

APPENDICITIS AND APPENDECTOMY

Background

This case definition was developed by the Armed Forces Health Surveillance Center (AFHSC) 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 any of the defining diagnoses of appendicitis (see ICD9 code list below) in *any* diagnostic position; or
- *One outpatient medical encounter* with any of the defining diagnoses of appendicitis (see ICD9 code list below) in the *primary or secondary* diagnostic position; AND *one outpatient procedure code* (CPT code) indicative of an appendectomy or other surgical procedure involving the appendix (see code list below).

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

Exclusions:

- None

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 - APPENDECTOMY

For surveillance purposes, an appendectomy case is defined as:

- *One inpatient procedure code (ICD9 code) or outpatient procedure code (CPT code) indicative of an appendectomy (see code list below).*

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 codes are included in the case definitions:

Condition	ICD-9-CM Codes	CPT Codes
Appendicitis	<p>540 Acute Appendicitis</p> <ul style="list-style-type: none"> - 540.0 (with peritonitis, perforation, or rupture) - 540.1 (with peritoneal abscess) - 540.9 (without mention of peritonitis, perforation, or rupture) <p>541 (appendicitis, unqualified)</p> <p>542 (other appendicitis; chronic, recurrent, relapsing, subacute)</p>	
Appendectomy <i>Outpatient procedures (CPT codes)</i>		<ul style="list-style-type: none"> - 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) <p><i>(continued on next page)</i></p>



		<ul style="list-style-type: none"> - 44870 (laparoscopy, surgical; appendectomy) - 44979 (unlisted laparoscopy procedure, appendix) - 44900, 44901 (drainage of appendiceal abscess)
<p>Appendectomy <i>Inpatient procedures (ICD9 codes)</i></p>	<p>45.72 (open and other cecectomy)</p> <p>45.73 (open and other right hemicolectomy)</p> <p>47 Operations on Appendix</p> <p>47.0 (appendectomy)</p> <ul style="list-style-type: none"> - 47.01 (laparoscopic appendectomy) - 47.09 (other appendectomy) <p>47.1 (incidental appendectomy)</p> <ul style="list-style-type: none"> - 47.11 (laparoscopic incidental appendectomy) - 47.19 (other incidental appendectomy) <p>47.2 (drainage of appendiceal abscess; excludes that with appendectomy)</p> <p>47.92 (other operations on appendix; closure of appendiceal fistula)</p> <p>47.99 (other operations on appendix; anastomosis of appendix)</p>	

Development and Revisions

- The case definition was developed based on reviews of the ICD9 codes, the scientific literature, and previous AFHSC analyses. The definition was developed by the AFHSC Medical Surveillance Monthly Report (MSMR) staff for a December 2012 article on appendicitis and appendectomies.¹

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.
- *Supplemental codes:* 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

None

Review

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.

