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RESEARCH NOTES

Pharmacists’ response during a pandemic: A survey on readiness to test during COVID-19

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Background: Testing is a principle component to reopening society and bringing the coronavirus 2019 (COVID-19) pandemic to an end. Pharmacists have the ability to perform certain point-of-care tests under federal regulations. On April 8, 2020, the Office of the Assistant Secretary for Health issued new guidance authorizing licensed pharmacists to order and administer COVID-19 tests.

Objective: The primary objective of this study was to investigate the views of pharmacists about pharmacist-ordered and -administered COVID-19 testing.

Methods: A 13-item questionnaire was developed to survey pharmacists who currently hold an active license in Rhode Island.

Results: A total of 122 (13.8%) pharmacists consented and responded to at least 1 question of the survey. The results indicated that the primary concern of the pharmacists in regard to performing COVID-19 testing was spreading the infection to family members (71.3%). Becoming personally infected (59.8%) and not having access to appropriate personal protective equipment (PPE) (62.3%) were the second and third most common concerns of the pharmacists. Almost all of the pharmacists (99.9%) responded that they would be willing to take part in the testing process if they had appropriate PPE. A total of 46% of the pharmacists expressed concern regarding reimbursement for their company, whereas 56% of the pharmacists requested personal compensation for this service.

Conclusion: Expanding the pool of health care providers who can perform testing is critical to achieving and sustaining proposed testing thresholds. Rhode Island pharmacists are willing to take part in performing COVID-19 testing provided appropriate PPE is available and services are reimbursed. Pharmacists are the most accessible and essential health care providers willing to take on critically important roles during the COVID-19 pandemic provided appropriate safety measures can be met.

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Pharmacists’ response during a pandemic

quarantine. The United States does not have a unified national testing infrastructure, leaving the decisions on testing to the states. This has led to widespread logistical and operational problems with the acquisition of limited supplies of testing equipment and reagents, slowing the delivery of results. At the time of this writing, the United States leads the world in per capita cases, hospitalizations, and deaths. Still, governors across the United States have developed systematic, evidence-based approaches to testing and other harm-reduction approaches such as masking, hand hygiene, and social distancing that have allowed some states to reopen their economies. The success and execution of these plans, including Rhode Island’s, are dependent on testing.

Pharmacy practice continues to fill gaps in health care and population health to address unmet patient needs. Most households in the United States are within 5 miles of a pharmacy and more than 1 pharmacist. Patients access pharmacists significantly more frequently than their primary care providers. Community pharmacy–based point-of-care testing (POCT) is 1 way pharmacists can improve and expand accessibility to services otherwise not readily available to their patients. The Clinical Laboratory Improvement Amendments of 1988 (CLIA) included pharmacies as laboratories, giving them the authorization to perform POCT, in accordance with state and federal regulations. Requirements for these tests vary from state to state and include 120 low-risk tests, including dyslipidemia, diabetes, influenza, and streptococcus group A. As of July 20, 2020, more than 14,000 pharmacies have been issued a CLIA waiver to perform POCT.

On April 8, 2020, the Office of the Assistant Secretary for Health issued new guidance under the Public Readiness and Emergency Preparedness (PREP) Act authorizing licensed pharmacists to order and administer COVID-19 tests that the U.S. Food and Drug Administration has authorized by means of the Emergency Use Agreement framework. Although guidance was issued under the PREP Act that gave pharmacists immunity from liability from claims of loss caused by the administration of COVID-19 tests, the guidance did not address many concerns of pharmacists including reimbursement or the lack of personal protective equipment (PPE).

Health care workers, especially those who provide treatment and testing to patients with COVID-19, are at a higher risk of contracting COVID-19. The World Health Organization recommend that all health care workers who collect specimens use eye protection, a medical mask, a long-sleeve gown, and gloves. These types of PPE are not normal daily equipment for pharmacists and pharmacy staff. Preparing pharmacists for COVID-19 testing, adequate PPE will need to be available. The lack of adequate PPE is one of many concerns pharmacists have while maintaining normal operations, much less considering specimen collection and testing for COVID-19.

