# Clinical Practice Guideline by the Infectious Diseases Society of America and the Pediatric Infectious Diseases Society: 2026 Guideline Update on The Management of Community-Acquired Pneumonia in Infants and Children Older than 3 Months of Age

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**ABSTRACT.**
As the first part of an update to the clinical practice guideline on the management of community-acquired pneumonia in infants and children older than 3 months of age, we present six updated recommendations. The updated recommendations span the characterization and management of pneumonia with parapneumonic effusion. The panel's recommendations are based on evidence derived from systematic literature reviews and adhere to a standardized methodology for rating the certainty of evidence and strength of recommendation according to the GRADE (Grading of Recommendations Assessment, Development, and Evaluation) approach.

**Key words.** pneumonia; parapneumonic effusion; empyema; guideline

## BACKGROUND

Pneumonia occurs in over 150 million children under 5 years of age every year, [Rudan], and is the leading cause of mortality among young children worldwide, causing 740,000 deaths each year in young children [Perrin].
Complicated pneumonia, including parapneumonic effusion, empyema, lung abscess, and necrotizing pneumonia, occur in a small portion of children with pneumonia, and is associated with higher rates of morbidity and mortality. Estimates of the rates and prevalence of complicated pneumonia vary, but one study observed that 7.9% of children <2 years and 16.9% of children 2-4 years of age with pneumococcal pneumonia had empyema [Grijalva].

For the purposes of this guideline, complicated pneumonia is defined as the presence of parapneumonic effusion and/or empyema associated with pneumonia. Parapneumonic effusion refers to a collection of fluid in the pleural space typically associated with pneumonia. A parapneumonic effusion may be uncomplicated, defined as a free-flowing and sterile pleural effusion, or complicated, defined as an effusion that is infected with bacteria or other organisms indicated by a positive culture, bacteria identified on gram stain, molecular detection, or evidence of marked inflammation. An effusion is classified as small if it contains a rim of fluid <10 mm on a lateral decubitus radiograph or opacifies less than ¼ of the hemithorax, moderate if it contains a rim of fluid ≥10 mm but opacifies less than half of the hemithorax, and large if it opacifies more than half of the hemithorax [2011 guideline]. Parapneumonic empyema is a collection of purulent fluid in the pleural space associated with an underlying pneumonia.

**Guideline Scope**
The scope of the guideline includes the diagnosis and management of pneumonia with parapneumonic effusion. Populations in low resource regions were excluded from this guideline as the diagnostic approach and management differs in these settings.
This guideline is intended for use by healthcare professionals who care for pediatric patients with pneumonia and complicated pneumonia, including but not limited to specialists in infectious diseases, emergency medicine, pulmonologists, hospitalists, surgeons and intensivists.

**Publication Scope**
The last iteration of this guideline was published in 2011 [Bradley]. The goals of this update were to incorporate contemporary evidence and apply the GRADE approach for the evidence appraisal process. Because of the wide scope and breadth of this guideline, a decision was made to split the guideline into several distinct parts to facilitate more timely completion. Five manuscripts and their corresponding supplementary materials comprise the first part of the series; subsequent parts will cover uncomplicated pneumonia.

**METHODS**
The panel included pediatric clinicians with expertise in infectious diseases, emergency medicine, hospital medicine, general pediatrics, and general surgery. Panelists were diverse in gender, geographic distribution, and years of clinical experience. Selected reviewers included clinicians with expertise in vaccines and vaccine impact evaluation, infection prevention and control, infectious disease epidemiology and emerging viral diseases, antimicrobial stewardship (including pediatric settings), and pediatric infectious diseases. Relevant recommendations have been reviewed and endorsed by the Pediatric Infectious Diseases Society (PIDS). .

