Health Management and Biosecurity Practices on U.S. Sheep Operations

Biosecurity is a system of practices designed to reduce the risk of introducing disease to an operation. Biocontainment is closely related to biosecurity but includes measures that reduce the spread of disease on an operation and from one operation to another. Together, biocontainment and biosecurity programs decrease infections and promote healthier more productive livestock.

As part of the Sheep 2011 study, the U.S. Department of Agriculture's National Animal Health Monitoring System (NAHMS) collected data on sheep health and management practices from a representative sample of operations in 22 of the Nation's major sheep-producing States, which were divided into 3 regions.[1] These operations collectively represented 85.5 percent of the ewe inventory and 70.1 percent of U.S. farms with ewes.

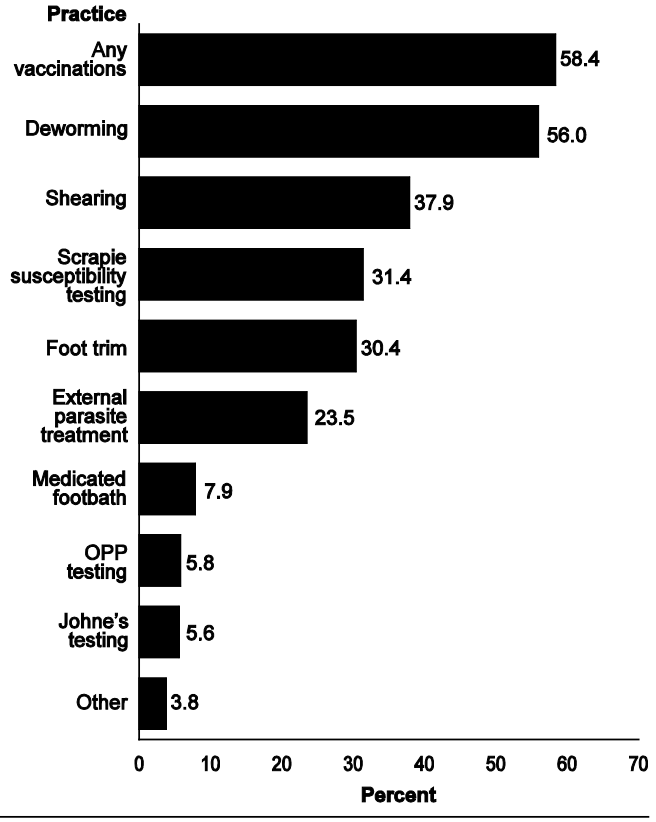
General practices

General biosecurity practices may include isolation of new arrivals, disease management practices administered to new arrivals (e.g., vaccination), isolation of sick sheep, rodent and pest control, equipment cleaning, minimizing visitor access to sheep, and manure management.

Flock additions and reintroductions

Adding new sheep to the flock is a great way to improve stock and introduce new bloodlines. However, new additions can also introduce disease agents to the flock, including scrapie, ovine progressive pneumonia (OPP), Johne's disease, and caseous lymphadenitis (CL). In 2010, 33.0 percent of operations minimized their risk of introducing new disease to their flock by not adding new sheep, other than by natural birth, while 28.6 percent of operations did add new lambs or sheep other than those born on the operation Management practices that reduce the risk of disease introduction by new additions include isolation, vaccination, shearing, foot trimming, deworming, and evaluating animal health status before flock introduction (figure 1).

