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Impact of COVID-19 on prevalence of community pharmacies as CLIA-Waived facilities

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ABSTRACT

Background: The Clinical Laboratory Improvement Amendments of 1988 (CLIA) enabled greater access to low-risk tests by allowing their use in facilities with a Certificate of Waiver in the U.S. Recently, the 2019 novel coronavirus (COVID-19) pandemic has shined a spotlight on CLIA-waived diagnostic testing. To meet this increased patient demand for diagnostic testing, the U.S. Department of Health and Human Services (HHS) authorized licensed pharmacists to order and administer FDA authorized COVID-19 tests.

Objective: This study aims to update the previous national benching report and examine both the number of pharmacies in the United States with CLIA Certificates of Waiver before and after the SARS-CoV-2 pandemic and the state-by-state differences in the percentage of pharmacies with CLIA Certificates of Waiver.

Methods: Data were collected from the U.S. Centers for Disease Control and Prevention CLIA Laboratory Search website May 3rd, 2015, August 4th, 2019 and November 26th, 2020. The website allows for exportation of demographic data on all CLIA-waived facilities by state.

Results: Pharmacies exhibited the largest growth both in number (4865 new locations) and by percent (45%) of CLIA-waived facilities between 2015 and 2020. The total number of pharmacies with a CLIA-waiver grew from 10,626 (17.94%) locations in 2015 to 12,157 (21.43%) locations in 2019, to 15,671 (27.63%) locations in 2020. States demonstrated considerable variability in the percentage of pharmacies with a CLIA-waiver, with a range of 2.92%–56.52%.

Conclusions: Pharmacies have become an increasingly important location for patients to access CLIA-waived tests in the United States, now serving as the second largest provider of CLIA-waived tests by the total number of locations. Most of this growth occurred between 2019 and 2020 due to the COVID-19 pandemic, and concentrated efforts will be necessary to sustain this momentum.

Introduction

The U.S. Clinical Laboratory Improvement Amendments of 1988 (CLIA) enabled greater access to simple, low-risk tests by allowing their use in facilities with a Certificate of Waiver. Convenient access to CLIA-waived tests can aid in diagnosis, speed time to treatment, and improve clinical outcomes for patients. The number of access points for CLIA-waived tests in facilities with a CLIA Certificate of Waiver has seen rapid growth, from 67,294 in 1993, to 266,516 in March 2020. Common CLIA-waived facilities include physician offices, skilled nursing facilities, home health agencies, community clinics, and ambulances.

Recently, the 2019 novel coronavirus (COVID-19) pandemic has shined a spotlight on CLIA-waived diagnostic testing. The lack of a vaccine or effective treatment in the early days of the pandemic left diagnostic testing as one of the only tools to control the spread of the virus. To meet this increased patient demand for diagnostic testing, the U.S. Department of Health and Human Services (HHS) authorized licensed pharmacists to order and administer FDA authorized COVID-19 tests.

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licensed pharmacists to order and administer FDA authorized SARS-CoV-2 tests. In their guidance, HHS noted the close relationships pharmacists have with patients and health care providers as well as the close proximity of pharmacies to most Americans. States have also rapidly expanded pharmacy-based CLIA-waived testing through both legislative and executive action to increase the capacity of providers and availability of diagnostic testing for COVID-19.

While federal and state action during the COVID-19 pandemic was notable, there has been recent confusion over the authority of pharmacists to perform CLIA-waived tests, as pharmacy-based testing preceded this action. A national benchmark report of the prevalence and dispersion of community pharmacies as CLIA-waived facilities was completed in 2015. The report found that pharmacies were the 4th leading provider of CLIA-waived tests by location, equating to 10,838 pharmacies, or 17.94% of all pharmacies nationally at that time.

