هيئة الصحة بدبي
DUBAI HEALTH AUTHORITY

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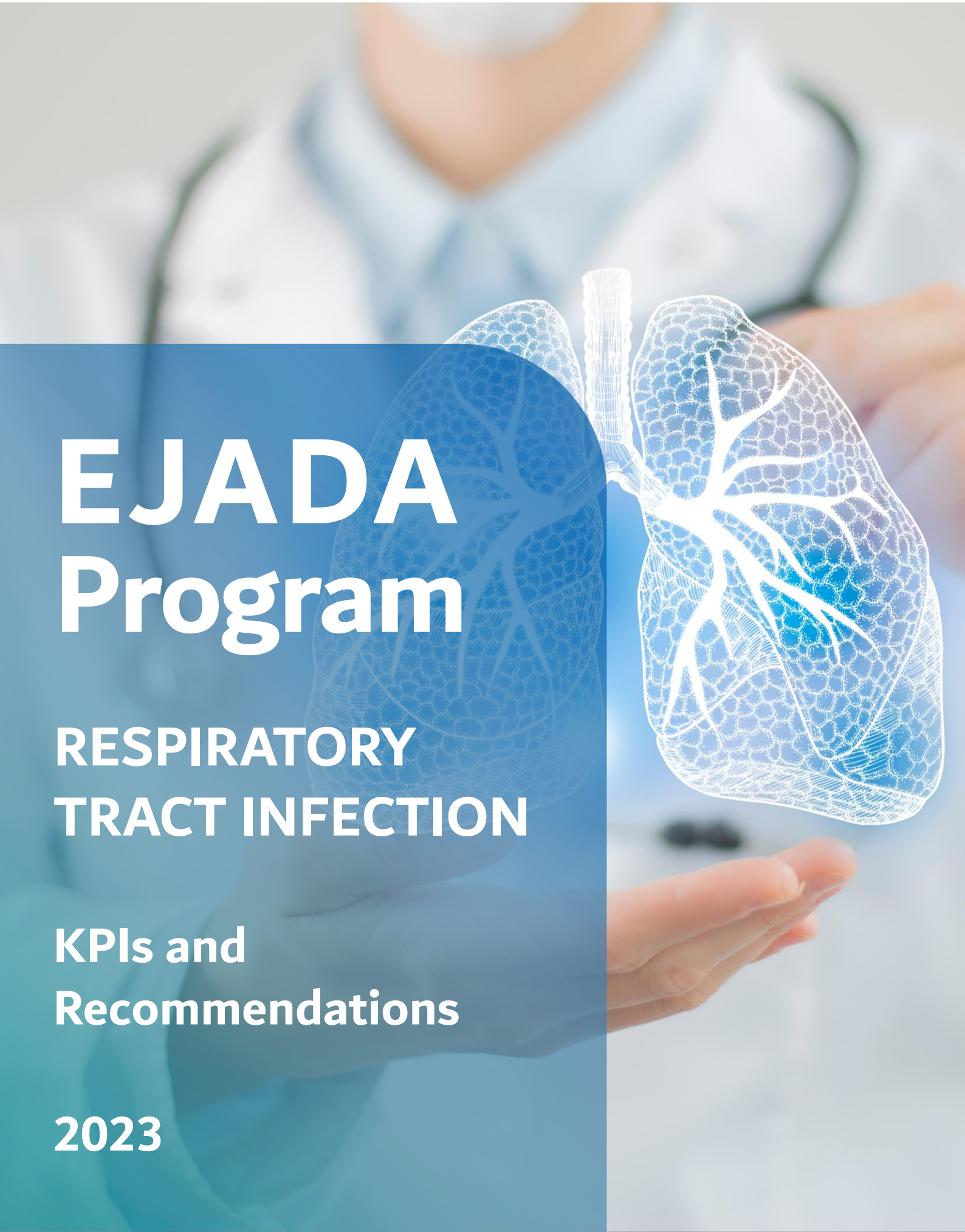
EJADA



EJADA Program

RESPIRATORY TRACT INFECTION

KPIs and Recommendations

2023

Content

Introduction

Respiratory Tract Infections (RTI) represent a ubiquitous and recurrent health concern affecting individuals of all ages worldwide. These infections can be caused by various pathogens, including viruses, bacteria, and occasionally fungi. Rhinoviruses, coronaviruses, adenoviruses, and influenza viruses are common viral etiologies, while *Streptococcus pyogenes* and Group A streptococcus are notable bacterial agents. While RTIs are typically mild and self-limiting, they can lead to substantial morbidity and a considerable socioeconomic burden due to their high prevalence.

Several factors predispose individuals to RTIs. Foremost among these is exposure to infectious agents, especially in crowded or poorly ventilated environments. Additionally, weakened immune defenses, such as in the very young, elderly, or those with immunocompromising conditions, increase susceptibility . Environmental factors, including cold and lower absolute humidity, can also contribute to a higher incidence of RTIs . Smoking, a compromised respiratory tract due to chronic diseases, and stress are further risk factors that can exacerbate RTI susceptibility.
Pharmacotherapy for RTIs predominantly focuses on symptom management and, in specific cases, the use of antibiotics for bacterial RTIs. Decongestants, antihistamines, and cough suppressants, are commonly employed to alleviate symptoms . In recent years, antiviral medications like oseltamivir have been developed to target specific viral URTIs, such as influenza .

Despite the familiarity of URTIs and their prevalence, several unmet needs persist in their management.
Inappropriate antibiotic prescribing for RTI has become a significant concern in primary care settings. RTIs, are predominantly caused by viruses, against which antibiotics are entirely ineffective . Patient and caregiver expectations have been recognized as a significant catalyst for the inappropriate prescription of antibiotics by primary care practitioners. Inappropriate antibiotic prescribing not only fails to enhance patient outcomes but also has the potential to exacerbate antimicrobial resistance, thereby compromising our ability to effectively combat infectious diseases. Additionally, the overuse of antibiotics is associated with adverse effects, including allergic reactions and disruption of the natural balance of beneficial bacteria in the body.

Fortunately, the latest advancements in URTI treatment have brought innovative approaches to symptom management and preventive measures. The advent of rapid diagnostic tests for URTIs, including influenza and respiratory syncytial virus, has facilitated timely and accurate identification of viral pathogens, enabling healthcare providers to prescribe antiviral medications more effectively. These advancements have not only improved the treatment of URTIs but have also contributed to better public health outcomes by reducing the spread of contagious infections.

Scope

The Ejada KPIs are quality indicators and ratings for physicians, facilities and insurance companies based on information collected by DHA systems from providers, payers and patients.

The RTI KPIs and Recommendations are based on UAE expert's consensus statement, International guidelines and WHO guidelines on management of respiratory tract infections. The KPIs are designed for healthcare practioners and providers to follow international best practices in the management of RTI patients.

The RTI KPIs cover the following aspects of RTI management:

- Point of care and rapid diagnostic tests for respiratory tract infections
- Pharmacological management of RTI and judicious use of antibiotics and antivirals
- Timely referrals to specialists, such as pulmonologists or infectious disease experts, for complex or severe RTI cases and follow up of RTI patients

The KPIs and recommendations have been reviewed by leading experts in UAE.

List of Abbreviations

S.No.	Abbreviation	Full form
1	AB	Acute Bronchitis
2	ARDS	Acute Respiratory Distress Syndrome
3	AOM	Acute Otitis Media
4	CT	Computed Tomography
5	CAP	Community Acquired Pneumonia
6	CURB-65	Confusion, Uremia, Respiratory rate, BP, age ≥ 65 years)
7	COVID-19	Coronavirus Disease 2019
8	CAP	Community-Acquired Pneumonia
9	CSOM	Chronic Suppurative Otitis Media
10	COPD	Chronic Obstructive Pulmonary Disease
11	CLIA	Clinical Laboratory Improvement Amendments
12	DHA	Dubai Health Authority
13	DDC	Dubai Drug Code
14	GAS	Group A Streptococcus
15	*H. influenzae*	*Haemophilus influenzae*
16	HIV	Human Immunodeficiency Virus
17	IV	Intravenous
18	IM	Intramuscular Injection
19	ICU	Intensive Care Unit
20	KOL	Key Opinion Leader
21	KPI	Key Performance Indicators
22	*L. Pneumophila*	*Legionella pneumophila*
23	*M. Tuberculosis*	*Mycobacterium tuberculosis*
24	MRSA	Methicillin-Resistant *Staphylococcus aureus*
25	NAI	Neuraminidase Inhibitor
26	NAAT	Nucleic acid amplification test
27	PCR	Polymerase Chain Reaction
28	POC	Point Of Care
29	*P. Aeruginosa*	*Pseudomonas aeruginosa*
30	RT-PCR	Reverse Transcription-Polymerase Chain Reaction
31	RIDT	Rapid influenza diagnostic test
32	RADT	Rapid antigen detection test
33	RF	Rheumatic Fever
34	SARS-CoV-2	Severe Acute Respiratory Syndrome Coronavirus 2
35	*S. Pneumoniae*	*Streptococcus pneumoniae*
36	URTI	Upper Respiratory Tract Infections
37	UAE	United Arab Emirates

