Proposed Changes to Existing Measures for HEDIS®[1] 2020: Appropriate Antibiotic Use Measures

NCQA seeks comments on proposed modifications to three HEDIS health plan measures that assess appropriate antibiotic use in individuals with acute bronchitis, an upper respiratory infection or pharyngitis. NCQA proposes to update the measures as follows:

- *Avoidance of Antibiotic Treatment in Adults With Acute Bronchitis (AAB)*
  - Expand the eligible age range to members 3 months and older.
  - Include the Medicare product line.
  - Change from a member-based denominator to an episode-based denominator.
  - Change the negative competing diagnosis time frame to "on the episode date through the three days after."
- *Appropriate Treatment for Children With Upper Respiratory Infection (URI)*
  - Expand the eligible age range to members 3 months and older.
  - Include the Medicare product line.
  - Change from a member-based denominator to an episode-based denominator.
  - Allow telehealth visits to identify eligible episodes.
  - Exclude episode if the member has a diagnosis of a comorbid condition during the 12 months prior to the episode date.
  - Remove the requirement to exclude episode dates where there was any diagnosis other than upper respiratory infection on the same date.
- *Appropriate Testing for Children With Pharyngitis (CWP)*
  - Expand the eligible age range to members 3 years and older.
  - Include the Medicare product line.
  - Change from a member-based denominator to an episode-based denominator.
  - Allow telehealth visits to identify eligible episodes.
  - Exclude episodes if the member has a diagnosis of a comorbid condition during the 12 months prior to the episode date.
  - Exclude episode if the member has a competing diagnosis on the episode date through the three days after.
  - Remove the requirement to exclude episode dates where there was any diagnosis other than pharyngitis on the same date.

Background

Clinical guidelines recommend against the use of antibiotics for the treatment of acute bronchitis, upper respiratory infections and viral pharyngitis, across all age ranges. Stakeholders supported broadening the measures to cover more of the population. In response, we reevaluated the measures to assess the feasibility of improving their adherence to clinical guidelines. In addition to expanding the current age ranges, NCQA explored additional changes to improve the measures' relevance and feasibility.

To assess the impact of these changes in the field, NCQA conducted testing with health plans representing commercial, Medicaid and Medicare product lines. We shared testing results with our advisory panel, whose feedback and guidance informed all the proposed changes to the measures' technical specifications.

[1]HEDIS® is a registered trademark of the National Committee for Quality Assurance (NCQA).

The current measures are specified for reporting by commercial and Medicaid product lines.

The current *Bronchitis* measure assesses the percentage of adults 18–64 years of age with a diagnosis of acute bronchitis who were *not* dispensed an antibiotic prescription.

The current *Upper Respiratory Infection* measure assesses the percentage of children 3 months–18 years of age who were given a diagnosis of upper respiratory infection and *were not* dispensed an antibiotic prescription.

The current *Pharyngitis* measure assesses the percentage of children 3–18 years of age who were diagnosed with pharyngitis, dispensed an antibiotic and received a group A streptococcus test for the episode.

Proposed Changes

Expand the eligible age ranges and product lines. Current guidelines and evidence, testing results and advisory panel feedback suggested there is opportunity for improvement in the other age ranges.

For the *Pharyngitis* measure, we propose to not include members under 3 years of age because guidelines recommend against strep testing in those ages.

For the *Bronchitis* measure, we propose aligning with the *Upper Respiratory Infection* measure's lower age boundary of 3 months.

Change from a member-based denominator to an episode-based denominator. The current measures are defined as member-level (e.g., members with multiple bronchitis diagnoses throughout the measurement period are only counted once, using the earliest episode in the year). An episode-based measure could highlight more episodes of potentially inappropriate antibiotic treatment. Additionally, our advisory panel recommended that a 30-day episode definition be used (e.g., if a member had two-episode dates that are fewer than 30 days apart, only the first episode date is used to assess if the member was prescribed antibiotics inappropriately) as a way to account for multiple visits that may be related to the same complaint or episode of care.

Exclude episode dates if the member has a competing diagnosis on the episode date or during the three days after. The current *Bronchitis* and *Upper Respiratory Infection* measures remove members with diagnoses that may warrant using antibiotics, such as acute bacterial infections. The current *Bronchitis* measure uses a 38-day time frame to look for members with a competing diagnosis. Our advisory panel suggested that this was too long from a clinical standpoint- and that the backward-looking portion was not necessary because we already have an antibiotic lookback. This change would decrease the time frame specified in the *Bronchitis* measure and add the exclusion to the *Pharyngitis* measure.

Exclude episodes if the member has a comorbid condition during the 12 months prior to the episode date. The current *Bronchitis* measure removes adult members with diagnoses for chronic conditions, such as HIV, that may put them at risk of acquiring a bacterial infection. Given the proposal to expand the measures' age ranges, we recommended adding this exclusion to the *Upper Respiratory Infection* and *Pharyngitis* measures.

Remove requirement to exclude episode dates where there was any diagnosis other than pharyngitis or upper respiratory infection on the same date. The current *Upper Respiratory Infection* and *Pharyngitis* measures remove members with any diagnosis other than the conditions of interest. It was intended to focus the measure specifically on visits for that condition, but stakeholders expressed concerns that this exclusion is too broad, and we propose its removal.

Allow use of telephone, video conferencing and asynchronous telehealth. The current *Bronchitis* measure allows telehealth visits to identify eligible episodes. NCQA conducted a systematic evaluation to determine if it should be included in the other measures, as well. Although some studies have shown that physicians were more likely to prescribe antibiotics during a telehealth visit than an in-person visit, other studies reported that telephone and video conferencing modalities were effective in providing accurate diagnostic services and that diagnosis and prescribing were similar to that of in-person physician visits.

We support the use of telehealth modalities across all three measures because practitioners use this service, and the same clinical practice guidelines should be used in both telehealth and in-office visits.

Supporting documents include the draft measure specifications, evidence workup and performance data.

NCQA acknowledges the contributions of the Antibiotic Overuse Measurement Advisory Panel, the Telehealth Expert Panel, the Pharmacy Panel and the Geriatric Measurement Advisory Panel

Avoidance of Antibiotic Treatment for ~~in Adults With~~ Acute Bronchitis/Bronchiolitis (AAB)

SUMMARY OF CHANGES TO HEDIS 2020

- Revised the measure name.
- Changed the measure from a member-based denominator to an episode-based denominator.
- Revised the Negative Competing Diagnosis time frame.
- Added the Medicare product line.
- Added age ranges, age stratifications and a total rate to the eligible population.
- Updated the continuous enrollment and allowable gap requirements.
- Revised the Data Elements for Reporting table.

Description

The percentage of episodes for members ages 3 months and older ~~years of age~~ with a diagnosis of acute bronchitis/bronchiolitis ~~who were not dispensed an antibiotic prescription~~ that did not result in an antibiotic dispensing event.

Calculation

The measure is reported as an inverted rate [1 – (numerator/eligible population)]. A higher rate indicates appropriate acute bronchitis/bronchiolitis treatment ~~of adults with acute bronchitis~~ (i.e., the proportion of episodes that did not result in an antibiotic dispensing event. ~~for whom antibiotics were *not* prescribed).~~

Definitions

Intake Period — January 1–December 28 ~~24~~ of the measurement year. The Intake Period captures eligible episodes of treatment.

Episode Date — The date of service for any outpatient or ED visit during the Intake Period with a diagnosis of acute bronchitis/bronchiolitis.

~~**IESD**~~ — ~~Index Episode Start Date. The earliest Episode Dates during the Intake Period that meets all of the following criteria:~~

- ~~A 30-day Negative Medication History prior to the Episode Date.~~
- ~~A 12-month Negative Comorbid Condition History prior to and including the Episode Date.~~
- ~~A Negative Competing Diagnosis during the 38-day period from 30 days prior to the Episode Date through 7 days after the Episode Date.~~
- ~~The member was continuously enrolled 1 year prior to the Episode Date through 7 days after the Episode Date.~~

Negative Medication History	To qualify for Negative Medication History, the following criteria must be met: • A period of 30 days prior to the Episode Date, when the member had no pharmacy claims for either new or refill prescriptions for a listed antibiotic drug. • No prescriptions that were filled more than 30 days prior to the Episode Date and are active on the Episode Date. A prescription is considered active if the "days supply" indicated on the date when the member filled the prescription is the number of days or more between that date and the relevant service date. The 30-day look-back period for pharmacy data includes the 30 days prior to the Intake Period.
Negative Comorbid Condition History	A period of 12 months prior to and including the Episode Date, when the member had no claims/encounters with any diagnosis for a comorbid condition.
Negative Competing Diagnosis	The Episode Date and 3 days following the Episode Date when the member had no claims/encounters with a competing diagnosis. ~~A period of 30 days prior to the Episode Date through 7 days after the Episode Date (38 total days), when the member had no claims/encounters with any competing diagnosis.~~

Eligible Population

Note: *Members in hospice are excluded from the eligible population. Refer to General Guideline 17: Members in Hospice.*

Product lines	Commercial, Medicaid, Medicare (report each product line separately).
Ages	Members who were 3 months or older as of the Episode Date. ~~Adults 18 years as of January 1 of the year prior to the measurement year to 64 years as of December 31 of the measurement year.~~ Report three age stratifications and a total rate: • 3 months–17 years. • 18–64 years. • 65 years and older. • Total. The total is the sum of the age stratifications.
Continuous enrollment	30 days ~~One year~~ prior to the Episode Date through three ~~seven~~ days after the Episode Date (3 ~~473~~ total days).
Allowable gap	~~No more than one gap of 45 days is permitted during the 365 days (1 year) prior to the Episode Date. To determine continuous enrollment for a Medicaid beneficiary for whom enrollment is verified monthly, the member may not have more than a 1-month gap in coverage (i.e., a member whose coverage lapses for 2 months [60 days] is not continuously enrolled).~~ No gaps in enrollment during the continuous enrollment period. ~~are allowed on the IESD through 7 days after the IESD.~~
Anchor date	None.
Benefits	Medical and pharmacy.

