Managing Strangles in the Canadian harness racing industry

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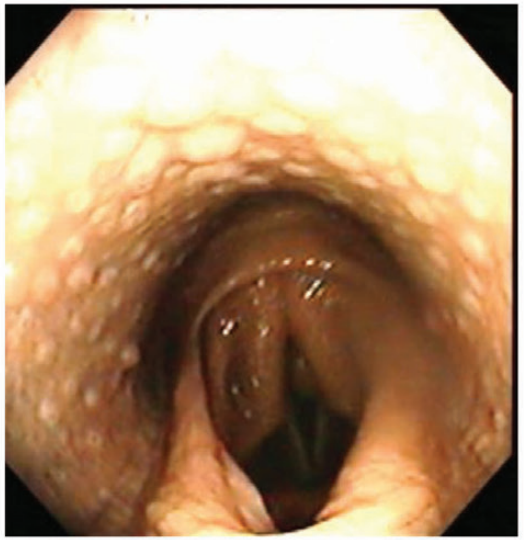
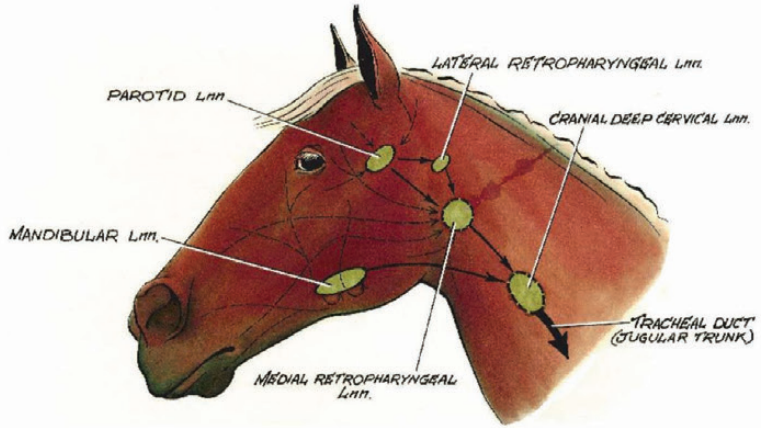
What we will cover

- Brief overview of Strangles
- Strangles situation overview
- Diagnostic testing
- Testing at Red Shores and in Ontario
- The Red Shores Solution
- Managing an outbreak
- What we learned

What is Strangles?





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- Strangles is a respiratory disease of horses caused by the bacterium *Streptococcus equi* subsp. *equi. (S. equi)*
- It is spread by nose-to-nose contact (direct) or by contact with contaminated things and people (indirect).
- It gains entry to the horse through the nose and travels to the pharynx.
- It enters the tonsillar tissue at the back of the throat and travels to the lymph nodes where it replicates and develops an abscess.
- Fever develops during this time of replication in the lymph node.

Clinical signs

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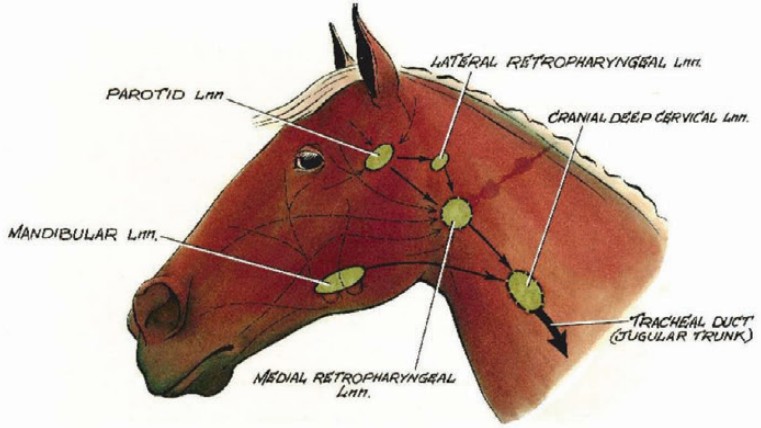

