



Emerging Pollutants: Protecting Water Quality for the Health of People and the Environment

Occurrence of antibiotics and psychiatric drugs in Brazilian municipalities: a data analysis approach

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Introduction

- Brazil is the 8th largest pharmaceutical market (Sindusfarma, 2022)
- Poor removal efficiency in WWTPs
- A portion of 45% of the population has no access to sanitary sewage treatment
- Ineffective legislation
- Sparse sampling campaigns are performed to quantify PhACs (Pharmaceutical Active Compounds) concentrations in wastewater and aquatic matrices.



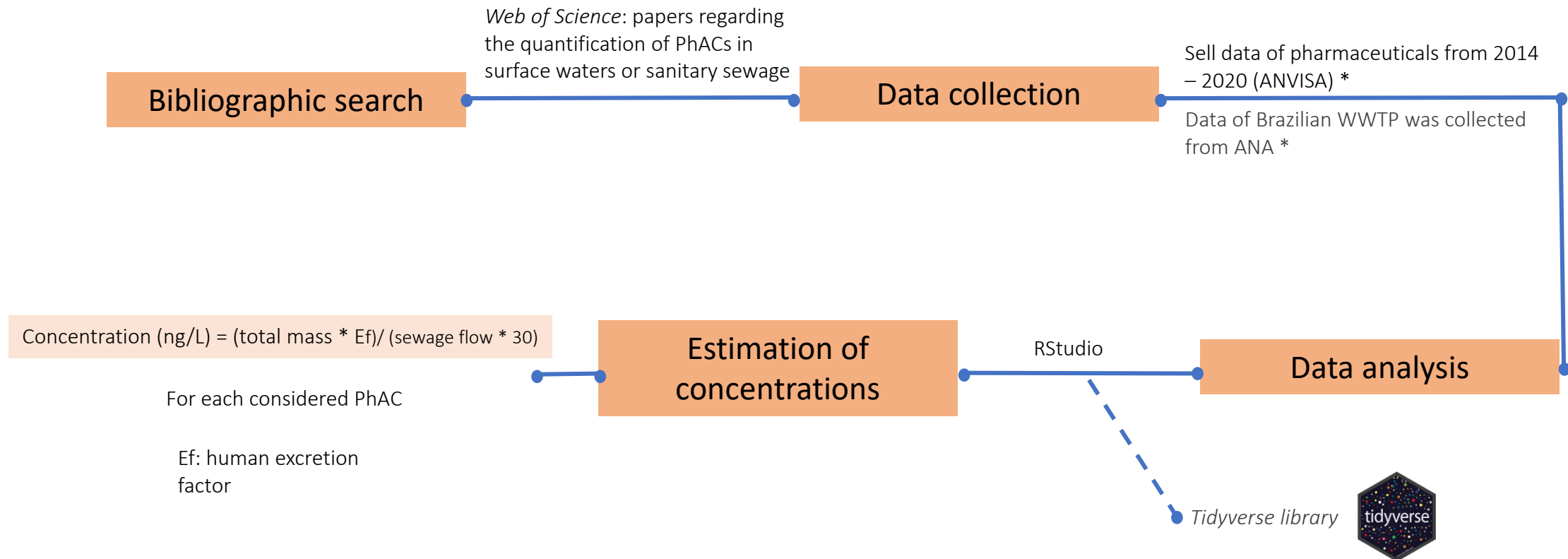
Objective

This ongoing research aims to investigate the pharmaceutical occurrence in the environment based on sales data, through statistical data analysis.

The specific objectives are:

- (I) to know Brazilian municipalities with greater recurrence of PhACs quantification;
- (II) to verify the most investigated pharmaceuticals;
- (III) to estimate the load of PhACs to be treated in Wastewater Treatment Plants based on sales data (WWTPs)

Methods



* National Controlled Product Management System (SGNPC) of National Health Surveillance Agency (ANVISA)

