Miller, Michele A., et al. "Outbreak of Mycobacterium tuberculosis in a herd of captive Asian elephants (Elephas maximus): Antemortem diagnosis, treatment, and lessons learned." *Journal of Zoo and Wildlife Medicine* 49.3 (2018): 748-754.

Abstract: **Tuberculosis (TB) was diagnosed in four Asian elephants (*Elephas maximus*) in a zoo in the United States.** The first case was detected by **isolation of *Mycobacterium tuberculosis* during routine trunk wash (TW) culture** testing of a herd of eight elephants. Retrospective antibody analyses revealed **seroconversion 1 yr before** diagnosis. Serological testing of the whole elephant herd identified **two additional suspect bulls with detectable antibody, but which remained culture-negative** and had no clinical signs of disease. In the **following months, *M. tuberculosis*, identical to the isolate from the index case, was isolated from TW samples of these two** elephants. **A fourth elephant seroconverted nearly 4 yr after the first TB case was detected, and *M. tuberculosis* was isolated from a TW sample collected 1 mo later. All four infected elephants received anti-TB therapy. Two treated elephants were eventually euthanized for reasons unrelated to *M. tuberculosis* and found to be culture-negative on necropsy, although one of them had PCR-positive lung lesions. One infected animal had to be euthanized due to development of a drug-resistant strain of *M. tuberculosis***; this animal did not undergo postmortem examination due to risk of staff exposure. **The fourth animal is currently on treatment.** Serial serological and culture results of the other four herd mates have remained negative.

* Question:
  + Which of the following is true about antemortem diagnosis and treatment of Myobacterium tuberculosis in captive Asian elephants (Elephas maximus)?
    1. PCR of tracheal wash is the gold standard for antemortem diagnosis.
    2. Tracheal wash culture is highly sensitive and specific.
    3. Seropositive elephants are strong suspects for infection.
    4. Negative tracheal wash culture can be used to confirm treatment success.
    5. Single antibiotic protocols are recommended to minimize resistance.
* Ans: C

Rivas, Anne E., et al. "Diagnosis and management of mycobacteriosis in a colony of little penguins (Eudyptula minor)." *Journal of Zoo and Wildlife Medicine* 50.2 (2019): 427-436.

Abstract: A group of zoo-housed little penguins (*Eudyptula minor*) was diagnosed with mycobacteriosis. **While undergoing multidetector computed tomography (MDCT) imaging for an unrelated research project, pulmonary lesions were detected in multiple individuals.** In general, birds appeared healthy and free of outward signs of disease. **After the loss of three individuals, polyclonal mycobacterial disease due to *Mycobacterium avium-intracellulare* complex was confirmed. Surviving birds were treated with rifampin (45 mg/kg), ethambutol (30 mg/kg), clarithromycin (10 mg/kg), and enrofloxacin (30 mg/kg) compounded into a single capsule administered once a day in food. After 3 mo of therapy, MDCT imaging documented a decrease in nodule size** and number in all remaining birds, with further improvement documented after 13 mo of treatment. MDCT imaging was invaluable for diagnosing disease, documenting disease progression over time, and assessing response to therapy. Early initiation of therapy before the development of outward signs of disease led to resolution of mycobacterial pulmonary lesions in multiple penguins. Mycobacterial disease in this group of little penguins, as well as previously published reports, suggests that the species is at increased risk for developing mycobacteriosis.

* Question: Name three *Mycobacterium spp* frequently implicated in zoological avian collections.
* Ans: *M. avium sub avium, M. avium sub intracellulare, M. genavense.*

**Retrospective evaluation of clinical signs and gross pathologic findings in birds infected with Mycobacterium genavense**

Anna Schmitz, Monika Rinder, Susanne Thiel Andrea Peschel, Kristina Moser, Sven Reese, and Rüdiger Korbel

*J Avian Med Surg.* 2018;32(3):194-204.

**Practice questions**

In a review of *M genavense* infection in birds, what was the most common gross finding on necropsy of passerines?

1. Hepatomegaly
2. Granulomas
3. Air sacculitis
4. Retained follicles
5. No significant findings

Answer: E

Which species of *Mycobacterium* has been associated with severe palpebral swelling and chemosis from subconjunctival granulomas in psittacines?