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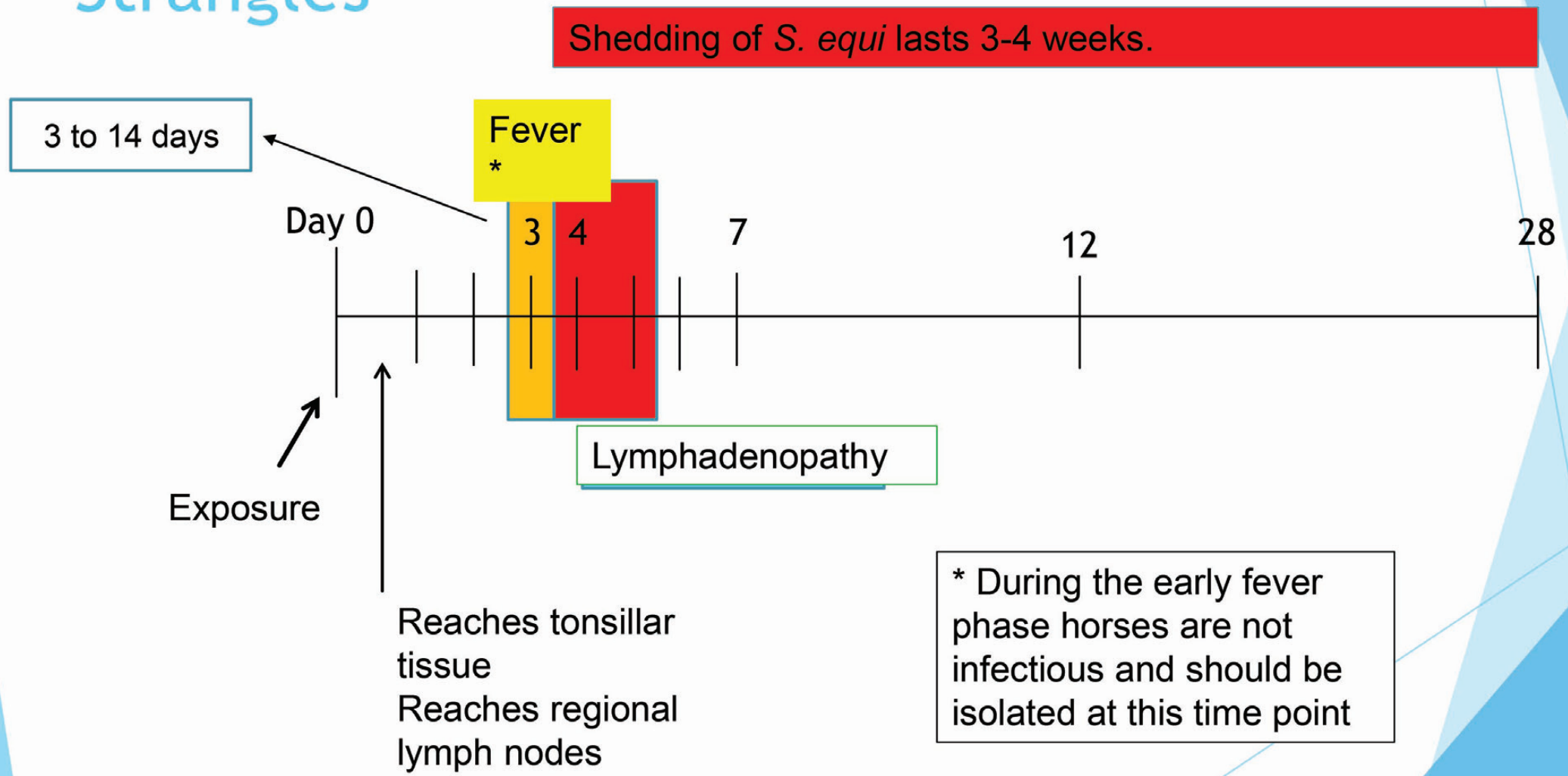
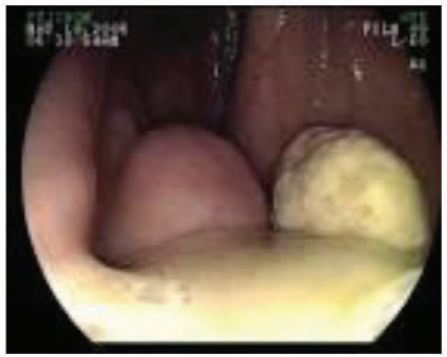
- Fever (>101.5°F or >38.5°C)
- +/- nasal discharge (this may be the only sign)
- Depression
- Difficulty swallowing
- Swollen and painful lymph nodes
  - Submandibular (under the jaw)
  - Retropharyngeal (throatlatch)
  - Parotid (behind the eye)

Disease Timeline of a typical case of Strangles





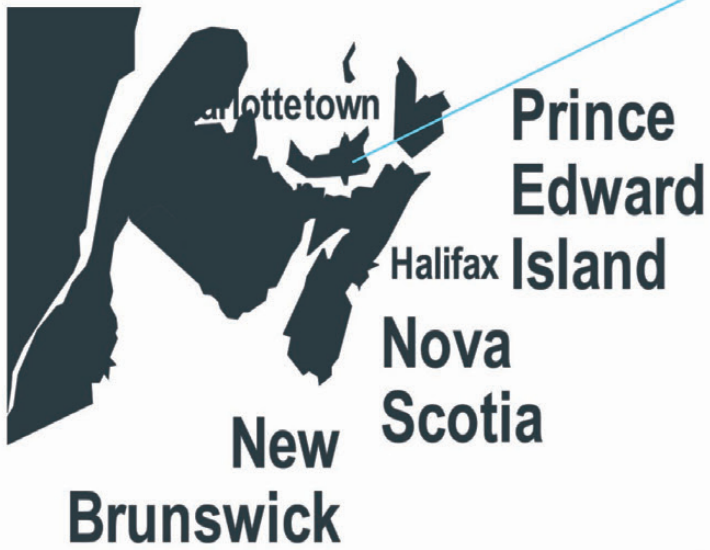
Recovery & Carriers

- Most horses recover from clinical signs in 2 to 4 weeks, but may shed bacteria for several weeks thereafter.
- After infection most horses have immunity for several years.