The panel's recommendations are based on evidence derived from systematic literature reviews and adhere to standardized methodology for rating the certainty of evidence and strength of recommendation according to the GRADE (Grading of Recommendations Assessment, Development and Evaluation) approach [Guyatt 2008]. Strong recommendations are made when the recommended course of action would apply to most people with few exceptions. Conditional recommendations are made when the suggested course of action apply to the majority of people with many exceptions, and shared decision making is important. Details of the systematic review and guideline development process are available in the supplementary material for each of the included manuscripts.

**RESULTS: RECOMMENDATIONS AND REMARKS**
**In children with parapneumonic effusion, should chest ultrasound or cross-sectional imaging (i.e., CT, MRI) be used to determine the character and confirm the size of the parapneumonic effusion?**

**Recommendation:** In children with radiographic evidence of a moderate to large parapneumonic effusion, the panel suggests obtaining a chest ultrasound over CT or MRI to characterize the size and complexity of the effusion (conditional recommendation, very low certainty of evidence).

**Remark(s):**
- If chest ultrasound is unavailable, computed tomography (CT) or magnetic resonance imaging (MRI) of the chest may be performed to characterize the size and complexity of the effusion.
- In children with a small parapneumonic effusion on chest x-ray and/or with minimal respiratory symptoms, additional imaging (e.g., chest ultrasound, CT, or MRI) is generally not recommended.

**In children (3 months to 18 years of age) with parapneumonic effusion, is pleural fluid drainage more beneficial than observation?**

**Recommendation:** In children with small, uncomplicated parapneumonic effusions, the IDSA panel suggests observation over pleural drainage (conditional recommendation, very low certainty of the evidence).

**Recommendation:** In children with moderate parapneumonic effusions associated with respiratory distress, large parapneumonic effusions, or documented purulent effusions, the panel recommends pleural drainage (no new evidence) [2011 IDSA CAP guideline].

**In a child in whom pleural drainage is indicated, should chest tube placement with fibrinolysis be performed in preference to surgical debridement (i.e., Video-assisted thoracoscopic surgery [VATS])?**

**Recommendation:** In children and adolescents (3 months to 18 years) with pneumonia-associated empyema in whom pleural drainage is indicated, the panel suggests using chest tube drainage and intrapleural fibrinolytics rather than surgical debridement as first-line therapy in most cases (conditional recommendation, very low certainty of evidence).

**Remark(s):**

- Although similar outcomes are observed between chest tube placement (i.e., thoracostomy) with fibrinolytics and VATS, chest tube placement with fibrinolytics is less invasive, less costly, and can often be performed without general anesthesia.
- VATS may be reserved for a subset of patients, such as those with extensive loculation and those with refractory disease after chest tube placement with fibrinolysis.
- The approach to pleural drainage should also be guided by the availability of local resources and personnel.

**In children with parapneumonic effusion, should small bore (<12Fr) or large bore (>14Fr) chest tubes be used for drainage?**

**Recommendation:** In children (3 months to 18 years) with parapneumonic effusion or empyema that necessitates drainage, the panel members suggest the use of small-bore (<12Fr) chest tubes over large-bore (>14FR) tubes (conditional recommendation, very low certainty of evidence).

**Remark(s):**

- Smaller tubes are effective at allowing for adequate drainage and subsequent fibrinolysis.
- Since the last IDSA update, all published protocols have used 12 Fr or smaller chest tubes.

**In children (3 months to 18 years) with parapneumonic empyema, should tPA and DNase or tPA alone be used for fibrinolysis?**

**Recommendation:** In children (3 months to 18 years of age) with pneumonia-associated empyema, the panel suggests administering tPA alone over tPA and DNase (conditional recommendation, low certainty of evidence).

**IMPLICATIONS FOR PRACTICE/DISCUSSION/RESEARCH NEEDS**

It should be noted that there are few studies which serve as the basis for the recommendations included in this guideline, and most included studies are either retrospective or observational in nature. Thus, the certainty of evidence and strength of recommendations are not high. High quality studies, including randomized controlled trials, are needed to determine the optimal approach to the management of children with pneumonia and associated parapneumonic effusions.