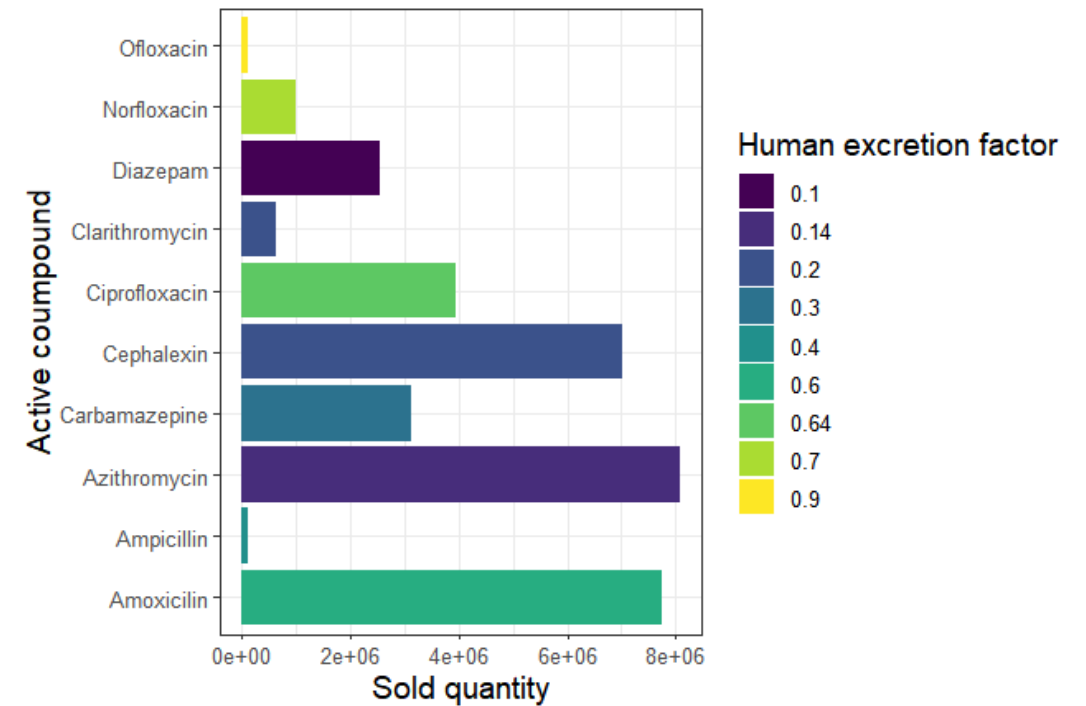
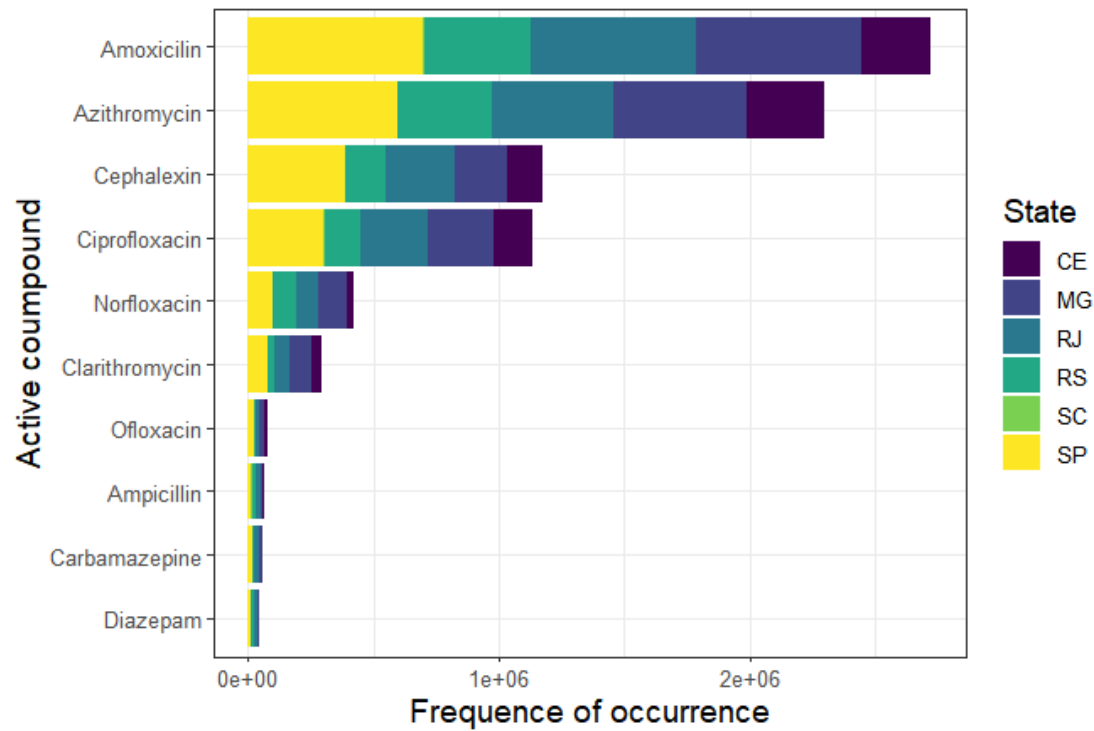
* National Water Agency (ANA)

