



# PRACTICAL BIOSECURITY RECOMMENDATIONS FOR FARM TOUR HOSTS

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# PRACTICAL BIOSECURITY RECOMMENDATIONS FOR FARM TOUR HOSTS

By

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## Abstract

This publication was written for livestock producers who would like to open their farms to the public for tours or educational workshops, yet reduce disease risks potentially associated with such visits.

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# Practical Biosecurity Recommendations for Farm Tour Hosts

If you are interested in and willing to host a farm tour or workshop for educational purposes, THANK YOU! With only about 1% of the US population producing food (USDA 2012), the general public and beginning farmers have limited opportunities to learn about farm management practices firsthand. Educating the public about best agricultural practices helps strengthen connections between farmers and consumers, dispel misinformation, and cultivate the next generation of farmers (Figure 1). Furthermore, a farm tour can be an excellent marketing tool by facilitating exposure to potential customers. Farm tours are also popular with “backyard” producer groups and clubs that enjoy traveling to each other’s farms to share and learn from each other.



Figure 1. Farm tours such as this can educate the public about the facts of modern dairy farm operations, for example, and help dispel misperceptions, confusion, and incredible beliefs perpetuated through biased sources. Photographer: Dorothy Elsner.

Consumers are increasingly interested in where their food comes from, how it is produced, and how they can grow their own. “Buy local” campaigns are commonplace, as are grassroots projects that encourage consumers to support local farmers. The number of small farms is increasing, perhaps in no small part due to such campaigns and the interest they create in farming. Indeed, the 2012 US Census of Agriculture showed increased farm numbers from 2002 to 2012 in only three categories of farm size: 1 to 9 acres, 10 to 49 acres, and >2,000 acres. These new small-scale farmers need education and guidance on a myriad of topics to operate a successful farm. Farm tours are an excellent way for them to gain such information and connect with mentors.

As a farm owner, you have the right and responsibility to establish risk management protocols for your farm. Sponsoring an educational event is no reason to lower disease-prevention standards. Recommendations in this article will address potential risks participants could pose to your farm biosecurity as well as potential problems they could take home. Table 1 is a checklist designed to assist with event planning. For more information about diseases of concern, contact local veterinarians and/or public health officials.

## Why Care about Biosecurity?

The reasons to reduce disease risk may not be obvious to those completely unfamiliar with agricultural production. Much is at stake. Education about the need for disease prevention should help moderate participants’ feelings of inconvenience regarding farm biosecurity requirements.

Animal disease outbreaks have varying degrees of ripple effects on animal welfare and well-being, farm profitability, workload, product quantity and quality, ability to transport and/or sell animals, veterinary and medication costs, and human health. An economic analysis of a Scottish herd of 100 cow-calf beef pairs calculated the effect of a Bovine Viral Diarrhea outbreak to be \$66.07 in 2003, \$86.66 in 2016 per cow per year thereafter (Gunn et al. 2004). Vaillancourt’s (2000) paper summarized the work of others who documented the cost of poultry disease epidemics; these costs ranged from \$0.59 to \$19 per bird. Cho et al. (2010) assessed the Net Present Value (NPV) of dairy cattle farms with moderate and high rates of Johne’s Disease infections as 45% and 1.3%, respectively, of the NPV of a farm without this insidious disease. Incursions of new diseases onto formerly negative premises can result in the loss of added value of breeding animals that were previously disease-negative, as well.

## Biosecurity Strategies

### Assess Risk

Biosecurity risk ranges from low to moderate to high. For farm tours, factors that increase risk include the number of different premises visited, degree of visitor contact with animals and/or manure, and the presence of contagious diseases in the area (Grooms 2003). Ultimately, the complexity of an event’s biosecurity plan will depend on the specific pathogen(s) of concern and the desired degree of risk containment (Wells 2000).

Table 1. Biosecurity planning checklist for livestock farm events.

Biosecurity Planning Checklist for Livestock Farm Events				
Task	Notes	Due By Date	Person Responsible	Completed?
Assess need for tour	Consider alternative approaches such as Skype, presentation, website, video recording, etc.			
Specify event goals and objectives	Will depend on the farm’s purpose for the event—advertising, education, marketing, etc.			
Identify need for tour co-sponsors	County Extension, Farm Bureau, local farm advocacy groups, etc.			
Discuss need for additional risk coverage with insurer	Consider additional one-day event coverage for liability			
Create biosecurity plan with veterinarian	Will depend on livestock species, type of visitors, and local disease issues. Use farm schematic when developing biosecurity plan. Include tour station visitation order, appropriate disinfectant, and how to reduce risk			
Establish event date	Consider likely weather, competing events, concurrent farm activities, labor available			
Determine best location for public parking	Off farm preferred; paved area best. May need to provide shuttle from parking to event entrance			
Decide on footwear and clothing requirements for event attendees	Require clean and disinfected rubber footwear OR provide plastic booties or farm boots; consider requiring clean coveralls or provide them if direct contact with animals will occur			
Decide if attendance will be restricted to reduce risk	Restrictions could include invitees only; no dogs; no children; no recent international travelers; etc.			
Create event advertising	Newspaper, email, flyers, social media, etc.			
Decide amount of registration fee to charge, if any	Costs or partial costs may be underwritten by co-sponsoring agency or grant			
Decide on food/refreshment needs (including food handler training)	Focus on non-perishable foods not likely to be associated with food allergies; providing raw farm-origin products will increase risk			
Determine accessibility to special needs audiences	Provide farm-owned 4-wheeler or golf cart; wheelchairs and strollers can transport pathogens into homes			
Determine how used disinfectant will be handled	Read and follow label instructions regarding disinfectant disposal			
Update first aid kits on farm	Replace missing or expired items			
Advertise event	At least two months before event; provide general information only (date, location)			
Open registration	At least one month before event			
Determine how and what to communicate with registrants	Restrict attendees to those who register by providing event details during registration (directions, time, clothing and footwear requirements, etc.)			
Obtain supplies	Soap, paper towels, booties, gloves, garbage bags, ice, etc.			



