Definitions and protocols governing the program and additional information

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Original protocol developed July 2012
Protocol updated in 2018
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Overview of the Ontario Maedi Visna Flock Status Program

The Ontario Maedi Visna Flock Status Program (OMVFSP) is a voluntary program to enable sheep producers to determine the infection status of their flocks with respect to maedi visna (MV) virus infection (also known as ovine progressive pneumonia or OPP), and to eradicate this infection through a program of biosecurity, serological testing of sheep and subsequent removal of positive animals from the flock. To enroll in the program, the producer must be willing to follow the rules of the program, permanently and uniquely identify all sheep in the flock, and follow specific biosecurity requirements.

Whole Flock Test (Appendix 1)

At the first qualifying test, all sheep and goats residing on the premise and that are 180 days of age (six months) and older have a blood sample drawn and are serologically tested. For the purposes of this program, goats are considered to be sheep.

Serological tests that are acceptable for use in the program are included in Section B.10.

Test POSITIVE rams and test POSITIVE ewes and their lambs (i.e. offspring that are less than 180 days of age) are removed from the flock. The status of the flock is then ENROLLED. The flock is eligible for testing 90 to 180 days later. If any animal has a POSITIVE test, the status remains as ENROLLED.

If all the results from the animals tested are NEGATIVE, the status of the flock will be ENROLLED - NEGATIVE, indicating a lower risk status. The flock is eligible for testing 180 (maximum 395) days later. If at this test, all the results from the animals tested are NEGATIVE, the status of the flock will be “B”, indicating a lower risk status. A minimum of 180 (maximum 395) days after the second NEGATIVE test the flock then qualifies to have only a random proportion of the total flock aged 365 days of age and older (i.e. ≥ 1 year of age) tested. If all results are NEGATIVE from the sample of animals tested, i.e. representing a third consecutive NEGATIVE flock test, the flock status will be “A”, designating the lowest risk level.

This status is then maintained through annual testing (every 365-395 days) of a random proportion of the flock, with all test results remaining NEGATIVE.

For closed flocks as defined by the program, the frequency of this test will be bi-annual (i.e. every other year). It is recommended that the biosecurity section of the Canadian Verified Sheep Program be used to create a farm-specific biosecurity plan that will enhance the farm’s ability to meet the biosecurity requirements found in Appendix 8. Biosecurity recommendations and requirements must also be followed in order to maintain flock status.

The benefits of this program may be realized through increased productivity associated with not being infected with the virus (lamb growth, milk production, losses from pneumonia and early culling) and increased breeding sales opportunities due to the low risk MV status of the flock.
Monitored Test (Appendix 2)

Producers may choose to enroll in the Monitored MV status option. This is a suitable program for large producers that already believe that their flock is not infected with MV virus (MVV). It will not allow infected flocks to reach low risk status. A random sample of total flock 365 days of age and older will be sampled.

If all sample results are NEGATIVE, the flock is MV MONITORED. To maintain this status, testing must be repeated annually.

Those flocks that adhere to the same biosecurity requirements as the Whole Flock program and have remained NEGATIVE on a minimum of three consecutive annual flock tests, will acquire a status of MV MONITORED - LOW RISK.

Flocks can at any time switch to the Whole Flock program following the protocols explained in detail in this protocol document.
Protocols of the Ontario Maedi Visna Flock Status Program

A. How to enroll your flock

1. You must first be willing to follow the program protocols and agree to fulfill the minimum biosecurity requirements.

2. It is strongly recommended to enroll in a flock health management program with your flock veterinarian to control other important production-limiting diseases.

3. Enrollment forms are available from the OMVFSP Coordinator at the Ontario Sheep Farmers’ office.
   
   Contact:
   
P: 519.836.0043
   
   E: admin@ontariosheep.org
   
   W: www.OntarioSheep.org

4. Indicate on the form whether enrolling in the Whole Flock program or the Monitored program.

5. To qualify for the **Whole Flock program**, the producer must agree to the following:

   a. All sheep and goats must be uniquely and permanently identified as defined by the OMVFSP protocols.

   b. All sheep and goats residing on the farm have a blood sample drawn by a veterinarian licensed to practice in the province in which the flock resides or a registered veterinary technician under the veterinarian’s direction, as defined by the OMVFSP protocols described in Section D.

   c. Meet and maintain all biosecurity requirements on the flock as defined by the OMVFSP protocols.

   d. Agree to promptly pay to Ontario Sheep Farmers (OSF) the testing costs as assessed by an approved Animal Diagnostic Laboratory. If one other than the Animal Health Laboratory, University of Guelph is used, please contact OSF first for approval. No results will be reported before accounts are settled with OSF.

   e. All individual farm results of the OMVFSP will be kept confidential.

   f. Quarterly, a list of participating producers in good standing, and their contact information will be published in the Ontario Sheep News magazine as well as the flock’s current program status. If the producer does not wish his/her flock’s name included, it will be suppressed from publication.
6. To qualify for the **Monitored program**, the producer must agree to the following:

   a. All sheep and goats residing on the farm have a blood sample drawn by a veterinarian licensed to practice in the province in which the flock resides or a registered veterinary technician under the veterinarian’s direction, as defined by the OMVFSP protocols described in **Section E**.

   b. Agree to promptly pay to OSF the testing costs as assessed by an approved Animal Diagnostic Laboratory. If one other than the Animal Health Laboratory, University of Guelph used, please contact OSF for approval. No results will be reported before accounts are settled with OSF.

   c. All individual farm results of the OMVFSP will be kept confidential.

   d. Quarterly, a list of participating producers in good standing, and their contact information will be published in the Ontario Sheep News magazine as well as the flock’s current program status. If the producer does not wish his/her flock’s name included, it will be suppressed from publication.

**B. Definitions**

1. **Maedi visna** (MV), also called ovine progressive pneumonia (OPP) is a viral disease of sheep and is caused by infection with **maedi visna virus (MVV)**. Clinical signs which occur primarily in adult sheep include:
   - Unexplained weight loss (chronic wasting);
   - Decreased exercise tolerance;
   - Respiratory distress; and
   - Hard udder at lambing.

Production losses in infected sheep are:
   - Decreased reproductive performance;
   - Higher lamb mortality rates through mismothering;
   - Early culling; and
   - Lower milk production which may manifest as lower weight gains in nursing lambs.

Once a sheep is infected with the virus, it remains infected for its lifetime. The virus is shed through infected white blood cells in respiratory secretions, colostrum and milk. Infected sheep produce antibodies to the virus, which are detected by serological (antibody) tests. It takes 2 weeks to 8 months to produce detectable antibodies after infection.

2. **Must** means that the owner of the flock, or their designated agent, is required (obliged) to carry out the stated activity as described, i.e. it is not voluntary.

3. A **sheep** is a ram, ewe or wether (castrated male). Usually, a sheep is ≥ 365 day of age, but for parts of this program, this term may be used for sheep ≥ 180 days of age.
4. All goats residing in the flock are required to be subjected to the same testing and removal protocols as sheep. This is because goats can become infected with MVV and may be able to transmit the virus to sheep. Therefore, when the protocol says “sheep”, it also applies to any goats in the flock or housed anywhere on the flock premises. All testing and biosecurity protocols apply equally to goats and sheep.

5. A lamb is a ram, ewe or wether < 180 days of age and is the offspring of both the birth dam (natural mother or embryo recipient) and of the foster dam (if the lamb was fostered or fed milk from a ewe that is not its birth mother). When determining disease status, the following is considered:
   a. Serological\(^1\) status of birth mother (natural or – if transferred as an embryo - recipient).
   b. Serological status of foster dam if fostered at any point while nursing.
   c. Not the serological status of the sire.
   d. The serological status of the genetic dam (donor) in cases of embryo collection and transfer,
      i. Unless if the embryos have been handled in accordance with the protocol set out by the International Embryo Transfer Society for the sanitary handling of embryos\(^2\).

6. A flock for purposes of this program, is a population of sheep and goats which at any time during the year are managed together, i.e. if sheep share pastures, housing, feeders, watering or other equipment that has not been disinfected between groups, then they are considered part of the same flock even if they reside at different premises for part or all of the year.

7. A flock premise is comprised of all buildings, dry lots, paddocks/corrals, and pastures occupied at any time of the year, by the flock.

8. To remove from the flock suggests that the MVV test positive sheep or lambs from MVV test positive ewes are to be sold directly to slaughter for meat and not as breeding stock. This is a strong recommendation and this program does not enforce the actual disposal fate of the animals.

9. The test date is the date that the blood samples were taken from the sheep, not the

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\(^1\) Serological status refers to the presence of antibodies produced by the immune system in response to infection by the virus, and detected by a serological (e.g. blood) test. The test does not detect presence of the virus – only the antibodies.

\(^2\) http://www.iets.org/
date that the results were received.

10. Interpretation of Individual MV Test Results *(Appendix 4)*

a. **A NEGATIVE Individual Maedi Visna (MV) Test**

For an individual animal test, the MV test is reported as NEGATIVE if the sheep sampled received a result of NEGATIVE by one of the following diagnostic tests:

i. A NEGATIVE antibody test results as determined by one of the following diagnostic test kits when obtained from an animal health diagnostic laboratory in good repute.

1. Elitest – MVV/CAEV (HYPHEN BioMed, Neuville sur Oise, France); hereafter referred to as the HYPHEN Elitest.³ This test detects antibodies to the p25 major core protein and gp46 transmembrane proteins. The company notes that this test is able to detect seroconversion in 14 to 51 days post-experimental infection and reports sensitivity⁴ and specificity of 99.4% and 99.3% respectively.

2. CAEV/MVV Antibody Test Kits, (IDEXX Laboratories, Hoofddorp, The Netherlands); hereafter referred to as the IDEXX test. IDEXX offers two kits; one is a total antibody-screening test and provides rapid results. The second is an indirect ELISA that detects several antigens including the P28 viral capsid. The company notes that it is able to detect antibodies to a variety of viral variants but that the appearance of anti-P28 antibodies can occur slightly later than that of the anti-viral envelop protein antibodies.

3. ID Screen® Maedi Visna Indirect (IDVet Innovative Diagnostics, Montpellier, France). This is an indirect ELISA that the company suggests can detect all genotype groups of maedi visna and CAE. It detects a panel of peptides from the MVV/CAEV transmembrane proteins, gp135 and p25 proteins.

ii. Because of inadequate test performance, at this time, results from the following will not be accepted as a NEGATIVE test.

1. AGID (Agar Gel Immunodiffusion test). This test is currently not available in Canada. Test sensitivity is very low although specificity is excellent.

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³ The Elitest (HYPHEN) when compared to the CFIA ELISA in an Ontario study appears to have the best agreement and sensitivity.

⁴Sensitivity refers to the test’s ability to correctly identify all infected sheep as test “POSITIVE”. Poor sensitivity leads to many false negative results. Conversely specificity refers to the test’s ability to correctly identify all healthy sheep as test “NEGATIVE”. Poor specificity leads to many false positive results. No test has perfect sensitivity and specificity.
2. Small Ruminant Lentivirus Antibody Test Kit, cELISA (VMRD Inc, Pullman Washington). This test detects antibodies to gp135 protein. In research conducted at the University of Guelph, test specificity was low although sensitivity was adequate.

3. PCR performed on EDTA blood, which detects evidence of the viral DNA in the blood sample and not antibodies. PCR tends to have lower sensitivity because of low levels of circulating virus in infected animals. However, specificity is excellent.

iii. Antibody tests are generally performed on serum but may also be performed on milk if validated by the company and accepted by the diagnostic laboratory performing the test.

b. A SUSPECT Individual MV Test Result
If, when using any of the tests listed in Section B.10.a.i., the result is SUSPECT, then the sheep must be either immediately removed or isolated and re-sampled within 30 days of the test date. If on re-sample and test,

i. The test result is NEGATIVE the individual test is reported as NEGATIVE.

ii. The test result is POSITIVE the individual test is reported as POSITIVE.

iii. The test result is SUSPECT the test is reported as POSITIVE.

iv. Not all diagnostic tests have a SUSPECT category.

c. A POSITIVE Individual MV Test Result
If, when using any of the tests listed in Section B.10.a.i. the result is POSITIVE, then the sheep is POSITIVE.

d. A NON-SPECIFIC Individual MV Test Result

i. If, when using any of the tests listed in Section B.10.a.i. the result is reported as NON-SPECIFIC, the sample must be retested by the laboratory using another of the tests listed in Section B.10.a.i., but the sheep is not resampled.

