

Healthy Sheep and Goats

Ovine Progressive Pneumonia (OPP) — Caprine Arthritis Encephalitis (CAE)

Voluntary program administered by the Minnesota Board of Animal Health (BAH) in cooperation with the United States Department of Agriculture (USDA) Veterinary Services

REQUIREMENTS FOR PARTICIPATION:

Note: The word “flock” refers to both sheep and goats.

The flock owner and manager who wishes to participate will:

- Submit an application to the BAH.
- Work with a designated BAH/ USDA inspector who will assist with sample collection, processing, and submission. The inspector will continue to assist until the flock reaches “test-negative” status. Once test-negative status has been achieved, the flock owner will employ an accredited veterinarian to conduct/assist with annual testing. Producers/Owners/Managers are responsible for all supplies, processing, shipping, laboratory fees and delivery of samples to the local veterinarian or the Minnesota Diagnostic Lab.
- Develop an eradication and monitoring plan with the BAH if the flock is found to be infected with the OPP/CAE virus. (*see Appendix 3: Testing and Management Recommendations.*)
- Schedule visits to be performed as required by a BAH assigned inspector by contacting the inspector or the BAH at 651-201-6809. Once test-negative status has been achieved, the flock owner or manager will schedule annual visits with the accredited flock veterinarian
- Have Identification, that is approved by the Board of Animal Health, applied to all enrolled animals (see <https://www.bah.state.mn.us/media/sheep-and-goat-official-id.pdf> for official ID options)
- Maintain a flock inventory in an electronic format and, prior to each annual inspection, submit an updated inventory to the BAH (with copy to the local veterinarian if flock is known as test-negative) that includes additions and dispositions having occurred since the previous inspection.
- Adhere to the OPP/CAE Program Testing Strategy as outlined below.

PARTICIPATION/STATUS LEVELS

- **Enrolled:** Participating flocks that have not achieved “test-negative” status. Flocks needing to implement an eradication plan will be tested frequently. (*see Appendix 1: Testing Strategy*).
- **Test-Negative:** Flocks that conduct three consecutive tests of all animals 12 months of age or older, performed at least six months apart with no positives detected, will be assigned “Test-Negative” status. (At the discretion of the BAH, the third test may be a partial flock test.)
 - These flocks will continue to test a percentage, plus any purchases and/or animals having experienced off-site exposure, every year (within 10-14 months of the most recent qualifying test). If unable to complete testing within the required time frame, producer will need to start over to reach “test-negative” status.

APPENDIX 1

TESTING STRATEGY

Sample collection and submission:

The following protocol must be followed when blood samples are collected for OPP/CAE testing:

- Producer will provide all required collection supplies (tubes, needles, etc.).
- Tubes will be pre-labeled and organized for easy access.
- Laboratory submission form will be completed and ready for signature.
- Producer will deliver samples (or arrange for delivery) to the University of Minnesota Veterinary Diagnostic Laboratory (MNVDL) for 'Elitest' ELISA testing.

Initial screening test, may be either whole or partial flock:

Whole flock: Test all sheep/goats in the flock 12 months of age or older.

- If 100% negative, the flock should be tested twice more at six-month intervals to confirm test-negative status.
- If any animals test positive, an eradication strategy will need to be implemented (see below).

Partial flock: Test sheep/goats as indicated in the tables below which shows the number of animals 12 months of age and older that need to be randomly sampled and tested to achieve a 95% confidence of detecting at least one positive if 5% or more of the flock is infected.

**Partial Flock Test Random Sampling Guide
Less than 200 Sheep/Goats**

Number of sheep/goats	Test
<30	All
30	26
40	31
50	35
60	38
70	40
80	42
90	43
100	43
120	47
140	48
160	49
180	50

**Partial Flock Test Random Sampling Guide
200 to 2000 Sheep/Goats**

Number of sheep/goats	Test
200	51
250	53
300	54
350	54
400	55
450	55
500	56
600	56
700	57
800	57
1000	57
2000	58

Note: It is recommended to select for testing only those animals that have been in the flock for a minimum of two years, with ample representation of all ages. This may increase the odds of detecting infection at the flock level.

- If any animals test positive on the initial partial-flock test, the producer should consider all options for disease eradication prior to conducting any additional testing (see below).
- If no positives are identified on the partial-flock screening test, it is recommended, though not required, that the remainder of the flock be tested as soon as possible.
- If the remainder of the flock is tested within 60 days of the partial-flock screening, and all animals test negative, this test will be considered a whole-flock 100% negative test.

- Flock should be tested twice more at 6-month intervals to confirm test-negative status.
- If no positives are identified on the partial-flock screening test, and the producer *does not* test the remainder of the flock within 60 days, all animals in the flock 12 months of age or older will need to be tested.
 - If all animals test negative, this will be considered a whole-flock 100% negative test.
 - Flock should be tested twice more at 6-month intervals to confirm test-negative status.