The Carrier State

- Approximately <10% of horses who recover from Strangles "carry" *S. equi* in their guttural pouches (sometimes in the sinuses) with the potential to shed the bacterium and to infect other horses.
- Carriers do not show clinical signs of Strangles.
- Carriers can shed the organism intermittently for months to years.
- Only need ONE susceptible horse to come in contact with a carrier to start an outbreak.
- Detecting shedders and carriers is usually done by performing a polymerase chain reaction (PCR) test looking for bacterial DNA.
- When a "carrier" is identified, the guttural pouches should be evaluated by endoscopy, chondroids removed if present, and the pouches flushed and infused with penicillin/gelatin once a week for three weeks.

Strangles in Standardbred racing overview



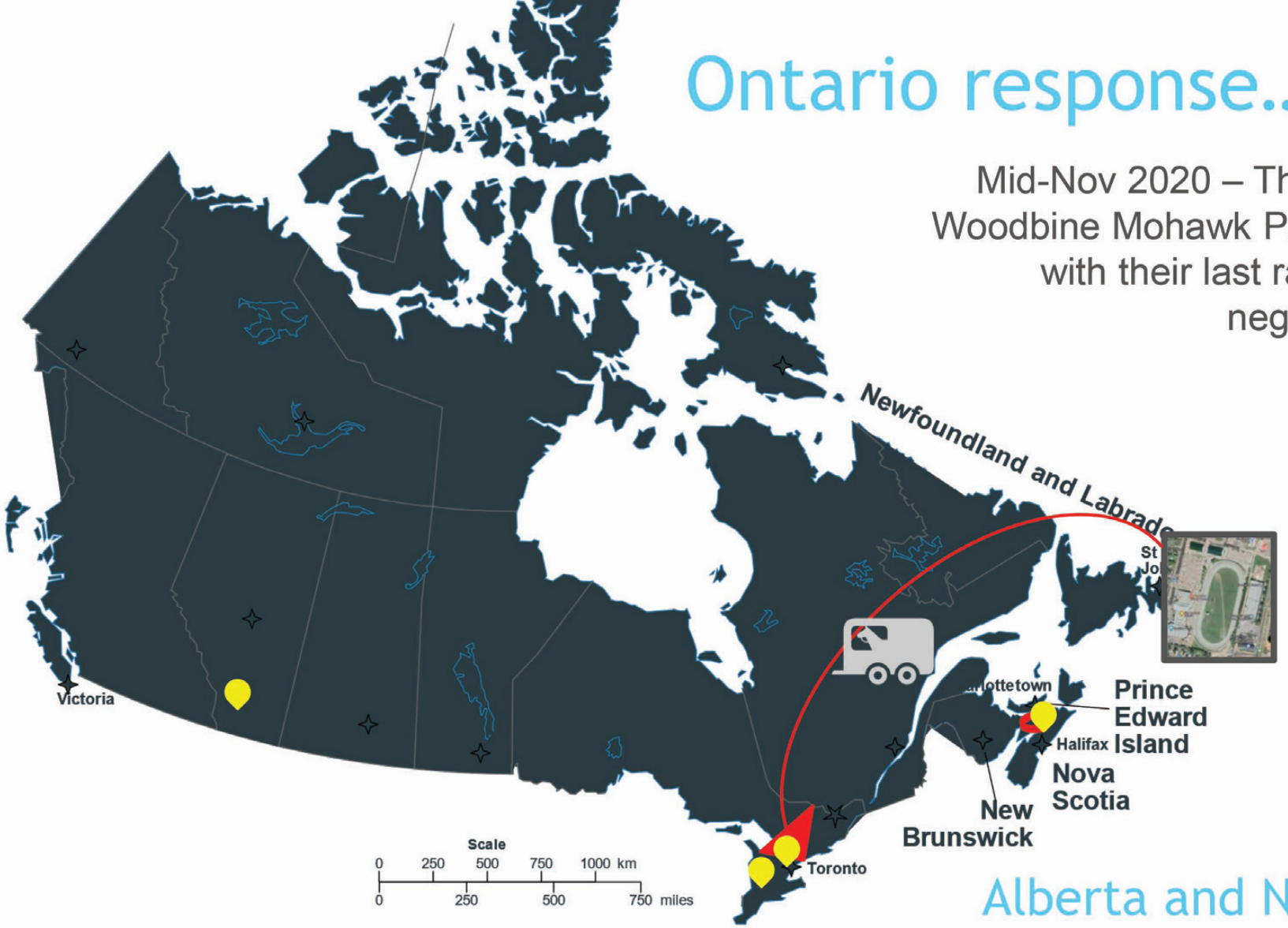
Late Oct 2020 –A yearling arrived at at Red Shores Racetrack P.E.I

Nov 6, 2020 –The yearling showed clinical signs of Strangles and culture test positive.

