Learning Outcomes

- Identify potential SARS-CoV-2 sources of contamination for surfaces, tools and equipment
- Describe the differences between cleaning, sanitizing and disinfecting
- Review existing SOPs from production, harvesting, packing, storage, and transportation to incorporate concerns for SARS-CoV-2
- Evaluate contact surfaces, tools, equipment as well as production, processing, packaging, storage and transportation areas as possible SARS-CoV-2 threats to staff and customers
- Modify or create SOPs, trainings, signage and logs to reduce SARS-CoV-2 pathogen transmission from production to sales of produce
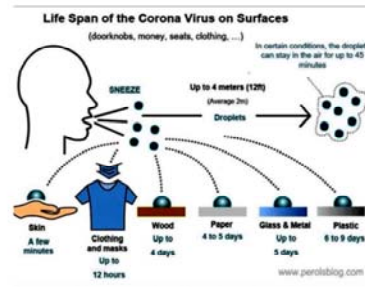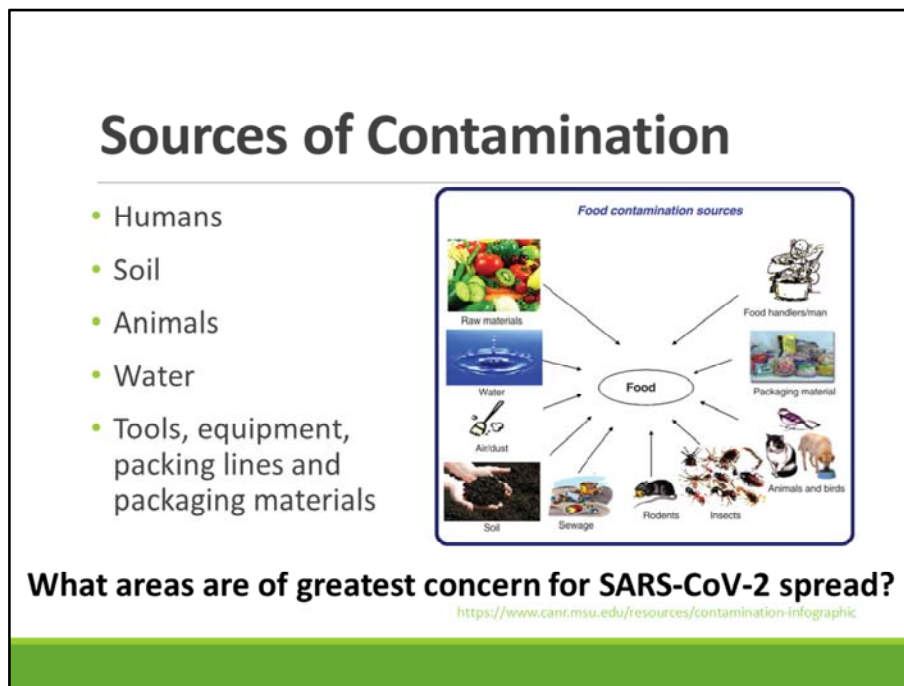
Notes:

- 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 ->
  o Avoid touching surfaces or items unnecessarily
  o Avoid touching your mouth, nose or face
  o 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
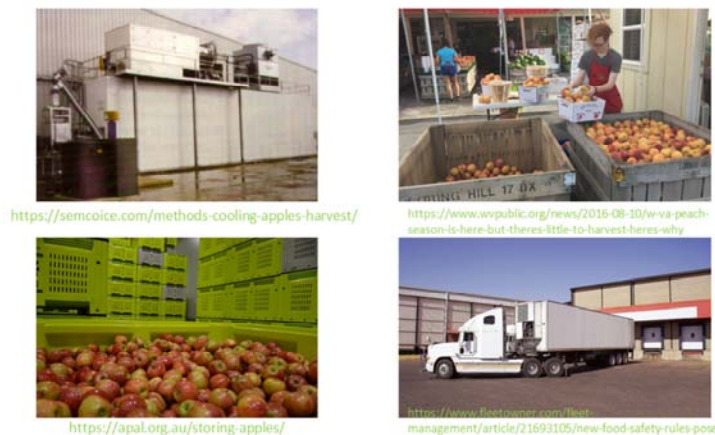
Notes
- Review where sources of food contamination including but not limited to:
    - Humans from fecal material, saliva, mucous, bodily fluids, improper hand washing & hygiene, illness or injury
    - Soil from raw manure used as a soil amendment, improper composting of manures, as well as other sources
    - Animals such as domestic and wild animals from feces and body shedding
    - Water can contaminate food by having contaminants within as well as spreading it, consider irrigation water, contained feeding areas, crop spray, washing and cleaning (gray water), flooding
    - Equipment that has been contaminated from humans, soil, manure, animals as well as water

