

INTRODUCTION

- COVID-19 is a global pandemic that has caused more than 600 million confirmed cases worldwide¹
- Over the past year, the proportion of COVID-19 diagnostic tests performed at home with antigen testing has increased substantially²
- Many at-home tests are self-interpreted and not reported to the local health department, which could lead to delayed case reporting or underreporting
- Nirmatrelvir/ritonavir and molnupiravir were authorized in December 2021 for the treatment of COVID-19 in high-risk patients³⁻⁴
- In NYC, there was early citywide access to oral antivirals compared to other jurisdictions⁵
- We sought to determine if the rates of prescribing these antivirals might act as an early indicator of increasing COVID-19 incidence in the setting of decreased case reporting

METHODS

- Lab-confirmed and probable COVID-19 cases are reported to the NYC Department of Health and Mental Hygiene (DOHMH)
- All pharmacies participating in the federal COVID-19 therapeutics program are required to report daily utilization data, which are made available to jurisdictions through the Tiberius platform
- Data: citywide daily case counts and daily prescription fills
- Timeframe: March 1, 2022 to June 19, 2022
- Regression modeling was performed of ARIMA-based estimates of case counts as a function of increasingly lagged ARIMA-based estimates of prescription fills

RESULTS

- 88,649 COVID-19 antiviral prescriptions filled
 - 31.7% of prescriptions filled through the NYC DOHMH partner pharmacy, 68.3% through non-partner pharmacies
- 239,352 cases in patients aged 18 and above were reported
 - Weekly case rates ranged from 33.3 to 288.1 cases per 100,000 residents
- Strong concordance noted between case counts and prescription fills (Figure 1)
- In our model, there was a strong correlation noted between ARIMA-smoothed case counts and prescription fills at no time lag (day 0, $r^2 = 0.95$) up to 14 days ($r^2 = 0.69$) (Figure 2)

