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Medical Infectious Diseases Among Adult Patients in the Emergency Department of HML: Incidence, Clinical Profile, and Management.

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Abstract:

Objective: To determine the incidence, clinical profile, and initial management of strictly medical infectious diseases (IDs) among adult patients presenting to the ED of Colonel Lotfi Hospital, Laghouat, Algeria.

Methods: A prospective observational study was conducted from November 1st, 2025, to April 1st, 2026. All adult patients (age ≥18 years) with suspected or confirmed medical IDs were enrolled via a standardized case report form. Severity was assessed using qSOFA, NEWS2, and CRB-65 (pneumonia) scores. Descriptive statistics were performed using IBM SPSS v27.

Results: Of 18,206 adult ED admissions, 58 patients met inclusion criteria (incidence: 0.32%; 95% CI: 0.24–0.41%) across 17 distinct infectious entities. Lower respiratory tract infections predominated (31.0%), with pneumonia as the leading diagnosis (24.1%). Systemic infections, sepsis (5.2%), septic shock (6.9%), brucellosis (5.2%), and measles (6.9%) collectively accounted for 24.1%. Median age was 53 years (IQR: 34.75–71); diabetes mellitus was the most prevalent comorbidity (20.7%). Abnormal vital signs were present in 67.2% of patients, and 18.5% had qSOFA ≥ 2. Diagnosis was established clinically in 48.3%, radiologically in 32.8%, and microbiologically in 19.0%, with a culture positivity rate of 6.9%. Empirical antibiotics were initiated in 91.4%; guideline concordance ranged from 0% in pleuritis and cystitis to 100% in meningitis and pyelonephritis, with community-acquired pneumonia (CAP) showing the lowest concordance (7.1%). In-ED mortality was 8.6%, and 58.6% of patients required hospitalization.

Conclusion: This study established the first incidence estimate of strictly medical IDs in an Algerian ED. The high mortality, broad guideline deviations, and complexity of presentations highlight critical gaps in microbiological capacity, antimicrobial stewardship, and severity-guided triage and raise a compelling case for the creation of a dedicated ID emergency unit at HML as a meaningful step toward evidence-based management in resource-limited settings.

Keywords: ***Emergency department; medical infectious diseases; incidence; clinical profile; antimicrobial stewardship; antibiotic concordance; community-acquired pneumonia; sepsis; brucellosis; measles; qSOFA; NEWS2; CRB65 (pneumonia cases); severity scoring; resource-limited setting. Laghouat, Algeria***

1. Introduction :

Infectious diseases (ID) remain a major public health concern in the world. Although their global mortality burden has declined from 32% of all deaths in 2000 to 18% in 2019, this progress is marked by profound socio-economic inequalities: communicable diseases still account for nearly 50% of deaths in low-income countries, compared to only 5–6% in high-income countries [1]. Beyond their mortality burden, IDs place a heavy strain on emergency care systems across the world. In high-income countries, they represent a major diagnostic burden, accounting for 19.3% of all adult ED visits in Germany [2]. In resource-limited settings, their impact is even more striking: data from Tanzania reveal that IDs rank as the third leading cause of critical illness among ED patients, accounting for 10.2% of critically ill cases, on par with trauma and behind only respiratory diseases (18.8%) and cardiovascular diseases (12.6%) [3] . These figures underscore that, in many parts of the world, an infection is not merely an inconvenience but a potentially life-threatening emergency. The ED occupies a uniquely critical position at the front line of IDs management, serving as the primary site of both initial presentation and early therapeutic decision-making. In this high-acuity, resource-constrained environment, IDs pose a significant clinical challenge owing to their heterogeneous presentations and potential for rapid progression. IDs are characterized not only by their etiological agents, most commonly bacteria or viruses [4], capable of inducing a systemic inflammatory response that may compromise vital organ function, but also by their routes of transmission, including airborne, droplet, or direct and indirect contact. They are further distinguished by their anatomical site of infection and their portal of entry into the host. IDs are broadly classified into two major domains: medical and surgical infections, a distinction that carries direct implications for management pathways in the emergency setting. In emergency practice, classification is most often guided by the anatomical site of infection. Urinary tract infections, principally acute pyelonephritis, represent the most frequent infectious syndrome, comprising 32.4% of cases. Respiratory infections, including community-acquired pneumonia (CAP), account for 10.3% of ID consultations. Other commonly encountered infection sites include the intra-abdominal region, skin and soft tissues (16.9% of ID consultations), and the central nervous system (CNS) [5]. In research settings, the gold standard for diagnosis remains expert panel adjudication, integrating clinical findings, advanced imaging, and microbiological evidence; however, in the ED, the absence of such a formal framework makes timely and precise diagnosis a direct determinant of patient prognosis [6]. The clinical spectrum of IDs ranges from minor localized conditions, such as cellulitis, to life-threatening presentations, including sepsis, fulminant septic shock, and multiple organ dysfunction syndrome [4]. Early diagnosis is frequently hindered by the non-specific and often delayed nature of clinical symptoms, a challenge compounded in elderly and polymorbid patients whose chronic conditions and polypharmacy may simultaneously mask acute infection and

mimic unrelated pathologies, or predispose them to severe complications [1]. In this context, standardized scoring systems are indispensable. qSOFA identifies sepsis-related organ dysfunction risk through three bedside parameters; NEWS2 integrates six physiological variables, with a threshold of ≥5 signaling the need for urgent intervention; and CRB-65 guides admission decisions in community-acquired pneumonia. These tools are particularly vital given that critically ill patients identified by physiological derangement carry an ED mortality of approximately 4.8%, compared to 0.06% in hemodynamically stable presentations [3].From a diagnostic standpoint, the identification of IDs traditionally relies on the recognition of a systemic inflammatory response, as described by the Systemic Inflammatory Response Syndrome (SIRS) criteria. Conventional parameters, body temperature, leukocyte count, and C-reactive protein (CRP) remain widely used, though their limited specificity has prompted the integration of additional biomarkers, most notably procalcitonin (PCT), which has gained importance as a tool for distinguishing bacterial from viral infections [6].The management of ID in the ED is further complicated by several converging imperatives. The admit-versus-discharge decision is obscured by atypical presentations in high-risk populations, while social determinants, including financial coverage, caregiver availability, and resource limitations, constrain safe outpatient management [3]. Simultaneously, the urgent need to administer broad-spectrum empirical Antibiotics within hours of sepsis onset, long before culture results are available, directly conflict with antimicrobial stewardship principles, as this practice exerts selection pressure that drives the emergence of multi-drug-resistant organisms (MDROs) [1].Despite this complexity, the incidence and clinical patterns of strictly IDs in the ED remain insufficiently documented. Most existing studies focus on specific organs or syndromes in isolation, such as pneumonia [7] or sepsis [8], leaving a significant gap in the comprehensive understanding of the full landscape of non-surgical IDs in adult emergency populations. Understanding these patterns is crucial for improving diagnostic accuracy, optimizing antimicrobial stewardship, and reducing the risks associated with inappropriate initial treatment. Accordingly, this study aims to determine the incidence, clinical profile, and management of medical IDs among adult patients presenting to the HML ED over a five-month period, with the specific objectives of identifying the most common infectious pathologies; characterizing the demographic and clinical profiles of affected patients; assessing the role of clinical signs, laboratory biomarkers, and imaging in the early identification of severe infections; and describing the initial management strategies, including empirical antibiotic therapy and supportive care delivered in the emergency setting.

2.Study Design and Setting: We conducted a prospective observational study over a five-month period, from November 1st, 2025, to April 1st, 2026, at the ED of Colonel Lotfi Hospital, Laghouat (HML). The study focused on the incidence, clinical

profile, and initial management of medical infectious diseases (IDs).

Study Population and Inclusion Criteria: The study included all adult patients (aged ≥18 years) who presented to the ED during the study period with suspected or confirmed medical ID. To ensure cohort homogeneity and accurate identification of ID cases, two main inclusion pathways were used: patients presenting with infectious complaints, including fever (>38.2°C), hypothermia (<35°C), chills, sweats, myalgia, fatigue, altered mental status, or an explicit infectious clinical syndrome (e.g., pneumonia, urinary tract infection, or meningitis), were selected. And patients initially presenting with non-infectious conditions, such as trauma, cardiovascular emergencies, neurological disorders, exacerbations of chronic diseases, and metabolic disorders, in whom further medical evaluations identified an active underlying infection necessitating medical intervention.

Definitions : A medical ID was defined as any clinical condition diagnosed by an attending physician, based on a combination of clinical, biological, and/or radiological findings. requiring antimicrobial therapy and primary medical management without the need for surgical intervention.

Exclusion Criteria: To maintain a targeted cohort of medical IDs among adult patients, cases requiring immediate surgical intervention or invasive procedures (e.g., appendicitis, peritonitis, or obstructive cholangitis), as well as trauma-related infections, were excluded from the study. Hospital-acquired infections occurring during hospitalization for other conditions were also excluded. Furthermore, patients under 18 years of age were not included in the study.

Data Collection and Variables: Data were collected prospectively, using a standardized case report form specifically designed for this study. Information was obtained through direct patient assessments, medical records, and ED registers, with patient privacy ensured via data anonymization. The documented variables included demographic characteristics (age, gender, and occupation). Comorbidities included diabetes, chronic lung disease (CLD), and an immunocompromised state. An immunocompromised state was defined as the presence of conditions associated with impaired immune function, including solid or hematological malignancy, ongoing or recent c hemotherapy, long-term corticosteroid therapy, immunosuppressive treatment, or other conditions affecting immune competence. Other comorbidities comprised conditions not classified in these categories, such as arterial hypertension, chronic kidney disease, cardiovascular diseases, epilepsy, benign prostatic hyperplasia, hypothyroidism, and Alzheimer's disease. Epidemiological risk factors included a recent travel history; documented contact with similar infectious cases; the consumption of potentially contaminated food; and exposure to unpasteurized dairy products. Additionally, clinical data were recorded, comprising presenting symptoms, vital signs, the presumed portal of entry (POE), and severity scores, including the quick Sequential Organ Failure Assessment :

(qSOFA) and the National Early Warning Score 2 (NEWS2), which were calculated for all patients with available required clinical data for severity assessment and risk stratification, rather than for diagnostic purposes. The CRB-65 score was applied only to patients with pneumonia as a disease-specific severity tool. The qSOFA score included mental status (Glasgow Coma Scale <15), respiratory rate ≥22 breaths/min, and systolic blood pressure ≤100 mmHg; a score ≥2 indicated severe disease [9]. The NEWS2 score incorporates respiratory rate, oxygen saturation, need for supplemental oxygen, temperature, systolic blood pressure, heart rate, and level of consciousness; a score ≥5 suggested clinical deterioration[10] .The CRB-65 score, specific to pneumonia, includes confusion, respiratory rate ≥30 breaths/min, systolic blood pressure <90 mmHg or diastolic blood pressure ≤60 mmHg, and age ≥65 years; a score ≥2 indicates increased severity and need for closer clinical assessment in the emergency setting [11]. Diagnostic data included the definitive diagnosis, laboratory results (including inflammatory biomarkers and microbiological cultures), and radiological findings (chest X-rays, ultrasounds, CT scans, and MRI). Therapeutic management data were collected, including type of care (outpatient or inpatient), time, and type of empirical antibiotic therapy and symptomatic treatment. Finally, outcome data were recorded based on the length of stay (LOS) in the ED and patient disposition (discharge or hospitalization). The management analysis was primarily focused on the clinical and microbiological adequacy of the initial antimicrobial therapy, rather than the administration timeline.

