

Financial Implications of COVID-19 Polymerase Chain Reaction Tests on Independent Laboratories



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During the COVID-19 pandemic, independent laboratories provided critically needed polymerase chain reaction (PCR) tests (Current Procedure Terminology Code: 87635) to identify positive COVID-19 patients. The Families First and Coronavirus Relief Act and CARES Act require commercial insurance plans to cover COVID-19 testing costs without any cost-sharing for patients, but do not set the price.^{1,2} Prior research has examined the variation in charges for PCR tests in laboratories.³ However, their financial return from COVID-19 testing remains unexplored. Using the unique taxation data from Hawaii, we analyzed how the COVID-19 pandemic affected the revenue and profitability of independent laboratories.

METHODS

Hawaii levies a comprehensive gross excise tax on sales revenue generated by businesses operating within the state. Businesses must submit monthly forms reporting on the entity's sales revenue.⁴ The Hawaii Department of Taxation queried its tax database for independent diagnostic laboratories that conducted COVID-19 PCR tests and identified 21 taxpayers. The monthly revenue was aggregated for these laboratories from July 2018 (20 months before the pandemic outbreak in March 2020) to November 2021 (20 months after March 2020; the most recent period with available data). The same 21 laboratories were tracked for the entire

period. To understand the relationship between revenue and COVID-19 PCR testing volume, the monthly total revenue was plotted together with the monthly total PCR testing volume in Hawaii provided by the Hawaii Department of Health.⁵

To estimate a lower bound of COVID-19 PCR test profit among the laboratories, their total revenue from March 2020 to November 2021 (21 months) was reduced by 21 multiplied by the pre-pandemic monthly mean revenue (July 2018–February 2020), which approximates the revenue from other tests; then, this number was reduced by the total COVID-19 PCR testing volume in Hawaii during this period multiplied by the Medicare reimbursement rate in Hawaii (\$51.33), which is deemed by the Centers of Medicare and Medicaid Services to at least cover the testing cost and thus represents an upper bound of the cost per test.⁶ This study was exempt from institutional review board approval by the University of Hawaii. Statistical analysis was conducted using R and STATA 16.

RESULTS

As presented in Table 1, the pre-pandemic monthly total revenue of independent laboratories in Hawaii was approximately \$19–22 million and fluctuated between \$28 and \$36 million after November 2020, growing fastest during May 2020–December 2020 (mean monthly growth rate: 8%). It tracks Hawaii's COVID-19 PCR testing volume closely (Fig. 1).

The estimated lower bound of profit generated from performing COVID-19 PCR tests alone among laboratories in Hawaii from March 2020 to November 2021 is \$28.2 million. Since the total PCR testing volume during this period is approximately 2.8 million, the \$28.2 million is equivalent to \$10 per test (on average across all payer types) or \$20 per capita (population: 1.4 million).

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Table 1 COVID-19 PCR Testing Volume and Total Revenue of Independent Laboratories in Hawaii, July 2018 to November 2021

Year-month	Testing volume (monthly growth rate)	Total revenue (monthly growth rate)
2018-07	0	\$19,399,385 (NA)
2018-08	0	\$19,743,514 (2%)
2018-09	0	\$19,644,532 (-1%)
2018-10	0	\$20,691,581 (5%)
2018-11	0	\$19,903,029 (-4%)
2018-12	0	\$19,062,867 (-4%)
2019-01	0	\$21,898,271 (15%)
2019-02	0	\$20,532,099 (-6%)
2019-03	0	\$21,069,334 (3%)
2019-04	0	\$21,191,425 (1%)
2019-05	0	\$21,530,146 (2%)
2019-06	0	\$19,903,272 (-8%)
2019-07	0	\$20,108,937 (1%)
2019-08	0	\$20,380,369 (1%)
2019-09	0	\$20,129,104 (-1%)
2019-10	0	\$21,951,036 (9%)
2019-11	0	\$20,212,836 (-8%)
2019-12	0	\$19,763,279 (-2%)
2020-01	0	\$21,990,828 (11%)
2020-02	0	\$20,898,511 (-5%)
2020-03	13,211 (NA)	\$21,247,231 (2%)
2020-04	21,585 (63%)	\$17,943,961 (-16%)
2020-05	20,804 (-4%)	\$19,630,395 (9%)
2020-06	40,276 (94%)	\$21,487,625 (9%)
2020-07	63,406 (57%)	\$25,905,787 (21%)
2020-08	133,456 (110%)	\$25,256,466 (-3%)
2020-09	136,380 (2%)	\$25,892,587 (3%)
2020-10	118,885 (-13%)	\$27,419,362 (6%)
2020-11	150,925 (27%)	\$29,125,611 (6%)
2020-12	152,766 (1%)	\$33,086,357 (14%)
2021-01	150,435 (-2%)	\$33,891,264 (2%)
2021-02	125,648 (-16%)	\$28,300,697 (-16%)
2021-03	167,265 (33%)	\$33,363,710 (18%)
2021-04	167,402 (0%)	\$32,839,956 (-2%)
2021-05	161,735 (-3%)	\$30,331,757 (-8%)
2021-06	126,566 (-22%)	\$30,790,539 (2%)
2021-07	126,273 (0%)	\$31,000,441 (1%)
2021-08	281,025 (123%)	\$36,000,199 (16%)
2021-09	254,456 (-9%)	\$34,093,624 (-5%)
2021-10	195,749 (-23%)	\$34,155,529 (0%)
2021-11	189,525 (-3%)	\$30,599,377 (-10%)