1. A NON-SPECIFIC test result is NOT related to MV infection status but may occur when sheep are immunologically stimulated by another infection or recent vaccination.

ii. If, on retest the laboratory can still not interpret the sample as either POSITIVE or NEGATIVE, the sheep will need to be resampled and tested.

11. Interpretation of Flock Level MV Test Results
a. A NEGATIVE Whole Flock Test Result requires that

i. All sheep ≥ 180 days of age in the flock were sampled within the same
time frame (within 7 days of each other) and found to test either all as NEGATIVE on the initial test result, or

ii. If any animals test SUSPECT, that all those animals received a NEGATIVE test when re-sampled within 30 days of the test date.

iii. If one or more animals in the flock do not receive a NEGATIVE test either initially or on re-sampling, then the flock test is not considered NEGATIVE.

b. A NEGATIVE Monitored or “A” Status Flock Test Result requires that
   i. A random sample of sheep ≥ 365 days of age in the flock were sampled within the same time frame (within 7 days of each other) and found to test either all as NEGATIVE on the initial test result, or
   
   ii. If any animals receive a SUSPECT result, that all SUSPECT animals all received a NEGATIVE test when re-sampled within 30 days of the initial test.
   
   iii. If one or more animals receive a POSITIVE test either initially or on re-sampling, then the flock test is not considered NEGATIVE.

12. Interpretation of Isolation Group MV Test Results
   a. An Isolation Group is a group of sheep (and lambs if present) that enters the Isolation Facility at one time. For purposes of this program, these animals should all be tested at the same time and will have the status of the group test result (see below).

   b. A Qualifying Isolation Group Test Result is an MV test administered within the same time frame (within 7 days of each other) of all sheep ≥ 180 days of age that are in the Isolation Group. (Appendix 5).

   c. A NEGATIVE Qualifying Isolation Group Test Result requires that all test results are NEGATIVE or NEGATIVE and SUSPECT, and that all SUSPECT animals subsequently received a NEGATIVE test if they qualify for re-sampling within 30 days of the test date.

      i. If an animal that has received a previous SUSPECT test result, again tests SUSPECT, that animal is considered POSITIVE and must be removed.

      ii. If one or more animals fail to receive a NEGATIVE test either initially or on re-sampling, then the Isolation Group test is considered POSITIVE.

   d. A POSITIVE Qualifying Isolation Group Test Result occurs when

      i. One or more animals has an MV test result of POSITIVE, or

      ii. One or more animals have an MV test result of SUSPECT when that
animal has had a previous SUSPECT result.

iii. In these cases, any animal within the Isolation Group with a NEGATIVE MV test, is considered exposed to a positive animal and requires two NEGATIVE MV test results 8 to 12 weeks apart, in which the entire Isolation Group test is NEGATIVE both times.

13. **Isolation Facility** means a facility that sheep are housed in for a specific period of time during which they must have no direct contact with other sheep, shared feeders or watering equipment. The isolation facility must be:
   a. Separately ventilated or be located at least 5 meters (16.25 feet) away from all locations where the higher status flock resides, to minimize the risk of aerosol transmission of the MV virus.
   
   b. Have no direct inside communication with the main flock, unless
   
   c. If within the same building, have a solid partition – which may include a lockable door - between the facility and the main flock so there can be no movement of animals or air from the isolation flock to the higher status flock.
   
   d. Inspected and approved by a veterinarian licensed in the province in which the flock resides, or their designated registered veterinary technician (RVT) at the enrollment test.

14. A **Closed Flock** is one that:
   a. Never brings in new sheep of unknown or lower status regardless of subsequent testing.
   
   b. Only brings in semen and embryos that meet the biosecurity requirements. See **Appendix 8**.
   
   c. Only brings in sheep from other “A” status flocks.
   
   d. Does not have sheep that leave and return (e.g. from shows or displays) unless those sheep are housed in an Isolation Facility as defined above while away and transported in a vehicle that meets the requirements listed in **Section C**.
C. Protocols

1. An official OMVFSP test requires the following:
   a. All official serological samples for any MV testing must be collected by, or their
collection supervised by one of the following:
      i. A veterinarian licensed in the province in which the flock resides.
      ii. A registered veterinary technician (RVT) or equivalent employed by and
          supervised by a veterinarian licensed in the province in which the flock
          resides. This supervision may be indirect, i.e. the veterinarian need not
          be on the premise during sampling but must sign the paperwork and is
          responsible for all the requirements of the program.
      iii. Not the owner or manager, spouse, immediate relative or employee of
           the owner or manager of the flock, even if he or she is a licensed
           veterinarian or RVT may supervise the collection of the samples, although
           they may participate in the sample collection if supervised by a
           veterinarian licensed in the province in which the flock resides or an RVT
           or equivalent employed and supervised by the veterinarian.
   b. That the antibody test used be one of those listed in Section B.10.a.i.

2. Sample collection and record keeping:
   a. “Whole Flock” program: all sheep and goats ≥ 180 days of age that reside at the
      flock premise on the date of the test must be sampled.
      i. Sheep that are isolated from the flock and will be sold within 30 days of
         the test date may not need to be sampled. Producers may, however, wish
         to test breeding animals that are being sold.
         1. E.g. market lambs intended for slaughter and ≥ 180 days of age.
         2. E.g. adults marked for culling.
         3. Animals sold for breeding purposes and ≥ 180 days of age. The
            program strongly recommends that animals that are high risk of
            being test positive (e.g. from a flock with diagnosed MVV infection
            or are themselves test positive), not be sold for breeding
            purposes.
   b. Monitored or Whole Flock – “A” Status program: a random sample selected
      from all sheep and goats ≥ 365 days of age that reside at the flock premise on
      the date of the test must be sampled.
   c. A minimum of 5 mL of whole clotted blood or 1 mL serum or plasma to be
      collected by venipuncture per sheep tested.
      i. Each tube must be clearly and uniquely identified.
ii. Usually laboratories will assess an additional cost for serum separation.

iii. Milk may be used if allowed by the diagnostic laboratory and the diagnostic kit has validated its use.

iv. Pooling of serological or milk samples is not permitted (i.e. combining of samples from more than one animal).

d. Ensure correct identification of the sheep and lambs and record this ID with the corresponding correct tube number on an official OMVFSP form (Appendix 6). These forms are available from OSF both as paper and a spreadsheet format, and will be provided to producers enrolled on the OMVFSP.

e. Complete the OMVFSP sample submission form entirely and properly.

i. The form that is currently available from OSF is specifically for use in the AHL, University of Guelph. If you wish to use a different laboratory, they must use one of the approved diagnostic tests (as listed in Section B.10.a.i.1.). Contact OSF for further instructions.

f. Transportation of the samples to the official laboratory should be done as quickly as possible. Coagulated blood or milk should be transported within 24 hours and kept chilled, not frozen, during transport. If serum is separated prior to shipping, it may be frozen, and shipping delayed if needed. However, action on the test results must still occur within 14 days of the date the animals were sampled, i.e. test date. Proper documents must accompany all samples.

i. In situations where the flock is sampled over several days, coagulated blood and milk should be shipped on the day of sampling, or at the latest the following day. However, if the serum has been separated and frozen, all samples can be shipped together. If the former, please let the laboratory know that more samples will be following.

g. Whole Flock and Monitored-Low Risk status flocks. All sheep NOT sampled that reside at that premise on the date of the Official Test must be identified as set out in this protocol, and that ID recorded on an official OMVFSP form obtained from OSF.

i. Sheep not sampled include lambs < 180 days of age and animals ≥ 180 days of age that will leave the flock in the next 30 days (refer to C.2.a).

ii. A Microsoft Excel spreadsheet OMVFSP_AHL_Inventory_Form is available from OSF that will allow for electronic entry and tracking of sheep tested, as well as sheep not tested that reside on the premise on the Official Test date. Worksheets included in this spreadsheet:

1. Animals Tested list. To facilitate proper tracking of animals for both OSF and your veterinarian, enter information on all animals tested on the flock test. It is formatted so that data can be copied
and pasted into AHL forms for easier submission.

2. Animals Not Tested list. All sheep that resided in the flock on the day of the test and are not tested must be listed on this sheet. This includes animals to be sold in next 30 days from the date of the Official Test, and lambs < 180 days of age. Any animals not on the subsequent list that are not a natural increase (i.e. offspring of ewes in the flock), or do not have the correct testing and transfer forms, will be assumed to be illegal entries and may jeopardize the status of the flock.

3. Animals Left the Flock list. All sheep that were on a previous inventory but have left the flock for any reason, including death, should be recorded here so that they can be permanently deleted from the inventory maintained by OSF.

3. **All official submission forms** ([Appendix 6](#)) must be signed by the supervising licensed veterinarian verifying that
   
a. The samples were obtained from the animals identified on the form, that

   b. All sheep and lambs were correctly identified and those ID’s recorded, and that

   c. The protocols for the OMVFSP have been followed.

4. The samples must be sent to a laboratory that offers the diagnostic tests identified in [Section B.10.a.i](#), and is recognized by the Ontario Sheep Farmers in the OMVFSP, i.e.

<table>
<thead>
<tr>
<th>Animal Health Laboratory</th>
<th>E: <a href="mailto:ahlinfo@uoguelph.ca">ahlinfo@uoguelph.ca</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>Veterinary Services Division</td>
<td>P: 519.824.4120 ext</td>
</tr>
<tr>
<td>54530 University of Guelph</td>
<td>F: 519.827.0961</td>
</tr>
<tr>
<td>50 Stone Road</td>
<td>W: <a href="http://www.guelphlabservices.com/AHL/">www.guelphlabservices.com/AHL/</a></td>
</tr>
<tr>
<td>Guelph, ON Canada N1G 2W1</td>
<td>Client Services Veterinarian Dr. Jim Fairles</td>
</tr>
<tr>
<td>Telephone: 519.824.4120 x54611</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Laboratoire d’expertise en pathologie animale (LEPAQ)</th>
<th>P: 418.643.6140 x 2602</th>
</tr>
</thead>
<tbody>
<tr>
<td>2650, rue Einstein</td>
<td>F: 418.644.4532</td>
</tr>
<tr>
<td>Québec (Québec) G1P 4S8</td>
<td></td>
</tr>
</tbody>
</table>
i. This veterinary diagnostic laboratory offers the HYPHEN Elitest for MV testing.

5. Whole Flock Program and Monitored Low-Risk Only.

**The identification information must be maintained by the flock owner / manager:**

a. The identification must be a permanent ID. This ID may be one of the following:
   i. Ear tag (metal or plastic dangle, button, or any combination). Double tagging is preferred, i.e. one tag in each ear but not required.
   ii. Legible tattoo - ideally backed up with an ear tag.
   iii. Radio frequency ID (RFID) ear tag or implant.
   iv. Official CSIP or ATQ identification.

b. Baseline information must be kept on each sheep in the flock including.
   i. Birth date (dd/mm/yyyy).
   ii. Sex (ram, ewe, wether).
   iii. Breed or breed type if not purebred.
   iv. Registration information for purebred registered animals is optional.

c. The identification used in the OMVFSP must be unique within the flock. This means:
   i. Each animal currently residing in the flock is uniquely identified.
   ii. No ID can be reused within the flock for a period of 15 years after initial date of enrollment.
   iii. If the animal is retagged with a different ID, the change in ID must be recorded on the OMVFSP form.

d. The identification must be clearly legible to the reader. This means:
   i. If tattoos are used but cannot be clearly read by the veterinarian, then the animal must also have a unique ear tag.
   ii. If the tag is not clearly legible, then the animal must be retagged at the time of sampling.

6. All sheep must be accounted for at each test: Whole Flock Program and Monitored Low-Risk
   a. Each sheep and lamb in the flock must be identified and recorded on the day of the initial Qualifying Test for Enrolled status.
      i. Sheep not listed on the form and present on the premise at the next
Official Test date must either be:

1. Natural additions to the flock, i.e. offspring of ewes currently residing in the flock. Dam’s ID must be indicated on the form.

2. Additions to the flock with an OMVFSP Transfer form (Appendix 7) and testing information on record at OSF.

b. Subsequent tests must account for all sheep in the flock, specifically:

i. Permanent removals (sales and deaths).

