



## Complete Summary

---

### TITLE

Perforated appendix: hospital admission rate.

### SOURCE(S)

AHRQ quality indicators. Guide to prevention quality indicators: hospital admission for ambulatory care sensitive conditions [revision 3]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2004 Jan 9. Various p. (AHRQ Pub; no. 02-R0203).

## Brief Abstract

### DESCRIPTION

This indicator assesses the number of admissions for perforated appendix per 100 admissions for appendicitis within Metropolitan Statistical Area (MSA) or county.

### RATIONALE

Perforated appendix may occur when appropriate treatment for acute appendicitis is delayed for a number of reasons, including problems with access to care, failure by the patient to interpret symptoms as important, and misdiagnosis and other delays in obtaining surgery.

Timely diagnosis and treatment may reduce the incidence of perforated appendix, and lower rates represent better quality care.

### PRIMARY CLINICAL COMPONENT

Perforated appendix; hospital admission rates

### DENOMINATOR DESCRIPTION

Discharges with diagnosis code for appendicitis in any field within Metropolitan Statistical Area (MSA) or county

### NUMERATOR DESCRIPTION

Discharges with International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) diagnosis code for perforation or abscess of appendix in any field. Patients transferring from another institution, Major Diagnostic Category (MDC) 14 (pregnancy, childbirth, and puerperium), or MDC 15 (newborns and other neonates) are excluded.

## Evidence Supporting the Measure

### PRIMARY MEASURE DOMAIN

Outcome

### SECONDARY MEASURE DOMAIN

Access  
Process

### EVIDENCE SUPPORTING THE MEASURE

One or more research studies published in a National Library of Medicine (NLM) indexed, peer-reviewed journal

## Evidence Supporting Need for the Measure

### NEED FOR THE MEASURE

Wide variation in quality for the performance measured

### EVIDENCE SUPPORTING NEED FOR THE MEASURE

AHRQ quality indicators. Guide to prevention quality indicators: hospital admission for ambulatory care sensitive conditions [revision 3]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2004 Jan 9. Various p. (AHRQ Pub; no. 02-R0203).

## State of Use of the Measure

### STATE OF USE

Current routine use

### CURRENT USE

Internal quality improvement  
Quality of care research

## Application of Measure in its Current Use

### CARE SETTING

Ambulatory Care  
Community Health Care

### PROFESSIONALS RESPONSIBLE FOR HEALTH CARE

Physicians

#### LOWEST LEVEL OF HEALTH CARE DELIVERY ADDRESSED

Counties or Cities

#### TARGET POPULATION AGE

Patients of all age groups, excluding newborns and other neonates

#### TARGET POPULATION GENDER

Either male or female

#### STRATIFICATION BY VULNERABLE POPULATIONS

Unspecified

### Characteristics of the Primary Clinical Component

#### INCIDENCE/PREVALENCE

Perforated appendix occurs in one-fourth to one-third of hospitalized acute appendicitis patients.

#### EVIDENCE FOR INCIDENCE/PREVALENCE

Braveman P, Schaaf VM, Egerter S, Bennett T, Schechter W. Insurance-related differences in the risk of ruptured appendix. *N Engl J Med* 1994 Aug 18; 331(7):444-9. [PubMed](#)

#### ASSOCIATION WITH VULNERABLE POPULATIONS

- Higher rates of perforated appendix have been noted in males, patients with mental illness or substance abuse disorders, people with diabetes, and blacks, as well as in children under the age of 4 (although appendicitis is rare in this age group).
- Braveman et al. found that the rate of perforated appendix was 50% higher for patients with no insurance or Medicaid than HMO-covered patients. A follow-up study by Blumberg et al. concluded that the high rate of perforated appendix in the black population at an HMO may be explained by delay in seeking care, rather than differences in the quality of health care.
- Weissman et al. found that uninsured (but not Medicaid) patients are at increased risk for ruptured appendix after adjusting for age and sex.

#### EVIDENCE FOR ASSOCIATION WITH VULNERABLE POPULATIONS

Blumberg MS, Juhn PI. Insurance and the risk of ruptured appendix. *N Engl J Med* 1995 Feb 9; 332(6):395-6; discussion 397-8. [PubMed](#)

Bratton SL, Haberkern CM, Waldhausen JH. Acute appendicitis risks of complications: age and Medicaid insurance. Pediatrics 2000 Jul;106(1 Pt 1):75-8. [PubMed](#)

Braveman P, Schaaf VM, Egerter S, Bennett T, Schechter W. Insurance-related differences in the risk of ruptured appendix. N Engl J Med 1994 Aug 18;331(7):444-9. [PubMed](#)

Weissman JS, Gatsonis C, Epstein AM. Rates of avoidable hospitalization by insurance status in Massachusetts and Maryland. JAMA 1992 Nov 4;268(17):2388-94. [PubMed](#)

## BURDEN OF ILLNESS

Unspecified

## UTILIZATION

Unspecified

## COSTS

Unspecified

## Institute of Medicine National Healthcare Quality Report Categories

### IOM CARE NEED

Getting Better

### IOM DOMAIN

Effectiveness  
Timeliness

## Data Collection for the Measure

### CASE FINDING

Both users and nonusers of care

### DESCRIPTION OF CASE FINDING

Discharges with diagnosis code for appendicitis within a Metropolitan Statistical Area (MSA) or county

### DENOMINATOR SAMPLING FRAME

Patients associated with provider

## DENOMINATOR (INDEX) EVENT

Clinical Condition  
Institutionalization  
Patient Characteristic

## DENOMINATOR INCLUSIONS/EXCLUSIONS

Inclusions  
Discharges with diagnosis code for appendicitis in any field among individuals in geographic areas defined at the Metropolitan Statistical Area (MSA) or county

Exclusions  
Unspecified

## NUMERATOR INCLUSIONS/EXCLUSIONS

Inclusions  
Discharges with International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) diagnosis code for perforation or abscess of appendix in any field (see Appendix A of the original measure documentation for ICD-9-CM codes)

Exclusions  
Patients transferring from another institution, Major Diagnostic Category (MDC) 14 (pregnancy, childbirth, and puerperium), or MDC 15 (newborns and other neonates) are excluded.