Event/diagnosis Follow the steps below to identify the eligible population:

Step 1 Identify all members who had an outpatient visit (Outpatient Value Set) with or without a telehealth modifier (Telehealth Modifier Value Set), a telephone visit (Telephone Visits Value Set), an online assessment (Online Assessment Value Set), an observation visit (Observation Value Set) or an ED visit (ED Value Set) during the Intake Period, with a diagnosis of acute bronchitis (Acute Bronchitis Value Set).

Do not include ED visits or observation visits that result in an inpatient stay (Inpatient Stay Value Set).

Step 2 Determine all acute bronchitis/bronchiolitis Episode Dates. For each member identified in step 1, determine all outpatient, observation or ED visits with a diagnosis of acute bronchitis/bronchiolitis.

Step 3 Test for Negative Comorbid Condition History. Exclude Episode Dates when the member had a claim/encounter with any diagnosis for a comorbid condition during the 12 months prior to or on the Episode Date. A code from any of the following meets criteria for a comorbid condition:

- HIV Value Set.
- HIV Type 2 Value Set.
- Malignant Neoplasms Value Set.
- Other Malignant Neoplasm of Skin Value Set.
- Emphysema Value Set.
- COPD Value Set.
- Cystic Fibrosis Value Set.
- Comorbid Conditions Value Set.
- Disorders of the Immune System Value Set.

Step 4 Test for Negative Medication History. Exclude Episode Dates where a new or refill prescription for an antibiotic medication (AAB Antibiotic Medications List) was filled 30 days prior to the Episode Date or was active on the Episode Date.

Step 5 Test for Negative Competing Diagnosis. Exclude Episode Dates where the member had a claim/encounter with a competing diagnosis on or 3 days after the Episode Date. ~~Dates where during the period 30 days prior to the Episode Date through 7 days after the Episode Date (38 total days) the member had a claim/encounter with any competing diagnosis.~~ A code from either of the following meets criteria for a competing diagnosis:

- Pharyngitis Value Set.
- Competing Diagnosis Value Set.

Step 6 Calculate continuous enrollment. The member must be continuously enrolled without a ~~with no more than one~~ gap in coverage from 30~~365~~ days ~~(1 year)~~ prior to the Episode Date through 3 days after the Episode Date (34~~369~~ total days).

Step 7 Remove Episode Dates that are within the 30-day period following another Episode Date (31 days total).

Deduplicate eligible episodes. If a member has more than one eligible episode in a 31-day period, include only the first eligible episode. For example, if a member has an eligible episode on January 1, include the January 1 visit and do not include eligible episodes that occur on or between January 2 and January 31; then, if applicable, include the next eligible episode that occurs on or after February 1. Identify visits chronologically, including only one per 31-day period.

Note: *The denominator for this measure is based on episodes, not on members. All eligible episodes that were not excluded or deduplicated remain in the denominator.*

~~***Step 7***~~ ~~Select the IESD. This measure examines the earliest eligible episode per member.~~

Administrative Specification

Denominator The eligible population.

Numerator Dispensed prescription for an antibiotic medication (AAB Antibiotic Medications List) on or 3 days after the Episode Date ~~IESD~~.

AAB Antibiotic Medications

Description	Prescription		
Aminoglycosides	• Amikacin • Gentamicin	• Streptomycin • Tobramycin	
Aminopenicillins	• Amoxicillin	• Ampicillin	
Beta-lactamase inhibitors	• Amoxicillin-clavulanate • Ampicillin-sulbactam	• Piperacillin-tazobactam • Ticarcillin-clavulanate	
First-generation cephalosporins	• Cefadroxil	• Cefazolin	• Cephalexin
Fourth-generation cephalosporins	• Cefepime		
Ketolides	• Telithromycin		
Lincomycin derivatives	• Clindamycin	• Lincomycin	
Macrolides	• Azithromycin • Clarithromycin	• Erythromycin • Erythromycin ethylsuccinate	• Erythromycin lactobionate • Erythromycin stearate
Miscellaneous antibiotics	• Aztreonam • Chloramphenicol • Dalfopristin-quinupristin	• Daptomycin • Erythromycin-sulfisoxazole • Linezolid	• Metronidazole • Vancomycin
Natural penicillins	• Penicillin G benzathine-procaine • Penicillin G potassium	• Penicillin G procaine • Penicillin G sodium	• Penicillin V potassium • Penicillin G benzathine
Penicillinase resistant penicillins	• Dicloxacillin	• Nafcillin	• Oxacillin
Quinolones	• Ciprofloxacin • Gemifloxacin	• Levofloxacin • Moxifloxacin	• Norfloxacin • Ofloxacin
Rifamycin derivatives	• Rifampin		
Second-generation cephalosporin	• Cefaclor • Cefotetan	• Cefoxitin • Cefprozil	• Cefuroxime
Sulfonamides	• Sulfadiazine	• Sulfamethoxazole-trimethoprim	
Tetracyclines	• Doxycycline	• Minocycline	• Tetracycline
Third-generation cephalosporins	• Cefdinir • Cefditoren • Cefixime	• Cefotaxime • Cefpodoxime • Ceftazidime	• Ceftibuten • Ceftriaxone

Description	Prescription	
Urinary anti-infectives	• Fosfomycin • Nitrofurantoin • Nitrofurantoin macrocrystals	• Nitrofurantoin macrocrystals-monohydrate • Trimethoprim

Note

- *Although denied claims are not included when assessing the numerator, all claims (paid, suspended, pending and denied) must be included when identifying the eligible population.*
- *Supplemental data may not be used for this measure.*

Data Elements for Reporting

Organizations that submit HEDIS data to NCQA must provide the following data elements.

Table AAB-1/2/3: Data Elements for Avoidance of Antibiotic Treatment for ~~in Adults With~~ Acute Bronchitis/Bronchiolitis

	Administrative
Measurement year	✓
Data collection methodology (Administrative)	✓
Eligible population	*For each age stratification and total~~✓~~*
~~Total N~~numerator events by administrative data	*For each age stratification and total~~✓~~*
Reported rate	*For each age stratification and total~~✓~~*

Appropriate Treatment for ~~Children With~~ Upper Respiratory Infection (URI)

SUMMARY OF CHANGES TO HEDIS 2020

- Revised the measure name.
- Changed the measure from a member-based denominator to an episode-based denominator.
- Added age ranges and age stratifications to the eligible population
- Added the Medicare product line.
- Added a comorbid condition exclusion.
- Removed the requirement to exclude episode dates where there was any diagnosis other than upper respiratory infection on the same date.
- Removed the anchor date requirements.
- Added telehealth visits to the eligible population.
- Revised the Data Elements for Reporting table.

Description

The percentage of episodes for members 3 months of age and older ~~children 3 months–18 years of age who were given a diagnosis~~ with a diagnosis of upper respiratory infection (URI) that did not result in an antibiotic dispensing event. ~~and was were not dispensed an antibiotic prescription~~.

Calculation

The measure is reported as an inverted rate [1 – (numerator/eligible population)]. A higher rate indicates appropriate URI treatment ~~of children with URI~~ (i.e., the proportion of episodes that did not result in an antibiotic dispensing event ~~for whom antibiotics *were not* prescribed~~).

Definitions

Intake Period — A 12-month window that begins on July 1 of the year prior to the measurement year and ends on June 30 of the measurement year. The Intake Period captures eligible episodes of treatment.

Episode Date — The date of service ~~when the member had an~~ for any outpatient or ED visit during the Intake Period with ~~only~~ a diagnosis of URI. ~~Exclude episode dates when the member had any diagnoses other than those listed in the~~ URI Value Set~~.~~

~~**IESD** — Index Episode Start Date. The earliest Episode Date during the Intake Period that meets all of the following criteria:~~

- ~~A 30-day Negative Medication History prior to the Episode Date.~~
- ~~A Negative Competing Diagnosis on or 3 days after the Episode Date.~~
- ~~The member was continuously enrolled 30 days prior to the Episode Date through 3 days after the Episode Date.~~

Negative Medication History	To qualify for Negative Medication History, the following criteria must be met: • A period of 30 days prior to the Episode Date when the member had no pharmacy claims for either new or refill prescriptions for a listed antibiotic drug. • No prescriptions filled more than 30 days prior to the Episode Date that are active on the Episode Date. A prescription is considered active if the "days supply" indicated on the date when the member filled the prescription is the number of days or more between that date and the relevant service date. The 30-day look-back period for pharmacy data includes the 30 days prior to the Intake Period.
Negative Comorbid Condition History	A period of 12 months prior to and including the Episode Date, when the member had no claims/encounters with any diagnosis for a comorbid condition.
Negative Competing Diagnosis	The Episode Date and three days following the Episode Date when the member had no claims/encounters with a competing diagnosis.