There was a large variability in the percentage of pharmacies with CLIA-waivers by state – ranging from 0% to 60% of pharmacies – that can largely be attributed to differences in state laws and regulations allowing pharmacists authority to perform CLIA-waived tests. A follow-up study conducted in March 2016 found that the number of CLIA-waived pharmacies had fallen by 1,728, primarily due to a large chain pharmacy’s corporate decision to not renew CLIA-waivers at many of its locations at the time.

This study aims to update the previous national benchmarking report and examine both the number of pharmacies in the United States with CLIA Certificates of Waiver before and after the SARS-CoV-2 pandemic and the state-by-state differences in the percentage of pharmacies with CLIA Certificates of Waiver. This new data will be compared to the original 2015 benchmarking report.

Methods

For the purposes of this study, a methodology identical to the prior national benchmarking report was adopted. All facilities that held either a CLIA Certificate of Waiver or higher credential (e.g., Certificate of Accreditation, Certificate of Compliance) as a CLIA-waived facility were counted, as those facilities holding these higher credentials may also perform CLIA-waived tests. To determine the number of CLIA-waived facilities by facility type nationally, and the number of pharmacies with a CLIA-waiver in each state, data were collected from the Centers for Disease Control and Prevention (CDC) CLIA Laboratory Search website on May 3rd, 2015, August 4th, 2019 and November 26th, 2020. The CDC website allows for a search of CLIA-waived laboratories and includes city, state, zip code, laboratory type (i.e., hospital, physician’s office, pharmacy, etc.), and certificate type (i.e., waiver, accredited, etc.). The authors of the current study conducted searches for all laboratory types and all certificate types for each of the 50 states and the District of Columbia, individually. The results from each state search were exported from the CDC webpage into a Microsoft Excel® spreadsheet for further analysis.

Applicants for a CLIA-waiver are required to report their “type of laboratory” that is most descriptive of their facility type. Twenty-nine choices are given for type of facility, one of which is “pharmacy.” The investigators leveraged this self-reported facility type to identify the facilities with the largest number of CLIA-waivers and the number of CLIA-waived laboratories in each state that are in pharmacies. A calculation of the percentage of pharmacies in each state that have a CLIA-waiver using data versus the total number of pharmacies in each state available in the National Association of Chain Drug Stores (NACDS) Fact Book published in 2019 was performed. The investigators treated all self-reported CLIA-waived pharmacies as community pharmacies for the purposes of calculating this percentage.

Results

Table 1 shows the top 10 facilities with a CLIA-waiver or higher in 2015 and their respective numbers in 2020. Pharmacies exhibited the largest growth both in number (4865 new locations) and by percent (45%). As a result, pharmacies became the 2nd ranking location of CLIA-waived facilities, behind physician offices.

Table 2 reports the number and percentage of community pharmacies with CLIA-waivers by state in 2015, 2019, and 2020. Of note, the total number of pharmacies with a CLIA-waiver grew from 10,626 (17.94%) locations in 2015 to 12,157 (21.43%) locations in 2019, to 15,671 (27.63%) locations in 2020. This represents a net increase of 5045 locations from 2015 to 2020. Most of this growth occurred between 2019 and 2020, with 3514 added locations or 70% of the total growth over the study time period.

The percentage of pharmacies holding CLIA-waivers continues to vary substantially by state, with a range of 2.92%–56.52% in 2020. By comparison, the range was 0%–60% of pharmacies per state in 2015. The states with the highest percentage of pharmacies in the state with a CLIA waiver in 2020 were: 1) Washington (56.52%); 2) Alaska (52.69%); and 3) Colorado (51.76%) The states with the lowest percentage of pharmacies with a CLIA-waiver were: 1) Pennsylvania (2.92%); 2) New Jersey (4.10%); and 3) New York (5.54%).

Discussion

Pharmacies have become an increasingly important location for patients to access CLIA-waived tests in the United States. This study demonstrated pharmacies are now the second largest provider of CLIA-waived tests by the total number of locations, which has grown 45% since 2015. By comparison, the total number of community pharmacies nationwide declined by 4% during the same time period.

