

APPENDICITIS

Includes Appendectomy

Background

This case definition was developed by the Armed Forces Health Surveillance Branch (AFHSB) for the purpose of epidemiological surveillance of appendicitis and appendectomies among the active and reserve components of the U.S. Armed Forces.¹ The burden of appendicitis on the Military Health System is significant. Between 2002 and 2011 there were 31,610 cases of appendicitis and 30,183 appendectomies. Onset of the condition is unpredictable and often sudden, so its occurrence in members of the U.S. Armed Forces can be disruptive, particularly in the deployed setting.¹

Clinical Description

The appendix is a small, blind-ended tube connected to the large intestine near its junction with the small intestine. Inflammation of the appendix, or appendicitis, can occur as a result of obstruction (i.e., by fecal material, a foreign object, or swelling of lymphoid tissue) or from infection; however, in most cases, the etiology is unknown. Typical symptoms include mild, central abdominal pain that progresses to sharp, severe pain in the lower right quadrant of the abdomen. The pain is often accompanied by nausea, vomiting, diarrhea, and fever. Left untreated, an inflamed appendix can rupture leading to peritonitis and sepsis. As such, appendicitis is a potentially life threatening condition that requires immediate medical intervention. Treatment is prompt surgical removal of the appendix, a procedure known as appendectomy.^{1,2}

Case Definition and Incidence Rules - *Appendicitis*

For surveillance purposes, a case of appendicitis is defined as:

- *One hospitalization* with a case defining diagnosis of appendicitis (see ICD9 and ICD10 code lists below) in *any* diagnostic position; or
- *One outpatient medical encounter* with a case defining diagnosis of appendicitis (see ICD9 and ICD10 code lists below) in the *primary or secondary* diagnostic position; AND *one* case defining Current Procedure Terminology (CPT) indicative of an appendectomy or other surgical procedure involving the appendix (see code list below) in any diagnostic position.

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 appendicitis

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¹ Armed Forces Health Surveillance Center. Appendicitis and Appendectomies, Active and Reserve Components, U.S. Armed Forces, 2002-2011. *Medical Surveillance Monthly Report (MSMR)*. 2012 Dec; 19(12): 7-12.

² Detmer DE, Nevers LE, Sikes ED Jr. Regional results of acute appendicitis care. *JAMA*. 1981;246:1318-1320.



Case Definition and Incidence Rules *(continued)*

- An individual is considered an incident case only *once per lifetime*.

Exclusions:

- None

Case Definition and Incidence Rules - *Appendectomy*

For surveillance purposes, a case of appendectomy is defined as:

- *One hospitalization* with a case defining procedure (PR) code indicative of an appendectomy (see ICD9 and ICD10 code lists below) in *any* diagnostic position.
- *One outpatient medical encounter* with a case defining Current Procedure Terminology (CPT) code indicative of an appendectomy (see code list below) in *any* diagnostic position.

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 procedure code for appendectomy.
- An individual is considered an incident case only *once per lifetime*.

Exclusions:

- None

Codes

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

Condition	ICD-10-CM Codes	ICD-9-CM Codes
Appendicitis	<i>K35 (acute appendicitis)</i>	<i>540 (acute appendicitis)</i>
	- K35.2 (acute appendicitis with generalized peritonitis)	- 540.0 (with peritonitis, perforation, or rupture)
	- K35.3 (acute appendicitis with localized peritonitis)	- 540.1 (with peritoneal abscess)
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- K35.8 (other and unspecified acute appendicitis)	- 540.9 (without mention of peritonitis, perforation, or rupture)
- K35.80 (unspecified acute appendicitis)	
- K35.89 (other acute appendicitis)	
K36 (other appendicitis)	542 (other appendicitis; chronic, recurrent, relapsing, subacute)
K37 (unspecified appendicitis)	541 (appendicitis, unqualified)
<i>K38 (other diseases of appendix)</i>	<i>543 (other diseases of appendix)</i>
- K38.0 (hyperplasia of appendix)	- 543.0 (hyperplasia of appendix; lymphoid)
- K38.1 (appendicular concretions)	- 543.9 (other and unspecified diseases of appendix)
- K38.2 (diverticulum of appendix)	
- K38.3 (fistula of appendix)	
- K38.8 (other specified diseases of appendix)	
- K38.9 (disease of appendix, unspecified)	

