

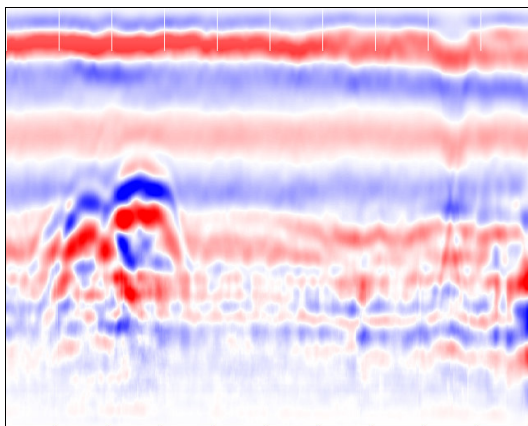
---

***a residual soil contamination study***  
*pursuant to deaths from virulent contagions*  
*and burial in the 5<sup>th</sup> Street Cemetery (1862 – 1888)*  
Lewiston, Idaho Territory

---

**abstract**

Preliminary research conducted during the early phases of the 5<sup>th</sup> Street Necrogeographical Study revealed that at least two (2) outbreaks of smallpox occurred in Lewiston and the surrounding area prior to 1888. Deaths from this single communicable disease may have played a contributing role in the apparent lack of exhumations at the old city cemetery (now Pioneer Park) after 1889, for fear that the contagions would have been spread throughout the community. The residual viability of fatal and communicable diseases during the period requires investigation before the park undergoes further on-site remote sensing.



**rationale and statement of need**

Mindful of its duty to investigate responsibly, the team is justifiably concerned that any proposed excavation(s) in the former city cemetery might allow residual contagions from communicable diseases to become airborne and endanger participants in the study and/or residents near the site. Therefore, we recommend a comprehensive investigation of all scenarios that may eventuate as a result of removal of human remains from the park.

**protocols**

1. The team will review all extant records from the period 1862 – 1889 to create a timeline of outbreaks of communicable diseases (*i.e.*, typhoid, cholera, smallpox, diphtheria, typhus and anthrax).

2. The team will compare the 5<sup>th</sup> Street Cemetery graves registry with the dates of these outbreaks, along with obituary notices noting the causes of deaths for persons buried in said graveyard.
3. The team will investigate the residual viability of the individual contagions in concert with county, state and national health/disease authorities.
4. Any exhumation(s) resulting from the ground-penetrating radar survey of the old cemetery will be conducted under the supervision of the Nez Perce County Health Department and local pathologists.

### **sample preliminary medical findings**

Numerous accounts relate how Native Americans died from contact with the clothing of disinterred white settlers who had only recently succumbed from the effects of smallpox, to cite just one disease. “The smallpox virus is fragile and in the event of an aerosol release of smallpox, > 90% of the virus will be inactivated within 24 hours. Therefore buildings exposed to the initial aerosol release of the virus do not need to be decontaminated. By the time the first cases are identified, typically 2 weeks after the release, the virus in the building will be gone. Smallpox virus can also be present in the scabs which slough off, potentially contaminating clothing, linens and surfaces. The virus is tightly bound to the scab however, and this limits the efficiency of virus transfer from the environment to people via reaerosolization.” (CDC) Concerns over possible residual contagion from this specific disease seem to be unwarranted.

### ***in-situ* soil analyses**

Soil samples from the old cemetery site, taken by probes from a depth of 1.5m – 2.0m, may prove helpful in determining any anomalies in the chemical makeup of the strata in Pioneer Park resulting from specific diseases other than smallpox.

### **consulting agencies**

Centers for Disease Control and Prevention (Atlanta GA)

Nez Perce County Health Department (Lewiston ID)

Idaho Department of Health and Welfare (Boise ID)

## Appendices

Fauber, John. "Chronic wasting disease may lurk in soil." *Milwaukee Journal Sentinel*. 19 September 2003.

"Soil disease kills 15 in Singapore." Reuters. 9 April 2004.

# *Chronic wasting disease may lurk in soil*

Infectious proteins cling to clay found across Wisconsin, research says

By JOHN FAUBER (*Last Updated: September 10, 2003*)

[jfauber@journalsentinel.com](mailto:jfauber@journalsentinel.com)

Prions, the infectious proteins believed to cause chronic wasting disease, literally stick to certain clay soils reinforcing the concern that dirt could be a continual source of future outbreaks, according to research presented Wednesday by a University of Wisconsin-Madison scientist. "Prions (in clay) may stay closer to the surface where they might be more likely to be ingested," said Joel Pedersen, the study's lead author and an assistant professor of soil biochemistry and environmental toxicology.

