the interventions and improved pathogen susceptibility profiles.

Conclusion: Rationalizing antimicrobial use proved to be an effective strategy for reducing microbial resistance and improving patient safety. Daily interactions with care teams contributed to more appropriate therapeutic decisions, directly reducing antimicrobial consumption and controlling multidrug-resistant strains. Strengthening stewardship programs should be a priority in healthcare institutions.

Keywords: Antimicrobials, Microbial resistance, Patient safety, Rational prescription, Stewardship program.

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COST REDUCTION AND RESOURCE OPTIMIZATION: ECONOMIC EVALUATION OF AN ANTIMICROBIAL PROGRAM IN AN INFECTIOUS DISEASES HOSPITAL

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Introduction/Objective: The Antimicrobial Management Program (AMP) is an institutional strategy aimed at optimizing antimicrobial use in healthcare services, ensuring therapeutic efficacy, reducing adverse events associated with inappropriate use, preventing the selection of resistant microorganisms, and lowering unnecessary healthcare costs. In an infectious diseases hospital, patients often require intensive and prolonged antimicrobial use, making this setting particularly vulnerable to resistant bacteria and high expenditures on costly therapies. This study aimed to analyze the economic impact of the AMP on antimicrobial treatment costs in an infectious diseases hospital.

Methods: This is a descriptive and retrospective study based on AMP monitoring data collected in 2024 in a tertiary hospital specializing in infectious diseases. Information was obtained from program performance indicators, including planned versus actual antimicrobial expenditure and adherence to clinical stewardship interventions. The study was approved under protocol number 7.423.682 and CAAE 85396524.8.0000.5044.

Results: In 2024, projected antimicrobial expenditures were estimated at R$590,626.48. Through AMP intervention strategies, actual spending totaled R$298,503.35, resulting in direct savings of R$292,123.13 and an optimization rate of 50.54%. These results were achieved through interdisciplinary clinical audits, early treatment reassessments, and promotion of responsible use of broad-spectrum antimicrobials. The program also had a positive clinical impact, with infection cure rates of up to 27% in some months and hospital mortality rates below 26% among monitored patients.

Conclusion: The AMP proved effective in reducing antimicrobial expenditures in an infectious diseases hospital without compromising clinical outcomes. The savings of over R$290,000 in a single year demonstrate the strategy's economic potential, particularly in high-complexity settings. Strengthening such initiatives is essential for the sustainability of healthcare systems and the fight against antimicrobial resistance.

Keywords: Stewardship, Antimicrobials, Bacterial resistance.

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RELATIONSHIP BETWEEN KPC PRODUCTION AND SENSITIVITY PROFILE TO POLYMYXINS, AMINOGLYCOSIDES, AND CEFTAZIDIME-AVIBACTAM IN A PUBLIC TERTIARY HOSPITAL IN SÃO PAULO

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Bacterial resistance is a global problem with serious consequences: increased mortality, prolonged hospitalizations, higher surgical site infection rates, and elevated costs. Resistance monitoring allows epidemiological assessment, targeted antimicrobial therapy, and detection of new strains. Rapid immunoassay-based multiplex tests are available for phenotypic detection and differentiation of five carbapenemase families (KPC, OXA-48-like, VIM, IMP, and NDM) directly from bacterial colonies. The NG-Test Carba 5® is a rapid (≤ 15 min) *in vitro* multiplex immunoassay for the phenotypic detection and differentiation of these common carbapenemase families produced by Enterobacterales and *Pseudomonas*. Tests were performed between August 2024 and March 2025. Sixty carbapenem-resistant strains (49 Enterobacterales and 11 *Pseudomonas aeruginosa*) identified by Vitek MS Prime® (BioMérieux) were tested using NG-Test Carba 5® to identify the resistance mechanism. Among Enterobacterales, 42 (70%) were KPC-producing, including 40 (95.24%) *Klebsiella pneumoniae*: 14 (35%) were sensitive to polymyxins, 27 (67%) to amikacin, 10 (25%) to gentamicin, and 21 (52.2%) to ceftazidime-avibactam. Two (4.76%) *Escherichia coli* isolates were both sensitive to polymyxin and gentamicin, one sensitive to amikacin, and the single isolate tested for ceftazidime-avibactam was sensitive. Beta-lactamases of the KPC, IMP, VIM, NDM, and OXA-48 types are the main enzymes produced by Enterobacterales that confer carbapenem resistance. A 2022 study showed that 77% of *K. pneumoniae* isolates were carbapenem-resistant due to KPC production, with polymyxin resistance at 29.5% and amikacin resistance at 19.6%. Strains resistant to these antimicrobials often have mutations in enzyme-coding alleles, mainly due to clinical antimicrobial

use. This technology enables monitoring of resistance enzyme emergence and correlation between enzyme production and cross-resistance among antimicrobial classes.

