

## **IDSA GUIDELINES**

# **2024 Clinical Practice Guideline Update by the Infectious Diseases Society of America on Complicated Intra-abdominal Infections: Risk Assessment, Diagnostic Imaging, and Microbiological Evaluation in Adults, Children, and Pregnant People**

**Robert A. Bonomo,<sup>1</sup> Anthony W. Chow,<sup>2</sup> Morven S. Edwards,<sup>3</sup> Romney Humphries,<sup>4</sup> Pranita D. Tamma,<sup>5</sup> Fredrick M. Abrahamian,<sup>6</sup> Mary Bessesen,<sup>7</sup> E. Patchen Dellinger,<sup>8</sup> Ellie Goldstein,<sup>9</sup> Mary K. Hayden,<sup>10</sup> Keith Kaye,<sup>11</sup> Brian A. Potoski,<sup>12</sup> Jesús Rodríguez Baño,<sup>13</sup> Robert Sawyer,<sup>14</sup> Marion Skalweit,<sup>15</sup> David R. Snyderman,<sup>16</sup> Sarah Pahlke,<sup>17</sup> Katelyn Donnelly,<sup>17</sup> Jennifer Loveless<sup>17</sup>**

<sup>1</sup>Medical Service and Center for Antimicrobial Resistance and Epidemiology, Louis Stokes Cleveland Veterans Affairs Medical Center, University Hospitals Cleveland Medical Center, Cleveland, Ohio, USA, and Departments of Medicine, Pharmacology, Molecular Biology, and Microbiology, Case Western Reserve University, Cleveland, Ohio, USA, <sup>2</sup>Department of Medicine, University of British Columbia, Vancouver, British Columbia, Canada, <sup>3</sup>Division of Infectious Diseases, Department of Pediatrics, Baylor College of Medicine, Houston, Texas, USA, <sup>4</sup>Division of Laboratory Medicine, Department of Pathology, Microbiology and Immunology, Vanderbilt University Medical Center, Nashville, Tennessee, USA, <sup>5</sup>Department of Pediatrics, Johns Hopkins University School of Medicine, Baltimore, Maryland, USA, <sup>6</sup>Department of Emergency Medicine, Olive View-UCLA Medical Center, Sylmar, California, USA, and David Geffen School of Medicine at UCLA, Los Angeles, California, USA, <sup>7</sup>Veterans Affairs Eastern Colorado Health Care, Aurora, Colorado, and Division of Infectious Diseases, University of Colorado School of Medicine, Aurora, Colorado, USA, <sup>8</sup>Department of Surgery,

**Corresponding Author:** Robert A. Bonomo (robert.bonomo@va.gov).

© The Author(s) 2024. Published by Oxford University Press on behalf of Infectious Diseases Society of America. All rights reserved. For commercial re-use, please contact reprints@oup.com for reprints and translation rights for reprints. All other permissions can be obtained through our RightsLink service via the Permissions link on the article page on our site—for further information please contact journals.permissions@oup.com. This article is published and distributed under the terms of the Oxford University Press, Standard Journals Publication Model (<https://academic.oup.com/pages/standard-publication-reuse-rights>)

University of Washington, Seattle, Washington, USA, <sup>9</sup>RM Alden Research Laboratory, Santa Monica, California, USA, <sup>10</sup>Division of Infectious Diseases, Department of Medicine, Rush University Medical Center, Chicago, Illinois, USA, <sup>11</sup>Division of Allergy, Immunology and Infectious Diseases, Rutgers Robert Wood Johnson Medical School, New Brunswick, New Jersey, USA, <sup>12</sup>Department of Pharmacy and Therapeutics, University of Pittsburgh School of Pharmacy, Pittsburgh, Pennsylvania, USA, <sup>13</sup>Division of Infectious Diseases and Microbiology, Department of Medicine, Hospital Universitario Virgen Macarena, University of Seville, Biomedicines Institute of Seville-Consejo Superior de Investigaciones Científicas, Seville, Spain, <sup>14</sup>Department of Surgery, Western Michigan University School of Medicine: Western Michigan University Homer Stryker MD School of Medicine, Kalamazoo, Michigan, USA, <sup>15</sup>Department of Medicine and Biochemistry, Case Western Reserve University School of Medicine, Cleveland, Ohio, USA, <sup>16</sup>Division of Geographic Medicine and Infectious Diseases, Tufts Medical Center, Boston, Massachusetts, USA, <sup>17</sup>Infectious Diseases Society of America, Arlington, Virginia, USA

