

Giardiasis

Investigation Guideline

CONTENT:

VERSION DATE:

Investigation Protocol:

- Investigation Guideline

06/2012

Supporting Materials found in attachments:

- Fact Sheet

05/2012

Revision History:

Date	Replaced	Comments
06/2012	04/2009	Minor formatting changes to investigation guideline. Changes to Laboratory Analysis. Changes to Standard Investigation sections to agree with EpiTrax system. Added new reporting form.
02/2012	-	Removed references to KS-EDSS. Updated case definitions to CDC 2011. Additional edits are still required to guideline.

Giardiasis

Disease Management and Investigative Guidelines

CASE DEFINITION (CDC 2011)

Clinical Description for Public Health Surveillance:

- An illness caused by the protozoan *Giardia lamblia* (aka *G. intestinalis* or *G. duodenalis*) and characterized by gastrointestinal symptoms such as diarrhea, abdominal cramps, bloating, weight loss, or malabsorption.

Laboratory Criteria for Case Classification:

- Laboratory-confirmed giardiasis shall be defined as the detection of *Giardia* organisms, antigen, or DNA in stool, intestinal fluid, tissue samples, biopsy specimens or other biological sample.

Case Classification:

- **Confirmed:** A case that meets the clinical description and the criteria for laboratory confirmation as described above. When available, molecular characterization (e.g., assemblage designation) should be reported.
- **Probable:** A case that meets the clinical description and that is epidemiologically linked to a confirmed case.

LABORATORY ANALYSIS

Because *Giardia* cysts are excreted intermittently in varying concentrations:

- Multiple stool collections (i.e., three stool specimens collected on multiple days) are recommended.
- Fecal immunoassays, such as direct fluorescent antibody (DFA) tests, are more sensitive than concentration methods and trichrome staining.
- Rapid immune-chromatographic cartridge assays, though, may be less sensitive and should not take the place of routine ova and parasite examination.

Molecular testing can be used to identify the subtypes of *Giardia*.

For testing at the Kansas Health and Environmental Laboratory:

- Collection: Parasite (O & P) Feces Mailer with the traditional two vials is preferred but the commercially available one vial system is accepted.
- Specimen: Feces, marble size, mixed well in 10% formalin and PVA bottles
- Timing of specimens: Collect three specimens within a 10-day period while a person is symptomatic or within 2 weeks after diarrhea resolves.
- Specimens containing anti-diarrheal compounds, barium, bismuth, or mineral oil interfere with the parasite examination.
- Do not refrigerate the preserved samples. Once preserved, the specimens can be stored and transported at room temperature.
- If there is a delay in obtaining the preservatives, refrigerate untreated stool specimens at 4°C (do not freeze) for up to 48 hours.
- For additional information and/or questions concerning isolate submission, and laboratory kits call (785) 296-1620 or refer to online guidance at www.kdheks.gov/labs/lab_ref_guide.htm

EPIDEMIOLOGY

Giardiasis has a worldwide distribution. Children are infected more frequently than adults. Prevalence is higher in areas of poor sanitation and where children who are not toilet trained, especially daycare centers. In the United States, surveys have demonstrated prevalence rates of *G. lamblia* range from 1-30%, depending on location and age. Cases occur most frequently from July-October.

DISEASE OVERVIEW

A. Agent:

G. lamblia is a protozoan parasite that has 2 forms: trophozoites and cysts. The trophozoite is the active form of the parasite which causes symptoms. Cysts are the infectious form which sometimes develops in the lower intestine and is excreted but does not cause symptoms. Infected persons may shed both trophozoites and cysts in stool.

B. Clinical Description:

Clinical symptoms include: watery foul-smelling diarrhea, abdominal cramps and excess gas. The diarrhea may be chronic or intermittent and is often accompanied by fatigue and "fatty stools." Anorexia combined with malabsorption can lead to significant weight loss, failure to thrive and anemia. Asymptomatic cases may also occur.