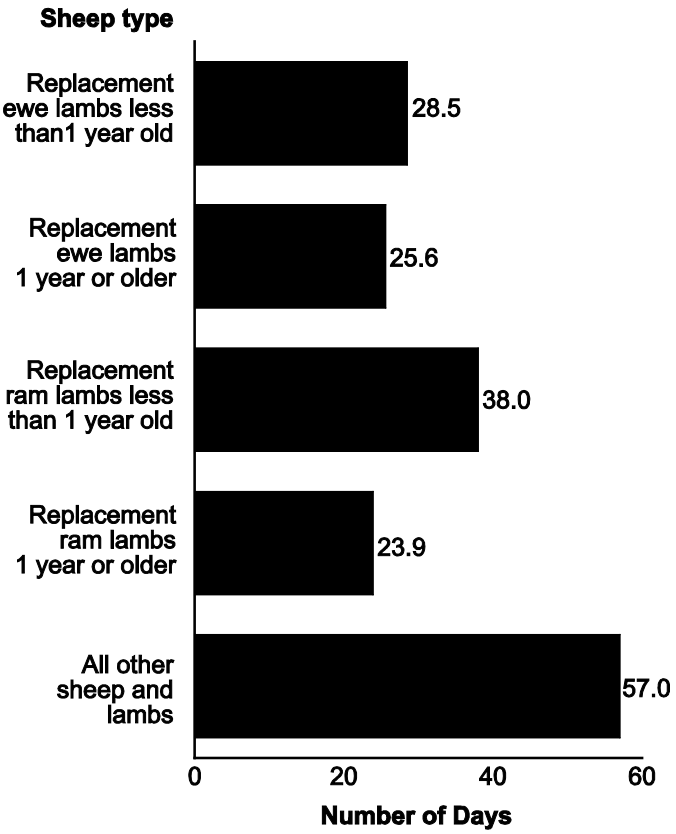
Figure 1. For operations that added sheep in 2010, percentage of operations that performed the following health management practices on new sheep before they arrived at the operation



[1] **Regions:**
West: California, Oregon, Washington
Central: Colorado, Idaho, Kansas, Montana, New Mexico, South Dakota, Texas, Utah, Wyoming
East: Iowa, Kentucky, Michigan, Minnesota, Missouri, New York, Ohio, Pennsylvania, Virginia, Wisconsin

Isolating new additions before placing them with the resident flock can reduce the risk of disease introduction. Less than half of all sheep operations that added new sheep (40.2 percent) quarantined new arrivals. As shown in figure 2, replacement ewe lambs less than 1 year old were quarantined for 28.5 days, on average. The recommended quarantine period is often 30 days, which, depending on the disease, might not be long enough.

Figure 2. For operations that quarantined new sheep or lambs in 2010, operation average* number of days new arrivals were quaranatined, by sheep type



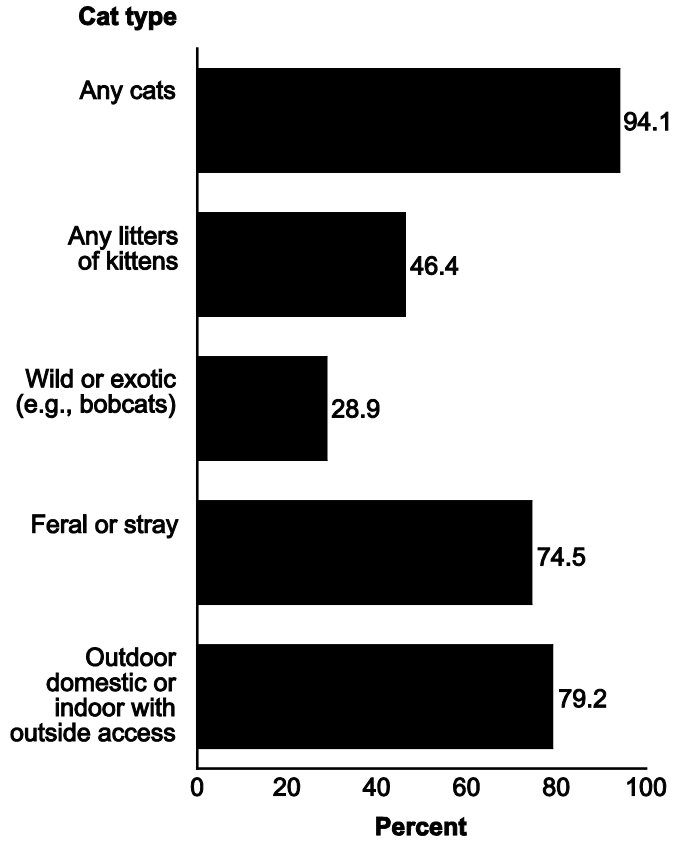
*A single value for each operation is summed over all operations reporting and divided by number of operations reporting.