Nov 2020 – Other racehorses in the index barn tested positive for *S. equi* but no other clinical cases of Strangles were reported until late December.

Feb 15, 2021– a horse in the adjacent barn to the index barn showed clinical signs of Strangles and was culture positive on testing.

Ontario response……



Mid-Nov 2020 – The Raceway at Western Fair and Woodbine Mohawk Park required testing of all horses with their last race in the Maritimes to have two negative *S. equi* tests 1 week apart.

Several horses were tested on arrival and a few were PCR positive *for S. equi*.

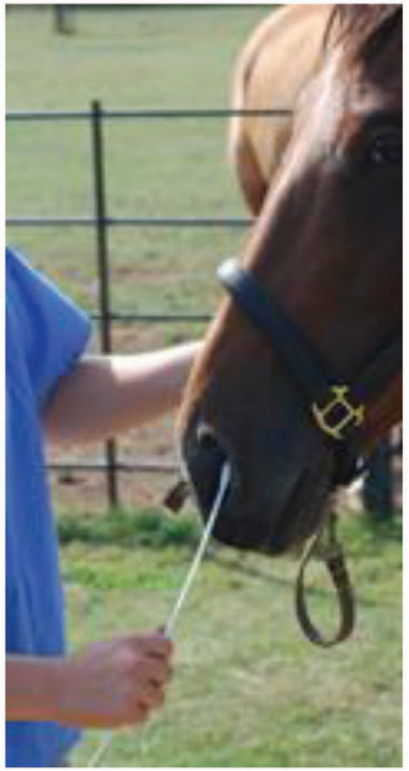
Other horses already at the facilities were tested for PCR and several were PCR test positive for. *S. equi*

None of these PCR positive horses had clinical signs of Strangles.

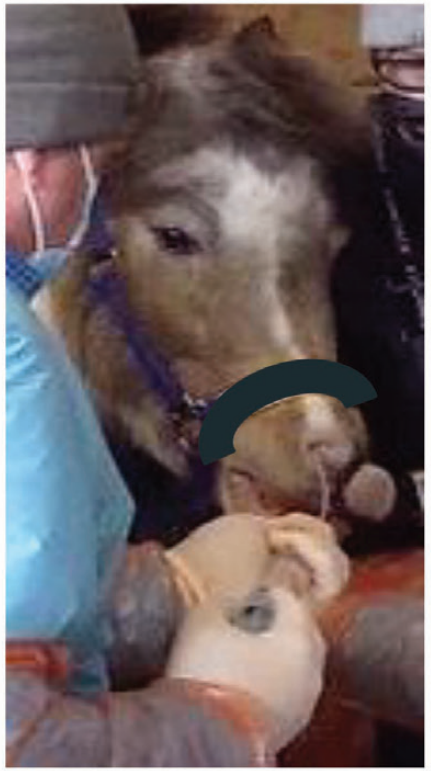
Alberta and Nova Scotia response….

Feb 25/26 – Century Casino (Calgary) and Truro Raceway implemented testing requirements.

