How Accountable Care Organizations Use Population Segmentation to Care for High-Need, High-Cost Patients

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ABSTRACT

ISSUE: New payment and care delivery models such as accountable care organizations (ACOs) have prompted health care delivery systems to better meet the requirements of their high-need, high-cost (HNHC) patients.

GOAL: To explore how a group of mature ACOs are seeking to match patients with appropriate interventions by segmenting HNHC populations with similar needs into smaller subgroups.

METHODS: Semistructured telephone interviews with 34 leaders from 18 mature ACOs and 10 national experts knowledgeable about risk stratification and segmentation.

KEY FINDINGS AND CONCLUSIONS: ACOs use a range of approaches to segment their HNHC patients. Although there was no consistent set of subgroups for HNHC patients across ACOs, there were some common ones. Respondents noted that when primary care clinicians were engaged in refining segmentation approaches, there was an increase in both the clinical relevance of the results as well as the willingness of frontline providers to use them. Population segmentation results informed ACOs' understanding of program needs, for example, by helping them better understand what skill sets and staff were needed to deliver enhanced care management. Findings on how mature ACOs are segmenting their HNHC population can improve the future development of more systematic approaches.

TOPLINES

▸ ACOs use a range of approaches to segment, or group, their sickest and costliest patients by the level of care and management they require.

▸ By engaging primary care clinicians' help in subdividing the high-need, high-cost patient population, ACOs can increase the usefulness of results and frontline providers' willingness to use them.

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INTRODUCTION

Five percent of the U.S. population has complex medical and behavioral or social needs, but this group accounts for 50 percent of the country's health care spending.[1] New payment and care delivery models such as accountable care organizations (ACOs) have prompted decision-makers at health care delivery systems to seek the best ways to meet these patients' needs while controlling costs.[2]

To this end, many ACOs have used predictive modeling and risk stratification to sort their entire population into risk levels (such as low, medium, and high). ACOs typically linked their high-risk patients to the ACO's general care management program. This approach has had mixed results, perhaps because high-risk patients have wide-ranging, heterogeneous needs, and different care management services benefit certain kinds of high-risk patients more than others.[3]

Fewer ACOs have taken the approach of subdividing (segmenting) this high-need, high-cost (HNHC) population into smaller subgroups with similar needs.[4] The National Academy of Medicine and others have highlighted the importance of recognizing that all HNHC patients are not alike, and recommend segmentation of HNHC patients.[5] It is theorized that segmentation will allow ACOs to better match patients to appropriate interventions, enabling them to provide higher-quality care and allocate limited resources more effectively. Interventions are most effective when they target the patients that they were intended to serve.[6] For example, an intervention might include outreach to socially isolated patients with congestive heart failure (CHF); additional social support might improve their medical condition and avoid preventable emergency department (ED) visits.

Because few ACOs have tackled segmentation of HNHC patients,[7] little is known about the best approach. To better understand the use of segmentation, we look beyond the few most visible efforts[8] to explore how mature ACOs segment their HNHC adult population, as well as the challenges these initiatives face.

FINDINGS

We completed interviews with 44 respondents: 10 national experts and 34 respondents from 18 ACOs. Most ACO respondents were medical directors, executives, care management program leads, clinician leaders, or data analytics leads. ACOs' characteristics were balanced by region, type (Medicare Shared Savings Program [MSSP], Next Generation, Medicaid[9]), ownership type, and size of population served (see Appendix).

Population Segmentation Goals and Team Make-Up

In tackling risk stratification and segmentation, some ACOs' goals are aspirational: improving patient outcomes, reducing costs, and achieving the Triple Aim.[10] ACOs also hope to inform program management by improving their understanding of several elements: which patients are high cost, and why; which patients have needs that health care organizations could address; how to allocate resources, such as staff, to care teams; and how to help teams prioritize workloads. They also want to identify the needs of HNHC subgroups, identify any additional necessary training of care management staff, and determine manageable panel sizes for care managers or teams.