Statistical Analysis: Data were analyzed using IBM SPSS Statistics for Windows, Version 27.0 (IBM Corp., Armonk, NY, USA). Quantitative variables were expressed as means, while qualitative variables were expressed as frequencies and percentages. Incidence rates were calculated as proportions and reported as percentages with their corresponding 95% confidence intervals (95% CI). The overall incidence of medical IDs was defined as the proportion of infectious cases relative to the total number of adult patients admitted to the HML ED during the study period. Subgroup incidences were determined for specific definitive diagnoses by dividing the number of cases for each infection by the total number of confirmed medical IDs identified during the study.

Ethical Considerations: The study was conducted in accordance with ethical principles of the Declaration of Helsinki. Patient confidentiality was strictly maintained through anonymization of all collected data.

3. RESULTS:

3.1. The Overall Incidence of Medical IDs:

Over the five-month study period (from the first of November 2025 to the first of April 2026), a total of 18,206 adult patients were admitted to the ED of HML. Of these, 58 patients met the inclusion criteria for confirmed medical IDs, yielding a global incidence of 0.32% (95% CI: 0.24% – 0.41%) among adult ED admissions during the study period. A total of 17 distinct ID

entities were diagnosed across the cohort. The distribution of diagnoses is presented in Table 1. CAP was the most frequently encountered condition, accounting for 14 cases (24.1%), followed by pharyngotonsillitis in nine cases (15.5%). Systemic infections comprising sepsis (n=3; 5.2%), septic shock (n=4; 6.9%), measles (n=4; 6.9%), and brucellosis (n=3; 5.2%) collectively represented 14 cases (20.7%), constituting the second most common ID group. Gastroenteritis accounted for five cases (8.6%), pleuritis (n=3; 5.2%), pyelonephritis (n=3; 5.2%), and meningoencephalitis (n=2; 3.4%). Rare presentations including chickenpox, cutaneous leishmaniasis, facial cellulitis, pyopneumothorax, shingles, and sinusitis each accounted for a single case (1.7

Table 1. Distribution of Diagnoses among Patients with Medical IDs (n=58)

Diagnosis	n	%
CAP	14	24.1
Pharyngotonsillitis	9	15.5
Septic shock*	4	6.9
Gastroenteritis	5	8.6
Measles	4	6.9
Brucellosis	3	5.2
Pleuritis	3	5.2
Pyelonephritis	3	5.2
Sepsis *	3	5.2
Cystitis	2	3.4
Bacterial Meningoencephalitis	2	3.4
Chickenpox	1	1.7
Cutaneous Leishmaniasis	1	1.7
Facial cellulitis	1	1.7
Pyopneumothorax	1	1.7
Shingles	1	1.7
Sinusitis	1	1.7
Total	58	100.0

* Sepsis and septic shock were retained as primary diagnoses in cases where no identifiable infectious focus was documented at the time of emergency assessment.

3.2. Clinical Profile

3.2.1 Distribution of Infectious Cases According to Site of Infection: The infectious focus was systematically categorized for all 58 patients. The lower respiratory tract was the predominant site of infection, involved in 18 cases (31.0%), encompassing CAP, pleuritis, and pyopneumothorax. Systemic infections comprising sepsis, septic shock, brucellosis, and measles represented the second most common category, accounting for 14 cases (24.1%). Upper respiratory tract infections (pharyngotonsillitis and sinusitis) were identified in 10 cases (17.2%). Abdominal infections (gastroenteritis) accounted for five cases (8.6%), while skin and soft tissue infections (facial cellulitis, cutaneous leishmaniasis, shingles, and chickenpox) were identified in four cases (6.9%). Upper urinary tract infections (pyelonephritis) affected three patients (5.2%), and lower urinary Tract infections (cystitis) were documented in two patients (3.4%). Central

nervous system infections (bacterial meningoencephalitis) were found in two cases (3.4%). The complete distribution is presented in Table 2.

Table 2. Distribution by Site of Infection (n=58)

Site of Infection	n	%
Lower respiratory tract	18	31.0
Systemic infection	14	24.1
Upper respiratory tract	10	17.2
Abdominal	5	8.6
Skin and soft tissue	4	6.9
Upper urinary tract	3	5.2
Lower urinary tract	2	3.4
Central nervous system	2	3.4
Total	58	100.0

Regarding the POE, this variable was systematically investigated in patients presenting with sepsis, septic shock, facial cellulitis, and meningoencephalitis, as these are the conditions for which identifying the POE carries direct clinical and therapeutic relevance, and it was successfully identified in all cases (100%). Among the three patients diagnosed with sepsis (n=3), the urinary tract was the sole identified portal of entry (100%). In patients with septic shock (n=4), the cutaneous and urinary routes were equally distributed, each accounting for half of cases (50%). In the single case of facial cellulitis (n=1), the ENT route was identified as the exclusive POE. And in the two patients with meningoencephalitis (n=2), the ENT route was the only POE (100%). Overall, among the 10 patients, the urinary route was the most frequently documented (n=5; 50%), followed by the ENT route (n=3; 30%) and the cutaneous route (n=2; 20%), as detailed in Table 3.

Table 3. Distribution of Diagnoses According to Portal of Entry (n=8)

Diagnosis	Portal of Entry						Total	
	Cutaneous		Urinary		ENT			
	n	%	n	%	n	%	n	%
Facial cellulitis	0	0.0 %	0	0.0 %	1	100.0%	1	100.0 %
Meningoencephalitis	0	0.0 %	0	0.0 %	2	100 %	2	100%
Sepsis	0	0.0 %	3	100 %	0	0.0 %	3	100%
Septic shock	2	50%	2	50 %	0	0.0 %	4	100%
Total	**2**	**20%**	**5**	**50 %**	**3**	**30 %**	**10**	**100%**

Epidemiological exposure was investigated in the 14 patients for whom it carried direct clinical relevance, namely, those diagnosed with brucellosis (n=3), gastroenteritis (n=5), measles (n=4), chickenpox (n=1), and cutaneous leishmaniasis (n=1). A documented epidemiological exposure was identified in nine of these patients (53.3%), while no exposure could be established in the remaining five cases (35.71%). Exposure was documented in all three brucellosis cases (100%), consistent with animal contact or consumption of unpasteurized dairy products, a relevant finding given the

pastoral character of the Laghouat region. Among gastroenteritis cases, four out of five patients (80%) had a documented exposure, all occurring in the context of a collective foodborne poisoning (CFP). In measles cases (n=4), the identified epidemiological risk factor was the absence of vaccination, documented in one out of four patients (25%); vaccination status could not be established in the remaining three cases. No epidemiological exposure was documented in the single cases of chickenpox. The single case of cutaneous leishmaniasis presented a significant epidemiological exposure history, given that Laghouat is a recognized endemic focus of Leishmania transmission in Algeria, consistent with the established diagnosis. all detailed in Table 4.

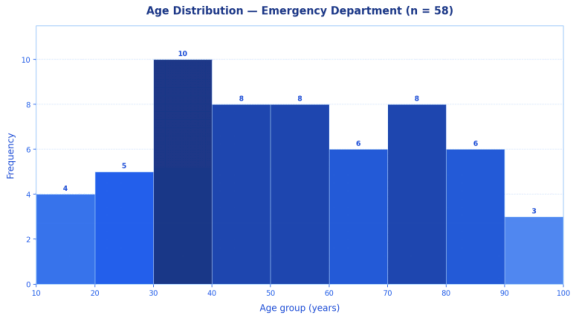
Table 4: Epidemiological Exposure among Patients with Clinically Relevant Diagnoses (n=15)

Epidemiological Exposure	Diagnoses					Total
	Brucellosis	Chickenpox	CL	GE	Measles	n (%)
No documented exposure	0	1	0	1	3	5 35.71%
Documented exposure	3	0	1	4	1	9 (64.29%)
Total	3	1	1	5	4	15 (100%)

CL = Cutaneous leishmaniasis
GE = Gastroenteritis

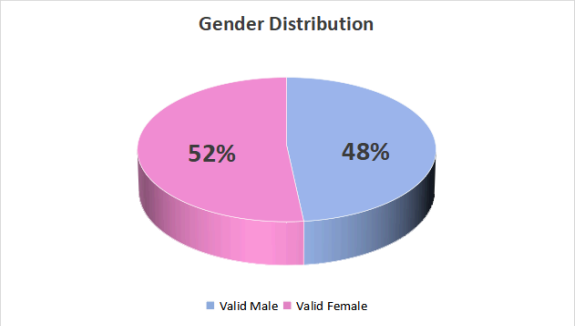
3.2.2 Age Distribution: The age distribution of the study population showed a wide range; the median age was 53 [34.75 - 71], spanning from 19 to 93 years, with cases distributed across multiple age groups. The histogram (Figure 1) demonstrates that patients aged 19 years represented the most frequent single-year group (n=4), followed by clusters at ages 27, 31, 43, and 56 years (n=3 each). The distribution shows a relatively broad spread without a single dominant age peak, with a notable presence of elderly patients; cases were recorded up to 93 years of age. This broad age range reflects the non-selective nature of ID presentations at the emergency level and underscores the vulnerability of both young adults and the elderly population.