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Samir S. Shah is chair of the pediatric CAP guideline panel. Mark Neuman is the vice-chair of the panel. Shawn St Peter and Krow Ampofo served as clinical leads for the questions addressed in this manuscript. Remaining panelists assisted with conception and design of the analysis, interpretation of data, drafting and revising the recommendations and manuscript, and final approval of the recommendations and manuscript to be published. Nigar Sekercioglu and Sheena Patel, methodologists, were responsible for general project management, designing and performing the systematic review, and leading the panel according to the GRADE process.

**Disclaimer:** It is important to recognize that guidelines cannot always account for individual variation among patients. They are assessments of current scientific and clinical information provided as an educational service; are not continually updated and may not reflect the most recent evidence (new evidence may emerge between the time information is drafted and when it is published or read); should not be considered inclusive of all proper methods of care, or as a statement of the standard of care; do not mandate any course of medical care; and are not intended to supplant clinician judgment with respect to particular patients or situations. Whether to follow guidelines and to what extent is voluntary, with the ultimate determination regarding their application to be made by the clinician in the light of each patient's individual circumstances. While IDSA makes every effort to present accurate, complete, and reliable information, these guidelines are presented "as is" without any warranty, either express or implied. IDSA (and its officers, directors, members, employees, and agents) assume no responsibility for any loss, damage, or claim with respect to any liabilities, including direct, special, indirect, or consequential damages, incurred in connection with these guidelines or reliance on the information presented.



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***Possible conflicts of interest.*** Evaluation of relationships as potential conflicts of interest is determined by a review process. The assessment of disclosed relationships for possible COIs is based on the relative weight of the financial relationship (i.e., monetary amount) and the relevance of the relationship (i.e., the degree to which an association might reasonably be interpreted by an independent observer as related to the topic or recommendation of consideration). The following panelists have reported relationships with the indicated companies since 2018, when guideline development began; these relationships are **unrelated to the topic of community-acquired pneumonia (CAP)**. **K.K.A.** served as a scientific advisor for Merck; served as an advisor for Janssen Pharmaceuticals; received research funding from the National Institute of Allergy and Infectious Diseases (NIAID), the Centers for Disease Control and Prevention (CDC), and the State Government of Utah; receives research funding from Merck. **M.D.C.** served as an advisor for BioGaia, Thermo Fisher, Genentech, Novartis, and Nestlé; engaged in activities with the International Scientific Association for Probiotics and Prebiotics (ISAPP); served as a member of the U.S. Preventive Services Task Force (USPSTF); served as chair of the American Academy of Pediatrics Committee on Pediatric Research; received research funding from the Agency for Healthcare Research and Quality (AHRQ). **C.E.** served as an advisor for Sanofi, Janssen Pharmaceuticals, and Gilead; received honoraria from Sanofi, Astellas, the Kentucky Rural Health Association and Medavera for collaboration on the writing and publication of a manuscript addressing the use of molecular techniques in respiratory infections; received research funding from AstraZeneca, Merck, Enanta Pharmaceuticals, Clinetic, the National Institutes of Health (NIH), Melinta Therapeutics, Novavax, and Moderna; receives research funding from AHRQ, the Florida Department of Health, and CDC; serves as a member of the American Academy of Pediatrics Committee of Infectious Diseases and as a Board Director (District III) for the AAP Florida Chapter. **T.A.F.** received honoraria from DiaSorin and Medscape/WebMD; served in editorial roles with Pediatric Research and Pediatric Emergency Care; served as a council member for the Society for Pediatric Research; received research funding from the National Heart, Lung, and Blood Institute (NHLBI) and the Patient-Centered Outcomes Research Institute (PCORI); served as strategy and operations officer for the Society for Pediatric Research; serves on the Pediatric Academic Societies Board of Directors. **J.S.G.** received research funding from AHRQ, NIH, CDC, and PCORI. **M.G.** served as president of the Society for Pediatric Research; served as a member of the Society for Pediatric Research Board of Directors; served as a member of the Pediatric Academic Societies Board of Directors; served as ambassador for North American Regional Societies for the Society for Pediatric Research; receives research funding from NIAID; receives research funding from the St. Louis Children's Hospital Foundation. **D.L.P.** received royalties from UpToDate; received honoraria from the American Academy of Pediatrics: Pediatrics Review and Education Program (PREP) for Infectious Diseases, JAMA Pediatrics, and UpToDate; received honoraria from Lurie Children's Hospital and the American Medical Association (AMA); received research funding from AHRQ and the Pew Charitable Trusts; owned intellectual property

