

## What do Emergency physicians think about the implementation of the Antibiotic Stewardship Program (PROA) in a Secondary-Level Hospital?

### ¿Qué opinan los médicos de urgencias sobre el programa de optimización de tratamiento antibiótico (PROA) en un hospital de segundo nivel?

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where they encounter the greatest difficulties in prescribing.

We conducted a survey among ED physicians at *Hospital Universitario Fundación Alcorcón* (Alcorcón, Spain) a second-level hospital with 400 structural beds. The ED manages 240 medical emergencies per day and has 34 attending physicians. It is organized into 2 pathways: one for surgery and traumatology and another for medical conditions, according to the Manchester Triage System. Patients awaiting admission remain in intermediate or high-acuity care pathways.

The ASP in our ED was initiated in May 2019. Daily recommendations are made regarding antibiotic prescribing in patients admitted to intermediate- and high-acuity medical pathways. The ASP team is multidisciplinary and consists of an infectious disease specialist, a microbiologist, and a pharmacist. From Monday through Friday, in the morning, health records, additional tests, and cultures of patients receiving antibiotic treatment are reviewed to provide recommendations. Empirical treatment is considered inappropriate when it does not comply with the hospital's clinical guidelines. Recommendations are communicated individually to the prescribing physician in a non-impositional manner, both verbally and in writing. In addition, training sessions are conducted and specific clinical protocols are developed (Supplementary data Annex 1, <https://www.reue.org/extra/60-311-1-SP.pdf>).

We conducted an anonymous, non-validated survey, with prior consent, through a Google form during November 2023. It included 24 multiple-choice questions with an option for free-text responses. Questions addressed specialty, years of experience, perception of prescribing quality, difficulties in prescribing, perception of the quality of recommendations, and ASP performance (Table 1).

The study was approved by *Hospital Universitario Fundación Alcorcón* Ethics Committee (CEIM) with reference Nos. 21/171 and 22/125.

Of the 34 physicians, 22 (64.7 %) responded to the survey; 17 (77.3 %) were specialists in Family and Community Medicine and 5 (22.7 %) in Internal Medicine, with a mean professional experience of 11.3 years. When asked about prescribing quality, 95.3 % reported prescribing antibiotics well or very well; however, less than half (43 %) reported knowing local resistance rates of common microorganisms. Regarding difficulties in prescribing, these were mainly due to rapid decision-making (63.6 %), lack of a simple guideline (45.5 %), and lack of knowledge of local epidemiology (45.5 %). Additional challenges were found in patients with prior infection or colonization by multidrug-resistant organisms (81.8 %), those with medical devices (40.9 %), and elderly patients with frequent readmissions (36.4 %). With respect to clinical syndromes, the greatest difficulties were found in endovascular (85.7

**Table 1.** Questions and answers from the survey conducted among emergency department physicians

Questions related to barriers in antibiotic prescribing [n (%)]					
How do you think you prescribe antibiotics?	Very well 1 (4.8)	Well 19 (90.5)	Poorly 1 (4.8)		
What are the main difficulties in empirical antibiotic prescribing in the ED?	Limited time and high workload 14 (60.3)	High staff turnover 1 (4.5)	Difficulty knowing local epidemiology 10 (45.5)	Lack of simple and quick reference guidelines 10 (45.5)	Other 3 (13.5)
In which patients is it most difficult to prescribe antibiotics?	Elderly with recent admissions 8 (36.4)	Patients with devices 9 (40.9)	Colonized with multidrug-resistant organisms 18 (81.8)	Septic patients 4 (18.2)	Other 2 (9)
In which clinical syndromes is antibiotic prescribing most difficult?	Urinary infection 2 (9.5)	Respiratory infection 0 (0)	Intra-abdominal infection 4 (19)	Endovascular 18 (85.7)	Other 4 (19)
Do you find it difficult to prescribe antibiotics in patients allergic to beta-lactams?	Yes 14 (63.6)	No 8 (36.4)			
Do you find it more difficult to prescribe antibiotics in septic patients requiring admission or in patients with uncomplicated infections being discharged?	Septic patients 15 (71.4)	Patients being discharged 6 (28.6)			
Which antibiotics are most difficult to use?	Beta-lactams 0 (0)	Renal-adjusted antibiotics (e.g., vancomycin) 3 (13.6)	Carbapenems 0 (0)	New antibiotics 19 (86.4)	
Is empirical or culture-guided prescribing more difficult?	Empirical 18 (87.5)	Culture-guided 3 (14.3)			
Questions related to local ecological data [n (%)]					
Do you approximately know resistance rates of common microorganisms?	Yes 12 (57.1)	No 9 (42.9)			
Questions related to patient follow-up [n (%)]					
Do you review cultures of patients discharged with antibiotics?	Yes 17 (77.3)	No 5 (22.7)			
Do you ever contact discharged patients to adjust antibiotics based on culture results?	Yes 19 (86.4)	No 3 (13.6)			
If yes, how do you contact them?	Call the patient 15 (78.9)	Refer to PCP 0 (0)	Reassess in ED 4 (21.1)		
Questions related to facilitators in antibiotic prescribing					
What could improve empirical antibiotic prescribing?	Training sessions 11 (50)	Local guidelines 17 (77.3)	Accessible resistance data 9 (40.9)	Feedback on prescribing 15 (68.2)	
Would you like to receive feedback on your prescribing?	Yes 21 (95.5)	No 1 (4.5)			
Since ASP implementation, do you think your prescribing has improved?	Yes 20 (90.9)	No 2 (9.1)			
If improved, why?	Access to microbiological results 2 (9.5)	Face-to-face advice 18 (85.5)	Training sessions 1 (4.8)	ASP not related 0 (0)	
Do you think ASP should be maintained in the ED?	Yes 22 (100)	No 0 (0)			