As the first part of an update to the clinical practice guideline on the diagnosis and management of complicated intra-abdominal infections in adults, children, and pregnant people, developed by the Infectious Diseases Society of America, the panel presents twenty-one updated recommendations. These recommendations span risk assessment, diagnostic imaging, and microbiological evaluation. The panel's recommendations are based upon 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.** intra-abdominal infection; acute appendicitis; acute cholecystitis; acute cholangitis; acute diverticulitis; acute intra-abdominal abscess; guideline

## BACKGROUND

A complicated intra-abdominal infection extends beyond the hollow viscus of origin into the peritoneal space or an otherwise sterile region of the abdominal cavity and is associated with peritonitis with or without abscess formation. This terminology is not meant to describe the infection's severity or anatomy. An uncomplicated intra-abdominal infection involves only intramural inflammation of the gastrointestinal tract without extension into the peritoneal space and can progress to a complicated infection if not adequately treated.

Complicated intra-abdominal infection is a commonly encountered clinical situation, with appendicitis alone affecting ~670,000 patients per year worldwide [1]. Intra-abdominal infection is the second most common cause of infectious morbidity and mortality in the intensive care unit. The requirement for intervention in most cases and the controversies surrounding the choice and

nature of surgical procedures performed add layers of complexity to the management of these infections.

### **Guideline scope**

The scope of this guideline includes acute appendicitis, acute cholecystitis (both acalculous and calculous), acute cholangitis, acute diverticulitis, abdominal abscess, secondary bowel perforation, and acute necrotizing pancreatitis. Where relevant, available evidence for children, pregnant adults, and non-pregnant adults with community-acquired or hospital-acquired infections was reviewed. For the purposes of this guideline, the following conditions were excluded: cancer, solid organ or bone marrow transplant, tubo-ovarian abscess, spontaneous bacterial peritonitis, liver cirrhosis, continuous ambulatory peritoneal dialysis associated infections, inflammatory bowel disease (including Crohn's disease and ulcerative colitis), nonperforated primary enteritis and/or colitis, or perforations due to diseases that are rare in North America (e.g., intra-abdominal tuberculosis, histoplasmosis, strongyloidiasis).

This guideline is intended for use by healthcare professionals who care for patients with complicated intra-abdominal infections, including but not limited to specialists in infectious diseases, emergency care clinicians, hospitalists, surgeons, and intensivists.

### **Publication scope**

The last iteration of this guideline was published in 2010 [2]. The goals of this update were to incorporate contemporary evidence and to apply the GRADE approach for the evidence appraisal process. Due to 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. Eight manuscripts and their corresponding supplementary materials comprise the first part of the series [3-9]; subsequent parts will cover antimicrobial therapy and source control.

The focus of the guideline is primarily complicated intra-abdominal infection; however, because many questions covered in this publication pertain to the initial diagnosis of intra-abdominal infection, the panel provided recommendations for both complicated and uncomplicated intra-abdominal infection. The intended population for each recommendation is explicitly stated within each statement.

Many existing guidelines from other associations related to this topic were reviewed during the development process [10-21].

## **METHODS**

The panel included clinicians with expertise in infectious diseases, pediatric infectious diseases, surgery, emergency medicine, microbiology, and pharmacology. Selected reviewers included clinicians with expertise in radiology, infectious diseases, and microbiology. Relevant

recommendations have been reviewed and endorsed by the European Society of Clinical Microbiology and Infectious Diseases (ESCMID), the American Society for Microbiology (ASM), and the Pediatric Infectious Diseases Society (PIDS).

The panel's recommendations are based upon 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 [22]. 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 would apply to the majority of people with many exceptions and shared decision-making is important. Details of the systematic review and guideline development processes are available in the supplementary materials for each included manuscript.

## **RESULTS: RECOMMENDATIONS AND REMARKS**

High quality evidence was lacking for all recommendations. Where there were knowledge gaps, the panel opted to provide limited clinical guidance for reasonable approaches rather than no guidance at all, and these statements are specifically labeled as knowledge gaps.

