

# Impact of the Rational Antibiotic Use System on Hospital Performance at Cartagena Colombia from 2018 to 2021

Fernandez Mercado JC1, Alvis-Zakzuk NR2, Alvis Guzman N3, Iglesia R4, Angulo T4, Castañeda C4, Blanco MT4,

1 Clínica Crecer Cartagena, mutualser EPS - University of Cartagena -, Colombia, 2ALZAK Foundation, Cartagena de Indias, BOL, Colombia, 3 ALZAK Foundation- Universidad De La Costa, Barranquilla, Colombia, 4 CLINICA CRECER, CARTAGENA, Colombia

## OBJECTIVES

To describe the experience carried out with the implementation and the Impact of the Rational Antibiotic Use System on Hospital Performance, at Cartagena, Colombia from 2018 to 2021, and the progressive decrease in the consumption of control antibiotics monitored by the National Institute of Health (INS). Compared to national and departmental averages.

## METHODS

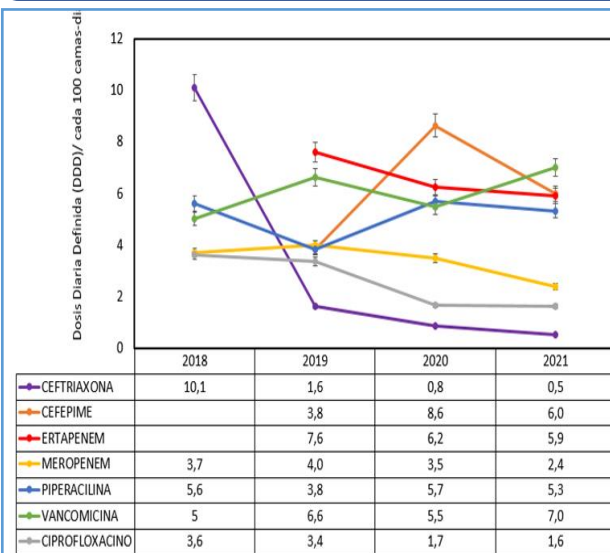
A retrospective and descriptive study was carried out. The antimicrobial application records generated from the institutional electronic medical record (Software Dinamica Gerencial) and the Control Antibiotic Consumption reports published by the INS in the periods between 2018 and 2021 were used. The methodology for measuring antibiotic consumption is carried out as proposed by the WHO, which uses the Defined Daily Dose (DDD). This was calculated with the number of DDDs between 100 days of stay. Once the DDD were determined, the consumption averages for each antibiotic were calculated by the Adult General Hospitalization service and the Adult Critical Care Unit, later the results were compared with the national and departmental averages.

## RESULTS

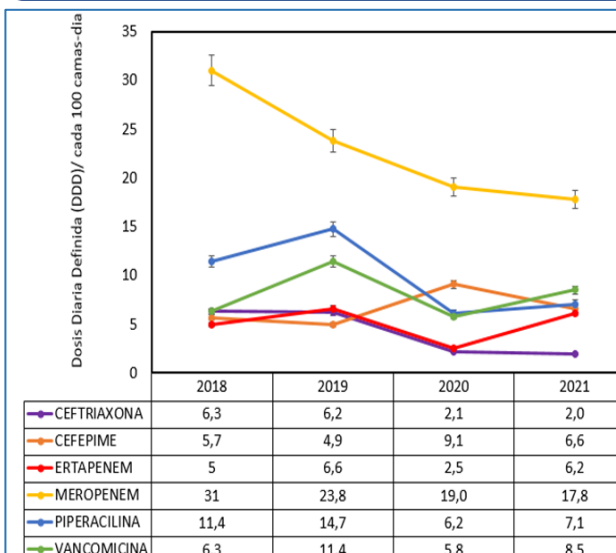
In the group of carbapenems, the reduction in the consumption of the antibiotic Meropenem between the periods 2018 and 2021 in the Adult General Hospitalization and Adult Critical Care Unit services is notable, with a reduction of 35% and 57%, respectively. Likewise, there is a significant decrease in the consumption of Ceftriaxone of 95% for the Adult General Hospitalization service and 32% for the Adult Critical Care Unit, and beta-lactams such as Piperacillin, with a 5% reduction in Adult General Hospitalization. and 62% Adult Critical Care Unit.

