Submitted: 21 December, 2024 Accepted: 21 March, 2025 Published: 08 August, 2026 DOI:10.22514/sv.2026.030

Open Access
Signa Vitae

REVIEW

Approach to and management of acute diarrhea in adults in the emergency department setting

Marcello Covino[1,2], Antonella Gallo[3,*], Maria Caterina Parlangeli[2], Fiammetta Maria Rognoni[2], Benedetta Simeoni[1], Luigi Carbone[1,4], Francesco Franceschi[1,2], Massimo Montalto[2,3]

[1]Department of Emergency Medicine, Fondazione Policlinico Universitario A. Gemelli IRCCS, 00168 Rome, Italy
[2]Catholic University of the Sacred Heart, 00168 Roma, Italy
[3]Department of Geriatrics, Orthopedics and Rheumatology, Fondazione Policlinico Universitario A. Gemelli IRCCS, 00168 Rome, Italy
[4]Department of Emergency Medicine, Ospedale Fatebenefratelli Isola Tiberina, 00186 Rome, Italy

***Correspondence**
antonella.gallo@policlinicogemelli.it
(Antonella Gallo)

Abstract

Acute diarrhea is a relevant public health problem and a leading cause of outpatient visits and emergency department (ED) admissions worldwide. This narrative review is intended to provide a guideline-based approach to support the management of acute diarrhea in the ED, a unique setting where physicians must manage a high volume of patients. Due to the limited availability of rapid diagnostic tests, most decisions are made empirically at the time of presentation based on clinical judgment. Hence, it is important to provide clinicians clear and practical decision-making rules to help distinguish among patients who can be safely discharged, those requiring etiological diagnosis or empiric antibiotic therapy, and those who need hospitalization. In most cases, acute diarrhea has a viral etiology, and the habitual use of antibiotics should be discouraged. However, antibiotic therapy may be appropriate for patients with severe disease, symptoms and signs suggestive of invasive bacterial infection, or those at high risk for complications. Azithromycin or a fluoroquinolone are the antibiotics of choice, depending on local susceptibility patterns and the patient's travel history.

Keywords

Acute diarrhea; Emergency department; Antibiotic therapy

1. Introduction

Acute diarrhea is a significant public health problem and a leading cause of outpatient visits and hospitalizations [1]. Worldwide, it is among the top ten causes of death [2], and even in resource-abundant settings, it frequently leads to a significant reduction in quality of life.

Infectious agents are the most common cause of acute diarrhea. Although viral gastroenteritis is more prevalent, bacterial infections, particularly *Campylobacter* and *Salmonella*, often lead to more severe illness and outbreaks, particularly in developed countries. Data from the Foodborne Diseases Active Surveillance Network (FoodNet) [3] confirm these pathogens as leading causes of enteric infections.

Adults frequently seek emergency care for acute diarrhea in both resource-limited and resource-abundant settings. However, a literature review reveals a significant gap; comprehensive management studies specifically addressing acute diarrhea in the emergency department (ED) are lacking [4], with existing research primarily focused on pediatric populations and developing countries [5, 6]. Consequently, clinicians often lack adequate decision support, which can result in disorganized, non-guideline-based management.

This review is intended to address this gap by providing an up-to-date overview of acute diarrhea epidemiology and management relevant to ED practice, with a focus on developed countries.

2. Epidemiology

The Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) 2016 [7] provides a comprehensive overview of the incidence and burden of diarrheal disease. This study illustrates the incidence and prevalence of diarrhea, the associated mortality, and how the burden changed across all ages in 195 countries between 1990 and 2016. In 2016, diarrhea was the eighth leading cause of death, contributing to over 1.5 million deaths globally across all age groups. By 2019, it had become the fifth leading cause of disability-adjusted life years (DALYs), resulting in the loss of 45.5 million DALYs [7]. Diarrheal mortality rates were highest among children under five (70.6 deaths per 100,000) and adults over 70 (171.7 deaths per 100,000) [2]. There is a surprising disconnect between the incidence and mortality of diarrhea. Although adults over 70 have a mortality rate nearly threefold higher than children under five, the incidence of diarrheal episodes is substantially lower in this older population, with rates of 0.9 and 1.75 episodes per person/year, respectively [2]. The data suggests that global population aging has amplified the diarrheal burden in this age group. Crucially, the most significant rise in

diarrhea mortality among those over 70 was observed in high-income countries. For instance, in the USA, the number of deaths within this age bracket surged by 264.8% between 2000 and 2016, increasing from 202 to 7396 deaths during that period [2]. Specifically, in high-income countries, an incidence of approximately 0.13 episodes per person per year and a mortality rate of 2.9 deaths per 100,000 (over 31,000 deaths) have been reported [7]. As mentioned above, mortality is even higher in the subgroup of adults over 70, reaching 20.1 deaths per 100,000 (almost 27,000 cases), with an incidence of 0.17 episodes per person per year.

Despite the likelihood that many patients with acute diarrhea initially present to the ED, research on managing this condition in this specific setting remains surprisingly limited.

3. Etiology

The World Health Organization defines acute diarrhea as the passage of three or more loose or liquid stools within a 24-hour period, lasting for 14 days or fewer [8]. Worldwide, the primary cause of acute diarrhea is infectious, and a wide variety of viruses (norovirus, rotavirus, adenovirus, astrovirus, and others), bacteria (*Salmonella* spp., *Campylobacter* spp., *Shigella* sp., enterotoxigenic *Escherichia coli*, *Clostridioides difficile*, *Vibrio cholerae*, and others), and parasites (*Cryptosporidium*, *Giardia*, *Cyclospora*, *Entamoeba*, and others) can cause it [2, 9]. Viral etiologies are the most common, and among them, despite vaccination programs adopted by a growing number of countries [10], rotavirus remains the leading cause of diarrheal incidence and mortality across all age groups worldwide [2]. According to the GBD 2016, the estimated number of deaths due to diarrhea decreased by 20.8% from 2005 to 2015, with rotavirus as the leading cause of death, followed by *Shigella* spp. and *Salmonella* spp. [2].

