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Leveraging Accountable Care Organization infrastructure for rapid pandemic response in independent primary care practices

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ABSTRACT

Background: Population risk segmentation and technology-enabled preventive care workflows are core competencies for Accountable Care Organizations (ACOs) that may also have relevance for public health emergencies.

Methods: During the early weeks of the COVID-19 pandemic, we aimed to leverage existing ACO capabilities to support 467 primary care practices across 27 states with pandemic response. We used Medicare claims and electronic health records to identify patients with increased COVID-19 vulnerability, for proactive outreach and guidance for “Staying Well at Home.”

Results: 302,125 patients met intervention criteria; 45% were reached within the first 6 weeks. Engagement in the initiative was uneven among ACO-participating practices. ACO staff identified prior practice engagement in core ACO workflows as a major facilitator of success and staffing shortages as a major barrier. Small practice size, non-metropolitan location, penetration of value-based payment models in the practice, and pre-pandemic Annual Wellness Visit completion rates were independently associated with successful outreach to COVID-vulnerable patients.

Conclusions: Rapid adaptation of ACO infrastructure assisted independent practices across the country to reach vulnerable patients with proactive guidance for staying well at home. The initiative was most successful in smaller, non-metropolitan practices and those with greater engagement in core ACO initiatives pre-pandemic.

Implications: Our experience suggests that primary care participation in accountable care models can contribute to preparedness for future public health crises.

1. Introduction

The COVID-19 pandemic has presented unprecedented challenges for primary care, with financial losses forcing practices to consider consolidation or closure, and threatening access to care.\textsuperscript{1–5} Early adopters of value based payment models may have been better positioned to respond to the challenges of the pandemic, as ACO participation offers diversified sources of practice revenue and organizational infrastructure for care delivery innovation. Over 44 million Americans receive health care through an Accountable Care Organization.\textsuperscript{6} To date, little is known about the experience of patients in ACOs during the COVID-19 pandemic.

A core tenet of success in accountable care is shifting from reactive, individual-focused care to proactive population health strategies. Physician-led ACOs in the Medicare Shared Savings Program have reduced hospital utilization and overall costs while increasing primary care utilization and improving quality.\textsuperscript{7–9} Strategies commonly employed by ACOs include emphasis on preventive care, risk segmentation and predictive modeling to identify high risk patients for targeted interventions, and use of technology to improve the efficiency and effectiveness of team-based care delivery.\textsuperscript{10,11} These capabilities have immediate relevance for pandemic response as well.

As COVID-19 cases began to surge and states implemented stay at home orders in the spring of 2020, our company sought to leverage ACO infrastructure toward helping independent primary care practices maintain financial viability while keeping patients and staff safe. This included identifying patients at highest risk of mortality in the event of COVID exposure, implementing workflows for proactive outreach,
patient education and needs assessment, and establishing a plan of care for chronic conditions. In this paper we aim to describe the design and implementation of this “Stay Well at Home” initiative, examine the initial impact of the initiative in reaching vulnerable patients, and describe facilitators and barriers to practice engagement.

1. Setting

Our company supports independent primary care practices to organize as ACOs and participate in value based payment models. Our ACOs are composed of independent practices without hospital affiliation, including private practices, federally qualified health centers, rural health centers, and multispecialty practices. During 2020 we operated 39 Medicare Shared Savings Program (MSSP) ACOs across 27 states, with a total of 467 practices and 440,000 attributed patients as of spring 2020.

Our approach to value based care relies upon technology-enabled team-based workflows. The ACO data platform, the “Aledade App,” incorporates multiple data sources to surface key information at the point of care, and provides worklists to facilitate outreach to prioritized patients for specific interventions. Core ACO initiatives include promoting Annual Wellness Visits, transitional care management after hospital discharge, reducing emergency department use through improved primary care access and follow-up after ED visits, and improving practice systems for coding accurately and addressing gaps in care. Practice transformation specialists (PTSs) provide on-the-ground support to help practices implement these workflows.