ACO teams conducting population segmentation typically include ACO chief medical officers, chief executives, population health leads, care coordination or care management program leads, data analytics leads, and practicing physician representatives (such as those from clinical leadership committees). To tailor care for the identified subgroups, teams add more frontline clinicians such as primary care physicians (PCPs), nurse care managers, social workers, care transition staff, and behavioral health providers.

Approaches to Population Segmentation

Most ACOs use both quantitative information, such as claims data, and qualitative data, including clinician assessments, to risk-stratify their population. This hybrid approach seems to offer the best compromise between consistent implementation and clinical salience. All 18

ACOs use claims data, utilization data, and/or reports from payers to risk-stratify their entire population. Sixteen ACOs also use limited clinical data elements from their electronic health records (EHRs) to inform risk stratification. In many of these, ACOs or third-party vendors employ an algorithm to analyze the available structured data and compute a numeric risk score. Based on this score, they typically classify their entire ACO population into low-, medium-, and high-risk groups. Several ACOs also identify a "rising risk" group. Some national experts and ACO respondents reported that numeric risk scores from vendors were not actionable because patients with the same risk scores could have wide-ranging needs, and the output lacked sufficient clinical context.

While all ACOs interviewed engage in whole-population risk stratification, some further segment their HNHC patients into subgroups. Some ACOs describe this process as sequential, with risk stratification preceding the segmentation of HNHC patients into smaller subgroups. Alternatively, the two efforts can occur as part of a single process. However, a few ACOs first identified patients with particular conditions or combinations of conditions, and then performed risk stratification and segmentation within those groups to determine which patients should receive more intensive and tailored care management.

Of the 13 ACOs reporting HNHC population subgroups, seven define their subgroups by incorporating clinical evaluation and risk assessment data that have been gathered in person from patients. Only four of these ACOs use data on patients' social and behavioral needs in the segmentation process. Most ACOs identify these needs during patient assessments made while tailoring care management services for HNHC patients, rather than during segmentation.

There are numerous challenges to accurately and efficiently capturing data on social and behavioral needs for risk stratification and segmentation. One challenge is documenting meaningful social and behavioral health data in a discrete structured format in current EHRs. Systematic data on social needs are also scarce at both the population and individual patient levels. Given that social service agencies and community organizations already collect their own data on substance abuse, housing, and food programs, there is a need for improved data coordination between them and health care delivery systems.

Among ACOs that incorporate social and behavioral health needs into segmentation, some use a hands-on approach while others opt for more automated tactics. For example, Rio Grande Valley ACO, an MSSP with clinics in Texas and New Jersey, takes a hands-on approach (Exhibit 1). Its interdisciplinary clinical team employs a tool to categorize HNHC patients into subgroups based on four domains: the patient's medical neighborhood; social support; medical status and trajectory; and self-management and coping skills, and mental health. Each subgroup is then assigned to an appropriate level of care management. In contrast, Montefiore ACO uses a highly automated approach to segmentation, incorporating claims and pharmacy data as well as indicators of patients' psychosocial needs (Exhibit 2). Montefiore's Next Generation ACO, an integrated hospital and physician entity in The Bronx, New York, serves 55,000 Medicare patients who typically receive medical care from Montefiore over their lifespan. Montefiore ACO has strong, in-house analytic capabilities and involves patients' PCPs after segmentation is complete.

Although there is no consistent set of subgroups into which ACOs segment their HNHC patients, certain subgroups are common. These subgroups include frail elderly, advanced illness (palliative, hospice, and end-of-life care), transitional care, homebound, comorbid medical conditions (often including diabetes, CHF, or chronic obstructive pulmonary disease [COPD]), comorbid medical and mental health conditions, chronic care rising risk, disabled, and end-stage renal disease (ESRD). The national experts and ACO clinicians in our study cautioned against using single disease-focused segments, because they risk missing the underlying cause of a patient's problems or fail to address comorbid conditions. ACOs identify frail elderly patients in a variety of ways: clinician referral, in-person clinical frailty assessments, in-house or vendor analyses based on diagnoses, claims-based utilization and patient demographics data, and frailty constructs such as the Johns Hopkins Adjusted Clinical Groups (ACG) System.[11]

Exhibit 1. Rio Grande Valley ACO Health Providers, LLC (Texas)

ACO characteristics

- Physician-owned Track 3 MSSP with 10,600 patients; 36 percent are dually eligible for Medicaid.
- "Hands-on" (nonautomated) approach to segmentation of high-risk patients into subgroups.