Procedure	ICD-10-CM (PR) Codes	ICD-9-CM (PR) Codes
Appendectomy (inpatient)	<i>0D9J (drainage, appendix)</i>	47.2 (drainage of appendiceal abscess)
	- 0D9J00Z (drainage of appendix with drainage device, open approach)	<i>Note: 47.2 excludes appendectomy. See Code Determination and Rationale below.</i>
	- 0D9J0ZX (drainage of appendix, open approach, diagnostic)	
	- 0D9J0ZZ (drainage of appendix, open approach)	
	- 0D9J30Z (drainage of appendix with drainage device, percutaneous approach)	
	- 0D9J3ZX (drainage of appendix, percutaneous approach, diagnostic)	
	- 0D9J3ZZ (drainage of appendix, percutaneous approach)	
	- 0D9J40Z (drainage of appendix with drainage device, percutaneous endoscopic approach)	
	- 0D9J4ZX (drainage of appendix, percutaneous endoscopic approach, diagnostic)	
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- 0D9J4ZZ (drainage of appendix, percutaneous endoscopic approach)	
- 0D9J70Z (drainage of appendix with drainage device, via natural or artificial opening)	
- 0D9J7ZX (drainage of appendix, via natural or artificial opening, diagnostic)	
- 0D9J7ZZ (drainage of appendix with drainage device, via natural or artificial opening)	
- 0D9J80Z (drainage of appendix with drainage device, via natural or artificial opening endoscopic)	
- 0D9J8ZX (drainage of appendix, via natural or artificial opening endoscopic, diagnostic)	
- 0D9J8ZZ (drainage of appendix, via natural or artificial opening endoscopic)	
<i>0DQJ (repair, appendix)</i>	47.92 (other operations on appendix; closure of appendiceal fistula)
- 0DQJ0ZZ (repair appendix, open approach)	47.99 (other operations on appendix; anastomosis of appendix)
- 0DQJ3ZZ (repair appendix, percutaneous approach)	
- 0DQJ4ZZ (repair appendix, percutaneous endoscopic approach)	
- 0DQJ7ZZ (repair appendix, via natural or artificial opening)	
- 0DQJ8ZZ (repair appendix, via natural or artificial opening endoscopic)	
<i>0DTF (resection, large intestine, right)</i>	45.73 (open and other right hemicolectomy)
- 0DTF0ZZ (resection of right large intestine, open approach)	
- 0DTF4ZZ (resection of right large intestine, percutaneous endoscopic approach)	
- 0DTF7ZZ (resection of right large intestine, via natural or artificial opening)	
- 0DTF8ZZ (resection of right large intestine, via natural or artificial opening endoscopic)	
<i>0DTH (resection, cecum)</i>	45.72 (open and other cecectomy)
- 0DTH0ZZ (resection of cecum, open approach)	

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- 0DTH4ZZ (resection of cecum, percutaneous endoscopic approach)	
- 0DTH7ZZ (resection of cecum, via natural or artificial opening)	
- 0DTH8ZZ (resection of cecum, via natural or artificial opening endoscopic)	
<i>0DTJ (resection, appendix)</i>	47.0 (appendectomy)
- 0DTJ0ZZ (resection of appendix, open approach)	- 47.01 (laparoscopic appendectomy) - 47.09 (other appendectomy)
- 0DTJ4ZZ (resection of appendix, percutaneous endoscopic approach)	47.1 (incidental appendectomy)
- 0DTJ7ZZ (resection of appendix, via natural or artificial opening)	- 47.11 (laparoscopic incidental appendectomy) - 47.19 (other incidental appendectomy)
- 0DTJ8ZZ (resection of appendix, via natural or artificial opening endoscopic)	
<i>0DTK (resection, ascending colon)</i>	45.73 (above)
- 0DTK0ZZ (resection of ascending colon, open approach)	
- 0DTK4ZZ (resection of ascending colon, percutaneous endoscopic approach)	
- 0DTK7ZZ (resection of ascending colon, via natural or artificial opening)	
- 0DTK8ZZ (resection of ascending colon, via natural or artificial opening endoscopic)	