Keywords: Bacterial resistance, NG-Test Carba 5, Rapid carbapenemase test.

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EVOLUTIONARILY CONSERVED CATALYTIC RESIDUES IN UREASES FROM CLINICAL *PSEUDOMONAS* SPP. ISOLATES ARE IMPORTANT FOR INHIBITION BY ACETOHYDROXAMIC ACID

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Introduction: The genus *Pseudomonas* includes opportunistic pathogens frequently exhibiting multidrug resistance and involved in hospital infections, in which urease remains an unexplored therapeutic target for virulence attenuation. Urease is a nickel-dependent metalloenzyme that catalyzes the hydrolysis of urea into ammonia and carbon dioxide, contributing to bacterial adaptation through environmental pH increase. Acetohydroxamic acid (AHA) is a well-characterized reversible urease inhibitor, approved in some countries for treating chronic urinary tract infections.

Objective: This study evaluated the binding of AHA to immature (apoenzyme) and mature (holoenzyme) forms of urease from clinical *Pseudomonas* spp. isolates.

Methods: Structural models were generated using AlphaFold3 (apoenzyme) and modified with AlphaFill (holoenzyme) for nickel ion insertion. Docking was performed using AutoDock Vina, and interactions were analyzed structurally in ChimeraX (v1.10). Interactions with AHA and with urease's natural substrate, urea, were analyzed.

Results: Docking simulations revealed similar binding affinities for AHA in both forms, −4.3 kcal/mol (apoenzyme) and −4.4 kcal/mol (holoenzyme); and for urea, −3.9 and −4.1 kcal/mol, respectively. In both cases, AHA interacted with a conserved set of catalytic residues, including His218, His245, His359, and Ala362. In the apoenzyme, AHA also interacted via hydrogen bonds with His133 and His135, while in the holoenzyme it established additional interactions with His271, KCX (carboxylated lysine), and coordinated with both nickel ions. Although AHA interacted with catalytic residues in both forms, stronger interactions were observed through metal coordination with Ni in the holoenzyme.

Conclusion: These findings reinforce the potential of AHA as a broad-spectrum urease inhibitor and highlight the need for further studies on its use in infections caused by *Pseudomonas*, beyond current therapeutic indications for urinary and gastric infections caused by *Proteus mirabilis* and *Helicobacter pylori*.

Keywords: Carboxylated lysine, Acetohydroxamic acid, *Pseudomonas* spp., Urease.

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CARBAPENEM RESISTANCE IN *KLEBSIELLA PNEUMONIAE*: EVIDENCE OF COMMUNITY DISSEMINATION IN CONCÓRDIA (SC) – 2023/2024

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Introduction/Objective: *Klebsiella pneumoniae* is a Gram-negative bacterium capable of causing severe infections, particularly in hospital settings. Although it is part of the normal microbiota, its dissemination and antibiotic resistance represent major challenges for treatment and public health. The increasing resistance to antimicrobials, especially carbapenems, poses significant difficulties in clinical practice. This study aimed to analyze the prevalence and carbapenem resistance profile of *K. pneumoniae* isolates from a clinical laboratory in Concórdia, Santa Catarina (SC), emphasizing cases in non-hospitalized patients.

Methods: A retrospective analysis was performed on 1,932 positive bacterial cultures (2023–2024) from a clinical laboratory in Concórdia (SC). Identification of *K. pneumoniae* was conducted using standard microbiological methods. Carbapenem susceptibility (ertapenem, meropenem, imipenem) was assessed by disk diffusion, with confirmation by MIC testing when indicated, following BrCAST 2023 criteria. Qualitative or quantitative cultures were used depending on sample type. Confidence intervals were calculated using the Wilson method.

Results: Among the 1,932 bacterial cultures analyzed, 217 (11.2%; 95% CI 9.8–12.7%) were identified as *K. pneumoniae*, consistent with national estimates (10–15%). Of these, 13 isolates (6.0%; 95% CI 3.2–9.9%) exhibited carbapenem resistance, all from outpatient samples, suggesting potential community dissemination of this resistance mechanism.

Conclusion: The data highlight an alarming emergence of carbapenem-resistant *K. pneumoniae* among ambulatory patients, indicating probable community spread. This phenomenon underscores the urgent need for continuous surveillance and integrated infection-control strategies to preserve antimicrobial effectiveness and safeguard public health. A multidisciplinary approach is essential to mitigate the propagation of resistance and ensure effective therapeutic options for infections caused by this pathogen.