

# Improving COVID-19 Outcomes for Medicare Beneficiaries: A Public Health–Supported Advanced Primary Care Paradigm

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## Policy Points

- > Maryland Primary Care Program participation was associated with lower incidence of COVID-19, COVID-19-related hospital admissions, and COVID-19-related death in 2020, according to this study of claims data for Medicare fee-for-service beneficiaries.
- > With public health agency support, advanced primary care practices may produce better COVID-19 patient outcomes.

## ABSTRACT

Public health and primary care have both been central to the COVID-19 response. To date, little is known about the effect of health care delivery systems that integrate public health and primary care. To examine the association between the receipt of public health–supported advanced primary care services and COVID-19 incidence, hospitalization, and death, this study compared 2020 fee-for-service claims from 263,891 Medicare beneficiaries participating in the Maryland Primary Care Program (MDPCP), a statewide advanced primary care program, with data from 65,366 nonattributed beneficiaries. The study found that the MDPCP group had a lower incidence of COVID-19 diagnosis (4.3% of beneficiaries vs. 4.6%), a lower rate of COVID-19-related inpatient admissions (1.29% vs. 1.43%), and a lower COVID-19 death rate (0.41% vs. 0.5%). These findings support the benefit of public health partnerships with advanced primary care practices during the COVID-19 pandemic.

## INTRODUCTION

In 2020 the United States struggled to contain the COVID-19 pandemic, with nearly one in four of the world's cases and one in five of the world's deaths.<sup>1</sup> Public health leaders called for a coordinated response on mitigation behaviors such as masks and social distancing and strategies like contact tracing, testing, treatment, and vaccines, yet implementation of these measures in the United States has been less successful than in many other countries.<sup>2,3</sup> However, there have been pockets of success wherein public health has

succeeded by partnering with community providers. One example is the Maryland Primary Care Program (MDPCP), Maryland's advanced primary care network of 525 primary care practices. While other articles have described the benefit of the MDPCP's public health–primary care partnership during COVID-19, this is the first study to examine the effect of that partnership in terms of quantitative COVID-19 outcomes data.<sup>4,5</sup>

Under the Maryland Department of Health (MDH) and the federal Centers for Medicare and Medicaid Services (CMS), MDPCP provides funding, support, data, and technical assistance to advanced primary care practices working to enhance primary care services through expansion of care management, integrated behavioral health, screening and referral for unmet social needs, and more.<sup>6</sup> The MDPCP also established a formal administrative relationship between primary care and MDH.

## **BUNDLED PUBLIC HEALTH SUPPORT SERVICES DURING COVID-19**

From the onset of the pandemic, MDH provided public health guidance and support regarding COVID-19 to MDPCP practices, fostering a rapid data-driven transition to address pandemic-related needs.<sup>5</sup> To ensure that all primary care practices were prepared to respond in a coordinated, informed, resourced, and population-focused manner, MDH provided a bundle of COVID-specific support to the MDPCP practices, enhancing the advanced primary care approach. This support included a webinar series with updates on pandemic epidemiologic status, testing strategies, identification of vulnerable beneficiaries, safe office workflows, personal protective equipment use and access, health equity data, behavioral health during COVID-19, and other related topics. These webinars provided attendees with a consistent source of scientific data and practice guidance on COVID-19 in a time of misinformation, information overload, and confusion.

In addition, MDH facilitated the provision of a telehealth platform at no cost to practices, as well as technical assistance for rapidly and effectively implementing telehealth and remote patient monitoring. By April 2020, a survey of 474 MDPCP practices reported that 99.2% of respondents were using telehealth.<sup>7</sup> To prop up standards and workflows for primary care around testing for COVID-19, MDH provided technical assistance on safe workflows for testing; supplied testing materials; and shared data showing test result turnaround time for various laboratories. Practices also took advantage of an online patient referral system through the state's designated health information exchange (HIE), which allowed providers to refer beneficiaries for testing and enabled beneficiaries to schedule their own testing appointments and referrals to monoclonal antibody infusion sites.

Lastly, MDH provided the practices with data tools to support their COVID-19 response. Data supports included practice-specific dashboards delivered over the state HIE that identified a practice's beneficiaries at high risk of developing severe instances of COVID-19. These beneficiaries were identified using a COVID Vulnerability Index (CVI), a risk measurement index developed by Socially Determined, Inc. that takes into account medical conditions, demographics, and environmental and social factors. From April 2020 to December 2020, 99.8% of MDPCP practices accessed the CVI tool.