Procedures**CPT Codes**

Appendectomy (outpatient)	44950 (appendectomy: incidental during intra-abdominal surgery)
	44955 (appendectomy when done for indicated purpose at time of other major procedure)
	44960 (appendectomy for ruptured appendix, with abscess or generalized peritonitis)
	44870 (laparoscopy, surgical; appendectomy)
	44979 (unlisted laparoscopy procedure, appendix)
	44900 (drainage of appendiceal abscess)
	44901 (drainage of appendiceal abscess)



Development and Revisions

- In October of 2016 the case definition was updated to include ICD10 codes.
- The definition was developed in December of 2012 by the AFHSC *Medical Surveillance Monthly Report (MSMR)* staff for use in a *MSMR* article on appendicitis and appendectomies.¹ The case definition was developed based on reviews of the ICD9 codes, the scientific literature, and previous AFHSC analyses.

Case Definition and Incidence Rule Rationale

- To increase the specificity of the case finding criteria for appendicitis diagnosed in the outpatient setting, an outpatient procedure code (CPT code) related to the appendix is also required. This increases the likelihood that the diagnosis of appendicitis in the first or second diagnostic position is a “true” case of appendicitis.
- Using this case definition, in-patient cases of appendectomy can be further stratified into “nonincidental appendectomies” (i.e., appendectomies performed for the indicated purpose [appendicitis]), “incidental appendectomies” (i.e., appendectomies performed incidentally during intra-abdominal surgery), and “other appendectomy-related” cases. They can also be stratified into acute and non-acute cases (see Table 1, *MSMR*, December 2012).¹

Code Set Determination and Rationale

- *Appendicitis*: Outpatient CPT codes 44900 and 44901 (drainage of appendiceal abscess) are included in the case definition and code set for appendicitis because the procedure, though not an appendectomy, confirms a case of appendicitis.
- *Appendectomy*: Inpatient ICD9 procedure codes 45.72 (open and other cecectomy) and 45.73 (open and other right hemicolectomy) are included in the code set for appendectomy as these surgical procedures generally involve removal of the appendix.
- Inpatient ICD9 procedure codes 47.2 (drainage of appendiceal abscess; excludes that with appendectomy), 47.92 (other operations on appendix; closure of appendiceal fistula), 47.99 (other operations on appendix; anastomosis of appendix) and CPT codes 44900 and 44901 (drainage of appendiceal abscess) do not involve an appendectomy. The codes are included in the code set for appendicitis for the purpose of confirming an appendicitis encounter in the outpatient setting. They are included in the code set for “appendectomy” for the purpose of stratifying cases by procedure type and are included in the category of “other appendectomy related” cases. These codes could be removed in a more specific case definition for appendectomy

Reports

AFHSB reports on appendicitis and appendectomy in the following reports:

- None

Review

Oct 2016	Case definition reviewed and updated by the AFHSB Surveillance Methods and Standards (SMS) working group.
Feb 2013	Case definition reviewed and adopted by the AFHSC Surveillance Methods and Standards (SMS) working group.



Dec 2012 Case definition reviewed and adopted by the AFHSC *MSMR* staff.

Comments

Limitations: Service members who had appendectomies prior to joining the U.S. Armed Forces cannot be excluded from analyses using Defense Medical Surveillance System (DMSS) data. As such, these individuals are included in the population considered at risk of being affected by appendicitis or appendectomy. Because such individuals are not excluded from the denominators for rate calculations, incidence rates may underestimate the true incidence rates of the conditions of interest.

