

The seroepidemiology of *Cryptosporidium parvum*: exposure is probably far more frequent than previously thought

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Cryptosporidium parvum (CP), an emerging waterborne pathogen, kills malnourished children and people with AIDS, and causes large diarrhoea outbreaks. Changing water use and climate patterns will alter its incidence. Published seropositivity rates to oocyst (transmission stage) antigens in older children and adults include: 17% Virginia, USA; 58% Oklahoma, USA; 65% Peru/Venezuela; 95% Fortaleza, Brazil. This has been conventionally interpreted as reflecting lifetime exposure. Much lower (5–20%) childhood serological rates have been reported, even though clinical cryptosporidiosis is most common in children. We assessed the assumption that anti-oocyst antibodies (AOA) accurately reflect lifetime exposure by reviewing 265 papers, dating from 1966 to the present, that directly or tangentially deal with CP serological responses.

We found a remarkable congruence of animal and human data documenting that AOA responses are transient (generally ± 3 months), and not permanent. No studies have shown persistence of human AOA without known or presumed re-exposure. Tissue stage antibodies (TSA), which unlike AOA can only arise after infection and not simply oocyst exposure, appear to be more persistent (± 1 year), and more common in childhood than AOA, though the number of studies is small. We conclude:

- The most scientifically conservative view is that AOA best reflects recent and not lifetime exposure, profoundly increasing (two orders of magnitude) estimates of lifetime exposure.
- Conventional AOA testing in adults may be most useful in detecting short-term or recent changes in oocyst exposure as water supply/climate changes occur.
- Future population-based studies should assess both AOA and TSA, so as to differentiate oocyst exposure from infection.

Birth outcomes and drinking water contamination

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Recent evidence linking adverse birth outcomes and chemical contaminants in public drinking water systems have been evaluated. A New Jersey study found associations between chlorinated disinfection by-products and neural tube defects (NTDs), oral cleft defects, cardiac defects, and small for gestational age (SGA). A follow-up to this