C. Reservoirs:

Humans and other mammals including dogs, cats, rodents, beaver, and muskrats.

D. Mode(s) of Transmission:

Fecal-oral, including: person-to-person, animal-to-person, waterborne and foodborne. Contaminated water can be in streams, lake waters and swimming pools. Drinks and ice made from contaminated water may transmit infection.

E. Incubation Period:

Range 1-4 weeks; average 7-10 days.

F. Period of Communicability:

Persons are infectious as long as cysts are being shed, which may be days to years. Asymptomatic carrier rates are high.

G. Susceptibility and Resistance:

The nature of immunity is uncertain. Some people with regular exposure may develop some degree of resistance to illness.

H. Treatment:

Effective treatments include metronidazole, tinidazole, and nitazoxanide. Alternatives to these medications include paromomycin, quinacrine, and furazolidone. Some of these drugs may not be routinely available in the United States. Treatment failure is not uncommon (approx. 10% of the time). A repeat course of the same or a different medication may be indicated. Different factors may shape how effective a drug regimen will be, including medical history, nutritional status, and condition of the immune system

NOTIFICATION TO PUBLIC HEALTH AUTHORITIES

Giardiasis shall be designated as infectious or contagious in their nature, and cases or suspect cases shall be reported within seven days:

1. Health care providers and hospitals: report to the local public health jurisdiction
2. Local public health jurisdiction: report to KDHE-BEPHI (see below)
3. Laboratories: report to KDHE-BEPHI (see below)

**Kansas Department of Health and Environment (KDHE)
Bureau of Epidemiology and Public Health Informatics (BEPHI)**

Phone: 1-877-427-7317

Fax: 1-877-427-7318

Further responsibilities of state and local health departments to the CDC:

As a nationally notifiable condition, giardiasis cases require a STANDARD report to the Center of Disease Control and Prevention (CDC).

1. STANDARD reporting requires KDHE-BEPHI to file an electronic report for cases within the next reporting cycle.
 - KDHE-BEPHI will file electronic reports weekly with CDC.
2. Local public health jurisdiction will report information as requested in the Kansas electronic surveillance system, as soon as possible, ensuring that the electronic form is completed within 7 days of receiving a notification of a report.

INVESTIGATOR RESPONSIBILITIES

- 1) [Report](#) all confirmed, probable and suspect cases to the KDHE-BEPHI.
- 2) Use the [case definition](#), to confirm the diagnosis with the medical provider.
- 3) Conduct [case investigation](#) to identify potential source of infection.
- 4) Conduct [contact investigation](#) to locate additional cases and/or contacts.
- 5) Identify whether the source of infection is major public health concern,
 - Involvement of a recreational water source or public water supply.
 - Further documented spread.
- 6) Initiate control and prevention measures to prevent spread of disease.
- 7) Complete and report information requested in the state electronic surveillance system.
- 8) As appropriate, use the notification letter(s) and the disease [fact sheet](#) to notify the case, contacts and other individuals or groups

STANDARD CASE INVESTIGATION AND CONTROL METHODS

Case Investigation

- 1) Contact the medical provider who ordered testing of the case or is attending to the case and obtain the following information. (This includes medical records for hospitalized patients.)
 - Obtain data on symptoms, onset date and time and recovery date and time.
 - Determine if further laboratory testing is needed.
 - Collect case's demographic data and contacting information (birth date, county, sex, race/ethnicity, address, phone number(s))
 - Record hospitalizations: location and duration of stay
 - Record outcomes: survived or date of death