1. Failure to account for animals no longer in the flock may lead to an inquiry by OSF regarding missing test results.

ii. Natural additions, i.e. offspring of ewes that resided in the flock at the time of the animal’s birth. Dam’s ID must be indicated on the form.

iii. New additions that are not natural additions.

1. All new additions must be accompanied by an OMVFSP Transfer Form (Appendix 7). Official forms are available from the OMVFSP Coordinator at OSF.

2. Unless transferred from an “A” status flock, all new additions must be placed into the Isolation Facility and cannot enter the flock without two negative MV tests 8 to 12 weeks apart while there.

iv. Failure to account for all additions may result in loss of status.

7. All sheep numbers in the flock or premise must be accounted for at each test: MV Monitored.

a. Including total adults – ewes and rams; total lambs <180 days of age; total lambs ≥ 180 days of age and additions to the flock. In the Microsoft Excel spreadsheet OMVFSP_AHL_Inventory_Form is a worksheet in which to record this information, available from the OMVFSP Coordinator, by request. A printout of the up-to-date flock inventory is also acceptable if provided at the time of the sampling visit.

8. Biosecurity requirements (Appendix 8)

To minimize the risk of spread or reintroduction of MVV infection to the flock, the following biosecurity precautions must be followed or are strongly recommended as indicated:

a. Surgical and treatment equipment (e.g. syringes, dose guns, shearing equipment) that may become contaminated with blood or saliva must not be shared between animals unless all “A” status, without first being disinfected⁵.

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⁵Disinfection of equipment can be done with sodium hypochlorite (6% bleach) by mixing 1 part bleach to 2 parts water for a final solution of 2% sodium hypochlorite OR sodium hydroxide by mixing 80 grams of sodium hydroxide crystals with 1 litre of water to make a 2 molar solution. These agents are effective against most
b. **Single-use needles**
   i. Are *strongly recommended* for use in flocks without a whole flock negative test.

c. **All personnel** working with the flock or visiting the flock premises
   i. *Must* wear clean clothing that has not been in contact with any sheep or goats not of “A” status (including those in isolation).
   
   ii. All protective footwear *must be* cleaned and disinfected prior to entering the flock premise (e.g. by vigorous scrubbing with a suitable disinfectant soap and fresh water).
   
   iii. Hands *must* be washed with a suitable disinfectant soap prior to handling sheep.

d. **Sheep leaving and returning to the flock** where there may be contact with unknown or lower status sheep (e.g. from shows, demonstrations, sales barns or shared pastures),
   i. If from “A” status flocks, on returning to the premise they *must*
      1. Be housed in an approved Isolation facility, and
      2. Have two negative MV tests; the first may be on return and the second between 8 and 12 weeks after the first test date
      3. The negative test results must be obtained prior to returning to the flock.
   
   ii. *It is strongly recommended* that if from Status Monitored - Low Risk” Status “B”, Enrolled- Negative, or Enrolled that upon return that they
      1. Are housed in an approved Isolation facility, and
      2. Have two negative MV tests between 8 and 12 weeks apart prior to returning to the flock.
   
   iii. On the next scheduled flock test those animals *must* be included in the flock test. If an “A” status test, they *must* be tested in addition to the random sample.

9. **Transportation of sheep**
   a. Livestock handlers *must* wear clean coveralls and boots.

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viruses, bacteria and the scrapie agent. Both can be used for disinfection of surgical equipment, docking and tattoo equipment, multi-dose syringes and work surfaces. Minimum contact time should be 10 seconds with the product being rinsed or wiped off after disinfecting. Chlorhexadine solution or soap is effective for disinfecting shearing blades.
b. All livestock carriers must be cleaned and disinfected with a suitable disinfectant before sheep are loaded.

c. Sheep from Status “A” flocks must be transported so that:
   i. There is no contact with sheep of unknown or lower status.
   
   ii. They are not unloaded at any other livestock facility with sheep of unknown or lower status en route to the new location.

d. It is strongly recommended that all movement of sheep from Status Monitored - Low Risk, Status “B”, or Enrolled be done so that:
   i. There is no opportunity for contact with other sheep of unknown or lower status.
   
   ii. They are not unloaded at any other livestock facility with sheep of unknown or lower status en route to the new location.

10. Sheep entering flocks enrolled in the OMVFSP
a. All sheep entering a flock enrolled in the OMVFSP must be accompanied by an OMVFSP Transfer form (Appendix 7).

b. Only sheep from Status “A” flocks can directly enter a flock enrolled in the OMVFSP without testing and an isolation period.

c. Sheep from any other flock other than “A” status must have two negative tests; the first may be on return and the second between 8 and 12 weeks after the first test date while in an approved Isolation Facility prior to entering a OMVFSP flock.

11. Qualifying of sheep to enter the flock from the Isolation Facility: (Appendix 5)
   a. Sheep enter isolation for the following reasons:
   i. New purchases from a flock not “A” status.
   
   ii. Return from outside flock (e.g. show, demonstration) where there was exposure to sheep or goats of unknown or lower MV status.
   
   iii. SUSPECT MV test result.

      1. It is strongly recommended that this group be kept separate from new or returning entries.

b. All sheep in the Isolation Facility are treated as a group. The status of the Isolation Group is the same as status of the lowest status animal in the group.
   i. It is strongly recommended that when animals enter the Isolation Facility, no new animals be added to the group until testing protocols are completed for the Isolation Group.
ii. All sheep entering the Isolation Facility from outside the flock must undergo a MV test at entry.

iii. An Isolation Group test must include all sheep in the Isolation Facility that are ≥180 days of age.

c. Entry – Initial Qualifying Test – All NEGATIVE:
   If the Isolation Group contains sheep that are new or returning entries to the flock and the Isolation Group Test is NEGATIVE,
   i. Then the group remains in isolation and must undergo a second group test (Entry – Qualifying Test for Release) in 8 to 12 weeks after the Entry – Initial Qualifying Test.

      1. Do not add any animals to the group during this time.

   ii. If the Entry – Qualifying Test for Release is NEGATIVE, and there have been no animals added to the Isolation Group in the meantime, then the group is eligible to enter the main flock.

d. Entry – Qualifying Tests – One or more POSITIVE
   If one or more sheep have a POSITIVE test at any point (i.e. Entry-Initial Qualifying Test; Entry – Qualifying Test for Release; or Entry – Qualifying Test for Release after POSITIVE Sheep Removed),
   i. The POSITIVE sheep must be removed and, if a ewe, also their lambs < 180 days of age.

   ii. The entire remainder of the group that tested NEGATIVE must remain in isolation and be resampled and tested in 8 to 12 weeks after the date on which the last POSITIVE sheep was removed from the group, i.e. Entry – Qualifying Test after POSITIVE Sheep Removed.

   iii. If the entire Isolation Group is then found to be NEGATIVE on this subsequent test, the group may enter the flock.

   iv. However, if one or more sheep test POSITIVE on this subsequent test, the testing protocol must start again at Section C.11.d.i.

e. Entry – Qualifying Tests – One or more SUSPECT and none POSITIVE.
   If one or more sheep are found to be SUSPECT on any test, and
   i. If, no other sheep in the Isolation Group test POSITIVE, and

   ii. Upon retest, all suspect sheep, test NEGATIVE then

      1. The group test will be considered a NEGATIVE test.

   iii. However, if upon retest, one or more SUSPECT sheep test POSITIVE or SUSPECT
1. The Isolation Group test is considered POSITIVE and you must follow the protocol at Section C.11.d.

f. Sheep that have qualified to enter a flock enrolled in the OMVFSP, from the ISOLATION FACILITY on an Entry – Qualifying Test:
   i. On the next scheduled flock test those animals must be included in the flock test. If an “A” status or Monitored Low-Risk test, they must be tested in addition to the random sample.

   ii. Flocks enrolled in the Monitored program are exempt.

g. SUSPECT Isolation Group Test from a flock test. If all sheep in the Isolation Group are there as a result of a SUSPECT test on a flock test, and
   i. All sheep receive a subsequent NEGATIVE test on the retest within 30 days of the flock test,

      1. The group of sheep can return to the flock immediately upon receipt of the test.

   ii. If one or more sheep in the Isolation Group test POSITIVE or SUSPECT, then the group test is considered POSITIVE and the protocol at Section C.11.d must be followed.

h. If lambs are born or are nursing a ewe while the dam is in the Isolation Group,
   i. The lamb must be tested and removed as per the protocol set out for the main flock, i.e.

      1. Lambs < 180 days of age will not be tested;

         a. Lambs born to POSITIVE ewes must also be removed from the Isolation Group;

         b. Lambs born to NEGATIVE ewes can remain with the dam.

      2. Lambs ≥ 180 days must be tested as part of the Entry - Qualifying Test.

12. **Embryo status:** All embryos being implanted in recipients located in the enrolled flock must have
   a. Either originated from donors located in a Status “A” flock, or

   b. Were handled in accordance with the protocol set out by the International Embryo Transfer Society for the sanitary handling of embryos.

13. **Semen status:** All semen (fresh or frozen) being used in artificial insemination programs within the flock must have
a. Originated from rams located in Status “A” flocks, or

b. From countries declared free of maedi visna virus infection, or

c. From rams collected in a Canadian Food Inspection Agency accredited AI Centre (ensuring that they have had at least one negative MV test prior to semen collection)⁶.

14. Removal of lambs of POSITIVE ewes:
   a. Weaned lambs < 180 days of age and born from and/or raised by POSITIVE ewes (natural or recipient or foster dams) or fed milk from POSITIVE ewes.
      i. It is strongly recommended to market these animals immediately so as to reduce risk of MVV infection to NEGATIVE flock.
      
      ii. However, they may be marketed at a date greater than within 30 days of the test date in order to ensure proper finish and access to optimal market opportunities.
      
      iii. If this delayed marketing option is selected,
           1. The lambs must be managed separately from the breeding flock, and
           2. Must be marketed at < 180 days of age.

   b. Nursing lambs < 180 days of age born from and/or nursing POSITIVE ewes.
      i. POSITIVE ewes with nursing lambs, may be held in an approved Isolation Facility until the lambs are old enough to be weaned.
      
      ii. Once the lambs are weaned
           1. The POSITIVE ewes must be removed.
           2. The weaned lambs can then be kept until market age as outlined in Section C.14.a.

15. Random Sample Flock Test - how to select sheep for sampling:
   a. For “A” status or Monitored or Monitored-Low Risk flock test.

   b. Only sheep ≥ 365 days of age are eligible for testing.

   c. The number of sheep to be tested is determined by the table in Appendix 9.

i. This number is determined to detect MV infection at a prevalence of ≥ 5% of the flock with 95% confidence that this level of flock infection is detected. The example given in the appendix is for use when the test has a sensitivity of 99% and specificity of 100%

1. i.e. if at least 5 of every 100 sheep in the flock are POSITIVE, then there is a 95% chance that at least one infected animal will be found on the random test.

ii. It will not reliably detect a prevalence of MV infection < 5% and will not reliably detect infection if the test used is less sensitive.

iii. The animals selected for testing must be randomly selected to ensure an accurate flock test.

d. Recommendations on how to randomly select sheep for testing are outlined in Appendix 9.

16. Avoid sampling the flock around the time of lambing.
There is evidence that infected pregnant or heavily lactating ewes may not test POSITIVE within one month of lambing (before and after). This may be because the ewe moves large volumes of immunoglobulins into her colostrum, or because its immune system is stressed or down-regulated from pregnancy or lactation. For this reason, it is strongly recommended that flock tests be scheduled so as to avoid sampling within 4 weeks of the expected lambing date until at least 4 weeks post-lambing. However, it is understood that this is sometimes not possible and so is not a requirement of the program.

17. Avoid sampling soon after vaccination.
There is evidence that a strong stimulation of the immune system, e.g. vaccination – may increase the chance of sheep testing POSITIVE, SUSPECT or NON-SPECIFIC, when not infected with MVV. This is because the immune system is generally activated. For this reason, it is strongly recommended that flock tests not be scheduled for up to 3 weeks after vaccination but may be done on the same day as vaccination. However, animals may be vaccinated and sampled on the same day.

D. Whole Flock Program (Appendix 1)

1. Qualifying test for “ENROLLED” or “ENROLLED – NEGATIVE” Status
   a. All sheep ≥ 180 days of age (calculated from birth date) within the flock must be sampled (see Section C for specifics).

   b. All sheep < 180 days within the enrolled flock must be identified and recorded as described in Section C.
c. As of the date of the initial Qualifying Test for “ENROLLED” or “ENROLLED NEGATIVE” Status, all biosecurity requirements must be followed.

d. No pre-screening of samples is permitted prior to submission of samples to the OMVFSP.
   i. Pre-screening means first submitting samples for non-official testing, removing the POSITIVE samples and submitting the rest of the samples for official testing.

