

# Performance of the Clinical and Hospital Pharmacy in the Management of Antimicrobial Use in Public Hospital of DF

## Atuação da Farmácia Clínica e Hospitalar no Gerenciamento do Uso de Antimicrobianos em Hospital Público do DF

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### RESUMO

**Objetivo:** Definir fluxos de trabalho multidisciplinares para padronização do serviço. Definição do elenco de medicamentos a ser monitorado e estudar resultados preliminares. **Métodos:** Criação de grupo de trabalho e tabulação dos dados em planilhas Excel<sup>®</sup> com as principais intervenções executadas em fevereiro/2019. **Resultados:** Observou-se que 35% dos tratamentos foram mantidos conforme prescrição inicial. 18% tiveram a duração de tratamento reduzida e 9% não foram autorizados pela CCIH devido a inconformidades. Também foi feita a correção de dose para função renal em 8% das prescrições. Calculou-se o valor do tratamento/dia para cada antimicrobiano. As intervenções descritas representam uma economia direta de R\$ 1905,08 reais. Não foram contabilizadas as despesas com materiais médico-hospitalares, transporte/logística e recursos humanos. O percentual de intervenções da farmácia clínica ocorre principalmente na etapa de prescrição devido ao rastreio pela dose individualizada. Também foram realizadas intervenções nas etapas de preparo, diluição e estabilidade. Reações adversas foram detectadas, notificadas e monitoradas devido a necessidade de manejo clínico. **Conclusões:** Este trabalho demonstra a economia financeira gerada pela atuação da equipe multidisciplinar e também reforça a necessidade de ampliação dos serviços farmacêuticos clínicos e logísticos, já que o trabalho no controle de dispensação individualizado associado a intervenções clínicas são mais eficazes. A complexidade do processo exige monitorização interdisciplinar em todas as etapas do tratamento visando a segurança do paciente.

**Descritores:** Antimicrobianos; Gerenciamento; Intervenção Farmacêutica.

### ABSTRACT

**Objective:** Define multidisciplinary protocols for service standardization. Definition of the list of drugs to be monitored and study preliminary results. **Methods:** Creation of a working group and tabulation of the data in Excel<sup>®</sup> with the main interventions executed in February / 2019. **Results:** It was observed that 35% of the treatments were maintained according to the initial prescription. 18% had a reduced treatment duration and 9% were not authorized by CCIH due to nonconformities. Dose correction for renal function was also performed in 8% of prescriptions. The interventions described represent a direct savings of R \$ 1905.08. The expenses with medical-hospital materials, transport / logistics and human resources were not accounted for. The percentage of clinical pharmacy interventions occurs mainly at the prescription stage due to individualized dose screening. **Conclusions:** This work demonstrates the financial economy generated by the multidisciplinary team and also confirm the need for expansion of clinical and logistic pharmaceutical services.

**Descriptors:** Antimicrobial; Management; Pharmaceutical Intervention.

ORIGINAL

## Introduction

The inappropriate and excessive use of antimicrobials led to increase in health costs, just like microbial resistance. In developing countries, indiscriminate prescription is enhanced by ease of availability of medicines and poorly controlled advertising. Consequently, leading to the worsening of infectious diseases, adverse reactions and longer time of hospitalization.<sup>1</sup>

The Hospital Regional de Samambaia (HRSam) is part of the SUS / DF network and has 131 beds, whose 20 are ICU. It also offers first aid, medical clinic, gynecology / maternity services and has the district reference center for hernia and cholecystectomy surgeries.

Hospital pharmacy services are performed for 24 hours a day and the drug dispensing system provides Individualized dose to 83 beds, with an expansion planned to 100% of beds. The creation of multidisciplinary teams and education programs for health professionals are necessary strategies to strengthen control actions in the rational use of medicines. Pharmacists have a fundamental role in this process since they perform a prior analysis of the prescription, make interventions to solve problems and also dispensing antimicrobials.

In order to control the irrational use of antimicrobials, SES DF issued a technical note establishing standards and routines in an interdisciplinary way and in conjunction with the CCIH, Pharmacy and Laboratory of Microbiology.<sup>2</sup> Based on these guidelines and guidelines of ANVISA, the Hospital Regional de Samambaia established internal measures to carry out antimicrobial management.