KPIs and their Measuring Parameters

Reporting Frequency: Monthly

S.No.	KPIs	Measuring Parameters
1	Appropriate Testing for Influenza using Rapid Molecular Assays in Outpatient Settings	Rapid Influenza Molecular Assay
2	Appropriate Testing for Influenza using Point-of-Care PCR in Outpatient Settings	Point-of-care RT-PCR
3	Appropriate Testing for Influenza using RT-PCR/other Molecular Assays in Inpatient Settings	Molecular assays (RT-PCR/ rapid influenza molecular assay)
4	Use of RIDT for Testing Influenza in Hospitalized Patients	Rapid influenza diagnostic tests
5	Avoidance of Use of Viral Culture for Primary Diagnosis of Influenza	Viral culture
6	Prescription of Monotherapy of Neuraminidase Inhibitors for Treatment of Influenza	DDC list of antivirals (NAI)
7	Judicious Prescription of Adjunctive Therapy for Patients Diagnosed with Influenza	DDC list of corticosteroids/immunomodulators
8	Appropriate Testing for Group A Streptococcus Pharyngitis using RADT	Rapid antigen detection test (RADT)
9	Appropriate Testing for Group A Streptococcus Pharyngitis using NAAT	Nucleic acid amplification test (NAAT)
10	Appropriate Antibiotic Treatment in Patients with Group A Streptococcus Pharyngitis	DDC list of antibiotics
11	Avoidance of Imaging Studies in Uncomplicated Rhinosinusitis	Nasal endoscopy/CT paranasal sinuses
12	Judicious Use of Antibiotics in Patients Diagnosed with Acute Bacterial Rhinosinusitis	DDC list of antibiotics
13	Avoidance of Antibiotics in Patients Diagnosed with Viral Rhinosinusitis	DDC list of antibiotics
14	Avoidance of Antibiotics Prescription for Treatment of Patients with Acute Otitis Media	DDC list of antibiotics
15	Avoidance of Antibiotic Treatment in Adults With Uncomplicated Acute Bronchitis (AAB)	DDC list of antibiotics
16	Chest Radiograph in Children with Community Acquired Pneumonia (CAP)	Chest radiograph
17	Blood culture in Children Suspected with Severe Bacterial CAP	Blood culture
18	Sputum Culture in Adult Patients with Community Acquired Pneumonia (CAP)	Sputum culture
19	Blood Culture in Adult Patients with CAP	Blood culture
20	Empiric Antibiotic Treatment in Adult CAP Patients without Comorbidities in Outpatient Settings	DDC list of antibiotics
21	Empiric Antibiotic Treatment in Adult CAP Patients with Comorbidities in Outpatient Settings	DDC list of antibiotics
22	Antibiotic Regimen in Adults with Non-severe CAP in Inpatient Settings	DDC list of antibiotics
23	Antibiotic Regimen in Adults with Severe CAP in Inpatient Settings	DDC list of antibiotics
24	Blood culture for Detecting Antimicrobial Resistance in Adults with CAP and Inadequate Response to Empiric Treatment	Blood culture
25	Imaging Tests in Adult Patients with CAP and Inadequate Response to Empiric Treatment to Rule Out Any Complications	chest radiograph/chest ultrasound/chest CT

Points to always consider when prescribing Antibiotics

- The great majority of common infections in primary health care can be treated without any antibiotics or with Access antibiotics.
- Reducing the inappropriate use of Watch antibiotics is key to control antibiotic resistance.

Decision Steps	Points to consider
Diagnosis	What is the clinical diagnosis? Is there evidence of a significant bacterial infection?
Decide	Are antibiotics really needed? Do I need to take any cultures or other tests?
Drug (medicine)	Which antibiotic to prescribe? Is it an Access or Watch or Reserve antibiotic? Are there any allergies, interactions or other contraindications?
Dose	What dose, how many times a day? Are any dose adjustments needed, for example, because of renal impairment?
Delivery	What formulation to use? Is this a good quality product? If intravenous treatment is needed, when is step down to oral delivery possible?
Duration	For how long? What is the stop date?
Discuss	Inform the patient of the diagnosis, likely duration of symptoms, any likely medicine toxicity and what to do if not recovering.
Document	Write down all decisions and the management plan.

Management of Bronchitis (in Adults)

Diagnosis

Microbiology Tests

Usually not needed; consider testing for Influenza virus or SARS-CoV-2 (e.g., during influenza season or outbreaks based on local epidemiological risk/situation/protocols)

Other Laboratory Tests

Usually not needed

Imaging

Usually not needed

Treatment

No antibiotic care

- Symptomatic treatment
- Bronchodilators (in case of wheezing), mucolytic or antitussive agents, can be considered based on local practices and patient preferences
- Patients/parents should be informed that:
- Great majority of cases are self-limiting and of viral origin
- Cough can persist for several weeks

Symptomatic Treatment

Medicines are listed in alphabetical order and should be considered equal treatment options

Ibuprofen 200-400 mg q6-8h (Max 2.4 g/day)

OR

Paracetamol (acetaminophen) 500 mg-1 g q4-6h (max 4 g/day)

- **Hepatic impairment/cirrhosis:** Max 2 g/day

Antibiotic Treatment

Antibiotic treatment is **not recommended and should be avoided** as there is no evidence of a significant clinical benefit and there is a risk of side effects of antibiotics

Management of Bronchitis (in Children)

Diagnosis

Microbiology Tests

Usually not needed; consider testing for Influenza virus or SARS-CoV-2 (e.g., during influenza season or outbreaks based on local epidemiological risk/situation/protocols)

Other Laboratory Tests

Usually not needed

Imaging

Usually not needed

Treatment

No antibiotic care

- Symptomatic treatment
- Bronchodilators (in case of wheezing), mucolytic or antitussive agents, can be considered based on local practices and patient preferences
- Patients/parents should be informed that:
- Great majority of cases are self-limiting and of viral origin
- Cough can persist for several weeks

Symptomatic Treatment

Medicines are listed in alphabetical order and should be considered equal treatment options

Ibuprofen (do not use if <3 months of age)

- **Pain control/antipyretic**: 5-10 mg/kg q6-8h
- **Oral weight bands**:

6-<10 kg	50 mg q8h
10-<15 kg	100 mg q8h
15-<20 kg	150 mg q8h
20-<30 kg	200 mg q8h
≥30 kg	200-400 mg q6-8h (Max 2.4 g/day)

OR

Paracetamol (acetaminophen)

- **Pain control/antipyretic**: 10-15 mg/kg q6h
- **Oral weight bands**:

3-<6 kg	60 mg q6h
6-<10 kg	100 mg q6h
10-<15 kg	150 mg q6h
15-<20 kg	200 mg q6h
20-<30 kg	300 mg q6h
≥30 kg	500 mg-1 g q4-6h (Max 4 g/day or 2 g/day if hepatic impairment/cirrhosis)

Antibiotic Treatment

Antibiotic treatment is **not recommended and should be avoided** as there is no evidence of a significant clinical benefit and there is a risk of side effects of antibiotics

Management of Acute Otitis Media (in Adults)

Diagnosis

Microbiology Tests

- Not needed unless a complication is suspected
- Cultures of pus from perforated ear drums should not be used to guide treatment

Other Laboratory Tests

Not needed unless a complication is suspected

Imaging

Not needed unless a complication (e.g., mastoiditis, brain abscess) is suspected

Otoscopy

Required for definitive diagnosis if available: Bulging, inflamed/congested tympanic membrane (may be opaque/show decreased mobility)

Treatment

Clinical considerations

- **Important:** Most non-severe cases can be managed symptomatically with no antibiotic treatment
- Instruct patients to monitor symptoms and report
- back in case they worsen/persist after few days
- Antibiotics should be considered if:
- Severe symptoms (e.g., systemically very unwell, ear pain despite analgesics, fever ≥39.0°C)

Symptomatic Treatment

Medicines are listed in alphabetical order and should be considered equal treatment options

Ibuprofen 200-400 mg q6-8h (Max 2.4 g/day)

OR

Paracetamol (acetaminophen) 500 mg-1 g q4-6h (max 4 g/day)
Hepatic impairment/cirrhosis: Max 2 g/day

Antibiotic Treatment Duration

5 days

Antibiotic Treatment

Antibiotic treatment is not required in the great majority of cases (see "Clinical Considerations" when antibiotics may be indicated)

All dosages are for normal renal function

First Choice

Amoxicillin 500 mg q8h
ORAL

Amoxicillin+clavulanic acid 500 mg+125 mg q8h
ORAL

Prevention

Overlaps with prevention of upper respiratory tract infections; hand hygiene, vaccination against *S. pneumoniae*, influenza and SARS-CoV-2 viruses can be useful

Management of Acute Otitis Media (in Children)

Diagnosis

Microbiology Tests

- Not needed unless a complication is suspected
- Cultures of pus from perforated ear drums should not be used to guide treatment