ERADICATION STRATEGY (producer may follow either method below)

Test-and-Remove:

This method is best used when initial test reports less than 50% of the flock is infected, and owner is comfortable with immediate removal of all animals testing positive. **Refer to Appendix 3, Testing and Management Recommendations.**

- Test all sheep/goats 4 months of age and older not included in the initial test.
- Remove all positive sheep/goats 4 months of age and older.
- Continue to test-and-remove until three consecutive 100% negative tests are achieved. *

Alternative:

Consider this method if initial test reports more than 50% of the flock is infected, or in cases where owner prefers to retain test-positives until sufficient replacements are obtained. Refer to Appendix 3, for recommended testing intervals.

- Manage all ewes/does from the “Parent Flock” as a single unit, regardless of their test status, allowing them to lamb/kid and raise all offspring until weaned.
- Two months after weaning test all lambs/kids selected as potential replacements, then permanently segregate all negatives.
- Continue to test the negative replacement animals until the entire management group has achieved three consecutive 100% negative tests. *

** With at least one month’s advance notice to the BAH, and at their discretion, producers with large flocks may elect to substitute a partial flock submission for the required 3rd consecutive 100% negative qualifying test.*

Regardless of the eradication method, “Test-Negative” status will not be awarded until the flock achieves three consecutive 100% negative tests following the removal of all positives.

Flocks with documented prior test negative history

At the discretion of the BAH, tests conducted prior to program enrollment may qualify for test-negative status. The producer must provide official copies of test results and tests must have been conducted by an accredited, approved laboratory with an approved test.

Acquisitions and/or off-site exposure

- All acquisitions and/or animals exposed off-site, *unless coming from an OPP/CAE Program enrolled flock of equal or higher status*, must be quarantined and tested on arrival. If negative, they should be tested again in 60 days, **before** being introduced to the flock. These animals must remain in quarantine for the full 60 days and be included in the next partial annual testing.
- If positive, the BAH will consult with the owner and flock veterinarian to determine next steps.

Maintaining “Test-Negative” Status

Once “Test-Negative” status has been achieved, 10% of the flock (but no less than 5 animals) must be tested annually.

- The local flock veterinarian conducting the annual inspection may, at his/her discretion, specify which animals are to be tested.
- If possible, animals selected for testing must be ewes that have been in the flock for at least two years.
- All acquisitions and/or any having been exposed off-site must be tested as noted above.

If test-positive animals are found in a “test-negative” flock, or in a flock nearing test-negative status

Any animal testing positive will be retested in 2 to 4 weeks.

- If retest is negative, the animal may return to the flock but must be included in the next annual round of testing.
- If retest is positive, the BAH will consult with the owner and flock veterinarian to determine next steps.

See next page for Appendices 2 and 3.

APPENDIX 2

Flow Chart: Minnesota Board of Animal Health or USDA visits flock to conduct annual inspection, collect samples and verify inventory

Initial Partial Flock Test

If infected:

Develop eradication plan with your BAH/USDA representative.

Test-and-Remove

Whole-flock test-and-remove: Test all at recommended intervals, removing positives, until achieving three consecutive 100% negative reports.

-or-

Partial-flock test-and-remove: Selected adults determined to be test-negative (and preferably known to be most productive) are permanently segregated and retested at recommended intervals until receiving three consecutive 100% negative reports.* All other retained animals must run as a separate group, permanently segregated from the newly test-negative flock.



Once three consecutive 100% negative tests have been achieved, and all positives are gone, flock will be listed as 'Test-Negative' on Board of Animal Health and OPP Society websites.

Alternative Strategy

All adults, regardless of status, are run together as the 'parent flock' and allowed to birth and raise all lambs/kids until weaning.

-and-

Offspring selected as potential replacements are tested 2 to 3 months post-weaning, positives removed, and negatives retested at recommended intervals until receiving three consecutive 100% negative reports; these become the basis for a new test-negative flock.*

-optional-

Adults from the 'parent flock,' if confirmed negative by at least three negative tests after all positives are gone, may join the test-negative flock.*



If all negative:

Test remainder of the flock to verify status.

If all negative, and owner can provide documentation of prior whole-flock neg tests having occurred within the most recent two years, flock is determined to be Test-Negative.



If all negative, but owner does not provide documentation of prior whole flock negative tests, flock is tested twice more at minimum 6-month intervals. If all negative, flock is determined to be Test-Negative.



Flock listed as 'Test-Negative' on Board of Animal Health and OPP Society websites



Maintaining Test-Negative Status

Once Test-Negative status has been achieved, only 10% of the flock (but no less than 5 animals) need to be tested annually, preferably consisting of ewes that have been in the flock for at least two years.

In addition, all acquisitions and/or off-site exposures, unless from an OPP/CAE Program Test-Negative flock must be quarantined and tested on arrival. If negative, they should be tested again in 60 days, **before** being introduced to the flock. These animals must remain in quarantine for the full 60 days and be included in the next partial annual testing.

*For large flocks, at the BAH discretion, a partial flock testing may be approved.