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 would apply to the majority of people with many exceptions and shared decision-making is important.

### **In adults and children with complicated intra-abdominal infection, which severity of illness score for risk stratification calculated within 24 hours of hospital or ICU admission best predicts 30-day or in-hospital mortality?**

**Recommendation:** Risk stratification according to severity of illness is important for management of complicated intra-abdominal infection. For adults with complicated intra-abdominal infection, if a severity of illness score is used, the panel suggests APACHE II (Acute Physiology Age Chronic Health Evaluation II; <http://www.globalrph.com/apacheii.htm>) as the preferred severity of illness score for risk stratification within 24 hours of hospitalization or ICU admission (*conditional recommendation, low certainty of evidence*).

Remarks:

- Because the WSES (World Society of Emergency Surgery) Sepsis Severity Score is specific to complicated intra-abdominal infection and performs well, it is an acceptable alternative to APACHE II for adults with complicated intra-abdominal infection.

- No severity of illness scoring system specific to complicated intra-abdominal infection can be recommended to guide management of pediatric patients with complicated intra-abdominal infection at present.

**In adults with suspected acute appendicitis, should US, CT, or MRI be obtained as the initial imaging modality?**

**In adults with suspected appendicitis, if initial imaging is inconclusive, should US, CT, or MRI be obtained for subsequent imaging?**

**Recommendation:** In non-pregnant adults with suspected acute appendicitis, the panel suggests obtaining an abdominal CT as the initial imaging modality to diagnose acute appendicitis (*conditional recommendation, very low certainty of evidence*).

Remarks:

- IV contrast is usually appropriate whenever a CT is obtained in adults with suspected acute appendicitis; however, CT without IV contrast also has high diagnostic accuracy in detecting acute appendicitis and may be appropriate [10].
- Because of CT's accuracy, immediate additional imaging studies beyond CT are usually not necessary. If a CT is negative but clinical suspicion for acute appendicitis persists, consider observation and supportive care, with or without antibiotics; if clinical suspicion is high, consider surgical intervention.
- US, when definitively positive or definitively negative, and MRI are also reasonably accurate and may precede CT, depending on the patient and clinical circumstances.

**In children with suspected acute appendicitis, should US, CT, or MRI be obtained as the initial imaging modality?**

**In children with suspected appendicitis, if initial imaging is inconclusive, should US, CT, or MRI be obtained for subsequent imaging?**

**Recommendation:** In children and adolescents with suspected acute appendicitis, the panel suggests obtaining an abdominal US as the initial imaging modality to diagnose acute appendicitis (*conditional recommendation, very low certainty of evidence*).

Remarks:

- US is generally readily available but is also operator-dependent and can yield equivocal results. MRI is not always readily available, and sedation may be required for young children. CT is generally readily available but involves radiation exposure and may require use of intravenous (IV) contrast or sedation.

**Recommendation:** In children and adolescents with suspected acute appendicitis, if initial US is equivocal/non-diagnostic and clinical suspicion persists, the panel suggests obtaining an abdominal MRI or CT as subsequent imaging to diagnose acute appendicitis rather than obtaining another US (*conditional recommendation, very low certainty of evidence*).

Remarks:

- US is generally available but is also operator-dependent and can yield equivocal results. MRI is not always readily available, and sedation may be required for young children. CT is generally readily available but involves radiation exposure and may require use of IV contrast or sedation.
- CT with IV contrast is usually appropriate when performed in children with suspected acute appendicitis after equivocal ultrasound; however, CT without IV contrast may be appropriate [11].
- Depending on the clinical situation, observation may be appropriate instead of subsequent imaging.
- If there is a strong clinical suspicion for appendicitis after equivocal imaging, exploratory laparoscopy or laparotomy may also be considered if subsequent imaging delays appropriate management.

In pregnant people with suspected acute appendicitis, should US or MRI be obtained as the initial imaging modality?

In pregnant people with suspected appendicitis, if initial imaging is inconclusive, should US or MRI be obtained for subsequent imaging?

