

Monitoring Coronavirus Disease 2019 (COVID-19) Through Trends in Influenza-like Illness, Laboratory-confirmed Influenza, and COVID-19—New York State, Excluding New York City, 1 January 2020–12 April 2020

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Innovative monitoring approaches are needed to track the coronavirus disease 2019 (COVID-19) epidemic and potentially assess the impact of community mitigation interventions. We present temporal data on influenza-like illness, influenza diagnosis, and COVID-19 cases for all 4 regions of New York State through the first 6 weeks of the outbreak.

Keywords. COVID-19; influenza; New York; epidemiological monitoring.

Since 2 March 2020, New York State (NYS) has been experiencing the largest outbreak of coronavirus disease 2019 (COVID-19) in the United States. By the end of March, COVID-19 cases were reported throughout the state; cases outside of New York City (NYC) were concentrated in 1 of 4 New York State Department of Health (NYS DOH) regions (metropolitan region) [1]. In response, state officials implemented a series of community mitigation strategies throughout the month of March that culminated in the “New York on PAUSE” executive order, which closed all nonessential businesses and ordered residents to stay at home [2, 3]. Innovative monitoring approaches are needed to track the epidemic and potentially assess the impact of these interventions.

Accurate monitoring of this outbreak is complex and likely influenced by specimen collection supply, provider testing practices, and patient care-seeking behaviors. Since COVID-19

symptoms are similar to those of influenza and other respiratory infections, monitoring influenza-like illness (ILI) alongside diagnostic trends for influenza and COVID-19 could provide a broader understanding of COVID-19, which is often mildly symptomatic and undiagnosed [4, 5]. Given the regional nature of COVID-19 within NYS, a regional monitoring approach may offer early warning and facilitate local planning. Here, we present temporal data on ILI and COVID-19 for all 4 regions of NYS, excluding NYC, as a case study for other settings.

METHODS

Data for this analysis came from 2 sources. First, data on ILI are from the Outpatient Influenza-like Illness Surveillance Network (ILINet) in NYS, which consists of 140 outpatient providers with specialties in emergency medicine, family medicine, internal medicine, pediatrics, employee health, and student health in 49 of 57 NYS counties outside of NYC. Each week, ILINet providers report the aggregate number of all-cause outpatient/emergency department visits and total number of visits with ILI, which is defined as fever of 100°F or greater with cough and/or sore throat in the absence of another known cause. Weekly trends are compared against the regional baseline of 3.2% established by Centers for Disease Control and Prevention (CDC) [6]. Second, data on influenza types A and B and severe acute respiratory syndrome coronavirus 2, the causative agent of COVID-19, are mandatorily reported by laboratories to NYS DOH electronically [7]. Population data are from National Center for Health Statistics bridged-race annual county-level population estimates [8].

NYS DOH operates 4 regional offices (Capital, Central, Western, Metropolitan) that cover all counties outside of NYC [9]. For each week of ILINet data, we aggregated the total number of ILI visits and outpatient visits per region to calculate the regional percent of visits that were for ILI. Additionally, we aggregated the number of new COVID-19 and influenza cases to respectively calculate daily rates (per 100 000 population) and average weekly rates for each disease by region. To align with other disease surveillance data, we present results according to weeks defined by CDC’s Morbidity and Mortality Weekly Report.

RESULTS

In all 4 regions, the average rate of reported laboratory-confirmed influenza cases per 100 000 increased from the beginning of the year until early February before declining through the end of March. From weeks 10 through 14 (1 March–4 April), the average daily influenza case rate decreased by 98.9%

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in the Central region, 98.7% in the Capital region, 98.4% in the Western region, and 96.9% in the Metropolitan region.