Mainly in developing countries, cholera caused by *V. cholerae* affects an estimated 3 million people annually, resulting in around 100,000 deaths, though underreporting is significant; it remains endemic in over 50 countries, primarily in Asia and in Africa, and triggers devastating epidemics [2, 11].

In developed countries [12, 13], norovirus is the most frequent cause; however, bacterial diarrhea often presents with more severe clinical manifestations, typically linked to specific situations such as foodborne outbreaks or traveler's diarrhea. The main causes of bacterial diarrheal illness include *Campylobacter* spp., *Salmonella* spp., enteropathogenic *Escherichia coli*, and enteroaggregative *E. coli* (EAEC). In addition, *Clostridioides difficile* has rapidly emerged as a cause of community-acquired diarrheal cases, primarily in high-income countries [14, 15].

Limited research exists on the etiology of acute diarrhea in adults presenting to EDs in resource-abundant settings. One multi-center US study enrolled adults with acute, severe gastroenteritis at three major medical centers, collecting stool samples at admission and serum samples 3–4 weeks later to assess antibody response [16]. Norovirus was the most commonly identified pathogen (27%), followed by *Salmonella* spp. and *Campylobacter* spp. *Clostridioides difficile* was also detected, often alongside other pathogens [16]. A similar study in Taipei, analyzing common infectious causes of gastroenteritis (primarily presenting with diarrhea) over four years, found comparable results [17]. Viruses were the predominant agents (43%), particularly norovirus (32%); bacteria accounted for 26% of cases, and *C. difficile* only 2%. In a substantial proportion of cases (36.7%), the causative agent remained unidentified [17].

Nowadays, the incidence of antibiotic-associated diarrhea is rapidly increasing, with *C. difficile* infection accounting for 10–20% of cases [18]. Timely diagnosis is essential due to both the severity and contagiousness of the disease, which can be particularly detrimental in an emergency setting [19].

In recent years, there has been a rapid increase in noninfectious causes of acute diarrhea, which may prompt patients to seek care in the emergency room.

Patients with inflammatory bowel diseases (IBDs) visit EDs more frequently and experience longer stays compared to the general population [20–24]. Higher comorbidity index, opioid and corticosteroid use, and recent hospitalization have been identified as predictors of ED visits among patients with IBDs [20]. Evaluation by a gastroenterologist in the year preceding the disease diagnosis has been found to be a negative predictor of emergency room admission [20]. The most common symptoms reported by this group presenting to the ED are abdominal pain related to Crohn's disease and hematochezia in ulcerative colitis; however, diarrhea is also a frequent reason for emergency room visits [22]. Acute infectious gastroenteritis is common in patients with IBD; however, distinguishing between a disease flare and a bacterial or viral infection can be challenging for physicians. In this patient cohort, a microbiological diagnosis of superinfection is desirable, conventionally achieved through stool culture, *C. difficile* toxin testing, and, more recently, through a multiplex gastrointestinal pathogen panel (GPP) [25]. Notably, although guidelines suggest the use of GPPs in diagnosing infectious diarrhea in patients with IBDs [1], they have been associated with longer hospitalizations and more frequent ED visits, particularly when used by non-gastroenterology clinicians [26]. This may be due to the intrinsic high sensitivity of the GPP, which makes it difficult to distinguish between infection and colonization. This can lead to over-prescription of antibiotics and, in cases of disease flare-ups, delays in optimizing specific therapy.

Chemotherapy- and radiotherapy-related acute diarrhea is another significant cause of ED visits in developed countries, as diarrhea is one of the most common adverse effects associated with these treatments, affecting 50–80% of treated patients [27]. Despite the known impact of acute diarrhea on cancer treatment interruptions, hospitalizations, and infection risk [28], no studies have specifically addressed its management in ED settings. Similar considerations apply to immunotherapy-related diarrhea, particularly from immune checkpoint inhibitors (ICIs). ICI-induced intestinal toxicity, most commonly associated with anti-Cytotoxic T Lymphocyte-associated antigen 4 (anti-CTLA4) or combination anti-CTLA4/Programmed cell death protein 1 (PD-1)/Programmed cell death ligand 1 (PD-L1) therapies, is a frequent cause of morbidity and treatment interruptions, requiring prompt recognition and management [29]. A study at the University of Texas MD Anderson Cancer Center

identified acute diarrhea as the leading cause ED admissions among ICI-treated patients [30]. Therefore, effective, and targeted management strategies are crucial for these patients upon ED arrival.

4. Diagnosis

4.1 Clinical and exposure evaluation

Because most acute diarrheal illnesses in previously healthy, immunocompetent individuals are brief, self-limiting, and present with mild and/or transient symptoms, laboratory investigation is generally unnecessary. However, as specific pathogens can be associated with increased risks of complications and severe disease, laboratory testing may be warranted in selected patients. These tests can guide further diagnostic workup and inform the decision to initiate empiric antibiotic therapy, if appropriate.

As emphasized in clinical guidelines [1], the decision to initiate antibiotic therapy must be carefully considered given the increasing problem of antibiotic resistance, now a global threat due to the rapid spread of drug-resistant pathogens that significantly reduces our ability to treat common infections. Moreover, beyond bacterial resistance, the indiscriminate prescription of antibiotics exposes patients to avoidable risks (*e.g.*, toxicity, side effects, alteration of the normal flora with the subsequent risk of *C. difficile* infection) and creates a significant financial burden.