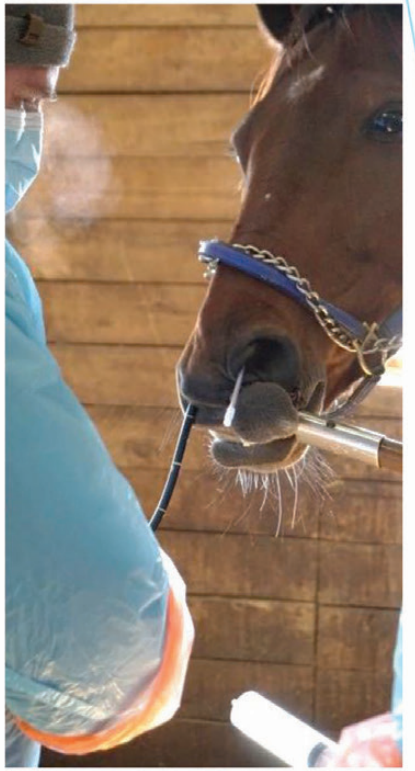
Nasal swab



Pharyngeal swab

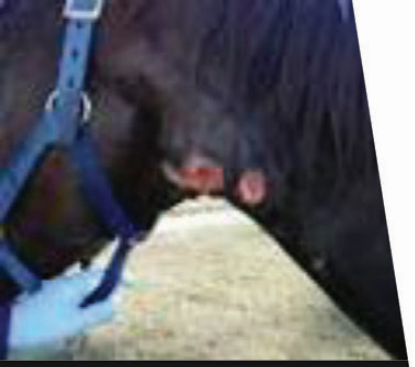


Pharyngeal wash



Guttural pouch sampling

S. equi detection – Sample Type



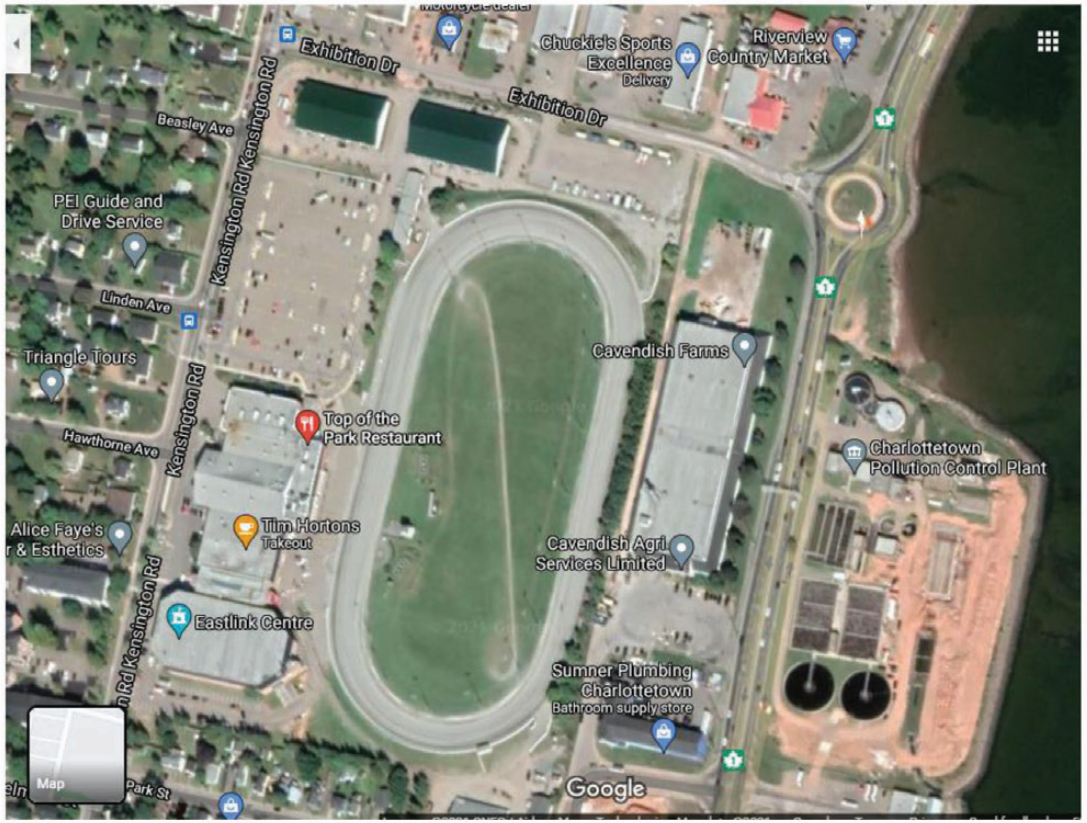
Diagnosing Strangles=
Clinical signs + Detection of *S. equi*

- *S. equi* can be detected by either bacterial culture of the draining pus or nasal fluids and/or by Polymerase Chain Reaction (PCR) testing of nasal swabs or fluids.
- **Bacterial Culture**
  - The sample is transferred to a "plate" of culture medium that allows specific bacteria to grow. When a colony is seen then a sample of the culture is put through a machine and identified. The process takes 2-4 working days.
    - **Pros** – identifies living *S. equi* (and therefore infectious)
    - **Cons** – takes longer for a result; may not detect low levels of bacteria in horses without clinical signs of Strangles (i.e. carriers)

Diagnosing Strangles= Clinical signs + Detection of *S. equi*

- **Polymerase Chain Reaction (PCR)**
  - The sample is put through a machine that detects *S. equi* DNA in the sample.
  - A number called the cycle threshold (Ct) is provided with the result and is an indication of the amount of bacterial DNA in the sample. It refers to the number of cycles the sample has to pass through the machine for DNA to be detected. The higher the Ct value the lower the amount of bacterial DNA.
    - **Pros** – fast (24 hour turnaround); can detect very low levels of *S. equi* DNA
    - **Cons** – it detects DNA only (dead as well as live *S. equi*)

Back at Red Shores…..