Other Laboratory Tests

Not needed unless a complication is suspected

Imaging

Not needed unless a complication (e.g., mastoiditis, brain abscess) is suspected

Otoscopy

Required for definitive diagnosis if available: Bulging, inflamed/congested tympanic membrane (may be opaque/show decreased mobility)

Treatment

Symptomatic Treatment

Medicines are listed in alphabetical order and should be considered equal treatment options

Ibuprofen (do not use if <3 months of age)

- Pain control /antipyretic: 5-10 mg/kg q6-8h
- Oral weight bands:

6-<10 kg	50 mg q8h
10-<15 kg	100 mg q8h
15-<20 kg	150 mg q8h
20-<30 kg	200 mg q8h
≥30 kg	200-400 mg q6-8h (Max 2.4 g/day)

Paracetamol (acetaminophen)

- Pain control/antipyretic: 10-15 mg/kg q6h
- Oral weight bands:

3-<6 kg	60 mg q6h
6-<10 kg	100 mg q6h
10-<15 kg	150 mg q6h
15-<20 kg	200 mg q6h
20-<30 kg	300 mg q6h
≥30 kg	500 mg-1 g q4-6h (Max 4 g/day or 2 g/day if hepatic impairment/cirrhosis)

Antibiotic Treatment Duration

5 days

Antibiotic Treatment Duration

Antibiotic treatment is not required in the great majority of cases (see "Clinical Considerations" when antibiotics may be indicated)

All dosages are for normal renal function

First Choice

Amoxicillin 80-90 mg/kg/day ORAL

Oral weight bands:

3-<6 kg	250 mg q12h
6-<10 kg	375 mg q12h
10-<15 kg	500 mg q12h
15-<20 kg	750 mg q12h
≥20 kg	500 mg q8h or 1 g q12h

Second Choice

Amoxicillin+clavulanic acid 80-90 mg/kg/day of amoxicillin component ORAL

Oral weight bands:

3-<6 kg	250 mg of amox/dose q12h
6-<10 kg	375 mg of amox/dose q12h
10-<15 kg	500 mg of amox/dose q12h
15-<20 kg	750 mg of amox/dose q12h
≥20 kg	500 mg of amox/dose q8h or 1 g of amox/dose q12h

Amox = amoxicillin

Oral liquid must be refrigerated after reconstitution

Prevention

Overlaps with prevention of upper respiratory tract infections; hand hygiene, vaccination against *S. pneumoniae, H. influenzae* and influenza viruses can be useful.

Management of Pharyngitis (in Adults)

Diagnosis

Microbiology Tests

- Low likelihood of Group A Streptococcus (GAS) (Centor score 0-2):
- Tests usually not needed
- Higher likelihood of GAS (Centor score 3-4):
- Rapid antigen test or throat culture could be considered, especially in countries where rheumatic fever (RF) and rheumatic heart disease are frequent
- Tests should only be performed if antibiotic treatment is considered following a positive test result

Other Laboratory Tests

Blood tests usually not needed

Imaging

Usually not needed unless a complication is suspected

Treatment

Symptomatic Treatment

Medicines are listed in alphabetical order and should be considered equal treatment options

Ibuprofen 200-400 mg q6-8h (Max 2.4 g/day)

OR

Paracetamol (acetaminophen) 500 mg-1 g q4-6h (max 4 g/day)
Hepatic impairment/cirrhosis: Max 2 g/day

Antibiotic Treatment Duration

Depending on the local prevalence or previous history of rheumatic fever:

Low Risk of RF: 5 days

High Risk of RF: 10 days

Note: when clarithromycin or cefalexin are used treatment duration is always 5 days

Antibiotic Treatment Duration

The only clear indication for antibiotic treatment is to reduce the probability of developing rheumatic fever in endemic settings (however, after 21 years of age the risk of RF is lower)

All dosages are for normal renal function. Antibiotics are listed in alphabetical order and should be considered equal treatment options unless otherwise indicated

First Choice

ACCESS Amoxicillin 500 mg q8h **ORAL**

OR

ACCESS Phenoxymethylpenicillin (as potassium) 500 mg (800 000 IU) q6h ORAL

Second Choice

ACCESS Cefalexin 500 mg q8h ORAL

OR

WATCH Clarithromycin 500 mg q12h ORAL

GAS remains universally susceptible to penicillin. However, resistance to macrolides is common in some communities

Center Clinical Scoring System

This system can help indicate infection origin (bacterial or viral) and whether antibiotics are necessary

However even with a score of 4, the probability of GAS infection is only 50% and this score has only been validated in high-income settings

Signs & Symptoms (1 point each)

- Fever > 38.0 °C
- No cough
- Tender anterior cervical lymphadenitis
- Tonsillar exudates

Score 0-2
•GAS pharyngitis unlikely
•Symptomatic treatment only
Score 3-4 - In case of low risk of RF (e.g., countries with **low** prevalence of RF)
•Antibiotic treatment can be withheld
even in cases of likely GAS pharyngitis
Score 3-4 - In case of high risk of RF (e.g., countries with **med/high** prevalence of RF)
•Antibiotic treatment recommended

Management of Pharyngitis (in Children)

Diagnosis

Microbiology Tests

- Lower likelihood to be caused by Group A Streptococcus
- (GAS) (Centor score 0-2):
- Tests usually not needed
- Higher likelihood to be caused by GAS (Centor score 3-4):
- Rapid antigen test or throat culture could be considered, especially in countries where rheumatic fever (RF) and rheumatic heart disease are frequent
- Negative rapid antigen test could be confirmed with a throat culture if available

Other Laboratory Tests

Blood tests usually not needed

Imaging

Usually not needed unless a complication is suspected

Treatment

Symptomatic Treatment

Medicines are listed in alphabetical order and should be considered equal treatment options

Ibuprofen (do not use if <3 months of age)

- Pain control /antipyretic: 5-10 mg/kg q6-8h
- Oral weight bands:

6-<10 kg	50 mg q8h
10-<15 kg	100 mg q8h
15-<20 kg	150 mg q8h
20-<30 kg	200 mg q8h
≥30 kg	200-400 mg q6-8h (Max 2.4 g/day)

OR

Paracetamol (acetaminophen)

- Pain control/antipyretic: 10-15 mg/kg q6h
- Oral weight bands:

3-<6 kg	60 mg q6h
6-<10 kg	100 mg q6h
10-<15 kg	150 mg q6h
15-<20 kg	200 mg q6h
20-<30 kg	300 mg q6h
≥30 kg	500 mg-1 g q4-6h (Max 4 g/day or 2 g/day if hepatic impairment/cirrhosis)

Antibiotic Treatment Duration

Depending on the local prevalence or previous history of rheumatic fever:

- Low Risk of RF: 5 days
- High Risk of RF: 10 days

Note: when clarithromycin or cefalexin are used treatment duration is always 5 days

Antibiotic Treatment Duration

The only clear indication for antibiotic treatment is to reduce the probability of developing rheumatic fever in endemic settings

All dosages are for normal renal function. Antibiotics are listed in alphabetical order and should be considered equal treatment options unless otherwise indicated

First Choice

Amoxicillin 80-90 mg/kg/day ORAL

Oral weight bands:

3-<6 kg	250 mg q12h
6-<10 kg	375 mg q12h
10-<15 kg	500 mg q12h
15-<20 kg	750 mg q12h
≥20 kg	500 mg q8h or 1 g q12h

OR

Phenoxymethylpenicillin (as potassium): 10-15 mg/kg/dose (16 000-24 000 IU/kg/dose) q6-8h ORAL

Second Choice

Cefalexin 25 mg/kg/dose q12h ORAL. Oral weight bands:

3-<6 kg	125 mg q12h
6-<10 kg	250 mg q12h
10-<15 kg	375 mg q12h
15-<20 kg	500 mg q12h
20-<30 kg	625 mg q12h
≥30 kg	500 mg q8h

OR

Clarithromycin 7.5 mg/kg/dose q12h ORAL

GAS remains universally susceptible to penicillin. However, resistance to macrolides is common in some communities

Center Clinical Scoring System

•This system can help indicate infection origin (bacterial or viral) and whether antibiotics are necessary

However even with a score of 4, the probability of GAS infection is only 50% and this score has only been validated in high- income settings

Signs & Symptoms (1 point each)

Fever > 38.0 °C

- No cough
- Tender anterior cervical lymphadenitis
- Tonsillar exudates

Score 0-2: GAS pharyngitis unlikely

Symptomatic treatment only

Score 3-4 - In case of low risk of RF (e.g. countries with **low** prevalence of RF)

Antibiotic treatment can be withheld even in cases of likely GAS pharyngitis **Score 3-4** - In case of high risk of RF (e.g., countries with **med/high** prevalence of RF) Antibiotic treatment recommended

Management of Acute Sinusitis (in Adults)

Diagnosis

Microbiology Tests

Usually not needed

Other Laboratory Tests

Usually not needed

Imaging

Usually not needed unless a complication or an alternative diagnosis is suspected

Treatment

No antibiotic care

Treatment is to improve symptoms, but antibiotics have minimal impact on symptom duration in most cases

Symptomatic treatment includes antipyretic and analgesic medications, nasal irrigation with a saline solution and topical intranasal glucocorticoids or decongestants