Figure 1: Age distribution histogram of patients with medical IDs (n=58):



3.2.3 Gender Distribution: The study cohort included 30 female patients (51.72%) and 28 male patients (48.28%), yielding a near-equal gender distribution with a slight female predominance (sex ratio F/M = 1.07). This balanced distribution suggests that medical IDs presenting to the ED in this setting affect both genders almost equally, with no statistically significant gender-based predominance. The gender distribution is illustrated in Figure 2.

Figure 2. Gender Distribution of the Study Cohort (n=58)



3.2.4 Occupational Status: The occupational profile of the study cohort was dominated by unemployed individuals, who accounted for 42 patients (72.4%). Retired patients comprised 10 cases (17.2%), and employed patients represented only six cases (10.3%). This sociodemographic profile is consistent with the predominance of elderly and chronically ill patient populations inherently at higher risk for IDs in ED presentations.

3.2.5 Comorbidities: Comorbid conditions, including diabetes and CLD and an immunocompromised state, were assessed in all 58 patients. At least one comorbidity was present in a substantial proportion of the cohort. Diabetes mellitus was the most prevalent among the specifically investigated comorbidities, present in 12 patients (20.7%). CLD was present in four patients (6.9%). The immunocompromised status was documented in five patients (8.6%). Other comorbidities, such as arterial hypertension, chronic kidney disease, cardiovascular diseases, epilepsy, benign prostatic hyperplasia, hypothyroidism, and Alzheimer's disease, were the most frequently recorded, identified in 24 patients (41.4%). 34 patients (58.6%) had none of these comorbidities were recorded, as detailed in Table 5.

Table 5. Prevalence of Comorbidities in the Study Cohort (n=58)

Comorbidity	Present		Absent	
	n	%	n	%
Diabetes mellitus	12	20.7	46	79.3
Immunocompromised state	5	8.6	53	91.4
Chronic lung disease (CLD)	4	6.9	54	93.1
Other comorbidities	24	41.4	34	58.6

3.2.6 Presenting Symptoms: The chief complaints at presentation were diverse, reflecting the broad spectrum of infectious syndromes encountered. General clinical deterioration (GCD) was the most frequently reported chief complaint, identified in 14 patients (24.1%), followed by fever in 11 cases (19.0%) and dyspnea in seven cases (12.1%). Diarrhea was the presenting symptom in five cases (8.6%), while rash was documented in four patients (6.9%). Cough and odynophagia were each reported in three patients (5.2%). Dysuria, arthralgia, facial pressure, facial swelling, flu-like syndrome, headache, hematuria, low back pain, painful rash, and ulcerocrusted nodule were each observed in one to two patients. The complete symptom distribution is presented in Table 6.

Table 6. Distribution of Chief Complaints / Presenting Symptoms (n=58)

Chief Complaint / Symptom	n	%
General clinical deterioration (GCD)	14	24.1
Fever	11	19.0
Dyspnea	7	12.1
Diarrhea	5	8.6
Rash	4	6.9
Cough	3	5.2
Odynophagia	3	5.2
Dysuria	2	3.4
Arthralgia	1	1.7
Facial pressure	1	1.7
Facial swelling	1	1.7
Flu-like syndrome	1	1.7
Headache	1	1.7
Hematuria	1	1.7
Low back pain	1	1.7
Painful rash	1	1.7
Ulcerocrusted nodule	1	1.7
Total	58	100.0

3.2.7 Vital Signs on Admission: On initial assessment, vital signs were abnormal in 39 patients (67.2%), whereas 19 patients (32.8%) presented with normal vital parameters. This finding underscores the significant proportion of patients with physiological compromise at the time of emergency presentation, reflecting the acute and potentially life-threatening nature of the ID managed in this cohort.

3.2.8 Biological Inflammatory Profile: Inflammatory biomarkers were assessed in patients for whom these investigations were performed to evaluate the prevalence of inflammatory syndrome. The following parameters were analyzed: CRP as a marker of acute inflammation, WBC counts to assess leukocyte response, and hemoglobin to screen for anemia. CRP was positive in the majority of valid cases (81.3%, n=39/48), suggesting widespread inflammatory activity in the sample. WBC counts were fairly evenly split between normoleukocytosis (42%, n=21/50) and hyperleukocytosis (44%, n=22/50), with only 14% (n=7/50) showing leukopenia, indicating that most patients had normal to elevated WBC counts. Hemoglobin was largely normal (88%, n=44/50), with only 12% (n=6/50) presenting with inflammatory anemia. Regarding the global inflammatory syndrome prevalence, considering positive CRP as the primary marker of inflammation, 39 out of 58 total patients had a positive CRP, representing a global rate of 67.2% of the entire cohort. With hyperleukocytosis added as another inflammatory criterion, up to 67–70% of the cohort showed at least one inflammatory marker, confirming that inflammatory syndrome was the dominant finding in this patient population. All are presented in Table 7. A total of 10 missing values were recorded for CRP and eight for both WBC and hemoglobin, accounting for 17.2% and 13.8% of the total cohort (n=58), respectively. These missing values correspond to patients for whom biological samples were either not collected, not available, or not processed at the time of admission. Consequently, these cases were

excluded from the validity analysis and do not reflect a biological finding but rather a limitation in data availability.

Table 7. Distribution of Inflammatory Biomarkers Among Hospitalized Patients (n=58)

Biomarker	n	% of total (n=58)	Valid %
CRP | valid n = 48 | missing = 10			
Negative	9	15.5%	18.8%
Positive	39	67.2%	81.3%
Total (tested)	**48**	**82.8%**	**100.0%**
WBC | valid n = 50 | missing = 8			
Normoleukocytosis	21	36.2%	42.0%
Hyperleukocytosis	22	37.9%	44.0%
Leukopenia	7	12.1%	14.0%
Total (tested)	**50**	**86.2%**	**100.0%**
HB | valid n = 50 | missing = 8			
Anemia	6	10.3%	12.0%
Normal HB	44	75.9%	88.0%
Total (tested)	**50**	**86.2%**	**100.0%**

3.2.9 Microbiological profile:

Microbiological investigations included blood culture, lumbar puncture, urine, and pus samples. Whereas blood culture was not attempted for any of the patients in our cohort, the rest of the microbiological investigations were attempted in 19 of the 58 patients (32.8%). Among this subgroup, results were positive in four cases (21.1% of those tested; 6.9% of the total cohort), negative in four cases (21.1%), and discordant with the clinical picture in four additional cases (21.1%). In seven of the 19 patients for whom microbiological workup was intended, sampling was ultimately not performed (36.8%) (Table 8). The identified microorganisms were distributed as follows: Escherichia coli, Klebsiella pneumoniae, and Candida albicans (Table 9), with one sample exhibiting mixed polymicrobial flora due to inadequate aseptic conditions during sample collection, which increased the possibility of contamination and limited accurate identification of the causative microorganism. The overall low rate of microbiological confirmation (6.9% positivity across the full cohort) is consistent with the predominantly clinical and radiological diagnostic approach observed in this study and reflects the limited systematic microbiological sampling noted previously.

Table 8. Microbiological Documentation Status among Patients with Microbiological Workup (n=19 tested; n=58 total cohort)

Microbiological Documentation Status	n (of 19 tested)	% of tested	% of total cohort (n=58)
Not performed	7	36.8	12.1
Performed Negative	4	21.1	6.9
Performed Discordant	4	21.1	6.9
Performed Positive	4	21.1	6.9
Total (tested)	19	100.0	32.8

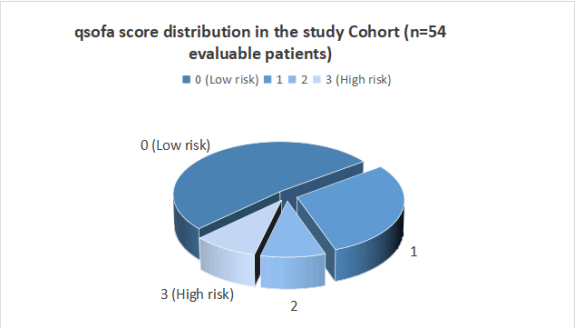
Table 9. Microorganisms Identified on Culture (n=58)

Microorganism Identified	n	% of total cohort (n=58)
Escherichia coli	1	1.7
Klebsiella pneumoniae	1	1.7
Candida albicans	1	1.7
Polymorphic flora	1	1.7
No microorganism identified	54	93.1
Total	58	100.0

3.2.10 Severity Assessment:

qSOFA Score: The qSOFA A score was applied to all 54 patients with complete data in the cohort. The majority (n=28; 51.85%) had a qSOFA score of 0, indicating low immediate risk of sepsis-related organ dysfunction. A score of 1 was recorded in 16 patients (29.63%). Importantly, 10 patients (18.52%) had a qSOFA score of 2 or 3, the threshold for high sepsis risk, distributed equally between scores of 2 (n=5; 9.26%) and 3 (n=5; 9.26%). The distribution is shown in Figure 3.

Figure 3. Qsofa score Distribution in the study Cohort (n=54)



CRB-65 Score (pneumonia cases): The CRB-65 score was calculated exclusively for the 13 pneumonia patients with complete data. The majority (n=6; 46.15%) had a CRB-65 score of 1, corresponding to low severity. Three patients (23.08%) had a score of 3, indicating high severity and warranting hospital admission. Two patients (15.38%) scored 2 (moderate severity), one patient (7.69%) scored 0 (outpatient management), and one patient (7.69%) scored 4, representing the highest severity category with a recommendation for urgent hospital admission and consideration of intensive care. The distribution is presented in Table 10.

Table 10. CRB-65 Score Distribution in Pneumonia Patients (n=13 evaluable cases)

CRB-65 Score (Pneumonia)	n	%
0	1	7.69
1 (Low severity)	6	46.15
2 (Moderate severity)	2	15.38
3 (High severity)	3	23.08
4 (Very high severity)	1	7.69
Total (pneumonia cases)	13	100.0

NEWS 2 Score: The NEWS2 score distribution (Table 11) demonstrated a wide range of values. A score of 0 was the most frequent, recorded in 16 patients (30.77%), reflecting a clinically stable subset. Six patients (11.54%) scored 1. Scores of 2 and 3 were each observed in 4 patients (7.69% each). Notably, scores of 5 or above the threshold for urgent clinical response were documented in a significant proportion of patients, with individual scores extending up

to 17, indicating cases of extreme physiological derangement. This wide distribution confirms the heterogeneous severity of the cohort, ranging from mild infections to critically ill presentations.

