.aphis.usda.gov/publications/animal_health/sars-cov-2-mink-guidance.pdf) - https://www.aphis.usda.gov/publications/animal_health/sars-cov-2-mink-guidance.pdf
- ICMSF opinion on SARS-CoV-2 and its relationship to food safety (3 Sept 2020) – [https://www.icmsf.org/wp-content/uploads/2020/09/ICMSF2020-Letterhead-COVID-19-opinion-final-03-Sept-2020.BF .pdf](https://www.icmsf.org/wp-content/uploads/2020/09/ICMSF2020-Letterhead-COVID-19-opinion-final-03-Sept-2020.BF.pdf)
- USDA, FDA Underscore Current Epidemiologic and Scientific Information Indicating No Transmission of COVID-19 Through Food or Food Packaging –

USDA - <https://www.fda.gov/news-events/press-announcements/covid-19-update-usda-fda-underscore-current-epidemiologic-and-scientific-information-indicating-no>

- COVID-19: Information for food industry - <https://nzfssrc.org.nz/covid19>

Transmission of SARS-CoV-2 is Primarily Person to Person

- Viral transfer is via respiratory droplets from someone diagnosed with COVID-19
- Respiratory droplets are released into the air through coughing, sneezing, talking, singing, yelling, etc.
- Usually travel only a few feet = social distancing is recommended (minimum 6 ft apart)
- Masks are recommended to trap respiratory droplets



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Notes:

- Virus is carried through moisture droplets and released into the air through coughing, talking, singing, yelling, sneezing,
- The viral particles in the droplets in the air can attach to cells in a healthy person and then infect, replicate and be dispersed once again to infect other healthy people
- Particles usually only travel a few feet which is why 6 ft of social distancing is recommended. BUT particles may travel further by aerosols and air conditioning/vents by helping them move further from infected people
- Masks and face coverings are therefore recommended as they trap some of or most of these viral particles and reduce the spread of the SARS-CoV-2 (the virus)
- In the beginning of the pandemic, recommendations did not include using masks because it was unclear the major route(s) of transmission.

Resources:

- SARS-CoV-2 Virus Transmission – NCSU– <https://foodsafety.ces.ncsu.edu/wp-content/uploads/2020/08/SARS-CoV-2-TRANSMISSION-1.pdf?fw=no>
- How Coronavirus Spreads – CDC - <https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/how-covid-spreads>

- COVID-19 Information for Food Industry Workers – Cornell Cooperative Extension - <https://www.youtube.com/watch?v=9NXhZ3V-VMQ>
- Episode 4: What's a Respiratory Droplet? Why Does It Matter? <https://www.youtube.com/watch?v=qWiA3NUD1Mw>
- Episode 7: How does COVID-19 spread? A review – CDC video - <https://www.youtube.com/watch?v=OQUMLJa0tAE>



Poster Stop the Spread of Germs <https://www.cdc.gov/coronavirus/2019-ncov/downloads/stop-the-spread-of-germs.pdf>

Surface Transmission of SARS-CoV-2

- ❖ SARS-CoV-2 can survive on surfaces and play a role in indirect transmission
- ❖ Transferred by touch with the virus must migrate and infect a cell
- ❖ Less infectious over time but depends on material, temperature and other factors

Life Span of the Corona Virus on Surfaces
(doorknobs, money, seats, clothing, ...)