Resources
- Kamala, K. Kumar, V.P. 2018. Chapter 1 – Food Products and Food Contamination. Pg. 1-19. In: Holban, A.M. and Grumezescu, A.M. (eds), Handbook of Food Bioengineering, Microbial Contamination and Food Degradation, Academic Press. https://doi.org/10.1016/B978-0-12-811515-2.00001-9
- Contamination Infographic https://www.canr.msu.edu/resources/contamination-infographic
- Microorganisms Infographic https://www.canr.msu.edu/resources/microorganisms

The Story of the Harvest Bin

Notes
- Just like you have completed a risk assessment on the farm as a whole, you should also consider also evaluating in-depth the risks of SARS-CoV-2 on harvest bins
- The upper left hand side shows Hydrocooling unit which can drip water onto harvested product and bins if they are placed any where near
- The upper right photo shows peaches harvested in wooden bins that are open for packaging into smaller bins. Wooden bins are harder to clean and sanitize which puts them at a higher risk for contamination issues
- The lower left photo shows apples in a large plastic bins which are stacked and runs the possibility that if an upper bin is contaminated it can contaminate bins below it.
- Finally the last photo (lower right) shows a semi loaded with product to be shipped. As with any transport, it is important that the container is cleaned so that lowers the risk for contamination from inside

Resources
- 30 tips for safe produce packing and transportation https://www.producegrower.com/article/food-safety-30-tips-safe-produce-packing-transportation/
- Transportation https://gaps.cornell.edu/educational-materials/decision-trees/transportation/
- Bins, Buckets, Baskets and Totes https://blog.uvm.edu/cwcallah/2018/11/14/bins-buckets-baskets-totes/

Have in place . . .

- Field harvest procedures
- Packing house flow
- Packing line
- Transportation plans
- Material and supply storage controls
- Pest and other contaminant controls
- Plans to monitor, correct and review

WHERE CAN SARS-CoV-2 BE INTRODUCED?

WHAT ADDITIONAL STEPS CAN I TAKE TO ENHANCE MY CURRENT PROCESS?

Notes
- While surface transmission is not the *primary* way that the virus spread from person to person, it is possible for the virus to transfer from a contaminated surface via hands.
- Consider the following areas:
    - Field harvest procedures: Employee issued harvest tools, Sharing, Cleaning and sanitizing procedures, Harvest containers and vehicles
    - Packing house flow: Hydrocooling, Quality control/culls, Ice bath, Storage, Cleanliness
    - Packing line: Employee PPE and social distancing, Quality control/culls Round 2, Food contact surfaces, Cleaning procedures, Environmental monitoring, Storage of packaging materials, Overall cleanliness
    - Transportation plans: include farm vehicles (trucks, gators and tractors), dollies, etc.
    - Material and supply storage controls: Do you have materials SARS-CoV-2 will stay on, where are you storing your materials and supplies to keep them out of contamination from normal items as well as SARS-CoV-2
    - Pest and other contaminant controls
    - Plans to monitor correct and review

Resources
- Handling COVID-19 Produce Farms and Packinghouses
  https://foodsafety.ces.ncsu.edu/wp-content/uploads/2020/03/Packinghouse_COVID-19_Flyer-2.pdf?fwd=no

- Agriculture Workers and Employers – CDC - https://www.cdc.gov/coronavirus/2019-ncov/community/guidance-agricultural-workers.html
- Agricultural Employer Checklist – CDC - https://www.cdc.gov/coronavirus/2019-ncov/community/pdf/Agricultural-Employer-checklist.pdf
- COVID-19 Response Plan Template for Fruit and Vegetable Farms https://docs.google.com/document/d/12sLifH-6Dm48lm_s2OIM3rIrN54Fv__z_i52Mvy5yGA/edit