Table 11. NEWS2 Score Distribution among Study Patients (n = 52 evaluable)

NEWS2 Score	n	%
0	16	30.8
1	6	11.5
2	4	7.7
3	4	7.7
5	2	3.8
6	3	5.8
7	1	1.9
9	2	3.8
10	3	5.8
11	2	3.8
12	1	1.9
13	2	3.8
15	1	1.9
16	2	3.8
17	3	5.8
Total	52	100.0

3.3 Management and Treatment:

3.3.1 Complementary Examinations:

Complementary investigations were performed as part of the diagnostic and management workup for all patients. Chest X-ray was the most frequently requested imaging modality, obtained in 34 patients (58.6%), consistent with the high proportion of lower respiratory tract infections in the cohort. CT scans were performed in 21 patients (36.2%), reflecting the need for advanced imaging in complex or severe cases. Abdominal or thoracic ultrasound was performed in 10 patients (17.2%). MRI was used in two patients (3.4%), restricted to cases requiring neurological characterization.

Regarding microbiological investigations, the cytobacteriological examination of urine (CBEU) was performed in seven patients (12.07%), consistent with the proportion of urinary tract infections. A lumbar puncture was performed in five patients (8.6%) in the diagnostic workup of suspected central nervous system infections and other relevant clinical indications. Pus samples were collected in two cases (3.4%), reflecting limited microbiological sampling overall. The full distribution is presented in Table 12.

Table 12 . Complementary Examinations Performed (n=58; multiple modalities per patient possible)

Complementary Examination	n	%
Chest X-ray	34	58.6
CT scan	21	36.2
Ultrasound	10	17.2
MRI	2	3.4
Lumbar puncture	5	8.6
(urinalysis/urine culture)	7	12.07
Pus samples	2	3.4

With respect to the basis of diagnosis confirmation or orientation, 28 patients

(46.55%) were diagnosed on clinical grounds alone or their clinical presentations oriented the diagnosis without confirmatory microbiological or radiological evidence at the ED level. Radiological confirmation/orientation was achieved in 19 patients (32.77%), and microbiological confirmation was obtained in 11 patients (20.86%), as detailed in Table 13.

Table 13. Basis of Diagnosis Confirmation (n=58)

Basis of Diagnosis : Confirmation / Orientation	n	%
Clinical orientation	28	46.55
Microbiological	11	20.68
Radiological (confirmation/orientation)	19	32.77
Total	58	100.0

The method of diagnostic confirmation varied according to the underlying infection. Radiological confirmation predominated in respiratory infections, accounting for all cases of CAP, pleuritis, and pyopneumothorax (100% each). In contrast, microbiological confirmation was mainly observed in infections such as brucellosis, meningoencephalitis, and cutaneous leishmaniasis (100% each). Clinical diagnosis alone was predominantly used in conditions such as sinusitis, shingles, and gastroenteritis (100% each). Some infections showed a mixed pattern of confirmation. In cystitis and measles, diagnoses were established equally by clinical and microbiological methods (50% each), while pyelonephritis was confirmed predominantly microbiologically (66.7%) with a smaller proportion of radiological orientation (33.3%). Overall, clinical confirmation represented 46.55% of cases, followed by radiological (32.77%) and microbiological methods (20.68%), highlighting variability in diagnostic approaches depending on the type of infection.

3.3.2 Antibiotic Therapy: Empirical antibiotic therapy was initiated in 53 patients (91.4%), while five patients (8.6%) did not receive antibiotics. These cases included viral infections (e.g., chickenpox), as well as patients managed with symptomatic treatment alone or those not treated prior to referral to other departments. Regarding the therapeutic regimen, monotherapy was the predominant approach, used in 29 patients (50.0%). Dual therapy was prescribed in 18 patients (31.0%), and triple-combination therapy was employed in six patients (10.3%), typically reflecting the management of severe or polymicrobial infections. The regimen distribution is shown in Table 14.

Table 14. Antibiotic Therapy Regimen Distribution (n=58)

Antibiotic Therapy Regimen	n	%
No antibiotic therapy	5	8.6
Monotherapy	29	50.0
Dual therapy	18	31.0
Triple therapy	6	10.3
Total	58	100.0

Among antibiotic classes, penicillins were the most widely used, prescribed in 22 patients (37.9%), followed by

third-generation cephalosporins (3GC) in 19 cases (32.8%) and nitroimidazoles in 13 cases (22.4%). Aminoglycosides were used in 11 patients (19.0%), most commonly as adjunctive antibiotic therapy in combination regimens. Fluoroquinolones were employed in nine cases (15.5%), predominantly for urinary and respiratory infections. Antifolates were used in five patients (8.6%). Other antibiotic classes, including macrolides (n=2; 3.4%), first-generation cephalosporins 1GC (n=1; 1.7%), and tetracycline (n=1; 1.7%), were prescribed in selected cases according to clinical indication. Other classes included the antiviral acyclovir, which was used in four patients (6.9%). The complete antibiotic class distribution is presented in Table 15.

Table 15. Antibiotic Classes Used in Empirical Treatment (n=58; multiple classes per patient possible)

Antibiotic Class	n	%
Penicillins	22	37.9
3GC	19	32.8
Nitroimidazoles	13	22.4
Aminoglycosides	11	19.0
Fluoroquinolones	9	15.5
Antifolates (cotrimoxazole)	5	8.6
Macrolides	2	3.4
1GC	1	1.7
Tetracycline	1	1.7

3.3.3 Symptomatic Treatment:

Symptomatic and supportive treatment was administered to 56 patients (96.6%), confirming it as a near-universal component of emergency management in this cohort. Only two patients (3.4%) did not receive any form of supportive therapy. Oxygen therapy was required in 21 patients (36.2%). underscoring the significant burden of respiratory compromise, particularly given the predominance of lower respiratory tract infections and the need for ventilatory support in a substantial proportion of cases. The 37 patients (63.8%) who did not require oxygen supplementation presented with preserved respiratory function or infectious foci outside the respiratory system.

3.3.4 Length of Stay, Outcome, and Hospitalization Department:

Length of Stay in the ED: LOS in the ED varied considerably across the cohort, ranging from one hour to 120 hours. reflecting the wide spectrum of clinical acuity encountered. The distribution was bimodal, with two dominant peaks: 14 patients (24.1%) had a LOS of one hour, corresponding to cases that were rapidly assessed and either discharged or transferred, and 23 patients (39.7%) had a LOS of 24 hours, representing the largest single group and likely reflecting observation periods pending diagnosis confirmation or inpatient bed allocation. The remaining patients had intermediate or prolonged stays, with nine patients (15.5%) remaining in the ED for 48 hours or more, including two patients with a LOS of 120 hours. Overall, more than half of the cohort (58.6%) required a stay exceeding 24 hours, underscoring the complexity of IDs management in the emergency setting and the frequent need for extended monitoring prior to definitive disposition.

Patient Outcome and Hospitalization Department: At the conclusion of their ED encounter, 34 patients (58.6%) were hospitalized for further inpatient management, representing the majority of the cohort. Nineteen patients (32.8%) were discharged directly from the ED following initial stabilization and treatment initiation. Five patients (8.6%) died during their ED course, highlighting the life-threatening potential of the infectious presentations managed in this setting. Among the 34 patients who were hospitalized, the pulmonology ward received the greatest number of admissions (n=16; 27.6% of the total cohort), consistent with the high proportion of lower respiratory tract infections. The IDs ward admitted 15 patients (25.9%), and the Intensive Care Unit (ICU) received three patients (5.2%), reflecting the subset of critically ill cases requiring organ support beyond emergency-level care. Patient outcomes and the distribution of admission departments are presented in Table 16

Table 16. Patient Outcomes and The distribution of admission departments (n=58)

Patient Disposition / Outcome	n	%
Discharge	19	32.8
Hospitalization (total)	34	58.6
- ID ward	15	25.9
- Pulmonology ward	16	27.6
- ICU	3	5.2
Death (in-ED)	5	8.6
Total	58	100.0

4. DISCUSSION:

4.1. Overall Incidence of Medical ID:

Over the five-month study period, medical IDs accounted for 58 of the 18,206 adult patients admitted to the ED of HML, corresponding to a global incidence of 0.32% (95% CI: 0.24–0.41%). This result places our study in a specific epidemiological context that requires careful interpretation before comparison with existing data. An extensive review of the published literature reveals that no study has, to date, specifically calculated the incidence of strictly medical IDs, that is, explicitly excluding all surgical infectious conditions, trauma-related infections, and nosocomial infections as a proportion of total adult ED admissions. All availab le studies that have quantified the burden of IDs in the ED have used broader definitions. The German EpiSEP study reported that ID encompassing infection, sepsis, and septic shock across all causes without the exclusion of surgical infections accounted ***for 19.3% of all adult ED presentations during a two-month prospective period [2]. A retrospective cohort study from Thailand focusing on elderly patients (≥65 years) documented that IDs represented 14.5% of all elderly ED visits [12] all without applying the restrictive surgical exclusion criterion that defines the present study. To our knowledge, this is the first prospective study to specifically evaluate the incidence of strictly medical IDs in the ED. As a result, direct numerical comparison with previously published data is not possible. The observed very low incidence of 0.32% should be interpreted in light of several contributing factors rather than a true absence of infectious pathology. First, and

most directly, the deliberate exclusion of all surgical infectious conditions (such as appendicitis, peritonitis, and obstructive cholangitis) and of all inter-facility transferred cases significantly reduces the number of eligible cases. Second, the denominator of 18,206 encompasses the totality of adult and pediatric ED visits, encompassing a wide variety of non-infectious emergencies such as trauma, cardiovascular events, neurological disorders, and metabolic decompensations, which inevitably dilutes the proportion of IDs. Third, local healthcare utilization patterns may play an important role; in the Laghouat region, patients with mild or moderate infections are more likely to consult primary healthcare facilities, private clinics, or informal care providers rather than presenting directly to the hospital ED . Fourth, the five-month window represents a seasonal snapshot and may not capture the full annualized incidence of infections with marked seasonal clustering. Fifth and finally, limited microbiological confirmation may have contributed to under-recognition or misclassification of certain infectious presentations under non-infectious diagnostic categories, particularly in elderly patients with atypical clinical presentations. Overall, the observed incidence of 0.32% is best interpreted as a result of study design, case definition, and healthcare organization rather than a true reflection of community prevalence. It likely underestimates the actual burden of medical IDs in the region, highlighting the strong influence of healthcare-seeking behavior and inclusion criteria on epidemiological estimates in emergency settings.

