The Impact of COVID-19 on Antibiotic Prescribing in Primary Care in England: Evaluation and Risk Prediction of the Appropriateness of Type and Repeat Prescribing

Authors : Xiaomin Zhong, Alexander Pate, Ya-Ting Yang, Ali Fahmi, Darren M. Ashcroft, Ben Goldacre, Brian Mackenna, Amir Mehrkar, Sebastian C. J. Bacon, Jon Massey, Louis Fisher, Peter Inglesby, Kieran Hand, Tjeerd van Staa, Victoria Palin

Abstract : Background: This study aimed to predict risks of potentially inappropriate antibiotic type and repeat prescribing and assess changes during COVID-19. Methods: With the approval of NHS England, we used the OpenSAFELY platform to access the TPP SystmOne electronic health record (EHR) system and selected patients prescribed antibiotics from 2019 to 2021. Multinomial logistic regression models predicted the patient's probability of receiving an inappropriate antibiotic type or repeating the antibiotic course for each common infection. Findings: The population included 9.1 million patients with 29.2 million antibiotic prescriptions. 29.1% of prescriptions were identified as repeat prescribing. Those with same-day incident infection coded in the EHR had considerably lower rates of repeat prescribing (18.0%), and 8.6% had a potentially inappropriate type. No major changes in the rates of repeat antibiotic prescribing during COVID-19 were found. In the ten risk prediction models, good levels of calibration and moderate levels of discrimination were found. Important predictors included age, prior antibiotic prescribing, and region. Patients varied in their predicted risks. For sore throat, the range from 2.5 to 97.5th percentile was 2.7 to 23.5% (inappropriate type) and 6.0 to 27.2% (repeat prescription). For otitis externa, these numbers were 25.9 to 63.9% and 8.5 to 37.1%, respectively. Interpretation: Our study found no evidence of changes in the level of inappropriate or repeat antibiotic prescribing after the start of COVID-19. Repeat antibiotic prescribing was frequent and varied according to regional and patient characteristics. There is a need for treatment guidelines to be developed around antibiotic failure and clinicians provided with individualised patient information.