APPENDIX 3

TESTING AND MANAGEMENT RECOMMENDATIONS:

Definitions Specific to Alternative Eradication Strategy:

- **Parent Flock:** Animals of both sexes, 12 months and older; may be either OPP/CAE positive or negative. Ewes/does are managed as a single unit, regardless of positive/negative status, and allowed to birth and raise all lambs/kids to weaning.
- **Test-Negative Replacement Flock:** Offspring of the Parent Flock that have been selected for replacements and found to be test-negative post-weaning. To confirm test-negative status, this group will be permanently segregated and retested every 2 to 3 months, with any positives immediately removed, until the entire group has achieved three consecutive 100% negative tests.

Recommendations, regardless of which eradication strategy is selected:

*Since 'Elitest' has been proven to detect positives within two months following infection, it is **strongly recommended** to test every 2-3 months while promptly removing positives. Test intervals longer than 3 months will allow infected animals to spread the virus, thereby extending the time for eradication.*

- OPP tests measure antibody response, which can be elevated by stress as well as infection with the virus. Therefore, whenever possible, it is best to avoid testing for several weeks following vaccination, breeding, lambing, weaning, illness or injury. Pregnant ewes, if handled gently and quietly, may be tested right up through the week prior to lambing.
- It has been found that if lambs weaned at 8 months of age from OPP infected dams, some lambs may still have colostral/milk anti-OPP antibodies remaining in their serum at 12 months of age. Therefore, while the flock is undergoing eradication, earlier weaning at 6-8 weeks of age is advised, and then waiting another 2 months before testing lambs.
- Potential replacements of high value, if positive post-weaning, should be separated in a pen with solid sides as far apart from all others as is practical and then retested in 2 months to reduce the possibility of a false positive test resulting from passive maternal antibodies.
- Animals with discrepant results, if not removed from the premises, should remain segregated from all others until at least three consecutive negative tests have been achieved.
- Retest the test-negative management group 2 to 3 months (minimum 7 weeks to avoid missing early infections) following the *removal date* (not bleed date) of any positives.
- Continue testing at 2 to 3-month intervals, promptly removing all test-positives, until receiving at least three consecutive 100% negative reports for the entire management group.
- Rams/bucks being collected for artificial insemination should be tested well in advance of the collection date, and again prior to use of the semen.
 - While OPP transmission via semen has not been documented, the OPP virus has been detected in semen.
- Permanent and legible identification should be applied to all animals in the program.
 - Accurate individual identification has proven crucial to the success of eradication efforts.
 - In flocks with more than 30 animals, electronic identification should be considered.

- If positive and negative groups rotate through buildings and pastures, the test-negative group should ***always*** be handled before the positives. If test-negatives must be confined to the same barn during lambing with test-positives, it's best to lamb them either before or after the positive group. If this is not feasible, designate an upwind section of the barn for the test-negatives with at least 10 feet separation or solid barrier between them and the positives.
- Utilize 'Electronet' and/or an electrified offset wire (either can be powered by a small portable battery unit) to discourage nose-to-nose contact between test-negative and test-positive groups through fences or dry lot panels.
- Avoid shared feeders since these result in close nose-to-nose contact. If this is not a possibility, allow at least 2 hours between feedings of positive/negative sheep, with negatives eating first.
- Avoid shared waterers whenever possible.
 - The OPP virus is carried in cells called macrophages, which are found in nasal discharge that usually sinks to the bottom of a water tank. Thus, while not recommended, shared water sources may not spread the virus if a solid barrier can be placed in the middle of the trough or automatic waterer so that each group (positive and negative) can drink without nose-to-nose contact with those on the other side of the barrier.
- Do not reuse needles.
 - There is significant correlation between needle reuse and OPP/CAE seroprevalence as flock size increases. Therefore, to decrease the risk of OPP/CAE and other infectious disease transmission when giving injections, a fresh needle should always be used for each animal. Consideration should also be given to the use of needle-free injectors, especially in large flocks.
- Clean and disinfect all equipment between use with test-negative and test-positive management groups.
 - Due to the unstable nature of the OPP/CAE virus in the environment, equipment such as syringes, ear taggers, tattoo pliers and water buckets may be used for both positive and negative management groups if appropriately cleaned and disinfected.
- Quarantine all new purchases and animals returning to the flock following exhibition, or other potential contact offsite, for 60 days. Testing immediately upon arrival and again at 60 days.
- Purchase only from flocks confirmed to be of equal or greater OPP/CAE status whenever possible.
- Do not share equipment or trailers with other flocks.
- Be alert to the risk of transmission via nose-to-nose contact and aerosol transmission via coughs.

Salvaging of test-negative animals from the parent flock:

Those with adequate facilities for managing multiple groups over an extended period may wish to reintroduce test-negative animals from the parent flock. This must be done only after all positive animals have been removed from the parent flock, and re-introductions have achieved three consecutive negative tests performed at minimum 60-day intervals.

Genetic selection:

Currently the OPP Society does not advocate genetic selection as a route to eradication. As noted below, *ALL breeds are susceptible to infection with the OPP/CAE virus*, so concentration needs to be on removing the virus and maintaining adequate biosecurity.

- United States Department of Agriculture (USDA) researchers have discovered that some strains of the OPP virus have adapted to infect sheep *regardless of their TMEM154 susceptibility genotype*.

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