After declining for several weeks in February, ILI increased in 3 of the 4 regions starting week 10 and in all 4 regions during week 11 (beginning 8 March) and week 12 (beginning 15 March; Figure 1). Between weeks 10 and 12, the largest increases occurred in the Metropolitan region (3.5% to 9.3%, 2.7-fold change) and the Capital region (4.4% to 7.1%, 1.6-fold change). During week 11 through week 13 (beginning 22 March), all regions exceeded the ILI baseline of 3.2%. Starting with week 13, the percent of visits with ILI decreased in all regions except the

Metropolitan region. Between week 13 and week 15 (beginning 5 April), ILI decreased by 60.0% in the Capital region, 65.4% in the Central region, and 45.5% in the Western region. At the end of week 15, ILI was noticeably lower than the baseline of 3.2% in both the Capital (week 15 ILI = 2.9%) and Central (week 15 ILI = 2.3%) regions.

COVID-19 was first confirmed in the Metropolitan region on 2 March before its first diagnosis in the other 3 regions around 1 week later (Capital and Central: 9 March, Western: 11 March). During week 11 and week 12 (8 March–21 March), the slope of daily COVID-19 cases (per 100 000) in each region

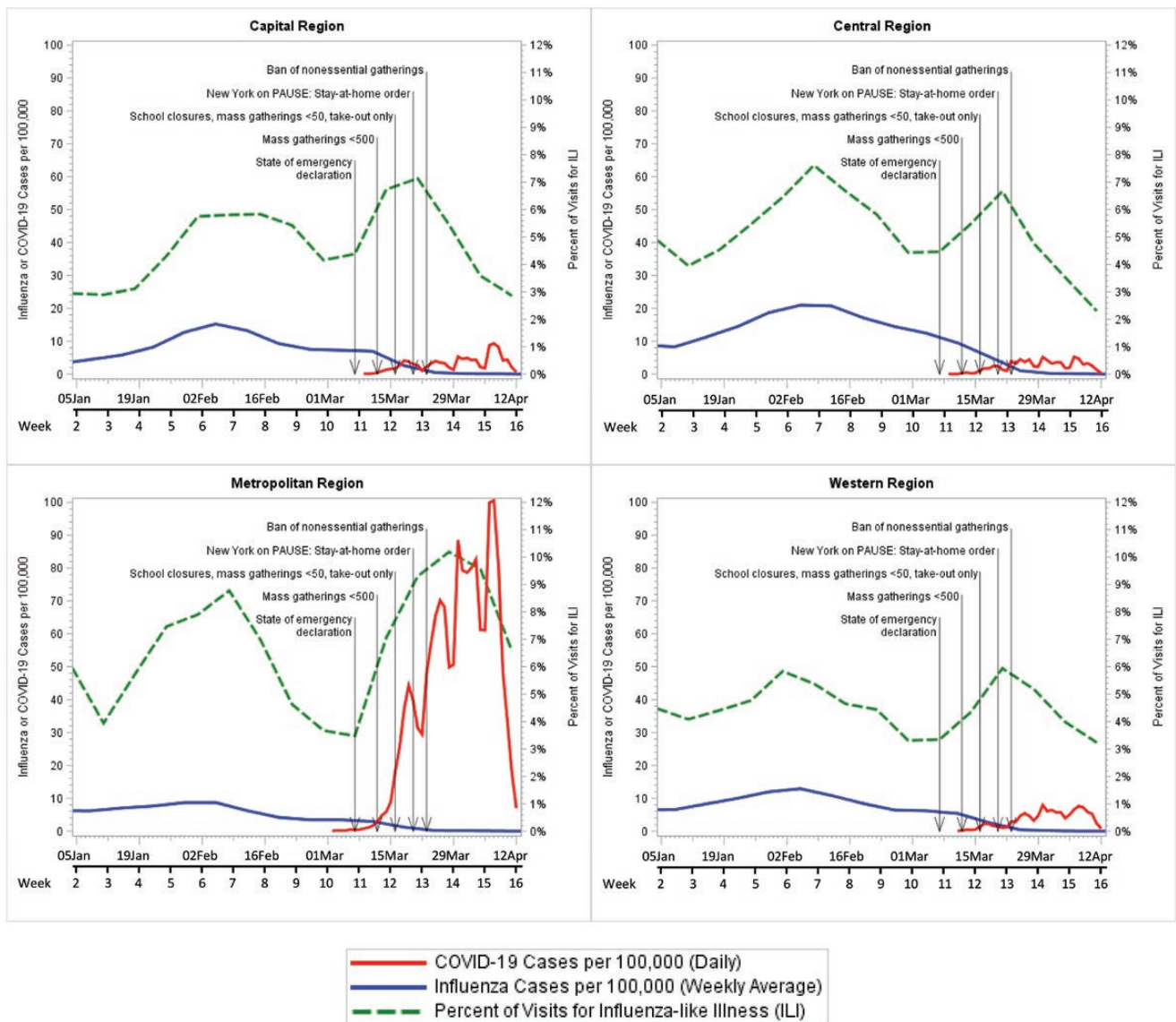


Figure 1. ILI reported to the Outpatient Influenza-like Illness Surveillance Network, laboratory-confirmed influenza, and laboratory-confirmed COVID-19 reported to surveillance by region in New York State, excluding New York City, 1 January 2020–12 April 12. Capital region: Albany, Clinton, Columbia, Delaware, Essex, Franklin, Fulton, Greene, Hamilton, Montgomery, Otsego, Rensselaer, Saratoga, Schenectady, Schoharie, Warren, Washington counties; Central region: Broome, Cayuga, Chenango, Cortland, Herkimer, Jefferson, Lewis, Madison, Oneida, Onondaga, Oswego, St. Lawrence, Tioga, Tompkins counties; Metropolitan Area region: Dutchess, Nassau, Orange, Putnam, Rockland, Suffolk, Sullivan, Ulster, Westchester counties; Western region: Allegany, Cattaraugus, Chautauqua, Chemung, Erie, Genesee, Livingston, Monroe, Niagara, Ontario, Orleans, Schuyler, Seneca, Steuben, Wayne, Wyoming, Yates counties. COVID-19 cases subject to weekly trends in testing, which typically declines on weekends. Abbreviations: COVID-19 coronavirus 2019; ILI, influenza-like illness.