Similar to new sheep added to the flock, sheep that leave the operation to attend an event can introduce disease agents to the flock when they return. Overall, 33.7 percent of operations had sheep or lambs leave and return after attending a fair, show, sale, rodeo, or after visiting another operation. Other ways sheep have contact with sheep from other operations include fence-line contact, grazing with sheep from other operations, and sheep from other flocks visiting the operation. Just over one-third of operations in which sheep had opportunities for contact with other sheep (34.6 percent) made efforts to decrease note-to-nose contact.

Physical contact with other animals

A number of diseases can be spread from other animals to sheep. For example, toxoplasmosis is an economically important disease commonly carried by cats and causes abortion and still births in many mammals, including sheep and humans. Sheep are infected by ingesting feed, bedding, pasture, or water contaminated by cat feces.[2] During 2010, nearly all operations (94.1 percent) had some type of cat present. As shown in figure 3, feral or stray cats are also common; 74.5 percent of operations reported their presence.

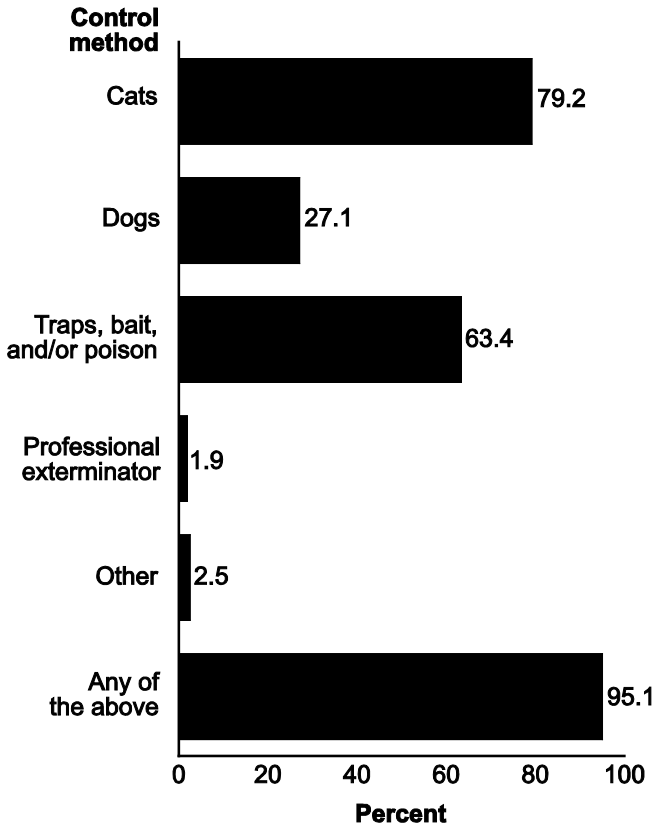
Figure 3. Percentage of operations by type of cats present during 2010



Rodents also contribute to the spread of disease. For example, rodents are attracted to sheep feed, and feed contaminated by rodent fecal matter can serve as a source of pathogens. Rodent control is, therefore, an important part of biosecurity. Cats were used for rodent control on 79.2 percent of operations;[2] 63.4 percent of operations used traps, bait, and/or poison to control rodents (figure 4).

[2] Cats that are either outdoor domestic or indoor with outside access; commonly referred to as “barn cats.”

