Results: Docking simulations showed strong binding for both forms: -4.8 kcal/mol for the apoenzyme and -5.2 kcal/mol for the holoenzyme. In both states, NAC interacted with a conserved set of residues. Shared interactions included hydrogen bonds with His219 and Asp360, and salt bridges with His134, His136, His219, and His272. In the apoenzyme, a specific hydrogen bond with His246 was observed, whereas in the holoenzyme, NAC formed additional hydrogen bonds with Ala363 and metal coordination with Ni^{2+} ions, absent in the apo form. Despite these subtle differences, the interaction core was highly conserved. Multiple sequence alignment of 438 urease sequences from *Klebsiella* clinical isolates confirmed that all interacting residues are highly conserved across the genus, indicating functional and structural robustness of the NAC binding interface.

Conclusion: These results indicate that NAC has the potential to interact with conserved urease residues, although full inhibition may depend on enzymatic maturation and the presence of metal ions. This binding potential supports the repositioning of NAC as an anti-virulence compound against infections caused by multidrug-resistant *Klebsiella* spp.

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ANALYSIS OF *IN VITRO* ACTIVITY OF CEFTAZIDIME-AVIBACTAM AGAINST CLINICAL ISOLATES OF *PSEUDOMONAS AERUGINOSA* COLLECTED FROM BRAZILIAN CENTERS FOR THE ATLAS SURVEILLANCE PROGRAM, 2018-2023

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Introduction: *Pseudomonas aeruginosa* is a pathogen that causes severe infections that are difficult to treat, as this bacterium can express multiple resistance mechanisms, in addition to its intrinsically limited susceptibility to many antibiotics. In this study, the *in vitro* activity of ceftazidime-avibactam was evaluated against clinical isolates of *P. aeruginosa*, both carbapenemase-producing and non-producing, collected as part of the global ATLAS surveillance program.

Methods: A total of 1239 non-duplicate *P. aeruginosa* isolates were evaluated, collected from different infection sites in hospitals across Brazil between 2018 and 2023. Susceptibility testing was performed using broth microdilution. The antimicrobial susceptibility profile was analyzed according to the breakpoints established by BrCAST (2025). The search for carbapenemase-encoding genes was performed by PCR followed by sequencing. Results Ceftazidime-avibactam (90.0% susceptible; MIC50/90, 2.0/8.0 mg/L) and colistin (99.8% susceptible; MIC50/90, 1.0/1.0 mg/L) were the antibiotics with the best *in vitro* activity. Approximately 70% of isolates tested for imipenem, cefepime, ceftazidime, and piperacillin-tazobactam were classified as susceptible with increased exposure, according to BrCAST criteria (range 68.7% to 74.5%). Susceptibility to ceftolozane-tazobactam was 84.3% (MIC50/90, 1.0/32.0 mg/L), but this antibiotic was evaluated in only 949/1239 isolates. Resistance gene screening was performed on 153 isolates, of which 17 (11%) were blaKPC-2 producers (4 also coproduced blaGES-1). The beta-lactamases found in 22 (18%) of the 123 ceftazidime-avibactam resistant *P. aeruginosa* isolates were: NDM-1 (n = 5), KPC-2 (n = 5), VIM-2 (n = 5), SPM-1 (n = 1), SPM-1+GES-1 (n = 1), IMP-16 (n = 1), IMP-56 (n = 1), KPC-2+GES-1 (n = 1), NDM-1+VEB-9 (n = 1), and NDM-1+VEB-14 (n = 1).

Conclusion: The results demonstrated that both ceftazidime-avibactam and ceftolozane-tazobactam maintain excellent *in vitro* activity (> 80%) against clinical isolates of *P. aeruginosa*. Although the presence of carbapenemases was relatively low among the isolates studied, ceftazidime-avibactam was 5 times more potent (MIC90) compared to ceftolozane-tazobactam, which may be partly explained by the presence of these beta-lactamases identified in the evaluated isolates.

Keywords: Bacterial resistance, Metallo-β-lactamases, Carbapenemases, KPC, Gram-negatives.

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ANALYSIS OF PHARMACEUTICAL INTERVENTIONS IN ANTIMICROBIALS AFTER IMPLEMENTATION OF A CLINICAL PHARMACIST SPECIALIZED IN THE ANTIMICROBIAL STEWARDSHIP PROGRAM

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Introduction: Inappropriate use of antimicrobials is a global challenge and contributes to increased microbial resistance and clinical complications. Effective management of these drugs is essential to optimize treatment and preserve the efficacy of antimicrobials. Antimicrobial Stewardship Programs (ASP) aim to ensure the appropriate use of antimicrobials (ATM) and achieve better clinical and microbiological outcomes, and several studies demonstrate the essential role of the clinical pharmacist in this context. Our objective was to evaluate pharmaceutical interventions in antimicrobials after the implementation of a clinical pharmacist dedicated to the ASP and specialized in infectious diseases.

