

** Proposed new case definition; to be confirmed by AFHSB following analyses of data*

HELMINTHIASES

Includes Flukes, Tapeworms, Filarial Worms and Round Worms

Background

This case definition was developed in 2016 by the Armed Forces Health Surveillance Branch (AFHSB) for the purpose of epidemiological surveillance of helminth infections important to military associated populations. The definition is based on a case definition developed for a *Medical Surveillance Monthly Report (MSMR)* article on helminthiases.¹

Clinical Description

Helminths, are parasitic worms that infect animals and humans worldwide. There are two major phyla of helminths. The nematodes (roundworms) include the major intestinal worms (soil-transmitted helminths) and the filarial worms that cause lymphatic filariasis (LF) and onchocerciasis. The phylum of platyhelminths (flatworms) includes the flukes (trematodes), such as the schistosomes, and the tapeworms (cestodes), such as the pork tapeworm that causes cysticercosis. Soil-transmitted helminth infections are among the most common. These helminths live in the intestine and their eggs are passed in the feces of infected persons and animals. Clinical features vary by helminth species, intensity of infection and age of host. Many species cause abdominal pain, malnutrition and weight loss and may or may not cause gastroenteritis. Filariasis is transmitted to humans through the bite of a mosquito. Symptoms include fever, chills, headache, and skin lesions in the early stages and, if untreated, enlargement of the limbs and genitalia in a condition called elephantiasis.² With the exception of *Strongyloides stercoralis*, helminths do not replicate within the human host.³ Diagnosis of helminth infections are based on clinical symptoms and laboratory testing of stool and blood specimens. Treatment is with antibiotics or antihelminths specific for the parasite. Prevention of these infections varies according to the mode of transmission i.e., avoidance of contaminated food, water, soil, and mosquito bites).⁴

Case Definition and Incidence Rules

For surveillance purposes, a case of a helminthiasis (worm infection) is defined as:

- *One hospitalization or outpatient medical encounter* with any of the case defining diagnoses of helminthiasis (see ICD9 and ICD10 code lists below) in *any* diagnostic position.
- *One record of a reportable medical event (RME) of a confirmed case of helminthiasis with a specific diagnosis of interest* (see list of conditions below).

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¹ Armed Forces Health Surveillance Center. Helminthiasis, Active Component, U.S. Armed Forces. *Medical Surveillance Monthly Report (MSMR)*. (forthcoming).

² Centers for Disease Control and Prevention (CDC). Parasites- Lymphatic Filariasis. See <http://www.cdc.gov/parasites/lymphaticfilariasis>; accessed April 2016.

³ Hotez, P, Brindley, P., Bethony, J, *et al.* Helminth infections: the great neglected tropical disease. *Journal of Clinical Investigation*. 118:1311–1321 (2008). doi:10.1172/JCI34261. See <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2276811>; (accessed March 2016)

⁴ Centers for Disease Control and Prevention (CDC). Foodborne, Waterborne, and Environmental Diseases (DFWED). <http://www.cdc.gov/ncezid/dfwed/index.html>; accessed March 2016.



Case Definition and Incidence Rules *(continued)*

Incidence rules:

For individuals who meet the case definition:

- The incidence date is considered the date of the first hospitalization or outpatient medical encounter that includes a defining diagnosis of helminthiasis.
- An individual is considered an incident case *once per surveillance period*.

Exclusions:

- None

Codes

The following ICD9 and ICD10 codes are included in the case definition:

Flukes

Condition	ICD-10-CM Codes	ICD-9-CM Codes
Flukes (trematodes)	<i>B65 (schistosomiasis [biharziasis])</i>	<i>120 (schistosomiasis [bilharziasis])</i>
	- B65.0 (schistosomiasis due to <i>Schistosoma haematobium</i> [urinary schistosomiasis])	120.0 (<i>Schistosoma haematobium</i>)
	- B65.1 (schistosomiasis due to <i>Schistosoma mansoni</i> [intestinal schistosomiasis])	120.1 (<i>Schistosoma mansoni</i>)
	- B65.2 (schistosomiasis due to <i>Schistosoma japonicum</i>)	120.2 (<i>Schistosoma japonicum</i>)
	- B65.3 (cercarial dermatitis)	120.3 (cutaneous schistosomiasis)
	- B65.8 (other schistosomiasis)	120.8 (other specified schistosomiasis)
	- B65.9 (schistosomiasis, unspecified)	120.9 (schistosomiasis, unspecified)
	<i>B66 (other fluke infections)</i>	<i>121 (other trematode infections)</i>
	- B66.0 (opisthorchiasis)	121.0 (opisthorchiasis)
	- B66.1 (clonorchiasis)	121.1 (clonorchiasis)
	- B66.2 (dicroceliasis)	121.8 (other specified trematode infections)
	- B66.3 (fascioliasis)	121.3 (fascioliasis)