- March - Screened all horses residing at Red Shores with a PCR test on nasopharyngeal wash
- 34/172 (20%) horses tested positive for *S. equi* by PCR
- None of the horses showed any clinical signs of Strangles
- Most were “weak positive” on PCR

Testing at Red Shores and in Ontario

- Samples that grew *S. equi* in culture and also had PCR testing done tended to have Ct values of less than 35.
- Samples that were PCR “weak” positive (Ct value >35) were typically culture negative.
- For the 34 horses screened positive at Red Shores and for all the horses PCR tested in Ontario that were positive .
  - None showed any clinical signs of Strangles.
  - All were PCR positive and culture negative.
  - The majority of PCR positives were 35 and greater.
- Horses which were PCR “weak” positive (Ct value >35), were generally negative on follow-up testing.

The Red Shores Solution

- Although the PCR test is very sensitive for picking up *S. equi* DNA, it has a false positivity rate of ~20% when used in clinically normal horses with no known direct exposure to a case of Strangles
- Red Shores had 34 PCR positive horses from 172 clinically normal horses from barns with no history of clinical cases.
- To demonstrate that PCR positive horses were a low risk to infecting other horses, culture tests were performed on 2 nasopharyngeal washes collected a week apart for horses with a PCR Ct value >35.
- For PCR positive horses with a Ct value <35, owners needed to retest and reach that Ct value of 35 or greater before culture testing.
- For new horses arriving at the track, the horses had to be clinically healthy with no known exposure to a clinical case of Strangles in the last 2 months. Two negative culture tests for *S. equi* a week apart were required and

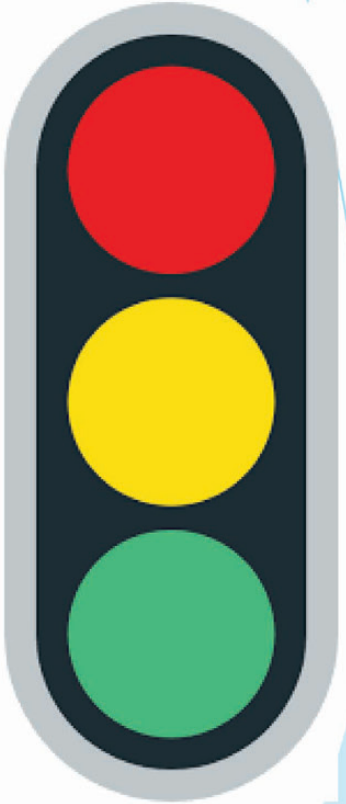
How do we manage a typical Strangles outbreak?

- IDENTIFY and ISOLATE horses with clinical signs of Strangles. They should be removed from the barn and put in isolation either in an empty barn or at a separate property, if possible.
- Stall maps can help identify horses at risk.
- The remaining horses are monitored for 14 days for clinical signs of Strangles.
- HORSES WITH FEVERS SHOULD BE CONSIDERED INFECTIOUS UNTIL PROVEN OTHERWISE and ISOLATED when possible.
- RESTRICT MOVEMENT of people and things between infected horses and the others on the property.

Managing an Outbreak

- Step 1 … Detect
- Step 2 … Segregate
- Step 3 … Treat

- 3 groups of horses:
  - **RED** Infected
  - **YELLOW** Exposed but not infected (incubating ?)
  - **GREEN** Not exposed (clean?)
  - (coloured electrical tape on halters can help identify groups)



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Protocol

- **YELLOW** and **GREEN**
  - Take and RECORD rectal temperatures 2x day (8 hours apart min)
  - Monitor for nasal discharge and swollen lymph nodes
  - Move to **RED** if temperature is increased or clinical signs are present
- Do not share equipment, buckets, etc. among groups (use colored electrical tape to identify)
  - Clean & disinfect daily (wheelbarrow wheels, fork/shovel handles and ends)
- Dedicated personnel for each zone
  - If that's not possible work (feed, muck, jog) from **green** to **yellow** to **red**
  - Change clothing – dedicated coveralls and boots for different zones
  - Footbaths (remove manure first) and good hand hygiene