4.2. Clinical Profile

4.2.1. Distribution by Infectious Site and Epidemiological Exposure: The distribution of infectious foci in our cohort followed a pattern broadly consistent with internationally reported ED infectious disease profiles, yet with notable local specificities reflecting the epidemiological, agro-ecological, and public health contexts of the Laghouat region. Lower respiratory tract infections (LRTIs) constituted the predominant infectious category, accounting for 31.0% of all presentations and encompassing CAP (n=14; 24.1%), pleuritis (n=3; 5.2%), and pyopneumothorax (n=1; 1.7%), a predominance robustly corroborated by the international literature, in which the respiratory tract was the most frequently identified infectious focus in the German EpiSEP cohort (35% overall, rising to 43.6% and 61.9% in sepsis and septic shock cases, respectively) [2] ; pneumonia alone accounted for 32.6% of infectious diagnoses in a Thai retrospective cohort of elderly ED patients [12], and it has been identified as the most frequent single infectious diagnosis across multiple ED-based studies, representing up to 45% of cases [2]. Beyond their numerical predominance, the severity spectrum captured within this category, ranging from uncomplicated CAP to pyopneumothorax, anticipates the pattern of high-acuity presentations that characterizes the remainder of our cohort. Indeed, systemic infections collectively constituted the second most prevalent category (n=14; 24.1%), and within this group, sepsis (n=3; 5.2%) and septic shock (n=4; 6.9%), whose combined proportion of 12.1% is consistent with the EpiSEP study's finding of sepsis in 30% of infectious ED cases [2], reflect a substantial

burden of life-threatening presentations, a burden that is arguably amplified in our setting given that, unlike EpiSEP, which examined a broader ED population, our cohort was restricted exclusively to infectious cases, thereby underscoring the critical role of the ED in the early recognition and management of high-risk patients in resource-limited contexts where delays in care may worsen outcomes. Alongside these severity-defined entities, the same systemic category also encompassed infections with specific epidemiological determinants, brucellosis (n=3; 5.2%) and measles (n=4; 6.9%), whose presence is not incidental but reflects the particular agro-pastoral and public health character of the Laghouat region: Brucellosis accounted for 5.2% (n=3) of all infectious presentations in our cohort, a proportion consistent with the sustained national burden documented by the INSP Annual Epidemiological Report (REM) 2024 [13], which recorded a national incidence of 20.61 cases per 100,000 inhabitants in 2024, confirming that brucellosis remains one of the most prevalent notified zoonoses in Algeria despite a slight decrease from 21.31 per 100,000 in 2023, while measles accounted for 6.9% (n = 4) of all infectious presentations in our cohort. At the national level, the INSP Annual Epidemiological Report (REM) 2024 recorded a slight increase in measles incidence from 0.98 to 1.12 cases per 100,000 inhabitants in 2024 [13] confirming persistent active circulation across Algeria despite national vaccination programs, a trend directly reflected in our cohort, where absent or uncertain vaccination status was documented in all four cases. This is fully consistent with international data showing that 65–96% of measles cases occur in unvaccinated or vaccination-status-unknown individuals [14,15] and that adults aged 15 years and older constitute 53% of cases during resurgence periods [14], a demographic shift consistently documented across Belgian [14], China [16] outbreak series driven by accumulated immunity gaps and signals an urgent need for targeted adult catch-up vaccination campaigns at the regional level. Shifting from systemic to anatomically localised presentations, upper respiratory tract infections (URTIs), comprising pharyngotonsillitis (n=9) and sinusitis (n=1), accounted for 17.2% of presentations, slightly exceeding the 14.0% reported for ENT infections in EpiSEP [2] and consistent with findings from the Irish EDAD multicenter study in which ENT infections constituted one of the three dominant categories driving antibiotic prescriptions at emergency discharge [17] a modest excess most plausibly attributable to seasonal recruitment bias and healthcare-seeking patterns directing URTIs to the ED rather than primary care, compounded by the exclusion of pediatric cases which may have concentrated adult ENT presentations requiring emergency evaluation; while URTIs thus represent a numerically significant and recurring component of infectious disease activity, their clinical weight must also be considered alongside their antibiotic stewardship implications, a dimension equally relevant to gastrointestinal presentations, which represented exclusively by acute gastroenteritis (n=5) and accounting for 8.6% of presentations, appearing lower than

the 13.0% for intra-abdominal infections in EpiSEP [2], yet this discrepancy is primarily methodological rather than epidemiological, as our study intentionally excluded surgical abdominal infections that inflate the abdominal proportions of general emergency cohorts, rendering our figure more contextually coherent when compared to the 11.0% of all ED visits attributed to gastrointestinal complaints in a US national cohort of over 565 million encounters [18]. A similar interpretive caution applies to skin and soft tissue infections (SSTIs), accounting for 6.9% (n=4) and comprising facial cellulitis, shingles, chickenpox , and cutaneous leishmaniasis, slightly below the 10.0% in EpiSEP [2] and the 7.7% SSTI prevalence in a Taiwanese nationwide hospitalized cohort [19], a difference again likely reflecting case-mix and referral selection rather than a true epidemiological deficit. The identification of cutaneous leishmaniasis within this category is geographically expected, as Algeria constitutes one of the most endemic countries for cutaneous leishmaniasis worldwide; according to the INSP Annual Epidemiological Report (REM) 2024[13], the national incidence rate of cutaneous leishmaniasis increased sharply from 15.30 to 26.76 cases per 100,000 inhabitants in 2024, confirming a significant upsurge in transmission across the country, of which the Laghouat wilaya, as an established endemic steppe focus, is an integral part, further reinforcing the regionally specific infectious profile of our cohort. In a parallel pattern of referral-driven under representation, urinary tract infections (UTIs), encompassing pyelonephritis (n=3) and cystitis (n=2), accounted for 8.6% of presentations, substantially lower than the 18.0% in EpiSEP [2] and the 27.8% reported as the leading infection focus among ED patients with sepsis or septic shock in a Colombian multicenter prospective cohort [20], a discrepancy most plausibly explained by referral pathway differences whereby uncomplicated lower UTIs are frequently managed in outpatient or primary care settings before emergency presentation, effectively filtering out the less severe end of the UTI spectrum from our cohort; conversely, central nervous system infections, represented exclusively by meningitis (n=2) and accounting for 3.4% of presentations, exceeding the 1.0% reported in EpiSEP [2], reflect the opposite dynamic, as severe CNS presentations are actively concentrated at our institution, which serves as the sole hospital in the wilaya equipped with both an infectious disease ward and an intensive care unit, positioning our ED as the primary referral center for complex and high-acuity infectious cases across the region. Taken together, the site distribution across all infectious categories in our cohort is broadly consistent with international emergency infectious disease epidemiology. The systematic comparison across infectious foci reveals that differences from international benchmarks are, in most instances, explicable by study design, referral pathway structure, and local healthcare organization rather than by true epidemiological divergence, with the meaningful exceptions of brucellosis and measles, whose excess representation reflects the irreducibly specific agro-pastoral and public health character of the Laghouat region and which distinguish this cohort

from those reported in urban European or North American centers.

4.2.2. Portal of entry (POE) determination was restricted to the clinically most relevant subgroup patients with sepsis, septic shock, facial cellulitis, and meningoencephalitis (n=10) in accordance with their therapeutic and prognostic implications. The urinary tract was the most frequently identified POE (n=5; 50%), followed by the ENT route (n=3; 30%) and the cutaneous route (n=2; 20%). Among sepsis cases specifically, the urinary tract represented the exclusive identified source (100%), while in septic shock cases, cutaneous and urinary portals were equally distributed (50% each). This distribution is fully consistent with the established epidemiology of community-acquired bacteremia: urinary-source bacteremia is the predominant form in the community setting, driven principally by uropathogenic Escherichia coli (UPEC), and is particularly prevalent in elderly patients, women, and those with structural urological abnormalities such as benign prostatic hyperplasia (BPH) [21].

4.2.3. Median age and gender distribution: The median age of the cohort was 53 years (IQR: 34.75–71), ranging from 19 to 93 years, reflecting a non-selective distribution of IDs across the adult lifespan and the role of the HML ED as the sole tertiary emergency center in Laghouat. Younger adults (notably 19-year-olds, n=4) were mainly affected by vaccine-preventable and community-acquired infections, while the elderly subgroup reflects increased vulnerability due to immunosenescence and comorbidities. This pattern is consistent with the EpiSEP cohort, which reported a mean age of 56 years [2], and with data showing high mortality in elderly infectious ED patients, such as the Thai cohort (22.7%) [12]. Gender distribution was nearly equal (51.72% female; sex ratio F/M = 1.07), consistent with what was reported. In the EpiSEP cohort, where the gender distribution was precisely equal (50% female) across 1,278 infected patients [2]. with the slight female predominance mainly explained by urinary tract infections, partially balanced by male-predominant respiratory infections.

4.2.4. Comorbidities: Comorbidities were frequent in the cohort, highlighting the strong link between chronic diseases and susceptibility to infection. Diabetes mellitus was the most common (n=12; 20.7%), exceeding its estimated prevalence in the general Algerian adult population (12–15%), and was mainly associated with more severe infections such as pneumonia, pyelonephritis, and sepsis. This aligns with the Surviving Sepsis Campaign (SSC 2021 guidelines)[22], which emphasizes that diabetes may blunt typical inflammatory responses, requiring a lower threshold for sepsis evaluation. Immunocompromised status was identified in five patients (8.6%), including malignancy, chemotherapy, and corticosteroid use. Immunocompromised patients exhibit attenuated or dysregulated inflammatory responses that may mask classic signs of infection, delay diagnosis, and predispose them to opportunistic pathogens. The identification of Candida albicans from a urinary sample in a septic shock patient raises the question of an immunocompromised background

facilitating fungal dissemination, a finding that warrants systematic immune status evaluation in all future septic shock presentations. CLD was present in four patients (6.9%), mainly in pneumonia and pleuritis, consistent with its known role in increasing susceptibility to lower respiratory tract infections due to impaired airway clearance.