**Recommendation:** In pregnant people with suspected acute appendicitis, the panel suggests obtaining an abdominal US as the initial imaging modality to diagnose acute appendicitis (*conditional recommendation, very low certainty of evidence*).

Remarks:

- It would also be reasonable to initially obtain an MRI in pregnant people with suspected acute appendicitis if access to an MRI is readily available. The conditional imaging strategy suggested (US, then MRI for equivocal results) would likely yield the same results as an MRI only.

**Recommendation:** In pregnant people with suspected acute appendicitis, if initial US is equivocal/non-diagnostic and clinical suspicion persists, the panel suggests obtaining an MRI as subsequent imaging to diagnose acute appendicitis (*conditional recommendation, very low certainty of evidence*).

Remarks:

- It would also be reasonable to initially obtain an MRI in pregnant people with suspected acute appendicitis if access to an MRI is readily available. The conditional imaging strategy suggested (US, then MRI for equivocal results) would likely yield the same results as an MRI only.

**In adults with suspected acute cholecystitis or acute cholangitis, should abdominal ultrasound (US) or CT be obtained as the initial imaging modality?**

**In adults with suspected acute cholecystitis or acute cholangitis, if initial imaging is inconclusive, should CT, MRI/MRCP (magnetic resonance cholangiopancreatography), or HIDA (hepatobiliary iminodiacetic acid) be obtained for subsequent imaging?**

**Recommendation:** In non-pregnant adults with suspected acute cholecystitis or acute cholangitis, the panel suggests abdominal US as the initial diagnostic imaging modality (*conditional recommendation, very low certainty of evidence*).

Remarks:

- The diagnosis of acute cholangitis should include clinical signs (jaundice, fever, chills, and RUQ abdominal pain), laboratory findings (indicators of inflammation and biliary stasis), and imaging findings (biliary dilatation, or evidence of an etiology, e.g., stricture, stone, obstructing mass).
- The panel did not identify any studies assessing the accuracy of abdominal US or CT for the diagnosis of acute cholangitis and relied on indirect evidence from acute cholecystitis.
- Because acute cholecystitis and acute cholangitis are uncommon in children, evidence in children was not systematically reviewed; however, it would be reasonable to mirror the imaging pathway for adults in children.

**Recommendation:** In non-pregnant adults with suspected acute cholecystitis or acute cholangitis, if initial US is equivocal/non-diagnostic and clinical suspicion persists, the panel suggests obtaining an abdominal CT scan as subsequent imaging to diagnose acute cholecystitis or acute cholangitis (*conditional recommendation, very low certainty of evidence*).

Remarks:

- The diagnosis of acute cholangitis should include clinical signs (jaundice, fever, chills, and RUQ abdominal pain), laboratory findings (indicators of inflammation and biliary stasis), and imaging findings (biliary dilatation, or evidence of an etiology, e.g., stricture, stone, obstructing mass).

- CT with intravenous contrast is preferable and usually appropriate when CT is obtained for subsequent imaging [12].
- The panel did not identify any studies assessing the accuracy of abdominal US or CT for the diagnosis of acute cholangitis and relied on indirect evidence from acute cholecystitis.
- Because acute cholecystitis and acute cholangitis are uncommon in children, evidence in children was not systematically reviewed; however, it would be reasonable to mirror the imaging pathway for adults in children.

**Recommendation:** In non-pregnant adults with suspected acute cholecystitis, if both US and CT are equivocal/non-diagnostic and clinical suspicion persists, the panel suggests obtaining either an abdominal MRI/MRCP or hepatobiliary iminodiacetic acid (HIDA) scan as subsequent imaging to diagnose acute cholecystitis (*conditional recommendation, low certainty of evidence for HIDA, knowledge gap for MRI/MRCP*).

Remarks:

- If both abdominal US and CT are inconclusive but acute *cholangitis* is suspected, MRI/MRCP is a reasonable option.
- The diagnosis of acute cholangitis should include clinical signs (jaundice, fever, chills, and RUQ abdominal pain), laboratory findings (indicators of inflammation and biliary stasis), and imaging findings (biliary dilatation, or evidence of an etiology, e.g., stricture, stone, obstructing mass).
- Because acute cholecystitis and acute cholangitis are uncommon in children, evidence in children was not systematically reviewed; however, it would be reasonable to mirror the imaging pathway for adults in children.