Table 1 (continued). Biosecurity planning checklist for livestock farm events.

Biosecurity Planning Checklist for Livestock Farm Events				
Task	Notes	Due By Date	Person Responsible	Completed?
Obtain boot brushes, disinfectants, buckets, and hoses for boot wash areas where needed for disease control	May only be needed at entrance and exit, but may also be needed between different buildings/areas of the farm			
Obtain an effective PA system	Might be able to borrow from county Extension office			
Identify event helpers	Registration, parking, food service, photography, animal handlers, social media, crowd control			
Create handouts for the event	Include farm mission statement, history, contact information, educational articles, sales sheet, etc.			
Create sign-in sheet for registration table	Name and phone or email at minimum in case of need to contact			
Establish single entry site for public	Control access and station someone at the entrance to monitor compliance with event policies			
Create and post signage	ENTRY, REGISTRATION, EXIT, REST ROOMS, PARKING, NO ENTRY, GARBAGE, WELCOME, etc.			
Identify and label restricted sites	Manure lagoons, areas with mature male livestock, dangerous machinery, etc.			
Create and situate handwashing sites	Locate near entrance, exit, food, livestock, and restroom areas			
Locate and label restrooms	May need rented port-a-johns			
Establish protocol to deal with non-compliant participants	Identify and prohibit access to those not in compliance at entrance and/or those who do not abide by event rules			
Determine how refreshments will be kept safe	Protect from flies, rain, and sun; keep cold food <40°F and hot food >140°F. May need ice, crock pots, etc.			
Decide if and how many chairs will be needed	Plastic patio or metal folding chairs are disinfectable			
Prepare for garbage collection	Garbage bags and cans; may need to provide garbage bags for attendees to transport soiled footwear and/or clothing			
Secure gate after event start	Provide cell phone number for late arrivals to call for admittance after gate closed—prevents entrance of un-monitored late attendees			
Conduct event	Ensure an educational, safe, and enjoyable activity for all			
Conduct event evaluation	Hard copy at event or electronic after			
Send thank-you notes to those who helped	Send individualized and hand-written notes promptly			

## Communicate with Participants before the Event

Participants should pre-register so details of the event can be shared with them. Restricting information released in initial publicity (e.g., date but no specific time or location) will cause interested persons to contact the host for more information; at that time, biosecurity expectations and other program details can be shared. Instruct participants to be punctual so access to the farm can be monitored. Explain what ages of children are allowed, if any. Do not allow visitors to bring dogs or other animals. Also, inform anyone who has travelled internationally within a week they will not be able to participate in the event due to the risk of Foreign Animal Disease transmission.

## Park Visitors Away from Livestock

Do not let participants drive their vehicles through your farm gate and onto your property where you drive your vehicles. Contaminated tires and overlap of farm and off-farm traffic is an important means by which some diseases are spread (Bowman and Shulaw 2001b; Baker 2004). Indeed, contaminated trailers are believed to be a major means of dissemination of the devastating Porcine Epidemic Diarrhea virus in the US since 2013 (Lowe et al. 2014). Designate a location near the farm where people can park safely and walk onto the farm with clean rubber boots. If such a site is not possible nearby, consider running a shuttle service from a more distant site to the farm. At minimum, keep visitors' vehicles out of pastures and confined to a farm area that does not overlap with farm vehicles or livestock (Figure 2). Optimal parking sites are on paved areas that can be disinfected and where livestock are excluded. If pastures must be used for parking, livestock should be excluded from the area for several weeks.

## Display Clear Signage

Post large, legible, waterproof signs that instruct participants where to park, where to go, and what to do. REGISTRATION, PARKING, THIS WAY, and EXIT are just a few suggestions that will help direct and control traffic and behavior. An



Figure 2. Clear signage posted at key locations will help control traffic and reduce risks.

attractive WELCOME sign would be a good addition and help set a friendly tone for the event.

## Insist on Clean Footwear and Clothing

It is critical for farm tour participants to wear clean clothing and disinfected footwear, especially if they live on a farm themselves (Bowman and Shulaw 2001a). Anyone with soiled clothing or footwear should not be allowed access to the premises; Figure 3 depicts the bacterial loads that can be cultured from contaminated footwear. Farm footwear and clothing policies should be shared during the pre-registration process and in event promotional materials.



Figure 3. Demonstration of bacteria cultured from boots with smooth and patterned soles. 1 = dirty, 2 = washed with water, 3 = disinfected. Note that patterned-soled boots are more difficult to disinfect effectively and may still harbor bacteria. Photo courtesy of ILVO-UGent.