According to current guidelines [1, 31], a thorough clinical and exposure history should always be obtained from individuals with acute diarrhea. Exposures or conditions suggestive of infectious diarrhea include consumption of shellfish; undercooked meat, fish, or eggs; unpasteurized milk; exposure to contaminated drinking or recreational water; contact with animals, their feces, or environment; recent antimicrobial therapy; international travel; institutional exposure; and anal or oral sexual contact. Regarding risk factors, specific conditions have been associated with an increased likelihood of specific infections. For example, pregnancy increases the risk of listeriosis following consumption of contaminated meat products or unpasteurized dairy products, cirrhosis is associated with *Vibrio* spp. infection, and hemochromatosis predisposes individuals to *Yersinia* spp. infection.

Among clinical features, duration of symptoms, characteristic of the stool (*e.g.*, watery, bloody, or nonbloody stool), and associated symptoms (*e.g.*, abdominal pain, abdominal cramping, fever, nausea, and vomiting) can provide important information for further investigation and clinical management. In fact, although bacterial diarrheas may present with similar clinical features, their specific management can vary significantly; as an example, antimicrobial agents may be indicated for *Campylobacter* spp. or *Shigella* sp. infections but are not indicated for Shiga toxin-producing *E. coli* (STEC) or for most *Salmonella* spp. infections. In particular, it is important to remember that STEC infection must be suspected in case of consumption of unpasteurized milk or dairy products, raw or undercooked meat, unpasteurized vegetables, or visits to a farm or petting zoo [31]. From a clinical point of view, these patients often complain of severe abdominal pain with visible blood in stools and typically no fever at the time of admission to the ED.

Additionally, past medical history and medications can provide valuable information; a recent use of antibiotics can be a clue to the presence of *C. difficile* infection, and medications such as proton pump inhibitors can increase the risk of infectious diarrhea [32, 33]. In particular, *C. difficile* testing should be considered in people with a history of diarrhea following exposure to antimicrobial agents within the previous 28 days and in those with healthcare-associated diarrhea. Although a wide range of antimicrobial agents have been implicated, the most strongly associated with *C. difficile* infection include cephalosporins, β-lactam/β-lactamase inhibitors, clindamycin, and quinolones. *Clostridioides difficile* colonization is common in hospitalized patients and residents of long-term care facilities. Moreover, asymptomatic carriage is recognized; therefore, patients without diarrhea should not be tested or treated. Other conditions warranting testing for infectious etiology include diarrhea in immunocompromised people and noninfectious extraintestinal manifestations associated with enteric pathogens, such as hemolytic anemia and *Campylobacter* or *Yersinia* infection or hemolytic uremic syndrome and STEC.

4.2 Laboratory tests

Given the wide variety of potential etiologies, it is crucial to equip physicians with appropriate tools to help determine whether further evaluation is necessary. As the goal of this review is to highlight a guideline-based approach for adults with diarrhea presenting to the ED, it is of great importance to identify clear and practical decision-making rules. These rules should support clinical judgment in distinguishing between patients who can be safely discharged, those requiring etiological diagnosis or empiric antibiotic therapy, and those requiring hospitalization.

Several attempts have been made to develop and validate a simple yet reliable scoring system for identifying bacterial diarrhea. Specifically, Sajeed *et al.* [34] conducted a pilot study on this topic and identified a set of parameters used to create a predictive score for bacterial gastroenteritis. This score was based on six variables (serum sodium, c-reactive protein, neutrophilic leukocytosis, fever, subjective sensation of fever, and watery diarrhea), each assigned a point. The study identified high-risk patients ($\geq$5 points) with a positive predictive value (PPV) of 86% for bacterial gastroenteritis. however, the lack of large-scale validation currently prevents the routine application of this score in the management of patients with diarrhea.

Routine tests, such as a peripheral blood count, do not reliably distinguish bacterial etiologies of diarrhea from other causes [31]. However, monitoring a complete blood count, along with electrolytes and creatinine, can help identify hematologic and renal function abnormalities, which are early signs of hemolytic uremic syndrome (HUS) in individuals with *E. coli* O157 or another STEC infection. The white blood cell (WBC) count can offer diagnostic clues. Typically, the total WBC count, and particularly the neutrophil and platelet counts, are often elevated in the presence of invasive bacterial

pathogens, but they may be decreased in cases of bacterial sepsis. An increase in eosinophils may suggest a parasitic infection, while monocyte predominance can indicate an intracellular pathogen, such as *Salmonella*. Note that a leukemoid reaction can be associated with *Shigellosis*.

Stool testing remains the most important tool for establishing the potential infectious etiology of diarrhea. While multiple stool specimens are rarely required to detect pathogens [35], collecting additional samples can increase the sensitivity for bacterial detection in patients with persistent diarrhea. A rectal swab can be used if a timely diarrheal stool sample is not feasible; however, it yields less fecal material and is more susceptible to environmental degradation [31]. Fresh stool is always preferred for identifying viral, protozoal agents, and *C. difficile* toxin.

Although not routinely applicable in the ED, the focus of this review, it is important to mention the development of molecular techniques. These procedures are more sensitive and less dependent on specimen quality than traditional culture methods. Crucially, they can simultaneously identify a multitude of pathogens (bacterial, protozoan, and viral) in a single test, however, careful clinical correlation is necessary when interpreting results from molecular testing, as these technologies target genetic material and do not distinguish between viable and nonviable organisms. Furthermore, the identification of more than one pathogen is not uncommon. These techniques are not yet in widespread use, but combined approaches using Polymerase Chain Reaction-based methods followed by culture in cases of positive results could be a promising strategy in the future.

Nevertheless, if infectious diarrhea is suspected, a search for the causative pathogen should not be routinely performed, as it does not always provide a diagnosis or alter the therapeutic approach [1, 31]. Jabak *et al*. [4] conducted a retrospective study on patients presenting to an ED with diarrhea; 12% of these patients underwent physician-ordered microbiological tests (*C. difficile* toxin, stool culture, Wright's stain), but a specific microbiological diagnosis was obtained in less than 10% of cases. This finding is consistent with the study by Chan *et al*. [36], also conducted in an ED setting, which showed that stool culture results did not alter patient management in the majority of cases.

