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# THE ECONOMIC IMPACT OF SERIOUS FLUOROQUINOLONE-RELATED ADVERSE EVENTS

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## INTRODUCTION

Fluoroquinolones (FQs) are broad-spectrum antimicrobials which are used to treat bacterial infections including genitourinary, respiratory, gastrointestinal, skin and soft tissue infections.<sup>1</sup> FQs have been in wide use for 30 years. The number of FQ prescriptions has steadily fallen equally with all antibiotic prescriptions in Finland and amount to 5% of antibiotic prescriptions. Although FQs are still considered to be mostly well tolerated, there are several serious and debilitating adverse events (AEs) associated with their use. Previous research has shown that estimations of FQ-related AE costs are scarce even though hospitalization is frequently required to treat AEs.<sup>2</sup> Due to reports of serious AEs associated with the use of FQs, the European Medicines Agency has recommended restrictions on their use several times.<sup>3</sup>

## OBJECTIVES

The aim of this study was to estimate the annual health care costs of serious FQ-related adverse events.

## METHODS

Serious FQ-related AE types were identified from the Finnish Pharmaceutical Insurance Pool's pharmaceutical injury claims and the Finnish Medicine Agency's Adverse Reaction Register. A decision tree model was built with R (version 3.3.3.) in order to predict annual costs associated with serious AEs. The population of the model was represented by the number of reimbursed FQ prescriptions from the Social Insurance Institution of Finland's database in 2018, which was multiplied by the probability of a serious AE. Probabilities of serious AEs were based on estimates from published literature. FQs included in the model were levofloxacin, moxifloxacin, ciprofloxacin, ofloxacin and norfloxacin. Tendon injuries, recurrent *clostridioides difficile* infections, severe cutaneous adverse reactions (SCAR), anaphylactic reactions, acute liver injuries, aortic ruptures and neuropsychiatric events were among serious AEs included in the model. All costs were converted to 2017 euro.

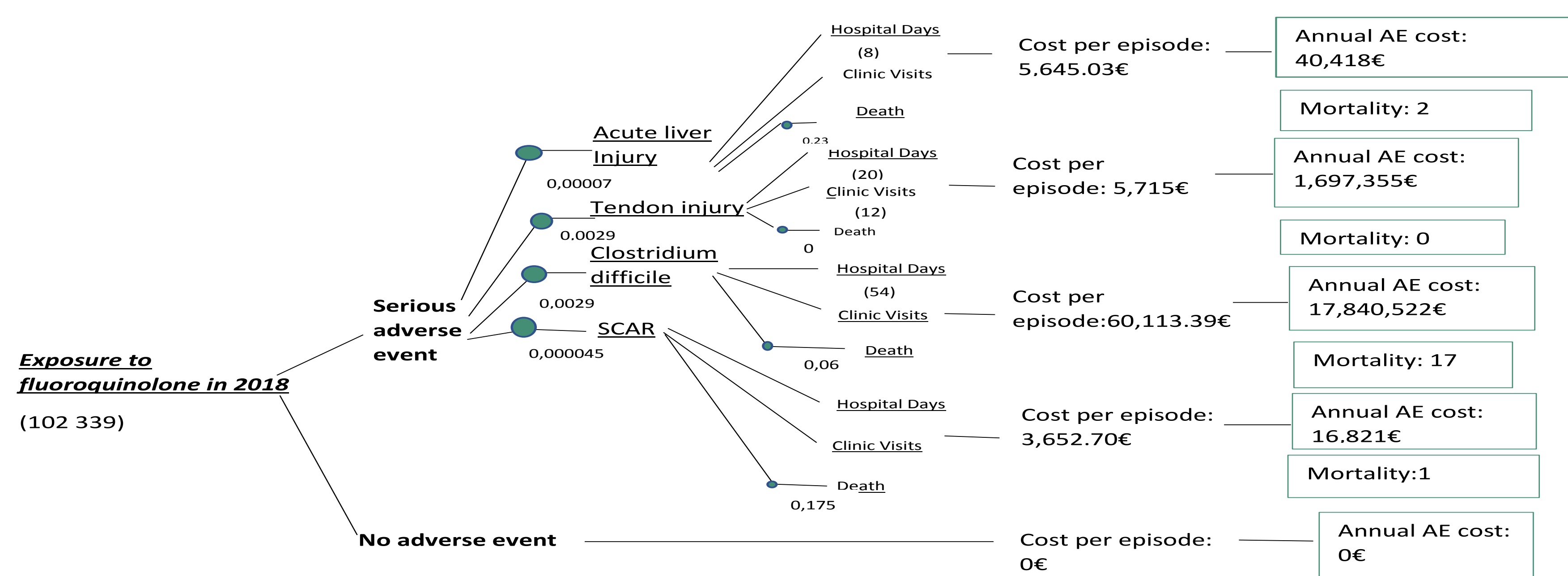


Figure 1. Simplified Model Structure: Annual Cost and Mortality Associated with Serious Fluoroquinolone-related Adverse Events

## RESULTS

A total of 102 339 FQ prescriptions were filled in 2018. Preliminary results of the study suggest that serious AEs associated with FQs can lead to annual health care costs of tens of millions of euros. Life-threatening recurrent *clostridioides difficile* infections were the most costly AEs as they frequently require long stays at hospital.

## DISCUSSION

The economic burden of drug-related AEs is often neglected in decision making although healthcare resources are limited and drug expenditures are multiplying. While AEs have been described in association with every class of antibiotics, previous studies have found that use of FQ can double the risk of certain AEs in comparison to other antibiotics.<sup>4 5</sup> This study drew its estimates from several published sources and databases, which adds uncertainty. Data available to estimate AE costs remains scarce and is regularly plagued by sporadic AE-reporting. Aortic dissections and neuropsychiatric AEs present examples of previously unidentified FQ-related AEs events, which are only now known to have harmful clinical and economic implications.

## CONCLUSIONS

Although FQs continue to be generally well tolerated antimicrobials, serious AEs can cause long-term disabilities to patients and high health care costs. Therefore, the risks and benefits of these drugs should always be weighed carefully.

## REFERENCES

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