

# The importance of Vancomycin and Aminoglycoside pharmacokinetics monitoring



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TRACK 4: TOMORROW'S WORLD – The ever-expanding digital landscape

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## Introduction

According to the CDC (Centers for Disease Control and Prevention) data, there are more than 2.8 million infections every year caused by antibiotic-resistant microorganisms in the US, resulting in more than 35,000 deaths.<sup>1</sup> Antimicrobial stewardship programs comprehend a set of coordinated measures and interventions with the aim of promoting the rational use of antimicrobial agents.<sup>2</sup> Physicians, pharmacists, nurses and clinical pathologists are part of the multidisciplinary team that implement these actions. Antibiotic pharmacokinetic monitoring is an important antimicrobial stewardship tool that allows for individualized dosing regimens implementation and cost-effective use, maximizing efficacy and reducing drug-associated toxicity.

## Objectives

The purpose of monitoring the serum concentrations of antibiotics is to optimize therapeutic results and minimize the risks and adverse effects associated with medication, which may reduce the duration of therapy and in hospitalization and their associated costs.

The pharmacokinetic follow-up of patients prescribed amikacin, gentamicin and vancomycin is a practice that has been implemented for several years in our hospital. The aim of the pharmaceutical team has been the circuit optimization with ever greater communication among the several healthcare professionals involved in it.

Pharmacokinetics is an important field of intervention for the hospital pharmacist as an integral part of the multidisciplinary team. The training and awareness of health professionals on this issue are increasingly essential in order to ensure quality patient care.



## Materials and Methods

In our hospital, pharmacokinetic monitoring of amikacin, gentamicin and vancomycin is carried out using decision-making software. Recently this program was updated to PrecisePK® software. Whenever there is an electronic prescription for these antibiotics, the pharmacist monitors the serum concentrations of the drug. The patient's individual data are entered into the PrecisePK® program which will allow for the implementation of an appropriate dosage regimen. For each patient is also created a file that records patient's information such as biometric data, diagnosis and clinical analysis (Table 1). The pharmacist contacts the physician whenever it is necessary to adjust the prescription and collect serum concentrations. The nursing team is responsible for collecting samples within the stipulated time.

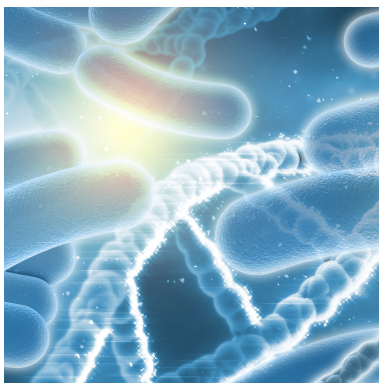
## Results

Year	Number of patients under follow-up	Acceptance Rate %
2020	245	93,3
2021	174	90,4
2022	186	95
2023 (1 <sup>ST</sup> )	44	99,5

Table 1 - Number of patients undergoing pharmacokinetic follow-up and acceptance rate of pharmaceutical interventions by physicians.

## Conclusion

- The acceptance rates of pharmaceutical interventions related to pharmacokinetics are high, showing that there is good cooperation between the team members. The purpose of implementing PrecisePK® will be to extend pharmacokinetic monitoring to other antibiotic drugs and other therapeutic classes with a narrow therapeutic range (valproic acid, phenytoin, lithium, among others).
- In order to have an effective dosage regimen individualization, it is important to promote the training of the various classes of health professionals. In addition to a general presentation that has already been held at the hospital, the pharmaceutical team has been carrying out face-to-face training in clinical services in order to raise awareness of the importance of pharmacokinetic monitoring and to reinforce the role of each health professional in this circuit.



### References

<sup>1</sup> CDC. Antibiotic Resistance Threats in the United States, 2019. Atlanta, GA: U.S. Department of Health and Human Services, CDC; 2019.

<sup>2</sup> UptoDate, accessed on 15.04.23