DISCUSSION

Independent laboratories in Hawaii experienced rapid revenue growth from May 2020 to December 2020

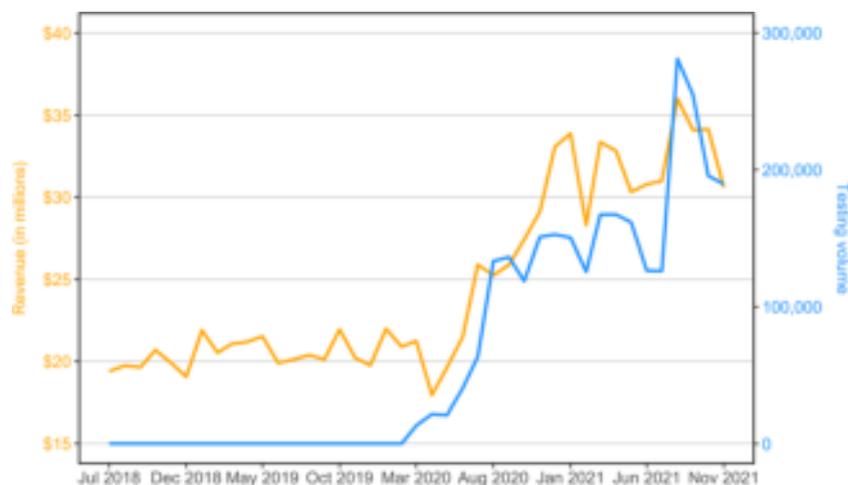


Fig. 1 COVID-19 PCR testing volume and total revenue of independent laboratories in Hawaii, July 2018 to November 2021.

(mean monthly growth rate: 8%), and earned at least \$10 profit per test from COVID-19 PCR tests, which was primarily driven by the generous reimbursement rate from commercial insurance plans. Although patients do not have cost-sharing for COVID-19 testing, the financial consequences of high profit for testing providers are born by plan sponsors and will likely result in higher insurance premiums, passing the burden to patients. This mechanism is true for other health care services without patient cost-sharing.

By using the Medicare reimbursement rate to approximate the cost per test and assuming all PCR tests in Hawaii during the pandemic were performed in independent laboratories, this study overestimated the cost and underestimated the profit earned from COVID-19 PCR tests. Indeed, we believe using the CMS reimbursement rate of \$51.33 is a conservative estimate of profitability as the CMS set a rate they felt would incentivize labs to increase testing capacity. The cost for each COVID-19 PCR test incurred by efficiently operated labs with large testing volumes is likely less than \$51.33. Similarly, estimating the revenue generated from non-COVID-19-related tests during the pandemic by using pre-pandemic revenue information likely represents an overestimation, resulting in underestimated profit. In addition, this study focuses on PCR testing and does not include PCR tests not performed at independent laboratories and other forms of COVID-19 testing (e.g., antigen or antibody). This study, limited by the lack of patient mix information and laboratory-specific financial information, was unable to estimate the profit earned by various payer groups or examine market dynamics. Finally, this study is based on data from Hawaii alone. However, the qualitative findings of this study are unlikely to be confined only to Hawaii.

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REFERENCES

1. U.S. Congress. H.R.748-CARES Act. March 17, 2020. <https://www.congress.gov/bill/116th-congress/house-bill/748>. February 19, 2022.
2. U.S. Congress. H.R.6201. Families First Coronavirus Response Act. March 17, 2020. <https://www.congress.gov/bill/116th-congress/house-bill/6201>. February 19, 2022.
3. Meiselbach MK, Bai G, Anderson GF. Charges of COVID-19 diagnostic testing and antibody testing across facility types and states. *J Gen Intern Med*. 2020. <https://link.springer.com/article/10.1007/s11606-020-06198-y>.
4. State of Hawaii Department of Taxation. General instructions for filing the general exercise/use tax returns. 2021. <https://files.hawaii.gov/tax/forms/2021/g45ins.pdf>. February 19, 2022.
5. State of Hawaii Department of Health. COVID-19 joint information center news and updates. 2022. <https://health.hawaii.gov/news/covid-19-updates>. February 19, 2022.
6. Centers for Medicare and Medicaid Services. Medicare administrative contractor (MAC) COVID-19 test pricing. January 25, 2021. <https://www.cms.gov/files/document/mac-covid-19-test-pricing.pdf>. February 19, 2022.

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