Sanitation SOPs

- Cleaning is not sanitizing
- Sanitizing is not disinfecting
- Disinfecting CANNOT happen without cleaning
- Assess effectiveness of your current SOPs
- Modify or create SOPs for cleaning and sanitizing as well as log sheet to track the process
- Train staff and monitor activity
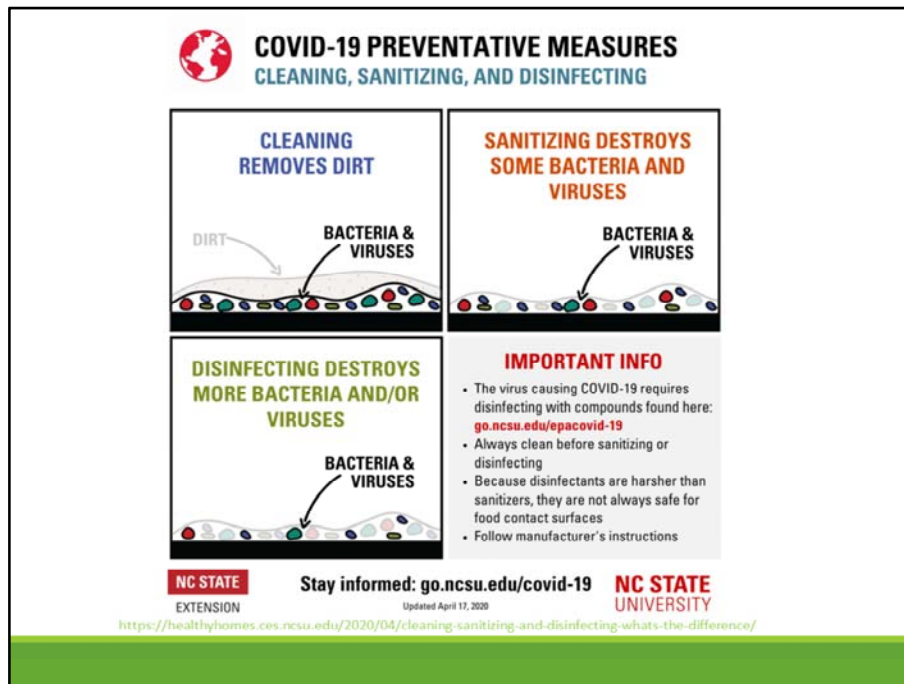
what is essential is invisible to the eye.

Notes
- IMPORTANT TO EMPHASIZE: Cleaning is NOT Sanitizing AND Sanitizing is not Disinfecting.
- Sanitizing can't occur without Cleaning and Disinfecting can't occur without Sanitizing
- Safety Standard Operating Procedures (SOPs) are written practices and procedures that are critical to producing safe food.
- The decision to sanitize or disinfect should be based on the probability of the presence of a known hazard.
- Sample Documents are available in Word from a variety of sources, but remember it is important that they be edited to fit your operation
- SOPs need to be created or revised for any changes in the cleaning/sanitizing/disinfecting procedures
- Also do not forget to train the staff to any changes and monitor the new procedures to allow corrections as needed

Resources
- Cleaning vs. Sanitizing https://producesafetyalliance.cornell.edu/sites/producesafetyalliance.cornell.edu/files/shared/documents/Cleaning-vs-Sanitizing.pdf
- Cleaning vs Sanitizing Infographic https://www.canr.msu.edu/resources/cleaning-vs-sanitizing-infographic
- Agriculture Workers and Employers – CDC - https://www.cdc.gov/coronavirus/2019-ncov/community/guidance-agricultural-workers.html

- National Good Agricultural Practices Program https://gaps.cornell.edu/educational-materials/decision-trees/log-sheets-sops/
- Standard Operating Procedures https://ag.umass.edu/vegetable/fact-sheets/standard-operating-procedures
- Sample SOPs for GAP Plan of Action Manual (AgCon) https://www.agconfoodsafety.com/200-standard-operating-procedures.html
- COVID-19 Facility/Site Compliance: Agricultural – Workforce Guidance https://psla.umd.edu/sites/psla.umd.edu/files/files/documents/Food%20Safety/Ag%20COVID19%20WorkforceGuidance_v1.pdf
- COVID-19 Facility/Site Compliance: Agricultural – Workforce Training Guidance https://psla.umd.edu/sites/psla.umd.edu/files/files/documents/Food%20Safety/Ag%20COVID19%20WorkforceTraining_v1%20(1).pdf
- COVID-19 disinfecting guidelines developed for produce farms https://vegetablegrowersnews.com/news/covid-19-disinfecting-guidelines-developed-for-produce-farms/

