

Veterinarian “Shortage” Areas for Small-Scale U.S. Livestock Operations, 2011

Livestock producers’ ability to access veterinary services is critical for ensuring food safety—which begins at the farm level—and for rapidly detecting potential outbreaks of foreign animal diseases. To address shortages of private-practice veterinarians in rural areas, the U.S. Department of Agriculture’s (USDA) National Institute of Food and Agriculture (NIFA) implemented the Veterinary Medicine Loan Repayment Program (VMLRP) in 2010. The VMLRP helps pay the student loans of veterinarians who practice in underserved areas.

Each year, state animal health officials (SAHO) in all 50 States have the option to submit nomination forms to VMLRP identifying areas in their State that may have a veterinarian shortage. NIFA holds external merit-review panels annually to evaluate the nominated areas and to determine which ones should be officially designated as shortage situations, based on qualitative and quantitative evidence presented by the SAHOs; most nominated areas are granted shortage designation status. The VMLRP pays up to \$25,000 per year toward student loans to eligible veterinarians who agree to work in a designated shortage area for 3 years. In 2011, the VMLRP received 159 applications from veterinarians who were interested in serving in shortage areas; 75 of these veterinarians received awards to alleviate shortage areas in 35 different States.¹

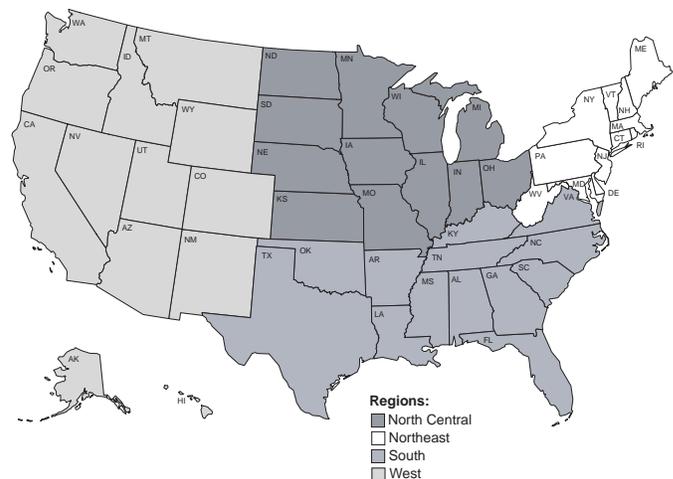
The USDA’s National Animal Health Monitoring System (NAHMS) conducted the Small-Scale U.S. Livestock Operations, 2011 study, which focused on operations that raised livestock and had gross annual sales from \$10,000 to \$499,999. Livestock included cattle, poultry, goats, sheep, swine, horses, aquaculture, or other farm animals raised for sale or home use. Because of concerns about veterinarian shortages^{2,3,4,5} one objective of the study was to explore producers’ perceptions of the availability of veterinarians. Producers from 8,123 operations in all 50 States completed the study questionnaire.

Distance to veterinarians

Producers were asked about the distance to the nearest veterinarian who works with their type of livestock or poultry. Weighted population estimates were generated to describe distance to veterinarians. Weights were based on the sampling design and allowed inference to the target population of all U.S. small-scale livestock operations. For

this study, the United States was divided into four regions based on Sustainable Agriculture Research and Education regions (map 1).

Map 1. Regional breakdown of States participating in the NAHMS Small-Scale U.S. Livestock Operations study, 2011



The percentage of operations that had a veterinarian available within 29 miles ranged from 71.0 percent of operations in the West region to 85.2 percent in the North Central region (table 1). In the West region, about one of four operations (24.2 percent) was located 30 to 99 miles from the nearest veterinarian who works with their type of livestock. Overall, 1.4 percent (0.5+0.1+0.8 percent) of all operations had no veterinarian available, or the nearest veterinarian was 100 or more miles away (table 1). Of operations that reported that no veterinarian was available for their livestock, 25 percent raised livestock species other than cattle, swine, sheep, goats, poultry, horses, and bison. These “other” species included aquaculture, rabbits, camelids, cervids, fur-bearing animals, and bees.

Table 1. Percentage of operations by distance to the nearest veterinarian that worked with the type of livestock or poultry present on the operation, and by region:

Distance (miles)	North Central	North-east	South	West	All operations
Less than 30	85.2	76.6	83.2	71.0	82.0
30–99	12.5	18.8	14.3	24.2	15.2
100–299	0.6	0.6	0.1	2.4	0.5
300 or more	0.0	0.0	0.1	0.2	0.1
No veterinarian available for my type of livestock	0.7	1.5	0.8	0.9	0.8
Don't know distance	1.0	2.5	1.5	1.3	1.4
Total	100.0	100.0	100.0	100.0	100.0

Spatial analysis of veterinarian shortage areas

To better characterize areas where producers had limited access to veterinarians, a spatial analysis was performed at the county level. The objective was to identify clusters of counties with a veterinarian shortage, which was defined as areas where producers reported that the nearest veterinarian for their livestock type was 100 or more miles away, or that a veterinarian was not available at all. Raw (unweighted) data were used for the spatial analysis due to challenges of combining survey design weights with spatial methodology.