2. Results from the Qualifying Test for “ENROLLED” or “ENROLLED NEGATIVE” Status
   a. If no animals test positive, then the flock test is NEGATIVE and flock status can be designated as “ENROLLED – NEGATIVE”.
      i. If the flock test is NEGATIVE go to Section D.6, Qualifying Test for “B” Status.
   b. If > 5% of animals test positive, then the Qualifying Test is POSITIVE and the flock status is “ENROLLED”.
      i. Follow the protocol at Section D.3.
   c. If ≤ 5% of animals test POSITIVE or SUSPECT, there is an option to resample those animals with a positive test result.
      i. This is to address imperfect test specificity, i.e. the chance that an animal tests positive when truly negative as may occasionally occur as described in Section C.17.
      ii. If this option is not taken, then the flock test is POSITIVE; go to Section D.3.
      iii. If this option is taken, follow the protocol at Section D.4.

3. If the Qualifying Test is POSITIVE then, (Appendix 4)
   a. All sheep with a POSITIVE test must be removed as well as their lambs < 180 days of age within 30 days of the test date.
   b. All sheep with a SUSPECT test may be immediately removed.
      i. If they are not they must be held in an Isolation Facility and must be removed or be retested within 30 days of the test date (see Section C).
      ii. If SUSPECT or POSITIVE results are obtained on the retest, the sheep must be removed from the flock within 30 days of the retest date.

4. If ≤ 5% of animals test positive or suspect on the Qualifying Test for “ENROLLED” status, and the option for retest of those animals is taken
   a. Request that all animals that tested positive or suspect be resampled not less than 14 days and not more than 28 days after the initial test date.
      i. For purposes of this resample, these animals will be called “initial reactors”.

Ontario Maedi Visna Flock Status Program
ii. Recommend isolation of all initial reactor animals until results are known of second sample.

iii. Resampling requires that a blood sample be drawn from all initial reactor animals. Samples must be drawn as set out in Section C.1.

iv. The sample will be analyzed using a diagnostic test acceptable to the OMVFSP. Refer to Section B.10.a.i.

b. If one or more of the samples are positive or suspect, then all initial reactor animals are considered to be true positives and must be removed within 14 days of the resample test date. Status is “ENROLLED”.
   i. Go to Section D.3 and follow the protocol.

c. If all samples are negative, then the Qualifying Test for “ENROLLED - NEGATIVE” status is considered NEGATIVE and the flock status is “ENROLLED – NEGATIVE”.

5. Follow-up Qualifying Test after a POSITIVE Whole Flock test.

   a. Must be scheduled between 90 and 180 days after the date of the initial Qualifying test date.

   b. If this test is NEGATIVE, then the status is “ENROLLED – NEGATIVE”. Go to Section D.6 - Qualifying Test for “B” Status.

   c. If > 5% of samples are POSITIVE, then go back to Section D.3 and follow the protocol.

6. Qualifying Test for “B” status - Whole Flock Test

   a. To achieve “B” status, the flock must receive two consecutive NEGATIVE whole flock tests 180 (no more than 395) days apart.
      i. All sheep ≥ 180 days of age must be tested within 7 days of each other.

   b. If all animals test negative, then the flock Qualifying Test for “B” status is NEGATIVE
      i. Go to Section D.8 and follow the protocol.

   c. If > 5% of animals sampled test positive, then the flock Qualifying test for “B” status is POSITIVE.
      i. Go to Section D.3 and follow the protocol.

   d. If ≤ 5% of animals sampled have a positive or suspect test, then there is an option to resample those animals.
      i. This is to address imperfect test specificity, i.e. the chance that an animal tests positive when truly negative as may occasionally occur as described in Section C.17.
ii. If this option is not taken, then the Qualifying Test for “B” status is POSITIVE
   1. Go to Section D.3 and follow the protocol.
   2. It is recommended that the owner schedule a visit with the flock veterinarian to discuss where the program may have broken down (e.g. possible biosecurity break). See Appendix 8 for biosecurity requirements and recommendations.

iii. If this option is taken,
   1. Go to Section D.7 and follow the protocol.

e. All biosecurity requirements must be followed.

7. If ≤ 5% of animals test positive or suspect on the Qualifying Test for “B” status, and the option for retest of those animals is taken:
   a. Request that all animals that tested positive or suspect be resampled not less than 14 days and not more than 28 days after the initial test date.
      i. For purposes of this resample, animals that test positive or suspect will be called “initial reactors”.
      ii. Recommend isolation of all initial reactor animals until results are known of second sample.
      iii. Resampling requires that a blood sample be drawn from all initial reactor animals. Samples must be drawn as set out in Section C.1.
      iv. The sample will be analyzed using a diagnostic test acceptable to the OMVFSP. Refer to Section B.10.a.i.

b. If one or more of the samples are positive or suspect, then all initial reactor animals are considered to be true positives and must be removed within 14 days of the resample test date. Status is “ENROLLED”.
   ii. Go to Section D.3 and follow the protocol.
   iii. It is recommended that the owner schedule a visit with the flock veterinarian to discuss where the program may have broken down (e.g. possible biosecurity break). See Appendix 8 for biosecurity requirements and recommendations.

c. If all samples are negative, then the Qualifying Test for “B” status is considered NEGATIVE and the flock status is “B”.

8. Qualifying Test for “A” status - Random Sample Test
   a. To achieve “A” status, the flock must receive
      i. Two (2) consecutive NEGATIVE whole flock tests 180 (no more than 395) days apart, and
      ii. An additional NEGATIVE random sample flock test 180 (no more than 395) days later.
b. 180 (no more than 395) days after the second consecutive NEGATIVE flock test, a randomly selected proportion of all sheep \( \geq 365 \) days of age must be tested (note change of age).

c. The statistically derived sample of sheep will be randomly selected and be large enough to detect MV infection at a prevalence of \( \geq 5\% \) with a 95% confidence interval (Appendix 9).
   i. This sample size assumes a sensitivity of 99% and a specificity of 100%.

d. All sheep in the flock must be recorded on the OMVFSP forms, including those not tested.

e. If all sheep tested receive a negative test, then the Qualifying Test for “A” status is NEGATIVE flock will be awarded “A” status.

f. If one (1) or more sheep receives a positive or suspect test (i.e. prevalence of MVV is \( \geq 5\% \)), then there is an option to resample those animals.
   ii. This is to address imperfect test specificity, i.e. the chance that an animal tests positive when truly negative as may occasionally occur as described in Section C.17.
   iii. If this option is not taken, then the flock test is POSITIVE; go to Section D.3.
   iv. If this option is taken, follow the protocol at Section D.9.

g. All biosecurity requirements must be followed.

9. If one or more animal tests positive or suspect on the Qualifying Test for “A” status, and the option for retest of those animals is taken:
   a. Request that the animals that tested positive or suspect be resampled not less than 14 days and not more than 28 days after the initial test date.
      i. For purposes of this resample, these animals will be called “initial reactors”.
      ii. Recommend isolation of this initial reactor animal until results are known of second sample.
      iii. Resampling requires that a blood sample be drawn from the initial reactor animals. Samples must be drawn as set out in Section C.1.
      iv. The sample will be analyzed using a diagnostic test acceptable to the OMVFSP. Refer to Section B.10.a.i.

   b. If any sample is positive or suspect, then the initial reactor animals are considered to be true positives and must be removed within 14 days of the resample test date. Status is “ENROLLED”.
      i. Go to Section D.3 and follow the protocol.
      ii. It is recommended that the owner schedule a visit with the flock
veterinarian to discuss where the program may have broken down (e.g. possible biosecurity break). See Appendix 8 for biosecurity requirements and recommendations.

c. If all samples are negative, then the flock qualifies for an “A Status Requalifying” Test.
   i. This requires that this flock test be conducted within 21 days of the resample test day.
   ii. A random sample of animals will be tested to detect infection at ≤ 2% prevalence.
   iii. Animals ≥ 365 days of age are eligible for this test.
       1. The owner will notify Ontario Sheep Farmers of the flock number as of the date of the test and the OMVFSP Coordinator will provide the number to be tested.
   iv. It is recommended that when selecting animals for sampling, that animals not previously sampled be prioritized for selection.
       1. All other selection must be done by random selection (Appendix 9).
   v. If all animals test negative, then the “A Status Requalifying” Test is NEGATIVE.
       1. Flock status is “A”.
   vi. If one or more animals test positive, then the “A Status Requalifying” Test is POSITIVE.
       1. Flock status is “ENROLLED”. Go to Section D.3 and follow the protocols.
       2. It is recommended that the owner schedule a visit with the flock veterinarian to discuss where the program may have broken down (e.g. possible biosecurity break). See Appendix 8 for biosecurity requirements and recommendations.
       3. The owner at this point can appeal this status to the OMVFSP Committee. Each case will be considered on individual merits and additional testing may be requested. Contact the OMVFSP Coordinator to register this appeal.

10. To maintain “A” status, the producer must
   a. Perform an annual random flock test 365 (no longer than 395) days after the previous NEGATIVE flock test, following the protocol as outlined in Section D.8.
   b. All biosecurity requirements must be followed.
   c. Failure to do so without indicating extenuating circumstance in writing to the
OMVFSP Coordinator⁷ may result in a loss of status.

11. Maintaining “A” status - Closed Flock designation:
   a. After achieving “A” status, Closed Flocks as defined in Section B, may choose to randomly test the flock at intervals of up to 2 years, specifically up to 790 days apart.

   b. Producers who wish to be designated as a closed flock must ask for such designation in writing from the project administrator.

   c. Otherwise the protocol as outlined in Section D. 10 must be followed.

E. Monitored MV Flock Program

1. The purpose of “MONITORED” status is to allow large flocks access to the OMVFSP at an affordable cost. It is of most use to the following flocks:

   a. Large flocks that believe that there is no MVV infection present and wish to have an MV status for advertising purposes (e.g. selling of breeding stock).

   b. Large commercial flocks that wish to discover the status of the flock to ensure that MV is not a cause of production loss. If “MONITORED” status is achieved, the producer may wish to maintain the status by testing any new additions and following recommended biosecurity protocols.

   c. It will not permit the owner to eradicate MVV from the flock; only the Whole Flock Program is able to do this.

2. No biosecurity or animal movement restrictions apply to Monitored flocks.

3. A random proportion of all sheep in the flock that are ≥ 365 days of age are selected for testing.
   a. The statistically derived sample of sheep will be randomly selected and be large enough to detect MV infection at a prevalence of 5% or greater with a 95% confidence interval (Appendix 9).

   b. No ID’s need to be recorded, but total numbers of sheep in the flock on the day of sampling must be included on the OMVFSP Microsoft Excel spreadsheet OMVFSP_AHL_Inventory_Forms available from OSF (Appendix 6).

4. In the event of a NEGATIVE flock test, the flock will be awarded “MONITORED” status for a time period not exceeding 395 days from the date of the test.

⁷ This person is the OMVFSP Coordinator at the Ontario Sheep Farmers 130 Malcolm Rd, Guelph, ON N1K 1B1.
a. This requires that all animals sampled test negative.

b. The random flock test must be repeated annually (180 to 395 days) to maintain “MONITORED” status.

c. Failure to do so will result in loss of status.

5. A flock with a POSITIVE flock test, i.e. one or more animals test positive or suspect, has no status.
a. To eradicate MVV, it is recommended that the owner enroll the flock in the Whole Flock Program.

F. Monitored – Low Risk Flock Program

1. Some flocks may wish to eventually achieve “MONITORED – LOW RISK” status. This requires the following:
a. The flock meets all biosecurity requirements of “ENROLLED” and “B” status flocks as outlined in Section C and summarized in Appendix 2.

b. Random flock sampling and testing will be performed as outlined in Section E.3.

c. If the above are performed for a minimum of three consecutive Monitored flock tests over a period not less than 18 months and not exceeding 26 months, and each random test is NEGATIVE, the flock will be awarded “MONITORED - LOW RISK” status after the third NEGATIVE flock test.
i. To fully qualify for “MONITORED-LOW RISK” status, at the Qualifying test, animal ID’s of all animals on the flock must be recorded on the official forms as for Whole Flock status.

d. “MONITORED - LOW RISK” status is valid for no longer than 395 days from the date of the last test.

e. This status implies that the flock is at low risk of being infected with MVV; however, “A” status and “MONITORED - LOW RISK” status are not equivalent in risk.

f. Sheep may not transfer from a “MONITORED - LOW RISK” flock to an “A” flock without testing and isolation as per Section C.