As the clinical guidelines analyzed [1, 31] do not specify different approaches based on clinical setting, it is reasonable to assume their recommendations apply to the ED as well. therefore, stool tests should only be performed under the following circumstances: severe illness (severe abdominal cramping or tenderness, signs of sepsis, $\geq$6 unformed stools per day), inflammatory diarrhea (fever $\geq$38.5 °C, small-volume stools containing blood and mucus), persistent symptoms (symptoms lasting more than one week), and high-risk hosts (*e.g.*, immunocompromised patients, pregnant women). In these cases, based on the patient's clinical history and suspected etiology, stool testing should include various bacteria. *Salmonella* spp., *Shigella* spp., *Campylobacter* spp., *Yersinia* spp., *C. difficile*, and STEC (both O157 and non-O157) should be considered in individuals with diarrhea accompanied by fever, bloody or mucoid stools, severe abdominal cramping or tenderness, and signs of sepsis. A broader panel of bacterial, viral, and parasitic agents should be considered in the context of a possible diarrheal illness outbreak (*e.g.*, multiple people with diarrhea who shared a common meal or a sudden increase in observed diarrheal cases). A broad differential diagnosis is also recommended in immunocompromised individuals, particularly those with moderate to severe primary or secondary immune deficiencies. Patients with acquired immunodeficiency syndrome (AIDS) and persistent diarrhea should undergo additional testing for *Cryptosporidium*, *Cyclospora*, *Cystoisospora*, *Microsporidia*, *Mycobacterium avium complex* (MAC), and *Cytomegalovirus* (CMV).

Blood cultures should be obtained in all individuals presenting with signs of sepsis, in immunocompromised individuals, and in those with certain high-risk conditions, such as hemolytic anemia, as well as when enteric fever or invasive salmonellosis is suspected. Additional investigations, such as imaging (*e.g.*, ultrasonography, computed tomography, magnetic resonance imaging) and endoscopy or duodenal aspirates, may be considered in specific clinical scenarios. However, their applicability in the ED may be challenging, and they might be more feasible during hospitalization.

Fecal leukocyte examination and stool lactoferrin detection are useful tools for differentiating inflammatory diarrhea from secretory diarrhea. However, they should not be employed to establish the specific cause of acute infectious diarrhea.

Regarding fecal calprotectin measurement in patients with acute infectious diarrhea, there is currently insufficient data to support a routine recommendation. Despite this, one prospective, case-control, multicenter study demonstrated that fecal calprotectin had a strong correlation with bacteriologically confirmed infectious diarrhea. This promising result suggests that calprotectin measurement could potentially change the current management algorithm for patients presenting with acute diarrhea [37].

5. Management of acute diarrhea according to the clinical guidelines

Regardless of the underlying cause, the management of acute diarrhea typically begins in the ED with general measures, primarily fluid replacement and nutritional maintenance.

Rehydration is the cornerstone of therapy for diarrheal illness. This is preferably achieved via the oral route, using solutions that contain water, salt, and sugar. For patients with more severe diarrheal disease, Oral Rehydration Solutions (ORSs)—such as those recommended by the World Health Organization (WHO) or commercially available alternatives—may be more appropriate. Adults suffering from severe hypovolemia should initially receive intravenous (IV) fluid replacement before transitioning to ORSs.

Finally, patients with bothersome symptoms may benefit from symptomatic pharmacologic therapy, including antimotility, antinausea, or antiemetic agents [31].

Due to the lack of rapid diagnostic tests for enteric pathogens, decisions regarding antibiotic therapy are often made empirically upon presentation based on clinical judgment. Routine antibiotic use should be discouraged, as most cases of acute diarrhea have a viral etiology and therefore do not benefit from antibiotic treatment in terms of duration

or symptom relief [1]. Antibiotic therapy should generally not be initiated in immunocompetent patients with acute bloody diarrhea while awaiting investigation results, nor in cases of acute watery, non-travel-associated diarrhea, which is more commonly of viral origin [31]. In specific scenarios, such as in stable patients with suspected STEC infection, including *E. coli* O157, clinical guidelines recommend withholding empiric antibiotic therapy until stool testing rules out STEC infection or Shiga toxin production. This approach is advised because antibiotics do not alleviate symptoms or prevent complications of STEC infection and may increase the risk of developing hemolytic uremic syndrome [38].

However, empiric and targeted antibiotic therapy may be appropriate for patients with severe disease, those with symptoms and signs suggestive of invasive bacterial infection, or those at high risk for complications. In these cases, it is essential to distinguish between acute bloody and watery diarrhea. For acute bloody diarrhea, empiric antibiotic therapy should be considered in the presence of severe illness (fever $\geq$38.5 °C, hypovolemia, $\geq$6 unformed stools per day, severe abdominal pain), features of inflammatory diarrhea (bloody diarrhea, small-volume mucous stools, fever), or immunocompromised status. For acute watery diarrhea, empiric antibiotics should only be started in immunocompromised individuals and in cases of non-travel-associated diarrhea with both persistent fever $\geq$38.5 °C for more than three days and moderate-to-severe illness (meaning partial or complete disability due to diarrhea) [1, 31].

Regarding traveler's diarrhea, there is a discrepancy based solely on expert indications between the American College of Gastroenterology (ACG) and the Infectious Diseases Society of America (IDSA) guidelines for empiric antibiotic treatment. The IDSA guidelines [31] recommend empiric antibiotic therapy for individuals with bloody diarrhea who have recently traveled internationally only if their body temperature is $\geq$38.5 °C and/or they exhibit signs of sepsis, and they do not provide specific indications for acute watery travel-associated diarrhea. The ACG guidelines [1] concur with empiric treatment for bloody diarrhea associated with fever. However, the ACG guidelines also suggest initiating empiric antibiotics in the presence of moderate-to-severe watery travel-associated diarrhea (meaning partial or complete disability due to diarrhea), regardless of the presence of fever.