was 3.6 (Metropolitan), 0.33 (Capital), 0.20 (Central), and 0.17 (Western). During weeks 13–15 (22 March–10 April), the slope of daily COVID-19 cases was lower in all 4 regions (Metropolitan = -0.07 , Capital = 0.19 , Central = -0.02 , Western = 0.14). By the end of week 15, the weekly average rate of new reported COVID-19 cases was 63.3 per 100 000 in the Metropolitan region, 5.5 per 100 000 in the Capital region, 3.1 per 100 000 in the Central region, and 5.7 per 100 000 in the Western region.

DISCUSSION

Until the emergence of COVID-19 in early March, ILI and laboratory-confirmed influenza tracked closely together, with both declining. Thereafter, in the NYS region with the highest rates of confirmed COVID-19 (Metropolitan), ILI increased most sharply. In the other 3 regions, ILI increased ahead of the emergence of COVID-19. This might signal early COVID-19 activity without diagnosis in those regions or increased concern over COVID-19 and care-seeking among people with mild ILI illness. On 16 April, the White House released guidelines for reopening states and regions that are predicated on the monitoring of COVID-19 cases and related symptoms, including ILI activity [10]. This report offers a framework and example for such local monitoring to identify areas in which COVID-19 is emerging or reemerging.

Furthermore, observation of ILI, influenza, and COVID-19 case trends throughout the first 6 weeks of the COVID-19 outbreak in NYS can provide insight on the impact of community mitigation policies, beyond cases alone [11]. In the weeks before “New York on PAUSE” (week 13), the average ILI and the daily rate of COVID-19 cases were increasing in all 4 regions. Beginning in week 13, the daily rate of COVID-19 cases stabilized in the Central and Metropolitan regions and ILI decreased in all regions, with Metropolitan ILI decreasing later. The heterogeneity in these indicators across NYS suggests the benefits of a more granular, rather than statewide, approach to monitoring the outbreak and for tailoring the application or suspension of mitigation strategies. While these data provide part of that picture, the inclusion of additional regional data on testing, test positivity, and estimated reproductive number will help further inform strategies [12].