## Objectives

- Set the cast of antibiotics monitored in hospital environment
- Establish workflows and interdisciplinary measures to manage the use of antimicrobials.
- Evaluate preliminary results about antimicrobial prescriptions taken in 2019 February.

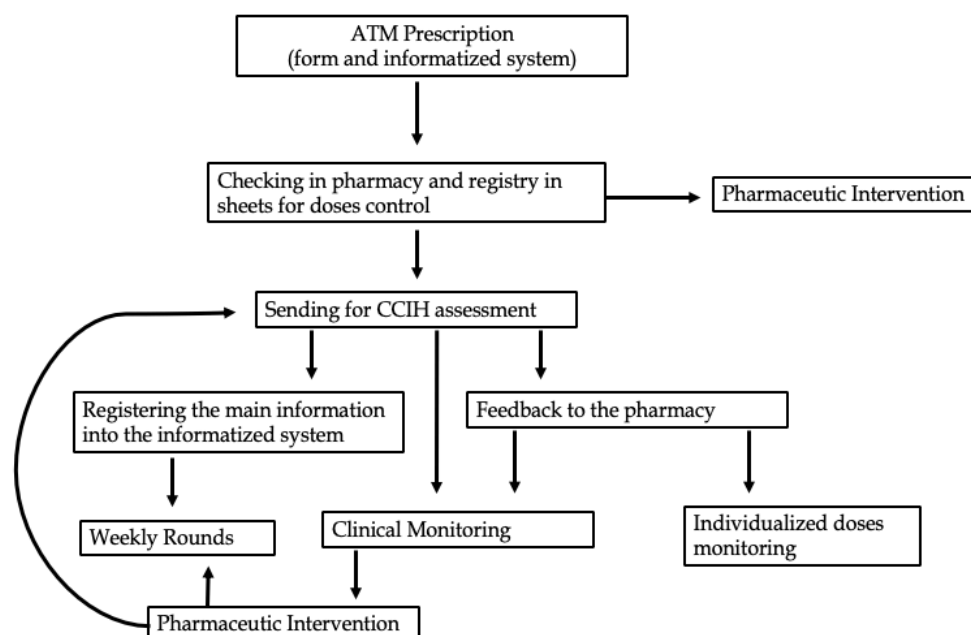
## Method

Creation of a working group including the pharmacy, CCIH and clinical management of the hospital, taking to standardize and disseminate the flow, from the antimicrobial prescription to reimbursement of the infectology and dispensing control by the hospital pharmacy. An excel spreadsheet has been improved to control the dispensing of antimicrobials via an individualized dose, controlling treatment time and dose adjustment. A retrospective study was carried out on the collection of antimicrobial prescriptions, the analysis of infectology and the main interventions carried out in the management of antimicrobials in the month of February 2019. The results were grouped in excel sheet in categories of interventions and by clinical of the Hospital Regional de Samambaia.

## Results

Initially the definition of the list of drugs to be controlled by this process was carried out. Considering the number of hospital beds and the number of servers, it was defined that all the injectable antimicrobials standardized by REME / DF should be evaluated by the CCIH. Pharmacological review of antimicrobials also occurs for all hospital clinics although maternity / gynecology still does not have an individualized dispensing system.

The structure of services for antimicrobial management was defined according to Figure 1.



**Figure 1-** Workflow for antimicrobial management in HRSam/DF

The prescription is carried out on the information system and in the SES Manual of Prescription of Antimicrobials form (Annex 1). This form is directed to the pharmacy, where the pharmacist's prior analysis takes place and the 24-hour treatment is released. Patient data, hospitalization clinic, complete dosage and duration of treatment are recorded in an Excel spreadsheet for daily control of antimicrobial dispensing. Then the manual prescription goes to the CCIH, where the evaluation of the infectology is carried out, which performs the evolution in electronic medical records and returns to the pharmacy. Then, the considerations received are updated and directed for monitoring by the clinical pharmacy. There are also weekly multidisciplinary visits in the medical clinic, first aid and ICUs to discuss the main cases and general guidelines.

This routine was implemented and improved in the months of November 2018 to January 2019. The data obtained in the manual antimicrobial forms in February 2019 were analyzed and tabulated in Excel spreadsheet, according to Table 1.