**In pregnant people with suspected acute cholecystitis or acute cholangitis, should abdominal US or MRI be obtained as the initial imaging modality?**

**Recommendation:** In pregnant people with suspected acute cholecystitis or suspected acute cholangitis, US or MRI can be considered as the initial diagnostic imaging modality; however, the panel is unable to recommend one imaging modality versus the other (*knowledge gap*).

Remarks:

- The diagnosis of acute cholangitis should include clinical signs (jaundice, fever, chills, and RUQ abdominal pain), laboratory findings (indicators of inflammation and biliary stasis), and imaging findings (biliary dilatation, or evidence of an etiology, e.g., stricture, stone, obstructing mass).



**In adults with suspected acute diverticulitis, should CT, US, or MRI be obtained as the initial imaging modality?**

**Recommendation:** In non-pregnant adults with suspected acute diverticulitis, the panel suggests obtaining an abdominal CT as the initial diagnostic modality (*conditional recommendation, very low certainty of evidence*).

Remarks:

- Intravenous (IV) contrast is usually appropriate whenever a CT is obtained and can be helpful to characterize and detect subtle bowel wall abnormalities and complications of diverticulitis; however, CT without IV contrast may be appropriate [13].

**Recommendation:** In non-pregnant adults with suspected acute diverticulitis, if CT is unavailable or contraindicated, the panel suggests obtaining an US or MRI as the initial diagnostic modality (*conditional recommendation, very low certainty of evidence*).

**In pregnant adults with suspected acute diverticulitis, should CT, US, or MRI be obtained as the initial imaging modality?**

**Recommendation:** In pregnant adults with suspected acute diverticulitis, US or MRI can be considered for imaging; however, the panel is unable to recommend one imaging modality versus the other (*knowledge gap*).

**In adults with suspected acute intra-abdominal abscesses, should abdominal US or CT be obtained as the initial imaging modality?**

**In adults with suspected acute intra-abdominal abscesses, if initial imaging is inconclusive, should MRI be obtained for subsequent imaging?**

**Recommendation:** In non-pregnant adults and adolescents with suspected acute intra-abdominal abscess, the panel suggests obtaining an abdominal CT as the initial diagnostic imaging modality (*conditional recommendation, very low certainty of evidence*).

Remarks:

- When CT is obtained, the use of intravenous contrast may improve visualization of the abscess wall [13].
- Because of CT's accuracy, immediate additional imaging studies beyond CT are usually not necessary.

**In children with suspected acute intra-abdominal abscesses, should abdominal US or CT be obtained as the initial imaging modality?**

**In children with suspected acute intra-abdominal abscesses, if initial imaging is inconclusive, should MRI be obtained for subsequent imaging?**

**Recommendation:** In children with suspected acute intra-abdominal abscess, the panel suggests obtaining an abdominal US as the initial diagnostic imaging modality (*conditional recommendation, very low certainty of evidence*).

Remarks:

- At least one study [23] suggests MRI as a reasonable option for initial imaging of suspected acute intra-abdominal abscess in children.
- US is generally available but is also operator-dependent and can yield equivocal results. MRI is not always readily available, and sedation may be required for young children. CT is generally readily available but involves radiation exposure and may require use of IV contrast or sedation.

**Recommendation:** In children with suspected acute intra-abdominal abscess, if initial US is negative/equivocal/non-diagnostic and clinical suspicion persists, the panel suggests either CT or MRI as subsequent imaging to diagnose acute intra-abdominal abscess (*conditional recommendation, very low certainty of evidence*).

Remarks:

- US is generally available but is also operator-dependent and can yield equivocal results. MRI is not always readily available, and sedation may be required for young children. CT is generally readily available but involves radiation exposure and may require use of IV contrast or sedation.

**In pregnant people with suspected acute intra-abdominal abscesses, should abdominal US or MRI be obtained as the initial imaging modality?**

**Recommendation:** In pregnant people with suspected acute intra-abdominal abscess, US or MRI can be considered as the initial diagnostic imaging modality; however, the panel is unable to recommend one versus the other (*knowledge gap*).