The growth in the number of pharmacies as CLIA-waived facilities seems to be catalyzed primarily by the growing demand for CLIA-waived tests for SARS-CoV-2. Nearly 70% of the growth in the number of pharmacy locations from 2015 to 2020 occurred over the past year. This is undoubtedly a result of the state and federal action to clarify the legal authority of pharmacists to provide CLIA-waived tests along with concentrated public health efforts to utilize pharmacies as convenient, accessible points of care. The growth is also likely due in part to efforts to strengthen pharmacy-based testing in the education curriculum in recent years.

While nationally there was growth in the number of pharmacies with CLIA waivers, there were four states that saw minor declines over the study period. This is likely attributable to the contraction in the total number of pharmacies and could also be related to a well-publicized incident of purported testing inaccuracy that was temporarily

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Table 1

| Top laboratory settings by facility count. |
|------------------------------------------|
| Type of Facility | Number of facilities in U.S. with CLIA-waiver or higher credential as of May 2015 | Number of facilities in U.S. with CLIA-waiver or higher credential as of November 2020 | Percent Change |
|------------------|-------------------------------------------------|-------------------------------------------------|----------------|
| Physician office | 122,634                                          | 125,807                                          | 3%              |
| Skilled nursing facility | 14,948                                          | 15,573                                          | 4%              |
| Home health agency | 14,467                                          | 13,747                                          | –5%             |
| Pharmacy | 10,838                                          | 15,703                                          | 45%             |
| Hospital | 9060                                            | 9351                                            | 3%              |
| Community clinic | 7154                                            | 7705                                            | 8%              |
| End stage renal disease facility | 5990                                            | 7425                                            | 24%             |
| Ambulatory surgery center | 5775                                            | 6800                                            | 18%             |
| Independent | 5424                                            | 7154                                            | 32%             |
| Ambulance | 4093                                            | 5234                                            | 28%             |
Associated with one pharmacy chain not renewing some of its CLIA-
waivers.\textsuperscript{10,14,15} The growth in pharmacy-based CLIA-waived testing during the
COVID-19 pandemic is similar to the growth in pharmacy-based vacci-
nations during the 2009 H1N1 influenza pandemic. Pharmacists had
started providing vaccines in community pharmacies over a decade
prior to the pandemic, but the concentrated efforts to mass immunize
the population permanently changed where vaccines were sought, with
nearly 1 in 3 vaccines now provided in community pharmacies.\textsuperscript{16,17}

The question remains whether this increase is sustainable or if the
number of CLIA-waived pharmacies will return to pre-pandemic levels.
While the pharmacy-based vaccination gains have continued long after
the 2009 H1N1 pandemic, this is likely due to the fact consumers
routinely sought vaccines from other venues, including the annual
influenza vaccine, prior to the pandemic. Whether or not a parallel can
be drawn with SARS-CoV-2 testing will be a subject of research in the
years ahead. It is unknown how demand for SARS-CoV-2 testing will be
established.

Further, while payment for pharmacy-based vaccines is supported under
Medicare, the payment environment for pharmacy-based testing is less
established.

