

Descriptive Analysis of COVID-19 Infections in Milwaukee County after the Wisconsin Election and Easter/Passover Holidays

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WI Election and Easter and Passover Holidays

Wisconsin held a statewide election in person on April 7th, 2020. Shortly thereafter, Easter and Passover holiday celebrations took place. This report explores the potential impact of the election and holiday weekend on COVID-19 infections among Milwaukee County residents. We present (1) overall trends and other factors that could have influenced COVID-19 trends during this time period, (2) descriptive information about individuals diagnosed with COVID-19 who participated in person in the April 7th election, (3) a comparison of voters with symptom onset dates prior to the election (those who may have been infectious at the time of voting) and after the election (those who may have been infected while participating in voting), and (4) an examination of data from the city of Milwaukee specifically, where the number of polling locations was reduced from 180 to 5 (Spicuzza and Dirr 2020).

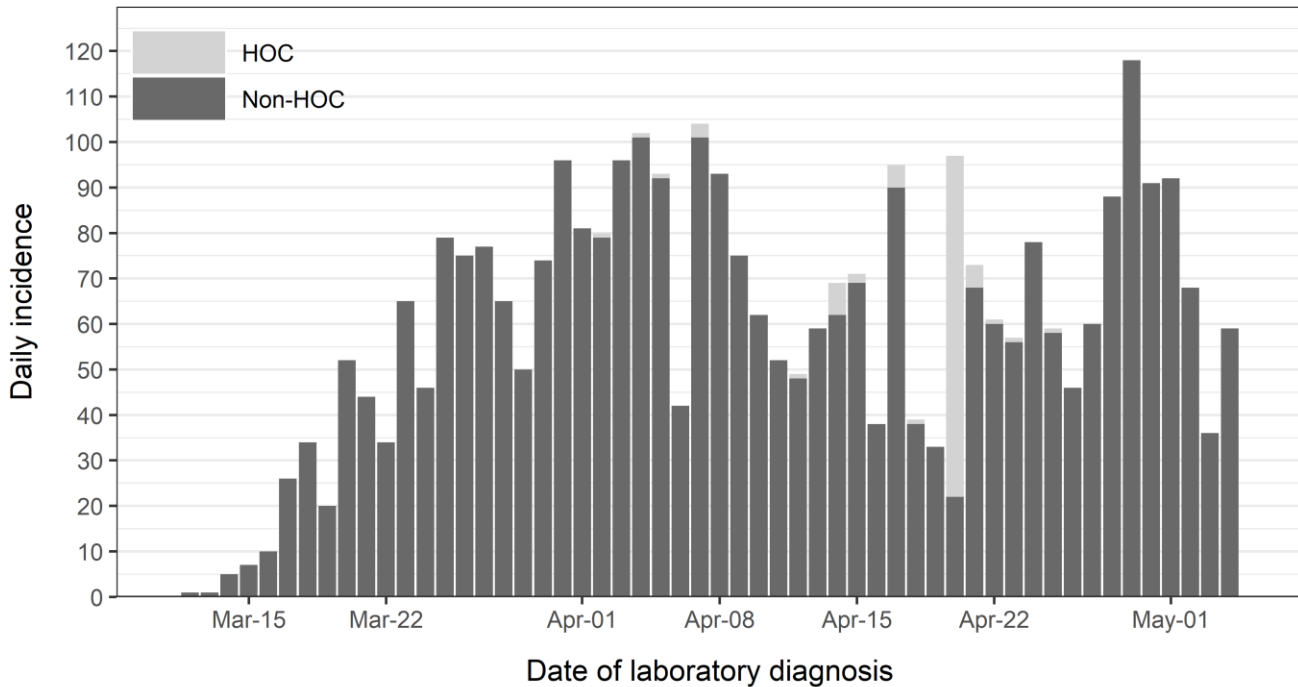
1. General trends in COVID-19 diagnoses and contextual factors

Symptoms of COVID-19 are reported to occur between 2 and 14 days after exposure, with a mean onset of 5-6 days after exposure (Centers for Disease Control and Prevention 2020; Harvard Health Publishing 2020; Mayo Clinic Staff 2020). We thus examine cases for which onset was reported to have occurred between 2 and 14 days after the April 7th election (onset April 9-April 21) and the April 10-12th Easter and Passover holiday weekend (April 12–April 26).

In addition to the election and the holiday weekend, several other contextual factors influenced COVID-19 data from this time period. First, around the time of the election, the number of COVID-19 cases began to decrease. However, approximately a week later, there was an uptick in the total number of tests completed and a general expansion of testing capacity, which comes with an expectation of an increased detection of cases. Further, during the same period, we observed several instances of focused testing and case ascertainment that have impacted observed trends. Perhaps the most influential of these events is the testing of all inmates at the Milwaukee County House of Corrections (HOC). All inmates were tested between April 18th and 19th, representing a 100% testing rate and an expected increase in cases in a population unable to take part in in-person voting. Staff at the HOC were tested on April 20th.