Prior to the pandemic, primary care practices participating in Aledade ACOs were already managing pediatric patients requiring outreach for preventive care, transitional care management, or targeted interventions. Practice familiarity with these prioritized, technology-enabled workflows allows for rapid deployment of new initiatives, creating a ripe opportunity to repurpose this infrastructure to assist with pandemic response.

2. Methods: components of ACO pandemic response

2.1. Personal protective equipment and telehealth

As COVID-19 began to surge in March 2020, our company was able to assist practices with the urgent need for personal protective equipment, acquiring and distributing $1.3 million worth of masks, gloves, gowns and face shields. Recognizing the need for swift implementation of telehealth capabilities, we vetted options and partnered with Updox to offer a secure platform free to practices, and provided training including best practices for patient engagement, team workflows, and billing guidance. By April 7th, 2020, 40% of all visits across our practices were being conducted by telehealth. Practices were provided with frequent updates on payment policies, local pandemic surveillance data, and support with financial relief opportunities as the landscape rapidly evolved.

2.2. Identification of COVID-vulnerable patients and tech-enabled outreach

Using the earliest available literature from COVID-19 cases in Wuhan, China, we developed an algorithm to identify patients who would be at highest risk of severe illness or death in the event of contracting COVID-19. The model assigned points for patient demographic factors (age and gender), chronic conditions (hypertension, diabetes, COPD, cardiovascular disease, and cancer), and hypertension severity as ascertained from Medicare claims, practice billing data, and practice EHR data. Assigned points correlated with unadjusted case fatality rates for Wuhan patients with these characteristics, and resulted in a “COVID Vulnerability Score” ranging from 0 to 16.4 among Medicare recipients. We collapsed these scores into four categories of COVID vulnerability: average (score < 2), increased (2–3.9), high (4–9) or very high (> 9) for ease of interpretation. The “high” category flagged all patients aged 70+, or younger patients with comorbidities. “Very high” risk patients included those with advanced age, and two or more comorbidities.

The assigned COVID vulnerability category was displayed prominently in the App beginning on 04/10/2020, enabling practices to consider converting scheduled visits for vulnerable patients to telehealth to reduce the risk of patient exposure. The App also provided a worklist of patients in descending order of COVID vulnerability score, to facilitate proactive outreach to patients with high or very high vulnerability.

2.3. Stay Well at Home toolkit

Accompanying the release of the COVID-19 vulnerability score and worklist, we developed a “Stay Well at Home” visit framework intended to proactively assess and address the needs of COVID-vulnerable patients through a billable telehealth visit. Supporting materials provided clinical practice recommendations as summarized in Table 1. The toolkit included sample scripting for patient outreach and team-based workflow guidance for scheduling, conducting, and billing the visit.

Roll out of the initiative relied on existing ACO communication venues that were used prior to the pandemic for sharing of best practices. The initiative was introduced to practices through ACO board meetings and Grand Rounds (a monthly CME series). ACO medical directors supported physician engagement through clinical calls or multi-practice “pod” meetings, while the practice transformation specialist (PTS) provided direct implementation support to practice staff. Practices are financially incentivized to participate in these meetings through the ACO shared savings distribution formula. The initiative was also promoted through email communications and through the App, with guidance and links to resources embedded within existing App workflows.

2.4. Evaluation methods

To evaluate the reach of the initiative and understand factors associated with successful outreach within the ACO, we conducted a prospective cohort analysis of attributed MSSP patients who were identified as having “high” or “very high” COVID-19 vulnerability in the initial release of the COVID-19 worklist. We examined how many patients were reached within the first 6 weeks, and used multivariate logistic regression to describe patient and practice characteristics associated with