Most guidelines recommend using disease severity (duration and intensity of symptoms) to direct treatment

Mild to Moderate Presentation (<10 days duration and improving):
•Watchful waiting approach with symptom relief and
no antibiotic treatment

Symptomatic Treatment

Medicines are listed in alphabetical order and should be considered equal treatment options

OR

Ibuprofen 200-400 mg q6-8h (Max 2.4 g/day)

Paracetamol (acetaminophen) 500 mg-1 g q4-6h (max 4 g/day)
Hepatic impairment/cirrhosis: Max 2 g/day

Clinical Considerations

Antibiotics should be considered if:
Severe onset of symptoms
- Fever ≥39.0 °C & purulent nasal discharge or facial pain for at least 3-4 consecutive days
Patients at increased risk of complications e.g., those with chronic underlying comorbid diseases (deciding on a case- by-case basis)
•"Red flag" signs/symptoms suggestive of complicated infection such as systemic toxicity, persistent fever ≥39.0°C, periorbital redness and swelling, severe headache, or altered mental status

Antibiotic treatment duration

5 days

Antibiotic treatment

Antibiotic treatment is not required in the great majority of cases (see "Clinical Considerations" when antibiotics may be indicated)
All dosages are for normal renal function. Antibiotics are listed in alphabetical order and should be considered equal treatment options unless otherwise indicated

Amoxicillin 1 g q8h
ORAL

OR

Amoxicillin+clavulanic acid 500 mg+125 mg q8h
ORAL

Management of Acute Sinusitis (in /children)

Diagnosis

Microbiology Tests

Usually not needed

Other Laboratory Tests

Usually not needed

Imaging

Usually not needed unless a complication or an alternative diagnosis is suspected

Treatment

No antibiotic care

Treatment is to improve symptoms, but antibiotics have minimal impact on symptom duration in most cases
Symptomatic treatment includes antipyretic and analgesic medications, nasal irrigation with a saline solution and topical intranasal glucocorticoids or decongestants
Most guidelines recommend using disease severity (duration and intensity of symptoms) to direct treatment

Mild to Moderate Presentation (<10 days duration and improving):
•Watchful waiting approach with symptom relief and **no antibiotic treatment**

Symptomatic Treatment

Medicines are listed in alphabetical order and should be considered equal treatment options

Ibuprofen (do not use if <3 months of age)

- Pain control /antipyretic: 5-10 mg/kg q6-8h
- Oral weight bands:

6-<10 kg	50 mg q8h
10-<15 kg	100 mg q8h
15-<20 kg	150 mg q8h
20-<30 kg	200 mg q8h
≥30 kg	200-400 mg q6-8h (Max 2.4 g/day)

OR

Paracetamol (acetaminophen)

- Pain control/antipyretic: 10-15 mg/kg q6h
- Oral weight bands:

3-<6 kg	60 mg q6h
6-<10 kg	100 mg q6h
10-<15 kg	150 mg q6h
15-<20 kg	200 mg q6h
20-<30 kg	300 mg q6h
≥30 kg	500 mg-1 g q4-6h (Max 4 g/day or 2 g/day if hepatic impairment/cirrhosis)

Clinical Considerations

Antibiotics should be considered if:
Severe onset of symptoms
- Fever ≥39.0 °C & purulent nasal discharge or facial pain for at least 3-4 consecutive days
Patients at increased risk of complications e.g., those with chronic underlying comorbid diseases (deciding on a case- by-case basis)
•"Red flag" signs/symptoms suggestive of complicated infection such as systemic toxicity, persistent fever ≥39.0°C, periorbital redness and swelling, severe headache, or altered mental status

Antibiotic treatment duration

5 days

Antibiotic treatment

Antibiotic treatment is not required in the great majority of cases (see "Clinical Considerations" when antibiotics may be indicated)
All dosages are for normal renal function. Antibiotics are listed in alphabetical order and should be considered equal treatment options unless otherwise indicated

Amoxicillin 80-90 mg/kg/day ORAL
Oral weight bands:

3-<6 kg	250 mg q12h
6-<10 kg	375 mg q12h
10-<15 kg	500 mg q12h
15-<20 kg	750 mg q12h
≥20 kg	500 mg q8h or 1 g q12h

OR

Amoxicillin+clavulanic acid 80-90 mg/kg/day of amoxicillin component ORAL
Oral weight bands:

3-<6 kg	250 mg of amox/dose q12h
6-<10 kg	375 mg of amox/dose q12h
10-<15 kg	500 mg of amox/dose q12h
15-<20 kg	750 mg of amox/dose q12h
≥20 kg	500 mg of amox/dose q8h or 1 g of amox/dose q12h

Management of Community Acquired Pneumonia (in Adults)

Diagnosis

Microbiology Tests

- Mild cases: usually not needed
- Severe cases (to guide antimicrobial treatment): blood cultures, urinary antigens for L. pneumophila and S. pneumoniae
- Selected cases (depending on epidemiology and risk factors): sputum rapid molecular test for M. tuberculosis, nasopharyngeal swab for influenza viruses and SARS-CoV- 2, HIV testing in settings with high HIV prevalence and in case of recurrent and/or severe pneumonia

Other Laboratory Tests

- **Determine disease severity:** blood urea nitrogen (see CURB-65 Scoring System box), blood pH and gases, white **blood cell count**
- **Differentiate bacterial and viral (taking into account pre- test probability):** C-reactive protein and/or procalcitonin

Note: tests depend on availability and clinical severity (e.g., blood gases will only be done in severe cases)

Imaging

- Chest X-ray not necessary in mild cases
- Infiltrate may not always be evident (e.g., dehydration) and non-infectious etiologies may mimic infiltrates (e.g., lung edema, pulmonary embolism)
- Radiologic appearance cannot be used to accurately predict pathogen

CURB-65 Severity Scoring System

Signs & Symptoms (1 point each)

- Presence of Confusion (new onset)
- Urea > 19 mg/dL (or > 7 mmol/L)*
- Respiratory rate > 30/min
- Systolic BP < 90 mmHg (<12 kPa) or Diastolic BP≤ 60 mmHg (<8 kPa)
- Age≥ 65 years

Score 0-1
•Consider outpatient treatment

Score 2
•Consider inpatient treatment
•Consider adding clarithromycin to beta- lactam for atypical coverage
•Perform microbiology tests

Score ≥3
•Inpatient treatment (consider ICU)
•Consider adding clarithromycin
•Perform microbiology tests

Other considerations such as severe comorbid illnesses or inability to maintain oral therapy should be taken into account. CURB-65 has not been extensively validated in low-income settings.
The **CRB-65 score, which does not require laboratory values for its calculation, can also be used, the score value interpretation is the same as for CURB-65*

Mild to Moderate Case

All dosages are for normal renal function
Antibiotics are listed in alphabetical order and should be considered equal treatment options unless otherwise indicated

First Choice

Amoxicillin 1 g q8h **ORAL**

OR

Phenoxymethylpenicillin (as potassium) 500 mg (800 000 IU) q6h ORAL

Second Choice

Amoxicillin+clavulanic acid 875 mg+125 mg q8h ORAL

OR

Doxycycline 100 mg q12h **ORAL**

Treatment

Antibiotic treatment duration

Treat for 5 days
If severe disease, consider longer treatment and look for complications such as empyema, if patient not clinically stable at day 5

Severe Cases

All dosages are for normal renal function
Antibiotics are listed in alphabetical order and should be considered equal treatment options unless otherwise indicated

First Choice

Cefotaxime 2 g q8h **IV/IM**

OR

Ceftriaxone 2 g q24h **IV** (1 g q24h **IM***)

**A larger volume would be painful to give as intramuscular injection*

IF CURB-65 ≥2, CONSIDER ADDING

Clarithromycin 500 mg q12h ORAL (or IV)

Clarithromycin has excellent oral bioavailability, and the intravenous route should be reserved for patients with impaired gastrointestinal function

Second Choice

Amoxicillin+clavulanic acid 1 g+200 mg q8h **IV**
A higher daily dose can be considered: 1 g+200 mg q6h

IF CURB-65 ≥2, CONSIDER ADDING

Clarithromycin 500 mg q12h ORAL (or IV)

Clarithromycin has excellent oral bioavailability, and the intravenous route should be reserved for patients with impaired gastrointestinal function

Management of Community Acquired Pneumonia (in Children)

Diagnosis

Microbiology Tests

- Mild cases: usually not needed
- Severe cases (to guide antimicrobial treatment): blood cultures
- Tests for COVID-19 and influenza can be considered if clinically indicated and available

Other Laboratory Tests

- No test clearly differentiates viral or bacterial CAP
  Consider: full blood count and C-reactive protein
- Note: tests depend on availability and clinical severity (e.g. blood gases will only be done in severe cases)

Imaging

- Chest X-ray not necessary in mild cases
- Look for lobar consolidation or pleural effusion
- Radiologic appearance cannot be used to accurately predict pathogen