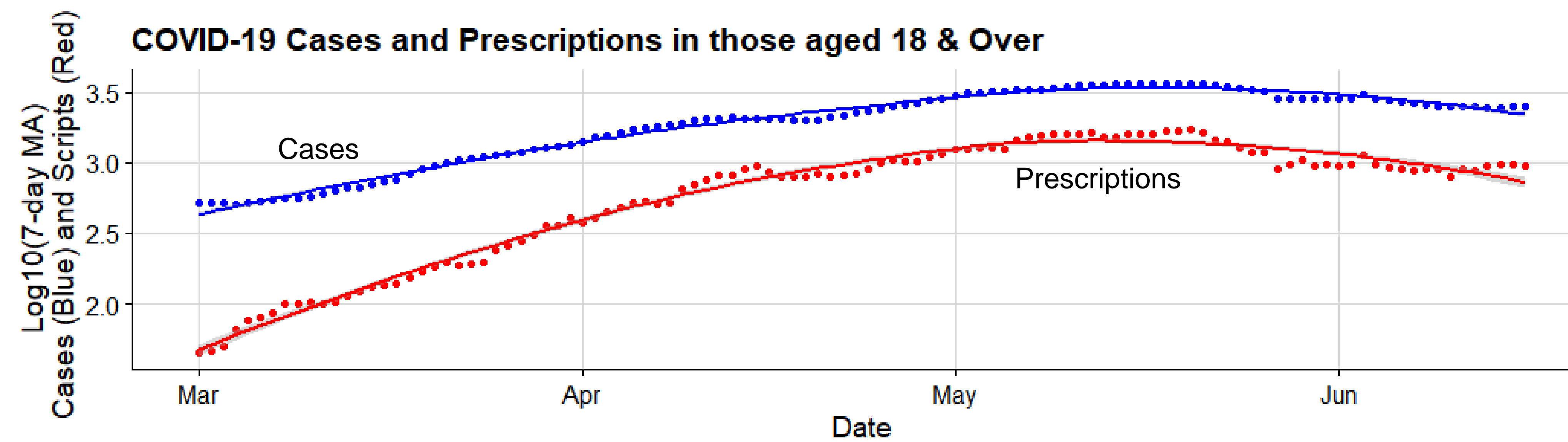


Figure 1. Log₁₀ 7-Day Moving Average of COVID-19 Cases and Antiviral Fills

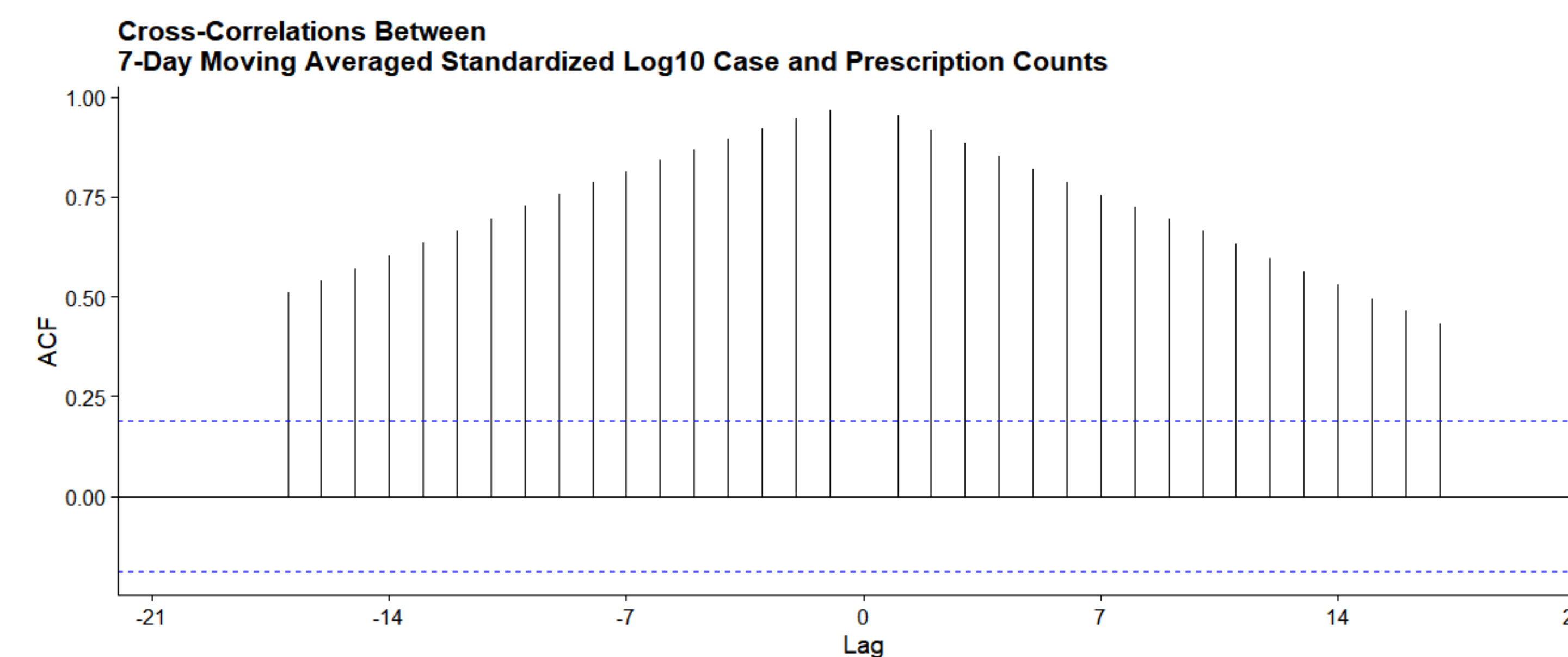


Figure 2: Cross correlations between cases and prescriptions

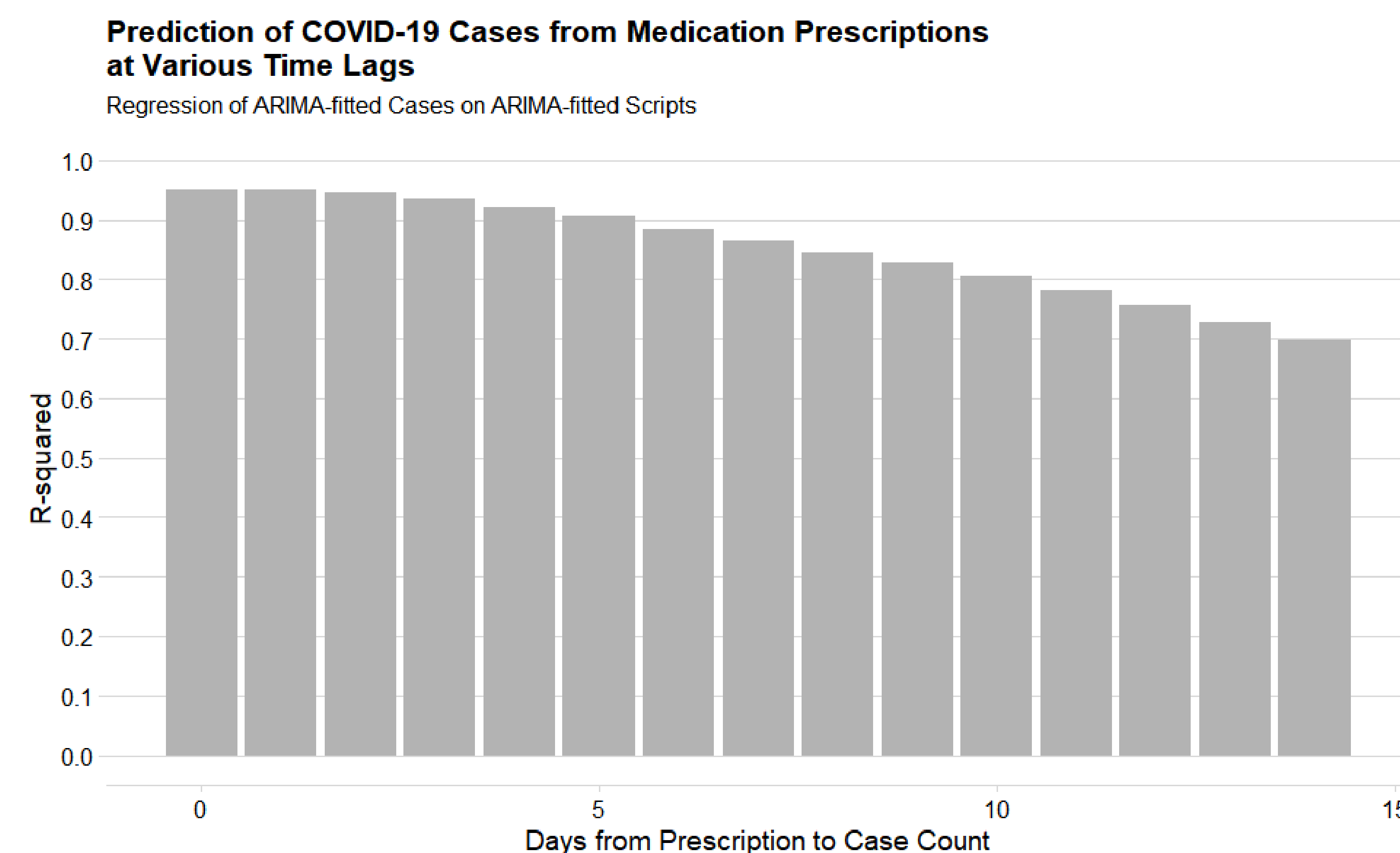


Figure 3: Prediction of COVID-19 Cases from Medication Prescriptions at Various Time Lags

CONCLUSIONS

- We observed a strong correlation between oral antiviral prescription fills and subsequent case counts
 - This relationship is very strong for predicting case counts in the next seven days and remains significant at 14 days (Figure 3)
- As COVID-19 testing moves away from traditional testing locations, new strategies are needed to facilitate timely epidemic monitoring
- Increasing rates of oral therapeutic prescribing could represent an early indicator of increasing COVID-19 transmission in a community
- Oral antiviral prescriptions may be an indirect marker of higher-risk infections given that oral antivirals are authorized for older individuals and those with comorbid conditions
- These findings highlight the importance of access to prescription data for public health surveillance
- Limitations include the unclear impact of ongoing public and prescriber education efforts on prescribing trends, as well as the use of population level data, which has limited detail of patient demographic characteristics
- Next steps would include validating this model by forecasting future cases
- Further research is needed to assess the benefit of including antiviral prescription data into COVID-19 forecasting models attempting to predict trends in transmission as reported cases become a less reliable indicator.

REFERENCES

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ACKNOWLEDGEMENTS

We would like to thank the NYC Health and Hospitals Test and Treat (T2) team and the New York City Department of Health and Mental Hygiene Department of Surveillance and Epidemiology and Integrated Data for their assistance with data generation.