## Caprine Arthritis-Encephalitis

**Fact Sheet compiled by:** Andrea Goodnight  
**Sheet completed on:** 15 April 2011; updated 21 July 2013  
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**Susceptible animal groups:** Domestic goats and more common in dairy goat breeds. Domestic sheep may be infected, and non-clinical but possibly carriers.  
**Causative organism:** Caprine arthritis-encephalitis virus (CAEV) is a small ruminant Lentivirus in the family Retroviridae that is related closely to OPP and Maedi-Visna viruses of sheep, and diagnostically difficult to differentiate.  
**Zoonotic potential:** None  
**Distribution:** Worldwide; more prevalent in herds with animals imported from long-established dairy herds. US, Canada, Europe – up to 80% seroprevalence (especially in long-established dairy herds); Southern Africa – “relatively free” of CAE.  
**Incubation period:** Seroconversion occurs in 2-8 weeks, but disease may be clinically latent for years. Once an animal is infected, it remains infected for life.  
**Clinical signs:** Five syndromes:  
- Arthritis – Chronic, goats > 6 mo of age; progressive lameness. Swelling of carpal joints most common and preferentially may affect hocks, stifles, hips, and atlantooccipital joints. Radiographs show soft tissue swelling and periarticular calcification.  
- Leukomyeloencephalitis – Typically kids 1-4 mo of age, but may be seen in adults; ataxia progressing to tetraparesis; blindness, head tilt, facial paralysis, opisthotonos may occur. Clinical course 1-2 weeks. Very poor prognosis for recovery.  
- Interstitial pneumonia – chronic, more common in adults  
- Mastitis – interstitial (“hard udder”), hypogalactia or agalactia around parturition in young does  
- Chronic wasting – poor body condition, rough hair coat  
**Post mortem, gross, or histologic findings:**

### Animal Group(s) Affected

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| Goats        | Vertical      | -Progressive lameness  
-Neurologic signs  
-Interstitial pneumonia  
-Chronic weight loss  
(animals may have one or more forms of the disease) | -Asymptomatic carrier state to chronic debilitating arthritis  
-Rapidly progressing neurologic disease | -Supportive care  
-Analgesics  
-Antibiotics for 2° infections | -Quarantine or cull infected animals  
-Serologic testing of herd every 6 months beginning at 6 months of age | No |

### Transmission Types
- **Vertical**
  - Infected colostrum or milk  
  - Possibly *in utero* or during parturition  
- **Horizontal**
  - Aerosolization  
  - Unsanitary milking practices  
  - Possible venereal transmission

### Disease Severity
- Asymptomatic carrier state to chronic debilitating arthritis  
- Rapidly progressing neurologic disease

### Treatment
- Supportive care  
- Analgesics  
- Antibiotics for 2° infections

### Prevention and Control
- Quarantine or cull infected animals  
- Serologic testing of herd every 6 months beginning at 6 months of age
Arthritis – thickened joint capsule, periarticular mineralization; chronic proliferative synovitis with subsynovial mononuclear infiltrates.

Leukomveloencephalitis – increased protein concentration in CSF with mononuclear pleocytosis. Asymmetrical foci of discoloration in the brain and/or spinal cord. Widespread perivascular infiltration by mononuclear cells. Coagulative necrosis and demyelination of white matter.

Interstitial pneumonia – nodular lymphoid aggregates, proliferation of smooth muscle, massive infiltration of the alveolar walls by lymphoid cells

Mastitis – Inflammatory cell foci within interstitium. Extensive nodular lymphoid proliferation can be observed around the alveolar ducts. In chronic cases, inflammatory cells and connective tissue replace the normal parenchyma.

**Diagnosis:** Clinical signs: CAEV history in herd; Serology (ELISA or AGID); PCR; synovial fluid analysis – red/brown color with low viscosity; increased cell count, with the majority mononuclear cells (lymphocytes); synovial biopsy for histopathology. Positive test results in kids <90 days old usually reflect colostral antibody transfer. However, negative test results do not reliably rule out CAE virus infection, because the time for post-infection seroconversion is variable and occasional goats have a very low titer that may not be detectable. Low antibody titers are common in late pregnancy.

**Material required for laboratory analysis:** ship samples cool, on ice; serum (2 ml); whole blood in EDTA (5 mL)

**Relevant diagnostic laboratories:**
National Veterinary Services Laboratories (NVSL) – ELISA and AGID
1920 Dayton Avenue, Ames, Iowa, 50010, USA
Tel: (515) 337-7266
Email: NVSL_Concerns@aphis.usda.gov
Website: http://www.aphis.usda.gov/animal_health/lab_info_services/diagnos_tests.shtml

Washington Animal Disease Diagnostic Laboratory (WADDL) – cELISA
Bustad Hall Room 155N, Pullman, Washington, 99164, USA
Tel: (509) 335-9696
Email: waddl@vetmed.wsu.edu
Website: http://www.vetmed.wsu.edu/depts_waddl/index.aspx

Colorado State University Veterinary Diagnostic Laboratory – PCR, AGID, cELISA
200 West Lake Street, 1644 Campus Delivery, Fort Collins, Colorado, 80526, USA
Tel: (970) 297-0320
Email: dlab@colostate.edu
Website: http://www.dlab.colostate.edu/webdocs/services/index.htm

**Treatment:** Supportive care with analgesics (NSAIDs); physical therapy; antibiotics and antifungas for secondary infections. Antiviral medications may lessen severity and slow progression of disease but are not routinely used.
Frequent proper foot trimming, soft bedding, good pasture management

**Prevention and control:** Quarantine or cull affected and seropositive animals. Remove kids from affected dams immediately after parturition and feed heat-treated (56°C) colostrum and feed kids pasteurized goat’s milk, milk from CAEV-negative goats, or milk replacer. Caesarean section may help prevent vertical transmission. Chemical disinfection of equipment. Serologic testing of herd recommended every 6 mo, beginning with kids at 6 mo of age.

**Suggested disinfectant for housing facilities:** Phenolic and quaternary ammonium compounds
**CAPRINE ARTHRITIS-ENCEPHALITIS**

**Notification:** Reportable for disease monitoring to the World Organisation for Animal Health (OIE), USDA APHIS, and many state veterinarians.

**Measures required under the Animal Disease Surveillance Plan:** None required

**Measures required for introducing animals to infected animal:** Not recommended

**Conditions for restoring disease-free status after an outbreak:** No seropositive animals remaining in herd after two successive testing periods. Testing performed twice yearly. Hand raise newborn kids on colostrum/milk from unadulterated source.

**Experts who may be consulted:**

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**References**

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