Potomac River Source Protection Partnership

Roundtable Notes

Infection in Young Calves – Explanation?

- (Trout) Acquired after birth; very weak immune system when born; no transfer b/w mother and fetus of immunity; some immunity in colostrum. Ruminants in general follow this trend.
- (Graczyk) Hormonal changes may alter immune system of mother.
- Lambs also suspected of carrying crypto in this manner

Mortality of AIDS Patients wrt Crypto

- (Graczyk) Crytpo contributing to death of AIDS patients (75%)

Source Tracking – Next Steps?

- (Ware) Crypto probably not best choice; follow water (not sure if this is helpful to water utilities, who are interested in crypto).
- (Jellison) Develop more general sampling plan to begin with, to target hot spots; choose suspected sites, get some variety initially and narrow down focus.
- (Trout) Go to animals in the watershed – is there a species associated with varieties infectious to humans?
- (Grace) Look at calves. Consider CAFO data in MD. (need data to document improvement)

Minimum Level of Chlorine that will inactivate Crypto

- (Ware) Very high – too high for human consumption
- (Trout) Studies done under laboratory conditions. Would be additional chlorine demand in real setting. (need more research on “inactivation” treatments, such as UV)
- (Graczyk) Although UV and ozone inactivate, still have problem with quality of water in distribution system. Water can be reinfected – chlorine provides residual.

Would we be off if we focused on CAFOs and effluent dominated streams?

- (Trout) If beef cattle follow same patter as dairy, by the time they get to feedlot, may not be shedding high levels. Dairy calves would be likely source of crypto.
- (What action makes sense – BMPs, relocation, housing calves & controlling runoff.)

Auction Houses?

- (Concentration of male calves). Not looked at yet (Trout)

Process – Resuspension from bed load of river?

- (Trout) It doesn't settle out.
- (Grace) Did find higher concentrations in outfall sediment.
- (Graczyk). Much found in sediment.

Point vs. Nonpoint

- (Grace) Didn't study NPS directly. Could not follow crypto down river. Using mass balance approach, less than 10% contributed by point source during storm events; however, if it is accumulating, would give different picture. In main stem, NPS dominates.

Preventing Infection in Calves

- Approaches
  - (Trout) Vaccination – problem with treating young calves
  - Treatment – most drugs are very expensive
  - Management – fly control; rodent control; very little difference b/w group and individual housing.
- Research being done on vaccines for humans and animals

Can we eliminate poultry or hogs as sources?

- (Trout) Poultry probably not producing strains infectious to humans, although immunosurpressed still vulnerable. Calves primary source of c. parvum. Little info on growing populations like Llamas.

General Trends?

- (Boutros) Not clear why numbers are decreasing. Could be location of study.
- (Graczyk) Crypto was not well known about previously – could be misdiagnoses.

Post 9/11 Concerns – Where do we stand w/real time crypto monitoring?

- (Graczyk) Kits are designed for army – 45 minutes small PCR unit.
- (Boutros) Still have issue of low-density pathogen and need to look at high volumes.

Surrogates?

- (Miller) Multiples may provide level of risk.
  - Rate of change of flow to address resuspension
  - Number of birds on beaches
  - Wind velocity
- (Boutros) E. Coli, all indicators can fail, but multiples increase chances of capturing

Wastewater Treatment (Boutros)

- Highest seen in beginning stages of treatment was 600,000/L, highest in secondary was 60,000/L
- Need to look at water intake relative to wwt plant.
- How soon will water supplier know about it.
- Hospitals – could be contributing
- Look at relative risk of failure of different treatment plants

GIS Approaches

- (Grace) Need to work at manageable scale, smaller part of basin. Use GIS to identify potential hotspots, then test.

Fellow Travelers

- (Johnson) Enteric viruses – if you are sampling, try to capture as many pathogens as you can. Start with subwatershed, look at potential sources and focus on hot spots.
- (Miller) Also look at sources

Relative Importance of Different Sources

- Cattle
- Geese
- (Jellison) Always possible that new species (non-parvum and non-humanis) could be identified that are risk to humans.
- (Jellison) Look at infectivity statis overall, not whether specific to humans

BMPs and Ches Bay Requirements – How do these come into play?

- Can we encourage requirements to be put in place sooner?
- Direct connection to farm can be drawn. Try to go directly to source.

Animal Husbandry Practices

- Is education needed on how cows can be protected at least while they are young? (Trout) Already is some level of separation with ages of cows – it does spread among young, however.
- Variability among hosts

Infectious and Viable?

- (Trout) Infectious unless it's dead
- UV light changes DNA so it can't reproduce.
- (Trout) Looked at UV to develop vaccine, with some success. Doesn't generate enough of response without overwhelming immune system.

Importance of Biosolids as Potential Source?

- Don’t have adequate setback distances from sinkholes
- Potential is there, but only in certain settings.
- Stream buffer is 50 feet.

Risk

- Not easy to quantify
- We know it’s present

Plan – What can we do?

- Look at data
- Assess streams
- What is it we are going to do?
- EPA funds (Nelson)
- SWCDs? What should they be doing?
- WWT Plants? CSOs?
- Pick a watershed, develop sampling plan. Then take to other areas in the basin.
- Source tracking (Jellison work)