The aim of this study was to collect views of pharmacists about the potential of pharmacist-administered COVID-19 tests. This survey could help legislatures understand these views and consider them when creating legislation. In addition, understanding these views would allow pharmacies to make informed decisions and create company policies regarding pharmacist-administered COVID-19 testing that pharmacists would be more likely to willingly accept.

**Objectives**

The primary objective of this study was to investigate the views of pharmacists on pharmacist-ordered and -administered COVID-19 testing.

**Methods**

**Study design, population, and setting**

This was a descriptive survey study that was approved as exempt by the University of Rhode Island institutional review board. Pharmacists who had e-mail addresses publicly listed with the Rhode Island Department of Health received an e-mail asking them to complete a survey. The professional associations disseminated the study as follows: On April 30, the original message was sent to all pharmacists; May 1, the survey was advertised through an electronic newsletter; and on May 7, a reminder was sent through the association Listserve. The survey was also advertised on the Rhode Island Pharmacist’s Association Facebook live COVID-19 town halls held on May 6 and May 13.

Any Rhode Island licensed pharmacist who received an e-mail was eligible to complete the survey. There were no exclusion criteria. There was no incentive for completing the survey, and the survey answers were anonymous and only available to the researchers. The survey remained available for participants to complete between April 30 and May 19, 2020.

**Survey development**

Informed consent was provided before completing the survey through the first question of the survey instrument. Three questions were asked to gather demographics about participants, 1 question was asked about where participants went to gather information about COVID-19, and 8 questions asked participants about their views of ordering and administering COVID-19 tests. All questions were multiple choice, and the participants could select more than 1 answer for 7 questions.

The 13–question anonymous survey was designed by study personnel to take less than 10 minutes to complete. Questions and elements were created and written by study personnel collectively. The survey was not piloted nor validated. The participants were able to quit the survey at any time without recording any information. All responses were stored within the Qualtrics (Qualtrics, Provo, UT) survey system and were only accessed by the researchers for analyses.

**Results**

A total of 879 pharmacists received an e-mail asking them to complete the survey, and 142 pharmacists agreed to take part in the study. In total, 122 (13.8%) pharmacists consented and responded to at least 1 question. Of those, 93 (76.2%) pharmacists described Rhode Island as their primary practice location, 33 (22.9%) indicated chain community pharmacy as their primary practice site, and 72 (59%) graduated pharmacy school before 2005. Table 1 shows all the responses to each question on the survey. The primary concern with COVID-19
testing was infecting family members from work exposure expressed by 87 (71.3%) pharmacists. If asked to conduct COVID-19 testing, 63 (51.6%) pharmacists felt they would not have access to appropriate PPE if they were to conduct testing. A total of 46 (37.7%) pharmacists indicated that their practice site could not be made safe through modifications for testing.