Varying levels of restriction are possible, depending on host farm risk tolerance, ease of implementation, and other factors:

- Farm hosts could require participants to change out of street shoes and into clean rubber boots at the car parking area; participants might need to bring their own clean boots or the farm host might provide them. This procedure may be the most effective method of pathogen control because visitors' footwear is left in their cars. Boots used during the farm tour could be left on the farm, disinfected on the farm and taken home, or taken home in a garbage bag and disinfected there.

*“A quick splash of a dirty boot in a foot bath is not likely to accomplish anything except to give a false sense of security.”* (Bowman and Shulaw 2001b).

- A boot washing and disinfecting area may be established at the car parking area for people to use before they enter the farm property. Washing boots thoroughly with soap and water to remove all visible debris before stepping in a disinfecting foot bath will extend the effective life the disinfectant in the bath. Use an appropriate disinfectant such as those listed in Table 2 and provide long-handled boot brushes. If a disinfectant foot bath is used, it should be monitored so the solution can be changed before it becomes visibly soiled and inactivated. Allow for the manufacturer's recommended contact time for effectiveness. Tour participants should wash and disinfect their boots again when they leave.
- The farm may provide heavy duty plastic overshoes to be worn throughout the event and discarded at the parking area before participants go home. The loud rustling noise created by plastic boots in motion can disturb some animals, though, and quite a bit of plastic waste can be generated. Also, these boots can develop holes that render them ineffective.
- Additional boot washes may be required before entering livestock housing areas.
- For added biosecurity, some farms supply clean cloth or disposable coveralls for participants to wear during tours and leave on the farm.

Detailed information on various disinfectants to consider using is available in Table 2. Follow label directions regarding proper storage, dilution rates, and disposal methods. Ensure disinfectant efficacy by changing foot baths before they become visibly soiled and inactivated. It is pointless to use disinfectants if adequate contact time is not allowed.

## ***Establish Controlled Entry***

Establish a single entrance for visitors. This will ease communication, information sharing, and monitoring of compliance with biosecurity protocols. After a reasonable arrival time has been allowed for the event, lock the gate and post a phone number latecomers can use to contact the host to request entry to the event. Unmonitored entry of latecomers will not ensure compliance with biosecurity protocols.

## ***Have a Greeting Area***

Visitors should be directed to a registration table or greeting area where they can meet the tour host, get a schedule, learn the locations of bathrooms and hand washing stations, and sign in. Visitor logs with accurate contact information are very important in case a human or animal disease outbreak necessitates follow-up contact after the event. This is a good

## **Definitions**

Clean = remove visible dirt, grime, and debris

Sanitize = quickly reduce bacterial numbers to safe levels

Disinfect = kill nearly all bacteria, viruses, and fungi

Sterilize = kill all bacteria, viruses, fungi, and bacterial spores

time to welcome everyone, share your farm mission, and preview what will be shared during the tour. Be sure to review biosecurity expectations and see if participants have complied thus far with disinfected boots, clean clothing, and other guidelines. Use this time to ask participants to wash their hands, address any biosecurity deficiencies, and/or dismiss non-compliant visitors.

## ***Use Gates***

People do not need to access all your property. Use gates—even temporary ones—to control access and foot traffic. Permanent locking gates in key areas help with overall farm security and are a good investment that helps prevent theft and damage. Figure 4 is an example of effective use of a gate with good signage.



Figure 4. Example of farm gate communication with visitors. Include a phone number at which potential visitors could request entry. Photo courtesy of the Ontario Livestock and Poultry Council.



Table 2. Disinfectants.

Type	Examples	Advantages	Disadvantages	Comments
Alcohols	Ethanol, Isopropyl	<ul style="list-style-type: none"> <li>• Readily available over the counter</li> <li>• Inexpensive</li> <li>• Broad-spectrum activity</li> <li>• Work quickly</li> </ul>	<ul style="list-style-type: none"> <li>• Ineffective in presence of organic debris</li> <li>• Flammable</li> <li>• Damages rubber and plastic</li> <li>• Can irritate skin</li> <li>• Ineffective against all viruses and bacterial spores</li> </ul>	<p>Ethanol approved for OLPS as disinfectant and sanitizer only. Effective against viruses. Isopropanol approved only as a disinfectant in OLPS and not effective against all viruses. Best use is for disinfection of clean surfaces.</p> <p>Kills pathogens by denaturing proteins, which damages membranes and causes cell lysis and death.</p> <p>Most effective alcohol concentrations are 70% to 90%.</p>
Aldehydes (formaldehyde, glutaraldehyde)	Aldesan	<ul style="list-style-type: none"> <li>• Inexpensive</li> <li>• Broad spectrum</li> <li>• Effective against most bacterial spores</li> <li>• Can be used as fumigant</li> </ul>	<ul style="list-style-type: none"> <li>• Corrosive and irritating</li> <li>• Toxic fumes</li> <li>• Carcinogenic</li> <li>• Minimal residual activity</li> <li>• Variable effectiveness in organic matter</li> <li>• Heat volatile</li> <li>• Critical disposal issues</li> <li>• Personal protective equipment required for use</li> </ul>	<p>Very effective disinfectant family, but carcinogenicity, toxic fumes, and environmental hazard from disposal make its use ill-advised.</p>
Chlorhexadine	Nolvasan Skin and Wound Cleanser, Surgical Scrub, and Solution; generics	<ul style="list-style-type: none"> <li>• Relatively non-corrosive and non-irritating</li> <li>• Maintains effectiveness in the presence of some organic material</li> <li>• Relatively broad spectrum (active against many bacteria and viruses)</li> <li>• Minimally toxic</li> </ul>	<ul style="list-style-type: none"> <li>• Precipitate in hard water</li> <li>• Not very effective against some pathogens (e.g., FMDV, TB, MAP, spore-forming bacteria, gram-positive bacteria, or Pseudomonas)</li> <li>• Can cause minor eye irritation</li> </ul>	<p>Use: disinfect inanimate objects after thorough cleansing; sanitizer for milking equipment.</p> <p>In OLPS, allowed for surgical procedures conducted by a veterinarian or as teat dip if other methods have become ineffective.</p> <p>Use correct formulation for surface to be disinfected. Use soap-based products for surgical scrub and hand washing, and dilute solutions for use on boots and equipment.</p>