4.2.5. The symptom profile of the cohort was dominated by non-specific presentations, with general clinical deterioration (GCD) being the most frequent complaint (n=14; 24.1%), followed by fever (n=11; 19.0%) and dyspnea (n=7; 12.1%). The predominance of GCD over fever highlights the diagnostic challenge of infectious diseases in elderly and polymorbid patients, where atypical presentations such as functional decline or altered mental status are common rather than focal symptoms. This aligns with evidence showing that around one-third of older ED patients present atypically, with the absence of fever being the most frequent pattern (34.42%), particularly in complicated UTI and dementia cases [23]. In our cohort, the low proportion of fever reinforces this phenomenon and supports maintaining a high index of suspicion for infection even in its absence, especially in vulnerable populations, where atypical presentations are a known source of diagnostic delay [24]. Dyspnea, 12.1%, was consistent with the high burden of lower respiratory tract infections in the cohort.

4.2.6. Biological Inflammatory Profile : Inflammatory biomarkers were assessed in our cohort to evaluate the prevalence of inflammatory syndrome. The following parameters were analyzed: CRP, WBC count, and hemoglobin. The high rate of positive CRP observed in our cohort (81.3% of valid cases, (n=39/48) suggests that the majority of patients were experiencing an active inflammatory or infectious process at the time of admission. The WBC results further support this finding, with 44% of patients (n=22/50) presenting with hyperleukocytosis, reflecting the bone marrow's response to systemic inflammation through increased white blood cell mobilization [25]. The 14% leukopenia rate (n=7/50) may reflect either an overwhelming infection depleting white cell reserves or an underlying immune suppression [26]. The relatively low anemia rate (12%, n=6/50) suggests that inflammatory activity had not yet progressed enough to significantly impair erythropoiesis in most patients; however, a moderate but significant association between hemoglobin and serum CRP has been identified in hospitalized patients, confirming the known link between intense inflammation and the development of anemia [27]. A recent study on hospitalized patients with acute infections found that elevated CRP was present in up to 89.86% of cases on admission, while leukocytosis was observed in only 23.2% [28], a pattern similarly reflected in our data, where CRP positivity was more prevalent than hyperleukocytosis. Regarding the overall prevalence of biological inflammatory syndrome, defined by at least a positive CRP, 39 out of 58 patients (67.2%) met the criteria, while the remaining 19 patients (32.8%) showed no biological evidence of active inflammation. This means roughly two-thirds of the cohort

were experiencing an active inflammatory process at admission, while one-third appeared biologically non-inflammatory. Studies conducted on large cohorts of hospitalized adults have confirmed that elevated CRP is a widespread finding across a range of acute illnesses [29], supporting the interpretation that the high positivity rate in our sample reflects the general inflammatory burden typically seen in hospital settings.

4.2.7. Microbiological investigations were performed in 19 of 58 patients (32.8%), with a low overall positivity rate of 6.9% (n=4). Identified pathogens included Escherichia coli (UCBE in pyelonephritis), Klebsiella pneumoniae (UCBU in sepsis), Candida albicans (UCBU in septic shock), and polymicrobial flora (suspected contamination). This low confirmation rate reflects major structural limitations, particularly the absence of blood culture capability at the HML ED. Since blood culture remains the gold standard for diagnosing bloodstream infections in sepsis and septic shock [30], its unavailability significantly limited definitive microbiological diagnosis. targeted therapy, and antimicrobial de-escalation, as emphasized in SSC 2021 guidelines[22]. Comparatively, the European Sepsis Care Survey reported that even in high-income settings, 89.6% of laboratories have time-restricted rather than 24-hour blood culture access [31], highlighting a global but more severe gap in this resource-limited context. The identification of E. coli aligns with its known role as the leading cause of community-acquired UTIs (75–80%) [21], while K. pneumoniae raises concern for possible ESBL-producing strains associated with increased morbidity and mortality in North African regions [32]. The detection of Candida albicans in septic shock requires careful interpretation to distinguish colonization from invasive infection, particularly in immunocompromised patients. The severity of infection was assessed using qSOFA, CRB-65, and NEWS2. For qSOFA (available in 54 patients), 18.52% (n=10) scored ≥2, indicating high risk of sepsis-related organ dysfunction. This is clinically relevant as Sepsis-3 data associate qSOFA ≥2 with ~24% in-hospital mortality and a 3–14-fold increase in mortality risk compared with lower scores [33] , although its limited sensitivity (~19.5–33%) reduces its utility as a standalone screening tool [34]. These findings support its use only as part of a multimodal assessment strategy. For pneumonia patients (n=13), CRB-65 showed that 46.15% (n=6) had scores ≥2, indicating moderate to very high severity requiring admission, while severity ranged up to a score of 4, consistent with reported mortality gradients of 2.40% (score 0), 13.43% (1–2), and 34.39% (3–4) [11]. This aligns with SPILF/SPLF 2024 guidelines recommending CRB-65 for site-of-care decisions [35] . NEWS2 demonstrated the widest severity range (0–17), with 30.77% scoring 0 and several patients reaching very high scores (5–17), reflecting marked physiological deterioration. Evidence from large ED cohorts shows NEWS2 outperforms qSOFA and MEWS in predicting mortality and ICU admission in infectious patients [36] and is superior to qSOFA for detecting sepsis with organ

dysfunction [37]. These findings support implementing NEWS2 as a primary triage tool at HML with escalation at NEWS2 ≥ 5.

*MEWS: Modified Early Warning Score (MEWS) is a clinical tool (0–14 points) used to identify high-risk patients based on five vital signs, though its predictive accuracy for mortality varies significantly depending on the specific site of infection [36].

4.3. Management:

4.3.1. Complementary Examinations: A chest X-ray was the most frequently obtained modality (n=34; 58.6%), consistent with the predominance of lower respiratory tract infections. CT scanning was performed in 21 patients (36.2%) , ultrasound in 10 (17.2%) , lumbar puncture in five (8.6%), UCBE in seven (12.07%) , and MRI in two (3.4%) . These proportions reflect appropriate modality selection guided by the suspected infectious site. The timing of examinations relative to antibiotic initiation was not systematically documented. Whether blood cultures, urine cultures, lumbar puncture, and other microbiological investigations were obtained before or after the first antibiotic dose could not be determined from the available data. This is clinically significant: a single dose of antibiotics can reduce blood culture sensitivity by up to 40%, and cerebrospinal fluid (CSF) culture sensitivity in bacterial meningitis is substantially reduced within hours of antibiotic initiation. The SSC 2021 guidelines[22] explicitly recommend obtaining blood cultures before initiating antibiotics, provided this does not delay treatment beyond 45 minutes in sepsis. The WHO 2024 meningitis guidelines similarly advocate for pre-antibiotic CSF and blood cultures whenever feasible. The inability to verify adherence to these recommendations directly reflects insufficient documentation practice in the ED registers and represents a methodological and clinical quality gap that must be prospectively corrected through standardised timestamped case report forms in future studies.

4.3.2 Antibiotic Therapy and Appropriateness of Disposition Decisions: Empirical antibiotic therapy was initiated in 53 patients (91.4%). The five untreated patients (8.6%) all represented appropriate non-antibiotic management decisions. Two cases of brucellosis were confirmed serologically and referred directly to the ID department for treatment initiation. The case of cutaneous leishmaniasis was confirmed through parasitological examination and clinical assessment and was similarly referred to the ID department, as no antibiotic indication existed. The case of measles was referred to the ID department for managed initiation of treatment. Chickenpox was managed with acyclovir. Among the 53 treated patients, monotherapy was the predominant regimen (n=29; 50.0%), followed by dual therapy (n=18; 31.0%) and triple therapy (n=6; 10.3%), the latter reserved for the most severe presentations. Time from ED presentation to first antibiotic dose was not documented for any patient, preventing evaluation against the SSC 2021 time-to-antibiotic benchmarks [22] , one of the most critical management quality indicators in sepsis, septic shock, and bacterial meningitis. This constraint is addressed in the limitations section. The following evaluates empirical antibiotic

selection for all 17 diagnosed entities against applicable international guidelines:

1. Pneumonia (n=14): According to the 2025 SPILF/SPLF [35] updated recommendations, empirical antibiotic therapy in CAP is stratified by severity and comorbidity profile. In non-severe CAP without comorbidity, amoxicillin monotherapy remains the first-line treatment. In non-severe CAP with comorbidity defined per Tableau 3 of the Guidelines as conditions including severe COPD, chronic heart failure, hepatic or renal insufficiency, immunosuppression, active neoplasia, and chronic alcoholism, among others, amoxicillin-clavulanate or parenteral third-generation cephalosporin 3GC is recommended. In severe CAP, dual therapy associating a parenteral 3GC with a macrolide constitutes the standard regimen, with levofloxacin reserved exclusively for documented beta-lactam or macrolide allergy. Combination therapy is not recommended in non-severe CAP, where monotherapy is the rule. It is worth noting that the IDSA/ATS 2019 guidelines[38] differ from SPILF/SPLF on one relevant point: diabetes mellitus is explicitly recognized by IDSA as a comorbidity warranting broader empirical coverage, a position not reflected in the SPILF/SPLF 2025 Tableau 3 . This distinction carries clinical relevance for the diabetic patients in this series and introduces interpretive nuance when benchmarking against either guideline set. A clinically relevant divergence exists between SPILF/SPLF 2025 and the IDSA/ATS 2019 guidelines regarding diabetes mellitus: While IDSA explicitly recognizes diabetes as a comorbidity warranting broader empirical coverage, this condition does not appear in the SPILF/SPLF 2025 Tableau 3 . This distinction carries direct interpretive consequences for two cases in this series. Among the 14 CAP cases analyzed, antibiotic appropriateness was evaluated across three clinical categories defined by severity and comorbidity profile, yielding the following overall results: one case was fully appropriate (7.1%), two cases were in a guideline-dependent grey zone (14.3%), and 11 cases were clearly inappropriate (78.6%).

Category 1: Non-severe CAP without comorbidity (n=3): One patient (33.3%) received amoxicillin monotherapy, fully concordant with the 2025 SPILF/SPLF first-line recommendation. The remaining two cases (66.7%) were non-compliant. The first received dual therapy associating penicillin with a fluoroquinolone, an unjustified combination in this clinical context, where monotherapy is explicitly recommended, and fluoroquinolone use is restricted to documented beta-lactam allergy. The second received penicillin combined with an aminoglycoside, a combination entirely unsupported in CAP empirical management: aminoglycosides carry no guideline recommendation in this indication given their poor lung tissue penetration. nephrotoxicity profile, and absence of evidence for efficacy against the predominant CAP pathogens.