- 2) Interview the case to determine source, risk factors and transmission settings:
 - At least 3 phone attempts at different times of day should be made before the [Generic Letter to Case](#) is used or the case is closed as lost to follow-up.
 - For the **3-25 days** prior to symptom onset examine:
 - Associations to international adoption or refugee screening
 - Water exposures:
 - Source of water at home and work.
 - Recent plumbing / construction work on water system at home
 - Accidental ingestion of untreated water
 - Water activities such as fishing or boating (specify)
 - Swim or wading in recreational water (type, location, and dates)
 - Animal exposures:
 - Visitation or residence on farm
 - Visit to animal exhibits
 - Exposure to manure
 - Contact with pets (indicate type of animal and if any were recently acquired or ill)
 - Other exposures:
 - Gardening and hand hygiene after handling dirt
 - Sexual activity may have resulted in contact with feces
 - Contact with others with similar symptoms or diagnosed with giardia
 - Travel History:
 - Outside of USA, Kansas, or county (specify dates and locations)
- 3) Case finding and transmission setting:
 - Identify cases occupation and involvement in the any of the following (note locations and dates attended and worked if ill):
 - Food handler
 - Health care
 - Group living
 - Day care or school
 - Laboratory work (including class attendance)
- 4) Investigate epi-links among cases (clusters, household, co-workers, etc).
 - If the case had contact with person(s) who have/had the disease or if there was a possible point source of infection, determine if the other “cases” have been reported to the state:
 - Use names and birthdates of possible cases to search the electronic surveillance system.
 - If found, record the previously reported case’s record number in the notes of the case you are investigating.
 - Highly suspected cases, that have not previously been reported should be investigated as a suspect case and reported in the state electronic surveillance system.
 - For suspected [outbreaks](#) refer to Managing Special Situations section.

Contact Investigation

- 1) Consider case activities since diarrhea began, including occupation:
 - Recreation water use (location, date, activities)
 - Food handling (location, date, activities)
 - Sexual contacts
 - Daycare attendance
- 2) Based on identified activities, examine dates and locations during the period from illness onset till the resolution of symptoms to identify potential contacts.
- 3) Contacts are defined as sexual partners, household members, daycare workers and attendees and those that may have consumed food, water or other beverage or bathed in a recreational water body that is known to be a source of infection.
- 4) ONLY if a risk of transmission exists, create a line listing of contacts at-risk of developing disease. Note possible high risk contacts
- 5) Follow-up symptomatic contacts as suspect cases.
- 6) Follow-up with household and close contacts (especially high risk contacts) as recommended under [Contact Management](#).
- 7) Institute control measures; see [Isolation, Work and Daycare Restrictions](#).

Isolation, Work and Daycare Restrictions

Giardiasis is not a disease considered for quarantine or isolation under Kansas Administrative Code, but the following guidelines are suggested:

- Children with diarrhea should not attend daycare until symptoms have resolved for 24 hours.
- Food handlers are restricted from handling food, or are excluded from work when they serve high risk groups, until diarrhea has resolved for 24 hours.
- Healthcare workers involved in direct patient care (feeding patients, handling or dispensing medications, ect.) are considered food handlers and are subject to food handling restrictions.
- Cases should not swim or engage in other form of recreational water use until 2 weeks after symptoms resolve.

Case Management

Generally not indicated unless the case works in a daycare and/or food service position (including direct patient care); in which case, follow-up is recommended to ensure compliance with control recommendations.

Contact Management

- 1) Household members or persons who share a common-source exposure (including daycares) should be tested only if symptomatic. If positive, treat as a case. If negative or asymptomatic, no restrictions or treatment needed.
- 2) Treatment of asymptomatic carriers is not effective for outbreak control of Giardiasis.

Environmental

- 1) More than one case associated with a childcare facility requires an inspection of the facility. See Managing Special Situations for Childcare Settings.
- 2) More than one case associated with an aquatic facility requires an inspection of the facility. Hyper-chlorination of water may be needed. See Managing Special Situations for [Swimming Pools and Aquatic Facilities](#).
- 3) For cases associated with a public water supply, see Managing Special Situation for [Public Water Supplies](#).
- 4) When using water for drinking, washing or cooking that may be unsafe; consider the following treatments:
 - Purify by boiling for 1 minute (at sea level) or distilled; or
 - Chemical disinfected with iodine using either tincture of iodine or tetraglycine hydroperiodide tablets.
 - Filter with filters that are labeled as able to remove Giardia or Crypto; reverse osmosis; absolute pore size of 1 micron or smaller; and/or tested and certified by NSF Standard 53 for cyst removal or cyst reduction.