Table 2

| State                  | Total number of community pharmacies with CLIA-Waivers in 2015 | Overall percentage of community pharmacies with CLIA-Waivers in 2015 | Total number of community pharmacies with CLIA-Waivers in 2019 | Overall percentage of community pharmacies with CLIA-Waivers in 2019 | Total number of community pharmacies with CLIA-Waivers in 2020 | Overall percentage of community pharmacies with CLIA-Waivers in 2020 | Percentage changes in community pharmacies with CLIA-Waivers from 2015 to 2020 |
|------------------------|---------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------|--------------------------------------------------------------------------------|
| Alabama                | 133                                                           | 10.48%                                                       | 362                                                           | 28.75%                                                       | 495                                                           | 39.32%                                                       | 36.74%                                                                   |
| Alaska                 | 48                                                            | 60.00%                                                       | 44                                                            | 47.31%                                                       | 49                                                            | 52.69%                                                       | 11.36%                                                                   |
| Arizona                | 363                                                           | 36.52%                                                       | 352                                                           | 34.38%                                                       | 328                                                           | 32.03%                                                       | –6.82%                                                                  |
| Arkansas               | 88                                                            | 12.94%                                                       | 265                                                           | 35.05%                                                       | 295                                                           | 39.02%                                                       | 11.32%                                                                   |
| California             | 779                                                           | 13.84%                                                       | 530                                                           | 8.72%                                                        | 542                                                           | 9.27%                                                        | 6.27%                                                                    |
| Colorado               | 213                                                           | 28.44%                                                       | 376                                                           | 48.39%                                                       | 398                                                           | 51.76%                                                       | 4.71%                                                                    |
| Connecticut            | 23                                                            | 3.59%                                                        | 64                                                            | 9.82%                                                        | 76                                                            | 11.66%                                                       | 18.75%                                                                   |
| Delaware               | 52                                                            | 27.51%                                                       | 35                                                            | 18.04%                                                       | 47                                                            | 24.23%                                                       | 34.29%                                                                   |
| District of Columbia   | 15                                                            | 11.90%                                                       | 14                                                            | 9.66%                                                        | 11                                                            | 7.59%                                                        | –21.43%                                                                  |
| Florida                | 1020                                                          | 24.05%                                                       | 1002                                                          | 22.85%                                                       | 1431                                                          | 32.62%                                                       | 42.81%                                                                   |
| Georgia                | 288                                                           | 14.10%                                                       | 449                                                           | 21.57%                                                       | 716                                                           | 34.39%                                                       | 59.47%                                                                   |
| Hawaii                 | 12                                                            | 6.19%                                                        | 12                                                            | 6.25%                                                        | 22                                                            | 11.46%                                                       | 83.33%                                                                   |
| Idaho                  | 102                                                           | 37.50%                                                       | 144                                                           | 45.43%                                                       | 155                                                           | 48.90%                                                       | 7.64%                                                                    |
| Illinois               | 668                                                           | 31.73%                                                       | 535                                                           | 25.66%                                                       | 601                                                           | 28.82%                                                       | 12.34%                                                                   |
| Indiana                | 319                                                           | 28.92%                                                       | 304                                                           | 32.36%                                                       | 323                                                           | 30.41%                                                       | 7.24%                                                                    |
| Iowa                   | 231                                                           | 34.79%                                                       | 271                                                           | 41.76%                                                       | 323                                                           | 49.77%                                                       | 19.19%                                                                   |
| Kansas                 | 140                                                           | 21.71%                                                       | 161                                                           | 27.76%                                                       | 221                                                           | 38.10%                                                       | 37.27%                                                                   |
| Kentucky               | 245                                                           | 24.14%                                                       | 332                                                           | 31.62%                                                       | 419                                                           | 39.90%                                                       | 26.20%                                                                   |
| Louisiana              | 153                                                           | 14.74%                                                       | 268                                                           | 25.02%                                                       | 345                                                           | 32.21%                                                       | 28.73%                                                                   |
| Maine                  | 3                                                             | 1.08%                                                        | 27                                                            | 9.64%                                                        | 89                                                            | 31.79%                                                       | 229.63%                                                                 |
| Maryland               | 165                                                           | 14.96%                                                       | 208                                                           | 17.52%                                                       | 264                                                           | 22.24%                                                       | 26.92%                                                                   |
| Massachusetts          | 3                                                             | 0.27%                                                        | 2                                                             | 0.19%                                                        | 68                                                            | 6.37%                                                        | 3300.00%                                                                |
| Michigan               | 440                                                           | 19.56%                                                       | 383                                                           | 16.42%                                                       | 681                                                           | 29.19%                                                       | 77.81%                                                                   |
| Minnesota              | 243                                                           | 25.80%                                                       | 276                                                           | 28.51%                                                       | 350                                                           | 36.16%                                                       | 26.81%                                                                   |
| Mississippi           92 | 9.47%                             | 194                                                   | 26.80%                                                       | 219                                                           | 30.25%                                                       | 12.89%                                                       |                                                                          |
| Missouri               | 375                                                           | 32.00%                                                       | 365                                                           | 28.38%                                                       | 415                                                           | 32.27%                                                       | 13.70%                                                                   |
| Montana                | 53                                                            | 25.12%                                                       | 65                                                            | 29.95%                                                       | 67                                                            | 30.88%                                                       | 3.08%                                                                    |
| Nebraska               | 93                                                            | 23.08%                                                       | 107                                                           | 24.88%                                                       | 138                                                           | 32.09%                                                       | 28.97%                                                                   |
| Nevada                 | –                                                             | –                                                            | 43                                                            | 9.82%                                                        | 49                                                            | 11.19%                                                       | 13.95%                                                                   |
| New Hampshire          | 26                                                            | 10.36%                                                       | 40                                                            | 15.63%                                                       | 51                                                            | 19.92%                                                       | 27.50%                                                                   |