Regarding empiric antibiotic treatment, no significant changes have been made in recent years [1, 31, 39–41]. However, current guidelines [1, 31] recommend azithromycin or a fluoroquinolone as the first-line antibiotics when treatment of acute diarrhea is deemed necessary. The choice depends on local susceptibility patterns and the patient's travel history. Other antibiotics, such as trimethoprim-sulfamethoxazole, ampicillin, and nalidixic acid, are no longer recommended due to increasing resistance that has diminished their effectiveness [1]. Empiric treatment is contraindicated for asymptomatic contacts of individuals confirmed to have bloody diarrhea. The focus for these contacts should instead be on providing guidance regarding appropriate infection prevention and control measures. For all antibiotics, a single dose, or a course of up to three days is usually sufficient for symptom resolution. Specifically, once-daily therapy is as effective as three-day therapy for traveler's diarrhea caused by noninvasive pathogens, and a three-day course is recommended for patients presenting with fever or dysentery. If symptoms persist beyond 24 hours, a three-day course of antibiotics should be completed. Azithromycin can be administered as a single 1000 mg dose or as 500 mg once daily for three days. Among fluoroquinolones, ciprofloxacin can be given as a single 750 mg dose or 500 mg twice daily for three days, and levofloxacin can be administered as a single 500 mg dose or 500 mg once daily for three days (Fig. 1, Ref. [1, 31]).

Given the increasing recognition of the human microbiota's role in physiological and pathological processes, it is important to briefly discuss the use of probiotics in the context of acute diarrhea. Although several studies [42] have shown that probiotics may safely reduce the severity and duration of symptoms in immunocompetent adults with infectious or antibiotic-associated diarrhea, their routine use is not currently recommended. This caution stems from the significant statistical heterogeneity among these studies. Such variability is a result of differing methodologies, including varying definitions of diarrhea, inconsistent outcome measurements, a wide range of probiotic products and treatment regimens, diverse participant populations, and clinical settings.

Whereas most patients can be safely managed in an outpatient setting, some may require hospitalization. Based on our experience and a review of the literature, hospitalization should be considered for individuals with a complex medical history of immunosuppression, significant comorbidities (*e.g.*, cardiovascular disease, diabetes mellitus), pregnant women, the elderly (age 65 or older), and those presenting with alarm symptoms or signs such as severe volume depletion/dehydration, abnormal electrolytes or renal function, bloody stool/rectal bleeding, weight loss, severe abdominal pain, prolonged symptoms (more than one week), or hospitalization or antibiotic use within the past three to six months (Fig. 2).

6. The challenge of managing acute diarrhea in the ED

Acute diarrhea is a significant public health problem and a major cause of morbidity and mortality worldwide. Surprisingly, despite the scale of the problem (in terms of mortality, morbidity, and costs), few real-world studies exist, and these highlight inconsistent management that is often noncompliant with current guidelines. This, in turn, results in harm to patients (potential overtreatment, development of antibiotic resistance) and the healthcare system (increased costs, increased length of hospital stays). The ED increasingly presents a formidable challenge, often serving as the first and only point of contact with the healthcare system [43]. ED physicians manage a high volume of patients and must make critical decisions based on limited information (medical history and diagnostic tests), which can increase the risk of errors and lead to significant concerns about both human and legal consequences. Moreover, decisions made in the ED inevitably impact subsequent patient management and prognosis [44]. An interesting American study conducted on adults and children admitted to the ED with diarrhea [45] evaluated factors influencing clinicians' decisions to prescribe antibiotics, fo-

Suggested empiric therapeutic regimens by guidelines		
	Suspected traveler's disease due to non invasive pathogens (according to exposure and geographical area)	**Patients with fever or dysentery or persistent symptoms after 24 hours**
Azithromycin	**1000 mg (single dose)**	**500 mg once daily for 3 days**
Ciprofloxacin	**750 mg (single dose)**	**700 mg twice daily for 3 days**
Levofloxacin	**500 mg (single dose)**	**500 mg once daily for 3 days**

FIGURE 1. Suggested empiric therapeutic regimens by guidelines [1, 31].