Education

- 1) Provide basic instruction in fecal-oral modes of transmission, environmental disinfection, and personal hygiene with proper hand washing techniques.
- 2) As relevant, discuss the risks of drinking untreated surface water while camping or hiking. Travelers, campers, and hikers should be advised of methods to make water safe for drinking, including boiling, chemical disinfection, and filtration.
- 3) Persons should be educated about the risks of both giardiasis and cryptosporidiosis.

MANAGING SPECIAL SITUATIONS

A. Evaluating a Significant Increase in Giardia Cases for Community

- Determine the total number of giardia cases reported for the month.
- Create a 5 year history report, based on following variables:
 - For a 5-year period ending the previous year.
 - By month; from the current month; through the current month.
 - Case status = Confirmed, probable, and/or suspect
 - Disease = Giardiasis (*Giardia lamblia*)
 - For chosen geographic area (i.e., county or region)
- Determine the median number of cases for the previous five years.
- If the current number of cases is greater than 2x the median number of the previous 5 years (disease action threshold), investigate as an outbreak.

B. Outbreak (and Significant Increase in Disease) Investigation:

- Two or more cases clustered in time and space with a common or suspected common source.
- Refer to [Managing Special Situations - Public Drinking Water Supply](#) for the definition of an outbreak associated to a public water supply.
- Initial notifications:
 - Notify KDHE immediately, 1-877-427-7317.
 - Notify internal and local partners – including representatives from different disciplines (i.e. environmental health specialists, laboratories)
 - Notify and mobilize all community partners that may be impacted; instruct them to intensify control measures.
 - Aquatics operators/managers
 - Child care programs and schools
 - Nursing homes / extended care facilities
 - Restaurants and hotel/motels
 - Providers of public water supplies (PWSs)
 - Other important community partners that might be impacted
- Consult the following KDHE resources:
 - [Foodborne Illness and Outbreak Investigation Manual](#) for food.
 - [Control of Enteric Outbreaks in Child-Care Facilities](#) for child-care.
- Identify a team leader for local case investigators. The team leader is responsible for tracking of new cases in the jurisdiction; noting what needs to be done; and providing updates to local, regional and state partners.
- Communicate with other health departments and agencies:
 - Use periodic, regularly scheduled conference calls with key contacts to keep informed, plan next steps and share information.
 - Decide how to maintain and share information outside of the calls. (i.e., e-mail, fax, website). Make sure communication method is effective.
 - After reviewing resources and contingency plans, request assistance as needed from regional or state health department.
- Organize and maintain all data related to outbreak
 - Keep logs of phone calls regarding the outbreak.
 - Document the number of hours spent on outbreak for future reference.
 - Create and maintain a line listing of cases
 - Record number;
 - Name and DOB (or age);
 - Symptoms and onset date;
 - Source of exposure;
 - Specimen collection date and lab results;
 - Case status (i.e., confirmed, probable, suspect)
- Data collected will be reported through the Kansas EpiTrax system.
- Evaluate findings and all relevant information to identify population(s) at risk of infection based on scope and intensity of the outbreak; define:
 - Person: who is getting ill (i.e., age, gender, immunocompromised, occupations); associations to drinking tap water, day cares,