All of these activities combined to produce a synergistic public health–primary care response to the COVID-19 pandemic. To determine whether this coordinated effort was beneficial in reducing the impact of COVID-19 on the practices' attributed beneficiaries, this study compared rates of COVID-19 diagnosis, COVID-19-related hospitalization, and COVID-19-related death in an MDPCP beneficiary cohort with those in a matched non-MDPCP cohort.

## STUDY FINDINGS

This study compared COVID-19 outcomes among two MDPCP-eligible populations. The study group comprised Medicare beneficiaries who participated in the MDPCP continuously throughout 2020 or until the beneficiary died. The comparison group was composed of Medicare beneficiaries who were eligible for attribution to a primary care practice but the practices elected not to participate in MDPCP in 2020. Using Medicare Claim and Claim Line Feed (CCLF) data from January 1, 2020, to January 31, 2021, the study included a total of 329,257 fee-for-service Medicare beneficiaries, with 263,891 beneficiaries in the MDPCP group and 65,366 beneficiaries in the nonparticipating group.

The nonparticipating group was matched to the MDPCP group on gender, age, race, county of residence, CVI, and dual eligibility for Medicare and Medicaid to ensure comparable populations. Subsequently, key demographic and clinical characteristics were compared across the MDPCP group and the nonparticipating group to determine any statistical differences.

## Demographic and clinical characteristics

After matching the nonparticipating group to the MDPCP group, there were no significant differences between the two groups by age category, gender, race, county of residence, CVI, and dual eligibility status (see Appendix). Statistically significant but small relative differences were observed in the average risk scores for Hierarchical Condition Category (HCC) and Area Deprivation Index (ADI). The small relative differences are of unknown clinical significance. Statistical differences in the third risk score, CVI, were removed in the population-matching step.

## COVID-19 Outcomes

MDPCP participation was associated with a lower incidence rate of COVID-19 diagnosis (4.3% of beneficiaries vs. 4.6%;  $p < 0.001$ ), a lower proportion of total beneficiaries who were admitted to the hospital for COVID-19 (1.29% of beneficiaries vs. 1.43%,  $p = 0.0027$ ), and a lower proportion of total beneficiaries who died of COVID-19 (0.41% vs. 0.5%,  $p = 0.0022$ ) (Table 1).

**Table 1. MDPCP Participation Was Associated With Lower COVID-19 Rates, Admissions, and Deaths**

	<b>MDPCP Group (n = 263,891)</b>	<b>Non-participating Group (n = 65,366)</b>	
	<b>n (%)</b>	<b>n (%)</b>	<b>p-value</b>
<b>Beneficiaries with COVID-19 diagnosis</b>	11,337 (4.3)	3,006 (4.6)	0.0007
<b>Beneficiaries with COVID-19 inpatient claims</b>	3,393 (1.29)	938 (1.43)	0.0027
<b>Beneficiaries with COVID-19 emergency department claims</b>	1,580 (0.6)	410 (0.63)	0.3999
<b>COVID-19 death count</b>	1,089 (0.41)	327 (0.5)	0.0022

**Table 2. No Difference in COVID-19 Inpatient Outcomes Observed**

	<b>MDPCP Group (n = 3,758)</b>	<b>Non-participating Group (n = 1,036)</b>	
<b>Outcome</b>	<b>n (%)</b>	<b>n (%)</b>	<b>p-value</b>
COVID-19 inpatient intensive care unit (ICU) claims	980 (26.08)	289 (27.9)	0.2402
COVID-19 inpatient non-ICU claims	2,778 (73.92)	747 (72.1)	0.2402
Average COVID-19 inpatient admission length of stay	9.91	9.77	0.6687

When analyzing COVID-19 outcomes among only the population in each group with a COVID-19 diagnosis, there was no difference in the rate of inpatient claims (29.93% vs. 31.2%,  $p = 0.1756$ ) or emergency department (ED) claims (13.94% vs. 13.64%,  $p = 0.6751$ ). However, there was a difference in COVID-19 mortality rate (9.61% vs. 10.88%,  $p = 0.0376$ ) among those who had COVID-19 diagnoses.