Eligible Population

Note: *Members in hospice are excluded from the eligible population. Refer to General Guideline 17: Members in Hospice.*

Product lines	Commercial, Medicaid, Medicare (report each product line separately).
Ages	Members who were 3 months ~~Children~~ 3 months or older as of the Episode Date. ~~as of July 1 of the year prior to the measurement year to 18 years as of June 30 of the measurement year~~. Report three age stratifications and total rate: • 3 months–17 years. • 18–64 years. • 65 years and older. • Total. The total is the sum of the age stratifications.
Continuous enrollment	30 days prior to the Episode Date through three days after the Episode Date (34 total days).
Allowable gap	No gaps in enrollment during the continuous enrollment period.
Anchor date	None. ~~Episode Date.~~
Benefits	Medical and pharmacy.
Event/ diagnosis	Follow the steps below to identify the eligible population:
Step 1	Identify all members who had an outpatient visit (Outpatient Value Set), with or without a telehealth modifier (Telehealth Modifier Value Set), a telephone visit (Telephone Visits Value Set), an online assessment (Online Assessment Value Set) an observation visit (Observation Value Set) or an ED visit (ED Value Set) during the Intake Period, with a diagnosis ~~only diagnoses~~ of URI (URI Value Set). ~~Exclude episode dates when the member had any diagnoses other than those listed in the URI Value Set on the same date of service, in any setting.~~ Exclude ED visits or observation visits that result in an inpatient stay (Inpatient Stay Value Set).

Step 2 Determine all URI Episode Dates. For each member identified in step 1, determine all outpatient, observation or ED visits with ~~only~~ a URI diagnosis.

Step 3 Test for Negative Comorbid Condition History. Exclude Episode Dates when the member had a claim/encounter with any diagnosis for a comorbid condition during the 12 months prior to or on the Episode Date. A code from any of the following meets criteria for a comorbid condition:

- HIV Value Set.
- HIV Type 2 Value Set.
- Malignant Neoplasms Value Set.
- Other Malignant Neoplasms of Skin Value Set.
- Emphysema Value Set.
- COPD Value Set.
- Cystic Fibrosis Value Set.
- Comorbid Conditions Value Set.
- Disorders of the Immune System Value Set.

Step 4 ~~3~~ Test for Negative Medication History. Exclude Episode Dates where a new or refill prescription for an antibiotic medication (CWP Antibiotic Medications List) was filled 30 days prior to the Episode Date or was active on the Episode Date.

Step 5 4 Test for Negative Competing Diagnosis. Exclude Episode Dates where the member had a claim/encounter with a competing diagnosis on or three days after the Episode Date. A code from either of the following meets criteria for a competing diagnosis:

- Pharyngitis Value Set.
- Competing Diagnosis Value Set.

Step 6 ~~5~~ Calculate continuous enrollment. The member must be continuously enrolled without a gap in coverage from 30 days prior to the Episode Date through 3 days after the Episode Date (34 total days).

Step 7 Remove Episode Dates that are within the 30-day period following another Episode Date (31 days total).

Deduplicate eligible episodes. If a member has more than one eligible episode in a 31-day period, include only the first eligible episode. For example, if a member has an eligible episode on January 1, include the January 1 visit and do not include eligible episodes that occur on or between January 2 and January 31; then, if applicable, include the next eligible episode that occurs on or after February 1. Identify visits chronologically, including only one per 31-day period.

Note: *The denominator for this measure is based on episodes, not on members. All eligible episodes that were not excluded or deduplicated remain in the denominator.*

~~***Step 6***~~ ~~Select the IESD. This measure examines the earliest eligible episode per member.~~

Administrative Specification

Denominator	The eligible population.
Numerator	Dispensed prescription for an antibiotic medication from the CWP Antibiotic Medications List on or 3 days after the Episode Date ~~IESD~~.

CWP Antibiotic Medications

Description	Prescription	
Aminopenicillins	• Amoxicillin	• Ampicillin
Beta-lactamase inhibitors	• Amoxicillin-clavulanate	
First generation cephalosporins	• Cefadroxil • Cefazolin	• Cephalexin
Folate antagonist	• Trimethoprim	
Lincomycin derivatives	• Clindamycin	
Macrolides	• Azithromycin • Clarithromycin • Erythromycin	• Erythromycin ethylsuccinate • Erythromycin lactobionate • Erythromycin stearate
Miscellaneous antibiotics	• Erythromycin-sulfisoxazole	
Natural penicillins	• Penicillin G potassium • Penicillin G sodium	• Penicillin V potassium
Penicillinase-resistant penicillins	• Dicloxacillin	• y
Quinolones	• Ciprofloxacin • Levofloxacin	• Moxifloxacin • Ofloxacin
Second generation cephalosporins	• Cefaclor • Cefprozil	• Cefuroxime
Sulfonamides	• Sulfamethoxazole-trimethoprim	
Tetracyclines	• Doxycycline • Minocycline	• Tetracycline
Third-generation cephalosporins	• Cefdinir • Cefixime • Cefpodoxime	• Ceftibuten • Cefditoren • Ceftriaxone

Note

- *Although denied claims are not included when assessing the numerator, all claims (paid, suspended, pending and denied) must be included when identifying the eligible population.*
- *Supplemental data may not be used for this measure.*

Data Elements for Reporting

Organizations that submit HEDIS data to NCQA must provide the following data elements.

Table URI-1/2/3: Data Elements for Appropriate Treatment for ~~Children With~~ Upper Respiratory Infection

	Administrative
Measurement year	✓
Data collection methodology (Administrative)	✓
Eligible population	*For each age stratification and total* ~~✓~~
Numerator events by administrative data	*For each age stratification and total* ~~✓~~
Reported rate	*For each age stratification and total* ~~✓~~

Appropriate Testing for ~~Children With~~ Pharyngitis (CWP)

SUMMARY OF CHANGES TO HEDIS 2020

- Revised the measure name.
- Changed the measure from a member-based denominator to an episode-based denominator.
- Added age ranges and age stratifications to the eligible population.
- Added the Medicare product line.
- Added a comorbid condition exclusion.
- Added a competing diagnosis exclusion.
- Removed the requirement to exclude episode dates where there was any diagnosis other than pharyngitis on the same date.
- Removed the anchor date requirements.
- Added telehealth visits to the eligible population.
- Revised the Data Elements for Reporting table.

Description

The percentage of episodes for members 3 years and older where the member was ~~children 3–18 years of age who were~~ diagnosed with pharyngitis, dispensed an antibiotic and received a group A streptococcus (strep) test for the episode. A higher rate represents better performance (i.e., appropriate testing).

Definitions

Intake Period

A 12-month window that begins on July 1 of the year prior to the measurement year and ends on June 30 of the measurement year. The Intake Period captures eligible episodes of treatment.

Episode Date

The date of service for any ~~when the member had an~~ outpatient or ED visit during the Intake Period with ~~only~~ diagnoses of pharyngitis. ~~Exclude episode dates when the member had any diagnoses other than those listed in the~~ Pharyngitis Value Set ~~on the same date of service.~~

~~**IESD**~~

~~Index Episode Start Date. The earliest Episode Date during the Intake Period that meets all of the following criteria:~~

- ~~Linked to a dispensed antibiotic prescription on or during the three days after the Episode Date.~~
- ~~A 30-day Negative Medication History prior to the Episode Date.on or 3 days~~
- ~~The member was continuously enrolled during the 30 days prior to the Episode Date through 3 days after the Episode Date.~~

Negative Medication History

To qualify for Negative Medication History, the following criteria must be met:

- A period of 30 days prior to the Episode Date when the member had no pharmacy claims for either new or refill prescriptions for a listed antibiotic drug.
- No prescriptions filled more than 30 days prior to the Episode Date that are active on the Episode Date.

A prescription is considered active if the "days supply" indicated on the date when the member filled the prescription is the number of days or more between that date and the relevant service date. The 30-day look-back period for pharmacy data includes the 30 days prior to the Intake Period.

Negative Comorbid Condition History	A period of 12 months prior to and including the Episode Date, when the member had no claims/encounters with any diagnosis for a comorbid condition.
Negative Competing Diagnosis	The Episode Date and three days following the Episode Date when the member had no claims/encounters with a competing diagnosis.

Eligible Population

Note: *Members in hospice are excluded from the eligible population. Refer to General Guideline 17: Members in Hospice.*

Product lines	Commercial, Medicaid, Medicare (report each product line separately).
Ages	Members who were ~~Children~~ 3 years or older as of the Episode Date. ~~as of July 1 of the year prior to the measurement year to 18 years as of June 30 of the measurement year.~~ Report three age stratifications and total rate: • 3–17 years. • 18–64 years. • 65 years and older. • Total. The total is the sum of the age stratifications.
Continuous enrollment	30 days prior to the Episode Date through 3 days after the Episode Date (34 total days).
Allowable gap	No gaps in enrollment during the continuous enrollment period.
Anchor date	None. ~~Episode Date.~~
Benefits	Medical and pharmacy.
Event/ diagnosis	~~Outpatient or ED visit with only diagnoses of pharyngitis and a dispensed antibiotic for that episode of care during the Intake Period.~~ Follow the steps below to identify the eligible population.
Step 1	Identify all members who had an outpatient visit (Outpatient Value Set), with or without a telehealth modifier (Telehealth Modifier Value Set), a telephone visit (Telephone Visits Value Set), an online assessment (Online Assessment Value Set), an observation visit (Observation Value Set) or an ED visit (ED Value Set) during the Intake Period, with only diagnoses of pharyngitis (Pharyngitis Value Set). ~~Do not include episode dates when the member had any diagnoses other than those listed in the Pharyngitis Value Set on the same date of service, in any setting.~~ Do not include ED visits or observation visits that result in an inpatient stay (Inpatient Stay Value Set).
Step 2	Determine all pharyngitis Episode Dates. For each member identified in step 1, determine all outpatient, observation or ED visits with a diagnosis ~~only diagnoses~~ of pharyngitis.
Step 3	Determine if antibiotics (CWP Antibiotic Medications List) were dispensed for any of the Episode Dates. For each Episode Date with a qualifying diagnosis, determine if antibiotics were dispensed on or up to 3 days after. Exclude Episode Dates if the member did not receive antibiotics on or up to 3 days after the Episode Date.