Category 2 Non-severe CAP with comorbidity (n=7): Two cases warrant separate discussion. Both patients presented with diabetes mellitus as their sole comorbidity and received penicillin

monotherapy. Per SPILF/SPLF 2025, which does not include diabetes in its comorbidity list, this management is technically concordant and would not mandate spectrum escalation. However, per IDSA/ATS 2019 guidelines, diabetes constitutes a recognized comorbidity requiring broader empirical coverage, rendering the same regimen insufficient. These two cases are therefore classified as guideline-dependent. grey zone (14.3% of total series), reflecting a genuine international discordance rather than a clear prescribing error. This ambiguity itself warrants prospective clarification in future local protocols. The remaining five cases in this category were all clearly inappropriate (71.4% of the category, 35.7% of the total series). The first received penicillin combined with metronidazole even in the context of suspected aspiration pneumonia. where anaerobic coverage may be considered; this combination is incorrect, as metronidazole requires pairing with a broad-spectrum agent covering typical CAP pathogens. The appropriate regimen in this context would be amoxicillin-clavulanate monotherapy, which inherently provides anaerobic coverage, or 3GC combined with metronidazole. The second received plain penicillin monotherapy in a comorbid patient for whom amoxicillin-clavulanate or parenteral 3GC was indicated, representing insufficient spectrum escalation. The third received metronidazole monotherapy, a critical prescribing error, as metronidazole as a sole agent provides no coverage of typical or atypical CAP pathogens and carries no empirical justification in this setting, even when aspiration is suspected. The fourth and fifth cases both received 3GC combined with a fluoroquinolone: while 3GC is appropriate, the addition of a fluoroquinolone constitutes unjustified dual therapy in non-severe disease and an unsupported substitution in the absence of a documented macrolide contraindication or confirmed Legionella suspicion.

Category 3 Severe CAP with comorbidity: (n=4): All four cases (100%) received non-concordant antibiotic regimens. The 2025 SPILF/SPLF guidelines are unambiguous. The first case received 3GC combined with a fluoroquinolone rather than a macrolide; while the 3GC component is appropriate, fluoroquinolone substitution for the macrolide partner is not guideline-endorsed in the absence of a documented contraindication, and evidence suggests that the immunomodulatory properties of macrolides contribute independently to outcomes in severe CAP beyond their antimicrobial activity. The second and third cases received 3GC monotherapy, omitting the mandatory macrolide component and constituting incomplete regimens in a severity stratum where dual therapy is strongly supported. The fourth case received fluoroquinolone monotherapy in the complete absence of a documented beta-lactam or macrolide allergy, the most significant deviation observed in this category, providing neither the preferred beta-lactam backbone nor the synergistic benefit of the recommended combination. Overall, antibiotic therapy was fully concordant with the 2025 SPILF/SPLF recommendations in one of 14 cases (7.1%), fell into a guideline-dependent grey zone in two cases (14.3%), and was clearly inappropriate in 11 cases (78.6%). The deviations spanned all severity categories

and encompassed insufficient spectrum in comorbid patients, incomplete dual therapy in severe disease, unjustified combination regimens in non-severe cases, and the use of molecules, aminoglycosides, and metronidazole monotherapy, carrying no established role in CAP empirical management. These findings reflect a systemic gap between local prescribing practice and current evidence-based recommendations, underscoring the need for antibiotic stewardship programs, structured prescriber education, and guideline-based clinical decision support tools in practice. Disposition appropriateness in CAP cases in the ED: Among the 14 CAP cases, disposition was appropriate in eight patients (57.1%), who were correctly admitted to the pneumology unit according to their CRB-65 score. One patient (7.1%) was hospitalized despite a CRB-65 of 0 and no documented modifying factors, representing an inappropriate admission. Two patients, (14.3%), with CRB-65 = 3 were admitted to the pneumology unit, despite meeting ICU admission criteria, constituted undertriage likely related to ICU unavailability, though it was nonconcordant with guidelines regardless. Two patients (14.3%) died in the ED after 24 hours without ICU transfer despite high severity scores, representing the most critical disposition failures of the series. In one case (7.1%) could not be evaluated due to insufficient clinical documentation precluding severity assessment. Overall, disposition was appropriate in 57.1%, inappropriate in 35.7%, and non-evaluable in 7.1% of cases, with undertriage as the dominant failure pattern.

2. Pharyngotonsillitis (n=9): Per HAS/SPILF 2024 guidelines [35], antibiotic therapy in adult pharyngotonsillitis is indicated only when bacterial etiology is confirmed or strongly suspected, ideally through a positive rapid antigen detection test (RADT) for Group A Streptococcus. First-line therapy is amoxicillin 1 g twice daily for six days; macrolides are acceptable solely in documented penicillin allergy; 3GC is not recommended. Given that approximately 90% of adult pharyngotonsillitis is viral, empirical antibiotic prescribing without RADT confirmation represents a major antibiotic stewardship concern. In our cohort, drug class selection was appropriate in all nine cases: penicillin monotherapy (n=8; 88.9%) is fully concordant with first-line recommendations, and macrolide monotherapy (n=1; 11.1%) is acceptable as a penicillin allergy alternative. However, RADT documentation was absent across all nine cases. The indication for antibiotic Therapy itself, therefore, could not be validated, and systematic prescribing in the absence of microbiological confirmation raises the possibility of significant overtreatment in a clinical entity where viral etiology predominates. This represents a critical antibiotic stewardship gap independent of drug class appropriateness. All nine patients were discharged from the ED, which is appropriate given that pharyngotonsillitis is managed exclusively on an outpatient basis in the absence of complications. Per HAS/SPILF 2024, no systematic follow-up is required; reassessment is indicated only in cases of clinical worsening or failure to improve within 48 to 72 hours.

3. Brucellosis (n=3): According to the Algerian Instruction N°07 of April 2nd, 2018 [39] , first-line treatment for acute brucellosis is Doxycycline 200 mg/day for six weeks combined with Gentamicin 80 mg IM twice daily for 7–14 days with second and third-line alternatives available. One patient received this combination, fully concordant with the guideline's first-line recommendation; however, two patients received no antibiotic therapy at the ED level and were referred directly to the ID department for treatment initiation. While specialist-supervised initiation is appropriate, the Algerian instruction is explicit that treatment must be promptly initiated upon diagnosis, given the established risk of progression toward serious focal complications. This deferral therefore represents a gap in ED management concordance. All three patients were hospitalized in the ID department, fully consistent with the instructions. recommendations for specialist supervision and long-term follow-up.

4. Cystitis (n=2): The analysis of both clinical cases according to SPILF/HAS 2026 guidelines [21] reveals major non-conformities. In the first case, a 27-year-old woman with no risk factors presenting with simple acute cystitis was treated with penicillin monotherapy, whereas single-dose fosfomycin-trometamol is the recommended first-line agent; the antibiotic conformity rate is, therefore, 0%, given that Escherichia coli resistance to amoxicillin reaches approximately 46% in community-acquired infections. Ambulatory management was fully appropriate, 100%. In the second case, a 60-year-old diabetic male diagnosed with cystitis at risk of complications was treated with injectable 3GC and hospitalized, representing multiple nonconformities: diabetes is explicitly not recognized as a risk factor for complications under current guidelines, and the recommended probabilistic first-line therapy was nitrofurantoin for seven days, with 3GC reserved for severe or complicated infections. antibiotic conformity rate: 0%. Hospitalization in the absence of any validated criterion (severe sepsis, vomiting, or diagnostic uncertainty) was equally unjustified (0%). Overall, both cases reflect a global antibiotic conformity rate of 0%, underscoring the need for stronger adherence to current ID guidelines.

5. Pyelonephritis (n=3): Among the three pyelonephritis cases in our cohort, all achieved a guideline-concordant conformity rate of 100%. According to SPILF/HAS [21] recommendations, first-line probabilistic therapy relies on fluoroquinolones or parenteral 3GC (ceftriaxone), with the choice guided by prior antibiotic exposure and disease severity. In our series, one patient received fluoroquinolone monotherapy, and two received 3GC monotherapy, both regimens fully consistent with current guidelines. The microbiological identification of E. coli in one case further supports the appropriateness of these empirical choices for community-acquired uropathogens.

6. Bacterial meningoencephalitis (BME) with an unidentified organism (n=2): Among the two cases in our cohort, both hospitalized in the ID department, management was fully

guideline-concordant. In Algeria, bacterial BME management follows the national Ministry of Health instructions 2023 [40], which are consistent with both SPILF 2018/2019 recommendations and WHO 2025 guidelines, all converging on the same empirical strategy. First-line therapy relies on parenteral 3GC at meningeal doses, with amoxicillin added when Listeria Monocytogenes cannot be excluded, nor can acyclovir when herpetic meningoencephalitis remains in the differential. Patient 2 received 3GC plus acyclovir fully concordantly, with 100% conformity. Patient 1 received 3GC combined with amoxicillin, an aminoglycoside, and acyclovir. The instructions endorse gentamicin alongside amoxicillin when Listeria is documented or strongly suspected, rendering this regimen appropriate, provided Listeria was part of the clinical suspicion confirmation. 100%. Hospitalization in an ID unit for both cases was fully justified, given that BME is a neurological emergency requiring close monitoring, IV antibiotic administration, and rapid management of potential complications such as raised intracranial pressure, seizures, and septic shock. Both patients had a favorable clinical outcome under inpatient care, supporting the appropriateness of the setting and regimens chosen.

7/8. Sepsis & Septic Shock (n=7): The SSC 2021 guidelines [22] recommend broad-spectrum empirical antibiotics within one hour for septic shock and within three hours for sepsis, with blood cultures obtained beforehand whenever feasible and mandatory daily de-escalation once culture results are available. Multidrug broad-spectrum regimens are favored, with a beta-lactam backbone as the universally recommended cornerstone of empirical therapy. Among sepsis cases, two patients received 3GC + nitroimidazole + aminoglycoside fully concordantly, and one received 3GC + 1GC, an irrational combination, as 1GC's spectrum is entirely subsumed by 3GC, adding drug exposure without any meaningful broadening of coverage. Among septic shock cases, Patients 1 and 3 (3GC-based triple therapy) were fully concordant; Patient 2 lacked a beta-lactam backbone, representing suboptimal Gram-positive coverage; and Patient 4 (penicillin + aminoglycoside) failed to provide the broad Gram-negative coverage mandated by SSC 2021. Additionally, Candida albicans identified in one septic shock patient warranted empirical echinocandin consideration; its absence represents a critical management gap. Across all seven cases, blood cultures were not obtained, precluding bacteremic confirmation and susceptibility-guided de-escalation, a major gap regardless of antibiotic appropriateness. Overall antibiotic conformity: 67% for sepsis and 50% for septic shock. Regarding outcomes, the correlation between antibiotic appropriateness and clinical course was striking. In sepsis, where antibiotic concordance was present in the majority of cases, all three patients had a favorable outcome, with one managed in the ID department and two in the ICU, suggesting that guideline-concordant empirical therapy contributed to clinical stabilization. In septic shock, where two of four regimens were suboptimal, three patients died in the ED

with a length of stay ranging from 24 to 72 hours. While only one patient survived with ICU admission, this is consistent with evidence that inappropriate or delayed empirical therapy is among the strongest independent predictors of mortality in septic shock . These findings underscore the critical importance of both antibiotic appropriateness and early blood culture collection in determining patient outcomes.