These findings are subject to a few limitations. First, we present the temporal association between policy interventions and ILI activity and COVID-19 rates, but we cannot attribute causality. Second, it is possible that observed ILI, as well as laboratory-confirmed influenza diagnoses, might be lowered by healthcare system efforts to triage mildly ill persons with ILI away from the healthcare setting to alternative COVID-19 testing locations (eg, drive-through or home visit collection) where they would not be captured in the ILINet or tested for influenza. Finally, COVID-19 diagnostic results might be influenced by ongoing changes in COVID-19 testing patterns during the reporting period.

Together, these results support use of multiple sources for triangulation in regional monitoring of trends and impact of policies for COVID-19, particularly in locations where the disease is emerging, testing capacity is still being strengthened, and/or influenza is in decline.

Note

Following is a list of the members of the New York State Coronavirus 2019 Response Team: Madhu Anand, New York State Department of Health (NYS DOH) Bureau of Communicable Disease Control; Bryon Backenson, NYS DOH Bureau of Communicable Disease Control; Alison Kaufman, NYS DOH Bureau of Communicable Disease Control; Daniel Kuhles, NYS DOH Bureau of Communicable Disease Control; Alison Muse, NYS DOH Bureau of Communicable Disease Control; Alexandra Newman, NYS DOH Bureau of Communicable Disease Control; Wendy Pulver, NYS DOH Bureau of Communicable Disease Control; Lou Smith, NYS DOH Bureau of Communicable Disease Control; Jamie Sommer, NYS DOH Bureau of Communicable Disease Control; Jennifer White, NYS DOH Bureau of Communicable Disease Control; Amy Dean, NYS DOH Wadsworth Center; Victoria Derbyshire, NYS DOH Wadsworth Center; Christina Egan, NYS DOH Wadsworth Center; Meghan Fuschino, NYS DOH Wadsworth Center; Sara Griesemer, NYS DOH Wadsworth Center; Rene Hull, NYS DOH Wadsworth Center; Daryl Lamson, NYS DOH Wadsworth Center; Jennifer Laplante, NYS DOH Wadsworth Center; Kathleen McDonough, NYS DOH Wadsworth Center; Kara Mitchell, NYS DOH Wadsworth Center; Elizabeth Nazarian, NYS DOH Wadsworth Center; Michael Popowich, NYS DOH Wadsworth Center; Jill Taylor, NYS DOH Wadsworth Center; Anne Walsh, NYS DOH Wadsworth Center; Sherlita Amler, Westchester County Department of Health; Ada Huang, Westchester County Department of Health; Renee Recchia, Westchester County Department of Health; Elizabeth Whalen, Albany County Department of Health; Elizabeth Lewis, Albany County Department of Health; Cynthia Friedman, Suffolk County Department of Health Services; Sandra Carrera, Suffolk County Department of Health Services; Lawrence Eisenstein, Nassau County Department of Health; Ann DeSimone, Nassau County Department of Health; Johanne Morne, NYS DOH AIDS Institute; Megan Johnson, NYS DOH AIDS Institute; Kristen Navarette, NYS DOH; Jessica Kumar, NYS DOH; Stephanie Ostrowski, NYS DOH; Andrienne Mazeau, NYS DOH; Sally Dreslin, NYS DOH; Nora Yates, NYS DOH; Danielle Greene, NYS DOH; Eugene Heslin, NYS DOH; Emily Lutterloh, NYS Bureau of Healthcare Associated Infections; David Holtgrave, University at Albany School of Public Health, State University of New York; Meredith Barranco, University at Albany School of Public Health, State University of New York.

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