Adapted from Bowman and Shulaw (2001b); Dvorak (2008); Grooms (2003); The University of Vermont (2010); University of Colorado Boulder Department of Environmental Health and Safety (2014); US Department of Agriculture Animal and Plant Health Inspection Service (2005); US Government Publishing Office (2016); and Wakenell (2005).

Notes: Unless specifically directed, do not mix different classes of disinfectants. Mixing can inactivate them and may cause dangerous chemical reactions. Follow manufacturer’s label and mixing instructions carefully; dispose of used solution as directed. Refer to label for effectiveness against specific disease-causing agents. Table includes only products registered for legal use in Washington State at time of publication. Additional products are registered for legal use in other states and/or may become available for use in Washington in the future. OLPS = Organic Livestock Production Systems; FMDV = Foot and Mouth Disease virus; MAP = Johne’s disease organism; TB = Tuberculosis.

Table 2 (continued). Disinfectants.

Type	Examples	Advantages	Disadvantages	Comments
Hypochlorites (sodium hypochlorite, chlorine dioxide, calcium hypochlorite, sodium chlorite, sodium chlorate)	Bleach, Oxine, Exspor, CDG Solution 3000 Liquid Concentrate, Purate	<ul style="list-style-type: none"> <li>• Effective against most viruses, bacteria, molds, and algae</li> <li>• Readily available</li> <li>• Excellent disinfectants on clean surfaces</li> <li>• Inexpensive</li> <li>• Not affected by water hardness</li> <li>• Broad spectrum</li> <li>• Proper concentration can kill TB, MAP, and FMDV</li> </ul>	<ul style="list-style-type: none"> <li>• Skin irritant and eye hazard</li> <li>• Can remove dyes and damage clothing, rubber and some metals</li> <li>• Corrosive</li> <li>• Inactivated in the presence of organic material (mud, manure, dirt, vegetation)</li> <li>• Not effective against bacterial spores</li> <li>• Activity in solution is short lived (&lt;24 hours).</li> <li>• No residual activity</li> <li>• Strong odor</li> <li>• Can damage metal, rubber, clothing, and skin</li> <li>• Volatile in hot water</li> </ul>	<p>Use bleach containing 5.25% to 6% sodium hypochlorite.</p> <p>Chlorine compounds are more active in warm water. They are compatible with soaps but <i>should never be mixed with acids</i>.</p> <p>Approved for disinfecting and sanitizing facilities and equipment in OLPS, but residual chlorine levels in water must not exceed maximum residual disinfectant limit defined by the EPA's Safe Drinking Water Act.</p> <p>Available as powders or liquid.</p> <p>Effectiveness depends on chlorine concentration and pH of solution (decreased effectiveness with increased pH).</p> <p>Make fresh solution daily and store in cool, dark place.</p> <p>Thoroughly rinse from animal contact surfaces or burns may result.</p> <p>Chlorine dioxide is an excellent disinfectant on cleaned surfaces. Can use on feeding equipment, livestock pens, and applied as fog to disinfect vacant animal housing. Effective against <i>Cryptosporidium</i> species, depending on concentration and contact time. Difficult to prepare and use, is temperature-dependent, and solution concentration must be verified before each batch is used.</p>
Iodophors (iodine antiseptics)*	Betadyne, Povidone, Weladol, generics	<ul style="list-style-type: none"> <li>• Broad activity spectrum against bacteria and fungi</li> <li>• Relatively low toxicity</li> <li>• Water soluble</li> <li>• Effective in hot and cold water</li> </ul>	<ul style="list-style-type: none"> <li>• Inactivated by heat, organic material, metals, and sunlight</li> <li>• Concentrated tinctures can irritate skin and stain clothes</li> <li>• No residual activity</li> <li>• Corrosive</li> <li>• Heat sensitive</li> <li>• Not effective against viruses or bacterial spores</li> <li>• Expensive</li> </ul>	<p>Often formulated with soaps to form antiseptic surgical scrubs.</p> <p>"Iodine" approved for use as organic disinfectant in OLPS.</p> <p>Do not mix iodophors with quaternary ammonium disinfectants or they will be inactivated.</p> <p>"Tamed" iodine preparations are less corrosive and irritating.</p> <p>Distribution restricted in some areas due to efforts to control illegal drug manufacturing.</p> <p>*Regulated by the FDA (antiseptics), not the EPA (disinfectants).</p>

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Table 2 (continued). Disinfectants.