CWP Antibiotic Medications

Description	Prescription	
Aminopenicillins	• Amoxicillin	• Ampicillin
Beta-lactamase inhibitors	• Amoxicillin-clavulanate	
First generation cephalosporins	• Cefadroxil • Cefazolin	• Cephalexin
Folate antagonist	• Trimethoprim	
Lincomycin derivatives	• Clindamycin	
Macrolides	• Azithromycin • Clarithromycin • Erythromycin	• Erythromycin ethylsuccinate • Erythromycin lactobionate • Erythromycin stearate
Miscellaneous antibiotics	• Erythromycin-sulfisoxazole	
Natural penicillins	• Penicillin G potassium • Penicillin G sodium	• Penicillin V potassium
Penicillinase-resistant penicillins	• Dicloxacillin	
Quinolones	• Ciprofloxacin • Levofloxacin	• Moxifloxacin • Ofloxacin
Second generation cephalosporins	• Cefaclor • Cefprozil	• Cefuroxime
Sulfonamides	• Sulfamethoxazole-trimethoprim	
Tetracyclines	• Doxycycline • Minocycline	• Tetracycline
Third generation cephalosporins	• Cefdinir • Cefixime • Cefpodoxime	• Ceftibuten • Cefditoren • Ceftriaxone

Step 4 Test for Negative Comorbid Condition History. Exclude Episode Dates when the member had a claim/encounter with any diagnosis for a comorbid condition during the 12 months prior to or on the Episode Date. A code from any of the following meets criteria for a comorbid condition:

- HIV Value Set.
- HIV Type 2 Value Set.
- Malignant Neoplasms Value Set.
- Other Malignant Neoplasms of Skin Value Set.
- Emphysema Value Set.
- COPD Value Set.
- Cystic Fibrosis Value Set.
- Comorbid Conditions Value Set.
- Disorders of the Immune System Value Set.

Step 5 4 Test for Negative Medication History. Exclude Episode Dates where a new or refill prescription for an antibiotic medication (CWP Antibiotic Medications List) was filled 30 days prior to the Episode Date or ~~where a prescription filled more than 30 days prior to the Episode Date~~ was active on the Episode Date.

Step 6 Test for Negative Competing Diagnosis. Exclude Episode Dates where the member had a claim/encounter with a competing diagnosis (Competing Diagnosis Value Set) on or 3 days after the Episode Date.

Step 7 ~~5~~ Calculate continuous enrollment. The member must be continuously enrolled without a gap in coverage from 30 days prior to the Episode Date through 3 days after the Episode Date (34 total days).

Step 8 Remove Episode Dates that are within the 30-day period following another Episode Date (31 days total).

Deduplicate eligible episodes. If a member has more than one eligible episode in a 31-day period, include only the first eligible episode. For example, if a member has an eligible episode on January 1, include the January 1 visit and do not include eligible episodes that occur on or between January 2 and January 31; then, if applicable, include the next eligible episode that occurs on or after February 1. Identify visits chronologically including only one per 31-day period.

Note: *The denominator for this measure is based on episodes, not on members. All eligible episodes that were not excluded or deduplicated remain in the denominator.*

~~Step 6~~ ~~Select the IESD. This measure examines the earliest eligible episode per member.~~

Administrative Specification

Denominator The eligible population.

Numerator A group A streptococcus test (Group A Strep Tests Value Set) in the 7-day period from three days prior to the episode date ~~IESD~~ through 3 days after the episode date ~~IESD~~.

Data Elements for Reporting

Organizations that submit HEDIS data to NCQA must provide the following data elements.

Table CWP-1/2/3: Data Elements for Appropriate Testing ~~for Children With~~ Pharyngitis

	Administrative
Measurement year	✓
Data collection methodology (Administrative)	✓
Eligible population	*For each age stratification and total* ~~✓~~
Numerator events by administrative data	*For each age stratification and total* ~~✓~~
Numerator events by supplemental data	*For each age stratification and total* ~~✓~~
Reported rate	*For each age stratification and total* ~~✓~~

Antibiotic Use Measures:
Avoidance of Antibiotic Treatment in Adults With Acute Bronchitis (AAB)
Appropriate Treatment for Children With Upper Respiratory Infection (URI)
Appropriate Testing for Children With Pharyngitis (CWP)
Measure Workup

Topic Overview

Importance and Prevalence

Health importance

The development of widely used antibiotics in the 1940s greatly helped to reduce infections that had once been the cause of significant morbidity and mortality. However, new generations of microbes with resistance to available antimicrobials pose serious threats to public health (CDC, 1998; Giblin, 2004). Resistance to antibiotics is an ongoing problem in medicine and may contribute to challenges in controlling the spread of infectious diseases.

Antibiotic resistance

Evidence shows that prescriptions of antibiotics that act against a wide range of disease-causing bacteria (broad-spectrum) have increased. Further, broad-spectrum antibiotic use frequently occurs when either no therapy is necessary or when more targeted bacterial treatments would be appropriate (CDC, 2017).

Antibiotics cause a selective pressure by killing susceptible bacteria, allowing antibiotic-resistant bacteria to survive and multiply. The overuse of antibiotics drives the development and spread of resistance, and can cause avoidable drug-related adverse events and add unnecessary medical costs. According to the Centers for Disease Control and Prevention (CDC), antibiotic-resistant infections affect 2 million people and are associated with 23,000 deaths annually in the U.S. In addition, gastrointestinal flora perturbations caused by antibiotics can cause overgrowth of Clostridium difficile, a pathogen that commonly affects hospitalized and frail patients.

In 2011, 262 million outpatient antibiotic prescriptions were dispensed in the U.S. (CDC, 2017). Organisms that were at one time easily treated, such as staphylococcus and streptococcus, have acquired resistance to many standard antibiotics, making them harder to treat. The development of resistance is likely exacerbated by overutilization of antibiotics in the outpatient setting (Chouake, 2014; Arroll, 2003; Arnold, 2005; Lin, 2010; Kerwat, 2010; CDC, 2017).

Financial Importance and Cost-Effectiveness

The economic costs of antibiotic resistance vary but have been estimated to be as high as $20 billion in excess direct health care costs, with additional costs to society for lost productivity as high as $35 billion a year (CDC, 2017). Additionally, hospital-acquired infections with drug-resistant microbes can increase both the length of stay and cost of treatment (Goldmann, 1996; Chen, 2009).

Opportunities for Improvement

Gaps in care

It is estimated that at least 30% of the outpatient antibiotic prescriptions in the U.S. are unnecessary. Specifically, approximately half of all antibiotics prescribed for acute respiratory conditions are deemed unnecessary. Of all excess antibiotic prescriptions, 7 million are written for pharyngitis, 7.8 million for viral upper respiratory infections (URI) and 8 million for bronchitis each year (CDC, 2017).

Interventions

The broad overuse of antibiotics is a key driver of microbial acquisition of resistance, and several efforts to lower the rate of resistance address overuse. Many factors contribute to the increase in antibiotic use, some outside the health care system (e.g., agricultural use, or use in veterinary medicine). However, within the health care system, both patients and clinicians may contribute to overuse; for example, parents who insist on antibiotics for a sick child might be contributing to the broad use of penicillin, which in turn leads to increased pneumococcal resistance to penicillin (Lucas et al, 2015). Other factors that can contribute include providers not having enough time during an office visit to explain why antibiotics are unnecessary and providers' lack of knowledge about when to prescribe or tendency to be overly cautious about withholding prescriptions (Arnold and Straus, 2005).

Current strategies for influencing antimicrobial prescribing patterns include clinician education, formulary restriction, prior-approval programs, automatic stop orders, academic interventions to counteract corporate influences on prescribing patterns, antimicrobial cycling (when two or more antibiotic classes are alternated on a time scale of months to years) and computer-assisted management programs.

Providers can help reduce antibiotic overprescribing by providing effective communication, discussing patient concerns and answering questions (CDC, 2015). The CDC's *National Strategy to Combat Antibiotic-Resistant Bacteria* and the President's 2014 Executive Order *Combating Antibiotic-Resistant Bacteria and the White House's National Strategy to Combat Antibiotic-Resistant Bacteria* focus on four areas to detect, prevent and control antibiotic resistance nationally in the U.S., the first of which aligns with our reevaluation.

- Slow the development of resistant bacteria and prevent the spread of resistant infections through expanding efforts across healthcare and in the community and *improving antibiotic stewardship*.
- Strengthen *national surveillance efforts* to combat resistance by leveraging regional labs and creating a new resistant antibiotic bank, targeting outbreaks and hotspots, supporting and tracking food safety, and expanding data reporting.
- Advance development and use of rapid and innovative *diagnostic tests for identification and characterization of resistant bacteria* through innovation development and leveraging advanced molecular diagnostics.
- Improve *international collaboration* and capacities for antibiotic resistance prevention, surveillance, control and antibiotic research and development by enhancing global response to resistant bacteria with global health implications.

Health care disparities

Demographic and socioeconomic factors can affect antibiotic prescribing. A 2018 study of 448,990 outpatient visits for common upper respiratory conditions that should not require antibiotics found that adult patients who were White or had commercial insurance were significantly more likely to receive inappropriate antibiotic treatment. Additional factors that increased the likelihood of receiving antibiotic treatment included provider type, provider age and practice setting (Schmidt, 2018).

Studies to determine whether racial and ethnic differences exist in antibiotic prescribing among children in the U.S. have found that, when compared to White children, Black and other racial and ethnic minorities are less likely to receive antibiotics for acute respiratory tract infections. A 2009 study of 1,296,517 encounters by over 200,000 children to 222 clinicians in 25 practices found that when treated by the same clinician, Black children received fewer antibiotic prescriptions, fewer acute respiratory tract infection diagnoses and a lower proportion of broad-spectrum antibiotic prescriptions than non-Black children (Gerber, 2013).

