Information for Health Care Providers
Cyclospora Infection or Cyclosporiasis

What is *Cyclospora*?
Cyclospora cayetanensis (SIGH-clo-SPORE-uh KYE-uh-tuh-NEN-sis) is a unicellular parasite that causes an intestinal infection called cyclosporiasis (sigh-clo-spore-EYE-uh-sis). Because *Cyclospora* is a coccidian parasite, infected people shed oocysts (rather than cysts) in their feces.

How is *Cyclospora* transmitted?
By ingesting infective *Cyclospora* oocysts (for example, in contaminated food or water). Outbreaks in the United States and Canada have been linked to various types of imported fresh produce.

Cyclospora cayetanensis completes its life cycle in humans. However, the oocysts shed in the feces of infected persons must mature (sporulate) outside the host, in the environment, to become infective for someone else. Therefore, direct person-to-person (fecal-oral) transmission of *Cyclospora* is unlikely. However, indirect transmission can occur if an infected person contaminates the environment and oocysts have sufficient time thereafter, under favorable conditions, to become infective. The process of maturation (sporulation) is thought to require from days to weeks.

Who is at risk for *Cyclospora* infection?
Persons of all ages are at risk for infection. Persons living or traveling in the tropics and subtropics may be at increased risk because cyclosporiasis is endemic in some developing countries. In some regions, infection appears to be seasonal. But the seasonality varies in different settings and is not well understood.

What are the symptoms of cyclosporiasis?
The incubation period between acquisition of infection and onset of symptoms averages approximately 1 week (ranges from approximately 2 to 14 or more days). *Cyclospora* infects the small intestine and typically causes watery diarrhea, with frequent, sometimes explosive, stools. Other common symptoms include

- loss of appetite,
- weight loss,
- abdominal cramping/bloating,
- increased flatus,
- nausea, and
- prolonged fatigue.

Vomiting, body aches, low-grade fever, and other flu-like symptoms may be noted. If untreated, the illness may last for a few days to a month or longer, and may follow a remitting-relapsing course. Some infected persons are asymptomatic, particularly in settings where cyclosporiasis is endemic.

How is *Cyclospora* infection diagnosed?
The most important thing for health care providers to realize about the diagnosis of *Cyclospora* infection is that stool specimens examined for ova and parasites usually are not examined for *Cyclospora* unless such testing is requested. Therefore, when evaluating persons with symptoms consistent with cyclosporiasis, specifically request testing for this parasite. If indicated, stool specimens should also be checked for other microbes that can cause a similar illness.

Another important point is that *Cyclospora* oocysts may be shed intermittently and at low levels, even by persons with profuse diarrhea. A single negative stool specimen does not exclude the

diagnosis; several specimens—that are processed and examined with sensitive methods—may be required. Additional perspective about laboratory testing is provided below.

How is cyclosporiasis treated?
Trimethoprim-sulfamethoxazole (TMP-SMX), or Bactrim*, Septra*, or Cotrim*, is the treatment of choice. The typical regimen for immunocompetent adults is TMP 160 mg plus SMX 800 mg (one double-strength tablet), orally, twice a day for 7-10 days.

No highly effective alternatives have been identified for persons who are allergic to (or are intolerant of) TMP-SMX. Approaches to consider for such persons include observation and symptomatic treatment, use of an antibiotic whose effectiveness against *Cyclospora* is unknown or is based on limited data, or desensitization to TMP-SMX. The latter approach should be considered only for selected patients who require treatment, have been evaluated by an allergist, and do not have a life-threatening allergy.

Anecdotal or unpublished data suggest that the following drugs are ineffective: albendazole, trimethoprim (when used as a single agent), azithromycin, nalidixic acid, tinidazole, metronidazole, quinacrine, tetracycline, doxycycline, and diloxanide furoate. Although data from a small study among HIV-infected patients in Haiti suggested that ciprofloxacin might have modest activity against *Cyclospora*, substantial anecdotal experience among many immunocompetent persons suggests that ciprofloxacin is ineffective.

How is *Cyclospora* infection prevented?
On the basis of currently available information, avoiding food or water that might be contaminated with stool is the best way to prevent infection. Symptomatic reinfection can occur.

Additional perspective about laboratory testing for *Cyclospora*

- *Cyclospora* oocysts are easily overlooked; low-level shedding (approximately 1-2 logs lower than for *Cryptosporidium* species) is common. To maximize recovery of *Cyclospora* oocysts, first concentrate the stool specimen, e.g., by the formalin-ethyl acetate technique (centrifuge for 10 minutes at 500 × *g*), and then examine a wet mount and/or a stained slide of the sediment.
- *Cyclospora* oocysts are approximately 8-10 micrometers in diameter (in contrast, *Cryptosporidium parvum/C. hominis* oocysts are approximately 4-6 micrometers in diameter).
- Ultraviolet fluorescence microscopy (UV excitation filter set at 330-365 nm or 450-490 nm) is a sensitive technique for rapidly examining stool sediments for *Cyclospora* oocysts, which stand out because they autofluoresce (*Cryptosporidium parvum/C. hominis* oocysts do not). If suspect *Cyclospora* oocysts are found, bright-field, phase contrast, or differential interference contrast microscopy can then be used to confirm that the structures have the characteristic morphologic features of *Cyclospora* oocysts (i.e., are nonrefractile spheres that contain undifferentiated cytoplasm or refractile globules).
- On a modified acid-fast-stained slide of stool, *Cyclospora* oocysts typically are variably acid fast (i.e., in the same field, oocysts may be unstained or stain from light pink to deep red). Unstained oocysts characteristically have a wrinkled (hyaline) appearance.
- If a "hot" modified safranin technique is used, *Cyclospora* oocysts uniformly stain a brilliant reddish orange.

For more information about these and other laboratory methods, see the DPDx website: http://www.dpd.cdc.gov/dpdx/HTML/Cyclosporiasis.htm

*Use of trade names is for identification only and does not imply endorsement by the Public Health Service or by the U.S. Department of Health and Human Services.

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From http://www.cdc.gov/ncidod/dpd/parasites/cyclospora/healthcare_cyclospora.htm