| Table 1 Components of the Stay Well at Home initiative and visit. |
| Key Components | Toolkit Resources |
| Patient education: COVID precautions | CDC guidance and COVID-19 fact sheets available in 30 languages |
| Medications and Durable Medical Equipment | Tips for identifying barriers to medication adherence and assuring uninterrupted access to medications and supplies |
| Chronic Condition Management | Guidance and resources for patient self-monitoring of chronic conditions including blood pressure, diabetes, heart failure, and COPD |
| Advance Care Planning | Strategies for telehealth physical exam |
| Social Needs and Behavioral Health | Evaluating appropriateness of upcoming specialist visits, testing, or procedures, and establishing safest plan of care |
| | COVID-19 specific conversation starters for discussing end of life care |
| | State-specific legal documents for advance care planning |

| Resources for combating loneliness and anxiety |
| Tobacco and substance use screening, counseling, and treatment options |
successful outreach among ACO participating practices. Patients were considered to be "reached" if practice staff documented this outcome on the COVID-19 worklist between 4/8/20 and 5/20/20; or, if practice billing data or Medicare claims data indicated any billed encounter with the COVID-19 worklist between 02/01/20-02/15/20 that were for patients attributed to value based ACO contracts (including both Medicare and commercial contracts). A rolling 12-month Annual Wellness Visit (AWV) completion rate as of 02/29/20 was used as an indicator of practice engagement in ACO initiatives prior to the pandemic.

The local impact of COVID-19 was quite variable across the country in these early weeks, and COVID-19 testing capacity was limited. To assess the presence of local disease suggestive of COVID-19 we included a variable measuring the prevalence of influenza-like-illness (ILI) as a percent of all practice visits during the six week study period.\(^\text{13}\)

### 2.5. Patient and practice characteristics

Patient age, gender, and race were obtained from Medicare administrative data. The presence of diabetes, hypertension, COPD, cardiovascular disease, and cancer were ascertained using Hierarchical Condition Category definitions, based on ICD-10 diagnosis codes found in the primary care EHR problem list, practice billing data or Medicare claims.\(^\text{15}\) Poor blood pressure control was defined as a blood pressure value of >160 systolic or >100 diastolic during the prior 12 months.

Primary care practice and local characteristics that might be expected to influence engagement were included in the analysis, including practice type (private practice, FQHC/RHC, multispecialty); Metropolitan Statistical Area status (metropolitan or non-metropolitan); years of ACO involvement; and practice size estimated by count of MSSP-attributed patients.\(^\text{16}\) Value-based care penetration in a practice was estimated by the portion of all billed encounters between 02/01/20-02/15/20 that were for patients attributed to value based ACO contracts (including both Medicare and commercial contracts). A rolling 12-month Annual Wellness Visit (AWV) completion rate as of 02/29/20 was used as an indicator of practice engagement in ACO initiatives prior to the pandemic.

To further understand factors influencing practice engagement, we identified high-engagement and low-engagement practices six weeks after launching the Stay Well at Home initiative, and surveyed the PTS most familiar with each practice. High engagement practices had documented an attempt to contact at least 75% of the patients on their COVID-19 worklist. Low engagement practices had attempted to contact fewer than 5% of patients. The survey included structured and open-ended questions about how the practice was introduced to the initiative, practice motivation, contributors to success, and barriers to engagement.

### 3. Results

#### 3.1. Patient population

A total of 302,125 patients met "high" or "very high" COVID vulnerability criteria, representing 71.7% of Medicare beneficiaries attributed to our ACOs in the Medicare Shared Savings Program. Targeted patients had an average age of 76, were 57% female and 84% white, and had a high prevalence of chronic conditions as shown in Table 2. Patients received primary care in a wide variety of practice settings, including private practices (50%), federally qualified or rural health centers (20%) and multispecialty groups (30%). Thirty percent of patients received primary care in a non-metropolitan statistical area. Practices varied in years of experience working with our company, Medicare MSSP patient panel size, proportion of total patient volume covered under value-based care contracts, and degree of baseline engagement in ACO activities as evidenced by Annual Wellness Visit completion rates (Table 2).

#### 3.2. Outreach results

Practices successfully reached 45% of targeted patients, or 136,000 vulnerable Medicare beneficiaries, within 6 weeks of the release of the COVID worklist. Outreach resulted in a billed visit for 38% of targeted patients, including telehealth visits for 14% of patients.