## DENOMINATOR TIME WINDOW

Time window is a single point in time

## NUMERATOR TIME WINDOW

Encounter or point in time

## DATA SOURCE

Administrative data

## LEVEL OF DETERMINATION OF QUALITY

Not Individual Case

## OUTCOME TYPE

Proxy for Outcome

## PRE-EXISTING INSTRUMENT USED

Unspecified

## Computation of the Measure

### SCORING

Rate

### INTERPRETATION OF SCORE

Better quality is associated with a lower score

### ALLOWANCE FOR PATIENT FACTORS

Analysis by subgroup (stratification on patient factors)  
Risk adjustment method widely or commercially available

### DESCRIPTION OF ALLOWANCE FOR PATIENT FACTORS

Observed (raw) rates may be stratified by areas (Metropolitan Statistical Areas or counties), age groups, race/ethnicity categories, and sex.

Risk adjustment of the data is recommended using age and sex.

Application of multivariate signal extraction (MSX) to smooth risk adjusted rates is also recommended.

### STANDARD OF COMPARISON

External comparison at a point in time  
External comparison of time trends  
Internal time comparison

## Evaluation of Measure Properties

### EXTENT OF MEASURE TESTING

Each potential quality indicator was evaluated against the following six criteria, which were considered essential for determining the reliability and validity of a quality indicator: face validity, precision, minimum bias, construct validity, fosters real quality improvement, and application. The project team searched Medline for articles relating to each of these six areas of evaluation. Additionally, extensive empirical testing of all potential indicators was conducted using the 1995-97 Healthcare Cost and Utilization Project (HCUP) State Inpatient Databases (SID) and Nationwide Inpatient Sample (NIS) to determine precision, bias, and construct validity. Table 1 in the original measure documentation summarizes the results of the literature review and empirical evaluations on the Prevention Quality Indicators. Refer to the original measure documentation for details.

## EVIDENCE FOR RELIABILITY/VALIDITY TESTING

AHRQ quality indicators. Guide to prevention quality indicators: hospital admission for ambulatory care sensitive conditions [revision 3]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2004 Jan 9. Various p. (AHRQ Pub; no. 02-R0203).

### Identifying Information

#### ORIGINAL TITLE

Perforated appendix admission rate.

#### MEASURE COLLECTION

[Agency for Healthcare Research and Quality \(AHRQ\) Quality Indicators](#)

#### MEASURE SET NAME

[Agency for Healthcare Research and Quality \(AHRQ\) Prevention Quality Indicators](#)

#### DEVELOPER

Agency for Healthcare Research and Quality

#### ADAPTATION

This indicator was included in the original Healthcare Cost and Utilization Project Quality Indicator Set (HCUP QI).

#### PARENT MEASURE

Perforated appendix (Agency for Healthcare Research and Quality)

#### RELEASE DATE

2001 Oct

#### REVISION DATE

2004 Jan

#### MEASURE STATUS

This is the current release of the measure.

#### SOURCE(S)

AHRQ quality indicators. Guide to prevention quality indicators: hospital admission for ambulatory care sensitive conditions [revision 3]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2004 Jan 9. Various p. (AHRQ Pub; no. 02-R0203).

## MEASURE AVAILABILITY

The individual measure, "Perforated Appendix Admission Rate," is published in "AHRQ Quality Indicators. Guide to Prevention Quality Indicators: Hospital Admission for Ambulatory Sensitive Conditions." This document is available in [Portable Document Format \(PDF\)](#) and a [zipped WordPerfect\(R\) file](#) from the [Quality Indicators](#) page at the Agency for Healthcare Research and Quality (AHRQ) Web site.

For more information, please contact the QI Support Team at [support@qualityindicators.ahrq.gov](mailto:support@qualityindicators.ahrq.gov).

## COMPANION DOCUMENTS

The following are available:

- "AHRQ Prevention Quality Indicators Software (Version 2.1 Revision 3)" (Rockville, [MD]: AHRQ, 2004 Jan 9) and its accompanying documentation can be downloaded from the [Agency for Healthcare Research and Quality \(AHRQ\) Web site](#). (The software is available in both SAS- and SPSS-compatible formats.)
- Guidance for using the AHRQ quality indicators for hospital-level public reporting or payment. Rockville (MD): Agency for Healthcare Research and Quality; 2004 Aug. 24 p. This document is available from the [AHRQ Web site](#).
- "HCUPnet, Healthcare Cost and Utilization Project" [internet]. (Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2004 [Various pagings]). HCUPnet is available from the [AHRQ Web site](#).
- "Refinement of the HCUP Quality Indicators" (Rockville [MD]: AHRQ, 2001 May. Various pagings. [Technical review; no. 4]; AHRQ Publication No. 01-0035). This document was prepared by the UCSF-Stanford Evidence-based Practice Center for AHRQ and can be downloaded from the [AHRQ Web site](#).

## NQMC STATUS

This NQMC summary was completed by ECRI on December 19, 2002. The information was verified by the Agency for Healthcare Research and Quality on January 9, 2003. This NQMC summary was updated by ECRI on April 6, 2004.

## COPYRIGHT STATEMENT

No copyright restrictions apply.

Date Modified: 10/25/2004

FIRSTGOV