The results obtained from the consumption of antibiotics in the General Hospitalization service and the Adult Critical Care Unit show a percentage variation with an increasing trend in the use of fourth-generation cephalosporins such as Cefepime and glycopeptides such as Vancomycin during the pandemic. considering the clinical picture of these patients and the results of the cultures necessary 72 hours after starting treatment, due to the above, a decrease in the consumption of Cefepime of 28% was obtained between the period 2020 to 2021, going from 9.1 to 6.6 DDD/100 bed days in the Adult Critical Care Unit service and 30% from 9.6 to 6 DDD/100 bed days in the Adult General Hospitalization service.

**Figure 1. Trend in the consumption of antibiotics (DDD/100 beds-day) in Adult General Hospitalization period 2018 – 2021.**



**Figure 2. Trend in the consumption of antibiotics (DDD/100 beds-day) in the Adult Critical Care Unit for the period 2018-2021.**



| ANTIBIOTIC              |        | 2018 | 2019 | 2020 | 2021 | Percentage difference between 2018-2021 |
|-------------------------|--------|------|------|------|------|-----------------------------------------|
| Ceftriaxone             | DDD    | 10,1 | 1,6  | 0,8  | 0,5  | -95%                                    |
|                         | VP (%) | 0%   | -84% | -48% | -39% |                                         |
|                         | P.N    | 7,5  | 8,1  | 9,7  | 11,8 |                                         |
|                         | P.D    | 3,5  | 0,2  | 0,4  | 2,9  |                                         |
| Cefepime                | DDD    | 2,9  | 3,8  | 8,6  | 6    | 106%                                    |
|                         | VP (%) | 0%   | 31%  | 126% | -30% |                                         |
|                         | P.N    | N/A  | 2,1  | 3,2  | 3,1  |                                         |
|                         | P.D    | N/A  | 3    | 5,7  | 3,1  |                                         |
| Meropenem               | DDD    | 3,7  | 4    | 3,5  | 2,4  | -35%                                    |
|                         | VP (%) | 0%   | 8%   | -13% | -31% |                                         |
|                         | P.N    | 7,3  | 5    | 6,1  | 5,8  |                                         |
|                         | P.D    | 5,4  | 3,8  | 2,3  | 3,2  |                                         |
| Piperacillin-tazobactam | DDD    | 5,6  | 3,8  | 5,7  | 5,3  | -5%                                     |
|                         | VP (%) | 0%   | -32% | 50%  | -7%  |                                         |
|                         | P.N    | 6,3  | 6,8  | 9,1  | 7,5  |                                         |
|                         | P.D    | 7,5  | 4,8  | 2    | 7    |                                         |
| Ertapenem               | DDD    | 5,7  | 7,6  | 6,2  | 5,9  | 3%                                      |
|                         | VP (%) | 0%   | 33%  | -18% | -5%  |                                         |
|                         | P.N    | N/A  | 0,9  | 2,5  | 0,7  |                                         |
|                         | P.D    | N/A  | 0,8  | 2    | 0,8  |                                         |
| Vancomycin              | DDD    | 5    | 6,6  | 5,5  | 7    | 40%                                     |
|                         | VP (%) | 0%   | 32%  | -17% | 27%  |                                         |
|                         | P.N    | 4,4  | 4,4  | 7    | 5,9  |                                         |
|                         | P.D    | 4,7  | 1,8  | 2,3  | 4,2  |                                         |
| Ciprofloxacin           | DDD    | 3,6  | 3,4  | 1,7  | 1,6  | -55%                                    |
|                         | VP (%) | 0%   | -5%  | -50% | -6%  |                                         |
|                         | P.N    | 10,3 | 7,2  | 9,2  | 8,4  |                                         |
|                         | P.D    | 4,5  | 0,2  | 0,1  | 2,4  |                                         |

## CONCLUSIONS

With the implementation of this program and the optimization strategies executed, the impact on the reduction of the consumption indicators of the Defined Daily Dose in the control antibiotics monitored by INS is shown, which place us below the departmental consumption averages. and nationals. This strategy must be replicated in all health institutions as a clinical practice that improves the quality of health care.