### Table 1

| Number for each question | Response | % (n) |
|-------------------------|----------|-------|
| 1 **What are your concerns with testing for COVID-19? (select all that apply)** | Bringing home the infection to my family | 71.3 (87) |
|  | Not having enough PPE | 62.3 (76) |
|  | Getting infected | 59.8 (73) |
|  | Not being properly trained | 47.5 (58) |
|  | Competing responsibilities | 45.9 (56) |
|  | Not getting paid for the service | 44.3 (54) |
|  | It’s outside my scope of practice | 18.9 (23) |
| 2 **Do you feel that you will have access to adequate PPE if asked to perform testing?** | Yes | 45.9 (56) |
|  | No | 41.6 (63) |
| 3 **How suitable is your current workplace for COVID-19 testing?** | Currently suitable | 25.4 (31) |
|  | Suitable with minimal change | 16.4 (20) |
|  | Suitable with many alterations | 19.7 (24) |
|  | My site cannot be made suitable | 37.7 (46) |
| 4 **How willing are you to perform tests for COVID-19?** | I would volunteer to perform tests without pay outside of my workplace | 18.9 (23) |
|  | I would volunteer to perform tests within my workplace without added payment | 17.2 (21) |
|  | I would only to perform tests with added payment | 28.7 (35) |
|  | I would only perform tests if it is required of me by my employer | 25.4 (31) |
|  | I would not perform tests even if it is required of me by my employer | 9.0 (11) |
| 5 **If you were asked to perform COVID-19 tests, where would you feel most comfortable performing them?** | State-run testing centers | 70.5 (86) |
|  | Emergency department | 28.7 (35) |
|  | Community chain | 26.2 (32) |
|  | Community independent | 23.0 (28) |
|  | Primary care | 42.6 (52) |
|  | Not feel comfortable in any setting | 17.2 (21) |
| 6 **If you were asked to administer COVID-19 tests, what role would you feel comfortable having? (select all that apply)** | Receiving patient-collected sample | 20.5 (74) |
|  | Collecting samples | 19.11 (69) |
|  | Ordering tests | 29.64 (107) |
|  | Selling at-home tests | 20.5 (74) |
|  | Analysis of specimen brought in by patient | 8.31 (30) |
|  | I would not feel comfortable with any role | 1.94 (7) |
| 7 **Given that you are provided proper PPE and trained appropriately, what type of sample would you feel comfortable collecting? (select all that apply)** | Nasopharyngeal swab | 47.5 (58) |
|  | Nasal swab | 75.4 (92) |
|  | Saliva collection | 73.0 (89) |
|  | Fingerstick blood collection | 60.7 (74) |
|  | Venipuncture blood collection | 11.5 (14) |
|  | Not feel comfortable with any method | 14.8 (18) |
| 8 **Under what conditions would you consider administering and performing COVID-19 tests? (select all that apply)** | Services are reimbursed to my employer | 42.5 (52) |
|  | Services are reimbursed to my employer | 56.6 (69) |
|  | Adequate PPE available (per CDC recommendations) | 91.0 (111) |
|  | Instructor-led live training available | 68.9 (84) |
|  | Self-guided training available | 41.0 (50) |
|  | Asymptomatic patient testing | 66.4 (81) |
|  | Symptomatic patient testing | 47.5 (58) |
|  | Walk-in testing | 40.2 (49) |
|  | Drive-thru testing | 46.7 (57) |
|  | Appointment testing | 76.2 (93) |
|  | Adequate support staff (i.e., technicians, interns, etc.) | 81.1 (99) |

Abbreviations used: COVID-19, coronavirus disease 2019; PPE, personal protective equipment; CDC, Centers for Disease Control and Prevention.
samples, collecting samples, ordering tests, selling at-home tests, or analyzing the specimen brought in by a patient. State-run testing centers were the preferred testing location among pharmacists (70.5%). Twenty-one (17.2%) pharmacists indicated that they would not feel comfortable performing COVID-19 testing in any setting, and 7 (1.94%) pharmacists indicated that they would not feel comfortable with any role involved in COVID-19 testing. Pharmacists felt most comfortable collecting nasal (75.4%), saliva (73.0%), and finger stick (60.7%) samples. Collecting samples from patients that are not routinely used in community practice were less preferred. Ultimately, 85% of the pharmacists were comfortable with collecting a sample from at least one of the available methods.

A total of 121 (99.2%) pharmacists would consider ordering and administering COVID-19 tests if reimbursement were provided, either personally or for their employer. Receiving additional live, instructor-led, training for collection and administration of COVID-19 tests was rated as the second most important item. When training and reimbursement were taken into consideration, 81 (66.4%) pharmacists preferred appointment-based testing to on-demand testing.

Discussion

This study indicated that most of the pharmacists were willing to perform COVID-19 testing. Only a small percentage (9%) of the survey pharmacists indicated that they would not be willing to perform COVID-19 testing even if it was required by their employer. The results from this study portray a willingness of pharmacists to participate in COVID-19 testing efforts if certain measures can be met.