SNEEZE

Up to 4 meters (2m)
(Average 2m)

Droplets

In certain conditions, the droplets can stay in the air for up to 45 minutes

Survival on surfaces:

- Skin: A few minutes
- Clothing and masks: Up to 12 hours
- Wood: Up to 4 days
- Paper: 4 to 5 days
- Glass & Metal: Up to 5 days
- Plastic: 6 to 9 days

www.pexelsblog.com

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Notes:

- not all of what is on a surface will be transferred to their hand which is why it is less likely than person to person
- IF CONCERNED ->
 - Avoid touching surfaces or items unnecessarily
 - Avoid touching your mouth, nose or face
 - Follow with handwashing and/or using hand sanitizer

Resources:

- Cleaning and Disinfecting Your Facility <https://www.cdc.gov/coronavirus/2019-ncov/community/disinfecting-building-facility.html>
- COVID-19 Preventative Measures Cleaning and Disinfection https://foodsafety.ces.ncsu.edu/wp-content/uploads/2020/03/Cleaning-and-disinfection_COVID-19_Flyer_031520.pdf?fwd=no
- COVID-19 Response Plan Template for Fruit and Vegetable Farms https://docs.google.com/document/d/12sLifH-6Dm48lm_s2OIM3rIrN54Fv_z_i52Mvy5yGA/edit
- Agricultural Employer Checklist for Creating a COVID-19 Assessment and Control Plan <https://www.cdc.gov/coronavirus/2019-ncov/community/pdf/Agricultural-Employer-checklist.pdf>

- COVID-19 FAQ for Foodservice Cleaning and Disinfection
https://foodsafety.ces.ncsu.edu/wp-content/uploads/2020/03/Retail-Cleaning_COVID-19_032620.pdf?fwd=no

Pet and Livestock Transmission of SARS-CoV-2


**MYTH BUSTERS
COVID-19**

✖ MYTH

I can catch COVID-19 from my pet

✔ FACT

While there has been one instance of a dog being infected in Hong Kong, to date, there is **no evidence that a dog, cat or any pet can transmit COVID-19**



- ❖ Rare examples of transfer from COVID-19 infected people to animals
- ❖ No evidence animals play a role in spreading SARS-CoV-2
- ❖ Recommended to practice healthy habits around pets and other animals

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Notes:

- There are some rare instances of transfer of the virus from people to animals after close contact with a person with COVID-19.
 - cats, dogs, ferrets, fruit bats, hamsters, tree shrews and some other mammals can be infected but we don't know all the animals that can be at this time.
 - Most of these are pets that have become sick after contact with people with COVID-19
 - Laboratory mice, pigs, chickens, and ducks do not seem to become infected or spread the infection based on results from studies.
 - Several animals in zoos have tested positive including lions, tigers, puma, snow leopard, cougar and great apes.
 - Reports of minks on mink farms that have reported COVID-19 but there may be a possibility (Netherlands and Denmark). There is guidance available from the USDA, CDC and state animal and public health partners on protecting work and animal health
 - No reports of SARS-CoV-2 in wildlife

Resources:


- Reducing the Risk of SARS-CoV-2 Spreading between People and Wildlife – CDC – <https://www.cdc.gov/coronavirus/2019-ncov/your-health/wildlife.html>

- What You Need to Know About COVID-19 and Pets – CDC - <https://www.cdc.gov/coronavirus/2019-ncov/downloads/covid-19-pets-prevention.pdf>
- Pets and Other Animals – CDC - <https://www.cdc.gov/coronavirus/2019-ncov/animals/pets-other-animals.html>
- Experimental Infection of Cattle with SARS-CoV-2 - https://wwwnc.cdc.gov/eid/article/26/12/20-3799_article

Food and Food Packaging Transmission of SARS-CoV-2

❖ NO cases reported of COVID-19 contracted from food or food packaging

❖ Transmission at food operations has been due to person to person transmission



https://foodsafety.ces.ncsu.edu/wp-content/uploads/2020/04/Produce-COVID-Food-Safety_Social-Media.png

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Notes:

- NO documented cases of COVID-19 contracted from food or food packaging according to the USDA, FDA and CDC (Feb 18 press release)
- NO COVID-19 cases have linked to food consumption or handling
- Transmission at places where food is served or sold has been DUE to person-to-person transmission especially without face coverings

Resources:

- COVID-19 Update: USDA, FDA Underscore Current Epidemiologic and Scientific Information Indicating No Transmission of COVID-19 Through Food or Food Packaging on Feb 18, 2021 - <https://www.fda.gov/news-events/press-announcements/covid-19-update-usda-fda-underscore-current-epidemiologic-and-scientific-information-indicating-no>
- Coronavirus (COVID-19) Update: Joint Statement from USDA and FDA on Food Export Restrictions Pertaining to COVID-19 on June 24, 2020 - <https://www.fda.gov/news-events/press-announcements/coronavirus-covid-19-update-joint-statement-usda-and-fda-food-export-restrictions-pertaining-covid>

SARS-CoV-2 vs Other Human Pathogens in Food Safety

- Other human pathogens in food safety are transmitted via the fecal-oral route
- Instead, SARS-CoV-2 is spread thru respiratory droplets
- This means we will need to use different strategies to address SARS-CoV-2 spread and how to deal with people who are sick with COVID-19.



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Notes:

- In food safety training, we discuss how people carry human pathogens such as Shigella, Hepatitis A, Norovirus, Cyclospora and others.
- People can also spread zoonotic pathogens like Salmonella, pathogenic E. coli and listeria monocytogenes.
- However, all of these human pathogens are spread via the fecal-oral route
- Thus trainings involve dealing with staff who are often the last to touch produce before it reaches the consumer, so the training focuses on those risk.
- For SARS-CoV-2 and COVID-19 we need other strategies because the spread is thru a different route

Resources:

- Ijaz MK, Sattar SA, Rubino JR, Nims RW, Gerba CP. 2020. Combating SARS-CoV-2: leveraging microbiocidal experiences with other emerging/re-emerging viruses. *PeerJ* 8:e9914 <https://doi.org/10.7717/peerj.9914>
- SARS-CoV-2 Virus Transmission InfoSheet - <https://foodsafety.ces.ncsu.edu/wp-content/uploads/2020/08/SARS-CoV-2-TRANSMISSION-1.pdf>

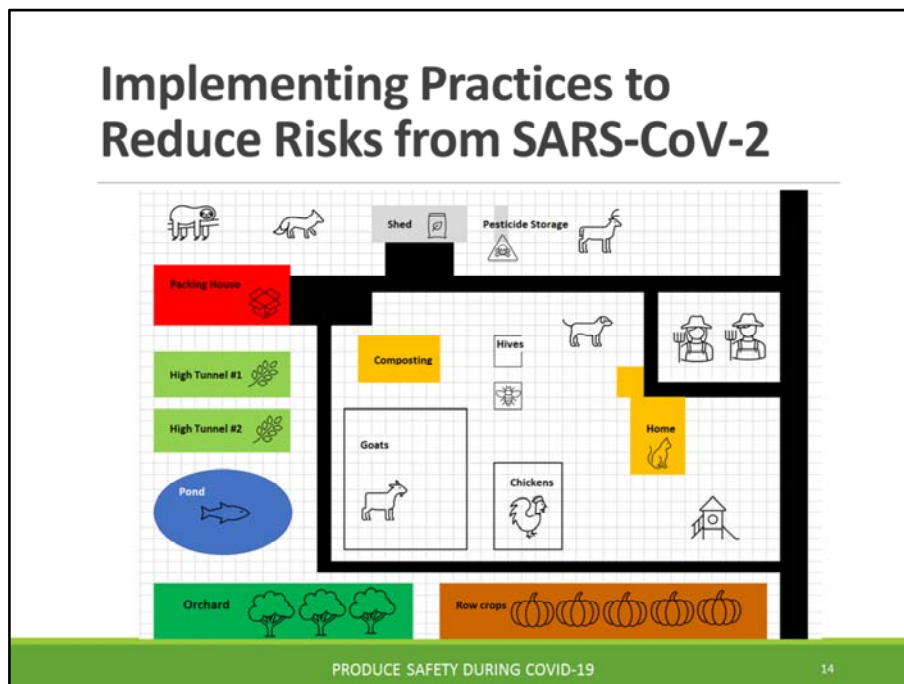


Notes:

- Educate yourself on the risks SARS-CoV-2 and COVID-19 pose for your farm. Use the national, state and local health departments as well as your ag service providers for assistance. Coming to this training sets you up to assess your risks.
- Implement practices to reduce the risks from SARS-CoV-2 and COVID-19 identified in your operation.
- To make sure practices you want to implement take place, you will need to monitor them.
- If a problem with implementation is identified then you will need to fix the problem by corrective actions and monitoring to prevent it from occurring again.
- Lastly, you may incorporate recordkeeping for some of the tasks to be able to monitor implementation of practices and see if these practices are addressing the problems and reducing the risks.

Resources

- Produce Safety Alliance Trainer Resources – Cornell - <https://producesafetyalliance.cornell.edu/training/trainer-resources/>




Notes:

- Focus on preventing person to person exposure and contamination from COVID-19
- Identify your highest risk areas and develop practices that will reduce these risks. Some possible considerations:
 - Create a single entry point on the farm for everyone working, visiting or coming on the farm to record their contact info, answer questions and take the temperature
 - Policies on what to do if someone appears to be “sick” and what to do
 - Decide on farmer’s markets based on their adherence to the appropriate guidance by the local/state health department
 - Eliminate farm pickups to reduce the number of people coming on the farm
 - Create a farm stand that is away from the majority of the farm and staff (and your family)
 - ?
- Many of these changes may require modification of current practices and ALSO additional training for staff, visitors, vendors, etc.
- In the past year, you may have already implemented these practices.
- Ask for help and seek training if you are unsure from the local and state health departments and agriculture service providers

Resources:

- Agriculture Workers and Employers – CDC -
<https://www.cdc.gov/coronavirus/2019-ncov/community/guidance-agricultural-workers.html>
- Food Safety and the Coronavirus Disease 2019 (COVID-19) – FDA -
<https://www.fda.gov/food/food-safety-during-emergencies/food-safety-and-coronavirus-disease-2019-covid-19>



Summary

- SARS-CoV-2 is primarily transmitted person to person
- NO report worldwide of a person getting COVID-19 from food or food packaging
- Safety impacts the farm, staff, customers, vendors, etc.
- Produce safety success depends on your commitment to implementing risk reduction strategies for the pandemic as well as food safety

PRODUCE SAFETY DURING COVID-19

Notes:

- Because this is primarily spread person to person this impacts your farm
- Because SARS-CoV-2 is NOT transmitted thru the fecal-oral route you will need to take additional and different steps than what is standardly used in food safety training to reduce the chance of SARS-CoV-2 and COVID-19 becoming a problem
- Farming is not done alone. You interact with staff, customers, delivery staff, repair people, etc. Thus it is imperative that you take this pandemic seriously if not for yourself, then for the other people you interact with for your farm business.
- Surface transmission is possible but has not been reported to be the major way this virus is spread. BUT that doesn't mean you should lessen how you clean and sanitize for basic food safety because microorganisms have not gone away during the pandemic.
- There are rare reports of transmission from people to animals.
- NO report worldwide of a person getting COVID-19 from food or food packaging
- Produce safety success depends on your commitment to implementing risk

reduction strategies

Resources:

- COVID-19 - CDC - <https://www.cdc.gov/coronavirus/2019-ncov/index.html>
- Agricultural Employer Checklist – CDC - <https://www.cdc.gov/coronavirus/2019-ncov/community/pdf/Agricultural-Employer-checklist.pdf>
- State & Territorial Health Department Websites – CDC - <https://www.cdc.gov/publichealthgateway/healthdirectories/healthdepartments.html>
- FoodCoVNET – NCSU - <https://foodcovnet.ces.ncsu.edu/welcome-to-foodcovnet/>
- Agriculture Workers and Employers – CDC - <https://www.cdc.gov/coronavirus/2019-ncov/community/guidance-agricultural-workers.html>

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