G. Moving from the Monitored or Monitored – Low Risk Program to the Whole Flock Program

1. For flocks with “MONITORED” status, at any time the producer may opt to join the MV
Flock Status Whole Flock program but must start at Section D.1 - Initial Qualifying Test for Enrolled Status, at which time all rules will apply.

2. Flocks with “MONITORED - LOW RISK” status may opt to enter the Whole Flock program at any time.
   a. If the initial qualifying test is NEGATIVE, then the flock will be awarded “B” status rather than “ENROLLED – NEGATIVE”.
   b. If the flock test is POSITIVE, then after the test POSITIVE sheep are removed, the flock will be awarded “ENROLLED” status.

H. Creating a negative MV Flock from “positive” flock genetics

In some purebred flocks with valuable genetics and a high prevalence of MV positive sheep, it may be desirable to establish a NEGATIVE flock from lambs, some of which may be born to POSITIVE ewes. The following outlines two methods as to how this might be done but does not modify or supersede the main program.

1. Artificial rearing of low-risk lambs born to test POSITIVE or unknown status ewes
   a. Lambs intended to be retained as replacements should be removed immediately at birth and preferably not allowed to suckle from the birth dam nor be cleaned by it because
      i. There is a significant risk of MVV transmission from the milk or colostrum.
      ii. There is a significant and higher risk of MVV transmission from the dam’s respiratory secretions or from secretions from other infected animals in the flock.
      iii. Be aware that there is also a risk of in utero transmission from infected dams to offspring, estimate at around 10%.
   b. Low risk colostrum is recommended to be fed to these lambs (Appendix 11):
      i. Sheep colostrum from “B” or “A” status flocks,
      ii. Heated treated colostrum from NEGATIVE ewes from within the POSITIVE flock
         1. Colostrum should be uniformly heated to 56°C and held at that temperature for 60 minutes to kill MVV. Temperatures higher than 60°C will destroy the antibodies in the colostrum.
      iii. Cow colostrum from bovine leucosis virus (BLV) and Johne’s disease (paratuberculosis) free herds. If bovine colostrum is used, the colostrum should be pooled to reduce the risk of bovine colostrum anaemia and
should be from older cows vaccinated against clostridial diseases.

1. It is strongly recommended to heat-treat cow colostrum, using the protocol in Section H.1.b.ii, if BLV or Johne’s disease status is unknown.

iv. Colostrum replacement products intended for use in lambs and fed according to label requirements as a minimum amount.

c. Lamb milk replacer is suitable to raise the lambs until weaned onto dry feed.

d. Artificially reared low-risk lambs must be housed separately from
   i. The POSITIVE flock if those sheep are present on-farm.
   ii. The NEGATIVE flock if those sheep are present on-farm.
   iii. Any sheep with a pending status (e.g. retest of SUSPECT sheep, new introductions in an Isolation Facility)

e. Infection with MVV may occur from transmission of the virus while in the womb, or from accidental transmission at birth. For this reason, the artificially reared lamb flock is considered a potential risk to the NEGATIVE flock until receiving a NEGATIVE test as described in H.1.f.

f. It is strongly recommended to manage these lambs as a group (i.e. no additions unless NEGATIVE status is confirmed) and house in an Isolation Facility.
   i. The Isolation Facility must meet the protocols as set out in Section C.
   ii. When the lambs are ≥ 180 days of age, the group of lambs must undergo two negative tests between 8 to 12 weeks apart before entering the flock.

2. Establishing an MV Low Risk Flock from First-Time Lambing Ewes. (Appendix 12)

This program is suitable for producers who wish to preserve flock genetics, have lots of barns and space but not labour. It requires that for 2 to 3 years, 3 flocks will need to be maintained for a period of time. The protocol is as follows:

a. First-time lambing ewes from main POSITIVE flock:
   i. Pregnant ewe-lambs (that have never lambed before) are moved away from the main flock to lamb in a separate premise. They are to be managed as a separate flock following the guidelines available in Appendix 12.
   ii. This group is considered MV POSITIVE but likely has a low-test prevalence of infection because of their age in comparison with their older flock-mates.
b. The lambs born to the ewe-lambs are raised by their dam until weaning.
   i. At weaning (~2 months of age), the lambs selected as replacements are moved to a different facility away from the main flock.
   ii. Lambs not identified as replacements are marketed or sold.
   iii. Their dams are returned to the POSITIVE flock when the lambs are weaned.

c. Offspring of first-time lambing ewes:
   i. These lambs have a lower risk of being infected with MVV but the risk is not “zero”.
   ii. This flock is to be treated as a separate flock (“Offspring Flock”) and subjected to the same testing protocols as for the Whole Flock program (Section D), when they reach 180 days of age.

d. Subsequent additions to “offspring flock”:
   i. New lambs reared as outlined in Section H.2.a may not enter the “Offspring Flock” until they reach 180 days of age and subsequently have had 2 NEGATIVE tests 8 to 12 weeks apart.

e. POSITIVE flock disposal:
   i. This flock can continue to produce market lambs but should be culled as quickly as the producer can afford as it represents a potential source of infection for the “offspring flock”.

I. Transfer of flock status when selling or buying sheep

If a producer purchases sheep from a flock enrolled in the OMVFSP, those sheep will only retain the status of the originating flock if:

1. The purchased sheep
   a. Do not contact sheep of lower or unknown status on route to the new location, and
   b. Are the only sheep to be housed at the new location which has either:
      i. Not housed sheep for at least 30 days, or
      ii. Has been clean and disininfected as described in Appendix 13; OR
   c. The purchased sheep are housed in an Isolation Facility; OR
   d. The contact sheep have the same or higher MV status than the purchased sheep.

2. It is important to remember that if sheep are mixed, the status will immediately change
to the lowest status of the mixed group. The purchaser of the sheep assumes all health risks once the sheep have left the premises of origin.

J. Advertising of MV Flock status

1. Producers are encouraged to advertise the OMVSP status of their flocks.

2. However, there are restrictions on what can be said or implied.
   a. Only the official name of the program may be used, specifically "The Ontario Maedi Visna Flock Status Program".

   b. The names of the Ontario Sheep Farmers and the University of Guelph can be used only in reference to their role as program administrators or collaborators.

   c. Only the terms of “ENROLLED”, “ENROLLED-NEGATIVE”, "B", "A", “MONITORED”, or “MONITORED - LOW RISK” MV status, can be used and must be used only if the status is in good standing.

   d. No reference should be made as to the flock being “free” of maedi visna infection but only “Low Risk”.

3. The Ontario Sheep Farmers will publish a list of participating flocks, their current status at the time of publication along with contact information in each issue of Ontario Sheep News - unless the producer contacts OSF in writing and indicates this not occur.
Appendix 1  Whole Flock program

Ontario Maedi Visna Flock Status Program

Whole Flock

Flock status unknown

90 to 180 days after last flock test

Test all sheep ≥ 180 days of age

Qualifying test for ENROLLED status

All POSITIVE sheep & their lambs < 180 days of age removed from the flock.

ENROLLED

NO

Is the flock test NEGATIVE?

YES

ENROLLED - NEGATIVE

180 to 395 days after last flock test

Test all sheep ≥ 180 days of age

Qualifying test for “B” status

NO

Is the flock test NEGATIVE?

YES

“B” Status

180 to 395 days after last flock test

Test random sample of sheep ≥ 365 days of age

Qualifying test for “A” status

NO

NO

Is the flock test NEGATIVE?

YES

“A” Status

If “A” status flock receives “closed flock” status, then testing may occur up to every 790 days.

New entries

Unless from “A” status flock, must have 2 NEGATIVE MV tests 8 to 12 weeks apart while in isolation.
Appendix 2  Monitored Flock program

Ontario Maedi Visna Flock Status Program

MONITORED

Flock status unknown

Test random sample of sheep > 365 days of age

If 1 or more samples are POSITIVE then flock has no status.

Is the flock test NEGATIVE?

MONITORED status

180 to 305 days after last flock test

Test random sample of sheep > 365 days of age

Test random sample of sheep > 365 days of age & follow biosecurity protocols

If 1 or more samples is POSITIVE then flock has no status.

Is the flock test NEGATIVE?

MONITORED status

180 to 305 days after last flock test

After 3 annual, consecutive negative MONITORED tests & biosecurity followed

MONITORED LOW RISK status

After achieving MONITORED LOW RISK status, flock can qualify for “B” status after one negative whole flock test.
Appendix 3  Enrollment form

Program Enrolment Form

This is to state that I (we)

<table>
<thead>
<tr>
<th>Last name</th>
<th>First name(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Farm name</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Address</td>
<td></td>
</tr>
<tr>
<td>City</td>
<td>Province</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Location of flock if different from above</td>
<td></td>
</tr>
<tr>
<td>Telephone</td>
<td>Cell phone</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Email</td>
<td></td>
</tr>
</tbody>
</table>

Agree to participate in the **Ontario Maedi Visna Flock Status Program (OMVFSP)** and agree to adhere to the following conditions:

a) All sheep and goats residing on my farm must be **uniquely and permanently identified** as defined by the OMVFSP protocols.

b) Have all sheep and goats residing on my farm blood sampled by a veterinarian licenced to practice in the province in which my flock resides or a registered veterinary technician under the veterinarian’s direction, as defined by the OMVFSP protocols.

c) Promptly act on the results of the MV test as defined by the OMVFSP protocols. Protocols are posted at [www.OntarioSheep.org](http://www.OntarioSheep.org).

d) Meet and maintain all biosecurity requirements on my flock as defined by the OMVFSP protocols.

e) Agree to promptly pay, to OSF, the testing costs as assessed by the Animal Health Laboratory, University of Guelph. No results will be reported to you before accounts are settled with OSF.

f) All individual farm results of the OMVFSP will be kept confidential.

g) Quarterly, a list of participating producers, in good standing, and their contact information (phone number and/or email address) will be published in the **Ontario Sheep News** as well as the flock’s current status. If you do not wish your flock’s name to be included, it will be suppressed from publication.

Initial below if you **DO NOT** wish your farm’s name and MV status to be published in the Ontario Sheep News: ________________.

**We wish to enroll the flock in the (please check one)**

- [ ] Whole Flock Program
- [ ] Monitored Flock Program
Please answer the following questions about your sheep flock:

| Number of ewes and rams >365 days of age (1 year) in the flock | Yes | No |
| Number of ewes and rams > 180 days of age and <365 days of age in the flock | Yes | No |
| Do you ever bring new sheep into your flock (rams, ewes, lambs)? | Yes | No |
| If yes, how often do you bring new sheep into your flock (times per year)? | | |
| Do you have any goats on the premises? | Yes | No |

Please include the name of your flock veterinarian/clinic that will be carrying out the OMVFSP testing. We will forward protocols and forms to this address in preparation for your initial qualifying test.

<table>
<thead>
<tr>
<th>Veterinarian’s name</th>
<th>Veterinary clinic name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td></td>
</tr>
<tr>
<td>City</td>
<td>Province</td>
</tr>
<tr>
<td>Telephone</td>
<td>Cell phone</td>
</tr>
<tr>
<td>Email</td>
<td></td>
</tr>
</tbody>
</table>

Please mail or email your enrollment form to:
OMVFSP Coordinator, Ontario Sheep Farmers
130 Malcolm Rd
Guelph, ON N1K 1B1
E: admin@ontariosheep.org

---

A flock is a group of sheep that are managed either together at any time of the year. E.g. breeding, pasturing, in a feedlot, etc.
Appendix 4  Interpretation of individual MV test results

Ontario Maedi Visna Flock Status Program

Interpretation of individual Maedi Visna test results

Sheep is sampled for MV testing

Test result is **NEGATIVE**.

Is the test **NEGATIVE**?

YES

Sheep is **NEGATIVE** for MV.

NO

Test result is **POSITIVE**.

Sheep is **POSITIVE** for MV.

NO

Test result is **SUSPECT**.

Sheep is isolated and re-sampled within 30 days of test date.