Severity Assessment and Consideration

- Children with pneumonia:
- Should be treated with oral amoxicillin at home with home care advice
- Pneumonia is diagnosed on either:
- Fast breathing (respiratory rate > 50 breaths/minute in children aged 2-11 months; resp rate > 40 breaths/min in children aged 1-5 years)
- Chest indrawing
- Children with severe pneumonia (or a child with pneumonia who cannot tolerate oral antibiotics):
- Should be admitted to hospital and treated with intravenous antibiotics
- Severe pneumonia is characterized by signs of pneumonia:
- - Fast breathing (+/- chest indrawing) PLUS
- -A general danger sign:
- Inability to breastfeed or drink
- Convulsions
- Lethargy or reduced level of consciousness

Mild to Moderate Case

All dosages are for normal renal function

Amoxicillin 80-90 mg/kg/day ORAL

Oral weight bands:

3-<6 kg	250 mg q12h
6-<10 kg	375 mg q12h
10-<15 kg	500 mg q12h
15-<20 kg	750 mg q12h
≥20 kg	500 mg q8h or 1 g q12h

Treatment

Antibiotic treatment duration

3 days: in areas of low HIV prevalence and no chest indrawing
5 days: in areas of high HIV prevalence and the child has chest indrawing
If severe disease, consider longer treatment and look for complications such as empyema, if patient not clinically stable at day 5

Severe Cases

All dosages are for normal renal function
Antibiotics are listed in alphabetical order and should be considered equal treatment options unless otherwise indicated

First Choice

Amoxicillin 50 mg/kg/dose **IV/IM**
≤1wk of life: q12h
>1wk of life: q8h

OR

Ampicillin 50 mg/kg/dose **IV/IM**
≤1wk of life: q12h
>1wk of life: q8h

OR

Benzylpenicillin 30 mg/kg/dose (50 000 IU/kg/dose) q8h **IV**

Combined with

Gentamicin **IV/IM**
Neonates: 5 mg/kg/dose q24h
Children: 7.5 mg/kg/dose q24h

IF HIV POSITIVE AND <1 YR OLD
To treat potential Pneumocystis pneumonia, **ADD**

Sulfamethoxazole+trimethoprim 40 mg/kg SMX+8 mg/kgTMP q8h IV/ORAL for 3 weeks

Second Choice

If NO Clinical Response to First Choice after 48-72 hours

Cefotaxime 50 mg/kg/dose q8h **IV/IM**

OR

Ceftriaxone 80 mg/kg/dose q24h **IV/IM**

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Management of Community Acquired Pneumonia (in Adults)

Diagnosis

Microbiology Tests

- Mild cases: usually not needed
- Severe cases (to guide antimicrobial treatment): blood cultures, urinary antigens for L. pneumophila and S. pneumoniae
- Selected cases (depending on epidemiology and risk factors): sputum rapid molecular test for M. tuberculosis, nasopharyngeal swab for influenza viruses and SARS-CoV- 2, HIV testing in settings with high HIV prevalence and in case of recurrent and/or severe pneumonia

Other Laboratory Tests

- **Determine disease severity:** blood urea nitrogen (see CURB-65 Scoring System box), blood pH and gases, white blood cell count
- **Differentiate bacterial and viral (taking into account pre- test probability):** C-reactive protein and/or procalcitonin

Note: tests depend on availability and clinical severity (e.g., blood gases will only be done in severe cases)

Imaging

- Chest X-ray not necessary in mild cases
- Infiltrate may not always be evident (e.g., dehydration) and non-infectious etiologies may mimic infiltrates (e.g., lung edema, pulmonary embolism)
- Radiologic appearance cannot be used to accurately predict pathogen

CURB-65 Severity Scoring System

Signs & Symptoms (1 point each)

- Presence of Confusion (new onset)
- Urea > 19 mg/dL (or > 7 mmol/L)*
- Respiratory rate > 30/min
- Systolic BP < 90 mmHg (<12 kPa) or Diastolic BP≤ 60 mmHg (<8 kPa)
- Age≥ 65 years

Score 0-1
•Consider outpatient treatment

Score 2
•Consider inpatient treatment
•Consider adding clarithromycin to beta- lactam for atypical coverage
•Perform microbiology tests

Score ≥3
•Inpatient treatment (consider ICU)
•Consider adding clarithromycin
•Perform microbiology tests

Other considerations such as severe comorbid illnesses or inability to maintain oral therapy should be taken into account. CURB-65 has not been extensively validated in low-income settings.
The **CRB-65 score, which does not require laboratory values for its calculation, can also be used, the score value interpretation is the same as for CURB-65*

Mild to Moderate Case

All dosages are for normal renal function Antibiotics are listed in alphabetical order and should be considered equal treatment options unless otherwise indicated

First Choice

Amoxicillin 1 g q8h **ORAL**

OR

Second Choice

Phenoxymethylpenicillin (as potassium) 500 mg (800 000 IU) q6h ORAL

Amoxicillin+clavulanic acid 875 mg+125 mg q8h ORAL

OR

Doxycycline 100 mg q12h **ORAL**

Treatment-hospital Facility

Antibiotic treatment duration

Treat for 5 days

If severe disease, consider longer treatment and look for complications such as empyema, if patient not clinically stable at day 5

Severe Cases

All dosages are for normal renal function

Antibiotics are listed in alphabetical order and should be considered equal treatment options unless otherwise indicated

First Choice

Cefotaxime 2 g q8h **IV/IM**

OR

Ceftriaxone 2 g q24h **IV** (1 g q24h **IM***)

**A larger volume would be painful to give as intramuscular injection*

IF CURB-65 ≥2, CONSIDER ADDING

Clarithromycin 500 mg q12h ORAL (or IV)

Clarithromycin has excellent oral bioavailability, and the intravenous route should be reserved for patients with impaired gastrointestinal function

Second Choice

Amoxicillin+clavulanic acid 1 g+200 mg q8h **IV**
A higher daily dose can be considered: 1 g+200 mg q6h

IF CURB-65 ≥2, CONSIDER ADDING

Clarithromycin 500 mg q12h ORAL (or IV)

Clarithromycin has excellent oral bioavailability, and the intravenous route should be reserved for patients with impaired gastrointestinal function

Management of Community Acquired Pneumonia (in Children)

Diagnosis

Microbiology Tests

- Mild cases: usually not needed
- Severe cases (to guide antimicrobial treatment): blood cultures
- Tests for COVID-19 and influenza can be considered if clinically indicated and available

Other Laboratory Tests

- No test clearly differentiates viral or bacterial CAP Consider: full blood count and C-reactive protein
- Note: tests depend on availability and clinical severity (e.g., blood gases will only be done in severe cases)

Imaging

- Chest X-ray not necessary in mild cases
- Look for lobar consolidation or pleural effusion
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Severity Assessment and Consideration

- Children with pneumonia:
- Should be treated with oral amoxicillin at home with home care advice
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- Chest indrawing
- Children with severe pneumonia (or a child with pneumonia who cannot tolerate oral antibiotics):
- Should be admitted to hospital and treated with intravenous antibiotics
- Severe pneumonia is characterized by signs of pneumonia:
- - Fast breathing (+/- chest indrawing) PLUS
- -A general danger sign:
- Inability to breastfeed or drink
- Convulsions
- Lethargy or reduced level of consciousness

Mild to Moderate Case

All dosages are for normal renal function

Amoxicillin 80-90 mg/kg/day ORAL

Oral weight bands:

3-<6 kg	250 mg q12h
6-<10 kg	375 mg q12h
10-<15 kg	500 mg q12h
15-<20 kg	750 mg q12h
≥20 kg	500 mg q8h or 1 g q12h

Treatment- Hospital Facility

Antibiotic treatment duration

3 days: in areas of low HIV prevalence and no chest indrawing
5 days: in areas of high HIV prevalence and the child has chest indrawing
If severe disease, consider longer treatment and look for complications such as empyema, if patient not clinically stable at day 5

Severe Cases

All dosages are for normal renal function
Antibiotics are listed in alphabetical order and should be considered equal treatment options unless otherwise indicated

First Choice

Amoxicillin 50 mg/kg/dose **IV/IM**
≤1wk of life: q12h
>1wk of life: q8h

OR

Ampicillin 50 mg/kg/dose **IV/IM**
≤1wk of life: q12h
>1wk of life: q8h

OR

Benzylpenicillin 30 mg/kg/dose (50 000 IU/kg/dose) q8h **IV**

Combined with

Gentamicin **IV/IM**
Neonates: 5 mg/kg/dose q24h
Children: 7.5 mg/kg/dose q24h

IF HIV POSITIVE AND <1 YR OLD
To treat potential Pneumocystis jirovecii pneumonia, **ADD**

Sulfamethoxazole+trimethoprim 40 mg/kg SMX+8 mg/kgTMP q8h IV/ORAL for 3 weeks

Second Choice

If NO Clinical Response to First Choice after 48-72 hours

Cefotaxime 50 mg/kg/dose q8h **IV/IM**

OR

Ceftriaxone 80 mg/kg/dose q24h **IV/IM**

Health Outcomes Indicators

Appropriate Testing for Influenza using Rapid Molecular Assays in Outpatient Settings