Results and Discussion

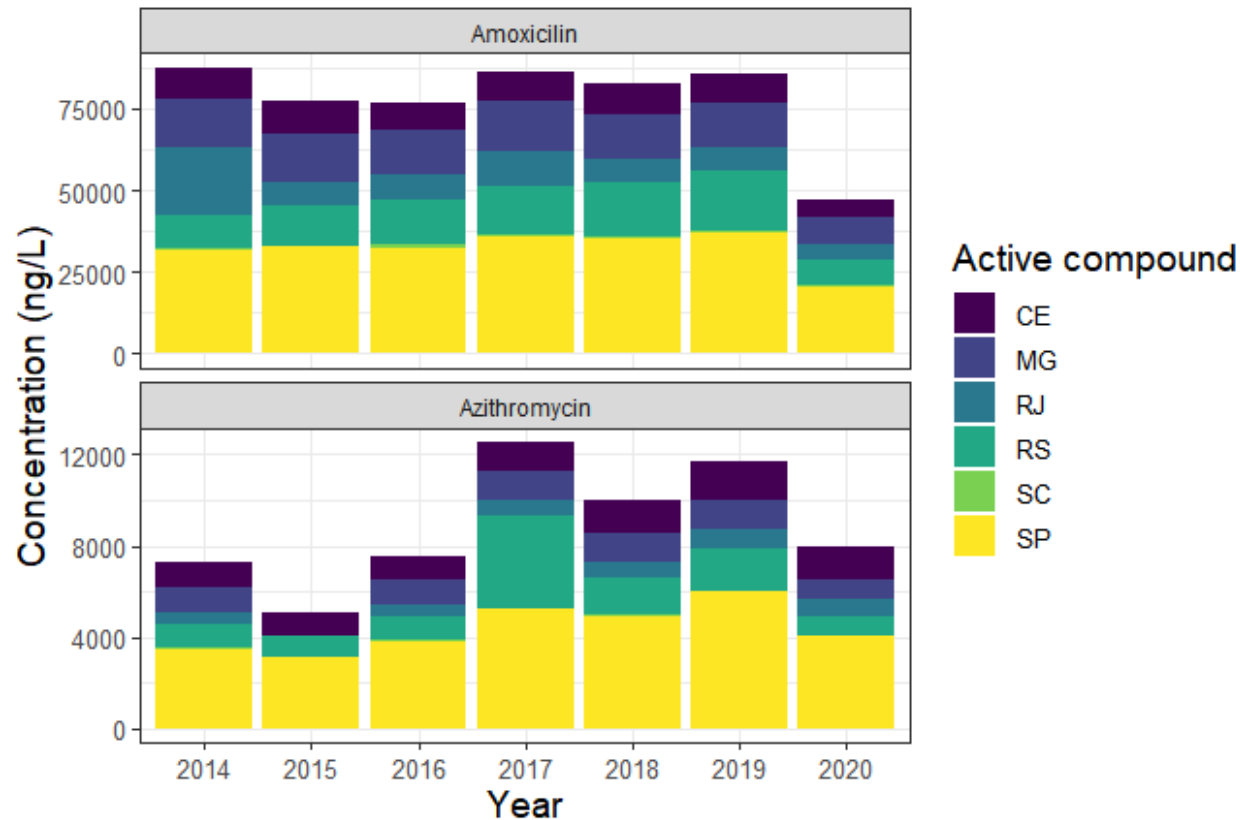
- In Brazil, PhACs in sanitary sewage are most reported in São Paulo state (Jundiaí, Campinas, São Carlos, São José do Rio Preto), Minas Gerais state (Belo Horizonte), Rio Grande do Sul state (Porto Alegre) and Ceará state (Fortaleza).
- The most investigated therapeutic classes are antibiotics and psychiatric drugs.
- Priority compounds in monitoring and control lists (GWRC, 2008; Kostich, Batt, Lazorchak, 2014; Reichert, et al., 2019).

Active compound
Amoxicilin, Cephalexin, Ciprofloxacin, Norfloxacin, Clarithromycin, Ofloxacin, Ampicillin
Diazepam, Carbamazepine

Results and Discussion



Results and Discussion



- Despite the high sold quantity of Azythromycin, the concentration is lower than Amoxicilin, due to the Ef.
- São Paulo presents the highest concentration based on the consumption of PhAC.
- The ANVISA databased is mostly composed by registers of sales of antibiotics and psychiatric drugs.

Conclusion

- This ongoing investigation verified that the monitoring and quantification of PhACs are mostly performed in São Paulo state, with Antibiotics being the most monitored compounds. Among the selected pharmaceuticals, Amoxicilin and Azythromicin present the highest sell quantity and due to the value of the Ef of Amoxicilin (60%), this produces the higher concentration to be treated.
- For future research the relationships of the PhACs will be deeply investigated, in order to better evaluate the variations of sales considering the evolution of prescription collection.
- The initial findings will be compared with previous predictive models for pharmaceuticals concentrations based on sales data.



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