Type	Examples	Advantages	Disadvantages	Comments
Oxidizing agents	Hydrogen peroxide, Trifectant, Virkon, Virkon S, Envirox systems, OxySept 333	<ul style="list-style-type: none"> <li>Relatively safe in diluted forms</li> <li>Broad spectrum</li> <li>Generally effective against FMDV and TB</li> </ul>	<ul style="list-style-type: none"> <li>Variable activity in the presence of organic material</li> <li>Some preparations may irritate skin</li> <li>Can damage clothes if concentrated</li> </ul>	<p>Hydrogen peroxide approved for use as disinfectant in OLPS.</p> <p>Some oxidizing disinfectants effective against broad range of bacteria, viruses, fungi, and bacterial spores. Some preparations effective when used on hard-to-disinfect equipment such as brushes, tack, etc.</p>
Peroxyacetic (peracetic acid)	VigorOx®	<ul style="list-style-type: none"> <li>Degrades into water soluble, non-toxic products</li> <li>No residue, no rinse needed</li> <li>Low foaming</li> <li>Acts quickly</li> <li>Broad spectrum of effectiveness</li> <li>Effective despite organic matter</li> <li>Tolerates wide temperature range</li> </ul>	<ul style="list-style-type: none"> <li>Strong odor</li> <li>Corrodes some metals</li> <li>Variable effectiveness against yeast and mold</li> <li>Expensive</li> <li>Hard water affects effectiveness</li> </ul>	<p>Approved only for sanitizing facility and processing equipment in OLPS.</p> <p>A very powerful oxidant, peroxyacetic acid is a mixture of acetic acid and hydrogen peroxide.</p> <p>When dissolved in water, it biodegrades to hydrogen peroxide and acetic acid, then water, oxygen, and carbon dioxide.</p>
Phenols (pine oil, bisphenols, carbolic acid)  Coal tar distillates (cresol and cresylic acid)	One-Stroke Environ, Tek-Trol	<ul style="list-style-type: none"> <li>Relatively non-toxic with contact</li> <li>Broad-spectrum disinfectants active against bacteria, some viruses and fungi</li> <li>Maintain activity in presence of some organic material</li> <li>Effective against MAP and TB bacteria</li> <li>Can be applied via fogging</li> <li>Not affected by water temperature</li> </ul>	<ul style="list-style-type: none"> <li>Can irritate skin with prolonged exposure</li> <li>Not effective against all viruses, including FMDV</li> <li>Not effective against bacterial spores</li> <li>Expensive</li> <li>Should not be used around cats</li> <li>Somewhat corrosive</li> <li>Disposal issues are possible</li> <li>Fumes toxic at high concentrations</li> <li>Little residual activity</li> </ul>	<p>Good all-purpose disinfectants for farm use.</p> <p>These compounds are coal-tar derivatives and often have a strong pine-tar odor.</p> <p>Various preparations in this family are combined with other products for enhanced effectiveness, water solubility, residual activity, or other properties.</p> <p>Coal tar distillates are similar to phenols, with excellent residual activity and effectiveness despite presence of organic matter. Have a strong odor and can produce toxic fumes; do not use in presence of live animals—let fumes dissipate.</p>
Phosphoric acid	Acid Sanitizer FP	<ul style="list-style-type: none"> <li>Inexpensive</li> <li>Non-flammable</li> <li>Acts quickly</li> <li>Broad spectrum</li> <li>Tolerates wide temperature range</li> <li>Unaffected by water hardness</li> </ul>	<ul style="list-style-type: none"> <li>Corrosive</li> <li>Skin irritant</li> <li>Excessive foaming</li> <li>Poor effectiveness against yeast and mold</li> </ul>	<p>Permitted use as equipment cleaner in OLPS providing no direct contact with organically certified livestock or land.</p> <p>Do not rinse surfaces with water after disinfecting. Cleaning required before disinfecting with phosphoric acid. Fresh solution needed daily or when visibly contaminated.</p>
Quaternary ammonium	Roccal-D Plus, Lysol, Renown	<ul style="list-style-type: none"> <li>Broad-spectrum antibacterial activity</li> <li>Some viral and fungal activity</li> <li>Good residual activity</li> <li>Stable after mixing</li> <li>Odorless, non-corrosive, non-toxic, and non-irritating if used as labeled</li> </ul>	<ul style="list-style-type: none"> <li>Inactivated by soap</li> <li>Activity can be reduced by organic material, heat, and hard water</li> <li>Ineffective against molds, bacterial spores and some viruses</li> <li>Ineffective against MAP bacterium</li> </ul>	<p>Contain ammonium.</p> <p>Older formulations only effective on clean surfaces; newer formulations active despite presence of some organic debris.</p> <p>Rinse soap from surfaces before disinfecting with quaternary ammoniums—most are inactivated by contact with soap or soap residue.</p>

Adapted from Bowman and Shulaw (2001b); Dvorak (2008); Grooms (2003); The University of Vermont (2010); University of Colorado Boulder Department of Environmental Health and Safety (2014); US Department of Agriculture Animal and Plant Health Inspection Service (2005); US Government Publishing Office (2016); and Wakenell (2005).