Notes
- Infographic that will differentiate between Cleaning, Sanitizing and Disinfecting

Resources
- Cleaning vs. Sanitizing
  https://producesafetyalliance.cornell.edu/sites/producesafetyalliance.cornell.edu/files/shared/documents/Cleaning-vs-Sanitizing.pdf
- COVID-19 Preventative Measures Cleaning, Sanitizing and Disinfecting
  https://healthyhomes.ces.ncsu.edu/2020/04/cleaning-sanitizing-and-disinfecting-whats-the-difference/

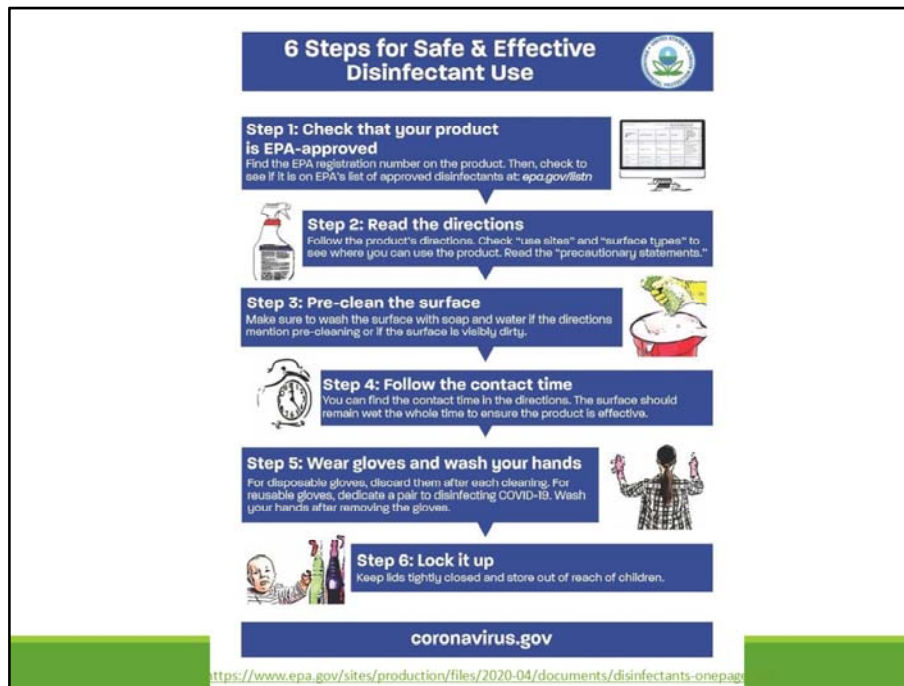**High-touch surfaces to sanitize regularly if not dirty**

1. Field: vehicle door handles, steering wheels, stick shifts, PTO handles, shared tools
2. Pack shed: dolly handles, cooler handles, door handles, light switches, scale buttons
3. Greenhouse: watering wand, germination chamber handles, door handles, vent openers
4. Office: keyboard, mouse, iPad, phones, chair armrests
5. Restrooms: toilet handles and seats, faucet handles, door handles
6. Tools and equipment: Sorting tables, harvest totes and buckets, scales, clippers, knives
7. Other: buttons, pads and touch screens used by staff or volunteers

Notes
- You might already have a robust cleaning and sanitizing routine for your farm's food contact surfaces like tools, totes and tables.
- Sanitizing for COVID-19 might not be significantly different from those current procedures, with the addition of more attention to the "high-touch" areas.
- However, some items and areas should be frequently cleaned and sanitized such as door handles, equipment, bins, point of sale equipment, chairs, tables and other heavily touched surfaces.