- recreational water or animal exposure 2 weeks before onset
 - o Place: where are the cases; to what settings are they associated
 - o Time: when did it start and is it still going on; use epi curves
 - Establish an official case definition to count cases and monitor outbreak
- Active case-finding and surveillance should be activated at the beginning of the outbreak to identify as many confirmed cases as possible to help identify the source of the outbreak.
 - Contact medical providers about need to consider O&P testing and reporting of all suspected cases with diarrheal symptoms
 - Survey hospitals, emergency departments, and physician's offices for suspect cases of watery diarrheal illness.
 - Examine records of patients with diarrhea at nursing homes.
 - Examine reports of school absenteeism for diarrheal illness.
 - Inquire about diarrheal illness in day-care facilities
 - If possible, establish a hotline for outbreak-related calls.
- If no association is identified: consider the need for additional laboratory testing to rule out false-positive tests, as well as additional surveys and more intensive epidemiological studies to evaluate the situation.
- Engage media to help disseminate public health messages.
 - Establish contact points with media sources.
 - If needed, form a working group to establish a relationship with media.
 - Use fact sheets and prepared press releases to reinforce educational efforts on health swimming and hand washing basics.
 - Send out frequent updates to keep media correctly informed.
- After increase in cases or outbreak is under control:
 - Active surveillance should continue for two incubation periods (i.e., 4-6 weeks) after the number of cases has fallen below the disease action threshold; any increases in disease should be examined to determine if new groups are being affected, if modifications are needed to control measures (i.e. more restrictive control measures) or if health messages need to be revised/redistributed.
 - Assist state in collecting data needed to complete the required reports of waterborne, foodborne or person-to-person disease to the CDC.
 - Contact all impacted community partners:
 - o Notify that the increase in cases or outbreak has been controlled.
 - o Debrief to identify barriers to control measures and how to address.
 - o Discuss how well communication worked between partners and
 - o Examine the effectiveness of the distributed public health messages.
 - As needed, modify control strategies and revise/distribute health communication messages based on debriefings and the overall evaluation of response.
 - Share lessons learned with local, state, and national partners.

C. Public Drinking Water Supply:

- The National Primary Drinking Water Regulations (NPDWR) (141.2) define a waterborne disease outbreak as the significant occurrence of acute infectious illness, epidemiologically associated with the ingestion of water from a public water system which is deficient in treatment, as determined by the appropriate local or state agency.
- Upon learning of a waterborne disease outbreak, public water suppliers (PWSs) are required to issue a Tier 1 public notice as soon as practical or within 24 hours via radio, hand delivery, posting or other method specified by the state to reach all persons served by the PWS (not just billing customers). PWSs must initiate consultation with KDHE within 24 hours for all Tier 1 situations. PWSs may consult either with 1) KDHE District Office Staff; or 2) KDHE Bureau of Water, Public Water Supply Section in Topeka.
- When the source of the outbreak has not been identified but the association to a PWS has not been ruled out; the following steps are recommended:
 - Response should be determined by a task force that includes representatives from health departments, water regulation, water utilities and public information officers, who are supported, as needed, by advisory groups.
 - Information needed to evaluate risk; examined in cooperation with local water treatment plant and KDHE Public Water Supply Section:
 - Identify source(s) and types of water (i.e., spring, surface, well)
 - Determine type(s) of treatment.
 - Determine number of PWSs and coverage areas; compare to epidemiologic plot maps.
 - Review water quality data. Graph peak turbidity levels each day before and during the suspected outbreak period; compare to epidemiologic curves.
 - Any recent changes in treatment protocol, temporary malfunctions or treatment failures before cases began to be reported?
 - Any chronic filtration problems? (i.e., frequent turbidity spikes in the 0.3 – 1.0 NTU range.)
 - Any recent repairs to the plant or distribution system, vandalism or unauthorized access; examine case distribution with affected sites.
 - Determine whether system pressure recently fell to less than 5 psi.
 - Determine whether there have been any recent changes in the water shed (i.e., flood, drought, land use, sewage overflow) that may have increased chances for fecal contamination.
 - Response should be based upon risk:
 - Health risk no longer suspected: event determined not to be associated to drinking water source; no further action
 - Health risk indeterminate at current time: heighten water monitoring and surveillance activities for an agreed upon period and re-evaluate situation as needed; notifications to immunocompromised persons may be considered.
 - Health risk suspected (but epidemiological association is not strong

and PWS is not deficient in treatment): considering releasing notifications based on local assessments of risk; modify notifications as needed based special populations at risk