The research heightens concerns for several reasons: Much of Wisconsin's soil contains clay, earlier research has shown that prions in soil can remain infectious for several years, and animals such as deer and cattle tend to eat significant amounts of dirt while grazing. But while prions tend to stick to clay soils, they seem to readily travel through sandy soils with little, if any, binding, Pedersen said.

Much of central and northern Wisconsin has sandy soil, although areas of the far northwest and the northeast are clay, said Cindy Stiles, an assistant professor of soil science at UW who was not involved in the study. Southeastern

Wisconsin tends to have clay and clay mixed with organic-rich material. Southwestern Wisconsin, including the area where chronic wasting disease has been found, tends to be dust over bedrock, a mixture that contains both clay and sand, she said. "Wisconsin has a lot of high-activity clays," Stiles said. "These clays can bind to chemicals quite well." Evidence that prions bind to clay and travel through sand has both good and bad implications, she said.

Some clays don't start until 10 to 20 inches below the surface. In those situations, the clay might be too far down for animals to ingest, and, at the same time, the clay could bind to the prions and prevent them from moving around the environment, she said. For instance, clay-lined landfills might be the best places to bury the carcasses of infected deer. On the other hand, sandy soils could allow prions to travel into ground or surface water where they might pose another risk, she said.

"If you have sand or clay, you have a different set of problems," she said. Also unknown is how infectious prions bound to soil would be. It is possible that ingested, clay-bound prions may not interact with cells in the body, making them less likely to cause disease, said Judd Aiken, a UW professor of animal health and biomedical sciences who is working with Pedersen on the soil research. In addition to prions being ingested, there is concern that prions in the soil could be absorbed by plants and worms that other animals might consume.

## **Soil long a concern**

For years, researchers who study transmissible spongiform encephalopathies such as chronic wasting disease, mad cow disease and scrapie in sheep have investigated whether soil is a medium that could spread those diseases. In a 1991 experiment, scientists at the National Institutes of Health mixed brain material from scrapie-infected hamsters with soil, packed it in perforated petri dishes, placed those in soil-filled clay pots and buried the pots in the ground. When the pots were dug up three years later, the prions still were strong enough to infect other animals.

In Iceland, where there have been scrapie outbreaks, pastures grazed by scrapie-infected sheep were left vacant for several years. When new sheep were brought in from flocks believed to be scrapie-free, the disease reappeared, according to a 1992 U.S. Department of Agriculture review paper. Deer research pens

in Fort Collins, Colorado, experienced a similar phenomenon - a new generation of sick elk - despite efforts to purge the soil of deadly prions.

In the next few weeks, Aiken and other UW researchers will begin a study to see whether hamsters that are fed prions bound to clay develop a prion disease. The experiment likely will take several months to complete. "We need to know what the state of the infectious agent is in the environment," Aiken said. "Soil type is something that is going to have to be strongly considered."

Pedersen's research, which is part of \$2.4 million federal grant, was presented Wednesday at the American Chemical Society's annual meeting in New York.

---

## ***Soil disease kills 15 in Singapore***

Singapore (Reuters) 9 April 2004- Bacteria lurking in soil and muddy water have killed 15 out of 31 victims in Singapore this year, twice the normal toll, the Straits Times newspaper reported on Friday.

Recent floods may have carried to the surface bacteria that normally live underground, the health ministry fears.

The city state sees an average of 59 cases of the disease melioidosis each year, the paper said, and in 2003 there were five deaths among the 42 infections reported.

The disease spreads when people inhale infected dust particles or consume contaminated water or food. Cuts in the skin are another route.

Direct transfer between people, or animals and people, is rare, but may follow contact with tainted blood or body fluids.

Symptoms such as swelling, lung infection, high fever, cough, chest pains, diarrhoea and skin lesions may surface within two days or only after several years.

There is no vaccine for melioidosis, which is caused by the organism *Burkholderia pseudomallei*, the United States Centres for Disease Control and Prevention says on its website, but the disease can be treated with antibiotics.