Resources
- COVID-19 disinfecting guidelines developed for produce farms
  https://vegetablegrowersnews.com/news/covid-19-disinfecting-guidelines-developed-for-produce-farms/
- Interim Standard Operating Procedure (SOP) for Cleaning and Disinfection of High Touch Surfaces on Farms during communicable disease outbreak of COVID-19
  https://www.calstrawberry.com/Portals/2/Documents/Announcements/2020/SOP%20for%20Cleaning%20High-Touch%20Surfaces%20During%20COVID-19.pdf?ver=2020-06-03-143716-437

Notes
- Using a disinfectant is the third step is needed.
- Here is a six step list for safe and effective use of disinfectants

Resources
- 6 Steps for Safe & Effective Disinfectant Use
  https://www.epa.gov/sites/production/files/2020-04/documents/disinfectants-onepager.pdf
- Cleaning vs. Sanitizing
  https://producesafetyalliance.cornell.edu/sites/producesafetyalliance.cornell.edu/files/shared/documents/Cleaning-vs-Sanitizing.pdf

Notes
- While the most important way to minimize the spread of the SARS-CoV-2 virus is by minimizing person-to-person contact, cleaning and sanitizing surface on the farm is also important.
- If a surface has been contaminated by SARS-CoV-2 or been in contact with someone with COVID-19, then it surface should be not only cleaned and sanitized but also disinfected as per the label.
- The best way to find products are to use the list developed by EPA that is a list of disinfectants for use against SARS-CoV-2 in March 2020 (List N). However, this is a list of ALL disinfectants that can be used against SARS-CoV-2 which includes products not appropriate for use in produce production, harvest, post-harvest and transport.
- Here are three examples of products.

Resources
- Cleaning and Sanitizing on the Farm for COVID-19 https://blog-fruit-vegetable-ipm.extension.umn.edu/2020/05/cleaning-and-sanitizing-on-farm-for.htmlList N Tool: COVID-19 Disinfectants https://cfpub.epa.gov/wizards/disinfectants/
- Introduction to Selecting an EPA-Labeled Sanitizer https://producesafetyalliance.cornell.edu/sites/producesafetyalliance.cornell.edu/files/shared/documents/Sanitizer-Factsheet.pdf
- Labeled Sanitizers for Produce - Excel Tool https://producesafetyalliance.cornell.edu/sites/producesafetyalliance.cornell.edu/files/shared/documents/PSA-Labeled-Sanitizers-for-Produce.xlsx and Video Tutorial: How to

use the Excel Tool Labeled Sanitizer for Produce https://youtu.be/wNNJOeITtxU

Packing Areas Questions?

- Is the area open or closed?
- Does the engineering and/or landscaping affect the potential transmission of SARS-CoV-2?
- Is the organization of the area maximize social distancing and reduce transmission of SARS-CoV-2?
- Are changes needed in the pest control program?
- Do not forget the surface areas for the staff, including rest rooms, break areas, lockers and changing areas

Notes
- Is your packing area/house open to the air or is a closed building? If open there are less risk concerns but there are still some. More concerns will need to be addressed for any closed building areas used for packing
- Is how the building is structured increase or reduce the risk for SARS-CoV-2? This may include space size for equipment and people which may impact social distancing? The building or the landscaping may also make flow of people, supplies and harvested materials difficult. Just has been done in other businesses, things may need to be rearranged to reduce these risks.
- What about pest control issues? Having your pets in the packing area is always a possible risk factor but now with COVID-19 which may now may need to be re-evaluated and exclude them as well as any other animals from the packing area.
- Do not overlooking cleaning and sanitizing the areas for staff including the break areas, lockers and changing areas as well as the rest rooms they utilize at the farm. You may also add to the SOPs one for cleaning the break area used by staff after it has been used.

Resources
- COVID-19 Response Plan Template for Fruit and Vegetable Farms
  https://docs.google.com/document/d/12sLifH-6Dm48lm_s2OIM3rIrN54Fv__z_i52Mvy5yGA/edit
- Handling COVID-19 Produce Farms and Packinghouses
  https://foodsafety.ces.ncsu.edu/wp-content/uploads/2020/03/Packinghouse_COVID-19_Flyer-2.pdf?fwd=no

- Interim Standard Operating Procedure (SOP) for Cleaning and Disinfection of High Touch Surfaces on Farms during communicable disease outbreak of COVID-19 https://www.calstrawberry.com/Portals/2/Documents/Announcements/2020/SOP%20for%20Cleaning%20High-Touch%20Surfaces%20During%20COVID-19.pdf?ver=2020-06-03-143716-437