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## Keep Visitors Safe

Do not permit visitors access to high-risk areas with working machinery, mature intact male animals, female livestock with offspring, guardian dogs, barbed or electric wire, grain bins, manure lagoons, gravel pits, etc. (Figure 5). Do not allow strollers, pacifiers, eating, smoking, or drinking in livestock areas. If children are allowed on the tour, be sure parents supervise them at all times – this may require handholding.



Figure 5. Thanks to close supervision and clear delineation of danger area, this robotic dairy tour attendee can get a close look at the system without risk from cattle or equipment.

Have hand washing stations available for use after livestock area tours, at rest rooms, food service areas, entrances, and exits. Remind participants to wash hands after contact with livestock, using the bathroom, and before eating or smoking. Figure 6 is a diagram of a simple and inexpensive portable hand washing station. The Centers for Disease Control report that alcohol-based hand sanitizers are not very effective if hands are particularly soiled or greasy; such hands should be washed with soap and water. Hand sanitizers with at least 60% alcohol can be quite effective on visibly clean hands.

Any food and beverage provided should be served in compliance with standard food safety practices: keep cold foods below 40°F and hot foods above 140°F, protect all food from insects, and use only potable water for beverages.

## Control the Flow

Have a plan for the day with an established route and approximate amount of time needed at each station. Ensure there is enough room for all to see and hear what is being presented—this may necessitate dividing visitors into groups and using PA systems. Additional farm staff or volunteers may be needed to keep all participants in view at all times. Provide seating if needed for those who need to sit. Keep foot traffic away from livestock feed and feeding areas, manure, and any carcasses. Visit young animals before mature animals.

## Portable Hand Washing Station

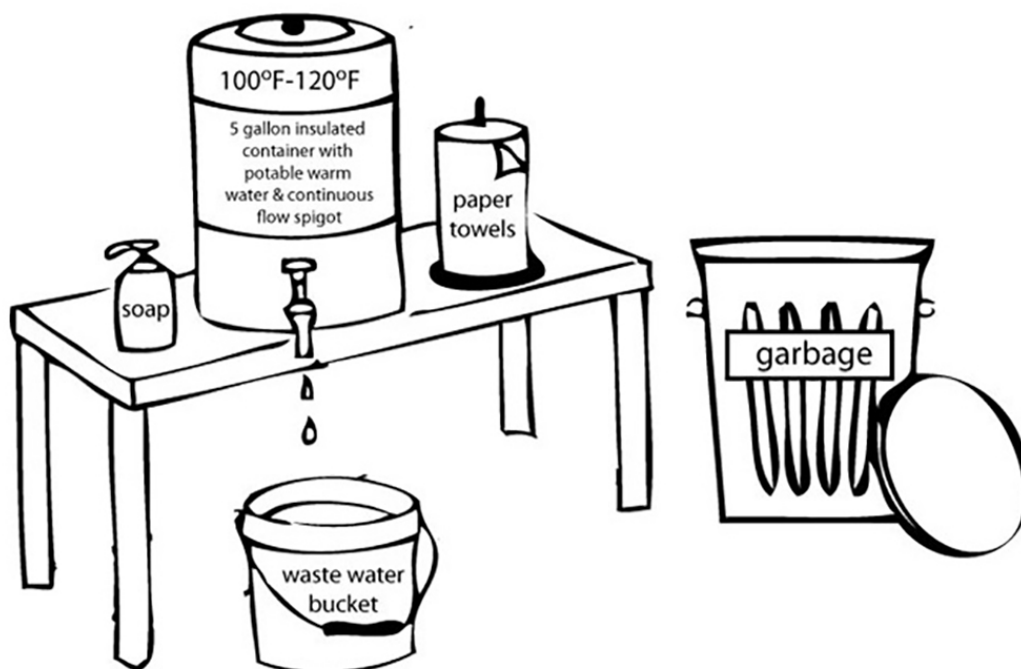


Figure 6. Low cost, portable hand washing station for remote locations. Instruct users to turn handle on and off using a paper towel and wash hands with soap under running water for at least 20 seconds. Replenish warm water as needed. Adapted from Kalamazoo (MI) County Environmental Health, by Sarita Role Schaffer.

Keep visitors away from intake fans that bring air in from outside, past visitors, and onto livestock (King 2007).

## Limit Direct Contact with Livestock

Prevent needless contact with livestock—participants with limited previous livestock contact are at higher risk of contracting common but relatively innocuous conditions such as ringworm and sore mouth; this is particularly true for children. People who do contact livestock should be advised to wash contacted skin with soap and water promptly. Better yet, provide disposable gloves to those who might be learning hands-on skills such as hoof trimming or vaccinating. There is no need for direct animal contact at most farm events (Figure 7).

## Just Say No

Do not allow participants to bring dogs with them. In addition to disease transmission, injury to animals or people is possible if strange dogs are allowed on the farm premise. Also, unpleasant interactions are likely to occur between resident farm dogs and visiting dogs.

It is difficult to disinfect baby strollers, chairs, and wheelchairs properly, so discourage their use. Young children should walk, be carried, or left home. Farm-origin vehicles such as four-wheelers or golf carts can be used to transport those who need assistance. Provide chairs, lawn area, or bedding bales for sitting.