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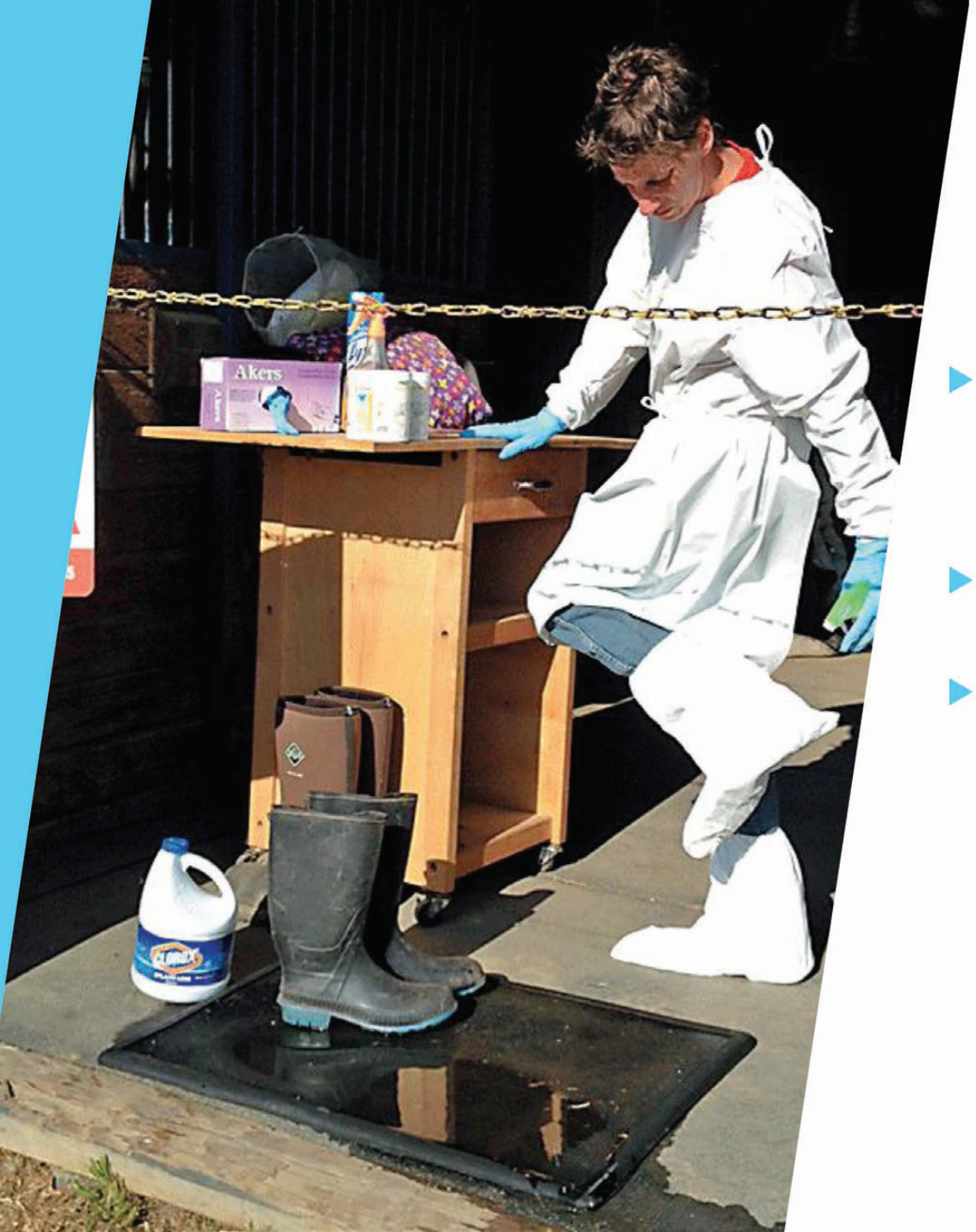

Releasing horses from isolation

- After horses have recovered from Strangles, they are tested 3-4 weeks after resolution of signs to ensure they haven't become "carriers".
- *S. equi* testing is typically done by PCR with or without culture.
- Two to three tests are taken a week apart to say the horse is negative (unless a guttural pouch sample is taken).

Environmental persistence

- 1-4 days on surfaces and soil exposed to UV light
- A recent study* showed *S. equi* survives well in wet (humid) and cold conditions
  - Several weeks in a water bucket in the cold
  - 3 weeks on the rubber sole of a shoe
  - 2 weeks on indoor wood
- Rest paddocks housing infected horses

* Durham et al. EVJ, 2018

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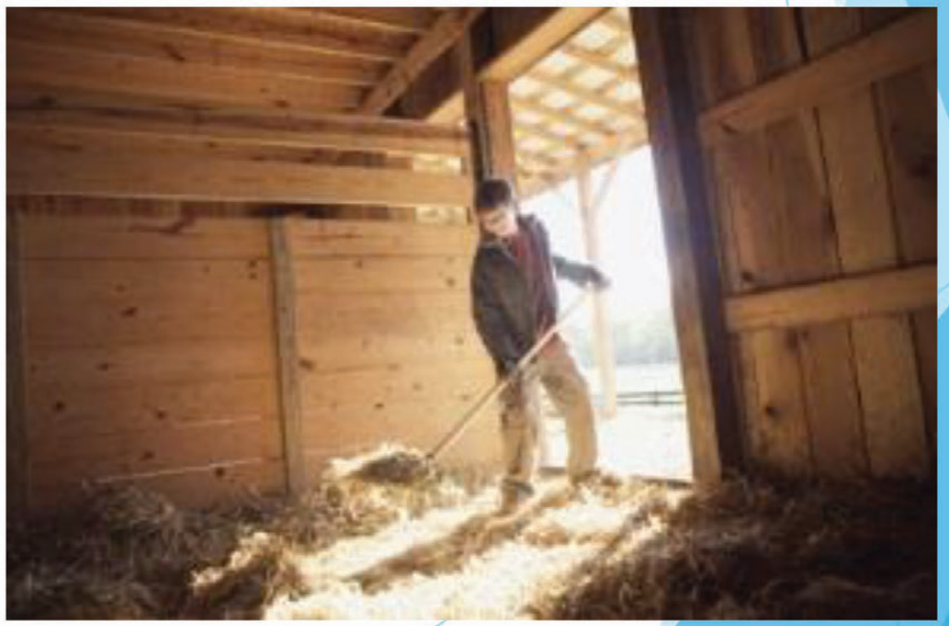
Biosecurity: Cleaning and Disinfection