Segmentation process

Defining target population

- Identify top 10 percent of high-cost patients each month using Medicare claims, ADT data, and internally developed software.
- Concurrently with segmentation process, ACO sends primary care physicians (PCPs) monthly lists of high-risk patients. PCPs can reach out to patients on list while awaiting segmentation results.

Defining subgroups (includes data sources used)

The ACO-level interdisciplinary complex case management (CCM) team uses a stratification tool to segment the high-cost patient list; this is not an automated process. The tool (developed in-house but based on GRACE, CalOptima, and other models) covers four domains:

1. Patient's medical neighborhood: access to care; experience with primary and specialty care providers; receipt of needed services; coordination of care; and enrollment in medical home.
2. Patient's social supports (home and social environment), using the Humboldt stratification tool.
3. Medical status, trajectory, and complexity (medications, treatments, compliance, severity).
4. Self-management, coping skills, and mental health.

Patients are assigned from one to 57 points based on the certification tool, with the four domains receiving equal weights. Total points determine high-need, high-cost patients' risk levels.

Clinician involvement in segmentation

- Multidisciplinary team that applies the stratification tool includes clinicians.
- CCM team works closely with primary care team to agree on care plan.
- If PCP, primary care team, or patient prefers not to enter CCM program, primary care team will receive guidance. Patient written consent is required to participate in CCM program.
- ACO has embedded care coordinator (licensed practical nurse or medical assistant) at each primary care practice. CCM team communicates closely with high-risk patients' care coordinator and PCP.

Tailoring care

Segmentation results used to tailor care management to the four levels of high-risk, high-cost patients:

- Level 4: **Highest-acuity patients** receive close supervision, regular visits by care manager during the week, 24-hour call service, frequent communication with PCP about patient, regular phone calls including medication and appointment reminders.
- Level 3: **Consistently high users of inpatient services** receive weekly visits by care manager, increased phone contact, and engagement of enhanced family or other supports.
- Level 2: **Patients with high social needs** have care coordinator to help address social needs alongside primary care team management of medical needs.
- Level 1: **Patients with rising risk** have a care coordinator who tracks and works with family to prevent patient from moving to a higher acuity level.

Exhibit 2. Montefiore ACO (Bronx, New York)

ACO characteristics

- Next Generation ACO with 55,000 patients; includes low-income, long-term patients of Montefiore Health System.
- Montefiore is an integrated delivery system (primary care, specialty care, hospitals).

Segmentation process

Data sources and their uses

- ACO receives claims files from payers and an attribution file from CMS. Its enterprise data warehouse contains clinical and pharmacy data from the EHR.
- Montefiore incorporates some external data sources on patients' social needs, such as U.S. Department of Housing and Urban Development data on housing.
- Montefiore conducted a baseline assessment of 4,000 patients. Those with substance abuse issues, psychological disorders, and unstable housing had much higher costs, which led Montefiore to incorporate six additional social determinant categories into its algorithms, as well as other qualitative and quantitative information.

Defining target population

- Six medical directors identify variables to include in algorithms, using clinical risk group (CRG) mapping.
- Patient claims data and the EHR are run through a proprietary, in-house risk stratification algorithm, using the CRG methodology, to identify patients who may benefit from targeted health care services. Montefiore refers to this step as patient identification. Results are updated monthly.
- The ACO further stratifies patients after identifying who may benefit from targeted services.

Defining subgroups

Patients identified through the algorithm are segmented by disease state. Segments are assigned to one of five "pods" that specializes in specific patient populations:

1. Congestive heart failure, asthma, chronic obstructive pulmonary disease, hypertension.
2. Diabetes.
3. End-stage renal disease and chronic kidney disease.
4. Complex/high-risk patients with comorbid conditions.
5. Advanced illness management for patients in hospice and palliative care.