A “hot-spot” analysis was used to identify geographic clusters where producers reported a veterinarian shortage. The hot-spot analysis identifies statistically significant spatial clusters of high values (hot spots) and low values (cold spots). Hot spots represent a geographic area where a condition is concentrated. In contrast, a cold spot represents an area lacking a condition. In this case, hot spots indicate an apparent shortage of veterinarians.

For the hot-spot analysis, veterinarian shortage was measured in two ways. First, a count variable was created by summing the number of respondents reporting a veterinarian shortage in each county. Second, the proportion of respondents reporting a veterinarian shortage was calculated for each county. The proportion variable was used to better detect shortages in counties with small numbers of respondents. Both the count and the proportion variables were individually subjected to hot-spot analysis, and the resulting hot spots were combined onto one map.

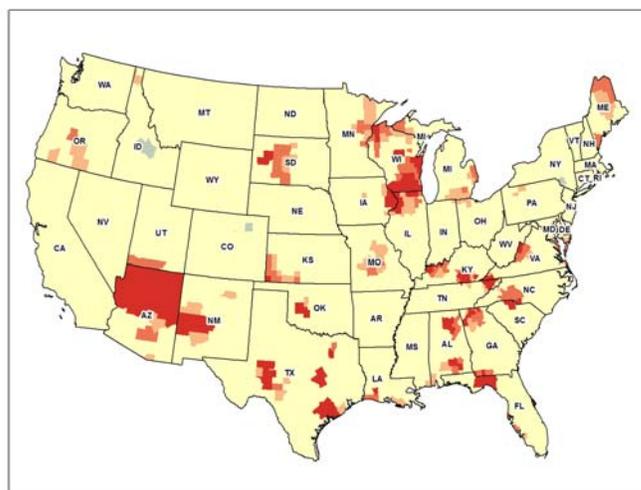
Clusters identified by hot-spot analysis contain counties that, as a group, had a higher count (or proportion) of producers that reported a veterinary shortage. Individual counties within the cluster can vary in the degree of veterinary shortage. Therefore, hot-spot analysis provides a broad look at potential veterinary shortage areas, but these shortages should be verified using local data. Hot spots are shown in shades of

orange/red on map 2. Darker shades indicate a cluster with higher statistical significance. Cold spots from the analysis are shown in blue and represent clusters where few producers reported a veterinary shortage, indicating sufficient access to veterinarians.

Large hot spots were located in New Mexico and Arizona. In the North Central region, southern Wisconsin and northern Illinois had areas of shortage (map 2). Several areas of shortage existed in Minnesota, South Dakota, and Missouri. The Northeast region had several areas in Maine and Pennsylvania with veterinary shortages. The South region had pockets of small, dispersed shortage clusters in multiple States.

Three cold spots were identified in Idaho, New York, and Colorado. These cold spots indicate clusters where few (or none) of the respondents reported a veterinary shortage, indicating sufficient access to veterinarians.

Map 2. Hot-spot analysis of veterinary shortages



Results of the hot-spot analysis were compared with the VMLRP’s 2011 designated shortage areas. Overall, 19.1 percent of veterinarian shortage hot-spot counties were also designated as VMLRP shortage areas. Interestingly, 80.9 percent of hot-spot counties were not designated as VMLRP shortage areas. These counties might be candidates for submission by SAHOs as shortage situations in the future, if local data support the presence of a veterinarian shortage.

Limitations

Several limitations of this study should be considered when interpreting results. First, the distance to veterinarians was reported by producers, and the locations of all available veterinarians might not be available to all producers. Second, the target population for this study was small-scale operations; therefore, results should not be extrapolated to larger operations. Finally, additional veterinary shortage areas may exist that were not identified in this analysis, since some U.S. counties were not included in the sample.

Summary

Information on veterinary shortage locations is useful to the VMLRP, other government agencies, and the overall veterinary community. The results of this study suggest multiple pockets of underserved areas for veterinary services across the United States for small-scale producers. Hot-spot analysis is a useful tool for detecting potential veterinarian shortage clusters, but the results should be validated using additional, local data. Other data sources include the opinions of local experts, maps of veterinary clinic locations, veterinarian organization membership lists, and Census of Agriculture information on farm location and type. Using hot-spot analysis results with other data sources is an effective way to define veterinary shortage areas.

References

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