Figure 7. These farm tour participants are learning about pasture and beef cattle management. This was an effective educational event despite no direct contact with livestock. Participants wore appropriate footwear and cattle will not return to this area for weeks.

## Keep It Clean

Avoid conducting farm tours during rainy/muddy weather if possible. Provide convenient garbage cans and paper towels throughout the tour. Give each participant a garbage bag to take to his/her vehicle for dirty boots and/or clothing to take home for laundering, disinfecting, or discarding.

## Use the Right Disinfectant

As detailed in Table 2, a wide array of products is available to inactivate pathogens (disease-causing organisms) on farm equipment, tools, boots, livestock facilities, footbaths, and other surfaces. *Disinfectants are not a shortcut to biosecurity and are just one aspect of disease control.* The selection of an appropriate disinfecting agent, as depicted in Figure 8, should be done on a case-by-case basis. This is a multi-factorial decision and should take into account pathogen risk, current environmental conditions, and the surface(s) to be disinfected. Besides variable effectiveness against specific pathogens and on different surfaces, disinfectants differ in their response to other conditions such as water hardness and/or temperature, contact time, amount of organic matter present, environmental temperature, and many other factors. To increase the likelihood of disinfectant effectiveness and safe use, follow the following recommendations:

- Clean surfaces before using a disinfectant. Surfaces must be cleaned with soap and water and thoroughly rinsed or many disinfectants will be inactivated by any organic material present. Pressure washers and steam jennies help remove stubborn biofilms and dried-on debris (Baker 2004).
- Read the label! Use a product with documented effectiveness against pathogens of concern under typical farm conditions of use.
- Follow mixing instructions on the label precisely and abide by all safety warnings and recommendations for personal protective equipment use. Do not mix different types of disinfectants unless specifically indicated on their labels to do so.
- Determine if farm water hardness or other factors will effect successful product use.
- Store concentrated and diluted disinfectant as indicated on the label; create fresh solutions before each use of short-stability preparations.
- Allow recommended contact time to ensure maximum kill of pathogens.
- Do not let disinfectants contact livestock unless specifically stated on the label as safe and allowable.

- If disinfectants are used on feeding surfaces or other livestock contact areas, rinse them off after the required disinfectant kill time and before animals contact the disinfected surfaces.
- Dispose of used or non-storable chemicals as instructed on the label, paying close attention to personal and environmental safety.

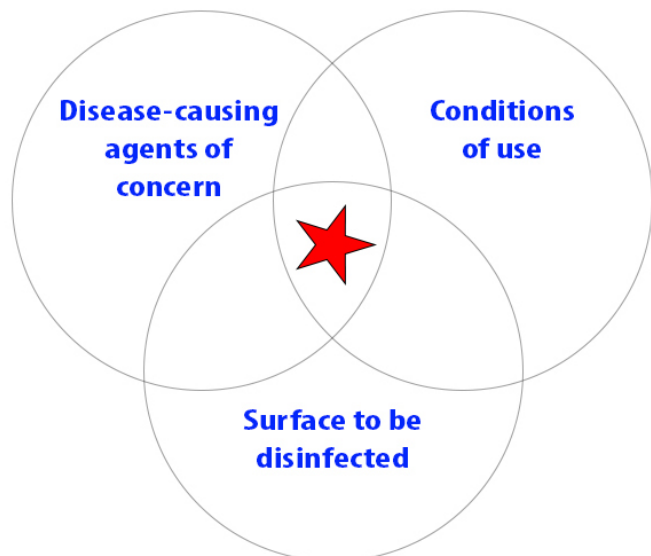


Figure 8. Factors to consider when selecting a disinfectant.

## Biosecurity: Part of Homeland Security

The US Department of Homeland Security (DHS) recognizes food and agriculture as one of the 16 Critical Infrastructure Sectors essential to US safety, security, public health, and economic health (OPS 2013). Accordingly, DHS developed protocols for federal employees who need to visit farms. There are three levels of DHS biosecurity designations:

Level 1: Farm visits only involve the farmhouse and/or office.

Level 2: Farm visits when minimal contact with livestock/poultry and/or their housing areas will occur.

Level 3: Farm visits when close contact with livestock/poultry and/or their housing areas will occur.

DHS biosecurity protocols for Level 2 (the typical level for most farm events) are:

- Avoid livestock areas (pens, barns, etc.) unless necessary for the purpose of the visit.

- Park vehicles on paved or concrete areas away from production sites on farms; avoid vehicle contact with dirt, mud, and manure.
- Wash hands with soap and water (or antibacterial gel if hands are not visibly soiled) before entering and after leaving the premise visited to reduce the risk of taking pathogens off the farm.
- Don clean rubber boots or plastic booties when exiting vehicles.
- When visit is concluded, return to vehicle and:
  - Clean and disinfect any equipment used with a brush and registered disinfectant.
  - Disinfect boots with an appropriate registered disinfectant after first cleaning with soap and water to remove visible debris. Apply disinfectant at correct concentration and for recommended contact time.
  - Dispose of used and unused disinfectant according to label instructions.
  - If using plastic booties, remove and dispose in plastic bag left on premises OR secure in “dirty” area of vehicle that is cleaned and disinfected appropriately.