Methods: A retrospective and quantitative analysis of pharmaceutical interventions in antimicrobials was conducted in the years 2023, 2024, and the first quarter of 2025. Data were collected monthly, recording the reasons for interventions, total number and monthly average of interventions, and the adherence rate of medical teams.

Results: Among the three main reasons for pharmacotherapeutic interventions were duration of therapy, dose, and indication. In 2023, 3,353 interventions were recorded, with a monthly average of 279 and an adherence rate of 74.7%. In 2024, the total number of interventions increased to 4,298, with a monthly average of 358 and an adherence rate of 81.1%. In the first quarter of 2025, 1,389 interventions were performed, resulting in a monthly average of 463 and an adherence rate of 88.3%. These data demonstrate an increase over time in both the number of monthly interventions and the adherence of medical teams.

Conclusion: The implementation of a specialist clinical pharmacist dedicated to antimicrobial management resulted in a substantial increase in pharmacotherapeutic interventions and in the adherence of medical teams. These results indicate that the presence of a professional specialized in the Antimicrobial Stewardship Program is essential to improve clinical practice and promote the appropriate use of antimicrobials, contributing to the fight against microbial resistance. Continuity and expansion of this model are recommended to further optimize clinical outcomes and patient safety.

Keywords: Antimicrobial stewardship program, Clinical pharmacist, Pharmacotherapeutic interventions.

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ANALYSIS OF PHARMACEUTICAL INTERVENTIONS IN THE ANTIMICROBIAL STEWARDSHIP PROGRAM BEFORE AND DURING THE COVID-19 PANDEMIC IN A PRIVATE HOSPITAL IN FORTALEZA, CEARÁ

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Introduction/Objective: Rational use of antimicrobials is essential to control bacterial resistance, especially during pandemics. The Antimicrobial Stewardship Program (ASP) uses pharmaceutical interventions (PI) to optimize treatments and ensure safe use. This study analyzed PI before and during the COVID-19 pandemic in a private hospital in Ceará, highlighting types of interventions, acceptance rates, and factors associated with physician adherence.

Methods: Retrospective observational study analyzing ASP data from 2018 to 2021 in a private hospital in Ceará, via a supplementary health operator. The following PI were assessed: reduction of treatment duration, oral sequential therapy, de-escalation, and class switching. Additionally, dose adjustment and exposure optimization were evaluated, practices already performed by the pharmacy team and incorporated into the ASP from 2020 onward. The study was approved by the Ethics Committee of the Institute of Health and Hospital Management (CAAE 20508519.4.0000.5684).

Results: A total of 7,422 PI were performed, with an overall acceptance of 62.75%. Before the pandemic, acceptance was 69.23%, dropping to 57.91% during COVID-19. Reduction of treatment duration, the most frequent PI (93%), had decreased acceptability from 73.49% to 57.92%, possibly due to staff overload, prolonged treatments, and concerns about the new disease. Oral sequential therapy increased acceptance (27.20% to 54.29%), likely due to the need for early discharge. De-escalation had higher adherence during the pandemic (67.39%), reflecting confidence in narrowing antibiotic spectrum based on culture results and clinical improvement. Class switching improved (25% to 55.81%), mainly due to replacing teicoplanin with vancomycin according to protocols. Aggregated interventions such as dose adjustment and exposure optimization maintained adherence above 80%, indicating physician confidence in clinical pharmacy.

Conclusion: ASP pharmaceutical interventions had good physician adherence, despite decreased acceptance during the pandemic. Ongoing persuasive strategies, collaboration between medical staff and management, and strengthening clinical pharmacy are essential to improve the program. This study reinforces the importance of maintaining structured programs for the rational and safe use of antimicrobials, especially during health crises.

Keywords: Antimicrobial stewardship, Pharmaceutical interventions, Acceptance rate, COVID-19.

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ANALYSIS OF THE RAPID CARBAPENEMASE IDENTIFICATION TEST IN A PUBLIC TERTIARY HOSPITAL IN SÃO PAULO CITY

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Bacterial resistance is a global problem with serious consequences: increased mortality, prolonged hospitalizations, higher rates of surgical site infection, and increased costs. We monitor resistance profiles for epidemiological assessment, guidance of targeted antimicrobial therapies, and identification of new strains. Rapid *in vitro* multiplex immunoassays exist for phenotypic detection and differentiation of five carbapenemase families (KPC, OXA-48-like, VIM, IMP, and NDM) directly from bacterial colonies. NG-Test Carba 5 is a rapid *in vitro* multiplex immunoassay (≤ 15 min) for phenotypic detection and differentiation of these five common carbapenemase families produced by *Enterobacteriales* and *Pseudomonas*. Tests were performed in the laboratory from August 2024 to March 2025. Sixty strains were tested (49 *Enterobacteriales* and 11 *Pseudomonas aeruginosa*) resistant to carbapenems identified by Vitek MS Prime (Biomerieux), selecting the carbapenem-resistant bacteria. NG-Test Carba 5 was used to identify the enzyme responsible for the resistance