YES

Is the test **NEGATIVE**?

NO

Test result is **POSITIVE** or **SUSPECT**.

POSITIVE and SUSPECT
Sheep and lambs <180 days must be removed.
Appendix 5  Interpretation of isolation groups test results

Ontario Maedi Visna Flock Status Program

Sheep enter the flock from unknown or lower status flock, or are returning to the flock after exposure to sheep of unknown or lower status.

**ISOLATION GROUP**
Sheep tested as a group on arrival to isolation.

**Entry-Initial Qualifying Test**

- **YES**
  - Is the isolation group test **NEGATIVE**?
    - **YES**
      - Group joins flock. Must be tested on next flock test.
    - **NO**
      - **POSITIVE sheep** MUST be removed.

- **NO**
  - **POSITIVE sheep** MUST be removed.

**Entry-Qualifying Test for Release**

- **YES**
  - Remaining sheep eligible for re-test in 8 to 12 weeks from date of removal of **POSITIVE** sheep.
- **NO**
  - **POSITIVE sheep** MUST be removed.
### Appendix 6  OMVFSP sample submission forms – example

**OMVFSP**

**SAMPLES TAKEN:**

**Date Sent:**

**SUBMITTED BY:**

**BILL OF FARM**

<table>
<thead>
<tr>
<th>Clinic No.</th>
<th>AHL USE TEMPLATE</th>
<th>Farm ID</th>
<th>Owner ID/Farm</th>
</tr>
</thead>
</table>

**Ontario Maedi Visna Flock Status Program**

**Determined Status:**

- [ ] Enrolled
- [ ] B Status
- [ ] A Status
- [ ] Monitored Status

**Farm Postal Code:**

**OMVFSP - Reason for Test:**

- [ ] one only

**Test Requested:**

- MV/SAEV Antibody Indirect ELISA Hypermantel
- Other

**Owner method of reporting (fax/email):**

<table>
<thead>
<tr>
<th><strong>AHL INTERNAL ID</strong></th>
<th><strong>AGE</strong></th>
<th><strong>Sex</strong></th>
<th><strong>Breed</strong></th>
<th><strong>ANIMAL ID</strong></th>
<th><strong>Vial</strong></th>
<th><strong>Test Result</strong></th>
</tr>
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<tbody>
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</table>

**Any Question? Please contact the lab:**

**AHL - Guelph Address:**

- University Health and Research Boulevard, Guelph, ON N1G 2W1
- Guelph, ON N1G 2W1
- Phone: 519-824-4000 Fax: 519-824-3323

**AHL - Keene Address:**

- University of Guelph
- Mailing Address: 75 Guelph Street, Guelph, ON N1G 2W1
- Phone: 519-824-4000 Fax: 519-824-3323

Page 1 of 1  
AHL Sample Form - 04-07-2011
# Appendix 7  OMVFSP Transfer form

## Sheep / Goat Transfer Form

### Vendor Information

<table>
<thead>
<tr>
<th>Vendor Name</th>
<th>8th or Street Address</th>
<th>Current Status Level of Flock</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Town</th>
<th>Province</th>
<th>Postal Code</th>
</tr>
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<tbody>
<tr>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Phone</th>
<th>Fax</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Vendor flock location if different from above

<table>
<thead>
<tr>
<th>Lot No.</th>
<th>Concession</th>
<th>Township</th>
<th>County</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

Date of Last flock test

### Information on Sheep / Goats to be Transferred

<table>
<thead>
<tr>
<th>QVF ID (Mandatory)</th>
<th>Birth Date</th>
<th>Sex</th>
<th>Breed</th>
<th>Embryo (if applicable)</th>
<th>Registration No.</th>
</tr>
</thead>
<tbody>
<tr>
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<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
</table>

### Receiver Information

<table>
<thead>
<tr>
<th>Receiver Name</th>
<th>8th or Street Address</th>
<th>Current Status Level of Flock</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Town</th>
<th>Province</th>
<th>Postal Code</th>
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</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Phone</th>
<th>Email</th>
</tr>
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<tbody>
<tr>
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</tr>
</tbody>
</table>

Receiver flock location if different from above

<table>
<thead>
<tr>
<th>Lot No.</th>
<th>Concession</th>
<th>Township</th>
<th>County</th>
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</tr>
</tbody>
</table>

Date of Last flock test

### Submitting Information

I certify that all the listed sheep came from an official Maedi Visna Status flock and will not be exposed to lower or unknown status sheep or goats en route to the Receiver Flock.

Vendor (Print Name) Date:  Date Animals to be Transferred:  (must be within 30 days of submitting form)  Date:  Telephone

*Top copy to accompany animals to receiver, 2nd copy to be mailed to program administrator, 3rd copy to be retained by vendor for audit*
### Appendix 8  OMVFSP Biosecurity requirements

| Biosecurity requirements for the Ontario Maedi Visna Flock Status Program | Flock status level<sup>9</sup> |
|---|---|---|---|---|---|
| **M** = must do  **R** = recommended | **MO** | **M-LR** | **EN** | **B** | **A** |
| **C.5. Animal identification**<br>The identification information *must* be maintained by the flock owner / manager. | | | | | |
| a. The identification *must* be a permanent ID. | **R** | **M** | **M** | **M** | **M** |
| b. Baseline information *must* be kept on each sheep in the flock. | | | | | |
| c. The identification used in the OMVFSP *must* be unique within the flock. | | | | | |
| d. The identification *must* be clearly legible to the reader. | | | | | |
| e. All sheep *must* be accounted for at each test. | | | | | |
| **B.13. Isolation facility** - a facility in which sheep are housed for a specific period of time during which they *must* have no direct contact with other sheep, shared feeders or watering equipment. The Isolation Facility *must* be: | | | | | |
| a. Separately ventilated to minimize the risk of aerosol transmission of the MV virus. | **R** | **M** | **M** | **M** | **M** |
| b. Have no direct inside communication with the main flock | | | | | |
| c. If within the same building, have a solid partition between the facility and the main flock so there can be no movement of animals or air from the isolation flock to the higher status flock. | | | | | |
| d. Inspected and approved by a veterinarian or their designate RVT at the enrolment test. | | | | | |
| **C.8.a. Surgical and medical equipment**<br>Surgical and medical equipment, that may become contaminated with blood or saliva must not be shared between the flock and any sheep housed in an isolation facility or part of another flock whose status is not “A”, without first being disinfected. | | | | | |
| **C.8.b. Single-use needles**<br>*Are strongly recommended* for use in flocks with test positive animals. | | | | | |

---

<sup>9</sup> MO = monitored; M-LR = monitored, low risk; EN = enrolled; NA = not applicable
<table>
<thead>
<tr>
<th>Biosecurity requirements for the Ontario Maedi Visna Flock Status Program</th>
<th>Flock status level³</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>M</strong> = must do</td>
<td><strong>R</strong> = recommended</td>
</tr>
<tr>
<td><strong>C.8.c. Personnel and visitors</strong></td>
<td></td>
</tr>
<tr>
<td>a. <em>Must</em> wear clean clothing that has not been in contact with any sheep or goats not of “A” status.</td>
<td>R</td>
</tr>
<tr>
<td>b. All protective footwear <em>must</em> be cleaned prior to entering the flock by vigorous scrubbing with a disinfectant soap (e.g. tamed Iodine or creosote-based soap) and fresh water.</td>
<td>M</td>
</tr>
<tr>
<td>c. Hands <em>must</em> be washed with a disinfectant soap prior to handling.</td>
<td>M</td>
</tr>
<tr>
<td><strong>C.9. Transportation of sheep</strong></td>
<td></td>
</tr>
<tr>
<td>a. Livestock handlers <em>must</em> wear clean coveralls and boots.</td>
<td>R</td>
</tr>
<tr>
<td>b. All livestock carriers <em>must</em> be cleaned and disinfected before sheep are loaded.</td>
<td></td>
</tr>
<tr>
<td>c. Sheep must be transported so that:</td>
<td></td>
</tr>
<tr>
<td>i. There is no contact with sheep or other livestock of unknown or lower status.</td>
<td></td>
</tr>
<tr>
<td>ii. They are not unloaded at any other livestock facility with sheep or other livestock of unknown or lower status en route to the new location.</td>
<td></td>
</tr>
<tr>
<td><strong>C.10. Sheep entering flocks on the OMVFSP</strong></td>
<td></td>
</tr>
<tr>
<td>a. All sheep entering a flock enrolled on the OMVFSP must be accompanied by an OMVFSP transfer form.</td>
<td>R</td>
</tr>
<tr>
<td>b. Only sheep from Status “A” flocks can directly enter a Status “A”, “Monitored - Low Risk”, “B”, or “Enrolled” flock without testing and an isolation period.</td>
<td></td>
</tr>
<tr>
<td>c. Sheep from any other flock other than “A” status, must have two negative tests 8 to 12 weeks apart while in an Isolation Facility prior to entering an OMVFSP flock.</td>
<td></td>
</tr>
<tr>
<td><strong>C.11. Qualifying of sheep to enter the flock from the Isolation Facility</strong></td>
<td></td>
</tr>
<tr>
<td>a. All sheep entering the Isolation Facility from outside the flock <em>must</em> undergo a MV test at entry.</td>
<td>R</td>
</tr>
<tr>
<td>b. All sheep in isolation are treated as a group. The status of the isolation group is the same as the lowest status animal in the group.</td>
<td></td>
</tr>
<tr>
<td>c. An Isolation Group test must include all sheep in isolation that are ≥ 180 days of age.</td>
<td></td>
</tr>
</tbody>
</table>
### Biosecurity requirements for the Ontario Maedi Visna Flock Status Program

<table>
<thead>
<tr>
<th>M = must do</th>
<th>R = recommended</th>
<th>Flock status level</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.12. Embryo status</td>
<td>All embryos being implanted in recipients located in the enrolled flock must have</td>
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</tr>
<tr>
<td>a. Either originated from donors located in a Status “A” flock or</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Were handled in accordance with the protocol set out by the International Embryo Transfer Society for the sanitary handling of embryos.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C.13. Semen status</td>
<td>All semen (fresh or frozen) being used in artificial insemination programs within the flock must have</td>
<td></td>
</tr>
<tr>
<td>a. Originated from rams located in Status “A” flocks or,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. From countries declared free of Maedi Visna virus infection, or</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. From rams collected in a Canadian Food Inspection Agency accredited AI Centre (ensuring that they have had at least one negative MV test prior to semen collection).</td>
<td></td>
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</tr>
<tr>
<td>C.14. Removal of offspring (lambs) of POSITIVE ewes:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Weaned lambs &lt; 180 days of age from POSITIVE ewes may be marketed at a date greater than within 30 days of the test date.</td>
<td></td>
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</tr>
<tr>
<td>i. If delayed marketing is selected, the lambs must be managed separately and be marketed at &lt; 180 days of age.</td>
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<tr>
<td>b. Lambs nursing POSITIVE ewes</td>
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<tr>
<td>c. POSITIVE ewes with nursing lambs, may be held in isolation until the lambs are old enough to be weaned.</td>
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Appendix 9  

Testing a random number of sheep for the OMVFSP

To be used for “A” status, “MONITORED” and “MONITORED LOW-RISK” status flock tests. Number of sheep ≥ 365 days of age, to be randomly selected and tested in order to be 95% confident of detecting at least one positive animal if 5% or more of the flock is infected. Assuming the test has 99% sensitivity and 100% specificity. Using a test with poorer sensitivity will require a higher sample size.

Number of sheep ≥ 365 days of age = flock size under consideration

If actual number of sheep lies between two flock sizes, use the higher sample size.

Table 1. Determining the number of sheep to be sampled for a random flock test

<table>
<thead>
<tr>
<th>Flock size</th>
<th>Sample size</th>
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<tr>
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How to perform the random flock test

Make a list of all sheep in the flock that are eligible for testing, i.e. ≥ 365 days of age. Number the sheep on the list 1, 2, 3... etc to the last sheep on the list.

Consult the table above to determine how many of those sheep must be tested. E.g. if 200 adult sheep are eligible for testing, then 52 sheep must be tested.

Use a random number table or generator to create a list of randomly selected numbers.

The producer can pre-sort the selected animals and have them ready for testing on the day.

A second way to use the random number list is to use this list to select animals as they run down the chute.

Random number tables are available as appendices in statistics texts. One is included in the table below.