**Table 1-** Main interventions and its percentual in HRSam.

Main interventions for antimicrobial management according each area- February 2019									
	Emergency	ICU	Medical Clinic	Maternity/ Gynecology	Surgical Clinic	Total			
Maintained treatment	34	25	19	9	5	92	35%		
Treatment reduction	14	26	6	1	1	48	18%	*	
Extended Treatment	2	2	1	0	1	6	2%		35%
Unauthorized for CCIH	12	2	9	1	1	25	9%	*	Interventions
Unevaluated for CCIH	10	6	5	1	0	22	8%		with direct
Do not begin ( Lacking of medicines)	1	2	0	0	0	3	1%		savings
Clearance adjustment for renal function	14	4	3	0	0	21	8%	*	
Not found	1	1	2	0	0	4	2%		
Discharge/ Transference	24	1	3	8	3	39	15%		
Death	1	2	1	1	0	5	2%		
Total (including all areas)	113	71	49	21	11	265			
	43%	27%	18%	8%	4%		100%	I	

The main interventions for antimicrobial management were treatment reduction by 18%, clearance adjustment for renal function (8%) and antibiotics not released by CCIH due to unnecessary indications with 9%. Patients with maintained treatment (35%) are enrolled in the antibiotic release control system through an individualized daily dose. When the prescription exceeds the time of treatment authorized by the CCIH, the clinical pharmacy is activated to analyze the case, making intervention with the prescriber and / or CCIH to suspend the medication, extend it or carry out scheduling if necessary.

The results presented in table 1 show that reduction in treatment duration, suspension of unnecessary antimicrobials and dose adjustment for renal function add up to 35% of the interventions, generating savings for the hospital and benefits for the patient. An antimicrobial price survey was carried out in the SES / DF Alfalinc material system in February 2019 and the treatment price / day was calculated for each item. These interventions (35%) represent a direct savings of R\$ 1905.08 only with the treatment / day of the antibiotic. The expenses with medical-hospital materials, transport / logistics and human resources were not accounted for. The distribution of antimicrobial prescriptions per clinic is shown in figure 2. It was observed that 43% of the prescriptions come from the emergency room, the sector with the highest turnover of beds, followed by ICU with 27% and hospitalization of the medical clinic covering 18% of prescriptions in February.

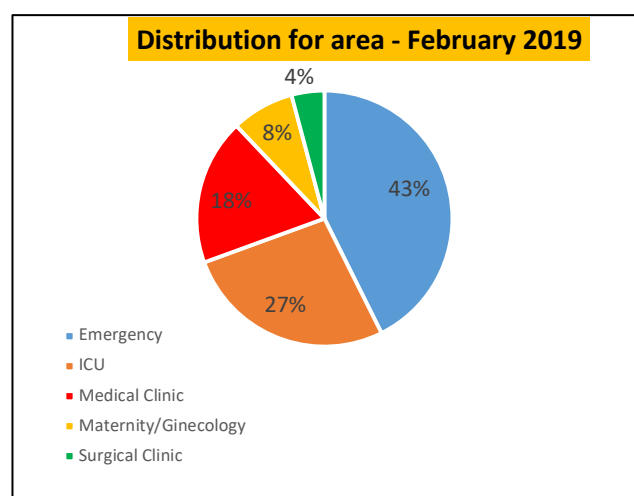
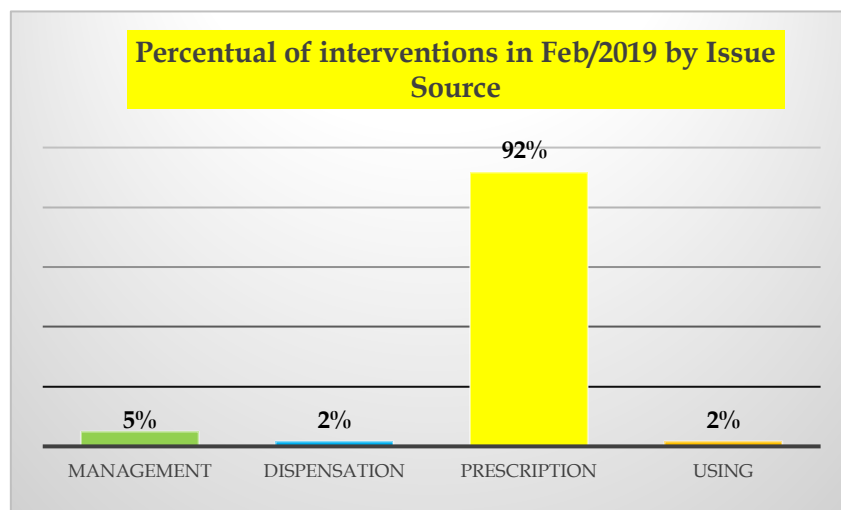
**Figure 2-** Prescriptions per clinic in February 2019