- o Health risk strongly suspected: issue Tier I notification and boil water advisories.
- Templates for notifications can be found at www.kdheks.gov/pws/pn.html.
- After boil water advisories are rescinded; notices need to go out by proper media outlets to inform public water users how to restart and flush water-using fixtures. This includes private water lines, commercial ice makers, medical and dental equipment, and items in commercial establishments.

D. Child Care Settings:

Coordinate activities with school nurse and/or administration.

For a single case association in a child-care setting:

- Reinforce the practice of frequent and good hand washing techniques.
- Reinforce good diapering practices including keeping diaper changing areas separate from children's play areas and keeping diapering and food-handling areas and responsibilities separated.
- Educate staff and parents:
 - Inform all staff about the symptoms of giardia, how it is spread, and control measures to be followed.
 - Inform parents about the symptoms of giardia, how it is spread, outbreak control policies, and needed changes in hygiene and cleanliness.
 - Notify parents of children who have been in direct contact with a child or adult caregiver with diarrhea; informing them to contact the child's healthcare provider if their child develops diarrhea.
- Exclude any child with uncontrolled diarrhea, from the setting until the diarrhea has stopped for 24 hours. This includes children that have not been diagnosed with giardia.
 - Uncontrolled diarrhea: increased number of stools, increased stool water, and/or decreased form that is not contained by the diaper
- Children with or who had giardia that have no diarrhea (i.e., asymptomatic) may remain in the facility if extra precautions are taken for 2 weeks following the resolution of their diarrhea.
 - Observe all hand washing and assist when needed.
 - Ensure the child's hands are washed at appropriate times.
 - Adults should ensure that they wash their hands after helping a child use the toilet or after diapering a child and before handling food.
 - If the child requires diaper changes,
 - o Use disposable gloves and disposable paper over the diaper changing surfaces. Change gloves and papers after each use.
 - o Ensure children wear clothing over their diapers to reduce opportunity for leakage.
 - o If possible, those who change diapers should not prepare/serve food.
 - Handle soiled clothing appropriately. Do not rinse out, store in a labeled plastic container or bag before returning home with parents.

- Disinfect surfaces and objects used by the child, including but not limited to bathrooms, diaper-changing areas, food-prep area, tabletops, high chairs and toys with an appropriate cleaner.
- Depending on the facilities capabilities, recently returning children can be grouped together in one classroom to minimize exposure to uninfected children and should not participate in water-play activities for 2 week period following diarrhea resolution.
- Move adults with diarrhea to jobs that minimize opportunities for spreading disease. (i.e., food or medicine handling; water-play)
- Establish, implement and enforce polices on water-play that:
 - Exclude children with diarrhea from water-play or swimming activities.
 - Discourage children from getting the water in mouths.
 - For swimming activities, have children shower with soap before entering the water or have staff wash younger children, particularly the rear end.
 - Take children on frequent bathroom breaks or check diapers often
 - Change diapers in a diaper changing area not by the water.
 - Do not use the fill and drain swimming pools.
- Active case-finding;
 - If the center includes diapered children, interview the operator and inspect attendance records to identify suspect cases among children or staff during the past month.
 - Request stool specimens for testing of symptomatic children, staff and/or household / close contacts of symptomatic individuals.
 - The day care operator should be instructed to call the health department immediately if new cases of diarrhea occur.
 - The facility should be called or visited once each week for 6 weeks after onset of the last case to verify that surveillance and appropriate preventive measures are being carried out.
 - Newly symptomatic children should be managed as outlined above.