Random number table

To use the table, read numbers from the table in any order (up, down, right, left or diagonal) and use the numbers to correspond to animal selection. E.g., if needing to select 39 animals from a list of 70 – you need to pick 39 numbers from 1 to 70 (without duplication) from this

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10 Source: [http://www.fao.org/Wairdocs/ILRI/x5436E/x5436e0c.htm#TopOfPage](http://www.fao.org/Wairdocs/ILRI/x5436E/x5436e0c.htm#TopOfPage) Table 6.
table. If starting at the top left of this table and reading from left to right – the first 5 numbers selected are: 52; 68; 73; 64; 66. These numbers can refer to e.g. the order of the ID in the flock; the order they come down the chute; the order in which they are caught (tough because that means you have to catch them all to get the right ones!).

### Table 2. Random number table for randomizing selection of sheep for random flock test.

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Some web-based random number generators:
- [http://www.random.org/integers/](http://www.random.org/integers/)
- [http://www.randomizer.org](http://www.randomizer.org)

When using these web sites to create a list, make sure each selected number is unique.

**What is NOT RANDOM:** testing the first animals down the chute or the first animals caught – not acceptable!
Appendix 10  Positive test after a negative flock test

Ontario Maedi Visna Flock Status Program

If one or more sheep are positive after at least one whole flock negative test

*Qualifying Test for “B” Status*

Flock status is **ENROLLED NEGATIVE**.

Whole Flock “B” Qualifying Test

< 5% of sheep test **POSITIVE** or **SUSPECT**.

OMVFSP Coordinator will request Veterinary Diagnostic Laboratory to resample all **POSITIVE** and **SUSPECT** sheep.

Positive animals isolated and resampled within 2 weeks of initial test.

Are all tests **NEGATIVE**?

NO

YES

Is the flock test **NEGATIVE**?

NO

YES

≥ 5% of sheep test **POSITIVE** or **SUSPECT**.

Status is **ENROLLED**. Remove all test **POSITIVE** sheep and lambs.

Even if all results are **NEGATIVE**, strongly recommend that all retested animals are removed from the flock.
Ontario Maedi Visna Flock Status Program

If one or more sheep are positive after at least one whole flock negative test

*Qualifying Test for “A” Status*

- Flock’s current status is “B” or “A”.
- Random proportion “A” Qualifying Test

One (1) sheep tests POSITIVE or SUSPECT.

- NO
  - OMOVFS Coordinator will request Veterinary Diagnostic Laboratory to resample this sheep.
  - Positive animal isolated and resampled within 2 weeks of initial test.
  - Is the test NEGATIVE?
    - NO
      - More than one (1) sheep test POSITIVE or SUSPECT.
    - YES
      - Status is “A”.

- YES
  - Status is ENROLLED.
    - Remove all test POSITIVE sheep and lambs.

- NO
  - Is the flock test NEGATIVE?
    - NO
      - More than one (1) sheep test POSITIVE or SUSPECT.
    - YES
      - Even if the result is NEGATIVE, it’s strongly recommended that this animal is removed from the flock.
Appendix 11  Flock management to lower risk of MVV infection in lambs

This appendix is offered to assist in properly rearing lambs from MV POSITIVE ewes but must be accompanied by proper testing as per the protocols of the OMVFSP.

Selecting suitable replacements

Because breaks in this program will occur, if the lambs did suckle the ewes or a lambing shift went awry, it is ideal to tag lambs differently (e.g. different coloured tags) to differentiate between those that are suitable replacements (i.e. made it through the “snatch and rear” program), versus those that should be sent to market (i.e. either unsuitable as replacement stock or likely nursed from their dam).

Reduce exposure to MVV contaminated environment and infected animals

- Remove the lambs you wish to retain as replacements immediately at birth, this will prevent them from ingesting contaminated colostrum or milk or contacting respiratory secretions.
- Prevent lambs from nursing dams if you can’t always be present at the time of birth.
- Removing as soon as born is ideal, but sometimes difficult to do 100% of the time. Teat tape (available on the web) applied to ewes’ teat ends prior to lambing will temporarily frustrate lambs from successfully nursing but is not a substitute for timely “snatch and rear”.
- Move the lambs to a warm location and dry off with clean, freshly laundered towels. Dip navels in 2 ½% tincture of iodine. Administer vitamin E selenium injection if selenium is not already present in the ewes’ late gestation diet. Insert suitable ID tags. And immediately feed colostrum (see below for safe colostrum).
- Washable “rubber-maid” type tubs can be purchased from home hardware stores. Put some straw in the bottom for absorption and traction for the lambs. These can be easily hosed out and disinfected when they become soiled – and can be stacked for storage when lambing is done.
- After move to the lamb rearing area. Until one week of age – try to keep in small groups (< 10 lambs per group) so that you can more easily detect sick lambs.
- The person caring for the newborn lambs should not be the same person that treats sick lambs as they can easily transmit bacteria, parasites and viruses that cause lamb diarrhea. If labour is short – have this person change coveralls between these groups, wash hands and wear disposable gloves when handling lambs.

Feeding “safe” colostrum and milk:

- Heat-treat colostrum from your infected flock.
  - The best ewes to collect colostrum from are healthy appearing older ewes that are test NEGATIVE.
  - Collect “first-milking” colostrum only – regardless of what subsequent milking colostrum looks like.
  - When collecting colostrum from these animals clean the udder thoroughly before collection, including disinfecting the teats. Hands should be clean or wear gloves.
• Heat-treat colostrum by warming to 133 - 140°F (56 - 60°C) for 60 minutes. This is a cooler temperature than pasteurization of milk. Do not allow the temperature to become hotter than 60°C or cooler than 56°C. If cooler, MV virus will survive. If hotter, the immunoglobulins (also called gammaglobulins, antibodies or IgG) in the colostrum will “cook” resulting in its inactivation and ruin the colostrum for feeding.

• Time the 60 minutes from when the temperature of the colostrum first reaches 56°C.

• Other bacteria are also killed by this process with the benefit that immunoglobulin absorption by the lamb is actually improved by the heat-treating process.

• Water bath type pasteurizers (e.g. Weck Canner) are able to keep the temperature constant. There are also home milk pasteurizers that claim they are also suitable for heat-treating colostrum (not all pasteurizers are suitable). These may cost $300 to $700 but are worth it in terms of labour saving and improved health of the lambs.

• Heat evenly in small batches, then freeze and label with the ID of the “donor” ewe. If that ewe becomes ill, her colostrum should be discarded.

• Colostrum from cows. There are advantages and disadvantages to this.

• Advantages are that large volumes of good quality colostrum can usually be easily sourced.

• Disadvantages are: the immunoglobulins are not to the “farm bugs”; the cows may also be infected with MAP and so the colostrum should also be heat-treated; cows should be vaccinated against clostridial diseases to assure protection of the lambs; and unusually, we sometimes see anaemia develop in lambs a few weeks after feeding cow colostrum.

• Heat-treat cow colostrum as with sheep colostrum. Obtain from healthy older cows – first milking only – and ideally from cows that are only moderate milk producers. This is to reduce the dilution of the immunoglobulins with milk. Label each batch with the ID of the donor cow in case later that if you identify problems, the rest of the colostrum can be discarded.

• Use colostrum replacement products. Again there are advantages and disadvantages.

• The biggest advantage is that there are tremendous labour savings as safe colostrum is always available.

• The disadvantages are the high cost, and the source of the colostrum is bovine so may not have immunoglobulins to the “farm bugs”.

• It is important to use appropriate volumes as underfeeding will result in lambs that are more susceptible to diseases such as pneumonia, diarrhea, coccidiosis, soremouth, etc.

• It is important to only use products licensed and labeled as colostrum replacement (not supplement) (e.g. Headstart Hi-Cal for Lambs, Grober). Colostrum substitutes should all have bovine immunoglobulins present as at least 10% of the volume by weight of the product.

• Freezing and thawing colostrum.
- Freeze in volumes that will be easy to thaw (e.g. ice cube size).
- Once frozen, move to plastic freezer bags that are labeled using a permanent marker (Sharpie).
- Store in a chest freezer at –20°C.
- Use oldest colostrum first (should not be older than 6 months).
- Thaw at room temperature or in the refrigerator (not the microwave as it will unevenly heat and will destroy the immunoglobulins). The thawed colostrum can be stored in the fridge for up to 1 week. Best is to purchase a chest freezer and refrigerator just for the lamb rearing operation. This will assure that you have lots of space to properly store colostrum.
- Proper amount to feed of “safe” colostrum
  - At the first feeding, which should be within an hour of birth (the sooner the better), the volume of colostrum should be 50 ml / kg body weight. If an average-sized lamb is 4 kg (~ 8 ½ lb), then the lamb needs to drink 200 ml or almost 7 ounces. Bigger lambs need more.
  - You can feed by nipple bottle (must be cleaned and disinfected between uses and stored away from flies) or esophageal feeder tube (ditto for cleaning). Bacterial contamination of feeding equipment will prevent proper absorption of the immunoglobulins and will make the lamb sick.
  - Colostrum is sticky and thick – if too thick for the tube or nipple, it can be diluted slightly with clean warm water but original volume of colostrum must be maintained.
  - Over the first 24 hrs of life, the lamb needs to have consumed 200 ml / kg body weight of colostrum, or 20% of its total body weight. The best way is to repeat the second feeding 3 hrs after the first and then the next 2 feedings, 6 and 12 hrs later.
  - For commercial products, follow directions on the label as a minimum recommendation.
  - Do not feed unpasteurized milk to lambs, use either pasteurized milk or milk replacer. For batch pasteurization of milk: 145°F (63°C) for 30 minutes. For flash pasteurization: 162°F (72°C) for 15 seconds.
Appendix 12  Establishing a MV low risk flock from first time lambing ewes

Ontario Maedi Visna Flock Status Program

Main flock
MV POSITIVE
To be culled as soon as able.

From main flock into separate premise.

First time lambing flock
Offspring of infected flock.
Are considered MV POSITIVE.
Lamb for the first time.
Raise lambs that are lower MV risk.

Back to main flock after lambs are weaned.

Weaned market lambs to main flock until ready for sale.

At weaning, move replacement lambs (offspring) to separate premise.

Offspring flock
MV POSITIVE
Weaned replacement lambs until old enough for MV testing.

Test offspring flock when ≥ 180 days of age.

is the flock test NEGATIVE?

NO
ENROLLED status

YES
ENROLLED-NEGATIVE status

Continue with protocols for Whole Flock test.

All POSITIVE sheep marketed or returned to main flock.
Appendix 13 Protocol for maintaining two flocks of different health status

For producers who wish to keep animals of unknown or lower disease status on the same premises as animals of higher health status, there are procedures that will reduce the risk that disease is not transmitted to the higher status flock. These protocols aren’t specific to one contagious disease but can be used to assist in maintaining MV low risk status. It is strongly recommended that you use the Sheep Biosecurity Standard section of the Canadian Verified Sheep Program to develop a farm-specific biosecurity plan that incorporates the following recommendations as relevant.

Buildings
a. Separate buildings housing different status animals by at least 5 metres from other livestock buildings to reduce risk of transmission of aerosol borne viruses and bacteria.

b. One exception to this is if the buildings have no internal access to each other and ventilation can only flow from the higher status flock (i.e. healthier) to the lower.

Leaving and returning to the higher status flock
a. Sheep leaving the higher status flock for any reason cannot return to the higher status flock without a period of isolation (NB, this includes rams).

b. This period of isolation and the required testing protocol will vary with the disease under consideration.

c. Please note that the required biosecurity precautions for a specific disease certification program ALWAYS supersede these recommendations.

Pastures and yards (corrals)
a. Sheep of differing health status should not graze the same pastures during the same grazing season. This period of time may be longer depending on the disease in question.

b. Fences should be constructed so that there is no opportunity for physical contact between the two flocks (e.g. escapes, shared water source, mineral and salt supplements) and no opportunity for manure run-off from the lower status flock to the higher. This is particularly important when managing manure piles.

c. If the only water source is a stream or river, the higher status sheep should have access up-stream from the lower status sheep. Ponds or lakes should not be shared if there is any concern regarding Johne’s disease (ovine paratuberculosis).

d. If there is concern of preventing Johne’s exposure,

i. Pastures should be empty of lower status sheep, goats and cattle for at least one grazing season which includes two full winter seasons, before being used by higher status sheep.
ii. Plowing and reseeding of the pasture before turnout is also strongly recommended.

iii. Manure should not be spread on these pastures unless composted thoroughly and it is strongly recommended not to spread it on pasture at all but rather on fields used for grain production.