	- B66.4 (paragonimiasis)	121.2 (paragonimiasis)
	- B66.5 (fasciolopsiasis)	121.4 (fasciolopsiasis)
	- B66.8 (other specified fluke infections)	121.5 (metagonimiasis) 121.6 (heterophyiasis)
	- B66.9 (fluke infection, unspecified)	121.9 (trematode infection, unspecified)

Tapeworms

Tapeworms (cestodes)	B67 (echinococcosis)	122 (echinococcosis)
	- B67.0 (echinococcus granulosus infection of liver)	122.0 (echinococcus granulosus infection of liver)
	- B67.1 (echinococcus granulosus infection of lung)	122.1 (echinococcus granulosus infection of lung)
	- B67.2 (echinococcus granulosus infection of bone)	122.3 (echinococcus granulosus infection, other)
	- B67.3 (echinococcus granulosus infection, other and multiple sites)	--
	- B67.31 (echinococcus granulosus infection, thyroid gland)	122.2 (echinococcus granulosus infection of thyroid)
	- B67.32 (echinococcus granulosus infection, multiple sites)	122.3 (above)
	- B67.39 (echinococcus granulosus infection, other sites)	
	- B67.4 (echinococcus granulosus infection, unspecified)	122.4 (echinococcus granulosus infection, unspecified)
	- B67.5 (echinococcus multilocularis infection of liver)	122.5 (echinococcus multilocularis infection of liver)
	- B67.6 (echinococcus multilocularis infection, other and multiple sites)	122.6 (echinococcus multilocularis infection, other)
	- B67.61 (echinococcus multilocularis infection, multiple sites)	
	- B67.69 (echinococcus multilocularis infection, other sites)	
	- B67.7 (echinococcus multilocularis infection, unspecified)	122.7 (echinococcus multilocularis infection, unspecified)
	- B67.8 (echinococcosis, unspecified, of liver)	122.8 (echinococcosis, unspecified, of liver)
	- B67.9 (echinococcosis, other and unspecified)	122.9 (echinococcosis, other and unspecified)

	- B67.90 (echinococcosis, unspecified)	unspecified)
	- B67.99 (other echinococcosis)	
	<i>B68 (taeniasis)</i>	<i>123 (other cestode infections)</i>
	- B68.0 (taenia solium taeniasis)	123.0 (taenia solium infection, intestinal form)
	- B68.1 (taenia saginata taeniasis)	123.2 (taenia saginata infection)
	- B68.9 (taeniasis, unspecified)	123.3 (taeniasis, unspecified)
	<i>B69 (cysticercosis [pork tapeworm])</i>	--
	- B69.0 (cysticercosis of central nervous system)	123.1 (cysticercosis)
	- B69.1 (cysticercosis of eye)	
	- B69.8 (cysticercosis of other sites)	
	- B69.81 (myositis of cysticercosis)	
	- B69.89 (cysticercosis of other sites)	
	- B69.9 (cysticercosis, unspecified)	
	<i>B70 (diphyllobothriasis [fish tapeworm] and sparganosis)</i>	--
	- B70.1 (sparganosis)	123.5 (sparganosis [larval diphyllobothriasis] infection)
	<i>B71 (other cestode infections)</i>	--
	- B71.0 (hymenolepiasis)	123.6 (hymenolepiasis)
	- B71.1 (dipylidiasis)	123.8 (other specified cestode infection)
	- B71.8 (other specified cestode infections)	123.8 (above)
	- B71.9 (cestode infection, unspecified)	123.9 (cestode infection, unspecified)

Filarial Worms

Condition	ICD-10-CM Codes	ICD-9-CM Codes
Filarial worms	<i>B72 (dracunculiasis [Guinea worm])</i>	125.7 (dracontiasis)
	<i>B73 (onchocerciasis [River blindness])</i>	125.3 (onchocerciasis)
	- B73.0 (onchocerciasis with eye disease)	
	- B73.00 (onchocerciasis with eye involvement unspecified)	
	- B73.01 (onchocerciasis with endophthalmitis)	

	- B73.02 (onchocerciasis with glaucoma)	
	- B73.09 (onchocerciasis with other eye involvement)	
	- B73.1 (onchocerciasis without eye disease)	
	<i>B74 (filariasis)</i>	--
	- B74.0 (filariasis due to <i>Wuchereria bancrofti</i>)	125.0 (bancroftian filariasis)
	- B74.1 (filariasis due to <i>Brugia malayi</i>)	125.1 (Malayan filariasis)
	- B74.2 (filariasis due to <i>Brugia timori</i>)	125.6 (other specified filariasis)
	- B74.3 (loiasis)	125.2 (loiasis)
	- B74.4 (mansonelliasis)	125.5 (mansonella ozzardi infection)
	- B74.8 (other filariases)	125.4 (dipetalonemiasis) 125.6 (above)
	- B74.9 (filariasis, unspecified)	125.9 (unspecified filariasis)

Roundworms (Soil-Transmitted Worms)