Figure 3 presents the percentage of clinical pharmacy interventions in the month of February/19, verifying that most interventions occur at the prescription stage due to screening by the individualized dose dispensing system. Major interventions in the dispensing and administration steps include guidelines for drug preparation, dilution, and stability. The problems related to the use are rare, however they require more attention because the adverse reactions need to be notified and monitored, besides being able to cause damages to the patient.



**Figure 3-** Percentage of interventions according to monitoring steps

The definition of the work processes has brought greater security for the performance of all the servers involved. According to Capucho et al, it is necessary to stimulate the critical approach to patient safety, with specific goals to prevent damage and minimize the risk of incidents.<sup>3</sup> As established in the flowchart, the pharmacy conducts the initial antimicrobial prescription conference checking dosage, indications, dose correction situations and irrational associations. The previous registration of the patient in an individualized dosage form and the return of the CCIH confirming the treatment time improves the dispensing control. It also allows early identification of overdue treatments and interventions from the clinical pharmacy to suspend the antibiotic. The double monitoring by the clinical pharmacy and CCIH, are more effective in the detection of therapeutic failures, as well as in the intervention with the care team for corrective measures. Silva 2008 reports that successful antimicrobial use programs should use two or more intervention strategies simultaneously.<sup>4</sup> These measures also reduce hospitalization time, minimize adverse reactions and induce microbial resistance. The excessive duration of antibiotic therapy also increases the risk of colonization by multiresistant microorganisms.

The management of antimicrobial use requires engagement of the entire multiprofessional and care team. The safety culture of the patient is still not very widespread in the institutions and the existence of an organized flow of information does not generate knowledge by itself.<sup>3</sup> Aiming to improve the interaction between the teams and the promotion of continuing education, the weekly multidisciplinary visits to the medical clinic and emergency room were expanded, with a discussion of the main cases. It was found that on-site activities bring professionals closer together and break

down communication barriers, as well as awakening the sense of joint action on behalf of the patient.

Among the main interventions in the use of antimicrobials, it can be observed that the reduction in the duration of treatment stimulates an earlier reassessment of the patient by the care team, avoiding unnecessary prolonged treatments. The non-release of the treatment by the CCIH, according to the assignment defined in technical note 01 of SES/DF<sup>2</sup>, occurs most of the time due to lack of sufficient clinical information to conclude an infectious diagnosis, colonized patients without clinical indication and self-limited infections.

It is also observed that 8% of the prescriptions were not evaluated by the CCIH. The workflow can be delayed mainly due to the lack of the infectious professional covering every day of the week. It is also verified that 15% of the prescriptions were checked after discharge or transfer of the patient. It is necessary to consider that the emergency room has high turnover of patients and many have significant clinical improvement and medical discharge without the need for professional evaluation of infectious disease.

The dose setting according to renal function comprises 8% of the cases. This intervention requires agility due to the use of potentially nephrotoxic antibiotics in hospitals, and may worsen the condition of patients with acute or chronic kidney disease. The processes of antibiotic deescalation and conversion between the parenteral and oral routes of administration for antibiotics with good availability have yet to be improved.

All the measures described in this study reaffirm the need to increase control over the use of antimicrobials, rationalizing the indiscriminate use and generating benefits from the economic point of view and for the patient. Promoting patient safety is the duty of the pharmacist and of all multidisciplinary teams.

## Conclusion

The clinical pharmacy service at HRSam covers approximately 10% of inpatient-day patients. WHO is advocated by a clinical pharmacist for every 20 critical beds or 30 non-critical beds per day. This work demonstrates the direct and indirect financial savings generated by the performance of the pharmacist in the monitoring of antimicrobial use. It also reinforces the need to expand clinical and logistical pharmaceutical services, for the work in the individual dispensation of control associated with clinical interventions are most effective in the correct use of medicines. The joint performance of a multidisciplinary team evidences the complexity of the process and demands constant management in all stages of the treatment.

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