COVID-19 outcomes related to inpatient hospital claims were also analyzed. No difference was observed across the groups in terms of rate of inpatient admissions that involved the intensive care unit (ICU) or average COVID-19 inpatient admission length of stay (Table 2).

### Clinical Care COVID-19 Outcomes

The MDPCP group had a higher percentage of COVID-19-positive beneficiaries with telehealth claims than the nonparticipating group (58.5% vs. 51.03%,  $p < .0001$ ). There was no difference between the two groups in terms of percentage of

COVID-19-positive beneficiaries given monoclonal antibody infusion (2.12% vs. 1.76%,  $p = 0.2228$ ) (Table 3). Monoclonal antibodies were a new therapy at the time, and referral volumes were very low for both groups, possibly contributing to the lack of significance for that outcome.

### Characteristics and Outcomes by Race and Ethnicity

COVID-19 outcomes were examined across the MDPCP group and the nonparticipating group by race and ethnicity subgroups, to determine if MDPCP participation had a disparate effect on beneficiaries of different race/ethnicity groups. Within racial/ethnic subgroups, the MDPCP group continued to show a lower incidence rate of COVID-19 and lower death rates. However, these differences were not statistically significant within every racial/ethnic subgroup. Data is not shown in this report.

**Table 3. Some Difference in Clinical Care Between MDPCP Participants and Nonparticipating Group**

	<b>MDPCP Group (N = 11,337)</b>	<b>Nonparticipating Group (n = 3,006)</b>	
<b>Treatment</b>	<b>N (%)</b>	<b>n (%)</b>	<b>p-value</b>
COVID-19-positive beneficiaries given monoclonal antibody infusion	240 (2.12)	53 (1.76)	0.2228
COVID-19-positive beneficiaries who received at least one telehealth service	15,824 (58.5)	3,724 (51.03)	<0.0001

## DISCUSSION

With the bundle of support and guidance provided by MDH, beneficiaries attributed to MDPCP practices experienced significantly lower rates of COVID-19 infection, inpatient admissions, and deaths as a proportion of the total population. Robust and readily accessible support, data, and guidance from MDH to advanced primary care practices enabled better outcomes by overcoming one of the chief challenges during a pandemic: prompt, data-driven, and effective action at the population level.

This study demonstrates statistically better outcomes for participating MDPCP beneficiaries in the context of COVID-19. The combination of technical solutions and consistent data and guidance from MDH, combined with a dedicated workforce to prevent and manage disease, created a favorable environment for better COVID-19 outcomes. Dashboards provided by MDH Public Health such as the CVI allowed practices to pursue a data-driven approach to identifying beneficiaries most likely to suffer from severe COVID-19. By using CVI, a measure that combines medical and sociodemographic information, practices were able to identify and prioritize care for beneficiaries at a higher risk of developing COVID-19 complications. Care for these beneficiaries included proactive practice outreach to ensure that beneficiaries were exhibiting safe behaviors and had access to resources such as COVID-19 testing if needed.

Additionally, guidance and technical assistance provided by MDH on safe office workflows and telehealth allowed MDPCP practices to pivot to alternate workflows early in the pandemic, ensuring lower COVID-19 spread associated with office visits and preserving patient access via remote visits. The adoption of telehealth at the beginning of the pandemic was critical to success. As of January 2019, 52% of MDPCP practices reported having telehealth, which grew to 63% by December 2019. By April 2020, one month into the pandemic, over 99% of MDPCP practices reported having telehealth in place. This rapid telehealth expansion in MDPCP practices shows in the higher percentage

of COVID-19-positive beneficiaries with telehealth claims in the MDPCP group (58.5%) versus the non-participating group (51.03%). Greater proportions of telehealth services for COVID-19-positive beneficiaries likely contributed to better COVID-19 outcomes for these individuals. For example, if a COVID-19-positive beneficiary had a telehealth visit with their primary care provider, the provider could inform the patient when to seek care at the hospital, ensuring that the patient got the right care and preventing COVID-19 death and other negative outcomes.

Beyond telehealth, the guidance provided to primary care providers by MDH through COVID-19 webinars allowed providers to communicate similarly clear guidance to their beneficiaries. The financial flexibility supplied by the MDPCP in providing non-visit-based funding for practices enabled the financial resilience necessary to maintain care for their patient population. It seems likely that the sum of all the support in the context of advanced primary care and a statewide coordinated program may have contributed to MDPCP practices' outcomes.