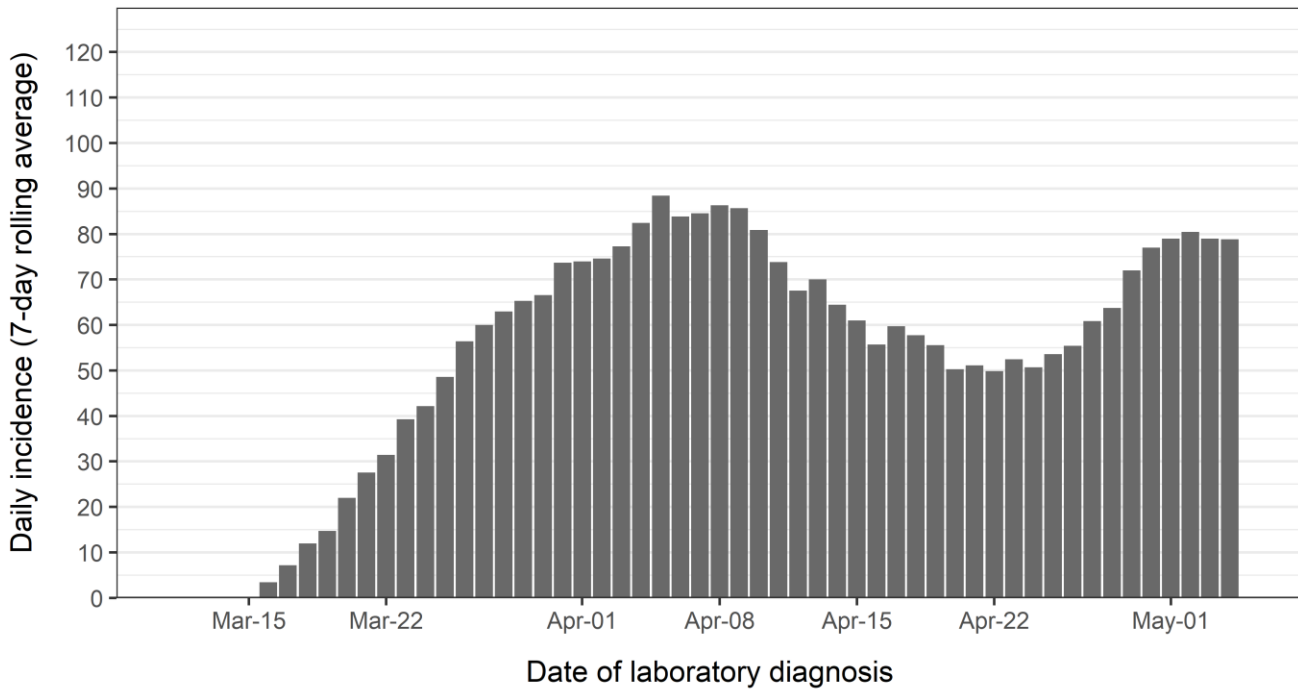
The figures below show the trend in COVID-19 cases since the start of the epidemic on March 12th. **Figure 1** shows the cumulative incidence of COVID-19, with cases among HOC inmates indicated. **Figure 2** shows the 7-day average daily incidence, excluding cases among HOC inmates. This view is important given substantial variation in daily incidence, including due to limited reporting of cases on weekend days. To relate incidence to the total number of tests conducted, **Figure 3** depicts the percentage of positive tests. Overall, a decrease in confirmed cases is observed starting around the time of the election; this decrease is not consistent, and a new increase in confirmed cases is observed starting around April 20th through April 22nd. Additional factors affecting these trends complicates interpretation and makes isolating the potential impact of these events difficult.