A 2017 study of 39,445 pediatric emergency department encounters for viral acute respiratory tract infections found that 4.3% of White children received antibiotics, compared to 1.9% of Black, 2.6% of Hispanic and 2.9% of other non-Hispanic children. Factors such as parental expectations, provider perceptions of parental expectations and implicit provider biases may contribute to the racial and ethnic differences in overprescribing (Goyal, 2017).

Telehealth Modalities

The continued evolution and expansion of telehealth services opens new possibilities for delivery of health care services and removes barriers to accessing care associated with cost and distance (Neufeld & Case, 2013). Telehealth involves the use of a wide range of information technology tools (telephone, teleconferencing, video conferencing, asynchronous platforms) to provide health care services for diagnosis, treatment and management of a wide variety of conditions (American Telemedicine Association [ATA], 2006; Parker, et al., 2014). The use of telephone and online medical consultations has been shown to increase access to care, improve convenience and flexibility and lower costs associated with health care (Jung & Padman, 2014; Uscher-Pines & Mehrotra, 2014).

Acute bronchitis

No evidence has been found to support the reliability of diagnosing acute bronchitis through video conferencing, telephone calls or asynchronous telehealth modalities. But despite a lack of published evidence, online clinics such as Teladoc® and HealthPartners' virtuwell® use video conferencing, telephone calls and asynchronous modalities to provide remote clinical services, including diagnosing and treating acute bronchitis.

Through these online platforms, patients answer questions about their symptoms and medical history, which are then reviewed by a health care provider. Using information from the platform, providers can diagnose conditions, create a treatment plan and write prescriptions, if appropriate and warranted.

There is conflicting evidence regarding the quality of online clinics such as Teladoc® and virtuwell®. A cohort study evaluating antibiotic prescribing rates between in-office visits and the Teladoc® clinic found that Teladoc® providers were more likely to inappropriately prescribe antibiotics for acute bronchitis (Uscher-Pines, et al, 2015). In contrast, a program evaluation of the virtuwell® product found that 81 of 86 (94%) acute bronchitis episodes managed using the software appropriately avoided prescribing antibiotics (Courneya, Palattao, & Gallagher, 2013).

Table 1. Select Characteristics of Studies on Telehealth for Bronchitis

Measure Component	Study	Telehealth Modality	Key Result	Type of Study
Diagnostic feasibility	Uscher-Pines, L., et al., 2015	Video conference, telephone, asynchronous	Teladoc® had higher rates of inappropriate antibiotic prescriptions for acute bronchitis when compared to patients who received in office care.	Cohort study
	Courneya, P., et al., 2013	Video conference, telephone, asynchronous	Analyzing all claims between 2010 and 2012, 86 acute bronchitis episodes were treated through virtuwell®. An overall effectiveness rate of 94.2% appropriately avoided prescribing antibiotics for acute bronchitis.	Program evaluation

Pharyngitis

There is mixed evidence to support the diagnostic accuracy of telehealth for pharyngitis. A prospective blinded study concluded that patients who received evaluation of a sore throat telemedicine exhibited poor agreement with those who received an in-person physical examination (Akhar et al., 2018). Contrarily, a program evaluation that assessed clinical guidelines for the diagnosis and treatment of children (mean age 12 years) with streptococcal pharyngitis using telehealth found that telephone and video conferencing modalities were effective in providing accurate diagnostic services (Schoenfeld, et al., 2016).

There is also mixed evidence regarding the appropriateness of antibiotic prescribing. A randomized clinical trial (RCT) found that agreement in the diagnosis of URIs, including pharyngitis and sinusitis, and prescription of antibiotics in children (mean age 6 years) using video conferencing was similar to that of in-person physicians (McConnochie, et al., 2006). However, a cohort study found that although online telehealth consultations increased access to diagnostic, treatment and follow-up health services for children, physicians were more likely to prescribe antibiotics during a telehealth visit than an in-person visit (Mehrotra, et al., 2013).

Table 2. Select Characteristics of Studies on Telehealth for Appropriate Testing for Children With Pharyngitis

Measure Component	Study	Telehealth Modality	Key Result	Type of Study
Diagnostic feasibility	Akhtar et al., 2018	Telephone	Patients who received care via telemedicine exhibited poor agreement with those who received the in-person physical examination.	Prospective blinded study
	Schoenfeld, et al., 2016	Telephone and video conferencing	Telehealth visits had a high adherence to guidelines for diagnosis and treatment of children with streptococcal pharyngitis.	Program evaluation
	McConnochie et al., 2006	Video conferencing with asynchronous supplement	Reproducibility of telemedicine diagnosis of URIs and in-person diagnosis was similar.	RCT
	Mehrotra et al., 2013	Asynchronous	Children in an eVisit (online assessment) group, had no difference in diagnostic and treatment outcomes for sinusitis compared to in-person care. eVisits saw a higher rate of prescription of antibiotics.	Retrospective cohort study

Diagnosis of URI

There is mixed evidence to support the effectiveness of telehealth in accurately diagnosing URIs. An RCT found that agreement in the diagnosis of URIs, including pharyngitis and sinusitis, and prescription of antibiotics in children (mean age 6 years) using video conferencing was similar to that of in-person physicians (McConnochie, et al., 2006). However, a cohort study found that although online telehealth consultations increased access to diagnostic, treatment and follow-up health services for children, physicians were more likely to prescribe antibiotics during a telehealth visit than an in-person visit (Mehrotra, et al., 2013).

Additionally, a prospective blinded study concluded that patients who received a sore throat evaluation via telemedicine exhibited poor agreement with those who received an in-person physical examination (Akhar et al., 2018). However, a program evaluation of clinical guidelines for the diagnosis and treatment of children (mean age 12 years) with streptococcal pharyngitis using telehealth found that telephone and video conferencing modalities were effective in providing accurate diagnostic services (Schoenfeld, et al., 2016).

Table 3. Select Characteristics of Studies on Appropriate Treatment for Children With URI

Measure Component	Study	Telehealth Modality	Key Result	Type of Study
Diagnostic feasibility	McConnochie et al., 2006	Video conferencing with asynchronous supplement	Reproducibility of telemedicine diagnosis of upper respiratory infections and in-person diagnosis was similar.	RCT
	Mehrotra et al., 2013	Asynchronous	Children in an eVisit (online assessment) group, had no difference in diagnostic and treatment outcomes for sinusitis compared to in-person care. eVisits saw a higher rate of prescription of antibiotics.	Retrospective cohort study
	Akhtar et al., 2018	Telephone	Patients who received care via telemedicine exhibited poor agreement with those who received the in-person physical examination.	Prospective blinded study
	Schoenfeld, et al., 2016	Telephone and video conferencing	Telehealth visits had a high adherence to guidelines for diagnosis and treatment of children with streptococcal pharyngitis.	Program evaluation

Illnesses and Guidelines

Acute bronchitis

Acute bronchitis is a common, self-limiting respiratory tract infection characterized primarily by a cough lasting less than 3 weeks, and is also referred to as a “chest cold” (CDC, 2015). The vast majority of acute bronchitis cases are viral. Bacteria are detected in 1%–10% of cases, and can include Bordetella pertussis, Chlamydia pneumoniae and Mycoplasma pneumoniae (Hart, 2014). Antibiotics are not indicated for the initial treatment of acute bronchitis and when prescribed, can do more harm than good. In 2014, 266.1 million courses of antibiotics were dispensed to outpatients in U.S. community pharmacies, and at least 30% of those were potentially unnecessary (CDC, 2017).

A 2017 Cochrane review of 17 studies assessing outcomes and adverse effects of antibiotic use in children and adults with acute bronchitis found limited evidence of clinical benefit to support antibiotic use across all age ranges studied. For 11 studies at follow-up, there was no difference in clinical improvement between the antibiotic and placebo groups. The review also found a small but significant increase in adverse effects in people treated with antibiotics, most commonly nausea, vomiting, diarrhea, headache and rash (Smith, 2017). Guidelines recommend against the use of antibiotics in patients, in both the current and proposed age ranges of the HEDIS bronchitis measure (Table 4).

Pharyngitis

Acute pharyngitis is a common illness that can be caused by different viruses and bacteria. Acute pharyngitis is also known as “strep throat” when caused by Streptococcus pyogenes, which are also called group A Streptococcus (GAS) or group A strep. GAS pharyngitis is an infection of the oropharynx, and most patients present with a sore throat that worsens when swallowing, neck pain or swelling, fever, headache and fatigue (CDC, 2016; Chow and Doran, 2016).

Acute pharyngitis accounts for approximately 12 million ambulatory care visits in the U.S. annually, or 1%–2% of all ambulatory care visits (Chow and Doran, 2016). Antibiotic treatment is always indicated for patients with a positive diagnosis for GAS pharyngitis, regardless of age, and penicillin or amoxicillin is the antibiotic of choice to treat GAS pharyngitis (CDC, 2016). Antibiotic treatment can help prevent the spread of infection and other sequalae such as scarlet fever. Viral pharyngitis should not be treated with antibiotics.

Although there is consensus among current guidelines that children and adults older than 3 years who are diagnosed with GAS pharyngitis should receive antibiotics, there is conflicting guidance on appropriate diagnostic tools. In place of a positive rapid antigen detection test (RADT) or a positive throat culture, the AAFP recommends that physicians stratify the risk of pharyngitis using a validated clinical prediction rule such as the Centor criteria. According to the Centor Criteria, GAS pharyngitis can be ruled out clinically in low-risk patients for whom no further testing is needed. For high-risk patients, the Centor criteria recommend prescribing empiric antibiotics.

It should be noted that guidelines differ on empirically treating with antibiotics, and most do not recommend this step, including the American College of Physicians and the Infectious Disease Society of America. All relevant recommendations from current guidelines are listed in Table 5. Guidelines recommend the use of antibiotics after testing in patients with GAS pharyngitis in both the current and proposed age ranges of the HEDIS pharyngitis measure.

