

# IMPORTANCE OF APPROPRIATE BEFORE-AND-AFTER QUASI-EXPERIMENTAL DESIGN TO EVALUATE THE IMPACT OF ANTIMICROBIAL STEWARDSHIP PROGRAMMES: COMPARATIVE RESULTS USING STATISTICAL HYPOTHESIS TESTING OR INTERRUPTED TIME SERIES ANALYSIS

T. López Viñau Lopez<sup>1</sup>, M. Sáez-Torres de Vicente<sup>1</sup>, L. García-Martínez<sup>1</sup>, J. Hernández Parada<sup>1</sup>, G. Ruiz Arca<sup>1</sup>, A Perea Pérez<sup>1</sup>, J. Torre-Cisneros<sup>2</sup>.  
<sup>1</sup>Hospital Reina Sofía, Pharmacy unit, Córdoba, Spain. <sup>2</sup>Hospital Reina Sofía, Infectious diseases unit, Córdoba, Spain.

## Objective

To compare results of an interrupted time series analysis (ITS) versus basic statistical hypothesis testing in a before-and-after study to evaluate the impact of Antimicrobial Stewardship Programmes (ASP) on cephalosporins consumption in a tertiary university hospital.

## Quasi-experimental study

## Methods



STATISTICAL ANALYSIS  
 (R software, version 3.6.1.)

Statistical hypothesis testing

U-Mann-Whitney test  
 Mean and Standard-Deviation (SD)

Null hypothesis assumed both periods having same averages  
 $(p > 0,05)$

Study Results

Interrupted Time Series regression analysis

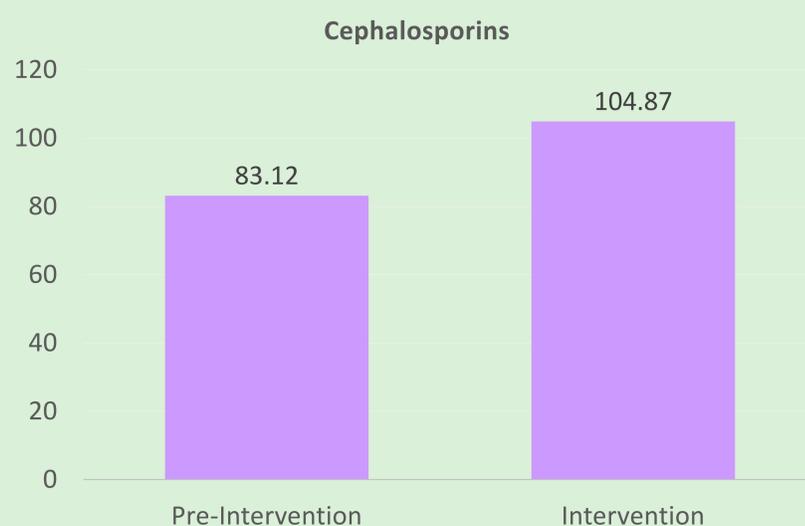
Longitudinal segmented regression (generalized least-squares)

For a time point equivalent to 2 years after ASP, relative differences between observed changes and estimated values expected in the absence of the intervention were calculated.  
 $P\text{-value} < 0.05$  (two tails) was considered significant.

Study Results

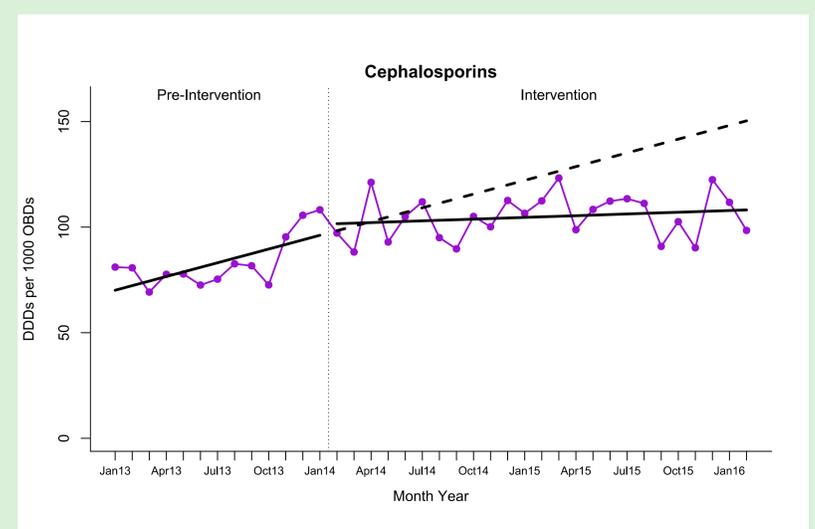
## Results

### STATISTICAL HYPOTHESIS TESTING



A significant increase ( $p < 0.001$ ) in cephalosporins consumption was shown in the intervention period.

### INTERRUPTED TIME SERIES ANALYSIS



Intervention led to a significant change in trend, moving from a pre-intervention upward slope to an almost horizontal slope. 2 years after the ASP, a significant decrease was observed in measured consumption compared to the expected of  $-28.07\%$ .

## Conclusion

- Although both quasi-experimental designs showed significant changes in cephalosporins consumption after the intervention, the interpretation of results is **contradictory**.
- While **hypothesis testing showed an increase** after the intervention, **ITS analysis** revealed that this consumption **was even less** than expected. This suggests **the programme may have been useful** in reducing the consumption of these antimicrobials.
- A **robust design** is essential in ASP, enabling appropriate interpretation of results.