For more than one case association to a child-care setting:

- Notify and mobilize operator
 - Along with recommendations “For a single case association...”, there will be a need to intensify control measures.
- A thorough inspection of the facility is needed. Examine situations that may encourage transmission and are not in line with recommendations.

Intensified control measures in a child-care setting:

- When enforcing good diapering practices, recommend the following:
 - Use of disposable gloves and paper over the diaper changing surfaces. Change gloves and papers after each diaper change.
 - Clothing should be worn over diapers to reduce the chance of leaks.
 - If possible, those who change diapers should not prepare or serve food.
- When educating the staff and parents, inform them about the outbreak.
- Encourage and educate on the need to exclude symptomatic children from child-care settings and that extra precautions are needed with asymptomatic children with giardia.

- Terminate all water play or swimming activities.
- Disinfect surfaces and objects with proper cleaners following label directions. Disinfection should occur to the following:
 - Bathrooms, diaper areas, food prep surfaces daily; including faucets and toilet handles.
 - Toys, tabletops, and high chairs more frequently (at least twice daily).
- Dishwasher-safe toys may be washed in a dishwasher with a dry cycle or a final rinse that exceeds 113°F for 20 minutes or 122°F for 5 minutes or 162°F for 1 minute.
- Cloth toys may be washed and heat-dried on the highest clothes dryer heat setting for 30 minutes.
- Put away toys that cannot be disinfected until the outbreak is over. Dispose of old play dough; use a new, individual container for each child.
- Cohorting or segregation of infected individuals together in separate rooms/site based on positive stool culture results will be implemented if cases continue to occur even after initial control measures are put into place or at the discretion of local health department.
 - Treated, asymptomatic, stool positive children can be released from cohorting 72 hours after the beginning of appropriate therapy.
 - Untreated, asymptomatic, stool positive children can be released from cohorting after the submission of three consecutive negative stool samples taken from the infected person and collected at least 24 hours apart and 24 hours after cessation of symptoms.
- Closing day-care centers temporarily or to the new admissions or readmissions is not recommended.
 - Permanent closure or revocation of license is necessary if determined by the Child-Care Licensing Program.
- Continue active case-finding. Instructing all day care operator(s) to inform health department of new cases and calling or visiting those facilities with associated cases weekly for 6 weeks after onset of the last case.
- Refer to the [KDHE Control of Enteric Disease Outbreaks in Childcare Facilities](#) for additional information.

E. Swimming Pools and Aquatic Facilities:

The following are standard activities that are recommended before an increase of waterborne disease is seen in your community; LHD's may perform these during National Recreational Water Illness (RWI) Week, the week before Memorial Day:

- Update e-mail, fax and/or phone list for aquatics operators/managers.
- Ensure that diarrhea-exclusion policies are implemented and enforced at facilities, including:
 - Alerting swim coaches to suspend swimmers with diarrhea.
 - Reassignment of staff with diarrhea to duties that do not require them to enter the water.
- Ensure that a fecal incident response plan is in place at the facility and that all staff is well trained on the appropriate response.

- Proper filtration and chlorination of water will prevent giardia from spreading in aquatic settings.

For more than one case association to an aquatic setting:

- Notify and mobilize operator:
 - Review the standard activities (listed above) with operator.
 - Inform of the need to intensify control measures.
- A thorough inspection of the facility is needed, examining situations that encourage transmission and practices that are not in line with recommendations.
 - The CDC’s “Environmental Health Outbreak Investigation Survey: Swimming Pool Venue” should be used to inspect the aquatic facility.
 - Ensure that operators maintain and monitor pH and free residual chlorine levels to prevent transmission of most waterborne pathogens.
 - Consult with the Office of Epidemiology on the need to collect water samples. Instructions on collection will be provided, as needed.
- If a period of possible contamination is identified, examine facility records during that period for events (i.e., swim meets) and other group activities, especially those involving high-risk groups (i.e., child care groups)
- Contact groups, as needed, to make them aware of signs of illness, to stop further transmission of disease and to identify new cases.