Totals 10,626 17.94% 12,157 21.43% 15,671 27.63% 28.91%
continuing. It is clear there are state-level legal impediments hindering uptake, hence the wide range of pharmacies with CLIA-waivers in any given state (2.92%–56.52%). Nevada provides one example of a state that amended its laws, leading to greater uptake. In 2015, 0% of Nevada pharmacies held a CLIA-waiver; this increased to 49 pharmacies, or 11.19%, in 2020. Nevada passed legislation in 2017 to enable pharmacist testing and provided targeted guidance to pharmacists about COVID-19 testing in 2020.11–21

While some state-level impediments to providing testing have been resolved, as Nevada demonstrates, another barrier to demand moving forward will be the ability of pharmacists to act on the results of tests. Influenza and Group A Streptococcus are among the most common tests provided in community pharmacies.22,23 The advantage of such tests is to identify patients with these minor ailments and initiate therapy quickly. If pharmacists do not have the ability to act on the tests, there is arguably less benefit, and therefore likely less demand for these services.

Recent changes in state laws show encouraging signs that the ability of pharmacists to act on the results of tests is growing. Effective July 1st, 2020 pharmacists in Florida will have the ability to perform clinical tests and act upon the results.23 Pharmacists in Florida now have the ability to screen for and treat minor, nonchronic health conditions (influenza, Group A streptococcus, etc.) without a collaborative practice agreement. Similar momentum has been seen in states as different politically, and geographically, as Idaho, Vermont, and Kentucky, allowing pharmacists to prescribe certain medications, including those that may be based on the results of CLIA-waived tests.22–25 State pharmacy associations, and importantly, public health stakeholders, have an important role to play in ensuring the gains in CLIA-waived test accessibility during COVID-19 sustain beyond the emergency phase of the pandemic.26,27 Efforts should be directed at removing state barriers to both testing and acting on the results of tests.

Conclusion
Pharmacies have become an increasingly important location for patients to access CLIA-waived tests in the United States, now serving as the second largest provider of CLIA-waived tests by the total number of locations. The number of community pharmacies with CLIA-waivers grew from 10,626 (17.94%) locations in 2015 to 15,671 (27.63%) locations in 2020. Most of this growth occurred between 2019 and 2020 due to the COVID-19 pandemic, and concentrated efforts will be necessary to sustain this momentum.

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Nicklas S. Klepser: Data curation, Formal analysis, Writing - original draft. Donald G. Klepser: Conceptualization, Methodology, Writing - review & editing, Supervision. Jennifer L. Adams: Conceptualization, Writing - review & editing. Alex J. Adams: Conceptualization, Methodology, Writing - review & editing. Michael E. Klepser: Conceptualization, Methodology, Writing - review & editing.