Figure 1: Milwaukee County daily number of confirmed COVID-19 cases



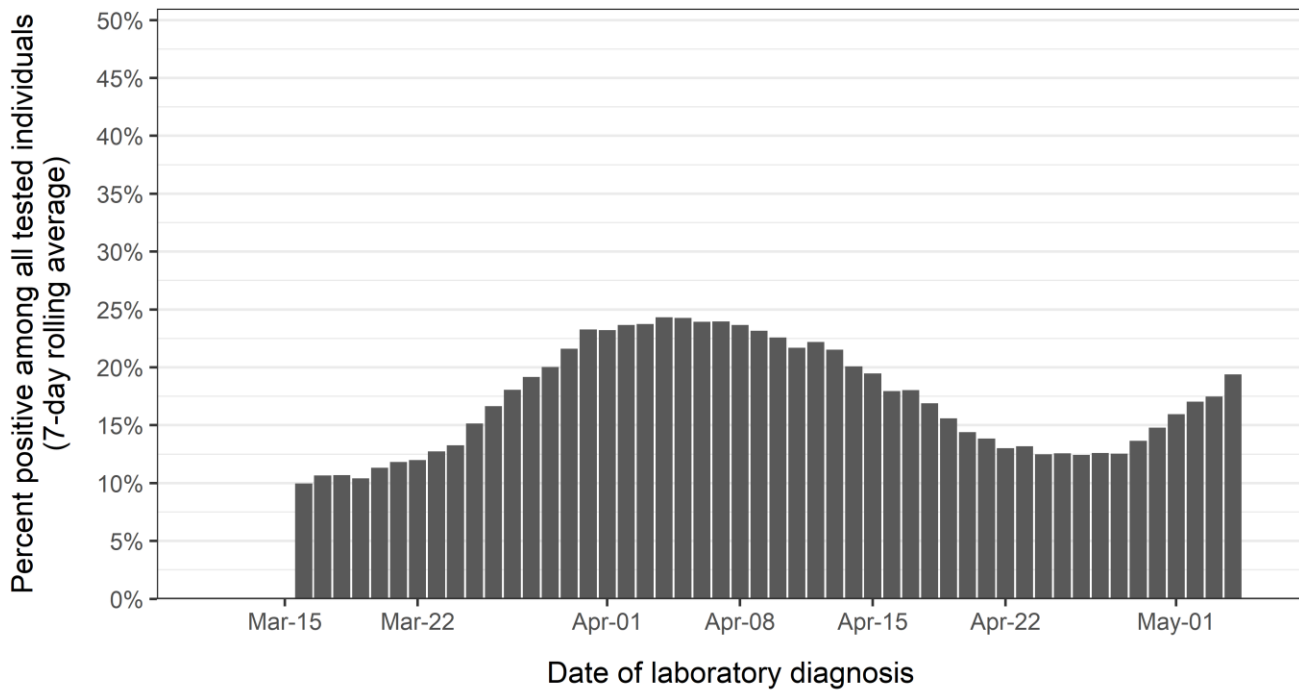
Data source: Wisconsin Electronic Disease Surveillance System (WEDSS)

Figure 2: Milwaukee County average daily number of confirmed COVID-19 cases, excluding HOC inmates



Data source: Wisconsin Electronic Disease Surveillance System (WEDSS)

Figure 3: Milwaukee County percentage of positive tests among all individuals tested, excluding HOC inmates



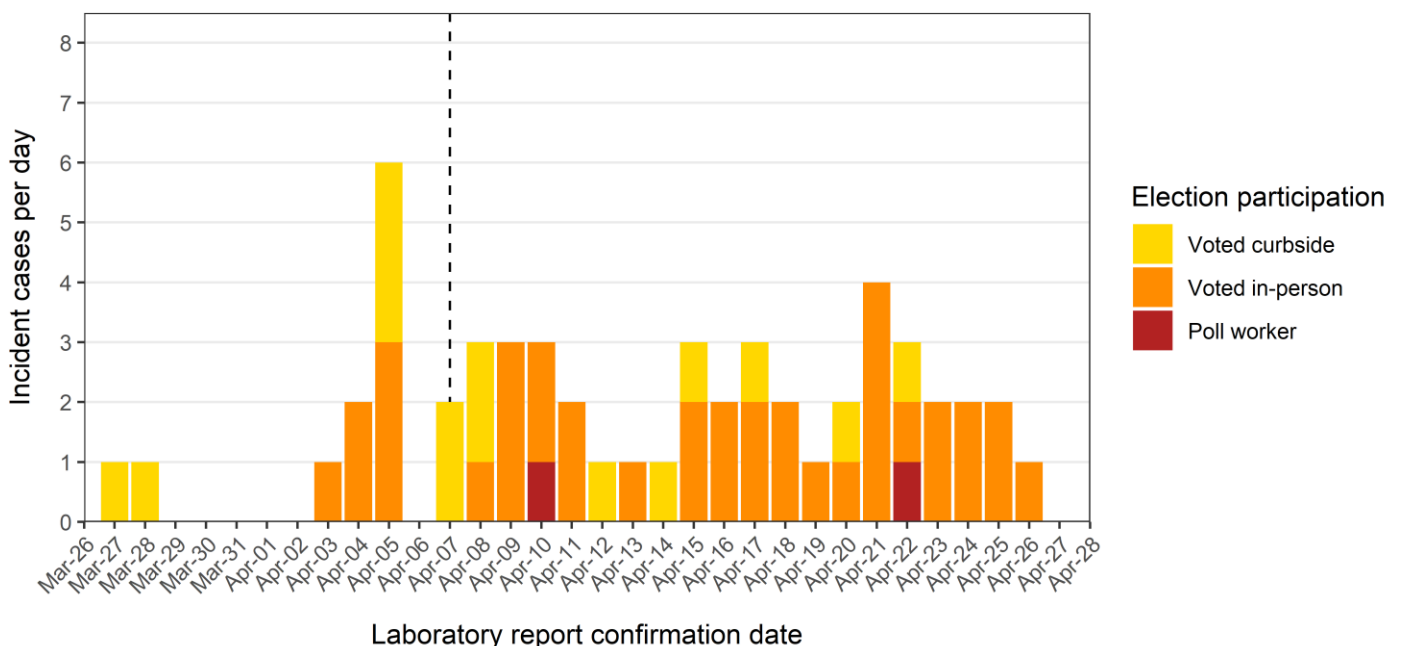
Data source: Wisconsin Electronic Disease Surveillance System (WEDSS)