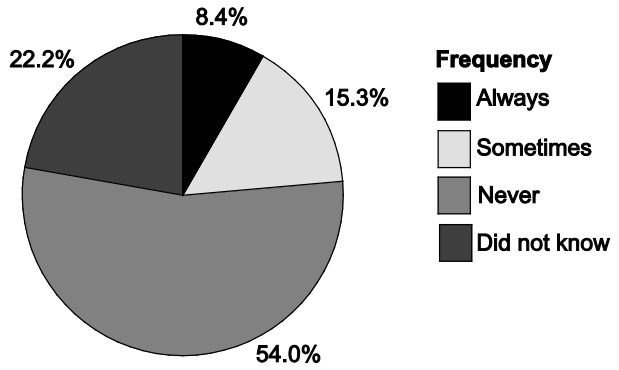
Figure 4. Percentage of operations by method used control rats and mice during 2010



Shearing

The shearing process presents another potential source of disease introduction to a flock and between members of the same flock. For example, the blades of shears can carry diseases between operations and between individual sheep. If the skin of an infected animal is broken (either before or during the shearing process) and the shears used on the animal are not disinfected before another animal is shorn, there is the possibility for disease introduction/spread. As shown in figure 5, a majority of operations with 20 or more ewes that sheared sheep never disinfected shears between individual sheep.

Figure 5. For operations that sheared sheep during 2010, percentage of operations* by frequency shears were disinfected between individual sheep



*For operations with 20 or more ewes.

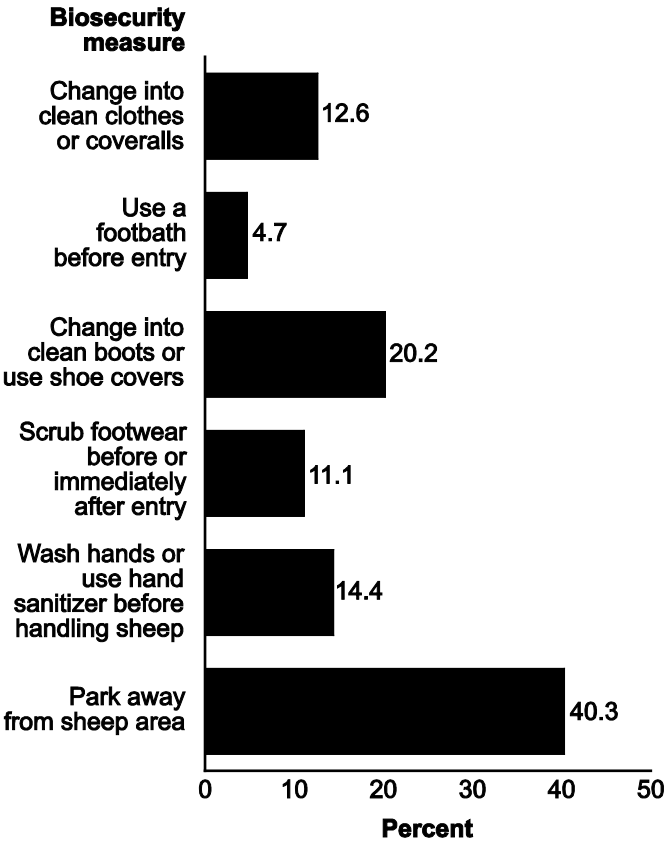
Additionally, the order in which sheep are sheared can impact disease transmission. Shearing from the youngest to oldest animals can decrease the likelihood of disease spread from older carrier sheep to younger naïve sheep; this strategy, however, is not a common practice among U.S. sheep operations; 91.6 percent of operations with 20 or more ewes reported that sheep were not shorn in a particular order. Just 3.8 percent of operations that sheared sheep in 2010 sheared them from youngest to oldest, while 4.5 percent sheared sheep from oldest to youngest.