Declaration of competing interest
N/A.

References
1. Centers for Disease Control and Prevention CDC. Good laboratory practices for waived testing sites. MMWR. November. 2015;11, p. 1. Available from http://www.cdc.gov/mmwr/PDF/rr/rr5413.pdf. Accessed July 2015.
2. Centers for Medicare and Medicaid Services CMS. Laboratories by type of facility. CLIA update; March 2020. Available from https://www.cms.gov.Regulations-an-d-Guidance/Legislation/CLIA/Downloads/facttype.pdf. https://www.cms.gov/Regulations-and-Guidance/Legislation/CLIA/Downloads/facttype.pdf. Accessed November 2020.
3. Health and Human Services HHS. HHS statements on authorizing licensed pharmacists to order and administer COVID-19 tests. April 8, 2020. Available from: https://www.hhs.gov/about/news/2020/04/08/hhs-statements-on-authorizing-licensed-pharmacists-to-order-and-administer-covid-19-tests.html.
4. Health and Human Services HHS. Guidance for licensed pharmacists, COVID-19 testing, and immunity under the PREP act. April 8, 2020. Available from: https://www.hhs.gov/sites/default/files/authorizing-licensed-pharmacists-to-order-and-administer-covid-19-tests.pdf.
5. COVID-19: information from the states. NASPA. Accessed November 29, 2020 http://covid-19-information-from-the-states. Accessed November 29, 2020.
6. Relax pharmacy regulations to help with COVID-19 testing and treatment. Mercatus Center. Published March 27, 2020. Accessed November 29, 2020. https://www.mercatus.org/publications/covid-19-crisis-response/relax-pharmacy-regulation-to-help-covid-19-testing-and-treatment.
7. Klepser M, Adams AJ, Klepser D. Clinical service implementation in the face of initial regulatory uncertainty. J Am Pharmacist Assoc. 2016;56(5):492, https://doi.org/10.1016/j.japh.2016.04.563.
8. Klepser ME, Adams AJ, Srnis P, Mazzucco M, Klepser D. U.S. community pharmacies or CLIA-waived facilities: prevalence, dispersion, and impact on patient access to testing. Res Soc Adm Pharm. 2016 Jul-Aug;12(4):614-621.
9. Doucette WR, Mott DA, Kreiling DH, et al. National pharmacist workforce study 2019 final report. Published January 10, 2020 https://www.aacp.org/sites/default/files/2020-03/NPWS_Final_Report.pdf. Accessed November 2020.
10. Adams AJ, Klepser ME, Klepser D. An update on community pharmacies as CLIA-waived facilities. Res Soc Adm Pharm. 2016 Jul-Aug;12(4):666-667. https://doi.org/10.1016/j.japh.2016.03.007.
11. Centers for Disease Control and Prevention CDC. CLIA laboratory search. Available from: http://www.cdc.gov/clia/Resources/LabSearch.aspx. Accessed November 2020.
12. National Association of Chain Drug Stores. Chain Member Fact Book, 2019-2020. July 2019.
13. Akinwale TP, Adams AJ, Dering-Anderson AM, Klepser ME. Pharmacy-based point-of-care testing for infectious diseases: considerations for the pharmacy curriculum. Currents in Pharmacy Teaching and Learning. 7(1), 131-136.
14. Alltucker K, Walgren shuts down 40 Theranos centers in Arizona. The Arizona Republic. Published June 13, 2016. Accessed December 1, 2020 https://www.azcentral.com/story/money/business/health/2016/06/13/walgren-shuts-down-40-theranos-centers-arizona/85839104/.
15. Alltucker K. As Theranos drama unwinds, former patients claim inaccurate tests changed their lives. USA TODAY. Accessed December 1, 2020 https://www.usatoday.com/story/news/nation/2018/07/05/theranos-elizabeth-holmes-lawsuits-patients-theranos-harm-arizona/74200802/; July 5, 2018.