Condition	ICD-10-CM Codes	ICD-9-CM Codes
Nematodes	<i>B75 (trichinellosis; [trichinosis])</i>	124 (trichinosis; trichinellosis)
	<i>B76 (hookworm diseases)</i>	<i>126 (ancylostomiasis and necatoriasis)</i>
	- B76.0 (ancylostomiasis)	126.0 (ancylostoma duodenale) 126.2 (ancylostoma braziliense) 126.3 (ancylostoma ceylanicum) 126.8 (other specified ancylostoma)
	- B76.1 (necatoriasis)	126.1 (necator americanus)
	- B76.8 (other hookworm diseases)	126.9 (ancylostomiasis and necatoriasis, unspecified)
	- B76.9 (hookworm disease, unspecified)	
	<i>B77 (ascariasis[roundworm])</i>	<i>127 (other intestinal helminthiasises)</i>
	- B77.0 (ascariasis with intestinal complications)	127.0 (above)
	- B77.8 (ascariasis with other complications)	
	- B77.81 (ascariasis pneumonia)	

	- B77.89 (ascariasis with other complications)	
	- B77.9 (ascariasis, unspecified)	
	<i>B78 (strongyloidiasis[threadworm])</i>	127.2 (strongyloidiasis)
	- B78.0 (intestinal strongyloidiasis)	
	- B78.1 (cutaneous strongyloidiasis)	
	- B78.7 (disseminated strongyloidiasis)	
	- B78.9 (strongyloidiasis, unspecified)	
	<i>B79 (trichuriasis [whipworm])</i>	127.3 (trichuriasis)
	<i>B80 (enterobiasis[pinworm])</i>	127.4 (enterobiasis)

Other Worms

Condition	ICD-10-CM Codes	ICD-9-CM Codes
Other nematodes	<i>B81 (other intestinal helminthiases, not elsewhere classified)</i>	
	- B81.0 (anisakiasis [herring worm])	127.1 (anisakiasis)
	- B81.1 (intestinal capillariasis)	127.5 (capillariasis)
	- B81.2 (trichostrongyliasis)	127.6 (trichostrongyliasis)
	- B81.3 (intestinal angiostrongyliasis)	127.7 (other specified intestinal helminthiasis)
	- B81.4 (mixed intestinal helminthiasis)	127.8 (mixed intestinal helminthiasis)
	- B81.8 (other specified intestinal helminthiasis)	127.7 (above)
	<i>B82 (unspecified intestinal parasitism)</i>	127.9 (intestinal helminthiasis, unspecified) 129 (intestinal parasitism, unspecified)
	- B82.0 (intestinal helminthiasis, unspecified)	
	- B82.9 (intestinal parasitism, unspecified)	
	<i>B83 (other helminthiases)</i>	<i>128 (other and unspecified helminthiases)</i>
	- B83.0 (visceral larva migrans)	128.0 (toxocariasis)
	- B83.1 (gnathostomiasis)	128.1 (gnathostomiasis)
	- B83.2 (angiostrongyliasis due to <i>Parastongylus cantonensis</i>)	128.8 (other specified helminthiasis)
	- B83.3 (syngamiasis)	
	- B83.8 (other specified helminthiasis)	128.8 (above)



	- B83.9 (helminthiasis, unspecified)	128.9 (helminth infection, unspecified)
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Annelids

Condition	ICD-10-CM Codes	ICD-9-CM Codes
Leech infection	- B83.4 (internal hirudiniasis)	134.2 (hirudiniasis)

Development and Revisions

- In May of 2016 the case definition was updated to include ICD10 codes.
- The definition was developed by the AFHSB Medical Surveillance Monthly Report (MSMR) staff for a forthcoming MSMR article on helminthiasis.¹ The case definition was developed based on reviews of the ICD9 and ICD codes, the scientific literature, and previous AFHSB analyses.

Case Definition and Incidence Rule Rationale

- Not all of the conditions documented in this case definition are Reportable Medical Events in the Armed Forces. See <https://www.afhsc.mil/Home/ReportableEvents> for a list of reportable events. Investigators wishing to compare specific causes of helminthiasis may want to consider the implications of this case finding criteria on the individual conditions.

Code Set Determination and Rationale

- Codes ICD9 123.4 (diphyllobothriasis, intestinal) / ICD10 B70.0 (diphyllobothriasis) are not included in the code set. Review of the data revealed this relatively rare condition (fish tapeworm) was coded 2,681 times during surveillance period (2004-2014), making it the most common cestode infection code. Further review of Armed Forces Health Longitudinal Technology (AHLTA) records for a subset of cases indicated that none of the medical encounters for which this code was used were for true cases of fish tapeworm. This code was used for a number of other conditions – most frequently, mental or behavioral health diagnoses.

Reports

AFHSB reports on helminthiasis in the following reports:

- Monthly: AFHSC Reportable Events Monthly Report. Available on the AFHSB website at: <http://www.afhsc.mil>; see “Reports and Publications”.

Review

May 2016	<i>Proposed</i> case definition reviewed and adopted by the AFHSB Surveillance Methods and Standards (SMS) working group.
May 2016	Case definition reviewed and adopted by the AFHSB MSMR staff.

Comments

None