The most common concerns reported among pharmacists were bringing the infection home to family members, not having adequate PPE, and getting personally infected. In addition, almost half of the pharmacists expressed that they felt they would not have access to adequate PPE if they were asked to perform testing. If the proper PPE is not used, the risk of infection is greater, and thus, the risk of infecting family members is greater. Household transmission frequently occurs asymptomatically, can occur between adults and children, and is riskiest to people older than 60 years.20-22 If adequate PPE were to be guaranteed and supplied to pharmacies throughout the course of testing operations, presumably, all 3 main concerns would be addressed. Although not directly asked, proper PPE access would likely also reduce the mental health concerns of those surveyed, which have been reported to have increased since the pandemic began.23

Most pharmacists would feel most comfortable performing COVID-19 tests at a state-run testing center rather than a chain or independent community pharmacy, primary care location, or emergency department. This aligns with the finding that most of the pharmacists felt that their current workplace could not be made suitable for COVID-19 testing, even with changes. Most of those surveyed were also willing to collect nasal and saliva samples for testing. Nasal and saliva samples are adequate samples for many point-of-care COVID-19 tests, and they are more comfortable for the patient.24 According to those surveyed, the ideal testing situation is one in which pharmacists are provided adequate PPE in a state-run testing center to collect nasal or saliva samples by appointment only.

Limitations

No validation was conducted to ensure the reliability and clarity of the questions, which may have led to redundancies and/or misguided questions. This study gathered pharmacists’ views about performing COVID-19 tests within a single state, Rhode Island. A limitation of this study was that the views of Rhode Island pharmacists may not accurately represent pharmacists’ views nationwide. This survey was conducted during the initial peak in COVID-19 cases in the state and the region, which may be part of the cause for limited responses. Several individuals who were invited to partake in the survey did not work in direct patient care and did not complete the survey owing to the feeling that the survey was not aimed at them, even though the investigators were looking to collect information from all licensed individuals.

Conclusion

Expanding the pool of health care providers who can perform testing is critical to achieving and sustaining proposed testing thresholds. Rhode Island pharmacists are willing to take part in performing COVID-19 testing provided the appropriate PPE is available and services are reimbursed.

Supplementary data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.japh.2020.10.003.

References

1. Johns Hopkins University of Medicine. Coronavirus resource center. Available at: https://coronavirus.jhu.edu/. Accessed October 3, 2020.
2. Holshue ML, DeRisi L, Lindquist S, et al. First case of 2019 novel coronavirus in the United States. N Engl J Med. 2020;382(10):929–936.
3. Centers for Disease Control and Prevention. Coronavirus Disease 2019 (COVID-19): how COVID-19 spreads. Available at: https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/how-covid-spreads.html. Accessed August 3, 2020.
4. Wang D, Hu B, Hu C, et al. Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus–infected pneumonia in Wuhan, China. JAMA. 2020;323(11):1061–1069.
5. Moghadas SM, Fitzpatrick MC, Sah P, et al. The implications of silent transmission for the control of COVID-19 outbreaks. Proc Natl Acad Sci U S A. 2020;117(30):17513–17515.
6. Lauer SA, Grantz KH, Bi Q, et al. The incubation period of coronavirus disease 2019 (COVID-19) from publicly reported confirmed cases: estimation and application. Ann Intern Med. 2020;172(9):577–582.
7. OECD. Testing for COVID-19: a way to lift confinement restrictions. Available at: https://www.oecd.org/coronavirus/policy-responses/testing-for-covid-19-a-way-to-lift-confinement-restrictions-89756248/. Accessed August 3, 2020.
8. IDSA. COVID-19 diagnostic testing policy recommendations. Available at: https://www.idsociety.org/globalassets/idsa/public-health/covid-19-diagnostic-testing-policy-recommendations.pdf. Accessed August 3, 2020.
9. COVID National Diagnostics Strategy 05.24. Final.pdf. Available at: https://www.democrats.senate.gov/imo/media/doc/COVID%20National%20Diagnostics%20Strategy%2005%2024%202020%2005%2024%20FINAL%20draft.pdf. 2020. Accessed August 3, 2020.
10. RI. gov. Governor unveils ‘Reopen RI’ framework for reopening economy. Available at: https://www.rg.gov/press/view/18234. Accessed August 3, 2020.
11. Qato DM, Zenk S, Wilder J, Harrington R, Gaskin D, Alexander GC. The availability of pharmacies in the United States: 2007–2015. Swiss J Econ. 2017;12(8), e0183172.
12. Bercerbrok LA, Gabriell N, Coley KC, Hernandez I. Evaluation of frequency of encounters with primary care physicians vs visits to community pharmacies among medicare beneficiaries. JAMA Netw Open. 2020;3(7), e209152.
13. Herbin SR, Klepser DG, Klepser ME. Pharmacy-based infectious disease management programs incorporating CLIA-waived point-of-care tests. J Clin Microbiol. 2020;58(5). e00726–19.