2. Summary of election participants

We define the population of individuals diagnosed with COVID-19 who participated in the election based on lab report confirmation date, symptom onset date, and their responses to questions about election participation. Only individuals who responded to questions about election participation and indicated that they participated in person, curbside, or as a poll worker are included. Further, the group is limited to those with a symptom onset date on or prior to April 21st. For individuals who participated in the election but do not have a symptom onset date (N = 8), we use the lab report confirmation date. Because lab report confirmation date generally follows symptom onset date by 6 days, we limit our analysis of the election to all COVID-19 cases who report voting and have a lab report confirmation date on or before April 27th. Of note, approximately half of confirmed COVID-19 cases during this time responded to questions about participating in the election (46.9% response rate among cases confirmed on or after April 7th), leaving substantial uncertainty. Due to limitations in testing and asymptomatic cases, it is likely that there are individuals with COVID-19 who participated in the election and are not reflected in the numbers presented here.

A total of 54 Milwaukee County residents who have been diagnosed with COVID-19 were identified to have participated in the election in person and have symptom onset or lab report confirmation dates indicating that they could have been infectious or infected at the time of voting. **Figure 4** below shows the incidence of COVID-19 positive cases who are known to have participated in the April 7th WI election as a poll worker or through voting either in-person or curbside. Some of these cases may have been infected prior to voting, some may have been infected while voting, and others may have been infected during other activities not related to the election.

Figure 4: Milwaukee County confirmed COVID-19 cases who are known to have participated in the April 7th WI election



Data source: Wisconsin Electronic Disease Surveillance System (WEDSS)

The table below summarizes characteristics of these cases. Of note, most participants voted in person (68.5%), most were Black/African American (59.3%), the vast majority were from the city of Milwaukee (81.5%), and many experienced onset of symptoms prior to April 9th (50.0% among cases with a recorded onset date), indicating that they were likely infectious at the time of voting. Of individuals identified in this review diagnosed with COVID-19 who took part in the election in person, 8 (14.8%) are now hospitalized and 0 have died. Among this group of voters, 29 individuals (53.7%) do not have any other known potential exposures to COVID-19 including (1) being a health care worker, (2) recent travel, or (3) contact with a COVID-19 positive individual.

Table 1: Characteristics of positive cases in Milwaukee County who are known to have participated in the election

	All N = 54
Participation in WI election	
Voted in-person	37 (68.5%)
Voted curbside	15 (27.8%)
Poll worker	2 (3.7%)
Age	
Mean (SD)	53.4 (13.8)
Median [Min, Max]	56.5 [19.0, 76.0]
Gender	
Female	30 (55.6%)
Male	24 (44.4%)
Race/Ethnicity	
Black or AA	32 (59.3%)
White	15 (27.8%)
Hispanic	5 (9.3%)
Other/Unknown	2 (3.7%)
City of residence	
Milwaukee	44 (81.5%)
Franklin	2 (3.7%)
Greenfield	2 (3.7%)
West Allis	2 (3.7%)
Hales Corners	1 (1.9%)
Oak Creek	1 (1.9%)
South Milwaukee	1 (1.9%)
West Milwaukee	1 (1.9%)

	All N = 54
Self-reported onset of symptoms	
Onset before April 9 th	26 (48.1%)
Onset on or after April 9 th	26 (48.1%)
Unknown	2 (3.7%)
Any known exposure risks?	
No	29 (53.7%)
Yes	25 (46.3%)
Has patient been hospitalized?	
No	46 (85.2%)
Yes	8 (14.8%)
Deaths	
No	54 (100.0%)

3. Comparison of voters by onset of symptoms

Because some individuals experienced symptom onset prior to voting, and some experienced symptom onset afterward, it is important to examine each group separately. The following table groups the cases who are known to have participated in the election by onset of symptoms before vs. on or after April 9th (2 days after the election). There are 2 patients with no recorded onset date who are excluded from this table.