Detailed biosecurity protocols for each level are available at [https://www.nrcs.usda.gov/Internet/FSE\\_DOCUMENTS/stelprdb1144151.pdf](https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1144151.pdf). A video called “Biosecurity Basics for NRCS Farm Visits” produced by the USDA Natural Resource Conservation Service is available at [www.conservationwebinars.net/webinars/biosecurity-basics-for-nrcs-farm-visits/?searchterm=None](http://www.conservationwebinars.net/webinars/biosecurity-basics-for-nrcs-farm-visits/?searchterm=None).

## Costs vs. Benefits

Vaillancourt (2000) rated the cost effectiveness of biosecurity steps and identified those responsible for the greatest reduction of risk for the least cost. These measures are:

- Changing clothing for employees who leave and return to the farm on the same day
- Establishing requirements before a vehicle can enter farm premise
- Using locks for each production house (most relevant to commercial poultry and swine operations)
- Establishing a parking area away from livestock/poultry barns
- Preventing access to restricted areas if visitors have been in contact with that species of livestock/poultry
- Providing plastic booties for visitors
- Installing signage advising visitors without authorization to stay off farm

Vaillancourt also stresses the potential benefit of any biosecurity system depends on compliance by everyone involved in the system; this would include visitors.



Gifford et al., as included in Vaillancourt (2000), reported the cost-benefit analysis of a biosecurity program on a broiler breeding farm as 1-to-3 considering a severe disease-causing agent and 30% risk of infection for the farm. When highly pathogenic diseases such as Avian Influenza were considered, a biosecurity investment was economically justifiable with just a 1% risk of an outbreak.

## Special Considerations for Certified Organic Livestock Production Systems

Organic livestock producers and processors must abide by the USDA's National Organic Program (NOP) regulations when using sanitizing agents that will contact organically certified crops, livestock, or food products (milk, eggs, and meat). No sanitizers can be used in any way that could result in contamination of organic products. During the organic certification process, producers must stipulate what sanitizers they plan to use. Sanitizers approved for use on equipment or facilities that livestock may contact include ethanol and isopropanol alcohol, chlorine disinfectants, hydrogen peroxide, iodine, and peroxyacetic acid. Chlorhexidine products may be used on organic livestock by veterinarians or as a teat dip if other approved products have become ineffective (US Government Printing Office 2016). The use of chlorine products is a bit complicated: if a chlorine-based disinfectant directly contacts an organic product at a concentration greater than allowed by the EPA's Safe Water Drinking Act, the product must immediately be rinsed with potable water and chlorine level monitored at the last point of contact.

Products not on the national list of approved substances might be allowed on a case-by-case basis by the organic program certifier if contacted in advance of the event and a determination of non-contamination is made. For example, a chemical not on the USDA's NOP list could be approved for use in a foot bath or boot wash if there is a safe place for legal disposal of the chemical residue off the organic property where it will not contact organic crops or livestock. Organic producers should always contact their certifier if they have questions about products they would like to use for biosecurity purposes on a certified organic farm.

*“Organic certification does not impede an operation’s ability to implement effective biosecurity measures.”*

– WSDA Organic Food Program

### Popular but Illegal and Ineffective

Popular opinion on vinegar and copper sulfate is incorrect: neither is legally registered for use as a disinfectant. Equally important, if they were used, they would have limited effectiveness. Copper sulfate is not effective against bacteria or viruses, and vinegar is not an effective broad-spectrum disinfectant. Because neither is approved or labeled for use as a disinfectant in Washington State, their use would not withstand legal scrutiny if problems arose.

## Think It Over

Before you host farm visits, consider the risks. How will you benefit? How will the public benefit? How effective, time consuming, and expensive will the necessary biosecurity measures be? How likely is it that the public will comply with these measures? Will the biosecurity measures you require be in harmony with the farm image you hope to portray? Are these measures themselves associated with additional risk? Could you provide meaningful virtual tours via blogs, uploaded videos, or Internet-based software? Will you need additional helpers for the day to help with supervision, education, and traffic flow? Can you get special event liability coverage from your insurance company? You may decide the effort and expense needed to reduce risk to tolerable levels are more than you are willing to accept. Consider conducting virtual farm tours via posting narrated videos online, creating a newsletter, or using social media to achieve your educational goals without added biosecurity risks.

## Summary

Although highly educational and enjoyable, farm tours come with certain risks. These risks include introducing new diseases or pathogen strains to host farm or participants' animals as well as zoonotic (animal-to-people) disease risks to participants. Such risks can be mitigated through careful pre-event planning and protocol development. Transparent education about biosecurity concerns can add to the value of the event for prospective livestock owners in attendance as well as keep the event enjoyable and safe. Each farm host will have to weigh the potential risks of hosting an event with potential benefits. If an event for the public will be held, following the above-mentioned suggestions should help reduce risks significantly. Consult your veterinarian for information about diseases of concern, appropriate disinfectants, and designing your biosecurity plan.

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Use pesticides with care. Apply them only to plants, animals, or sites as listed on the label. When mixing and applying pesticides, follow all label precautions to protect yourself and others around you. It is a violation of the law to disregard label directions. If pesticides are spilled on skin or clothing, remove clothing and wash skin thoroughly. Store pesticides in their original containers and keep them out of the reach of children, pets, and livestock.

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