Clinician involvement in segmentation

- Frontline PCPs are involved after, not during, the segmentation process.
- Clinicians can adjust patients' assigned risk groups after they have been enrolled in a care management program. Changes to assigned risk groups usually occur during monthly clinical meetings where frontline clinicians discuss how to better serve challenging patients.

Tailoring care

- Care management programs are designed to meet the needs of patients in each subgroup.
- After patients are enrolled in care management, a nurse administers a baseline assessment to collect timely information about the patient's medical, social, and behavioral needs.
- After segmentation and assignment to care management programs, staff assess patients' willingness to engage in care management. More than 90 percent agree to participate, a high engagement rate credited in part to the use of nonclinical staff to approach patients.
- Pods provide an enhanced layer of care management for the patient's PCP. The primary care team is informed of the care management activities through the EHR. A pod includes multiple health care teams. In the diabetes pod, for example, an integrated behavioral health team works with the diabetes care team, given that one-half of the diabetics also have mental illnesses.

Engaging PCPs to refine their segmentation approaches can increase the usefulness of results, as well as frontline providers' willingness to use them. Involvement of primary care teams can help address PCPs' initial skepticism and concern that an ACO is "interfering" in their patients' care. ACOs use provider input to adapt algorithms to include variables that are particularly important to their population. For example, one interviewee said they "constantly solicit provider feedback," noting that "three physicians found issues with the algorithm not accurately identifying patients with chronic kidney disease and some basic mental health issues." Based on physician feedback, "we went back and layered GFR [glomerular filtration rate] values and PHQ-9 [Patient Health Questionnaire-9] data so these patients would be picked up in the high- and rising-risk categories."[12] A few ACOs have a team of clinicians that identifies important variables to include in their algorithms.

Many ACOs ask the PCP or other clinical staff to review the results of their segmented high-risk patient subgroups. They allow clinical staff to add or remove patients, using their clinical judgment of who could benefit from enhanced care management. A medical director described how to engage frontline providers early in the segmentation process: the ACO must carve out time in the providers' schedule "30 minutes a week for a month, where you pull them off the front line, they don't see patients, the nurse sits down with them, and they look at the list." Conversely, a few ACOs do not seek clinician input; for them, risk stratification and segmentation "happen behind the scenes."

Some ACO and national expert respondents said it was important to communicate segmentation results to frontline clinicians in a transparent, accessible, and actionable way — such as a banner or button in the EHR that indicates the patient's risk group. In at least one ACO, clinicians also can click the button to see the top 10 variables used to calculate the patient's risk level. In another ACO, the patient's risk score is "literally a flag in the electronic record with a pulldown tab to get in touch with the care manager."

Even among ACOs pursuing population segmentation of HNHC patients, only a few go beyond preexisting care management programs to further tailor care to those subgroups. ACOs that tailor care to subgroups use existing disease-specific care management programs, such as a program for ESRD patients. They also create new or modify existing care management efforts based on the needs of various subgroups. Most respondents stressed the importance of keeping HNHC patients with their usual primary care practice while adding an enhanced layer of care management. That might mean embedding a care manager in the primary care site or using a care manager or care management team housed elsewhere in the organization. Tailoring care for subgroups typically includes addressing the care management team's clinical backgrounds and care management skills, or the frequency, duration, and type of the team's contacts (home visits or phone calls, for example).

The care management team usually adapts an enhanced care management approach for individual patients within a high-risk subgroup, based on in-person or telephone-administered risk assessments conducted by a nurse care manager or nurse care coordinator. At several ACOs, physicians and lead care managers are heavily involved in designing or identifying existing risk assessment tools that guide how care is tailored.