In adults and children with known or suspected intra-abdominal infection (uncomplicated or complicated), should blood cultures be obtained to effect a meaningful change in antimicrobial therapy?

**Recommendation:** In adults and children with suspected intra-abdominal infections who have an elevated temperature AND: hypotension and/or tachypnea and/or delirium, OR there is concern for antibiotic-resistant organisms that would inform the treatment regimen, the panel suggests obtaining blood cultures (*conditional recommendation, very low certainty of evidence*).

Remarks:

- Direct evidence on obtaining blood cultures in patients with intra-abdominal infections is lacking.
- Concern for antibiotic-resistant organisms includes high rates of regional resistance to commonly used agents administered as empiric treatment for intra-abdominal infections, patient history of any colonization or infection with organisms not susceptible to commonly used empiric regimens within the previous 90 days, antibiotic treatment within the previous 90 days, elderly or immunocompromised patients or patients with other significant comorbidities, and/or healthcare-associated infection.

**Recommendation:** In non-immunocompromised adults and children with suspected intra-abdominal infections who have a normal/elevated temperature but do not have hypotension, tachypnea, or delirium, and there is no concern for antibiotic-resistant organisms that would inform the treatment regimen, the panel suggests not routinely obtaining blood cultures (*conditional recommendation, very low certainty of evidence for adults/low certainty of evidence for children*).

Remarks:

- Direct evidence on obtaining blood cultures in patients with intra-abdominal infections is lacking.
- Clinicians should use their best judgment considering the benefits and risks of performing blood cultures. In select cases (e.g., concern for antibiotic-resistant organisms, concern for ascending cholangitis, complex intra-abdominal abscess), blood cultures may be helpful to assist with clinical decision-making and further management. Concern for antibiotic-resistant organisms includes high rates of regional resistance to commonly used agents administered as empiric treatment for intra-abdominal infections, patient history of any colonization or infection with organisms not susceptible to commonly used empiric regimens within the previous 90 days, antibiotic treatment within the previous 90 days, elderly or immunocompromised patients or patients with other significant comorbidities, and/or healthcare-associated infection.

**In adults and children with known or suspected intra-abdominal infection (uncomplicated or complicated), should cultures of intra-abdominal fluid be obtained to effect a meaningful change in antimicrobial therapy?**

**Recommendation:** In adults and children with complicated intra-abdominal infection who are having a procedure for source control, the panel suggests obtaining intra-abdominal cultures to guide antimicrobial therapy (*conditional recommendation, moderate certainty of evidence*).

Remarks:

- When obtaining intra-abdominal cultures, fluid inoculation is the preferred method of collection.

**Recommendation:** In adults and children with uncomplicated appendicitis undergoing an appendectomy, the panel suggests not routinely obtaining intra-abdominal cultures (*conditional recommendation, low certainty of evidence*).

Remarks:

- Immunocompromised patients are at increased risk for antibiotic-resistant organisms and intra-abdominal cultures are generally warranted.
- At the time of surgery, if complicated disease is suspected/recognized, intra-abdominal cultures may be advised.

**Acknowledgments:** The expert panel would like to acknowledge the work of the previous panel, under the leadership of Dr. Joseph Solomkin, for their work on the previous iteration of this guideline. The panel would like to acknowledge the contributions of Elena Guadagno, medical librarian, for the creation and execution of PICO-specific search strategies; and Dipleen Kaur and Dr. Nigar Sekercioglu, methodologists, for their contributions to the design of various analyses. Rebecca Goldwater and Imani Amponsah provided project coordination. Thomas Schofield's statistical expertise was critical to completing the analyses for various scoring tools in complicated intra-abdominal infection. When scoping the diagnostic imaging questions, Drs. Dean Nakamoto and Yngve Falck-Ytter provided clinical guidance. The panel would also like to acknowledge the following organizations and selected reviewers for their review of the draft manuscript: American Society for Microbiology, European Society of Clinical Microbiology and Infectious Diseases, Pediatric Infectious Diseases Society, and Drs. Sheldon Brown (infectious diseases), Eric Cober (infectious diseases), Patrick T. Delaplain (pediatric surgery), Dean Nakamoto (radiology), and Sharon Chen (microbiology).