- Remove organic debris
  - Preferred manually (scrubbing) or foaming agents with detergent
  - Rinse and allow to dry
  - Then apply liquid disinfectant



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Disinfectants

- Bleach (inactivated by organic debris e.g., manure, urine)
- Virkon S (potassium peroxymonosulfate)
- Prevail (accelerated hydrogen peroxide (AHP))

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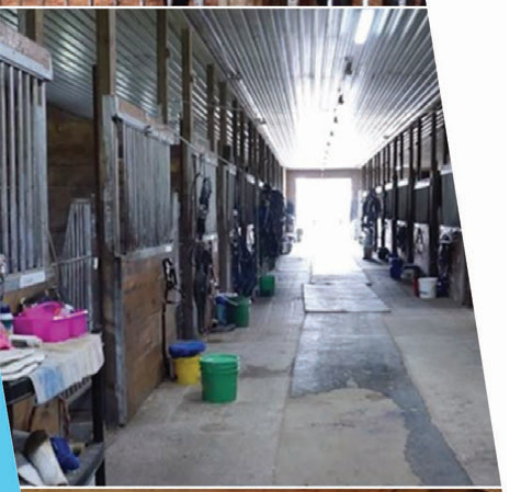

Prevention of Strangles: Quarantine/Separate new arrivals

- Quarantine new arrivals for 2 weeks
  - Challenging
  - Put in separate barn at facility
  - Or treat as a “yellow” group and treat as “infected” until the 2 weeks are up
    (feed, muck, jog last, and no nose-to-nose contact)
- Screen all new arrivals for risk of exposure and consider testing
  - Ask questions – is it from a high-risk group or area?

Risk of Strangles – which populations pose the greatest risk?

- Horses coming from outside the racing industry.
  - Horses bought at sales barns (companion animals).
  - Horses coming from a boarding stable / lay up farm.
- Horses who have not raced for a while.
- Young unraced horses.
- Horses coming from facilities with a previous history of Strangles.
- The most recent clinical cases of Strangles in Ontario harness racing have been horses that have shipped from Indiana and Ohio.
- Strangles is endemic everywhere including Ontario, Alberta, Manitoba, Quebec and the Maritimes. It can be managed but not eradicated from the racing population.

Vaccination

- Modified-**live bacterial intranasal** vaccine
- Administered only to healthy, non-febrile horses
  - 2 vaccines 2-3 weeks apart then annually
  - Not for horses < 1 year of age
  - **Do not vaccinate**
    - in the face of an outbreak
    - within 1 year of having strangles
      - test using SeM ELISA (antibody test) before vaccinating
      - Risk of an immune mediated disease if the antibody levels are high and the horse is vaccinated
- Decrease severity of disease and duration of bacterial shedding
- Do not vaccinate prior to having any injections performed by your veterinarian (including joint injections) if you can avoid it
- Rarely horses can develop signs similar to Strangles (e.g., fever, lymph node swelling)
- Horses that are vaccinated may test positive for *S. equi* for 30 days.

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Communication

- Communication is very important – between veterinarians, trainers, owners, shippers, tracks, and regulators. Those disseminating public communication pieces should be familiar with “case definitions”.
  - A horse with Strangles is not the same as a horse that has tested positive for *S. equi*
  - Strangles is a disease with clinical signs present
- Testing should always be accompanied by a plan. How will the results be used, what will the results mean and how will they be communicated to the industry?
- Equine Disease Communication Centre (equinediseasecc.org) / Canadian Animal Health Surveillance System (CAHSS.ca)

What we've learned

- Either PCR testing or culture can be used to identify *S. equi* in horses with clinical signs compatible with Strangles. These horses should be isolated from the other horses
- For other horses with risk of exposure (e.g., in the same barn or at the end of the shed row), they should be monitored for clinical signs of Strangles for 14 days.
- When PCR testing is applied randomly to a group of likely unexposed normal horses there appears to be a significant rate of false-positives
- Always have a plan before you test.
- Biosecurity remains a key part of limiting exposure.
- Communication is an important tool for outbreak control and industry trust.

Questions?