**Protective clothing**

a. Separate boots and coveralls should be worn whenever working with the higher status flock.

b. These do not leave the higher status barn except for laundering.

c. They can be worn over clean “street” clothes but not over protective clothing worn to handle lower status sheep.

d. Hands and arms should be washed with iodine or chlorhexadine soap before entering clean facilities.

e. Hats, overcoats, mittens and gloves should also be changed or not worn into higher status facilities.

**Entry biosecurity**

a. The main laneway to the buildings housing the higher status sheep should be gated with a locking device.

b. This gate, which may be in the form of a gate or chain barrier, should be clearly signed, indicating no admittance without permission of the farm manager.

c. Visitors from off-farm that need to visit the flock (e.g. shearer, veterinarian, purchaser), should wear clean coveralls and boots that have not been exposed to lower status sheep. Rubber boots must be thoroughly washed prior to entry with a disinfectant soap. Leather boots should be worn inside clean rubber boots or plastic disposable boots. Coveralls should be freshly laundered. All visitors should first visit the higher status flock, following the protocol above, before visiting the lower status flock.

**Vehicles and large equipment**

a. Trucks, tractors, manure removal equipment, feeding and watering equipment should not be shared between flocks. If large pieces of equipment must be shared, they should be thoroughly washed and disinfected before coming into the higher status flock.

b. Vehicles from off-farm should not enter the yard to which sheep may have access, unless first cleaned of manure. Vehicles of particular risk are commercial livestock trucks or trailers. If shipping lambs to market regularly and using a commercial livestock carrier, it is advisable to build a loading ramp away from any areas where sheep may be housed.

**Other equipment**

Separate equipment for shearing (blades, shearing unit, board, clothing and footwear), tail
docking, castrating (ringing equipment), drenching, automatic syringes, lamb tubes & artificial rearing equipment, warming boxes, crates, restraint equipment and any equipment that is used in direct contact with sheep is strongly recommended. In the face of economic hardship that precludes having two of everything above, disinfection must be used. Use disinfection protocols listed below in this document.

**Manure management**

a. Fresh manure from the lower status flock must not be spread on pastures or hay fields unless the hay is being sold off-farm or is to be fed to other species of livestock (e.g. horses).

b. Manure run-off must be contained so that it cannot reach yards, fields or contaminate water sources.

c. Composting manure is an acceptable way to “rehabilitate” manure. However, the manure should be a minimum of one year of age and turned at least once to ensure total composting. A composting manure pile should not have fresh manure added to it.

**Dead stock**

a. Carcasses must be buried or composted immediately and away from contact with either flock.

b. Carrion eaters (dogs, coyotes, foxes, crows, seagulls, hawks and eagles) must be prevented from gaining access to these carcasses as they can spread disease.

**Guardian livestock**

a. Use of guardian dogs, llamas and donkeys are acceptable ways of protecting livestock from predators. Dogs often travel from flock to flock within a farm and this is acceptable. Donkeys do not share diseases with sheep and can be moved from flock to flock although if foot rot is present in either flock, disinfection the donkey’s feet prior to moving with zinc sulphate is recommended.

b. Llamas can be infected with some sheep diseases, notably Johne’s disease and caseous lymphadenitis. For this reason it is recommended that llamas that come from sheep farms of unknown or lower health status not be used for predator protection in the higher status flocks.

c. Guardian, working and pet dogs if allowed to scavenge dead sheep, can become infected with tapeworms (*Taenia ovis*, *Taenia hydatigenia*, *Echinococcus*). These tapeworms can be transmitted back to sheep causing damage to the carcass. Echinococcus is also a dangerous zoonotic infection in humans. If scavenging is suspected, dogs must be dewormed every 5 weeks with an antiparasitic drug called a cestocide. Contact your veterinarian to obtain an effective drug.

**Insect and vermin control**

a. Flies can spread disease. Control flies through prompt removal of manure from yards, using fly traps and fumigating if necessary.
b. Rodent (rats, mice) and bird control (pigeons, crows, sparrows, swallows, seagulls) should be practised as they can spread disease. This can be done by using rat poison, fumigating or trapping.

c. Screen windows and ledges that can be used for bird nests. Plug holes.

**Shearing CLA negative flocks**

a. For closed flocks, the shearer represents a significant risk for the introduction of caseous lymphadenitis. The onus is on the flock owner, with the cooperation of the shearer, to ensure that the disease does not have an opportunity to enter the flock at shearing time.

b. The bacteria (*Corynebacterium pseudotuberculosis*) can survive for weeks and months in dried pus on shearing equipment and can invade slightly abraded and unbroken skin.

c. For this reason, it is recommended that

i. The higher status flock have its own shearing equipment, shearing board, moccasins, table for tagging and folding fleeces. The equipment is very difficult to disinfect in an effective manner so, if shared, pose a significant risk to the flock.

ii. Coveralls or shearing pants as well as shirts, coats and hats used by the shearer and any assistants should be freshly laundered and not used in any other flock.

iii. Boots used by assistants should be freshly scrubbed and disinfected.

iv. Wool bags should either be new, freshly laundered or left outside the yard.

v. Before shearing, the shearer should wash his/her arms and hands with chlorhexidine soap.

vi. All nicks and abrasions post-shearing should be treated immediately with 2% iodine solution.

**General Recommendations for Disinfection**

**Disinfection** = process of eliminating infectious organisms by using chemical or physical agents on a physical object (not animals).

What follows is a brief overview of disinfection and disinfectant agents and there are many references available with more in-depth information.

**Disinfection of a premise**

- Remove all animals, utensils & equipment (e.g. feeders and waterers).

- Scrub and clean utensils and equipment with detergent soap. Rinse well.

- Make sure electrical outlets are covered.

- Wear protective clothing (boots, rubber gloves, coveralls, mask).
• If waterers are not removable, empty completely and clean as above. Make sure they are rinsed well after disinfecting.

• Make sure run-off isn’t available to livestock or contaminates water sources.

• Gently wet area to prevent dust (e.g. Coxiella burnetii is highly infective when inhaled in dust), knock down cobwebs after wetting.

• Scrub, scrape and flush away all gross organic material using a cleaner/sanitizer detergent compound (e.g. 2-4% sodium carbonate).

• Rinse well. High pressure hot water will help to dissolve fats and other organic debris when cleaning and rinsing. The premises must be rinsed well to prevent inactivation of disinfectant. They must also be dry before applying disinfectant.

• Apply disinfectant and leave on for recommended time as outlined in the directions.

• Dirt yards that cannot be disinfected, should have organic debris scraped away and wet areas drained or built up. Fences around yards and outdoor equipment should be scrubbed and disinfected as above.

• Lamb milk feeding equipment - wash with detergent, rinse well and rinse with 2% hypochlorite solution (bleach).

**Footbaths**

• Locate at every doorway with a boot brush hanging nearby

• Boots should be scrubbed and washed every time an individual enters and exits the premises

• Change every 3 days or more frequently if become contaminated with organic material

• Do not add salt or antifreeze to prevent freezing.

• Should be a minimum of 10 centimetres (4") in depth

**Equipment**

Disinfection of equipment can be done with sodium hypochlorite (6% bleach) by mixing 1-part bleach to 2 parts water for a final solution of 2% sodium hypochlorite OR sodium hydroxide by mixing 80 grams of sodium hydroxide crystals with 1 litre of water to make a 2-molar solution. These agents are effective against most viruses, bacteria and the Scrapie agent. Both can be used for disinfection of surgical equipment, docking and tattoo equipment, multi-dose syringes and work surfaces. Minimum contact time should be 10 seconds with the product being rinsed or wiped off after disinfecting. Chlorhexidine solution or soap is effective for disinfecting shearing blades.

**Selecting a disinfectant**

Disinfectants will not work well unless organic material is removed, the detergent flushed well and the premises dry. After that, the main considerations are environmental hazard, the agent...
to be killed and availability. Make absolutely sure that you read the directions well for preparation and use and acquaint yourself with the efficacy of the various compounds against bacteria and their spores, viruses, fungi and parasites and their eggs. Many of the compounds do not work well in the presence of any organic material (e.g. manure) and require prolonged contact time to be totally efficacious. A short description on the uses of common disinfectants follows. More information on disinfectants, disinfecting and general procedures can be found in the references listed below:

**Phenols:** These are commonly found in household disinfectants (e.g. Lysol) and often have a pungent smell. They are effective against a broad range of bacteria, particularly gram-positive bacteria but **not** against bacterial spores (e.g. Clostridial diseases, Anthrax), as well as some viruses. They are also corrosive and irritating to skin.

**Quaternary Ammonium Compounds (QUATS):** They have a broad spectrum of activity (gram + and gram - bacteria and enveloped viruses. **Not** effective against *Mycobacterium* sp. (e.g. Johne’s disease), bacterial spores, fungi and non-enveloped viruses. They are useful in general disinfecting and cleaning, even in the presence of trace organic debris. They are often the disinfectant of choice since they are effective and non-toxic. Some individuals may develop contact dermatitis with repeated exposure.

**Alcohols:** This is usually ethyl alcohol or isopropyl alcohol. They are effective against a wide range of organisms but not bacterial spores or some non-enveloped viruses. The concentration must be high to be effective (60-90%). Repeated use on rubber equipment can cause damage, they are irritating to the skin with prolonged use and are expensive to use for cleaning of large surfaces.

**Hypochlorites (Chlorine):** e.g. Bleach is sodium hypochlorite. It is very effective against many bacteria, viruses and prions (e.g. scrapie) but inactivated in the presence of organic material and not effective against bacterial spores. Ammonia (animal urine) will also inactivate. Sodium and calcium hypochlorites are effective but corrosive. It is useful for disinfecting metal equipment. 1 part 6% bleach to 2 parts water makes an effective solution of 2% bleach. If using for equipment that may be contaminated with prions, use at a 5% solution.

**Iodine and Iodine Based Disinfectants:** Aqueous (Lugol’s) and alcoholic iodine (tincture) are often used as antiseptics on wounds. Iodophors (iodine + carrier) release iodine in an acid medium and are effective in the presence of trace organic material against bacteria and viruses. They can be used as skin disinfectants or for general disinfection and cleaning.

**Hydrogen Peroxide (30%):** A stabilized peroxide makes an excellent disinfectant for surfaces and works against almost all pathogens including enveloped and non-enveloped viruses, bacteria, fungi and some activity against bacterial spores. These products may be blended with QUATS, peracetic acid and iodophors.

**Chlorhexadine:** Used as skin cleaners in low concentrations (<4%). It is useful against gram positive bacteria (e.g. *Corynebacterium pseudotuberculosis*) but less so against coliforms and viruses. It can be used for cold sterilization of surgical instruments and shears if they are rinsed clean first. It does not work well in presence of organic material.
**Glutaraldehyde:** These compounds are bacteriocidal, virucidal, fungicidal and parasiticidal and work well in the presence of organic material. But they need to be used in a well-ventilated area and are dangerous to work with.

**Formaldehyde:** Formaldehyde is a gas but is available as a 37% solution known as formalin. Formaldehyde is often used to fumigate buildings (swine, poultry, veal) by pouring formalin onto potassium permanganate. This is rarely used in sheep premises because of the danger to people. 1 to 5% formalin is sometimes used as a disinfectant but is very irritating and toxic and may be carcinogenic to workers.

**Peracetic Acid:** Is a very strong oxidizing agent and effective against many pathogens including bacterial spores. It is mildly corrosive and should be used with care but doesn’t harm the environment.

**Sodium Hydroxide:** Lye or caustic soda (NaOH) is effective at 2% but caustic to handle. 80 gms of crystal to 1 L of water makes a 2-molar solution which is good for disinfecting equipment if scrapie is a concern. Allow 10-minute contact time and then rinse.

**Combination Products:** There are a number of products on the market that use a combination of chemicals. An example is a product which combines ammonium chloride and sodium hydroxide for killing coccidial oocysts.

**For cold sterilization,** gluteraldehydes, phenols and 70% alcohol (with antirust tablets) can be used. Check with your veterinarian to determine what they use. However, to be effective, the instrument should first be cleaned of organic material and fats and then left in the solution a minimum of 5 minutes. The solution should be changed frequently. Shearing blades, scalpels, and other surgical instruments would come under this.

**References**