Ascariasis rev March 2021

BASIC EPIDEMIOLOGY

Infectious Agent
Ascariasis is caused by the soil-transmitted helminths *Ascaris lumbricoides* and *Ascaris suum*. Both are roundworm intestinal nematodes. *Ascaris lumbricoides* is found in humans, while *Ascaris suum* is most commonly found in pigs. *Ascaris lumbricoides* is the most prevalent of all human intestinal nematodes worldwide.

Transmission
Transmission is primarily via ingestion of soil contaminated with feces. Eggs are shed in an infected person's feces but do not become infectious until they have incubated in the soil for 2-3 weeks. Once they become infectious they can be transmitted via contaminated soil and water, agriculture products contaminated with human or pig feces, fingers (especially children), or fomites.

Incubation Period
Eggs must incubate in soil for 2-3 weeks before they become infectious to humans. Once the infected eggs are ingested, it takes approximately 8 weeks for the eggs to develop into an egg-laying adult female worm.

Communicability
Human to human transmission of *Ascaris* spp. does NOT occur because part of the worm's life cycle must be completed in soil before becoming infectious. Soil contamination is perpetuated by fecal contamination from infected humans for *Ascaris lumbricoides* and humans (rarely) or pigs for *Ascaris suum*. An infected person may shed eggs for as long as they are infected with an egg-laying adult which may be several years.

Clinical Illness
Most infections with Ascaris spp. are asymptomatic. Live worms, passed in stools or occasionally from the mouth, anus, or nose, are often the first recognized sign of infection. Larval migration may result in pulmonary manifestations such as wheezing, cough, fever, eosinophilia and pulmonary infiltration in some patients. Light infections may result in minor abdominal discomfort, dyspepsia, and loss of appetite. Heavy infections may result in severe abdominal pain, fatigue, vomiting, or weight loss. In children, these symptoms can result in nutrient deficiencies causing delayed growth and/or cognitive impairment. Serious complications are rare but can be fatal and include intestinal obstruction by a bolus of worms, or obstruction of bile duct, pancreatic duct or appendix by one or more adult worms.

DEFINITIONS

Clinical Case Definition
Early symptoms of ascariasis occur during larval migration and include cough, wheezing, pneumonitis and eosinophilia. Minor infections may manifest as abdominal discomfort or loss of appetite. Major infections may result in obstruction and inflammation of intestinal organs (appendicitis, pancreatitis etc.), vomiting (possibly accompanied by expulsion of adult worms), weight loss, and fatigue. In children, nutrient deficiency, growth retardation, and cognitive impairment may also be present.

Laboratory Confirmation

- Microscopic identification of *Ascaris* spp. (*A. lumbricoides* or *A. suum*) eggs in stool specimens **OR**
- Microscopic identification of ascarid larvae in sputum or gastric washings, **OR**
- Identification of adult worms passed from the anus, mouth or nose

Case Classifications

- **Confirmed:** A case that is laboratory confirmed
- **Probable**: A clinically compatible case with evidence of infection such as
    - An ultrasound showing worms in the pancreas or liver or
    - CT or MRI scans showing worms present in the ducts of the liver or pancreas.

SURVEILLANCE AND CASE INVESTIGATION

Case Investigation
Local and regional health departments should promptly investigate all reports of ascariasis. Investigations should include an interview of the case or a surrogate to get a detailed exposure history. Please use the Ascariasis Investigation Form available on the DSHS website: http://www.dshs.texas.gov/idcu/investigation/

Note:

- If an imported case (acquired outside of Texas) of Ascariasis is diagnosed/identified in a refugee with a current Texas address, it should be investigated and counted as a Texas case. If a case currently has an address outside of your jurisdiction or the refugee plans to move to another state or country, fax the available investigation information, with the new address, to DSHS EAIDU. This information will be forwarded to the appropriate jurisdiction.

Case Investigation Checklist

- ☐ Confirm laboratory results meet the case definition.
- ☐ Review medical records or speak to an infection preventionist or healthcare provider to verify case definition, identify possible risk factors, and describe course of illness.
- ☐ Interview the case to get detailed exposure history and risk factor information.
    - Use the **Ascariasis Investigation Form** to record information from the interview.
    - If the case is not available or is a child, conduct the interview with a surrogate who would have the most reliable information on the case, such as a parent or guardian.
    - Provide education to the case or his/her surrogate about effective hand washing, food safety practices, and avoidance of soil contamination. See Prevention and Control Measures.
- ☐ Fax completed forms to DSHS EAIDU at **512-776-7616**
    - For lost to follow-up (LTF) cases, please complete as much information as possible obtained from medical/laboratory records (e.g., demographics, symptomology,

onset date, etc.) on investigation form and fax/e-mail securely to DSHS EAIDU and indicate the reason for any missing information.

- If the case is part of an outbreak or cluster, see Managing Special Situations section.
- All confirmed case investigations must be entered and submitted for notification in the NEDSS Base System (NBS). Please refer to the *NBS Data Entry Guidelines* for disease specific entry rules.