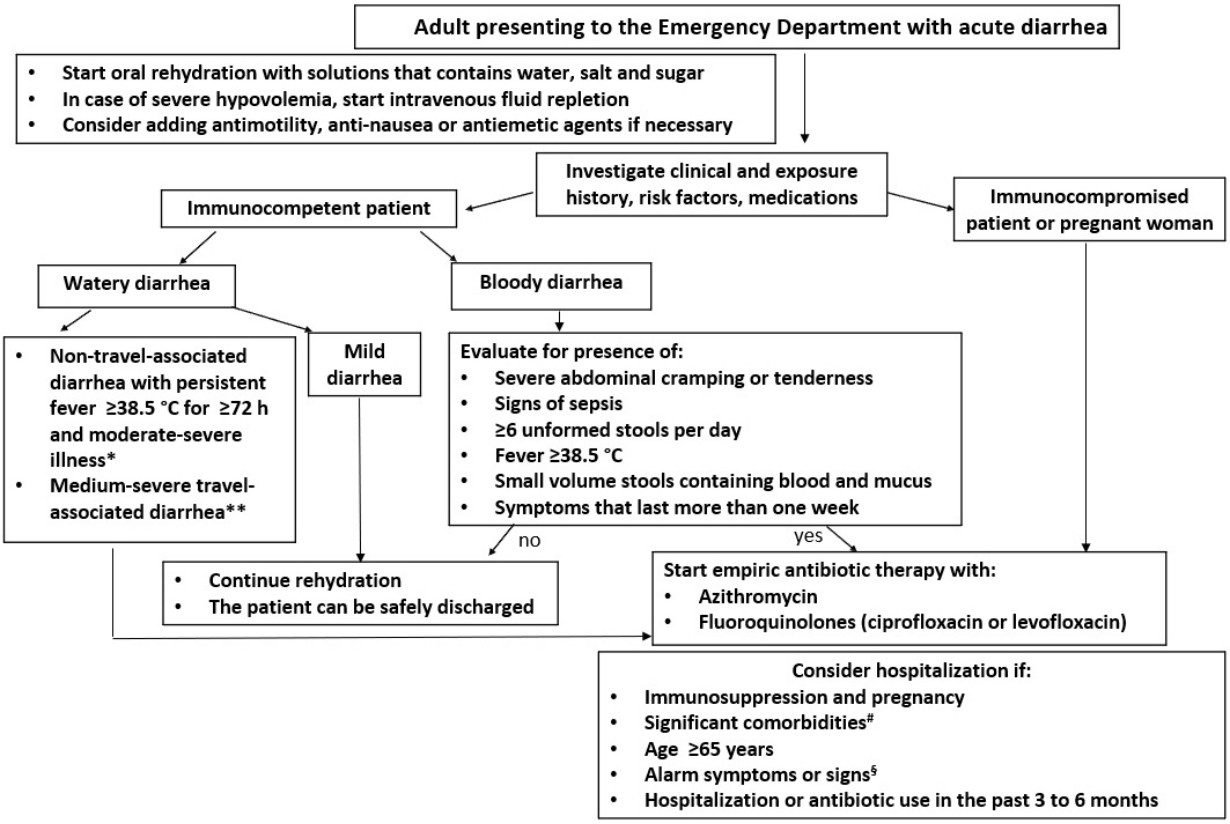

FIGURE 2. Management of the adult with acute diarrhea in the ED. *: meaning partial or complete disability due to diarrhea (IDSA guidelines and ACG guidelines). **: meaning partial or complete disability due to diarrhea with or without fever (ACG guidelines). #: *i.e.*, cardiovascular disease, diabetes mellitus, *etc.* §: *i.e.*, severe volume depletion/dehydration, abnormal electrolytes or renal function, bloody stool/rectal bleeding, weight loss, severe abdominal pain, prolonged symptoms (more than one week).

cusing on how patient expectations and satisfaction influenced these decisions. The researchers found that antibiotics were more likely to be prescribed when clinical signs suggested bacterial enteritis or when clinicians perceived that patients expected them (although clinicians correctly identified these expectations in only 33% of cases). Interestingly, 100% of patients who received antibiotics reported satisfaction with their treatment, compared to 90% satisfaction among those who did not. Additionally, a 2020 study [46] assessing diarrhea management in public hospitals in Bangladesh echoed these findings, highlighting deviations from guidelines due to challenges in managing patient expectations (such as requests for IV fluids or antibiotic prescriptions), overcrowding, and poor hygiene conditions in hospitals. This underscores how patient expectations, cultural factors, and medico-legal concerns can influence medical decisions, potentially leading clinicians to

deviate from clinical guidelines. Although clinicians may feel pressured by patient expectations, overtreatment in emergency settings can also stem from the fear of missing something important in patient care. This dynamic is exacerbated in the ED, where the focus is often on promptly alleviating symptoms due to overcrowding and delays in diagnostic evaluations. This issue is particularly complex in managing conditions such as diarrhea. A systematic analysis of common treatment pitfalls and optimal management strategies would be beneficial for clinicians. Given the challenges of the ED environment, developing specific guidelines tailored to this setting could prove valuable.

7. Conclusions

In conclusion, acute diarrhea remains a substantial global health concern, contributing significantly to morbidity and mortality. Despite its frequent presentation in the ED, a validated management approach for these patients in this setting is lacking, and research in this area remains limited.

According to guidelines [1, 31], initial management should prioritize general measures such as fluid replacement (preferably oral, if possible, or intravenous if necessary) and ensuring adequate nutrition. Because most cases are of viral origin, routine antibiotic use is discouraged. Furthermore, even when infectious diarrhea is suspected, routine pathogen identification may often fail to lead to a definitive diagnosis or alter the treatment plan. However, empiric antibiotic therapy may still be warranted in specific patient groups. Treatment options include azithromycin or a fluoroquinolone, with the final choice dependent on both local susceptibility patterns and the patient's travel history.

Managing acute diarrhea in adults presents both diagnostic and therapeutic challenges, requiring careful consideration of the risks and benefits of interventions. Further research and greater awareness of this important clinical issue are essential.

AVAILABILITY OF DATA AND MATERIALS

Data analyzed in this study were a re-analysis of existing data, which are openly available at locations cited in the reference section.

AUTHOR CONTRIBUTIONS

MC and AG—conceptualization. FMR, MCP, MM and LC—data curation. AG, FMR and MCP—writing–original draft preparation. MC, AG, BS, FF, LC and MM—writing–review and editing. FF, LC and MM—supervision. All authors have read and agreed to the published version of the manuscript.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Not applicable.

ACKNOWLEDGMENT

Not applicable.

FUNDING

This research received no external funding.

CONFLICT OF INTEREST

The authors declare no conflict of interest. Marcello Covino is serving as one of the Editorial Board members of this journal. We declare that Marcello Covino had no involvement in the peer review of this article and has no access to information regarding its peer review. Full responsibility for the editorial process for this article was delegated to CPC.

REFERENCES

[1] Riddle MS, DuPont HL, Connor BA. ACG clinical guideline: diagnosis, treatment, and prevention of acute diarrheal infections in adults. The American Journal of Gastroenterology. 2016; 111: 602–622.