1. *M avium* subsp. *avium*
2. *M bovis*
3. *M avium* subsp. *paratuberculosis*
4. *M genavense*
5. *M intracellulare*

Answer: D

**Mycobacteriosis in captive psittacines: A brief review and case series in common companion species (Eclectus roratus, Amazona oratrix, and Pionites melanocephala)**

McRee, Anna Elizabeth, Higbie, Christine T., Nevarez, Javier G., Rademacher, Nathalie T., and Tully, Thomas N.

*Journal of Zoo and Wildlife Medicine* 2017;48(3): 851-858.

**Practice question:**

What is the gold standard for antemortem diagnosis of mycobacteriosis in psittacines?

1. Fecal acid-fast stain
2. Blood culture
3. Hepatic granulomas on CT
4. Tissue biopsy for PCR
5. Intradermal tuberculin test

Answer: D

**MYCOBACTERIUM BOVIS IN FREE-RANGING LIONS (*PANTHERA LEO*) - EVALUATION OF SEROLOGICAL AND TUBERCULIN SKIN TESTS FOR DETECTION OF INFECTION AND DISEASE**

Michele A. Miller, Peter Buss, Tashnica Taime Sylvester, Konstantin P. Lyashchenko, Lin-Mari deKlerk-Lorist, Roy Bengis, Markus Hofmeyr, Jennifer Hofmeyr, Nomkhosi Mathebula, Guy Hausler, Paul van Helden, Eliza Stout, Sven D.C. Parsons, Francisco Olea-Popelka

J. of Zoo and Wildlife Medicine, 50(1):7-15 (2019)

**PERFORMANCE OF THE TUBERCULIN SKIN TEST IN *MYCOBACTERIUM BOVIS*–EXPOSED AND –UNEXPOSED AFRICAN LIONS (*PANTHERA LEO*)**

[Ignatius M. Viljoen](https://bioone-org.lp.hscl.ufl.edu/search?author=Ignatius_M._Viljoen), [Tashnica Taime Sylvester](https://bioone-org.lp.hscl.ufl.edu/search?author=Tashnica_Taime_Sylvester), [Sven D. C. Parsons](https://bioone-org.lp.hscl.ufl.edu/search?author=Sven_D._C._Parsons), [Robert P. Millar](https://bioone-org.lp.hscl.ufl.edu/search?author=Robert_P._Millar), P[aul D. van Helden](https://bioone-org.lp.hscl.ufl.edu/search?author=Paul_D._van_Helden), [Michele A. Miller](https://bioone-org.lp.hscl.ufl.edu/search?author=Michele_A._Miller)

JWD 55(3), 2019

**Which of the following is true regarding *Mycobacterium bovis* testing in free-raging lions in South Africa?**

1. **STAT-PAK and DPP have a very high test specificity**
2. A single intradermal Tb test is sufficient to declare an African lion free of *M. bovis*
3. Nontuberculin mycobacteria causes positive results on DPP VetTB
4. African lions are asymptomatic and do not need to be tested for *M. bovis*
5. Culture positive animals do not typically show signs of disease on necropsy

Mycobacterial infections are most commonly reported in which species of elephant? Which species of mycobacterium is most frequently reported?

Answer:

Asian elephant (Elephas maximus)

Mycobacterium tuberculosis

Based on a recent study evaluating Mycobacterium bovis in banded mongooses (Mungos mungo), which of the following is true?

A. Acid fast staining on granulomatous lesions post-mortem has a high sensitivity for M. bovis

B. Aerosol is the most likely mode of transmission of M. bovis in mongoose

C. Baboons are the maintenance host of M. bovis in South Africa

D. Percutaneous infection is the most common clinical presentation of M. bbovis in mongoose

E. Serological assays were highly specific for M. bovis infection

Answer: B

Questions:

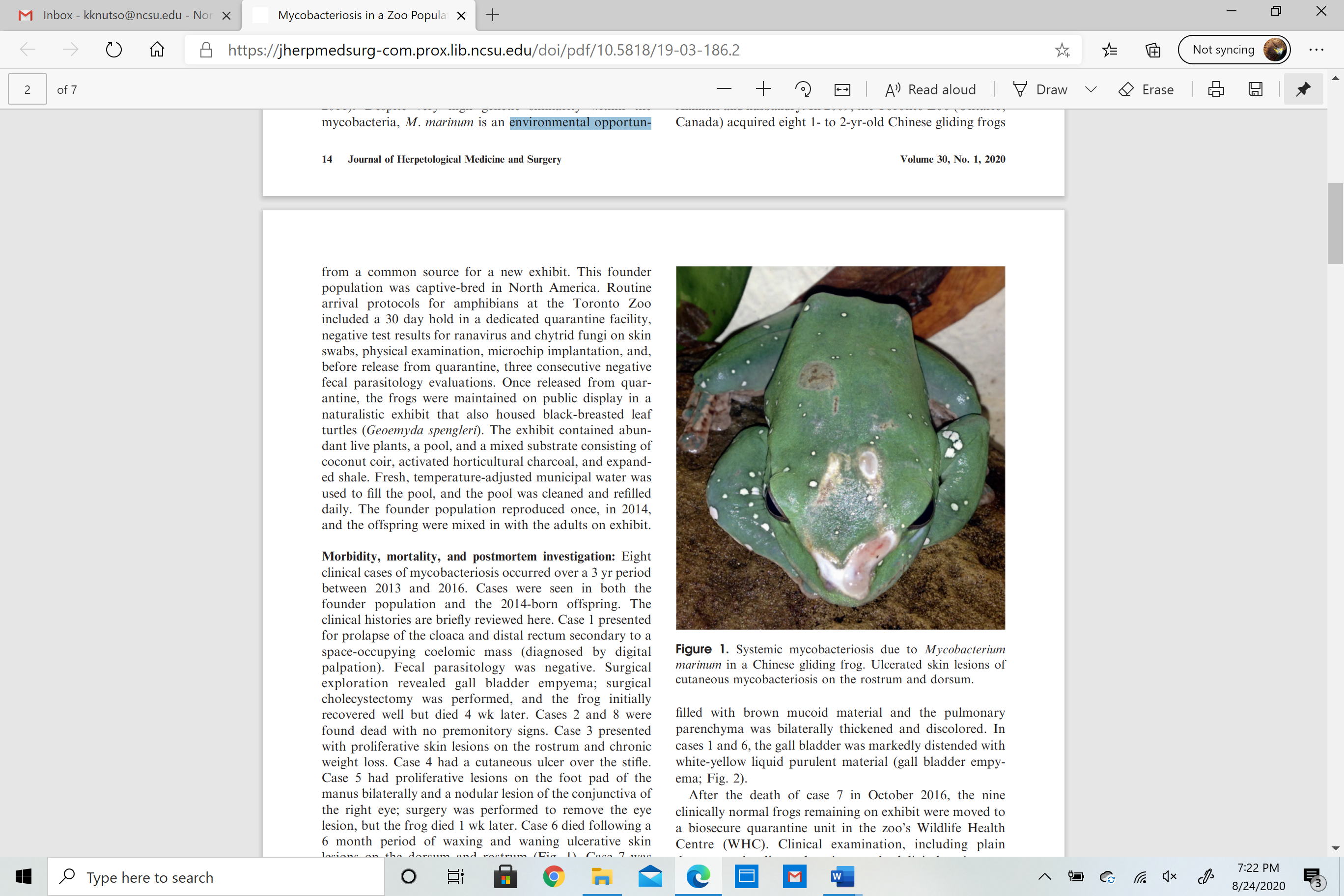
1. Describe the recommended surveillance testing in pinnipeds to rule out mycobacterial disease.

Answer:

Recommended combination of mycobacterial surveillance tests in pinnipeds:

* 2+ tracheobronchial lavages (for AFB, M-TB PCR, and mycobacteria culture)
* 2+ DPP Vet-TB tests, taken at least 8 wk apart
* 1+ CT scan

1. You are evaluating a Chinese Gliding Frogs (*Rhacophorus dennysi*) for ulcerative skin lesions. You take an impression cytology of the skin lesions for acid-fast staining (see below). What is the most likely etiologic agent? What diagnostic test could you perform to confirm your suspicions?



Answer:

*Mycobacterium marinum*

Mycobacterial culture and speciation or PCR