Among those potentially infectious at the time of voting (N = 26), most (61.5%) voted in person, the average age was 57.6, and 46.2% were female. Of these voters, 76.9% were Black/African American, 19.2% were White, and 3.8% were Hispanic. The vast majority were Milwaukee city residents (88.5%). Most did not report a known source of exposure (65.4%) and 2 (7.7%) have since been hospitalized.

Among those potentially infected while voting (N = 26), the vast majority voted in person (N = 73.1%), the average age was 49.9, and the vast majority were female (69.2%). By race and ethnicity, these voters identified as Black (46.2%), White (34.6%), and Hispanic (15.4%). The vast majority were Milwaukee city residents (76.9%). Many did not report a known source of exposure (46.2%) and 6 (23.1%) have since been hospitalized.

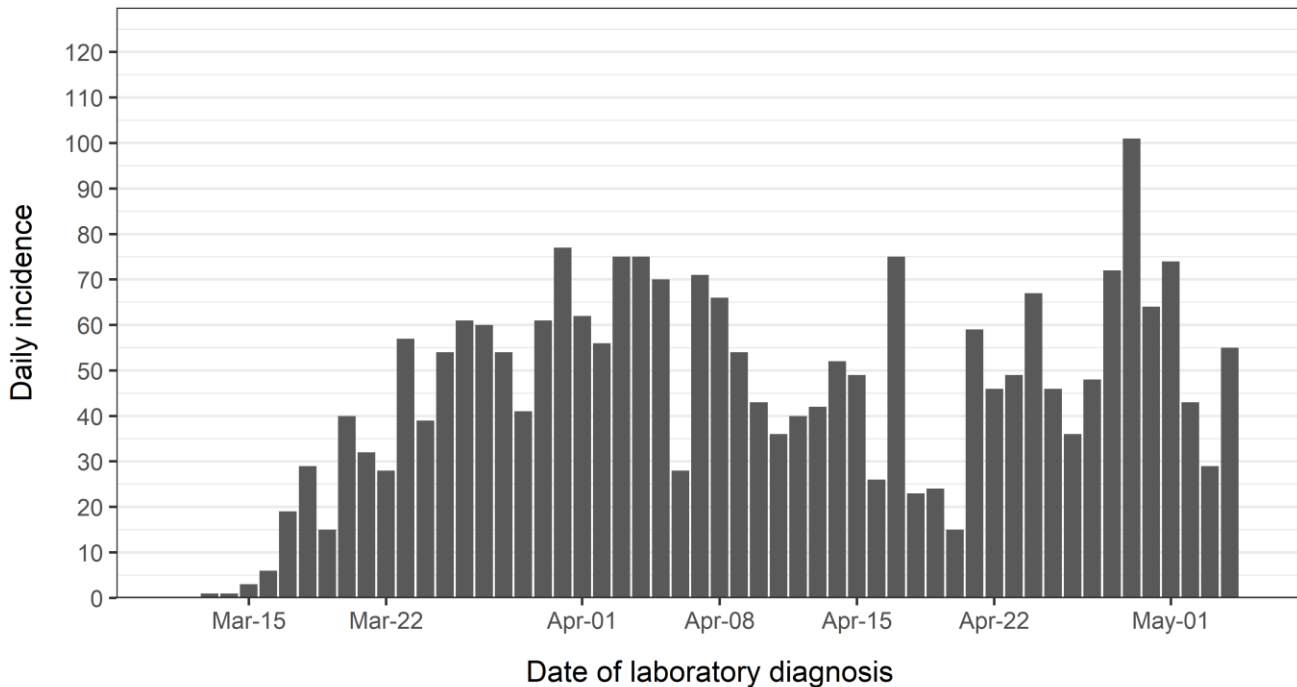
Table 2: Characteristics of positive cases in Milwaukee County who are known to have participated in the election, grouped by onset of symptoms

	Onset Before April 9 th	Onset on or After April 9 th
	N = 26	N = 26
Participation in WI election		
Voted in-person	16 (61.5%)	19 (73.1%)
Voted curbside	10 (38.5%)	5 (19.2%)
Poll worker	0 (0.0%)	2 (7.7%)
Age		
Mean (SD)	57.6 (11.6)	49.9 (14.4)
Median [Min, Max]	57.5 [32.0, 76.0]	54.5 [19.0, 69.0]
Gender		
Female	12 (46.2%)	18 (69.2%)
Male	14 (53.8%)	8 (30.8%)
Race/Ethnicity		
Black or AA	20 (76.9%)	12 (46.2%)
White	5 (19.2%)	9 (34.6%)
Hispanic	1 (3.8%)	4 (15.4%)
Other/Unknown	0 (0.0%)	1 (3.8%)
City of residence		
Milwaukee	23 (88.5%)	20 (76.9%)
Greenfield	1 (3.8%)	1 (3.8%)
West Allis	0 (0.0%)	2 (7.7%)
Franklin	0 (0.0%)	1 (3.8%)
Hales Corners	1 (3.8%)	0 (0.0%)
Oak Creek	1 (3.8%)	0 (0.0%)
South Milwaukee	0 (0.0%)	1 (3.8%)
West Milwaukee	0 (0.0%)	1 (3.8%)
Any known exposure risks?		
No	17 (65.4%)	12 (46.2%)
Yes	9 (34.6%)	14 (53.8%)
Has patient been hospitalized?		
No	24 (92.3%)	20 (76.9%)
Yes	2 (7.7%)	6 (23.1%)
Has patient died?		
No	26 (100.0%)	26 (100.0%)