Notes
- Within the Packing Area/House there are zones that have higher risks for exposure to contaminants. These are assigned levels from 1 (highest risk) to 4 (lowest risk).
- In dealing with SARS-CoV-2, zone 1 is of the greatest concern as it has the highest level of exposure to humans which carries the most risk.
- So it is worthwhile to re-evaluate zones in the packing area/house in regards to SARS-CoV-2 and remember this may be fluid. Zone 1 may be found not only where people are putting things on the line but also when they are taking them off and any other locations down the line where people may be in contact with the product.
- Also remember that it is important to keep any packing clean and protected from all sources of contamination.

Resources

- COVID-19 Response Plan Template for Fruit and Vegetable Farms
  https://docs.google.com/document/d/12sLifH-6Dm48lm_s2OIM3rIrN54Fv__z_i52Mvy5yGA/edit
- Tools for farmers: Harvest
  http://foodsafety.uconn.edu/Food_Processing_landing_page/Processing_Meat_&_Poultry/toolsworkerharvest.php
- Tools for farmers: Post-Harvest Handling
  http://foodsafety.uconn.edu/Food_Processing_landing_page/Processing_Meat_&_Poultry/toolsworkerpostharvesthandling.php

- Handling COVID-19 Produce Farms and Packinghouses
  https://foodsafety.ces.ncsu.edu/wp-content/uploads/2020/03/Packinghouse_COVID-19_Flyer-2.pdf?fwd=no

Notes
- During COVID-19 do not overlook dealing with your storage areas as this can be of higher risk.
- Because SARS-CoV-2 is transmitted via respiratory droplets, any areas that have higher humidity or reduced temperatures will extend the time the respiratory droplets are in air. As a result it may be worth while changing some procedures and protocols to lessen exposure to your staff in the storage areas
  - Map the storage layout and create a flow that reduce staff time inside the storage area
  - Maintain regular cleaning and maintenance schedule
  - Disinfect the area of there was a possible SARS-CoV-2 episode
  - Increase the frequency of "deep" cleans

Resources
- COVID-19 Response Plan Template for Fruit and Vegetable Farms
  https://docs.google.com/document/d/12sLifH-6Dm48lm_s2OIM3rIrN54Fv__z_i52Mvy5yGA/edit
- Tools for farmers: Post-Harvest Handling
  http://foodsafety.uconn.edu/Food_Processing_landing_page/Processing_Meat_&_Poultry/toolsworkerpostharvesthandling.php

Transportation

- Transport vehicles should be considered high contact areas – trucks, "gators", 4-wheelers, pallet jacks, etc.
- Create a cleaning, sanitizing and disinfecting schedule for vehicles inside and out
- Restrict smoking and eating in all vehicles
- If controlled storage vehicle, monitor temperature and humidity as well as produce condition during transport
- Consider increasing the frequency of "deep" cleans of vehicles

Notes
- All transport vehicles and equipment should be considered high contact areas since they are used by people. This includes not only vehicles but also dollies and pallet jacks as well.
- SOPs should be created for cleaning, sanitizing and disinfecting vehicles and equipment on a regular basis
- Because smoking and eating require taking off a mask, these should be restricted activities in farm vehicles and equipment
- If a controlled storage vehicle is used on the farm the temperature and humidity should be monitored as well as the condition of the produce during transport.

Resources
- Transportation https://gaps.cornell.edu/educational-materials/decision-trees/transportation/
- COVID-19 Facility/Site Compliance: Agricultural – Delivery Guidance https://psla.umd.edu/sites/psla.umd.edu/files/files/documents/Food%20Safety/Ag%20COVID19%20DeliveryGuidance_v1%20(1).pdf
- COVID-19 Response Plan Template for Fruit and Vegetable Farms https://docs.google.com/document/d/12sLifH-6Dm48lm_s2OIM3rIrN54Fv__z_i52Mvy5yGA/edit

Agritourism

- Increased potential for pathogen transmission via contact surface areas and people (staff and visitors)
- Determine non-entry zones for visitors and clearly mark barriers
- Pre-package items to discourage bare hand sorting
- Limit samples to single-serving packaged, take away items
- Increase number and location of handwash and hand sanitizer stations
- Advise visitors to NOT pick or eat dropped produce

Notes
- Agritourism operations add a new level of risks over just a general farm operation and will require additional risk assessments such as these and others mentioned in previous modules.