Biosecurity measures for visitors

Visitors can include people such as veterinarians, other sheep producers, shearers, extension agents, nutritionists, feed company consultants, customers, and renderers. Visitors, especially those who have contact with animals from other operations, can introduce disease agents via their boots, clothing, vehicles, or other equipment. Overall, 97.1 percent of sheep operations had visitors enter the sheep production area during the previous12 months. Nearly all these operations (96.6 percent) allowed visitors access to sheep-raising areas.

Hand-washing is an easy and effective method of preventing disease transmission and was always or sometimes required for visitors on 14.4 percent of operations (figure 6). In addition, 28.3 percent of operations always required visitors to park vehicles away from sheep areas, while another 12.0 percent sometimes required visitors to park away from sheep areas.

Figure 6. For operations in which visitors entered the sheep-raising area during 2010, percentage of operations* by biosecurity measure always or sometimes required before visitors were allowed to enter sheep-raising area

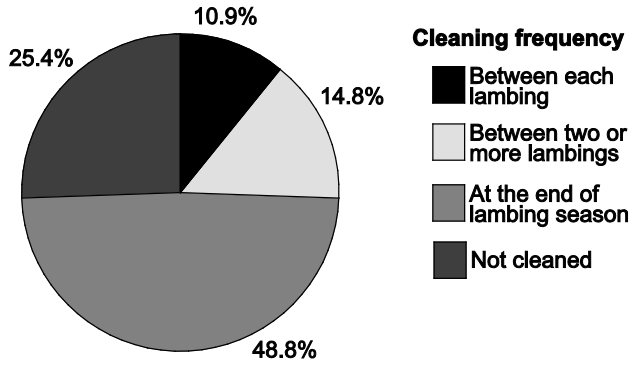


*For operations with 20 or more ewes.

Lambing management and biosecurity

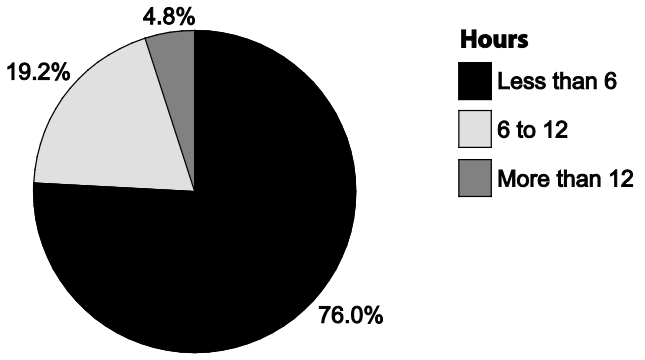
Periparturient ewes and newborn lambs are especially susceptible to infectious diseases because their immune system might be suppressed from either the stresses of pregnancy and birthing (ewes) or from an immature immune system (lambs). Cleaning the lambing area is, therefore, crucial in preventing disease transmission from ewe to lamb and from ewe to ewe. Prions (the cause of scrapie) and bacterial organisms (including the causative agents of Q fever and Johne's disease as well as *Salmonella* species and *Toxoplasma gondii*) can be shed into the environment by tissue and fluid left by infected ewes following birth. Cleaning the manure and waste bedding from the lambing area during lambing season is crucial in preventing disease transmission. Figure 7 shows that 10.9 percent of operations cleaned the manure and waste bedding from the lambing area between each lambing, and 14.8 percent did so between two or more lambings. One-fourth of operations (25.4 percent) never cleaned the lambing area.

Figure 7. Percentage of all operations by frequency that manure and waste bedding were cleaned from the lambing area during 2010 lambing season



Placentas, or afterbirth, can also harbor infectious organisms and should be removed from the lambing area as soon as possible. Removing placentas is particularly important in high-density operations in which ewes are clustered, making exposure to infectious placentas more likely. Just over one-third of operations (67.9 percent) usually removed placentas from the lambing area. Most operations (76.0 percent) removed placentas within 6 hours (figure 8). For operations that usually removed placentas from the lambing area, composting and throwing out for carnivores were the two most common methods used to dispose of placentas (30.8 and 28.0 percent of operations, respectively).The latter method does not truly represent removal since infectious organisms are still spread in the environment and might be consumed by carnivores.