The disparate impact nationally of the COVID-19 pandemic on communities of color has been well publicized.<sup>9,10</sup> Improving outcomes for racial and ethnic minority populations remains an area for improvement for the MDPCP and public health overall. Results of this study suggest that beneficiaries across all racial/ethnic subpopulations benefited from MDPCP participation, although only some outcomes maintained statistical significance when analyzed within racial/ethnic subgroups. Statistically significant outcomes across the two groups within racial/ethnic subgroups included greater use of telehealth in African Americans, lower rates of cases in Hispanic individuals, and lower death rates in Asian populations, compared to nonparticipating counterparts within those racial/ethnic subgroups.

MDPCP practices were able to support beneficiaries in reducing their incidence of COVID-19 and most importantly, reducing the incidence of death. Although there are no studies yet to support this notion, it is possible that the



patient-centered approaches used by MDPCP practices, which incorporate the medical, behavioral, and social impacts on health, may be a better approach to care delivery during a pandemic.

The pandemic is shining a bright light on many of the weaknesses in the US health care delivery system and has offered opportunities for rapid-cycle innovations to address these issues. It is well established that the US public health system has been underfunded and understaffed over the past decade.<sup>11</sup> At the same time, the primary care delivery system has remained focused largely on episodic care without tools and resources to address the broad population-based needs. The pandemic brought a sudden and intense opportunity to bring these two parts of the delivery system together synergistically to address COVID-19 in Maryland.

Although this study focused on the available claims data for Medicare beneficiaries, it is important to point out that most of the support and tools provided to the practices were payer-agnostic. Moving into the later phases of the pandemic in 2021, MDH continues to provide support and guidance to practices in the form of an online referral system to the state's monoclonal antibody infusion centers and data-driven vaccine tracking and prioritization. This study shows the great opportunity that lies beyond the pandemic through the integration of public health and primary care in statewide programs like MDPCP. The main strengths of this study were the use of a large set of administrative data, matched analysis to limit selection bias, and statistically significant findings.

## Limitations

Several notable limitations exist with the study. Claims data used in the study do not include all COVID-19 infections or deaths. Many beneficiaries, especially the asymptomatic, never end up in the hospital or their physician's office. Those who receive guidance over the telephone and decide to quarantine are unlikely to generate a claim. Therefore, the number of COVID-19 infections is

likely an undercount in these populations, though the error is systemic for both study cohorts. Moreover, some beneficiaries who die from COVID-19 do not necessarily have an insurance claim associated with that event. These individuals would not be captured in the study death counts. This effect is not likely to differ across the two groups.

The matching process removed 168,360 beneficiaries (72.0%) from the nonparticipating group and 23,894 beneficiaries (8.3%) from the MDPCP group. It is not known whether the removal of these beneficiaries added any bias to the study. Additionally, the study is restricted to the Medicare fee-for-service population. While the Medicare population has seen a large share of the COVID-19 impact, multipayer data would allow a broader conclusion on the impact of advanced primary care services during the COVID-19 pandemic.

As MDPCP is a voluntary program, there may be selection bias as to which practices choose to participate. It is not possible to fully determine if the beneficial effects of MDPCP participation were due to coordinated activities between primary care and public health, or due to the characteristic of practices that self-select into the MDPCP. Rigorous matching on age category, race, CVI, gender, county, and dual eligibility removes any obvious inherent differences between MDPCP and nonparticipating practices and limits the effect of potential selection bias.

COVID-19 is an unpredictable disease wherein some beneficiaries die from complex organ failure, and other beneficiaries have a mild reaction. Although this study accounts for beneficiaries' financial, clinical, and social risk, there may be other factors that drive outcomes, such as timeliness of diagnosis, which were not accounted for in this study. Lastly, data analysis was limited to only 13 months of data, and the full impact of COVID-19 will not be known until community transmission is reduced to near zero and vaccinations reach the level of herd immunity.

## CONCLUSION

Attributed Maryland Medicare MDPCP beneficiaries, who received proactive and comprehensive care in primary care offices, experienced lower rates of COVID-19 infection, hospitalization, and death. Integrating these enhanced public health data and supports with a coordinated and better-funded primary care workforce may be one of the keys to defeating the COVID-19 pandemic and providing a glimpse into the future of true population health management.

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## NOTES

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