Resources
- COVID-19 Facility/Site Compliance: Agricultural – Business Checklist
  https://psla.umd.edu/sites/psla.umd.edu/files/files/documents/Food%20Safety/Ag%20COVID19%20BusinessChecklist_v1%20(2).pdf
- COVID-19 Facility/Site Compliance: Agricultural – Workforce Guidance
  https://psla.umd.edu/sites/psla.umd.edu/files/files/documents/Food%20Safety/Ag%20COVID19%20WorkforceGuidance_v1.pdf
- COVID-19 Facility/Site Compliance: Agricultural – Workforce Training Guidance
  https://psla.umd.edu/sites/psla.umd.edu/files/files/documents/Food%20Safety/Ag%20COVID19%20WorkforceTraining_v1%20(1).pdf
- COVID-19 Facility/Site Compliance: Agricultural – Delivery Guidance
  https://psla.umd.edu/sites/psla.umd.edu/files/files/documents/Food%20Safety/Ag%20COVID19%20DeliveryGuidance_v1%20(1).pdf
- Best Management Practices for Agritourism Farms During the COVID-19 Pandemic
  https://smallfarms.cornell.edu/resources/farm-resilience/best-management-practices-for-agritourism-covid/
- COVID-19 Agritourism Resources & Information
  https://ucanr.edu/sites/agritourism/COVID-19/

- COVID-19 Facility/Site Compliance: Agricultural – Delivery Guidance
  https://psla.umd.edu/sites/psla.umd.edu/files/files/documents/Food%20Safety/Ag%20COVID19%20DeliveryGuidance_v1%20(1).pdf
- Farm Pick-Your-Own (PYO)/Agricultural Tourism Activities – Guidance Memo #5
  https://www.mass.gov/doc/mdar-bulletin-16-farm-pick-your-own-pyoagricultural-tourism-activities/download
- Handling COVID-19 Best Practices for Agribusiness https://foodsafety.ces.ncsu.edu/wp-content/uploads/2020/04/Agribusiness_COVID-19_Flyer-2.pdf
- Ways to Keep Agritourism Relevant Through the COVID-19 Pandemic
  https://www.growingproduce.com/vegetables/ways-to-keep-agritourism-relevant-through-the-covid-19-pandemic/

Reduce Transmission from off The Farm

- Pre-sell and pre-package produce when possible
- Use separate containers to take off farm for sales instead of harvest boxes
- Pack additional PPE and hand sanitizer for staff use
- Choose retail display containers that can be cleaned, sanitized and disinfected
- Provide locations to dispose of used PPE and collect clothing used by the staff off site to be cleaned
- Create additional barriers to prevent contact that can bring SARS-CoV-2 back to the farm

Notes
- Review ways to reduce the potential for transmission when off the farm by using some of these options for both your staff and your customers

Resources
- COVID-19 Response Plan Template for Fruit and Vegetable Farms https://docs.google.com/document/d/12sLifH-6Dm48lm_s2OIM3rIrN54Fv__z_i52Mvy5yGA/edit
- Agriculture Workers and Employers – CDC - https://www.cdc.gov/coronavirus/2019-ncov/community/guidance-agricultural-workers.html
- Agricultural Employer Checklist – CDC - https://www.cdc.gov/coronavirus/2019-ncov/community/pdf/Agricultural-Employer-checklist.pdf
- Considerations for Outdoor Farmers Markets https://www.cdc.gov/coronavirus/2019-ncov/community/outdoor-farmers-markets.html
- COVID-19 Preventative measures cloth coverings for Food Employees https://foodsafety.ces.ncsu.edu/wp-content/uploads/2021/04/Foodservice-Facecovers_COVID-19_Flyer_040920.pdf

Summary

- Revisit "The Farm"
- Identify potential contact and contamination points
- Evaluate application of best practices with your staff and farm
- Target areas of high risk for SARS-CoV-2 transmission
- Modify or create SOPs to reduce risk, document change and monitor based on SARS-CoV-2 as well as the changing and future outbreaks