4. A focus on the City of Milwaukee

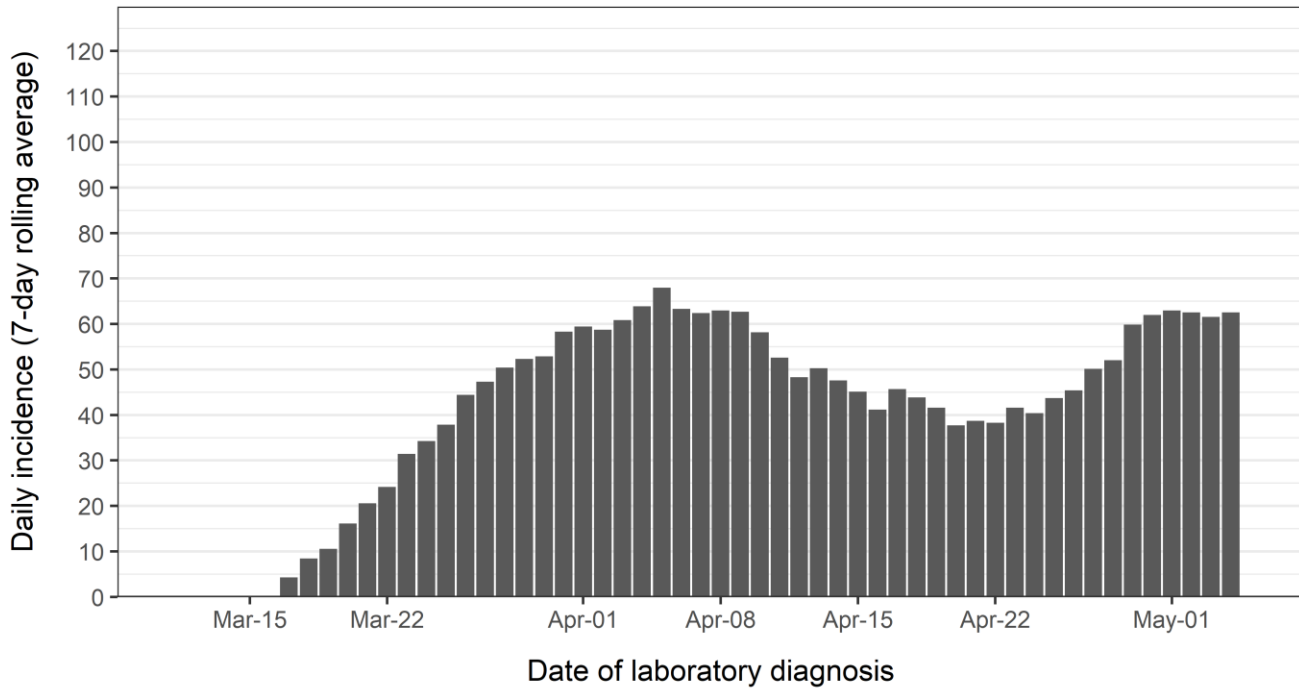
The City of Milwaukee comprises the majority of population in Milwaukee County. Thus, we repeat the above analyses for the City of Milwaukee alone without a consideration of HOC cases as the facility is located outside of the city. **Figure 5** shows daily incidence, **Figure 6** shows 7-day average incidence, and **Figure 7** shows the percent positive testing rate. As with the county, the total number of COVID-19 cases decreased around the time of the election but has since increased again. The reasons for this are unclear, given changes in testing capacity as well as the election and holiday weekend. **Figure 8** shows the laboratory confirmation dates for cases among City of Milwaukee residents who are known to have participated in the election. The following tables provide a summary of characteristics for these City of Milwaukee cases overall (**Table 3**) and grouped by onset of symptoms (**Table 4**).