Dr. Robert A. Bonomo is chair of the panel. In addition to Robert Bonomo, Drs. Anthony Chow, Morven Edwards, Romney Humphries, and Pranita Tamma served as leads for the topics covered in this first part of the series. Remaining panelists are leads for topics yet to be completed. Jennifer Loveless and Katelyn Donnelly, methodologists, were responsible for project management and designing and performing the data analyses. Dipleen Kaur and Sarah Pahlke, methodologists, contributed to the analyses on risk assessment and whether to perform blood cultures, respectively. The entire panel was involved in the development of clinical questions, discussions of the literature, drafting of recommendations, and editing of the manuscript.

**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.

The guidelines represent the proprietary and copyrighted property of IDSA. All rights reserved. No part of these guidelines may be reproduced, distributed, or transmitted in any form or by any means, including photocopying, recording, or other electronic or mechanical methods, without the prior written permission of IDSA. Permission is granted to physicians and health care providers solely to copy and use the guidelines in their professional practices and clinical decision making. No license or permission is granted to any person or entity, and prior written authorization by IDSA is required to sell, distribute, or modify the guidelines, or to make derivative works of or incorporate the guidelines into any product, including, but not limited to, clinical decision support software or any other software product. Except for the permission granted above, any person or entity desiring to use the guidelines in any way must contact IDSA for approval in accordance with the terms and conditions of third-party use, in particular any use of the guidelines in any software product.

**Financial support:** This work was supported by the Infectious Diseases Society of America.

**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). A.C. receives honoraria from UpToDate, Inc.; serves on an Agency for Healthcare Research and Quality technical expert panel for diagnosis of acute right lower quadrant abdominal pain (suspected acute appendicitis); and has served as an advisor for GenMark Diagnostics, Inc. on molecular diagnostics for gastrointestinal pathogens. J.R.B. serves as Past President of the European Society of Clinical Microbiology and Infectious Diseases. M.S.E. receives royalties from UpToDate, Inc. as Co-Section Editor of Pediatric Infectious Diseases. M.H. serves on the Society Healthcare Epidemiology of America (SHEA) Board of Directors and has received free services from OpGen, Inc. for a research project. R.H. is an advisor for bioMérieux, Inc. and was previously an employee of Accelerate Diagnostics, Inc.;

has received research funding from bioMérieux, Inc.; and served as an advisor for Thermo Fisher Scientific, Inc. All other authors reported no relevant disclosures.

**Additional information:** The rationale for each recommendation is detailed in each individual manuscript. More detailed information on the analysis and development of recommendations is available in each manuscript's Supplementary Material.

## REFERENCES

1. Guan L, Liu Z, Pan G, et al. The global, regional, and national burden of appendicitis in 204 countries and territories, 1990-2019: a systematic analysis from the Global Burden of Disease Study 2019. *BMC Gastroenterol* **2023**, 23(1): 44.
2. Solomkin JS, Mazuski JE, Bradley JS, et al. Diagnosis and management of complicated intra-abdominal infection in adults and children: guidelines by the Surgical Infection Society and the Infectious Diseases Society of America. *CID* **2010**; 50(2): 133-164.
3. Bonomo RA, Chow AW, Abrahamian FM, et al. 2024 Clinical practice guideline update by the Infectious Diseases Society of America on complicated intra-abdominal infections: risk assessment in adults and children. *CID* **2024**;
4. Bonomo RA, Tamma PD, Abrahamian FM, et al. 2024 Clinical practice guideline update by the Infectious Diseases Society of America on complicated intra-abdominal infections: diagnostic imaging of suspected acute appendicitis in adults, children, and pregnant people. *CID* **2024**;
5. Bonomo RA, Edwards MS, Abrahamian FM, et al. 2024 Clinical practice guideline update by the Infectious Diseases Society of America on complicated intra-abdominal infections: diagnostic imaging of suspected acute cholecystitis and acute cholangitis in adults, children, and pregnant people. *CID* **2024**;
6. Bonomo RA, Tamma PD, Abrahamian FM, et al. 2024 Clinical practice guideline update by the Infectious Diseases Society of America on complicated intra-abdominal infections: diagnostic imaging of suspected acute diverticulitis in adults and pregnant people. *CID* **2024**;
7. Bonomo RA, Tamma PD, Abrahamian FM, et al. 2024 Clinical practice guideline update by the Infectious Diseases Society of America on complicated intra-abdominal infections: diagnostic imaging of suspected intra-abdominal abscess in adults, children, and pregnant people. *CID* **2024**;
8. Bonomo RA, Humphries R, Abrahamian FM, et al. 2024 Clinical practice guideline update by the Infectious Diseases Society of America on complicated intra-abdominal infections: utility of blood cultures in adults, children, and pregnant people. *CID* **2024**;
9. Bonomo RA, Humphries R, Abrahamian FM, et al. 2024 Clinical practice guideline update by the Infectious Diseases Society of America on complicated intra-abdominal infections: utility of intra-abdominal fluid cultures in adults, children, and pregnant people. *CID* **2024**;
10. Expert Panel on Gastrointestinal Imaging: Kambadakone AR, Santillan CS, Kim DH, et al. ACR Appropriateness Criteria® right lower quadrant pain: 2022 update. *J Am Coll Radiol* **2022**; 19(11S): S445-S461.
11. Expert Panel on Pediatric Imaging: Koberlein GC, Trout AT, Rigsby CK, et al. ACR Appropriateness Criteria® suspected appendicitis-child. *J Am Coll Radiol* **2019**; 16(5S): S252-S263.