14. National Alliance of State Pharmacy Association. COVID-19: testing. Available at: https://naspa.us/resource/covid-19-testing/. Accessed August 3, 2020.

15. U.S. Department of Health and Human Services. HHS statements on authorizing licensed pharmacists to order and administer COVID-19 tests. Available at: https://www.hhs.gov/about/news/2020/04/08/hhs-statements-on-authorizing-licensed-pharmacists-to-order-and-administer-covid-19-tests.html. Accessed August 3, 2020.

16. Centers for Disease Control and Prevention. Coronavirus disease 2019 (COVID-19). Interim operational considerations for public health management of healthcare workers exposed to or with suspected or confirmed COVID-19: non-U.S. healthcare settings. Available at: https://www.cdc.gov/coronavirus/2019-ncov/hcp/non-us-settings/public-health-management-hcw-exposed.html. Accessed August 3, 2020.

17. World Health Organization. Infection prevention and control during healthcare when novel coronavirus (nCoV) infection is suspected. Available at: https://www.who.int/publications-detail-redirect/10665-311495. Accessed August 3, 2020.

18. Centers for Disease Control and Prevention. Coronavirus disease. Pharmacies: guidance for pharmacists and pharmacy technicians in community pharmacies during the COVID-19 response. Available at: https://www.cdc.gov/coronavirus/2019-ncov/hcp/pharmacies.html. Accessed August 3, 2020.

19. Antrim A. Pharmacists concerned about lack of personal protective equipment, hand sanitizers for COVID-19 outbreak. Pharmacy Times. Available at: https://www.pharmacytimes.com/news/pharmacists-concerned-about-lack-of-personal-protective-equipment-hand-sanitizers-for-covid-19-outbreak. Accessed August 3, 2020.

20. Yousaf AR, Duca LM, Chu V, et al. A prospective cohort study in non-hospitalized household contacts with SARS-CoV-2 infection: symptom profiles and symptom change over time [e-pub ahead of print]. Clin Infect Dis. https://doi.org/10.1093/cid/ciaa1072, accessed August 3, 2020.

21. Yung CF, Kam KQ, Chong CY, et al. Household transmission of severe acute respiratory syndrome coronavirus 2 from adults to children. J Pediatr. 2020;225:249–251.

22. Shah K, Saxena D, Mavalankar D. Secondary attack rate of COVID-19 in household contacts: systematic review [e-pub ahead of print]. QJM. https://doi.org/10.1093/qjmed/hcaa232, accessed August 3, 2020.

23. Elbeddini A, Wen CX, Tayefehchamani Y, To A. Mental health issues impacting pharmacists during COVID-19. J Pharm Policy Pract. 2020;13:46.

24. Père H, Podglajen I, Wack M, et al. Nasal swab sampling for SARS-CoV-2: a convenient alternative in times of nasopharyngeal swab shortage. J Clin Microbiol. 2020;58(6). e00721–20.

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