PCP: Primary Care Physician; ASP: Antimicrobial Stewardship Program; ED: emergency department.

%) and intra-abdominal infections (19 %). Empirical prescribing was more difficult than targeted therapy (85.7 %), and greater challenges were reported when prescribing new antibiotics (86.4 %). In terms of areas for improvement, most physicians expressed a desire for feedback on their prescribing (68.2 %) and access to quick and accessible local guidelines (77.3 %). A total of 91 % believed that the ASP had improved their prescribing, mainly due to face-to-face advisory support (85.7 %). All

respondents (100 %) wished the ASP to be maintained. The most valued aspects were accessibility, in-person interaction, and the presence of a qualified multidisciplinary team that explained its decisions.

Despite growing interest in implementing ASPs in EDs, there is limited evidence on the best quantitative indicators to measure their activity,<sup>8</sup> and even fewer data on qualitative indicators such as physician opinions.

Most available studies come from

different health care settings, such as Indonesia<sup>9</sup> or Australia.<sup>10</sup> In Spain, a 2015 study by Monclús Cols *et al.*<sup>11</sup> aimed to identify barriers in antibiotic prescribing and administration but was not conducted within a specific ASP for EDs. Therefore, we believe that our findings provide relevant insight.

The survey was conducted 4 years after ASP implementation in the ED, during which improvement in the appropriateness of empirical antibiotic therapy increased from 50 % to 71.2

%,<sup>12</sup> which may explain the perception that antibiotics are prescribed well or very well. However, the limited knowledge of local epidemiology is notable, as previously reported in other studies,<sup>13</sup> and represents a key factor in improving antibiotic prescribing.

As reported in other studies,<sup>14</sup> ED patients are increasingly older and have more comorbidities. Our data show that prescribing antibiotics is more difficult in these patients. Unlike other studies,<sup>14</sup> ED physicians in our setting reported greater difficulty selecting antibiotics for intra-abdominal and endovascular infections.

This study has limitations: the survey was not previously validated, which may limit comparability with other studies. Additionally, it was conducted in a single center with a small sample size and potential response bias. These limitations suggest the need for future multicenter qualitative studies.

Finally, perhaps the most relevant finding is that most physicians believe the ASP has improved their prescribing and highly value elements highlighted in the literature,<sup>15</sup> such as feedback, development of local guidelines, accessibility, in-person interaction, and the expertise of the ASP team.

In conclusion, ASPs are perceived as a useful tool to improve antibiotic prescribing among ED physicians. Understanding their perspectives provides valuable insight to further improve prescribing practices through the development of quick-reference guidelines, training in clinical syndromes, management of complex patients, and use of new antimicrobials.