Figure 5: City of Milwaukee daily number of confirmed COVID-19 cases



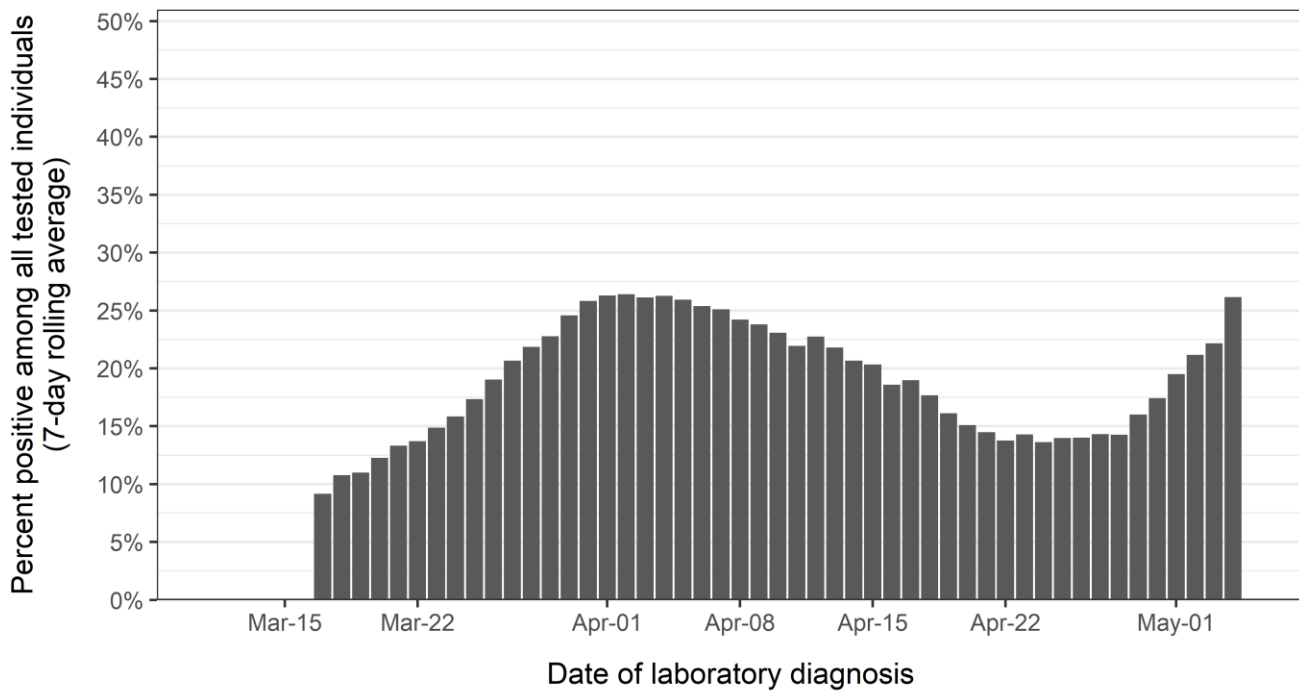
Data source: Wisconsin Electronic Disease Surveillance System (WEDSS)

Figure 6: City of Milwaukee average daily number of confirmed COVID-19 cases



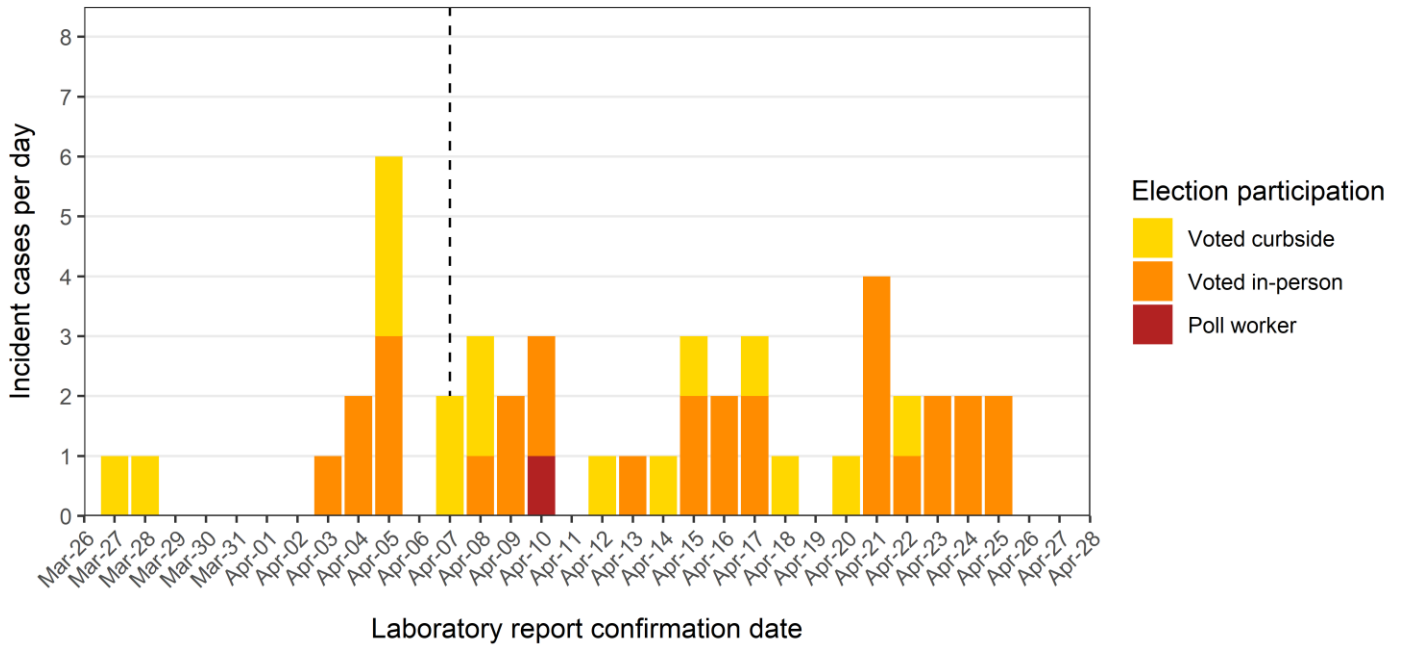
Data source: Wisconsin Electronic Disease Surveillance System (WEDSS)

