The Role of Wildlife Rehabilitation as Sentinels for One Health Issues at the Wildlife and Public Health Interface:

Reports of *Taenia crassiceps* Cysticercosis in Woodchucks (*Marmota monax*) and Squirrels (*Sciurus carolinensis*) in Maryland and Virginia

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WCV Call of the Wild Conference – 13 November 2011
The One Health Initiative

“A One Health approach aims to promote and implement meaningful collaboration and communication between veterinary medicine, human medicine, wildlife management, and multiple allied disciplines working locally, nationally, and globally to attain optimal health for people, animals, and our shared environment.”

American Association of Wildlife Veterinarians
Wildlife Rehabilitation – why?

- Extinction of experience (with the natural world)
- Human impact on wildlife
- Societal expectations
- Public education
  - Natural history and natural resources
  - Zoonotic disease and public health risks
- Partnership between veterinarians, public health, wildlife biologists, and wildlife rehabilitators
- Government and public policy
## Second Chance Wildlife Center (SCWC) Rehabilitation Case Database

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Woodchuck – subcutaneous mass

12-14 cm mass extending length of femur to proximal metatarsus
Woodchuck – Gross pathology
Woodchuck – Histopathology

*Taenia crassiceps* cystercerosis

- Multiple cysticerci in a lymph node
- Invaginated protoscolex (arrow) and posterior bladder (asterisk)
- Two rows of rostellar hooklets
- Muscular anterior sucker
Eastern Gray Squirrel
SQ & Abdominal Gross Pathology

Abdominal distention and multiple pendulous masses (6-8 cm) along ventrum and forelimbs containing multilocular cysts
Squirrel – Histopathology

*Taenia crassiceps* cystercercosis

- Multiple cystercerci in SQ tissue
- Rostellar hooklets and anterior sucker
- Invaginated protoscolex (arrow) and posterior bladder (asterisk)
Severe abdominal distention with displacement of visceral organs by ‘homogenously dense’ space occupying mass on radiograph
Severe, diffuse infiltration in abdominal cavity of multiple larval cystic masses often coalesced and adhered to visceral organs and mesentery; Pulmonary edema in thoracic cavity
Tapeworm Lifecycles

**Taenia spp.**

1. Eggs or gravid proglottids in feces and passed into environment
2. Embryonated eggs and/or gravid proglottids ingested by pigs
3. Oncospheres hatch, penetrate intestinal wall, and circulate to musculature
4. Humans infected by ingesting raw or undercooked infected meat
5. Oncospheres develop into cysticerci in pig muscle
6. Cysticerci may develop in any organ, being more common in subcutaneous tissues as well as in the brain and eyes
7. Embryonated eggs ingested by human host
8. Adults in small intestine
9. Embryonated eggs develop into cysticerci in pig muscle

**Echinococcus spp.**

1. Ingestion of eggs (in feces)
2. Embryonated egg in feces
3. Hydatid cyst in liver, lungs, etc.
4. Intermediate Host (sheep, goats, swine, etc.)
5. Scolex attaches to intestine
6. Adult in small intestine
7. Scolex attaches to intestine
8. Ingestion of cysts (in organs)
9. Definitive Host (dogs & other canids)

Additional notes:
- Oncosphere hatches; penetrates intestinal wall
- Eggs or gravid proglottids in feces and passed into environment
- Eggs or gravid proglottids in feces and passed into environment
Human infection – *Taenia crassiceps*

- First reported in N.A. (Canada) 1970s
- Intermediate host
- Intraocular infections
- Subcutaneous and intramuscular tissues
- Domestic animals (dogs) common source

Conclusions

Wildlife rehabilitation

- Provides public service for injured wildlife
- Acts as safeguard at the human–animal interface
- Serves as a sentinel for “one health” / zoonotic diseases

Tapeworm infection life cycle exemplifies the human-wildlife-domestic animal interface for zoonotic disease transmission…. continual reports worldwide.

Important to include wildlife rehabilitation as a partner in “one health” efforts to protect animal and public health.
Thank you!

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