Description Title	Appropriate testing for influenza using rapid molecular assays in outpatient settings
Definition	The percentage of patients diagnosed with influenza and who had received a rapid molecular assays in outpatient settings, during measurement year
Numerator	The number of patients diagnosed with influenza and who had received a rapid molecular assays in outpatient settings, during measurement year
Denominator	Total number of patients diagnosed with influenza in outpatient settings
Exclusion criteria	Not considered
Unit of measure	% of patients diagnosed with influenza, who received rapid molecular assay testing
Measure target and/or threshold	Higher % of patients evaluated is better
Rationale	Rapid influenza molecular assays are a relatively new kind of highly sensitive molecular point-of-care influenza diagnostic test for rapid (15–30 minutes) detection of influenza A and B viral RNA in respiratory specimens, with higher sensitivity. Rapid molecular assays should be preferred to rapid influenza diagnostic tests (RIDTs) in the diagnosis of suspected influenza patients in outpatient settings

Appropriate Testing for Influenza using Point-of-Care PCR in Outpatient Settings

Description Title	Appropriate testing for influenza using POC PCR in outpatient settings
Definition	The percentage of patients diagnosed with influenza and who had received a POC PCR in outpatient settings, during measurement year
Numerator	The number of patients diagnosed with influenza and who had received a POC PCR in outpatient settings, during measurement year
Denominator	Total number of patients diagnosed with influenza in outpatient settings
Exclusion criteria	Not considered
Unit of measure	% of patients diagnosed with influenza, who received POC PCR
Measure target and/or threshold	Higher % of patients evaluated is better
Rationale	In clinical practice, rapid influenza diagnostic tests (RIDTs) are the mainstay of point-of-care (POC) testing due to their ease of use and prompt availability of results in less than 20 min. However, these assays have demonstrated poor performance. RT-PCR assays are found to be associated with improved sensitivity and reduced turnaround time compared to viral culture; their performance characteristics have also been found to be significantly better than RIDTs, as POC

Appropriate Testing for Influenza using RT-PCR/other Molecular Assays in Inpatient Settings

Description Title	Appropriate testing for influenza using RT-PCR/other molecular assays in inpatient settings
Definition	The percentage of patients diagnosed with influenza and had received RT-PCR/any other molecular assays in inpatient settings, during measurement year
Numerator	The number of patients diagnosed with influenza and had received RT-PCR/any other molecular assays in inpatient settings, during measurement year
Denominator	Total number of patients diagnosed with influenza in inpatient settings
Exclusion criteria	Not considered
Unit of measure	% of patients diagnosed with influenza, who received RT-PCR/any other molecular assays
Measure target and/or threshold	Higher % of patients evaluated is better
Rationale	Reverse-transcription polymerase chain reaction (RT-PCR) or other molecular assays should be preferred to other influenza tests in hospitalized patients to improve detection of influenza virus infection.

Use of RIDT for Testing Influenza in Hospitalized Patients

Description Title	Use of RITD for testing influenza in hospitalized patients
Definition	The percentage of patients diagnosed with influenza and had received RIDT in inpatient settings, during measurement year
Numerator	The number of patients diagnosed with influenza and had received RIDT in inpatient settings, during measurement year
Denominator	Total number of patients diagnosed with influenza in inpatient settings
Exclusion criteria	Not considered
Unit of measure	% of patients diagnosed with influenza, who received rapid molecular assay testing
Measure target and/or threshold	Lower % of patients evaluated is better
Rationale	Molecular assays including rapid molecular assays, RT-PCR, and other nucleic acid amplification tests should be preferred to rapid influenza diagnostic tests (RIDTs) in hospitalized patients to improve detection of influenza virus infection. Rapid influenza molecular assays are a relatively new kind of highly sensitive molecular point-of-care influenza diagnostic test for rapid (15–30 minutes) detection of influenza A and B viral RNA in respiratory specimens, with higher sensitivity

Avoidance of Use of Viral Culture for Primary Diagnosis of Influenza

Description Title	Avoidance of Use of viral culture for primary diagnosis of influenza
Definition	The percentage of patients in whom viral culture was performed to confirm primary diagnosis of influenza, during measurement year
Numerator	The percentage of patients in whom viral culture was performed to confirm primary diagnosis of influenza, during measurement year
Denominator	Total number of patients diagnosed with influenza
Exclusion criteria	Not considered
Unit of measure	% of patients diagnosed with influenza, who received viral culture for initial diagnosis
Measure target and/or threshold	Lower % of patients evaluated is better
Rationale	Viral culture should not be considered for initial or primary diagnosis of influenza because results will not be available in a timely manner to inform clinical management. However, viral culture can be considered to confirm negative test results from RIDTs and immunofluorescence assays, such as during an institutional outbreak, and to provide isolates for further characterization

Prescription of Monotherapy of Neuraminidase Inhibitors for Treatment of Influenza

Description Title	Prescription of monotherapy of neuraminidase inhibitors for treatment of influenza
Definition	The percentage of patients dispensed with monotherapy of neuraminidase inhibitors (oral oseltamivir/ inhaled zanamivir/or intravenous peramivir) during measurement year
Numerator	The number of patients dispensed with monotherapy of neuraminidase inhibitors (oral oseltamivir/ inhaled zanamivir/or intravenous peramivir) during measurement year
Denominator	Total number of patients diagnosed with influenza
Exclusion criteria	Not considered
Unit of measure	% of patients diagnosed with influenza, who were prescribed neuraminidase inhibitors
Measure target and/or threshold	Higher % of patients prescribed with monotherapy of NAI is better
Rationale	Antiviral treatment should be initiated as soon as possible with monotherapy of neuraminidase inhibitor (NAI) and combination of NAIs should be avoided. Higher doses of NAI should be avoided and for uncomplicated cases 5 days course of treatment and for patients with a documented or suspected immunocompromising condition or patients requiring hospitalization for severe lower respiratory tract disease (especially pneumonia or acute respiratory distress syndrome [ARDS]

Judicious Prescription of Adjunctive Therapy for Patients Diagnosed with Influenza

Description Title	Judicious Prescription of adjunctive therapy for patients diagnosed with influenza
Definition	The percentage of patients dispensed with adjunctive therapy (corticosteroids/immunomodulators) in treatment of influenza, during measurement year
Numerator	The number of patients dispensed with adjunctive therapy (corticosteroids/immunomodulators) in treatment of influenza, during measurement year
Denominator	Total number of patients diagnosed with influenza
Exclusion criteria	Not considered
Unit of measure	% of patients diagnosed with influenza, who were prescribed adjunctive therapy (corticosteroids/immunomodulators)
Measure target and/or threshold	Lower % of patients prescribed with adjunctive therapy is better
Rationale	Corticosteroid/immunomodulator adjunctive therapy should not be considered for the treatment of adults or children with suspected or confirmed seasonal influenza, influenza-associated pneumonia, respiratory failure, or ARDS, unless clinically indicated for other reasons.

Appropriate Testing for Group A Streptococcus Pharyngitis using RADT

Description Title	Appropriate testing for pharyngitis using Rapid Antigen Detection Test (RADT)
Definition	The percentage of patients 3 years and older, diagnosed with GAS pharyngitis, dispensed with antibiotic and had received RADT, during measurement year
Numerator	The number of patients 3 years and older, diagnosed with GAS pharyngitis, dispensed with antibiotic and had received RADT, during measurement year
Denominator	Total number of patients aged 3 years and older diagnosed with pharyngitis, dispensed with an antibiotic
Exclusion criteria	Pharyngitis patients who were not dispensed with an antibiotic, patients with cystic fibrosis, immunodeficiency conditions, oncology patients
Unit of measure	% of patients diagnosed with pharyngitis, who obtained RADT
Measure target and/or threshold	Higher % of patients evaluated is better
Rationale	RADT allows for earlier treatment, symptom improvement, and reduced disease spread. RADT specificity ranges from 90 to 99 percent. Sensitivity depends on the commercial RADT kit used and was approximately 70 percent with older latex agglutination assays. Newer enzyme-linked immunosorbent assays, optical immunoassays, and chemiluminescent DNA probes are 90 to 99 percent sensitive.

Appropriate Testing for Group A Streptococcus Pharyngitis using NAAT

Description Title	Appropriate testing for pharyngitis using Nucleic Acid Amplification Test (NAAT)
Definition	The percentage of patients 3 years and older, diagnosed with GAS pharyngitis, dispensed with antibiotic and had received NAAT, during measurement year
Numerator	The number of patients 3 years and older, diagnosed with GAS pharyngitis, dispensed with antibiotic and had received NAAT, during measurement year
Denominator	Total number of patients aged 3 years and older diagnosed with pharyngitis, dispensed with an antibiotic
Exclusion criteria	Pharyngitis patients who were not dispensed with an antibiotic, patients with cystic fibrosis, immunodeficiency conditions, oncology patients
Unit of measure	% of patients diagnosed with pharyngitis, who obtained NAAT
Measure target and/or threshold	Higher % of patients evaluated is better
Rationale	Currently NAATs offer significant advantages over RADTs with reflexive culture for the detection of GAS pharyngitis. They are as sensitive as either culture alone or RADTs with reflexive culture and can rapidly provide definitive and actionable results especially with the availability of CLIA-waived rapid NAATs. These tests are easy to perform and can be used in many settings, including, but not limited to, outpatient clinics, urgent-care centers, and hospital laboratories.