URI

URIs are often characterized by nasal discharge, congestion or cough. The course of most uncomplicated viral URIs lasts about 5–7 days (CDC, 2017). Uncomplicated URIs account for 25 million visits to family physicians and about 20–22 million days of absence from work or school each year in the U.S. Although the majority of these infections are caused by viruses, a high percentage are incorrectly treated with antibiotics (Zoorob et al., 2012).

Current guidelines recommend against the use of antibiotics for the treatment of URIs in both children and adults. The 2017 Institute for Clinical Systems Improvement (ICSI) and 2016 AAFP guidelines base their recommendations on the evidence found in a Cochrane systematic review of outcomes and adverse effects associated with the use of antibiotics for the common cold in both children and adults. The review found that, “participants receiving antibiotics for the common cold did no better in terms of lack of cure or persistence of symptoms than those on placebo, based on a pooled analysis of six trials with a total of 1047 participants” (Kenealy, 2017). The authors also noted that adult participants had a significantly greater risk of adverse effects with antibiotics than with a placebo.

Relevant recommendations from current guidelines are listed in Table 6. Guidelines recommend against the use of antibiotics in patients in both the current and proposed age ranges of the HEDIS upper respiratory infection measure.

References for Summary of Evidence

Akhtar, M., P.G. Heukelom, A. Ahmed, R.D. Tranter, E. White, N. Shekem, … N.M. Mohr. 2018. "Telemedicine Physical Examination Utilizing a Consumer Device Demonstrates Poor Concordance with In-Person Physical Examination in Emergency Department Patients with Sore Throat: A Prospective Blinded Study." *Telemedicine and E-Health* doi:10.1089/tmj.2017.0240

American Telemedicine Association. May 2006. *Telemedicine, Telehealth, and Health Information Technology*. http://www.who.int/goe/policies/countries/usa_support_tele.pdf?ua=1

Arnold, S.R., and S.E. Straus. 2005. "Interventions to Improve Antibiotic Prescribing Practices in Ambulatory Care." *Cochrane Database Syst Rev* 19(4):CD003539. doi: 10.1002/14651858.CD003539.pub2

Arroll, B., T. Kenealy, N. Kerse. 2003. "Do Delayed Prescriptions Reduce Antibiotic Use in Respiratory Tract Infections? A Systematic Review." *Br J Gen Pract* 53(496): 871–7.

Centers for Disease Control and Prevention (CDC). 1998. "Preventing Emerging Infectious Diseases: A Strategy for the 21st Century: Overview of the Updated CDC Plan." *MMWR* 47(RR15): 1–14.

CDC. 2015. *Antibiotic Prescribing and Use in Doctor's Offices. Acute Cough Illness (Acute Bronchitis): Physician Information Sheet (Adults).* https://www.cdc.gov/getsmart/community/materials-references/print-materials/hcp/adult-acute-cough-illness.html

CDC. 2016.*Group A Streptococcal (GAS) Disease. Pharyngitis (Strep Throat).* https://www.cdc.gov/groupastrep/diseases-hcp/strep-throat.html

CDC. 2017. *Antibiotic Prescribing and Use in Doctor's Offices. What is Acute Bronchitis?* https://www.cdc.gov/antibiotic-use/community/for-patients/common-illnesses/bronchitis.html

CDC. 2017. *Get Smart: Know When Antibiotics Work in Doctor's Offices. Measuring Outpatient Antibiotic Prescribing.* https://www.cdc.gov/getsmart/community/programs-measurement/measuring-antibiotic-prescribing.html

CDC. 2017. *National Strategy to Combat Antibiotic Resistance.* https://www.cdc.gov/drugresistance/federal-engagement-in-ar/national-strategy/index.html

CDC. *Diseases and Organisms in Healthcare Settings*. https://www.cdc.gov/HAI/organisms/organisms.html

Chen, Y.Y., F.D. Wang, C.Y. Liu, P. Chou. 2009. "Incidence Rate and Variable Cost of Nosocomial Infections in Different Types of Intensive Care Units." *Infect Control Hosp Epidemiol* 30(1):39-46. doi: 10.1086/592984

Chouake, J., A. Krausz, B.L. Adler, H.W. Cohen, J.D. Nosanchuk, A. Friedman. 2014. "Management of Cutaneous Abscesses by Dermatologists." *J Drugs Dermatol* 13(2): 611–16.

Courneya, P.T., K.J. Palattao, and J.M. Gallagher. 2013. "HealthPartners' Online Clinic for Simple Conditions Delivers Savings of $88 per Episode and High Patient Approval." *Health Affairs* 32(2), 385–92. doi:10.1377/hlthaff.2012.1157

Evans, G. 2000. "The Day-Care Connection to Drug Resistance: Parental Pressure Leads to Antibiotic Pressure." *Healthcare Infect Prev* 1–2.

Gerber, J.S., P.A. Praad, A.R. Localio, A.G. Fiks, et al. 2013. "Racial Differences in Antibiotic Prescribing by Primary Care Physicians." *Pediatrics* 131(4): 677–84. doi:10.1542/peds.2012-2500

Goldmann, D.A., R.A. Weinstein, R.P. Wenzel, et al. 1996. "Strategies to Prevent and Control the Emergence and Spread of Antimicrobial-Resistant Microorganisms in Hospitals: A Challenge to Hospital Leadership." *JAMA* 275(3): 234–40. doi:10.1001/jama.1996.03530270074035

Hart, A.M. 2014. "Evidence-Based Diagnosis and Management of Acute Bronchitis." *Nurse Practitioner* 39(9): 32–9. doi: 10.1097/01.NPR.0000452978.99676.2b

Harris, A.M., L.A. Hicks, A. Qaseem. 2016. "Appropriate Antibiotic Use for Acute Respiratory Tract Infection in Adults: Advice for High-Value Care from the American College of Physicians and the Centers for Disease Control and Prevention." *Ann Intern Med* 164(6): 425–34. doi: 10.7326/M15-1840

Giblin, T.B., R.L. Sinkowitz-Cochran, P.L. Harris, et al. 2004. "Clinicians' Perceptions of The Problem of Antimicrobial Resistance in Health Care Facilities." *Arch Intern Med* 164(15): 1662–8. doi: 10.1001/archinte.164.15.1662

Goyal, M.K., T.J. Johnson, J.M. Chamberlain, C. Casper, et al. 2017. "Racial and Ethnic Differences in Antibiotic Use for Viral Illness in Emergency Departments." *Pediatrics* 140(2):e20170203. doi: https://doi.org/10.1542/peds.2017-0203

Jung, C., and R. Padman. 2014. "Virtualized Healthcare Delivery: Understanding Users and Their Usage Patterns of Online Medical Consultations." *International Journal of Medical Informatics* 83, 901–14. http://dx.doi.org/10.1016/j.ijmedinf.2014.08.004

Kalra, M.G., K.E. Higgins, E.D. Perez. 2016. "Common Questions About Streptococcal Pharyngitis." *Am Fam Physician* 94(1): 24–31.

Kerwat, K., M. Kerwat, J. Graf, H. Wulf. 2010. "Resistance to Antibiotics and Multiresistant Pathogens." *Anasthesiol Intensivmed Notfallmed Schmerzther* 45(4):242–3.

Lin, M.Y., M.K. Hayden. 2010. "Methicillin-Resistant Staphylococcus Aureus and Vancomycin-Resistant Enterococcus: Recognition and Prevention in Intensive Care Units." *Crit Care Med* 38(8 suppl): S335–44. doi: 10.1097/CCM.0b013e3181e6ab12

Lucas, P.J., C. Cabrel, A.D. Hay, J. Horwood. 2015. "A Systematic Review of Parent and Clinician Views and Perceptions that Influence Prescribing Decisions in Relation to Acute Childhood Infections in Primary Care." *Scand J Prim Health Care* 33(1): 11–20. doi: 10.3109/02813432.2015.1001942

McConnochie, K.M., G.P. Conners, A.F. Bayer, J. Goepp, N.E. Herendeen, … K.J. Roghmann. 2006. "Differences in Diagnosis and treatment Using Telemedicine Versus In-Person Evaluation of Acute Illness. *Ambulatory Pediatrics* 6, 187–95. https://www.ncbi.nlm.nih.gov/pubmed/16843248

McConnochie, K.M., N.E. Wood, N.E. Herendeen, P.K. Ng, K. Noyes, … K.J. Roghmann. 2009. "Acute Illness Care Patterns Change With Use of Telemedicine." *Pediatrics* 123(6), e989–995. doi:10.1542/peds.2008-2698

Mcconnochie, K.M., N. Wood, H. Kitzman, N. Herendeen, J. Roy, and K. Roghmann. 2005. "Telemedicine Reduces Absence Resulting From Illness in Urban Child Care: Evaluation of an Innovation." *Pediatrics* 115(5), 1273–82. doi:10.1542/peds.2004-0335

Mehrotra, A., S. Paone, G.D. Martich, S.M. Albert, and G.J. Shevchik. 2013. "A Comparison of Care at eVisits and Physician Office Visits for Sinusitis and Urinary Tract Infections." *JAMA Internal Medicine* 173(1), 72–4. doi:10.1001/2013.jamainternmed.305

Neufeld, J., and R. Case. 2013. "Walk-In Telemental Health Clinics Improve Access and Efficiency: A 2-Year Follow-Up Analysis." *Telemedicine and e-Health* 938–41. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3850444/

Parker, E., S. Zimmerman, S. Rodriguez, and T. Lee. 2014. "Exploring Best Practices in Home Health Care: A Review of Available Evidence on Select Innovations." *Sage Journals* 26(1), 17–33. doi: 10.1177/1084822313499916