from Elsevier; served as associate editor for the Journal of the Pediatric Infectious Diseases Society (JPIDS) and the American Academy of Pediatrics PREP ID; serves on the Pediatric Infectious Diseases Society (PIDS) Board of Directors and Executive Committee; serves as president of PIDS. **M.S.** received research funding from the County of San Diego Health and Human Services Agency. **A.M.S.** received research funding from PCORI, the Children and Youth with Special Health Care Needs National Research Network (CYSHCNet), and the Gerber Foundation; reported a family relationship in which a spouse served as a consultant for echocardiography study interpretation for the Midwest Cardiovascular Research and Education (MCORE) Foundation. **D.J.W.** received research funding from AHRQ and NIH for work related to the Seattle-based Pediatric Health Information Partnership (P-HIP) initiative aimed at improving pediatric mental health care; serves on the Executive Council for the Pediatric Research in Inpatient Setting (PRIS) Network; serves on the Editorial Board for the Journal of Hospital Medicine; receives research funding from AHRQ and NIH. **S.S.S.** served in editorial roles with JAMA Pediatrics for the American Medical Association; served as senior deputy editor and then editor-in-chief for the Journal of Hospital Medicine for the Society of Hospital Medicine; served as associate editor for the Journal of the Pediatric Infectious Diseases Society; served as a Committee on Infectious Diseases member for the American Academy of Pediatrics; served as vice-chair for Pediatric Research in Inpatient Settings; received honoraria from the Society of Hospital Medicine; received research funding from NIAID, NHLBI, PCORI, and the Ohio Department of Public Health. **M.N.** served as associate editor for Pediatrics for the American Academy of Pediatrics; received research grants from Harvard University; serves as Co-Editor-in-Chief of Pediatric Emergency Care; receives honoraria from Wolters Kluwer for editorial roles with UpToDate and Pediatric Emergency Care; provides medical expert consultation, including medical record review and expert testimony in legal cases for law firms on issues not related to pneumonia.

The following panelists have reported relationships with the indicated companies since 2018, when guideline development began; these relationships are **related to the topic of community-acquired pneumonia (CAP)**. **K.K.A.** served in advisory roles involving patient enrollment for clinical trials with Johnson & Johnson and Merck related to lumicitabine, tedizolid, ceftolozane/tazobactam, and bezlotoxumab (all such relationships are no longer active). **D.L.P.** served on a data safety monitoring board for Pfizer for a trial related to azithromycin; received honoraria from Medscape related to an educational podcast (relationship ended in 2024); owns intellectual property related to educational materials for Elsevier; receives other remuneration from the AMA. **D.J.W.** received research funding from NIH/NIAID for work related to Vanderbilt/ICE-CAP/R01AI125642 and Vanderbilt/VTEU/HHSN272201300023I, CDC for work related to Vanderbilt/NVSN/U01IP001063 and AHRQ for work related to R01HS029331, the Reducing Overuse of Antibiotics with Decision Support (ROADS) study aimed at testing the safety and effectiveness of clinical decision support to promote antibiotic stewardship in lower respiratory tract infections in children; received in-kind research support from bioMérieux for procalcitonin assays related to CAP decision-making (this relationship is no longer active); reported a family relationship in which a spouse is employed by Pfizer and the funds are paid directly to them. **M.N.** served as a member of the Guideline Development Group of the World Health Organization for the Diagnosis and Management of Pneumonia and Diarrhea in Children. **All other authors reported no disclosures**.

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