[2] GBD 2016 Diarrhoeal Disease Collaborators. Estimates of the global, regional, and national morbidity, mortality, and aetiologies of diarrhoea in 195 countries: a systematic analysis for the Global Burden of Disease Study 2016. The Lancet Infectious Diseases. 2018; 18: 1211–1228.

[3] Shah HJ, Jervis RH, Wymore K, Rissman T, LaClair B, Boyle MM, *et al*. Reported incidence of infections caused by pathogens transmitted commonly through food: impact of increased use of culture-independent diagnostic test—foodborne diseases active surveillance network, 1996–2023. Morbidity and Mortality Weekly Report. 2024; 73: 584–593.

[4] Jabak SJ, Kawam L, El Mokahal A, Sharara AI. Management of acute diarrhea in the emergency department of a tertiary care university medical center. Journal of International Medical Research. 2022; 50: 3000605221115385.

[5] Dekate P, Jayashree M, Singhi SC. Management of acute diarrhea in emergency room. Indian Journal of Pediatrics. 2013; 80: 235–246.

[6] Colletti JE, Brown KM, Sharieff GQ, Barata IA, Ishimine P; ACEP Pediatric Emergency Medicine Committee. The management of children with gastroenteritis and dehydration in the emergency department. Journal of Emergency Medicine. 2010; 38: 686–698.

[7] GBD 2019 Diseases and Injuries Collaborators. Global burden of 369 diseases and injuries in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. The Lancet. 2020; 396: 1204–1222. Erratum in: Lancet. 2020; 396: 1562.

[8] Farthing M, Salam MA, Lindberg G, Dite P, Khalif I, Salazar-Lindo E, *et al*. Acute diarrhea in adults and children: a global perspective. Journal of Clinical Gastroenterology. 2013; 47: 12–20.

[9] Gadewar S, Fasano A. Current concepts in the evaluation, diagnosis and management of acute infectious diarrhea. Current Opinion in Pharmacology. 2005; 5: 559–565.

[10] Ghosh S, Malik YS, Kobayashi N. Therapeutics and immunoprophylaxis against noroviruses and rotaviruses: the past, present, and future. Current Drug Metabolism. 2018; 19: 170–191.

[11] Clemens JD, Nair GB, Ahmed T, Qadri F, Holmgren J. Cholera. The Lancet. 2017; 390: 1539–1549.

[12] Spina A, Kerr KG, Cormican M, Barbut F, Eigentler A, Zerva L, *et al*. Spectrum of enteropathogens detected by the FilmArray GI panel in a multicentre study of community-acquired gastroenteritis. Clinical Microbiology and Infection. 2015; 21: 719–728.

[13] Ayukekbong JA, Mesumbe HN, Oyero OG, Lindh M, Bergström T. Role of noroviruses as aetiological agents of diarrhoea in developing countries. Journal of General Virology. 2015; 96: 1983–1999.

[14] Huhulescu S, Kiss R, Brettlecker M, Cerny RJ, Hess C, Wewalka G, *et al*. Etiology of acute gastroenteritis in three sentinel general practices, Austria 2007. Infection. 2009; 37: 103–108.