Prevention and Control Measures

- Routine hand washing with soap and warm water.
- Proper disposal of human waste products, such as feces, is necessary to prevent contamination of soil.
- Avoid areas where human waste contamination of soil or water is likely.
- Proper removal and disposal of pet waste from outdoor areas.
- Thoroughly wash fruits and vegetables to remove soil/fertilizer residue.
- Thoroughly cook all fruits and vegetables that may have been in contact with soil produced from human and animal waste.

Exclusions

There is no human-to-human transmission of ascariasis therefore no exclusion from work, school or daycare is required for disease control purposes unless the individual has diarrhea. If the individual has diarrhea, the standard exclusion until diarrhea free for 24 hours without the use of diarrhea suppressing medications applies. Diarrhea is defined as 3 or more episodes of loose stools in a 24-hour period.

MANAGING SPECIAL SITUATIONS

Outbreaks/Clusters

If an outbreak or cluster is suspected, notify the DSHS Emerging and Acute Infectious Disease Unit (EAIDU) at **(512) 776-7676**.

The local/regional health department should:

- Interview all cases suspected as being part of the outbreak or cluster.
- Request medical records for any case in your jurisdiction that died, was too ill to be interviewed, or for whom there are no appropriate surrogates to interview.
- Prepare a line list of cases in your jurisdiction. Minimal information needed for the line list might include patient name or other identifier, DSHS or laboratory specimen identification number, specimen source, date of specimen collection, date of birth, county of residence, date of onset (if known), symptoms, underlying conditions, treatments and outcome of case, and risky exposures, such as inadequate waste disposal near the home or work, recreational activities in areas with inadequate waste disposal, or travel to an endemic country reported by the case or surrogate.

Line list example:

ID	Name	Age	Sex	Ethnicity	Onset	Symptoms	Risks	Notes
1	NT	34	F	White/non-Hispanic	12/4/16	Diarrhea, Anemia	Travel to Vietnam, lives in same neighborhood as ID 2	Brother ill
2	PR	4	M	Unknown	11/30/16	Anemia, bloody stool	Poor sanitation near home, lives in same neighborhood as ID 1	Lost to follow up (LTF)

- If the outbreak was reported in association with an apparent common risk factor (e.g., work or live near a possible site of soil contamination, members of the same household with similar travel), recommend that anyone displaying symptoms seek medical attention from a healthcare provider.
- If several cases in the same family or geographic area are identified and there is a possibility for similar exposures (e.g., travel to the same country, poor sanitation), testing of potentially exposed persons or mass de-worming treatment may be warranted.

REPORTING AND DATA ENTRY REQUIREMENTS

Provider, School, Child-Care Facility, and General Public Reporting Requirements
Confirmed, probable and clinically suspected cases are required to be reported **within 1 week** to the local or regional health department or the Texas Department of State Health Services (DSHS), Emerging and Acute Infectious Disease Unit (EAIDU) at **(800) 252-8239 or (512) 776-7676**.

Local and Regional Reporting and Follow-up Responsibilities
Local and regional health departments should:

- Enter the case into NBS and submit an NBS notification on all **confirmed and probable** cases.
    - Please refer to the *NBS Data Entry Guidelines* for disease-specific entry rules.
    - A notification can be sent as soon as the case criteria have been met. Additional information from the investigation may be entered upon completing the investigation.
- Fax completed forms to DSHS EAIDU at **512-776-7616** or email securely to an EAIDU epidemiologist.

When an outbreak is being investigated, local and regional health departments should:

- Report outbreaks within 24 hours of identification to the regional DSHS office or to EAIDU at **512-776-7676.**

LABORATORY PROCEDURES

Fecal Ova and Parasite testing for helminth eggs (fecal O&P examination) is widely available from most private laboratories, and if needed, DSHS laboratory is available for specimen submission. Adult worm specimen identification may not be available at private laboratories therefore submission

to the DSHS laboratory is available and highly recommended. Contact EAIDU to discuss further if needed.

Specimen Collection

- Submit a stool specimen in an O&P stool collection kit (5-10 % formalin & Zn-PVA fixatives).
    - Required volume: Stool 5 g solid or 5 mL liquid.
- Adult worms should be submitted in either 5-10% formalin or 70% ethanol.

Submission Form

- Use DSHS Laboratory G-2B form for specimen submission.
- Make sure the patient's name and date of birth or medical record number match exactly what is written on the transport tubes.
- Fill in the date of collection, date of onset, diagnosis/symptoms, and all required fields.

Specimen Shipping

- Transport temperature: May be shipped at ambient temperature.
- Ship specimens via overnight delivery.
- DO NOT mail on a Friday, or state holiday, unless special arrangements have been pre-arranged with DSHS Laboratory.
- Ship specimens to:

Laboratory Services Section, MC-1947
Texas Department of State Health Services
1100 West 49th Street
Austin, TX 78756-3199
Attn. Walter Douglass (512) 776-7569

Possible Causes for Rejection:

- Specimen not in correct transport medium.
- Missing or discrepant information on form/specimen.
- Transport media was expired.
- Unpreserved specimen received greater than 24 hours after collection. (Specimen may still be submitted as an attempt will be made to complete testing on compromised material.)

- Call Medical Parasitology Lab (512) 776-7560 with specific questions about specimen acceptance criteria.

REVISION HISTORY

March 2021

- Entire section updated