Figure 8. For operations that usually removed placentas from the lambing area, percentage of operations by the average length of time placentas were left on the ground before removal during 2010



Abortions are frequently caused by infectious organisms that may be transmitted among ewes, making aborted fetuses and placentas a potential source of infectious organisms. In 2010, 43.8 percent of operations experienced abortions in their flock. Of these operations, 79.6 percent removed the placentas and/or fetuses as soon as possible (figure 9).

Figure 9. For operations with ewes that aborted during 2010, percentage of operations by protocol used for aborting ewes

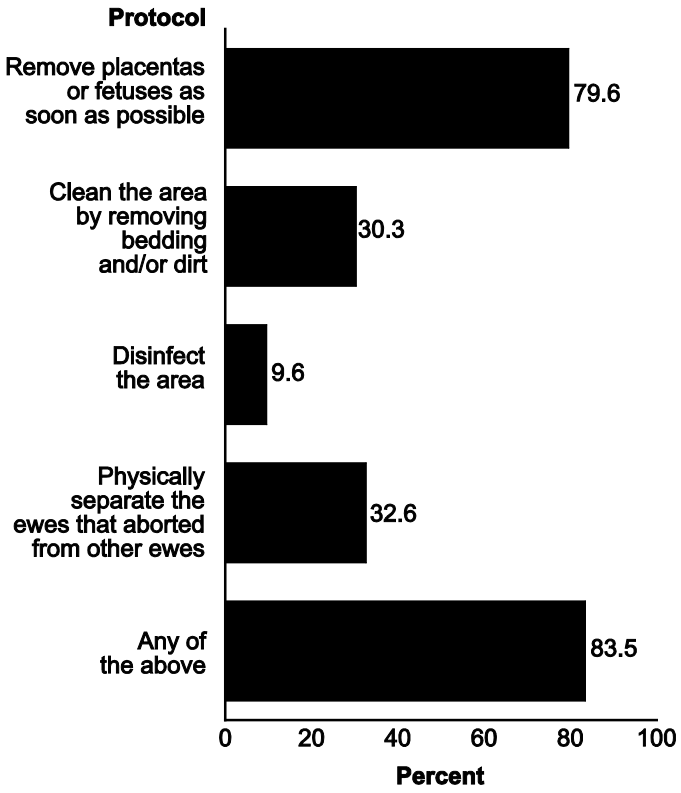
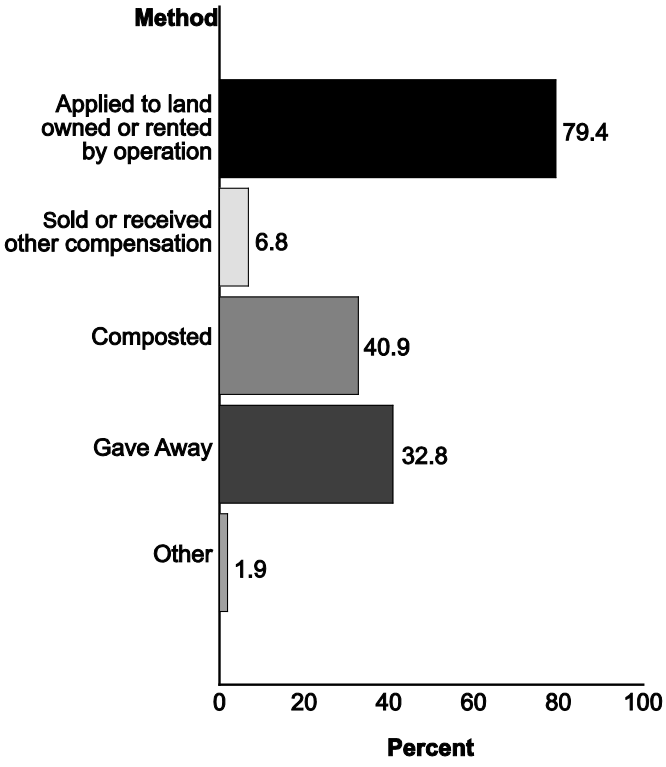