[15] Burke KE, Lamont JT. Clostridium difficile infection: a worldwide disease. Gut and Liver. 2014; 8: 1–6.
[16] Bresee JS, Marcus R, Venezia RA, Keene WE, Morse D, Thanassi M, *et al*. US acute gastroenteritis etiology study team. The etiology of severe acute gastroenteritis among adults visiting emergency departments in the United States. The Journal of Infectious Diseases. 2012; 205: 1374–1381.
[17] Lai CC, Ji DD, Wu FT, Mu JJ, Yang JR, Jiang DD, *et al*. Etiology and risk factors of acute gastroenteritis in a Taipei emergency department: clinical features for bacterial gastroenteritis. Journal of Epidemiology. 2016; 26: 216–223.
[18] Bartlett JG. Clinical practice. Antibiotic-associated diarrhea. The New England Journal of Medicine. 2002; 346: 334–339.
[19] Skyum F, Pedersen C, Andersen V, Chen M, Franke A, Petersen D, *et al*. Risk factors for contagious gastroenteritis in adult patients with diarrhoea in the emergency department—a prospective observational multicentre study. BMC Infectious Diseases. 2019; 19: 133.
[20] Nugent Z, Singh H, Targownik LE, Strome T, Snider C, Bernstein CN. Predictors of emergency department use by persons with inflammatory bowel diseases: a population-based study. Inflammatory Bowel Diseases. 2016; 22: 2907–2916.
[21] Terlizzi EP, Dahlhamer J, Ji A. QuickStats: percentage of adults aged ≥18 years who had visited an emergency department at least once in the past 12 months, by age group and Inflammatory Bowel Disease (IBD) status—National Health Interview Survey, 2015 and 2016. Morbidity and Mortality Weekly Report. 2019; 68: 207.
[22] Ballou S, Hirsch W, Singh P, Rangan V, Nee J, Iturrino J, *et al*. Emergency department utilisation for inflammatory bowel disease in the United States from 2006 to 2014. Alimentary Pharmacology & Therapeutics. 2018; 47: 913–921.
[23] De Simone B, Davies J, Chouillard E, Di Saverio S, Hoentjen F, Tarasconi A, *et al*. WSES-AAST guidelines: management of inflammatory bowel disease in the emergency setting. World Journal of Emergency Surgery. 2021; 16: 23.
[24] Huh G, Yoon H, Choi YJ, Shin CM, Park YS, Kim N, *et al*. Trends in emergency department visits and hospitalization rates for inflammatory bowel disease in the era of biologics. PLOS ONE. 2019; 14: e0210703.
[25] Binnicker MJ. Multiplex molecular panels for diagnosis of gastrointestinal infection: performance, result interpretation, and cost-effectiveness. Journal of Clinical Microbiology. 2015; 53: 3723–3728.
[26] Ahmad W, Nguyen NH, Boland BS, Dulai PS, Pride DT, Bouland D, *et al*. Comparison of multiplex gastrointestinal pathogen panel and conventional stool testing for evaluation of diarrhea in patients with inflammatory bowel diseases. Digestive Diseases and Sciences. 2019; 64: 382–390.
[27] Benson AB III, Ajani JA, Catalano RB, Engelking C, Kornblau SM, Martenson JA III, *et al*. Recommended guidelines for the treatment of cancer treatment-induced diarrhea. Journal of Clinical Oncology. 2004; 22: 2918–2926.
[28] Wei D, Heus P, van de Wetering FT, van Tienhoven G, Verleye L, Scholten RJ. Probiotics for the prevention or treatment of chemotherapy- or radiotherapy-related diarrhoea in people with cancer. Cochrane Database of Systematic Reviews. 2018; 8: CD008831.
[29] Terrin M, Migliorisi G, Dal Buono A, Gabbiadini R, Mastrorocco E, Quadarella A, *et al*. Checkpoint inhibitor-induced colitis: from pathogenesis to management. International Journal of Molecular Sciences. 2023; 24: 11504.
[30] El Majzoub I, Qdaisat A, Thein KZ, Win MA, Han MM, Jacobson K, *et al*. Adverse effects of immune checkpoint therapy in cancer patients visiting the emergency department of a comprehensive cancer center. Annals of Emergency Medicine. 2019; 73: 79–87.
[31] Shane AL, Mody RK, Crump JA, Tarr PI, Steiner TS, Kotloff K, *et al*. 2017 infectious diseases society of America Clinical Practice Guidelines for the diagnosis and management of infectious diarrhea. Clinical Infectious Diseases. 2017; 65: e45–e80.
[32] Neal KR, Scott HM, Slack RC, Logan RF. Omeprazole as a risk factor for campylobacter gastroenteritis: case-control study. BMJ. 1996; 312: 414–415.
[33] Hassing RJ, Verbon A, de Visser H, Hofman A, Stricker BH. Proton pump inhibitors and gastroenteritis. European Journal of Epidemiology. 2016; 31: 1057–1063.
[34] Sajeed SM, De Dios MP, Dan OWJ, Punyadasa AC. Defining a clinical prediction rule to diagnose bacterial gastroenteritis requiring empirical antibiotics in an emergency department setting: a retrospective review. Indian Journal of Gastroenterology. 2023; 42: 79–87.
[35] Baron EJ, Miller JM, Weinstein MP, Richter SS, Gilligan PH, Thomson RB III, *et al*. A guide to utilization of the microbiology laboratory for diagnosis of infectious diseases: 2013 recommendations by the Infectious Diseases Society of America (IDSA) and the American Society for Microbiology (ASM)(a). Clinical Infectious Diseases. 2013; 57: e22–e121.
[36] Chan SS, Ng KC, Lyon DJ, Cheung WL, Cheng AF, Rainer TH. Acute bacterial gastroenteritis: a study of adult patients with positive stool cultures treated in the emergency department. Emergency Medicine Journal. 2003; 20: 335–338.
[37] Shastri YM, Bergis D, Povse N, Schäfer V, Shastri S, Weindel M, *et al*. Prospective multicenter study evaluating fecal calprotectin in adult acute bacterial diarrhea. The American Journal of Medicine. 2008; 121: 1099–1106.
[38] Safdar N, Said A, Gangnon RE, Maki DG. Risk of hemolytic uremic syndrome after antibiotic treatment of Escherichia coli O157:H7 enteritis: a meta-analysis. JAMA. 2002; 288: 996–1001.
[39] Helton T, Rolston DD. Which adults with acute diarrhea should be evaluated? What is the best diagnostic approach? Cleveland Clinic Journal of Medicine. 2004; 71: 778–779, 783–785.
[40] Thielman NM, Guerrant RL. Clinical practice. Acute infectious diarrhea. The New England Journal of Medicine. 2004; 350: 38–47.
[41] Guerrant RL, Van Gilder T, Steiner TS, Thielman NM, Slutsker L, Tauxe RV, *et al*.; Infectious Diseases Society of America. Practice guidelines for the management of infectious diarrhea. Clinical Infectious Diseases. 2001; 32: 331–351.
[42] Collinson S, Deans A, Padua-Zamora A, Gregorio GV, Li C, Dans LF, *et al*. Probiotics for treating acute infectious diarrhoea. Cochrane Database of Systematic Reviews. 2020; 12: CD003048.
[43] Institute of Medicine Committee on the Future of Emergency Care in the U.S. Health System. The future of emergency care in the United States health system. Annals of Emergency Medicine. 2006; 48: 115–120.
[44] Boudi Z, Lauque D, Alsabri M, Östlundh L, Oneyji C, Khalemsky A, *et al*. Association between boarding in the emergency department and in-hospital mortality: a systematic review. PLOS ONE. 2020; 15: e0231253.
[45] Karras DJ, Ong S, Moran GJ, Nakase J, Kuehnert MJ, Jarvis WR, *et al*.; EMERGEncy ID NET Study Group. Antibiotic use for emergency department patients with acute diarrhea: prescribing practices, patient expectations, and patient satisfaction. Annals of Emergency Medicine. 2003; 42: 835–842.
[46] Biswas D, Hossin R, Rahman M, Bardosh KL, Watt MH, Zion MI, *et al*. An ethnographic exploration of diarrheal disease management in public hospitals in Bangladesh: from problems to solutions. Social Science & Medicine. 2020; 260: 113185.

How to cite this article: Covino M, Gallo A, Parlangeli MC, Rognoni FM, Simeoni B, Carbone L, Franceschi F, Montalto M. Approach to and management of acute diarrhea in adults in the emergency department setting. Signa Vitae. 2026; 22(3): 34-41. doi: 10.22514/sv.2026.030.