16. Rosenfeld LA, Eikind P, Grasso A, et al. Extending the reach: local health department collaboration with community pharmacies in Palm Beach County, Florida for H1N1 influenza pandemic response. J Publ Health Manag Pract. 2011;17:439-446.
17. Lutz Rachel. Pharmacist-provided flu shots please patients. Pharmacy Times. Published, June 9, 2015. Accessed November 29, 2020 https://www.pharmacytimes.com/resource-centers/cough-cold/pharmacist-provided-flu-shots-please-patients.
18. Palacia J. Moderna’s COVID-19 vaccine shines in clinical trial. NPR.org. Published November 16, 2020. Accessed November 29, 2020 https://www.npr.org/sections/health-shots/2020/11/16/935239294/modernas-covid-19-vaccine-shines-in-clinical-trial.
19. Nevada State Board of Pharmacy. Newsletter; October 2017. Available from: http://napharmacy.wp-content/uploads/2016/06/Nevada-Newsletter-October-2017.pdf.
20. Wuest JD. Partial waiver of off-site pharmacy practice to permit pharmacy personnel to perform COVID-19 testing. Published May 6, 2020 Available from: https://bop.nv.gov/uploadedFiles/bopxi/photos/content/Resources/ALL/10.14%20Partial%20Waiver%20for%20Off-Site%20COVID-19%20Test%20REVISED.pdf. Accessed November 29, 2020.
21. Authors Registered Pharmacists to Collect Specimens and Perform Certain Laboratory Tests. 2017. Accessed December 1, 2020 https://bop.nv.gov/uploadedFiles/bopxi/photos/content/Resources/ALL/10.14%20Partial%20Waiver%20for%20Off-Site%20COVID-19%20Test%20REVISED.pdf. Accessed November 29, 2020.
22. Drug Enforcement Administration DEA. DEA authorizes registered pharmacists to perform certain drug tests. DEA Bulletin. November 30, 2020. Available from: https://www.deadiversion.usdoj.gov/bulletin/2020/20201130.html.
23. Klepser ME, Adams AJ. Pharmacy-based management of influenza: lessons learned from research. Int J Pharm Pract. 2018;26(6):573-578. https://doi.org/10.1111/ijpp.12448.
24. Klepser ME, Adams AJ, Klepser, DG. Antimicrobial stewardship in outpatient settings: leveraging innovative physician-pharmacist collaborations to reduce antibiotic resistance. Health Security, 13, 166-173. DOI: 10.1099/hst.2018.00083.
25. Practice of pharmacy. CS/HB 389 (F.L. 2020) https://www.flsenate.gov/Session/Bill/2020/389/BillText/er/FLD.
25. Adams AJ. Pharmacist prescriptive authority: lessons from Idaho. Pharmacy. 2020;8(3):112. https://doi.org/10.3396/pharmacy.803112.
26. Legislature Vermont. An Act Relating to Professional Regulation, S. 220; 2017 (Act 178) https://legislature.vermont.gov/Documents/2020/Acts/ACT178/AG-T178%20An%20ActEnacted.pdf.
27. Kentucky Board of Pharmacy. Board approved protocols. Accessed November 29, 2020 https://pharmacy.ky.gov/Pages/Board-Approved-Protocols.aspx.

28. Roberts GE, Rubin SE, Smith JK, et al. Public health perceptions of community pharmacy partnership opportunities. *J Publ Health Manag Pract*. 2015;12(4). https://doi.org/10.1097/PHH.0000000000000276, 423-415.

29. Gunnins PO, Klepser ME, Adams AJ, et al. Potential for pharmacy-public health collaborations using pharmacy-based point-of-care testing services for infectious diseases. *J Publ Health Manag Pract*. 2017;23(6):593-600. https://doi.org/10.1097/PHH.0000000000000482.