12. Expert Panel on Gastrointestinal Imaging: Russo GK, Zaheer A, Kamel IR, et al. ACR Appropriateness Criteria® right upper quadrant pain: 2022 update. *J Am Coll Radiol* **2023**; 20(5S): S211-S223.
13. Expert Panel on Gastrointestinal Imaging: Weinstein S, Kim DH, Fowler, KJ, et al. ACR Appropriateness Criteria® left lower quadrant pain. Accessed October 3, 2023. <https://acsearch.acr.org/docs/69356/Narrative/>
14. Rhodes A, Evans LE, Alhazzani W, et al. Surviving Sepsis Campaign: International guidelines for management of sepsis and septic shock: 2016. *Intensive Care Med* **2017**; 43(3): 304-377.
15. Mazuski JE, Tessier JM, May AK, et al. The Surgical Infection Society Revised Guidelines on the management of intra-abdominal infection. *Surg Infect (Larchmt)* **2017**; 18(1): 1-76.
16. Montravers P, Dupont H, Leone M, et al. Guidelines for management of intra-abdominal infections. *Anaesth Crit Care Pain Med* **2015**; 34(2): 117-130.
17. Binda GA, Cuomo R, Laghi A, et al. Practice parameters for the treatment of colonic diverticular disease: Italian Society of Colon and Rectal Surgery (SICCR) guidelines. *Tech Coloproctol* **2015**; 19(10): 615-626.
18. Sartelli M, Chichom-Mefire A, Labricciosa FM, et al. The management of intra-abdominal infections from a global perspective: 2017 WSES guidelines for management of intra-abdominal infections. *World J Emerg Surg* **2017**; 12: 29.
19. Hall J, Hardiman K, Lee S, et al. The American Society of Colon and Rectal Surgeons clinical practice guidelines for the treatment of left-sided colonic diverticulitis. *Dis Colon Rectum* **2020**; 63(6): 728-747.
20. Yokoe M, Hata J, Takada T, et al. Tokyo Guidelines 2018: diagnostic criteria and severity grading of acute cholecystitis (with videos). *J Hepatobiliary Pancreat Sci* **2018**; 25(1): 41-54.
21. Miura F, Okamoto K, Takada T, et al. Tokyo Guidelines 2018: initial management of acute biliary infection and flowchart for acute cholangitis. *J Hepatobiliary Pancreat Sci* **2018**; 25(1): 31-40.
22. Guyatt GH, Oxman AD, Vist GE, et al. GRADE: an emerging consensus on rating quality of evidence and strength of recommendations. *BMJ* **2008**; 336(7650): 924-926.
23. Abdeen N, Naz F, Linthorst R, et al. Clinical impact and cost-effectiveness of noncontrast MRI in the evaluation of suspected appendiceal abscesses in children. *J Magn Reson Imaging* **2019**; 49(7): e241-e249.