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## REFERENCES

1. Papadimitriou-Olivgeris M, Marangos M, Christofidou M, Fligou F, Bartzavali C, Panteli ES, et al. Risk factors for infection and predictors of mortality among patients with KPC-producing *Klebsiella pneumoniae* bloodstream infections in the intensive care unit. *Scand J Infect Dis*. 2014;46:642-8.
2. Browne K, Chakraborty S, Chen R, Willcox MD, Black DS, Walsh WR, et al. A New Era of Antibiotics: The Clinical Potential of Antimicrobial Peptides. *Int J Mol Sci*. 2020;21:7047.
3. Ohnuma T, Chihara S, Costin B, Treggiari MM, Bartz RR, Raghunathan K, et al. Association of Appropriate Empirical Antimicrobial Therapy With In-Hospital Mortality in Patients With Bloodstream Infections in the US. *JAMA Netw Open*. 2023;6:e2249353.
4. Patel J, Harant A, Fernandes G, Mwamelo AJ, Hein W, Dekker D, et al. Measuring the global response to antimicrobial resistance, 2020-21: a systematic governance analysis of 114 countries. *Lancet Infect Dis*. 2023;23:706-18.
5. Rodriguez-Baño J, Paño-Pardo JR, Alva-

rez-Rocha L, Asensio A, Calbo E, Cercenado E, et al. Programas de optimización de uso de antimicrobianos (PROA) en hospitales españoles: documento de consenso GEIH-SEIMC, SEFH y SEMSPH. *Enferm Infecc Microbiol Clin*. 2012;30:22.e1-22.e23.

6. Oltra Hostalet F, Núñez-Núñez M, Portillo Cano MDM, Navarro Bustos C, Rodríguez-Bañó J, Retamar Gentil P. Analysis of quality antimicrobial agent use in the emergency department of a tertiary care hospital. *Emergencias*. 2018;30:297-302.
7. May L, Cosgrove S, L'Archeveque M, Talan DA, Payne P, Jordan J, et al. A call to action for antimicrobial stewardship in the emergency department: approaches and strategies. *Ann Emerg Med*. 2013;62:69-77.e2.
8. Ruiz Ramos J, Santolaya Perrín MR, González Del Castillo J, Candel FJ, Quirós AM, López-Contreras González J, et al. Design of a panel of indicators for antibiotic stewardship programs in the Emergency Department. *Farm Hosp*. 2024;48:T57-T63.
9. Setiawan E, Cotta MO, Abdul-Aziz MH, Sosilya H, Widjanarko D, Wardhani DK, et al. Indonesian healthcare providers' perceptions and attitude on antimicrobial resistance, prescription and stewardship programs. *Future Microbiol*. 2022;17:363-75.
10. Gouloupoulos A, Rofe O, Kong D, Maclean A, O'Reilly M. Attitudes and beliefs of Australian emergency department clinicians on antimicrobial stewardship in the emergency department: A qualitative study. *Emerg Med Australas EMA*. 2019;31:787-96.
11. Monclús Cols E, Nicolás Ocejedo D, Sánchez Sánchez M, Ortega Romero M. Detección mediante encuesta de las dificultades con las que se encuentra el personal sanitario en la prescripción y administración de antibióticos en la práctica clínica diaria de un servicio de urgencias hospitalario. *Emergencias*. 2015;27:50-4.
12. Martínez la Cruz P, Moreno-Núñez L, Valverde-Canovas JF, Sanz-Márquez S, Velasco-Arribas M, Martín-Segarra O, et al. Impact of an antibiotic stewardship programme in the emergency department of a secondary hospital. *Infect Dis Now*. 2025;55:105063.
13. Ruiz Ramos J, Suárez-Lledó Grande A, Santolaya Perrín R, Caballero Requejo C, Hijazi Vega M, López Vinardell L, et al. Programas de optimización del uso de antimicrobianos en los servicios de urgencias españoles: Estudio PROA-URG. *Rev Esp Quimioter*. 2024;37:163-9.
14. Orviz E, Jerez-Fernández P, Suárez-Robles M, Ramos-Rey C, Armenteros I, Fernández-Revaldería M, et al. Estrategias para la mejora de la prescripción del tratamiento antibiótico en Urgencias. *Rev Esp Quimioter*. 2020;33:85-6.
15. Neo JRJ, Niederdeppe J, Vilemeyer O, Lau B, Demetres M, Sadatsafavi H. Evidence-Based Strategies in Using Persuasive Interventions to Optimize Antimicrobial Use in Healthcare: a Narrative Review. *J Med Syst*. 2020;44:64.