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BIOINFORMATICS SEMINAR

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PREDICTION MODEL FOR COVID-19 PATIENT VISITS IN THE AMBULATORY SETTING

The ability to forecast patient volumes in primary care practices by accurately evaluating the dynamic changes in patient visits and fitting these data to a statistical model is useful for the appropriate allocation of human and material resources for future planning. The primary objective of this study was to accurately forecast the number of COVID19 and nonCOVID19 weekly visits at two locations, Christiana MAP2 Suite 1250 (MAP2) and Wilmington Health Center (WHC) using a time series prediction model called AutoRegressive Integrated Moving Average (ARIMA). This retrospective study looked at patients who tested positive for COVID19 and were not currently hospitalized and the ambulatory services that they utilized before and during the COVID19 pandemic—Family Medicine, located at MAP2 and WHC. In conjunction, a separate study population of nonCOVID19 patients from the same ambulatory services was created. We used one year of retrospective weekly data for model development (January 1, 2019 – December 31, 2019, N= 53 observations) and the most current 2020 weekly data (January 1, 2020 – June 15, 2020, N=24 observations) for validation. Best-fitting models of non-seasonal ARIMA and ARIMAX were applied at each location for both COVID19 and nonCOVID19 to 8-week prediction periods and compared using mean absolute percentage error (MAPE) statistics. The best-fitting models for COVID19 were ARIMAX (4,1,2) MAP2 and ARIMAX (4,1,1) WHC, with forecasting accuracy at 48% and 62% respectively. For nonCOVID19 models, ARIMA (2,0,1) was the best-fitting for both locations with forecasting accuracy over 80%.

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