Schmidt, M.L., M.D. Spencer, L.E. Davidson. 2018. "Patient, Provider, and Practice Characteristics Associated with Inappropriate Antimicrobial Prescribing in Ambulatory Practices." *Infection Control and Hospital Epidemiology* 39(3): 307–15. doi: 10.1017/ice.2017.263

Schoenfeld, A.J., J.M. Davies, B.J. Marafino, M. Dean, C. DeJong, … R.A. Dudley. 2016. "Variation in Quality of Urgent Health Care Provided During Commercial Virtual Visits." *JAMA Internal Medicine* 176(5), 635–42. doi:10.1001/jamainternmed.2015.8248

Shulman, S.T., A.L. Bisno, H.W. Clegg, et al. 2012. "Executive Summary: Clinical Practice Guideline for the Diagnosis and Management of Group A Streptococcal Pharyngitis: 2012 Update by the Infectious Diseases Society of America." *Clin Infect Dis* 55(10):e86–102. doi: https://doi.org/10.1093/cid/cis847

Siegel, J.D., E. Rhinehart, M. Jackson, L. Chiarello. 2006. *The Healthcare Infection Control Practices Advisory Committee. Management of Multidrug-Resistant Organisms in Healthcare Settings.* https://www.cdc.gov/infectioncontrol/guidelines/MDRO/index.html

Smith, S.M., T., Fahey, T., Smucny, J., Becker, L.A. 2017. "Antibiotics for Acute Bronchitis." *Cochrane Database Syst Rev* DOI: 10.1002/14651858.CD000245.pub4

Snellman, L., W. Adams, G. Anderson, A. Godfrey, A. Gravley, K. Johnson, P. Marshall, et al. 2013. *Diagnosis and Treatment of Respiratory Illness in Children and Adults. Institute for Clinical Systems Improvement (ICSI).* http://www.infectologia.edu.uy/images/stories/pdf/4_guias_clinicas/sitio_infeccion/tracto_respiratorio/guia_adultos_ninosICSI2013.pdf

Uscher-Pines, L., and A. Mehrotra. 2014. "Analysis of Teledoc Use Seems to Indicate Expanded Access to Care for patients Without Prior Connection to a Provider." *Health Affairs* 33(2), 258-264. doi: 10.1377/hlthaff.2013.0989

Virtuwell. (n.d.). *Try virtuwell, the 24/7 Online Clinic.* Retrieved July 17, 2017, from https://www.virtuwell.com/how-it-works

World Health Organization (WHO). 2017. *Antibiotic Resistance*. http://www.who.int/mediacentre/factsheets/antibiotic-resistance/en/

Specific Guideline Recommendations

Table 4. Clinical Practice Guidelines: Acute Bronchitis- Summary of Recommendations

Organization	Year	Age	Recommendation	Rating/Grade
American Academy of Family Physicians	2016	Adults and children	Avoid prescribing antibiotics for uncomplicated acute bronchitis.	Grade A
American College of Physicians and the Centers for Disease Control and Prevention	2016	Adults	Clinicians should not perform testing or initiate antibiotic therapy in patients with bronchitis unless pneumonia is suspected.	High-Value Care Advice
American Academy of Pediatrics	2014	Children 1-23 months	Clinicians should not administer antibacterial medications to infants and children with a diagnosis of bronchiolitis unless there is a concomitant bacterial infection, or a strong suspicion of one.	Evidence Quality: B; Recommendation Strength: Strong Recommendation
American Academy of Pediatrics	2013	Children	Because the predominant etiologies for these conditions are viruses, antibiotic therapy is not indicated. Because of uncertainty about the relevance of the diagnosis of acute bronchitis for children, data are limited. Nonetheless, a large meta-analysis concluded that there was no benefit to antibiotic therapy (including for delayed prescriptions) for patients with nonspecific cough and cold.	Consensus Statement
American College of Chest Physicians	2006	Adults and children	For patients with the putative diagnosis of acute bronchitis, routine treatment with antibiotics is not justified and should not be offered.	Quality of Evidence, Good; Benefit, None; Grade of Recommendation, D

Table 5. Clinical Practice Guidelines: Pharyngitis- Summary of Recommendations

Organization	Year	Age	Recommendation	Rating/Grade
American Academy of Family Physicians	2016	Not specified	Physicians should diagnose GABHS pharyngitis using an approach that combines a validated clinical decision rule (e.g., modified Centor score, FeverPAIN score) with selective use of rapid antigen detection testing.	Evidence Rating: A
American Academy of Pediatrics	2013	Children	Testing should generally not be performed in children younger than 3 years in whom GAS rarely causes pharyngitis and in whom rheumatic fever is uncommon. Diagnosis of GAS requires confirmation by rapid testing or culture. Do not treat empirically.	Consensus Statement
American College of Physicians and the Centers for Disease Control and Prevention	2016	Adults	Clinicians should test patients with symptoms suggestive of group A streptococcal pharyngitis by rapid antigen detection test and/or culture for group A Streptococcus. Clinicians should treat patients with antibiotics only if they have confirmed streptococcal pharyngitis.	High-Value Care Advice
			Patients who meet fewer than 3 Centor criteria do not need to be tested. IDSA suggests that they can be used to identify patients who have a low probability of group A streptococcal pharyngitis and do not warrant further testing.	NA
American Heart Association	2009	All age groups	Diagnosis of GAS pharyngitis is best accomplished by combining clinical judgment with diagnostic test results, the criterion standard of which is the throat culture. If findings are suggestive of GAS pharyngitis, then a throat culture or RADT should be performed to confirm diagnosis.	Class IIb, LOE B
			The use of a clinical algorithm without microbiological confirmation has been recommended recently by some authors as an acceptable strategy for diagnosing GAS pharyngitis in adults but not children. However, use of this approach could result in the receipt of inappropriate antimicrobial therapy by an unacceptably large number of adults with nonstreptococcal pharyngitis and is not recommended.	Class III, LOE B
Infectious Diseases Society of America	2012	Children (≥3 years) and adults	Diagnostic studies for GAS pharyngitis are not indicated for children <3 years old because acute rheumatic fever is rare in children <3 years old and the incidence of streptococcal pharyngitis and the classic presentation of streptococcal pharyngitis are uncommon in this age group. Selected children <3 years old who have other risk factors, such as an older sibling with GAS infection, may be considered for testing.	Strong Recommendation Moderate Quality of Evidence

Organization	Year	Age	Recommendation	Rating/Grade
Institute for Clinical Systems Improvement	2017	Children and adults	It is the consensus of the ICSI work group not to test for Group A Streptococcal (GAS) pharyngitis in patients with modified Centor criteria scores <3 or when viral features like rhinorrhea, cough, oral ulcers and/or hoarseness are present. Testing should generally be reserved for patients when there is a high suspicion for GAS and for whom there is intention to treat with antibiotics.	Consensus Statement
			It is the workgroup consensus that empirical antibiotic treatment of suspected Group A Streptococcal (GAS) pharyngitis is not recommended. There is inconclusive evidence regarding antibiotic treatment of GAS pharyngitis in low-risk patients.	Strong Recommendation High Quality of Evidence

Table 6: Upper Respiratory Infection: Summary of Recommendations

Organization	Year	Age	Recommendation	Rating/Grade
American College of Physicians and the Centers for Disease Control and Prevention	2016	Adults	Clinicians should not prescribe antibiotics for patients with the common cold.	High-Value Care Advice
American Academy of Family Physicians	2012	Adults and children	Antibiotics should not be used for the treatment of cold symptoms in children or adults (A Rating)	Strength of Recommendation: A
American Academy of Family Physicians	2011	Children	Antibiotic therapy does not benefit children with bronchiolitis, the common cold, or nonstreptococcal pharyngitis.	Strength of Recommendation: A
			Using strategies that delay or avoid antibiotic prescription for viral upper respiratory tract infections will significantly reduce antibiotic use without increasing long-term complications.	Strength of Recommendation: A
American Academy of Pediatrics	2013	Children	Because the predominant etiologies for these conditions are viruses, antibiotic therapy is not indicated. Because of uncertainty about the relevance of the diagnosis of acute bronchitis for children, data are limited. Nonetheless, a large meta-analysis concluded that there was no benefit to antibiotic therapy (including for delayed prescriptions) for patients with nonspecific cough and cold.	Consensus Statement
Institute for Clinical Systems Improvement	2017	Adults and Children	The ICSI work group does not recommend antibiotics for treatment of common cold symptoms in children and adults.	Quality of Evidence: Low; Strength of Recommendation: Strong

Grading System Key

American Heart Association	
CLASSIFICATION OF RECOMMENDATION	
Class I	Conditions for which there is evidence and/or general agreement that a given procedure or treatment is beneficial, useful, and effective
Class II	Conditions for which there is conflicting evidence and/or a divergence of opinion about the usefulness/efficacy of a procedure or treatment
Class IIa	Weight of evidence/opinion is in favor of usefulness/efficacy.
Class IIb	Usefulness/efficacy is less well established by evidence/opinion.
Class III	Conditions for which there is evidence and/or general agreement that a procedure/treatment is not useful/effective and in some cases may be harmful
LEVEL OF EVIDENCE	
A	Data derived from multiple randomized clinical trials or meta-analyses
B	Data derived from a single randomized trial or nonrandomized studies
C	Only consensus opinion of experts, cases studies, or standard of care
American Academy of Family Physicians	
STRENGTH OF RECOMMENDATION	
A	Consistent, good-quality patient-oriented evidence.
B	Inconsistent or limited-quality patient-oriented evidence.
C	Consensus, disease-oriented evidence usual practice, expert opinion, or case series for studies of diagnosis, treatment, prevention, or screening.
American Academy of Pediatrics	
STRENGTH OF RECOMMENDATION	
A	Consistent, good-quality patient-oriented evidence.
B	Inconsistent or limited-quality patient-oriented evidence.
C	Consensus, disease-oriented evidence usual practice, expert opinion, or case series for studies of diagnosis, treatment, prevention, or screening.
ASSESSING QUALITY OF EVIDENCE	
Level 1	Good-quality, patient-oriented evidence
Level 2	Limited-quality patient-oriented evidence
Level 3	Other evidence

American College of Physicians
High-Value Care: Good benefit relative to harms and costs.
Low Value Care: Benefits do not clearly justify harms and costs.