Patients in practices with higher AWV completion rates prior to the pandemic were more likely to be reached (OR 1.69, 95% CI (1.13–2.51)), as were patients in small practices compared to large practices (OR 1.46, 95% CI (1.13–1.87)), and non-metropolitan areas compared to metropolitan areas (OR 1.29, 95% CI (1.06–1.57)). Value based care penetration, or proportion of total practice visit volume in accountable care contracts, was associated with successful outreach (OR 1.80, 95% CI (1.3–2.85)). We did not observe an association between practice type or years of affiliation with our company and the likelihood of successful outreach, controlling for other practice characteristics.

Across the 467 practices, the median rate of successful outreach was

### Table 2

| Study Population Demographics and COVID-19 Risk Factors Prevalence (N = 302,125) |
|-----------------------------|---|
| Age                        | 76 |
| Sex                        |  57%  |
| Race                       |  43%  |
| Chronic Disease Diagnoses  |               |
| Cancer                     | 22%  |
| Chronic Obstructive Pulmonary Disease | 25%  |
| Cardiovascular Disease     | 37%  |
| Diabetes                   | 41%  |
| Hypertension               | 90%  |
| BP Control                 | 75%  |
| Uncontrolled (>160/100)     |  5%  |
| Unknown                    |  20% |
| Study Population Practice Characteristics (N = 302,125) |
| ACO Start Year              |               |
| 2014                       |  2%  |
| 2015                       |  2%  |
| 2016                       | 11%  |
| 2017                       | 19%  |
| 2018                       | 11%  |
| 2019                       | 27%  |
| 2020                       | 27%  |
| Practice Type              |               |
| Private Practice           | 50%  |
| FQHC/RHC                   | 20%  |
| Multispeciality            | 16%  |
| Other                      | 14%  |
| Metropolitan Statistical Area (MSA) Status |         |
| Metropolitan               | 70%  |
| Non-metropolitan           | 30%  |
| Practice Size (MSSP Lives Under Management) |               |
| Small (0–500)              | 14%  |
| Medium (501–2000)          | 52%  |
| Large (>2000)              | 34%  |
| Value Based Care Penetration (mean) | 27%  |
| Baseline AWV Rate (mean)    | 64%  |
| Local Prevalence of Influenza-like-Illness (mean) | 6%  |

Adapted from: Amon C. Local Prevalence of Influenza-like-Illness (mean) 6%, Baseline AWV Rate (mean) 64%, Value Based Care Penetration (mean) 27%. Healthcare 10 (2022) 100623.
44%; 25% of practices reached fewer than 33% while 25% of practices reached >60% (Fig. 1). Consistent with the patient-level analyses, higher reach rates were associated with smaller practice size, non-metropolitan location, higher value-based care penetration, and higher AWV completion rates prior to the pandemic.

3.3. Facilitators and barriers to practice engagement: insights from key informants

Forty-seven practice transformation specialists provided survey responses for a convenience sample of 85 high engagement practices and 99 low engagement practices (24 of the 47 practice transformation specialists had practices in each category). The vast majority of high engagement practices were using the COVID-19 worklist to schedule telehealth visits (94%), and were simultaneously using other ACO worklists for Transitions of Care (92.6%) and ED Follow-Up (85.2%) for patient outreach. When asked what they believe drove engagement with the initiative, the most common response was strong prior engagement with ACO work (39%), followed by a need to fill schedules (28%), concern for patients (24%), and staff availability (24%).

Practices with low engagement in the Stay Well at Home initiative had lower rates of engagement in other core ACO initiatives, with only 59.6% using the Transitions of Care worklist and 49.5% using the ED Follow-Up worklist. When asked about barriers to utilizing the COVID-19 worklist, the most common response was staff furloughs or lower than usual staffing levels (40.4%).