Figure 10. Percentage of operations by method used to dispose of manure



Manure management

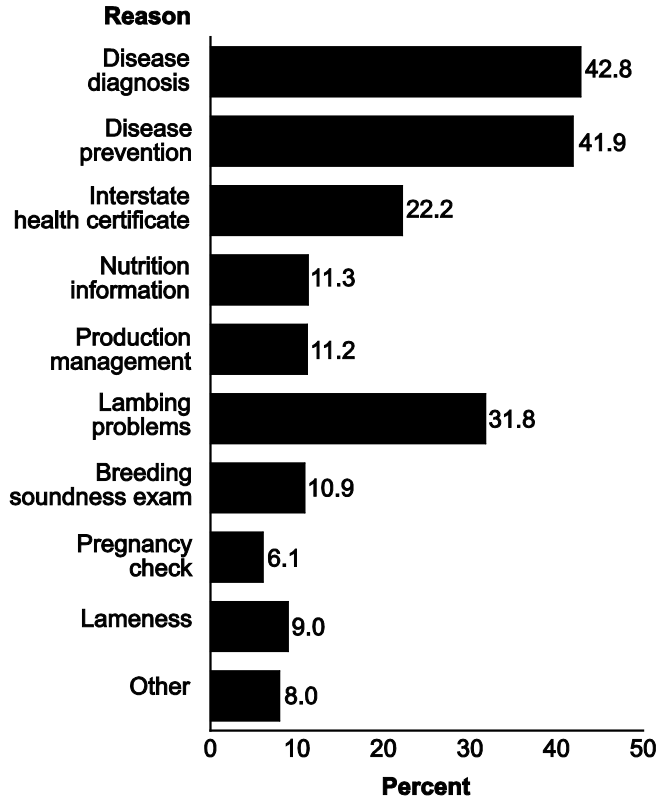
Manure and bedding management is crucial in lambing areas, but it is also a key tool in reducing the spread of disease from infectious organisms shed in fecal material as well as reducing the parasite load of the sheep. Manure removed from the sheep pastures, sheds, barns, and feeding areas must then be disposed of. The majority of operations (79.4 percent) disposed of manure by applying it to land either owned or rented by the operation (figure 10).

If possible, the same equipment should not be used to handle both manure and feedstuffs. Just over one-fourth of operations (26.5 percent) used the same equipment to handle manure and feed, either routinely or sometimes/rarely. In this case, cleaning equipment before handling feed is strongly recommended. Of operations that used the same equipment to handle feed and manure, the most common cleaning procedure between handling manure and handling feed was to wash the equipment with water or steam only (70.8 percent).

Veterinarians and disease prevention

Part of a veterinarian's job is to assist producers in preventing disease by consulting with owners on biosecurity and best management practices. In 2010, less than one-fourth of operations (23.9 percent) had a private veterinarian visit the operation for any sheep-related reason. On these operations, the two most common reasons for consulting a veterinarian were disease diagnosis and disease prevention (42.8 and 41.9 percent of operations, respectively) [figure 11].

Figure 11. For operations that consulted a veterinarian in 2010, percentage of operations by reason for consultation



Summary

Biosecurity and biocontainment practices can reduce the risk of disease introduction to an operation and the spread of disease on an operation. Each operation should develop its own plan, using customized protocols based on specific risks faced by the operation. When developing biosecurity and biocontainment plans, producers are encouraged to use the resources available to them, such as veterinarians, extension agents, and published resources.

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