American College of Chest Physicians
1A/Strong Recommendation, High-Quality Evidence: Benefits clearly outweigh risk and burdens, or vice versa.
1B/Strong Recommendation, Moderate Quality Evidence: Benefits clearly outweigh risk and burdens, or vice versa.
1C/Strong Recommendation, Low-Quality or Very Low-Quality Evidence: Benefits clearly outweigh risk and burdens, or vice versa.
2A/Weak Recommendation, High-Quality Evidence: Benefits closely balanced with risks and burden.
2B/Weak Recommendation, Moderate-Quality Evidence: Benefits closely balanced with risks and burden.
2C/Weak Recommendation, Low-Quality or Very Low-Quality Evidence: Uncertainty in the estimates of benefits, risks, and burden; benefits, risk, and burden may be closely balanced.

Institute for Clinical Systems Improvement			
Category	**Quality Definitions**	**Strong Recommendation**	**Weak Recommendation**
High Quality Evidence	Further research is very unlikely to change our confidence in the estimate of effect.	The work group is confident that the desirable effects of adhering to this recommendation outweigh the undesirable effects. This is a strong recommendation for or against. This applies to most patients.	The work group recognizes that the evidence, though of high quality, shows a balance between estimates of harms and benefits. The best action will depend on local circumstances, patient values or preferences.
Moderate Quality Evidence	Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.	The work group is confident that the benefits outweigh the risks, but recognizes that the evidence has limitations. Further evidence may impact this recommendation. This is a recommendation that likely applies to most patients.	The work group recognizes that there is a balance between harms and benefit, or that there is uncertainty about the estimates of the benefits and harms of the proposed intervention that may be affected by new evidence. Alternative approaches will likely be better for some patients under some circumstances.
Low Quality Evidence	Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change. The estimate or any estimate of effect is very uncertain.	The work group feels that the evidence consistently indicates the benefit of this action outweighs the harms. This recommendation might change when higher quality evidence becomes available.	The work group recognizes that there is significant uncertainty about the best estimates of benefits and harms. Very weak recommendation, other alternatives may be equally reasonable.

Infectious Diseases Society of America			
Category	**Quality Definitions**	**Strong Recommendation**	**Weak Recommendation**
Moderate Quality Evidence	Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.	The work group is confident that the benefits outweigh the risks, but recognizes that the evidence has limitations. Further evidence may impact this recommendation. This is a recommendation that likely applies to most patients.	The work group recognizes that there is a balance between harms and benefit, or that there is uncertainty about the estimates of the benefits and harms of the proposed intervention that may be affected by new evidence. Alternative approaches will likely be better for some patients under some circumstances.
Category	**Quality Definitions**	**Strong Recommendation**	**Weak Recommendation**
Low Quality Evidence	Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate or any estimate of effect is very uncertain.	The work group feels that the evidence consistently indicates the benefit of this action outweighs the harms. This recommendation might change when higher quality evidence becomes available.	The work group recognizes that there is significant uncertainty about the best estimates of benefits and harms. Very weak recommendation, other alternatives may be equally reasonable.

References for Recommendations

American Academy of Family Physicians (AAFP). *SORT: The Strength-of-Recommendation Taxonomy.* https://www.aafp.org/dam/AAFP/documents/journals/afp/sortdef07.pdf

Ebell, M.H., J. Siwek, B.D. Weiss, S.H. Woolf, J. Susman, B. Ewigman, et al. 2004. "Strength of Recommendation Taxonomy (SORT): A Patient-Centered Approach to Grading Evidence in the Medical Literature." *Am Fam Physician* 69: 549–57.

American College of Physicians (ACP). *Clinical Guidelines and Recommendations from the American College of Physicians: The Role in Improving Health Care Value and Reducing Over Diagnosis.* http://www.preventingoverdiagnosis.net/2016Presentations/Timothy_Wilt.pdf

American College of Chest Physicians (ACCP), Guyatt, G., D. Gutterman, M.H. Baumann, et al. 2006. "Grading Strength of Recommendations and Quality of Evidence in Clinical Guidelines: Report from an American College of Chest Physicians Task Force." *Chest* 129:174–81. doi: 10.1378/chest.129.1.174

Institute for Clinical Systems Improvement (ICSI). *Reviewing Evidence Using GRADE.* https://www.icsi.org/_asset/z87hr3/EvidenceGRADE042017.pdf

Infectious Diseases Society of America (IDSA). *Development Resources.* http://www.idsociety.org/Guidelines_Other/

National Institute for Health and Care Excellence (NICE), Tan, T., and P. Little. 2008. "Antibiotic Prescribing for Self-Limiting Respiratory Tract Infections in Primary Care: Summary of NICE Guidance." *BMJ* 337:a437. http://pediatrics.aappublications.org/content/132/6/1146 doi: 10.1136/bmj.a437

HEDIS Health Plan Performance Rates: Avoidance of Antibiotic Treatment in Adults With Acute Bronchitis (AAB)

Table 1. HEDIS AAB Measure Performance—Commercial Plans

Measurement Year	Total Number of Plans (N)	Number of Plans Reporting (N (%))	Performance Rates (%)						
			Mean	Standard Deviation	10th Percentile	25th Percentile	50th Percentile	75th Percentile	90th Percentile
2017*	406	393 (96.8)	30.8	10.7	21.2	24.2	28.4	34.1	43.9
2016	420	407 (96.9)	28.4	10.1	19.7	22.4	25.8	31.3	39.5
2015	428	413 (96.5)	26.7	10.1	17.5	20.6	24.5	29.0	38.7

*For 2013 the average denominator across plans was 2,035 individuals, with a standard deviation of 3,482.

Table 2. HEDIS AAB Measure Performance—Medicaid Plans

Measurement Year	Total Number of Plans (N)	Number of Plans Reporting (N (%))	Performance Rates (%)						
			Mean	Standard Deviation	10th Percentile	25th Percentile	50th Percentile	75th Percentile	90th Percentile
2017*	275	235 (84.5)	33.7	9.5	25.2	27.6	32.0	37.4	44.6
2016	282	232 (82.3)	30.4	8.6	21.7	25.0	28.7	33.7	39.1
2015	278	222 (76.9)	28.1	8.5	19.5	22.1	26.3	32.3	38.7

*For 2013 the average denominator across plans was 1,388 individuals, with a standard deviation of 1,788.

HEDIS Health Plan Performance Rates: Appropriate Treatment for Children With Upper Respiratory Infection (URI)

Table 1. HEDIS URI Measure Performance—Commercial Plans

Measurement Year	Total Number of Plans (N)	Number of Plans Reporting (N (%))	Performance Rates (%)						
			Mean	Standard Deviation	10th Percentile	25th Percentile	50th Percentile	75th Percentile	90th Percentile
2017*	406	384 (94.6)	88.3	7.1	79.2	85.5	90.2	92.5	94.9
2016	420	403 (96.0)	87.7	7.0	78.9	84.0	89.3	92.4	94.8
2015	428	406 (94.9)	87.5	7.2	77.7	84.4	89.1	92.2	95.0

*For 2017 the average denominator across plans was 12,054 individuals, with a standard deviation of 3,651.

Table 2. HEDIS URI Measure Performance—Medicaid Plans

Measurement Year	Total Number of Plans (N)	Number of Plans Reporting (N (%))	Performance Rates (%)						
			Mean	Standard Deviation	10th Percentile	25th Percentile	50th Percentile	75th Percentile	90th Percentile
2017*	275	207 (75.3)	89.1	7.1	80.6	86.6	90.4	93.8	95.9
2016	282	210 (74.5)	88.6	7.1	77.8	86.4	89.7	93.5	96.0
2015	278	201 (72.3)	87.8	7.7	76.2	84.9	89.4	93.4	96.1

*For 2017 the average denominator across plans was 7,259 individuals, with a standard deviation of 8,647.

HEDIS Health Plan Performance Rates: Appropriate Testing for Children With Pharyngitis (CWP)

Table 1. HEDIS CWP Measure Performance—Commercial Plans

Measurement Year	Total Number of Plans (N)	Number of Plans Reporting (N (%))	Performance Rates (%)						
			Mean	Standard Deviation	10th Percentile	25th Percentile	50th Percentile	75th Percentile	90th Percentile
2017*	406	380 (93.6)	86.2	9.1	76.7	82.6	88.0	91.5	94.0
2016	420	397 (94.5)	83.7	9.5	73.8	78.7	85.4	89.7	93.1
2015	428	398 (93.0)	81.9	10.2	70.7	77.0	83.7	88.3	92.3

*For 2017 the average denominator across plans was 1,952 individuals, with a standard deviation of 3,222.

Table 2. HEDIS CWP Measure Performance—Medicaid Plans

Measurement Year	Total Number of Plans (N)	Number of Plans Reporting (N (%))	Performance Rates (%)						
			Mean	Standard Deviation	10th Percentile	25th Percentile	50th Percentile	75th Percentile	90th Percentile
2017*	275	206 (75.0)	78.3	11.2	65.0	72.5	80.1	86.0	90.5
2016	282	204 (72.3)	74.1	12.2	59.7	67.1	75.2	82.9	88.0
2015	278	196 (70.5)	71.1	13.2	55.1	63.2	71.6	81.0	86.6

*For 2017 the average denominator across plans was 4,434 individuals, with a standard deviation of 5,329.