Figure 7: City of Milwaukee percentage of positive tests among all individuals tested



Data source: Wisconsin Electronic Disease Surveillance System (WEDSS)

Figure 8: City of Milwaukee confirmed COVID-19 cases who are known to have participated in the April 7th WI election



Data source: Wisconsin Electronic Disease Surveillance System (WEDSS)

Table 3: Characteristics of positive cases in the city of Milwaukee who are known to have participated in the election

	All
	N = 44
Participation in WI election	
Voted in-person	28 (63.6%)
Voted curbside	15 (34.1%)
Poll worker	1 (2.3%)
Age	
Mean (SD)	52.8 (13.6)
Median [Min, Max]	54.5 [25.0, 76.0]
Gender	
Female	26 (59.1%)
Male	18 (40.9%)
Race/Ethnicity	
Black or AA	32 (72.7%)
Hispanic	5 (11.4%)
White	5 (11.4%)
Other/Unknown	2 (4.5%)
Self-reported onset of symptoms	
Onset before April 9 th	23 (53.5%)
Onset on or after April 9 th	20 (46.5%)
Freq Missing	1
Any known exposure risks?	
No	23 (52.3%)
Yes	21 (47.7%)
Has patient been hospitalized?	
No	37 (84.1%)
Yes	7 (15.9%)
Has patient died?	
No	44 (100.0%)
Freq Missing	0

Table 4: Characteristics of positive cases in the city of Milwaukee who are known to have participated in the election, grouped by onset of symptoms

	Onset Before April 9 th	Onset on or After April 9 th
	N = 23	N = 20
Participation in WI election		
Voted in-person	13 (56.5%)	14 (70.0%)
Voted curbside	10 (43.5%)	5 (25.0%)
Poll worker	0 (0.0%)	1 (5.0%)
Age		
Mean (SD)	57.9 (11.7)	48.3 (13.1)
Median [Min, Max]	57.0 [32.0, 76.0]	50.0 [25.0, 69.0]
Gender		
Female	11 (47.8%)	15 (75.0%)
Male	12 (52.2%)	5 (25.0%)
Race/Ethnicity		
Black or AA	20 (87.0%)	12 (60.0%)
Hispanic	1 (4.3%)	4 (20.0%)
White	2 (8.7%)	3 (15.0%)
Other/Unknown	0 (0.0%)	1 (5.0%)
Any known exposure risks?		
No	15 (65.2%)	8 (40.0%)
Yes	8 (34.8%)	12 (60.0%)
Has patient been hospitalized?		
No	21 (91.3%)	15 (75.0%)
Yes	2 (8.7%)	5 (25.0%)
Has patient died?		
No	23 (100.0%)	20 (100.0%)

Conclusions

The election and Easter/Passover holiday weekend took place during a transition period that makes it difficult to discern whether these events had an impact on the spread of COVID-19. In particular, the increase in testing capacity during this time and the overall decreasing trend in cases starting around the time of the election complicate interpretation.

Data Sources & Acknowledgments

This report was created by faculty and staff in the Medical College of Wisconsin (MCW) Institute for Health and Equity (IHE) in partnership with Milwaukee County collaborators who serve on the Epidemiologic Intelligence team. Data sources include the Wisconsin Electronic Disease Surveillance System (WEDSS), the US Census Bureau, the Milwaukee County Medical Examiner's office, the Emergency Medicine Resource, and publicly available data obtained from local health and emergency response agencies. Data from the Wisconsin Electronic Data Surveillance System (WEDSS) summarized for the week includes data from April 28, 2020 through May 04, 2020. This work was funded by the Advancing a Healthier Wisconsin Endowment at the Medical College of Wisconsin.

Contact Information

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