Appropriate Antibiotic Treatment in Patients with Group A Streptococcus Pharyngitis

Description Title	Appropriate antibiotic treatment in patients with Group A streptococcus (GAS) pharyngitis
Definition	The percentage of patients (3 years and older) diagnosed with GAS pharyngitis, who were treated with penicillin/amoxycillin, during measurement year
Numerator	The number of patients (3 years and older) diagnosed with GAS pharyngitis, who were treated with penicillin/amoxycillin, during measurement year
Denominator	Total number of patients (3 years and older) diagnosed with GAS pharyngitis, who were treated with an antibiotic, during measurement year
Exclusion criteria	Patients diagnosed with pharyngitis, not treated with antibiotics during the measurement year
Unit of measure	% of patients treated with penicillin/amoxycillin
Measure target and/or threshold	Higher % of patients treated with penicillin/amoxycillin is better
Rationale	*Streptococcus pyogenes*, also known as group A streptococcus is the primary cause for bacterial pharyngitis. Accurate diagnosis and prompt antimicrobial therapy of streptococcal pharyngitis are important for preventing suppurative and nonsuppurative sequelae of the infection and reducing both duration of symptoms and transmission of the agent.

Avoidance of Imaging Studies in Uncomplicated Rhinosinusitis

Description Title	Avoidance of Imaging Studies in Uncomplicated Acute Bacterial Sinusitis
Definition	The percentage of patients 3 years or older in whom imaging studies (nasal endoscopy or CT of paranasal sinuses) was performed to diagnose rhinosinusitis, during measurement year
Numerator	The number of patients 3 years or older in whom imaging studies (nasal endoscopy or CT of paranasal sinuses) was performed to diagnose rhinosinusitis, during measurement year
Denominator	Total number of patients 3 years or older with rhinosinusitis, during measurement year
Exclusion criteria	Bacterial sinusitis with complications, cystic fibrosis, oncology patients, immunocompromised patients
Unit of measure	% of patients in whom imaging tests were done
Measure target and/or threshold	Lower % is better
Rationale	Clinicians should diagnose rhinosinusitis on basis of stringent clinical criteria in terms of typical signs, symptoms, and temporal patterns of URI. Avoidance of unnecessary exposure to radiation and avoidance of unnecessary therapy for false-positive diagnosis, should be a key consideration in clinical practice. Only in patients with chronic and recurrent rhinosinusitis, imaging studies could be considered.

Judicious Use of Antibiotics in Patients Diagnosed with Acute Bacterial Rhinosinusitis

Description Title	Use of antibiotic therapy in patients with acute bacterial Rhinosinusitis
Definition	The percentage of patients 3 years or older with acute bacterial sinusitis, in whom antibiotic therapy was prescribed, during measurement year
Numerator	The number of patients 3 years or older with acute bacterial rhinosinusitis, in whom appropriate first line antibiotic therapy was prescribed, during measurement year
Denominator	Total number of patients 3 years or older, diagnosed with acute rhinosinusitis
Exclusion criteria	Exclude patients with complicated acute bacterial sinusitis, immunocompromised, oncology and cystic fibrosis patients
Unit of measure	% of patients with rhinosinusitis who were treated with 1st Line antibiotic
Measure target and/or threshold	Lower % is better
Rationale	In patients with acute rhinosinusitis, antibiotics should be avoided as 80% of cases resolve in 14 days without any antibiotics. 7-day delayed antibiotic therapy should be considered only when patient develops purulent nasal discharge or in patients with persistent infection.

Avoidance of Antibiotics in Patients Diagnosed with Viral Rhinosinusitis

Description Title	Avoidance of antibiotic therapy in patients with viral Rhinosinusitis
Definition	The percentage of patients 3 years or older with viral rhinosinusitis, in whom antibiotic therapy was prescribed, during measurement year
Numerator	The number of patients 3 years or older with viral rhinosinusitis, in whom antibiotic therapy was prescribed, during measurement year
Denominator	Total number of patients 3 years or older, diagnosed with viral rhinosinusitis
Exclusion criteria	Exclude patients with complicated acute bacterial sinusitis, immunocompromised, oncology and cystic fibrosis patients
Unit of measure	% of patients with rhinosinusitis who were treated with 1st Line antibiotic
Measure target and/or threshold	Lower % is better
Rationale	Antibiotics are not recommended to treat viral rhinosinusitis because they are ineffective against viral illness and do not directly relieve symptoms. Treatment of pain and fever with appropriate analgesics and antipyretics is recommended in patients with viral rhinosinusitis.

Avoidance of Antibiotics Prescription for Treatment of Patients with Acute Otitis Media

Description Title	Avoidance of Antibiotics Prescription for Treatment of Patients with AOM
Definition	The percentage of patients diagnosed with acute otitis media (AOM), in whom appropriate first line antibiotic therapy was prescribed, during measurement year
Numerator	The number of patients diagnosed with acute otitis media (AOM), in whom appropriate first line antibiotic therapy was prescribed, during measurement year
Denominator	Total number of patients diagnosed with AOM during measurement year
Exclusion criteria	Exclude patients with CSOM, Cystic fibrosis, immunocompromised conditions
Unit of measure	% of patients with AOM treated with 1st Line antibiotic (amoxicillin/azithromycin/cefdinir/cefpodoxime/ceftriaxone/cefuroxime/clarithromycin /clindamycin)
Measure target and/or threshold	Lower % is better
Rationale	Treatment goals in acute otitis media include symptom resolution and reduction of recurrence. Most children with acute otitis media (70 to 90 percent) have spontaneous resolution within seven to 14 days; therefore, antibiotics should not routinely be prescribed initially for all patients. Delaying antibiotic therapy in selected patients reduces treatment-related costs and side effects and minimizes emergence of resistant strains.

Avoidance of Antibiotic Treatment in Adults With Uncomplicated Acute Bronchitis (AAB)

Description Title	Avoidance of Antibiotic Treatment in Adults With Uncomplicated Acute Bronchitis (AAB)
Definition	The percentage of adults 18-64 years of age with a diagnosis of acute bronchitis who were not dispensed an antibiotic prescription during the measurement year
Numerator	The number of adults 18-64 years of age with a diagnosis of acute bronchitis who were not dispensed an antibiotic prescription during the measurement year
Denominator	The percentage of patients 18–64 years of age with a diagnosis of acute bronchitis
Exclusion criteria	COPD, emphysema, cystic fibrosis, immunocompromised patients
Unit of measure	% of patients with bacterial sinusitis who were treated with 1st Line antibiotic
Measure target and/or threshold	Higher % is better
Rationale	Antibiotic treatment is not indicated for management of uncomplicated acute bronchitis

Chest Radiograph in Children with Community Acquired Pneumonia (CAP)

Description Title	Chest radiograph in children with CAP
Definition	The percentage of children 3 months to 12 years, hospitalized for management of CAP, in whom chest radiograph was done, during the measurement year.
Numerator	The number of children 3 months to 12 years, hospitalized for management of CAP, in whom chest radiograph was done, during the measurement year.
Denominator	Total number of children 3 months to 12 years hospitalized for management of CAP
Exclusion criteria	Children treated for CAP in outpatient settings, cystic fibrosis, immunocompromised and oncology patients
Unit of measure	% of patients in whom chest radiograph was done
Measure target and/or threshold	Higher % of episodes not treated with antibiotics is better
Rationale	Chest radiographs (posteroanterior and lateral) should be obtained in all patients hospitalized for management of CAP to document the presence, size, and character of parenchymal infiltrates and identify complications of pneumonia that may lead to interventions beyond antimicrobial agents and supportive medical therapy.

Blood culture in Children Suspected with Severe Bacterial CAP

Description Title	Diagnostic tests in children with bacterial CAP
Definition	The percentage of children 3 months to 12 years suspected with severe CAP , in whom blood cultures were done during the measurement year.
Numerator	The number of children 3 months to 12 years suspected with severe CAP , in whom blood cultures was done during the measurement year.
Denominator	Total number of children 3 months to 12 years hospitalized for management of bacterial CAP
Exclusion criteria	Children with suspected CAP managed in the outpatient setting
Unit of measure	% of patients in whom complete blood cell count/blood culture was done
Measure target and/or threshold	Higher % is better
Rationale	Routine measurement of the complete blood cell count is not necessary in all children with suspected CAP managed in the outpatient setting, but in those with more serious disease it may provide useful information for clinical management. Blood cultures should be obtained in children requiring hospitalization for presumed bacterial CAP that is moderate to severe, particularly those with complicated pneumonia. Sensitive and specific tests for the rapid diagnosis of influenza virus and other respiratory viruses should be used in the evaluation of children with CAP.