High- and low-engagement practices were similarly likely to have been introduced to the initiative during a meeting with their PTS (88.9% vs. 82.8%) and/or through a clinical call or pod meeting with an ACO medical director (57.4% vs. 59.6%). High-engagement practices were more likely to have attended additional forums promoting the initiative, including Grand Rounds for physicians (37.0% vs. 26.3%) and Complex Care Rounds for care managers (24.1% vs. 12.1%).

4. Discussion

The Stay Well at Home initiative reached 136,000 Medicare beneficiaries over the course of 6 weeks in April–May 2020, representing one-third of all Medicare patients attributed to 467 participating practices in 39 ACOs across 27 states. Key to this success was the ability to leverage existing ACO infrastructure and capabilities, such as ascertaining patient risk factors from multiple data sources for risk segmentation, invoking cross-disciplinary expertise for rapid development of comprehensive best practice guidance, and leveraging existing technology-enabled workflow tools and on-the-ground practice support for adoption and implementation.

While all practices in this study were members of an Aledade ACO with equal access to the resources and tools provided for pandemic response, practice engagement in this initiative was uneven. Vulnerable patients were more likely to receive outreach if their primary care practice had previously demonstrated high engagement in ACO initiatives, specifically related to high rates of Annual Wellness Visit outreach and completion. Patients in smaller practices and in more rural settings were also more likely to receive outreach, which may suggest greater nimbleness for rapid implementation of new initiatives in these settings.

The need to fill schedules and availability of practice staff were identified as major facilitators of practice engagement; while staff furloughs, competing priorities, and low adoption of telehealth were identified as barriers.

Rapid deployment of a risk model would not have been possible without global scientific collaboration for data collection and data transparency. In the context of the public health emergency, the ability to rapidly deploy the intervention and agility to iterate our approach was more important than the predictive accuracy of the initial model. The COVID vulnerability score has been in continual use beyond this initial 8-week study period, including for prioritization of patient outreach as vaccines became available. We have been able to refine our targeting methods over time, incorporating factors that had not been identified as independent predictors of COVID vulnerability in the early weeks of the pandemic such as African American race, obesity, and additional chronic conditions.

There are several limitations to this study. Because the initiative was deployed simultaneously to all ACO-participating practices without a control group, no conclusions can be drawn about the effects of this initiative relative to usual care within the ACO, or about the impact of ACO participation relative to non-participation. Observed associations between patient and practice characteristics and the likelihood of successful outreach do not establish causality. We were unable to assess fidelity to specific recommended components of the Stay Well at Home visit, and did not examine other factors that may have influenced outreach.
outreach success, such as practice staffing, management approaches and provider or patient perception of the threat of COVID-19.

During the early weeks of the COVID-19 pandemic, we aimed to use ACO infrastructure to position independent practices across a diversity of community settings to respond rapidly to the needs of their most vulnerable patients, while also mitigating the financial vulnerability of primary care practices by increasing visit volumes. Many facets of the ACO care delivery model may have contributed to the success of this initiative, including centralized resources for rapid development of the toolkit and the data algorithm, material support for practices to implement telehealth and navigate the changing public policy and payer reimbursement landscape, and pre-existing practice familiarity with technology-enabled population health workflows. As the pandemic continues, the nation’s primary care infrastructure remains at risk while unmet needs for preventive services and chronic disease care accumulate.7,23 Future research should examine the influence of value based care models in mitigating these harms, and further elucidate the value of accountable care for primary care resilience and public health.

5. Conclusions

Accountable Care Organization infrastructure was successfully leveraged for proactive outreach to vulnerable patients during the early weeks of the COVID-19 pandemic across a network of 467 independent primary care practices in 27 states, reaching over 100 patients per practice per week. The initiative had greater uptake in small practices and non-metropolitan areas, and in practices with higher value-based care contract penetration and higher engagement in the ACO’s Annual Wellness Visit initiative prior to the pandemic. Primary care participation in accountable care models may be an effective mechanism for improving community preparedness for future public health crises.

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Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Each of the authors is employed by Aledade Inc.

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