Intensified Giardia Control Measures for Aquatic Facilities include:

- Reinforce efforts to educate patrons about crypto, how it is spread in the water, and how they can protect themselves and others
- Reinforce diarrhea-exclusion policies for patrons and staff
 - Post diarrhea-exclusion messages that can be seen and understood.
 - Alert swim coaches to suspend swimmers who are ill with diarrhea.
 - Reassign staff ill with diarrhea to duties not requiring entry into water.
- Hyper-chlorinate the water (when not being used) to levels that will inactivate giardia (contact time of 45). See chart below for free chlorine levels needed in parts per million (ppm) based on the amount of time the chlorine levels are maintained (disinfection time).

Chlorine Levels (ppm)	Disinfection Time
1.0	45 minutes
2.0	25 minutes
3.0	19 minutes

- If hyper-chlorination has not occurred since the cases were at the facility, instruct operator to perform hyper-chlorination immediately.
- Recommend hyper-chlorinating weekly as a preventive measure.
- Clean or dispose of materials used in water that may retain water (i.e. porous mats or toys).
- Discuss with operator(s) other possible steps to prevent transmission such as suspending group events, closing “kiddie pools” and/or limiting access to diapered/toddler-aged children.
- Release information by an appropriate media outlet that those at risk for serious illness should consider not swimming during an outbreak.

F. Animals in Public Settings:

- Consult with the Bureau of Epidemiology and Public Health Informatics.
- Refer to "[Animals in Public Places Compendium](#)."

DATA MANAGEMENT AND REPORTING TO THE KDHE

- A. Organize and collect data.
- B. Report data via the state electronic surveillance system.
 - Especially data that collected during the investigation that helps to confirm or classify a case.

ADDITIONAL INFORMATION / REFERENCES

- A. **Treatment / Differential Diagnosis:** American Academy of Pediatrics. 2009 Red Book: Report of the Committee on Infectious Disease, 28th Edition. Illinois, Academy of Pediatrics, 2009.
- B. **Epidemiology, Investigation and Control:** Heymann. D., ed., Control of Communicable Diseases Manual, 19th Edition. Washington, DC, American Public Health Association, 2009.
- C. **Case Definitions:** CDC Division of Public Health Surveillance and Informatics, Available at: www.cdc.gov/ncphi/diss/nndss/casedef/case_definitions.htm
- D. **Kansas Regulations/Statutes Related to Infectious Disease:** www.kdheks.gov/epi/regulations.htm
- E. **Kansas Primary Drinking Water Regulations:** www.kdheks.gov/pws/regs/drinking_water_regs.pdf
- F. **Kansas Pubic Water Supply – Public Notification:** www.kdheks.gov/pws/pn.html
- G. **KDHE Foodborne Illness and Outbreak Investigation Manual:** Available at: www.kdheks.gov/epi/download/kansas_foodborne_illness_manual.pdf
- H. **KDHE Control of Enteric Disease Outbreaks in Childcare Facilities:** www.kdheks.gov/epi/download/Enteric_Disease_in_Daycare_Centers.pdf
- I. **KDHE Recreational Water Toolkit:** www.kdheks.gov/beh/water_guidelines.htm
- J. **Animals in Public Places Compendium:** www.kdheks.gov/epi/human_animal_health.htm
- K. **Recreational Water Illness Outbreak Response Toolkit (CDC):** www.cdc.gov/healthywater/emergency/toolkit/rwi-outbreak-toolkit.html
- L. **Fecal Incident Response Recommendations for Pool Operators:** www.cdc.gov/healthywater/pdf/swimming/pools/fecal-incident-response-recommendations.pdf
- M. **Environmental Health Outbreak Investigation Survey: Swimming Pool Venue:** www.cdc.gov/healthywater/pdf/emergency/environmental-health-outbreak-survey-swimming-pool.pdf
- N. **Additional Information (CDC):** www.cdc.gov/health/default.htm

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