Sputum Culture in Adult Patients with Community Acquired Pneumonia (CAP)

Description Title	Obtaining pre-treatment sputum culture in adult patients with CAP
Definition	Percentage of adult patients with CAP managed in hospital settings with severe CAP disease/ or empirically treated for MRSA or *P. aeruginosa*, in whom pre-treatment sputum culture was obtained during measurement year
Numerator	Number of adult patients with CAP managed in hospital settings with severe CAP disease/ or empirically treated for MRSA or *P. aeruginosa*, in whom pre-treatment sputum culture was obtained during measurement year
Denominator	Total number of adult patients with CAP managed in hospital settings
Exclusion criteria	Patients with cystic fibrosa, immunocompromised patients, oncology patients
Unit of measure	% of patients who obtained sputum culture
Measure target and/or threshold	Higher % of patients evaluated is better
Rationale	In hospitalized patients with severe CAP and when strong risk factors for MRSA and *P. aeruginosa* are identified, sputum gram stain and culture are recommended to decide upon appropriate therapy. Obtaining sputum for Gram stain and culture in situations is recommended when risk factors for MRSA or P. aeruginosa are present, both when initial empiric therapy is expanded to cover these pathogens and when it is not expanded.

Blood Culture in Adult Patients with CAP

Description Title	Obtaining pre-treatment blood culture in adult patients with CAP
Definition	Percentage of adult patients with CAP managed in hospital settings with severe CAP disease/ or empirically treated for MRSA or *P.aeruginosa*, in whom pre-treatment blood culture was obtained during measurement year
Numerator	Number of adult patients with CAP managed in hospital settings with severe CAP disease/ or empirically treated for MRSA or *P.aeruginosa*, in whom pre-treatment blood culture was obtained during measurement year
Denominator	Total number of adult patients with CAP managed in hospital settings
Exclusion criteria	Patients with cystic fibrosa, immunocompromised patients, oncology patients
Unit of measure	% of patients who obtained blood culture
Measure target and/or threshold	Higher % of patients evaluated is better
Rationale	Routinely obtaining blood cultures may generate false-positive results that lead to unnecessary antibiotic use and increased length of stay. In severe CAP, delay in covering less-common pathogens can have serious consequences. Therefore, the potential benefit of blood cultures is much larger when results can be returned within 24 to 48 hours

Empiric Antibiotic Treatment in Adult CAP Patients without Comorbidities in Outpatient Settings

Description Title	Empiric antibiotic treatment in adult CAP patients without comorbidities in outpatient settings
Definition	Percentage of adult CAP patients without any comorbidities (chronic heart, lung, liver or renal disease/diabetes mellitus/malignancy), treated empirically with antibiotics (amoxycillin/ doxycycline/ a macrolide [azithromycin or clarithormycin]) in outpatient settings, during measurement year
Numerator	Number of adult CAP patients without any comorbidities, treated empirically with antibiotics (amoxycillin/ doxycycline/ a macrolide [azithromycin or clarithormycin]), in outpatient settings during measurement year
Denominator	Total number of adult CAP patients without comorbidities managed in outpatient settings
Exclusion criteria	Adult CAP patients with comorbidities managed in outpatient settings, CAP patients managed in inpatient settings
Unit of measure	% of patients treated with empiric antibiotic therapy
Measure target and/or threshold	Higher % of patients evaluated is better
Rationale	Amoxycillin is considered safe in the treatment of CAP patients and therefore recommended in these patients despite lack of coverage for atypical organisms. Doxycycline has a broad spectrum of action, including the most common relevant organisms and hence considered in treatment of these patients.

Empiric Antibiotic Treatment in Adult CAP Patients with Comorbidities in Outpatient Settings

Description Title	Empiric antibiotic treatment in adult CAP patients with comorbidities in outpatient settings
Definition	Percentage of adult CAP patients with comorbidities(chronic heart, lung, liver or renal disease/diabetes mellitus/malignancy), treated empirically with antibiotics (combination therapy with amoxicillin/clavulanate or cephalosporin and macrolide or monotherapy with flouroquinolone]) in outpatient settings, during measurement year
Numerator	Number of adult CAP patients with comorbidities, treated empirically with antibiotics (combination therapy with amoxicillin/clavulanate or cephalosporin and macrolide or monotherapy with flouroquinolone]) in outpatient settings, during measurement year
Denominator	Total number of adult CAP patients with comorbidities managed in outpatient settings
Exclusion criteria	Adult CAP patients without comorbidities managed in outpatient settings, CAP patients managed in inpatient settings
Unit of measure	% of patients treated with empiric antibiotic therapy
Measure target and/or threshold	Higher % of patients evaluated is better
Rationale	Patients with comorbidities are likely more vulnerable to poor outcomes if the initial empiric antibiotic regimen is inadequate. many such patients have risk factors for antibiotic resistance by virtue of previous contact with the healthcare system and/or prior antibiotic and are therefore recommended to receive broader-spectrum therapy to ensure adequate coverage.

Antibiotic Regimen in Adults with Non-severe CAP in Inpatient Settings

Description Title	Antibiotic regimen in adults with non-severe CAP in inpatient settings
Definition	Percentage of adults with non-severe CAP in inpatient settings, treated with combination therapy with beta-lactum and a macrolide or monotherapy with respiratory fluoroquinolone, during measurement year
Numerator	Number of adults with non-severe CAP in inpatient settings, treated with combination therapy with beta-lactum and a macrolide or monotherapy with respiratory fluoroquinolone, during measurement year
Denominator	Total number of adults with non-severe CAP managed in inpatient settings
Exclusion criteria	Adult patients with CAP managed in out-patients settings and with severe CAP managed in inpatients settings
Unit of measure	% of patients treated with empiric antibiotic therapy
Measure target and/or threshold	Higher % of patients evaluated is better
Rationale	The antibiotic coverage recommendations for patients hospitalized with CAP remain aligned to cover the most likely pathogens causing CAP

Antibiotic Regimen in Adults with Severe CAP in Inpatient Settings

Description Title	Antibiotic regimen in adults with severe CAP in inpatient settings
Definition	Percentage of adults with severe CAP in inpatient settings, treated with combination therapy with beta-lactum and a macrolide or combination therapy with beta-lactum and respiratory fluoroquinolone, during measurement year
Numerator	Number of adults with severe CAP in inpatient settings, treated with combination therapy with beta-lactum and a macrolide or combination therapy with beta-lactum and respiratory fluoroquinolone, during measurement year
Denominator	Total number of adults with severe CAP managed in inpatient settings
Exclusion criteria	Adult patients with CAP managed in out-patient settings and non-severe CAP managed in inpatient settings
Unit of measure	% of patients treated with empiric antibiotic therapy
Measure target and/or threshold	Higher % of patients evaluated is better
Rationale	The antibiotic coverage recommendations for patients hospitalized with CAP remain aligned to cover the most likely pathogens causing CAP

Blood culture for Detecting Antimicrobial Resistance in Adults with CAP and Inadequate Response to Empiric Treatment

Description Title	Blood culture for Assessment of Antimicrobial Resistance in Adults with CAP and Inadequate Response (Failure to achieve clinical stability within 5 days) to Empiric Treatment
Definition	Percentage of adults with CAP and inadequate response to empiric antibiotic therapy, in whom blood culture was done to assess antimicrobial resistance, during measurement year
Numerator	Number of adults with CAP and inadequate response to empiric antibiotic therapy, in whom blood culture was done to assess antimicrobial resistance, during measurement year
Denominator	Total number of adults with CAP and inadequate response to antibiotic therapy
Exclusion criteria	Patients with malignancy, cystic fibrosis and immunosuppressive conditions
Unit of measure	% of patients in whom blood culture was done
Measure target and/or threshold	Higher % of patients evaluated is better
Rationale	Failure to achieve clinical stability within 5 days is associated with higher mortality and worse clinical outcomes. Such failure should prompt assessment for a pathogen resistant to the current therapy.

Imaging Tests in Adult Patients with CAP and Inadequate Response to Antibiotic Treatment to diagnose complications

Description Title	Imaging Tests in Adult Patients with CAP and Inadequate Response to Antibiotic Treatment to diagnose complications
Definition	Percentage of adult patients with CAP and inadequate response to antibiotic treatment, in whom radiograph/chest ultrasound/and/or chest CT was done to rule out parapneumonic effusion/empyema/lung abscess , during measurement year
Numerator	Number of adult patients with CAP and inadequate response to antibiotic treatment, in whom radiograph/chest ultrasound/and/or chest CT was done to rule out parapneumonic effusion/empyema/lung abscess , during measurement year
Denominator	Total number of adult patients with inadequate response to antibiotic treatment
Exclusion criteria	Patients with malignancy, cystic fibrosis and immunosuppressive conditions
Unit of measure	% of patients who underwent chest radiograph/chest ultrasound/chest CT
Measure target and/or threshold	Higher % of patients evaluated is better
Rationale	Failure to achieve clinical stability within 5 days is associated with higher mortality and worse clinical outcomes. Such failure should prompt assessment for a pathogen resistant to the current therapy and/or complications of pneumonia (e.g., empyema or lung abscess) or for an alternative source of infection and/or inflammatory response.

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