### SPRING VIREMIA OF CARP

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<th>Animal Group(s) Affected</th>
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<td>Fishes, specifically members of the Family Cyprinidae.</td>
<td>Horizontal and most cases occur in the spring or early summer when the water begins to warm but remains below 15°C.</td>
<td>Multiple and varied, including lethargy, pale gills, fecal cast, and branchial hemorrhage.</td>
<td>Mortality with SVCv in carp may reach 100% but is frequently much less.</td>
<td>None</td>
<td>Strict biosecurity and quarantine protocols should be followed based on information available through the OIE and USDA. A DNA vaccine has potential as a method of prevention and control.</td>
<td>No</td>
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**Fact Sheet Reviewed by:** Denise Petty, Stephen A. Smith

**Susceptible animal groups:** Fishes of the family Cyprinidae. Some notable examples include: carp/koi (*Cyprinus carpio*), golden orfe (*Leuciscus idus*), goldfish (*Carassius auratus*), and tench (*Tinca tinca*).

**Causative organism:** Spring Viremia of Carp Virus (SVCv); *Rhabdovirus carpio*

**Zoonotic potential:** None

**Distribution:** Global, especially in temperate geographical areas.

**Incubation period:** Varies depending on water temperature. Latent infections can likely persist for months or even years. Arthropods such as the fish louse (*Argulus sp.*) are likely vectors.

**Clinical signs:** Infected fish may present with a variety of clinical signs including, but not limited to, abdominal distention, exophthalmia, lethargy, pale gills, darkening of the body surface, fecal casts, skin and branchial hemorrhage, and distension or protrusion of the vent.

**Post mortem, gross, or histologic findings:** On necropsy, affected fish may have generalized edema which may be sanguineous, organ hemorrhage, intestinal inflammation, and the gastrointestinal tract may contain mucus and no ingesta. Histopathologic examination may reveal multifocal necrosis in liver and pancreas, pericarditis, and renal tubular degeneration.

**Diagnosis:** Diagnosis is usually made with viral isolation from spleen and/or caudal kidney and/or serum antibody titers and confirmed with virus neutralization. It is important to note that SVCv infected fish also may present opportunistic Gram-negative bacterial infections.

**Material required for laboratory analysis:** A minimum of 10 moribund fish or 10 fish exhibiting clinical signs of SVCv must be collected. Fish should be sent live to the laboratory or sacrificed and packed separately in sealed aseptic refrigerated containers or on ice. Depending on the size of fish, whole fish (body length 0-4 cm) or the entire viscera including kidney and encephalon (body length 4-6 cm) should be collected. If the fish is larger, liver, kidney, spleen and encephalon should be collected aseptically. Samples should be combined to form pools of a maximum of five fish per pool that should not exceed 1.5g. Tissues should be placed in sterile vials and stored at 4°C until virus extraction is performed at the laboratory which is recommended to begin...
within 24 hours of sample collection. For detecting asymptomatic carriers, tissue samples of kidney, spleen, gill and encephalon should be collected. Depending on the population size, fish collection must encompass a statistically significant number of specimens. The sampling should be designed in order to enable detection, at a 95% confidence level, of infected animals. Ultrafiltration using large volumes of water can be used to concentrate and isolate the virus.

### Relevant diagnostic laboratories:
Various approved state and federal laboratories. Information is available through the USDA web site.

### Treatment:
None.

### Prevention and control:
Facilities holding and importing high risk cyprinid fishes should be diligent in following standard quarantine protocols and adhere to appropriate and periodic screening as prescribed by the OIE and USDA. A DNA vaccine utilizing the SVCV glycoprotein gene has proved promising in challenge trials using koi.

### Suggested disinfectant for housing facilities:
The disinfection protocol depends on the size, type and nature of the materials and sites to be disinfected. When an active outbreak of SVCv has occurred, the infected stocks should be depopulated and all areas that held the infected fish must be disinfected. The virus may be inactivated by formalin, ozone, sodium hypochlorite, organic iodophors, gamma and ultraviolet radiation, pH extremes of < 4.0 or > 10.00, and heating at 60°C for 15 minutes. All equipment and tanks, raceways and ponds should be disinfected. The USDA APHIS also recommends if surface water – rather than municipal water source - is used as incoming water to the farms that it be treated with sand filtration and UV.

### Notification:
All suspect cases should be necropsied and the United States Department of Agriculture (USDA) contacted for proper routing of diagnostic samples. Confirmed cases must be reported to the USDA and state veterinarian.

### Measures required under the Animal Disease Surveillance Plan:
Once an infection is reported, a facility has to follow the recommendations described in the International Aquatic Animal Health Code and the Diagnostic Manual for Aquatic Animal Diseases by OIE to be declared free of SVCv. In the United States, the USDA recommendations must be followed.

### Measures required for introducing animals to infected animal:
Not applicable.

### Conditions for restoring disease-free status after an outbreak:
See the OIE web site for most current information. Facilities must be disease free for at least 2 years before disease-free status can be granted. Periodic testing with negative results is required to maintain this status.

### Experts who may be consulted:
A complete summary of the disease and diagnostic procedures are available through the Office International des Epizooties (OIE) (http://www.oie.int/).

### References: