Community-Based Testing for COVID-19 in a Low-Prevalence, Rural Area: Documentation of Logistics and Practical Aspects of Testing

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ABSTRACT

Introduction: Testing and mitigation strategies for severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) infection often focus on high-prevalence, urban communities, leaving low-prevalence rural areas without specific strategies to maintain the health and safety of their populations. We evaluated a cost-effective strategy for SARS-CoV-2 testing to determine point prevalence in a rural community with a generally low prevalence of infection.

Methods: We voluntarily tested asymptomatic clinic employees and conducted 2 community SARS-CoV-2 testing events in Cashton, Wisconsin, that included testing for asymptomatic persons. We also partnered with local clinics and public health departments to conduct weekly drive-up clinics for asymptomatic, high-risk persons identified through enhanced contact tracing. This was possible as testing capacity in Wisconsin never reached its maximum, and we continued symptomatic testing through our clinic.

Results: We tested 61 employees, 268 individuals at 2 community events, 36 high-risk asymptomatic people at drive-up clinic events, and 128 symptomatic people within our clinic. We observed 1 positive result in asymptomatic people and 5 positive results in symptomatic patients, confirming the low prevalence in our area.

Conclusions: Our testing events confirmed a low prevalence of SARS-CoV-2 infection, providing prevalence information to local businesses and schools. We reinforced our partnership with local public health departments to facilitate enhanced contact tracing and test asymptomatic persons, and we provided a service to asymptomatic persons requiring testing for travel, school, or work. Local businesses and community members appreciated the services and expressed relief for point-in-time testing results during a period of stress and uncertainty.

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INTRODUCTION

Since the first case of coronavirus disease 2019 (COVID-19) in the United States, a wave of infection has left no state without disease burden.[1,2] The prevalence of disease, however, varies widely between states and between rural and urban communities within states. By August 2020, Wisconsin had more than 70,000 cases and 1,000 deaths due to severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2).[3,4] Milwaukee County had the most cases (>23,000), whereas some rural counties had fewer than 50.[3,5]

Information from the Centers for Disease Control and Prevention and public health departments focused initially on high prevalence areas and includes recommendations such as masking, business closures, and occupancy restrictions. Information on managing disease in lower risk, lower prevalence rural areas is lacking. Ways to appropriately ensure safety for COVID-19 in rural populations already at risk for social isolation and related health issues, including increased rate of heart attacks, depression, and chronic disease, have not yet been fully elucidated.[6] Rural areas face particular challenges in the surveillance of SARS-CoV-2 because of greater travel distances for testing, risks of travel in and out the community, and diminishing capacities in rural hospitals.[6-10] In addition, rural physicians tend to be older and at greater risk themselves.[7]

Data on the transmission of SARS-CoV-2 indicate asymp-

tomatic people actively contribute to the reproductive number (R0), often without awareness they are infecting others.[11] Despite risk of transmission of SARS-CoV-2 by asymptomatic persons, appropriate testing strategies for asymptomatic persons, including health care workers, have not been fully determined. Limited testing resources and the focus on testing symptomatic patients have likely hindered the ability to accurately determine prevalence of the virus in both urban and rural communities.[7] However, within Wisconsin, testing capacity has not reached full capacity, allowing the opportunity to work with local health departments to offer testing to asymptomatic persons.[12]

Scenic Bluffs Community Health Center is a Federally Qualified Health Center (FQHC) with its primary site in Cashton, Wisconsin. Most patients are from Monroe County and the surrounding counties of Vernon and La Crosse. The first positive case of SARS-CoV-2 infection reported in Monroe County was on March 24, 2020.[13] In Vernon and La Crosse counties, the first cases confirmed were on April 22 and March 18, 2020, respectively.[14,15] Each of these counties had a low prevalence of disease when testing began in the area. A proactive testing protocol for symptomatic and asymptomatic patients was started to help determine the usefulness of enhanced contact tracing and community-wide testing. This report describes a collaborative approach to monitoring prevalence of disease burden of SARS-CoV-2 in a low incidence area of Wisconsin.

METHODS

Planning for Testing

Prior to large-scale community testing, we reviewed recommendations from health centers that had completed similar events.[16] We then created a map of our facility and contacted local authorities to determine logistics of traffic flow and set-up during an event. We advertised the first community event locally by word of mouth, flyers to local businesses for their essential workers, and flyers to local homes in English and Spanish. We encouraged preregistration by phone so that contact information for anyone who was not a patient at our clinic could be entered into our electronic health record. We requested insurance information to bill for staff time to administer the test; however, participants were not billed for any costs not covered by insurance.

To conduct testing while keeping costs at a minimum, we obtained test kits through Exact Sciences Laboratories, LLC (Madison, Wisconsin), which partnered with the state of Wisconsin to increase testing capacity and provide testing supplies, laboratory services, and results to any health care provider without cost.[17] Our health center also received grant funding from the federal government to continue to provide services throughout the pandemic, which allowed us to cover some staff expenses for testing events despite the ubiquitous decrease in revenue for primary care providers during this pandemic.

Testing Procedures

The procedures for the SARS-CoV-2 (N gene detection) test were followed as described by Exact Sciences and the Wisconsin Department of Health Services.[17] This test is a real-time reverse transcriptase polymerase chain reaction (RT-PCR) test for qualitative detection of nucleic acid from SARS-CoV-2 in respiratory specimens. Collection supplies were used for nasal (anterior nares) collection, including a synthetic-tipped swab on a plastic shaft and RNase-free normal saline transport media. Samples were stored in a biohazard bag and temperature controlled from the time of collection until shipment by courier for processing the evening of the sample collection. Laboratory processing included extraction of viral RNA from specimens followed by 1-step reverse transcription and PCR amplification with primer and probe sets specific to regions of the SARS-CoV-2 RNA genome.[18]

Employee Testing and Community Testing Events

Prior to the first community event, asymptomatic health center employees were screened to evaluate courier systems and testing protocols. The initial community-wide testing event was held May 20, 2020 in advance of a holiday weekend and included testing for both symptomatic and asymptomatic individuals. Advertising by flyers began approximately 10 days before the event. A second employee-only event was completed on June 1, 2020.

On July 10, 2020, a second community event was held just after a holiday weekend. Advertising included printed flyers and word of mouth through local public health organizations, including schools. Social media was used the day of the event but not before to ensure outreach was localized.

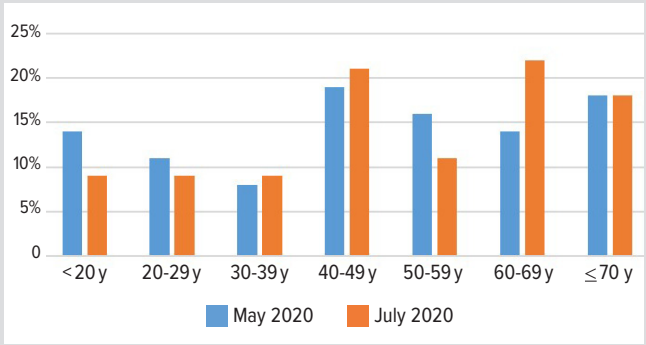
During the community testing events, 1 person directed traffic into 2 separate testing lanes. At the far end of the event site, registration staff assisted with test packets for preregistered people. Premade test packets included patient-specific lab labels, testing supplies, and a consent form. The consent form included a disclaimer and release explaining that deidentified test results may be used for education and research purposes, along with standard privacy and HIPAA policies. Participants were asked to sign the form prior to testing. The packet was then placed on people's windshields as they drove to the testing tent. For those who had not preregistered, the staff stationed at the registration tent helped them complete the information prior to advancing to the testing tent, and the packet was still placed on the windshield. Two staff members were assigned per testing lane: 1 person administered the test and the other verified correct labeling on the containers and information on the lab sheet. A clinician was available in the testing tent to answer patient questions or provide advice on maintaining quarantine if someone was experiencing symptoms or was thought to have a high-risk exposure. We defined high-risk asymptomatic persons as having a known exposure to another person who tested positive for SARS-CoV-2 infection or had exposure to another person under

Table 1. Testing of Employees and Persons at Community Testing Events or Weekly Clinics, May – July, 2020

	Date	N	Positive Tests (n)
Asymptomatic Employee Testing	May 14	37	1[a]
Asymptomatic Employee Testing	June 1	27	0
Community Testing Event #1	May 20	124	0
Community Testing Event #2	July 10	144	0
June (Thursdays) Drive-up Clinic Testing (High-Risk Asymptomatic Persons)	June 4	2	0
	June 11	2	0
	June 18	6	0
	June 25	15	0
July (Thursdays) Drive-up Clinic Testing (High-Risk Asymptomatic Persons)	July 2	4	0
	July 16	4	0
	July 23	3	0
	July 30	0	0
Symptomatic Persons Tested in the Clinic	May – July	128	4

[a]A second PCR swab was done 5 days after the first positive result (the day the positive test result was returned) and a third PCR swab was done on day 7. Both subsequent swabs were negative, and an antibody test done at 4 weeks also was negative. The patient was isolated until 2 negative results were obtained.

Figure 1. Age Distribution of People Tested at 2 Community Events



Abbreviation: y, years.

Figure shows results from community testing event held May 20, 2020 (N = 124) and July 10, 2020 (N = 144).

investigation. Staff in the testing tent only used full personal protective equipment (PPE), including a powered air purifying respirator (PAPR), gown, and gloves. Staff at registration wore masks, gloves, and gowns because they were reaching in and out of people's cars at various times, similar to other events across the country.[19] Participants were informed they would be called at the phone number they provided when results were available. Employees and community members were allowed to have a repeat test at a subsequent event.

Partnership With Local Health Departments for Drive-up Testing of High-Risk, Asymptomatic Persons

After the first event, the health center recognized there was a need/desire in the community for asymptomatic testing, based on public reactions and calls from patients and community members regarding testing capability. Callers primarily asked if the center was still willing to test people without symptoms for reasons such as travel, work clearance, and contact with a case. Active connections are maintained with the Monroe County Health Department—the local public health department (LPHD) and site of the main health center location. Health center staff is also in communication with LPHDs in Vernon and La Crosse counties, and the pandemic increased the frequency of these conversations and connections. Thus, it was natural to develop partnerships with LPHDs for SARS-CoV-2 testing.

After strategic conversations with representatives of LPHDs, we established a weekly 2-hour drive-up "clinic" by appointment and referral for asymptomatic testing only. We maintained that the patient had to have a recommendation from an outside provider (ie, either from a clinic or public health department) to ensure that patients had been counseled on the interpretation of test results. Specifically, patients were instructed that a negative result did not mean that quarantine was no longer necessary for a high-risk contact patients or that someone was no longer at risk for infection in the future. In the absence of a referral or contact with another provider, we offered the patient a visit with a clinic provider, but we did not schedule these patients for drive-up testing. The health department also started using our "high-risk clinic" for some enhanced contact tracing to obtain tests for high-risk contacts of known cases. Most drive-up testing clinics were held on Thursdays during June and July, with the exception of July 9 as people were scheduled for our large community-wide event the following day, if appropriate.

Testing of Symptomatic Patients at Our Clinic

Throughout these events, we maintained regular clinic hours and included symptomatic testing by appointment. People concerned about SARS-CoV-2 based on contact who did not have a referral to our high-risk clinic were offered an appointment with a provider, but with no guarantee of testing at that visit.

RESULTS

Asymptomatic Employee Testing

We tested 37 asymptomatic employees prior to the first community testing event and 27 asymptomatic employees at a second timepoint (Table 1). We observed 1 positive SARS-CoV-2 test in an asymptomatic employee who was not working in the building at the time.

Community Testing Events

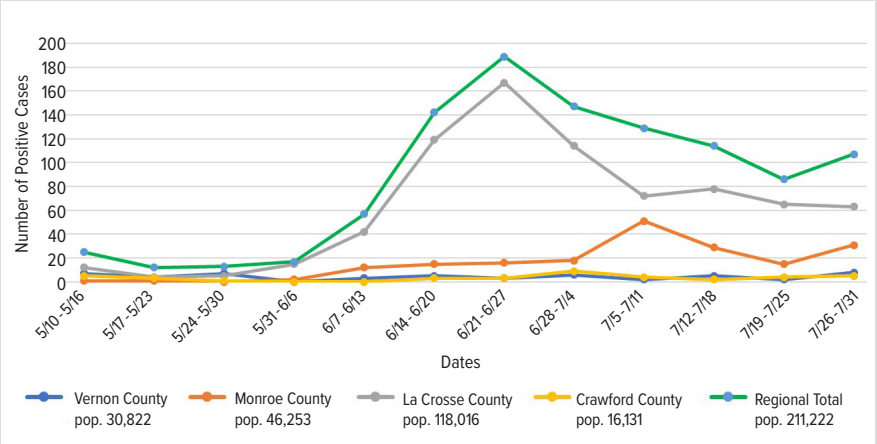
We tested 124 people—symptomatic and asymptomatic—at our first community event May 20 (Table 1). The majority were asymptomatic when tested. At a second community-wide event July 10, we screened 144 people. There were more symptomatic people at the second event, and many more had some type of contact to a positive case that was not considered high risk by the

health department. The majority of participants at community events were aged 40 years and older and nearly one-fifth (18%) were older than 70 years (Figure 1). In contrast, symptomatic persons tested within our clinic tended to be younger, and only 10% of those tested were older than 65 years (data not shown). Consistent with community demographics, most participants at community events were White/Caucasian (data not shown).

Testing of High-Risk Asymptomatic Persons at Weekly Drive-up Clinics

The 2-hour drive-up testing clinics were held weekly in June and July, 2020 (Table 1). No asymptomatic high-risk persons tested positive for SARS-CoV-2.

Figure 2. Weekly Positive Case Count by County[22]



Abbreviation: pop, population.
Data on weekly positive SARS-CoV-2 tests for 4 counties in Wisconsin from May 10 to July 31, 2020. Populations estimates are based on 2019 data.[23]

Testing at Our Clinics

From May through July, 2020, 128 symptomatic patients were teseted at our clinic during normal clinic hours (Table 1). Four patients (3.1%) tested positive for SARS-CoV-2 infection.

Availability of Test Results

Results were typically available within 3 to 7 days, depending on lab capacity. After our first community event, most results were received within 4 days; however, due to labeling errors, some results were delayed up to 7 days. After our second event, results were back within 4 days and all participants were contacted within 5 days of the event. For the weekly clinics, results were often received within 3 to 4 days.

Table 2. SARS-CoV-2 Test Positivity Rate by Date and County[22]

Dates (2020)	Vernon	Monroe	La Crosse	Crawford	Region Total
May 10 – May 16	4.1%	0.5%	2.7%	2.0%	2.3%
May 17 – May 23	1.9%	0.3%	0.5%	3.2%	0.8%
May 24 – May 30	3.2%	0.0%	0.4%	0.4%	0.5%
May 31 – June 6	0.0%	0.4%	1.0%	0.0%	0.6%
June 7 – June 13	1.4%	2.7%	4.5%	0.0%	3.3%
June 14 – June 20	2.6%	4.0%	9.2%	0.3%	5.1%
June 21 – June 27	1.3%	3.4%	9.1%	1.6%	6.9%
June 28 – July 4	2.6%	3.2%	6.0%	5.8%	5.2%
July 5 – July 11	0.4%	11.3%	6.1%	1.9%	5.6%
July 12 – July 18	2.7%	5.7%	13.3%	1.1%	7.7%
July 19 – July 25	0.9%	4.1%	6.2%	2.5%	4.8%
July 26 – July 31	2.4%	6.3%	5.7%	3.4%	5.1%

Estimated Costs of Events

Exhaustive cost analysis was not performed; however, we estimate each 6-hour event cost the health center approximately $7,100 for staff time the day of the event and for follow-up. Staff entered results into the Wisconsin Electronic Disease Surveillance System (WEDSS) and contacted each participant by phone with their results. Supply costs were approximately $4/person since lab supplies and costs were covered by Exact Sciences. We also implemented appropriate use of PPE, utilizing reusable equipment (PAPRs) if possible.

DISCUSSION

We aimed to determine the point prevalence of COVID-19 to help define cost-effective mitigation efforts for our community. Through increased access to COVID 19 testing, we sought to reassure community members and test travelers and other people at risk. Our results confirmed that point prevalence for the community remained low in an asymptomatic population when there was little prevalence in the symptomatic population, even as incidence began to increase in the region and throughout the state. We observed 1 positive result in asymptomatic persons and 5 positive results in symptomatic patients. We also had 1 positive test in a high-risk asymptomatic person tested on August 4, 2020, which was after our July 31, 2020 data cut-off date.

Other testing events occurred in the area around the time of our second community event on July 10: one in Monroe County on June 30, testing more than 200 people with 7 positives;[20] and one in Vernon County on July 7, testing over 400 people with no positives.[21] Both were run by the National Guard in partnership with local health organizations. Results were shared with us through the LPHDs. At the time of our events, the symptomatic positive rates in our surrounding area remained low but increased beginning at the end of May (Figure 2).[22,23] From May 10 through July 31, 2020, the positivity rate for the 4-county region ranged from 0.5% to 7.7% (Table 2).[22] The number of positive cases in Wisconsin increased in September 2020, with a peak number of cases in November 2020. Though our 2 community testing

events were open to everyone, all but 3 people tested were from ZIP codes starting with "546"—our primary service area—thus achieving our goal of testing local community residents.

Our informal, ongoing discussions with LPHD helped keep us informed of local trends and provided public health agencies a resource for their clients who had limited access to medical care or testing. As a smaller, independent organization, we were the only clinic in our region able to provide asymptomatic testing at the time of our events. We provided testing at no cost to patients, regardless of insurance status. Our community testing events appeared to provide reassurance to the people tested, as evidenced by many compliments received and requests for future events from local businesses and multiple local school districts. Our weekly "high-risk" clinic continues to receive referrals from LPHDs and physicians affiliated with other facilities whose patients have had exposures that warrant testing.

PCR testing of asymptomatic people with nasopharyngeal swabs is not ideal. Given the lower prevalence of SARS-CoV-2 in asymptomatic people, the positive and negative predictive values of PCR testing is predictably lower in asymptomatic people than in those who are symptomatic. Based on information provided by Exact Sciences, their PCR test for SARS-CoV-2 agreed with 100% of both positive and negative results versus another COVID-19 PCR test; however, a definitive way to measure sensitivity and specificity of the PCR test used was not available given the lack of a standard or other COVID-flu test for comparison.

We suggest that the benefits of testing asymptomatic people in our community outweigh the shortcomings, because asymptomatic participants were offered appropriate information on testing limitations. Through face-to-face education, people who were tested were instructed to continue their quarantines if exposed to a person who tested positive and that negative tests do not affect risk of future infections. All participants tested at community events received verbal information from a health care professional for any high-risk exposure and written materials reiterating recommendations on handwashing, wearing masks, and physical distancing.

Controlling the spread of SARS-CoV-2 infection involves enhancing awareness of testing, ensuring the availability of testing for symptomatic and asymptomatic persons, optimizing the ease of access to testing, and addressing community perceptions regarding testing.[24,25] Maintaining high capacity for testing and resources for contact tracing levels continues to be important in controlling the COVID-19 pandemic as mandates, such as limiting restaurant capacities, are lifted. Community testing events can develop and sustain effective links between testing and primary care. As a primary care provider, our health center understands community issues and can respond to both community and individual patient needs. We also understand privacy issues and the importance of follow-up for patients if they become symptomatic and/or require further intervention. Larger community-wide testing events may not allow for patient education and the relationship building we can offer. Through partnerships with local public health and community organizations, we continue to recommend mitigation and containment strategies for our patients and community. Prior to the availability of vaccine, we promoted strategies including mask-wearing in public, frequent hand hygiene, and limiting large group gatherings without masks.

In order to ensure reimbursement of costs, other area organizations limit community testing to patients covered by specific insurance plans. An insurance-based approach excludes those who are uninsured or have other financial, cultural, or linguistic barriers to care. FQHCs, such as Scenic Bluffs, operate on a sliding fee scale and accept patients regardless of insurance status or ability to pay. Thus, FQHCs are uniquely positioned to focus on low income or otherwise underserved communities. In our small, primary care clinic with modest federal grant funding, we were able to prioritize timely test results, patient notification, and effective systems to link participants with a primary care clinician. We are working to reduce costs by streamlining paperwork and assigning appropriate tasks to volunteers. Challenges with conducting an independent testing event include access to electrical supplies outdoors, reliable internet access, weather, and staff to ensure adequate testing, registration, and data management.

We will continue to hold asymptomatic community-wide testing events if requested by public health departments or other organizations. Through our partnership with LPHDs, we continue to provide "enhanced contact tracing" by testing asymptomatic contacts with significant exposure to confirmed cases. Ideally, this strategy will identify asymptomatic carriers before they spread the virus. Our results may help inform policies around business and school openings, and at the time of writing, we plan to test public school employees prior to their return to work as requested by 4 local school districts. Our continued testing program can provide reassurance to our community during this tumultuous and challenging era.

CONCLUSION

We were able to implement enhanced contact tracing that may not be possible in larger urban areas due to logistical and resource challenges. Our community testing and testing of high-risk asymptomatic persons served people without access to testing through other means and helped to reassure our community. We propose that additional partnerships and similar testing events be developed given anticipated reductions in testing through the National Guard or patient access to other means of testing. Along with mitigation strategies, testing events continue to be crucial to pandemic management,[24,25] even with the availability of safe and effective vaccines.

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