9. Gastroenteritis (n=5): The IDSA 2017 guidelines [41] specify that antibiotic therapy is not routinely recommended for acute gastroenteritis in immunocompetent adults, as most cases are self-limiting. Antibiotics are reserved for fever with bloody diarrhea, documented susceptible bacterial pathogens, traveler's diarrhea, or immunocompromised patients. All five patients, presenting in the context of a collective foodborne poisoning event, received nitroimidazole combined with cotrimoxazole, providing anaerobic, protozoal, and Shigella-directed coverage. While the foodborne outbreak context increases the prior probability of a bacterial aetiology, justifying some degree of empirical treatment, the universal antibiotic prescription of all five cases without individual stool culture confirmation or severity stratification is not fully concordant with IDSA 2017 stewardship principles . Stool culture and susceptibility testing should be performed before empirical therapy, particularly in patients with fever or bloody diarrhea, to guide targeted antibiotic use and avoid unnecessary broad-spectrum exposure . Antibiotic choice conformity is considered partially concordant and contextually defensible but microbiologically unsupported. Regarding outcome, all five patients were discharged with ambulatory treatment and had a favorable clinical evolution, consistent with the self-limiting nature of most community-acquired gastroenteritis episodes and supporting the appropriateness of the outpatient management setting.

10/11. Pleuritis and Pyopneumothorax(n=4) : The AATS 2017 consensus guidelines recommend parenteral 3GC (ceftriaxone) combined with metronidazole or aminopenicillin with a beta-lactamase inhibitor as empirical first-line therapy for community-acquired pleural infection. targeting both Gram-positive aerobes and anaerobes [42]. Anti-anaerobic coverage is specifically recommended as part of empirical therapy, even when only aerobic pathogens are identified. None of the four cases achieved full guideline concordance; the recommended 3GC + metronidazole combination was not used in any case. The two patients receiving 3GC monotherapy lacked anaerobic coverage; the patient receiving penicillin + aminoglycoside had streptococcal coverage but no anaerobic cover, and aminoglycosides are explicitly contraindicated in pleural infection due to poor pleural fluid penetration; the patient receiving nitroimidazole + penicillin had anaerobic and streptococcal coverage but lacked Gram-negative coverage. Overall antibiotic conformity: 0%. All four patients were hospitalized in the pneumology department, which was fully appropriate given the severity of pleural infection, requiring inpatient monitoring, drainage assessment, and parenteral antibiotic

administration. Future practice should systematically implement 3GC + metronidazole as the empirical standard for community-acquired pleural infection.

12. Measles (n=3): Measles is a highly contagious viral illness for which no approved antiviral therapy exists; management is entirely supportive, with antibiotics reserved exclusively for documented bacterial superinfections such as pneumonia [43]. Vitamin A supplementation is recommended given its role in reducing complication severity. One patient received no antibiotic therapy fully appropriate in the absence of bacterial complications. The remaining three patients all presented with radiologically confirmed pneumonia, justifying antibiotic initiation as treatment for documented bacterial superinfection, rendering the decision to treat concordant with guidelines. However, the choice of regimens warrants scrutiny: 3GC monotherapy (n=2) is appropriate for community-acquired bacterial pneumonia complicating measles, while the fluoroquinolone combined with aminoglycoside (n=1) lacks a beta-lactam backbone and represents a suboptimal regimen for this indication. Overall antibiotic initiation conformity: 100%; antibiotic choice conformity: 67%. All four patients were appropriately hospitalized in the ID department for airborne isolation, supportive care, and monitoring. Single-room isolation and airborne isolation are essential in the hospital setting to prevent nosocomial transmission; these were, however, not systematically applied at the ED level in our cohort, representing a gap in protocol adherence.

13. Facial Cellulitis (n=1): The IDSA 2014 guideline [44] recommends antibiotic therapy targeting streptococci for typical non-purulent cellulitis, with suitable agents including penicillin, amoxicillin, amoxicillin-clavulanate, dicloxacillin, cephalexin, or clindamycin. In the absence of systemic signs, non-purulent cellulitis may be managed on an outpatient basis with oral streptococcal-targeted therapy. The patient received penicillin combined with nitroimidazole: the penicillin component is fully appropriate, while the nitroimidazole addition is not guideline-concordant for standard non-necrotizing facial cellulitis, adding unnecessary anaerobic coverage in the absence of a documented odontogenic origin or deep space infection. Antibiotic conformity is, therefore, considered partially concordant. The ambulatory management with oral therapy was fully appropriate and consistent with IDSA 2014 recommendations, and the patient had a favorable outcome, supporting the adequacy of the outpatient setting for non-complicated facial cellulitis.

14. Chickenpox (n=1) : According to recommendations from SPILF [45], antiviral therapy (acyclovir or valacyclovir) is indicated in adults due to the higher risk of complications, while antibiotics are reserved only for documented bacterial superinfection. In this case, management with antiviral therapy alone was fully appropriate and consistent with antimicrobial stewardship principles. The decision to hospitalize the patient in the ID department likely reflects the adult age and potential severity of chickenpox, rather than treatment inadequacy. Notably, airborne and

contact precautions were not systematically implemented at the ED level, potentially contributing to nosocomial transmission within our cohort. This underscores the critical importance of early clinical recognition at triage and prompt isolation from the first patient contact.

15. Shingles (Herpes Zoster) (n=1): Guidelines from SPILF [46] recommend early antiviral therapy (valacyclovir or acyclovir) within 72 hours, with no indication for antibiotic therapy in uncomplicated cases. In this case, the antiviral treatment was appropriate and guideline-concordant. However, the addition of a macrolide was unnecessary, as it has no activity against VZV, representing inappropriate antibiotic use. The outpatient management is consistent with the typically benign course of uncomplicated herpes zoster.

16. Sinusitis (n=1) Recommendations from AAOHNS [47] and SPILF support either watchful waiting or first-line treatment with amoxicillin (± clavulanate) for acute bacterial rhinosinusitis. The use of penicillin monotherapy in this case can be considered broadly acceptable, although amoxicillin is preferred due to better pharmacokinetic properties and evidence. The favorable outcome with ambulatory management aligns with the generally mild nature of uncomplicated sinusitis.

17. Cutaneous Leishmaniasis (n=1): Management of cutaneous leishmaniasis relies on antiparasitic therapies, with no role for antibiotics in the absence of bacterial superinfection, as highlighted in Ministerial Instruction N°06 of October 16, 2011[48] relating to the Conduct of Treatment of Cutaneous Leishmaniasis. The absence of antibiotic therapy in the single case of this study was therefore fully appropriate. Hospitalization in the ID department was fully appropriate as it ensured specialist supervision, proper administration of antimonate de meglumine, and close monitoring for potential drug toxicity.

4.3.3. Length of stay: The ED length of stay (LOS) ranged from 1 to 120 hours, with a bimodal distribution: 14 patients (24.1%) had a LOS of 1 hour (rapid assessment and early discharge or transfer), and 23 patients (39.7%) had a LOS of 24 hours, the largest single cluster, likely reflecting observation periods pending diagnostic confirmation or inpatient bed availability. Over half the cohort, 58.6%, had a LOS exceeding 24 hours, reflecting the complexity of ID management in the ED and the frequent need for extended monitoring prior to definitive disposition. Prolonged ED stays exceeding 48 hours are associated with an increased risk of nosocomial infection (n=9; 15.5%), including two patients with 120-hour stays. This may reflect boarding secondary to inpatient bed unavailability rather than ongoing active management, reflecting a failure in patient flow management at our institution.

3.4. Overall Outcomes and Mortality: At the conclusion of the ED encounter, 34 patients (58.6%) were hospitalized, 19 (32.8%) were discharged with ambulatory treatment, and five (8.6%) died during their ED course. The in-ED mortality of 8.6% is clinically significant: published data document ED infectious disease mortality

ranging from 4.8% in hemodynamically stable presentations to substantially higher figures in septic shock. The five in-ED deaths were concentrated within the highest-severity subset (qSOFA ≥ 2, NEWS2 ≥ 5). The hospitalization rate of 58.6% is consistent with the 61.8% rate reported in the Thai elderly ED ID cohort [19] .

5. Limitations: This study has several limitations. The absence of antibiotic timing data precluded evaluation of compliance with SSC "time-to-antibiotic" targets. The unavailability of blood culture facilities was a major structural limitation, preventing bacteremia confirmation and antimicrobial de-escalation. The single-center design limits generalizability across Algeria's heterogeneous ED contexts. The five-month observation period introduces potential seasonal bias. Missing severity score data and the extremely low 6.9% microbiological confirmation rate restrict the robustness of the analysis. Finally, incomplete vaccination documentation among patients with vaccine-preventable infections limited the public health interpretation of these cases.

6. Conclusion:

To our knowledge, this is the first prospective study dedicated solely to medical ID in an Algerian ED, yielding a global incidence of 0.32%, a figure best understood as a product of study design and local healthcare-seeking behavior rather than a true reflection of community burden. Lower respiratory tract infections predominated, with CAP as the leading single diagnosis, while the concurrent presence of brucellosis and measles as recurrent emergency presentations reflects the irreducibly specific agro-pastoral and public health character of the Laghouat region, signaling sustained endemic transmission and accumulated vaccination gaps that demand reinforced surveillance and catch-up immunization. Severity was substantial across the cohort, with 18.5% of patients meeting high sepsis-risk criteria and an in-ED mortality rate. The high mortality, frequent guideline deviations, and complex presentations reveal major gaps in microbiological capacity, antimicrobial stewardship, and severity-based triage, supporting the need for a dedicated infectious diseases emergency unit at HML to improve evidence-based care in resource-limited settings.

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