ACOs struggle to tailor care to HNHC subgroups when lack of funding limited their ability to hire enough care managers. Care management staff are sometimes so busy with current high utilizers that they lack resources to reach out to rising-risk patients. And many are frustrated with the lack of coordination among care management programs from different health plans and initiatives. As one ACO clinician observed:

> [Care management is] siloed and business-driven, not patient-driven. Why do we have nurse care managers in primary care? Because someone's paying us to do it in the [primary care demonstration] program. Why do we have nurse care managers doing discharge planning in the hospital? Because DRG [diagnosis-related group] payments make that a valuable activity from the hospital's perspective. Why don't we have nurse care managers managing our cystic fibrosis patient population? Because nobody pays for it.

Refinement of Population Segmentation Approaches over Time

National experts and ACO respondents stressed the need for ongoing feedback loops. To improve its utility, they either refined or completely replaced their segmentation approach over time. A few ACOs used continuous feedback loops that incorporated short-term process measures, such as chronic condition control and rates of emergency department utilization.

Respondents offered examples of improvements made to risk stratification and segmentation approaches after such assessments: incorporating new or more current data sources, such as EHR data; enhancing the collection of social and behavioral health data; modifying the care management team (hiring more social workers, for example, or reallocating care managers); and changing relationships with third-party vendors. Process refinement often includes better engagement of frontline clinicians as well as more oversight from formal physician advisory committees.

Challenges to Assessing Effectiveness of Population Segmentation and Care Management

Although care management informed by risk stratification and segmentation can help improve program management and some process measures, changes in cost or quality outcomes cannot necessarily be attributed to these efforts. Some study respondents noted improvements, including a decline in admission rates for particular conditions (CHF and COPD, for example); reduced ED visits; increased contact with patients who had not contacted the system in the prior two years; increased use of evidence-based preventive services; and improved patient self-confidence in their ability to manage their chronic conditions. ACO respondents also noted that population segmentation influenced program management goals.

Respondents noted numerous challenges to quantitatively assessing the effectiveness of current risk stratification, segmentation, and care management approaches. These include:

- Regression to the mean.[13]

- Small sample sizes of high-risk subgroups within an ACO, resulting in insufficient statistical power to assess effects on outcomes.

- Limited actionability of claims data because of the time required for health plans to process claims, as well as claims' lack of clinical nuance.

- Cost of integrating EHR data when ACO medical practices use different EHR platforms.

- Difficulty of establishing causality when ACOs participate in simultaneous initiatives, such as same-day appointments or efforts to reduce readmissions and increase access to urgent care clinics.

Exhibit 3 summarizes respondents' collective advice to ACOs new to population segmentation.

Vendors' claims of achieving savings can be hard to validate, as some respondents reported. One ACO physician said "they did not provide the statistical analysis that [would let] me know for sure that they're not just reporting regression to the mean." Another ACO physician noted that both vendors and ACOs "face immense pressure . . . to come up with any data that supports their work." This respondent stated it is unrealistic to expect "you could hire a turn-key solution from the outside and drop it on top of existing practices and within a year have a positive outcome."

Exhibit 3. Respondents' Advice and Tactics for Segmentation

1. Start small and take it slowly.

"Just start off somewhere. Don't let perfect be the enemy of the good." —— Chief medical officer

2. Keep the initial approach as efficient as possible.

"These are expensive processes [so] think about how you keep the intervention as tight and efficient as possible. If you prove that you can do something valuable in a small, efficient way, then maybe you can grow it rather than thinking, hey, let's try to throw the entire kitchen sink at people and see what sticks." —— ACO physician lead

3. Use a model that is transparent and understandable to clinicians.

4. Involve physicians and care teams in working closely with the analytics team.

"The person generating the scores and setting the strategic needs and goals needs to see what it's like on the ground. . . . That gap is really common . . . [but] it's a two-way street. [Frontline clinicians] have to feel heard, but they also have to listen." —— National expert

5. Start with a focus on good data capture and storage, then expand the scope of data over time.

"The 'up-front investment' to create a single clean data repository is 'money-well spent.'" —— Executive from well-resourced ACO

6. Build in an ongoing feedback system to learn from on-the-ground providers in the practices how well your segmentation and care-tailoring approaches are working.

- Be sure your process helps rather than disrupts practices' workflows.
- Adjust your approach over time.

7. Focus on patients with addressable needs for whom you can have an impact — not just high-cost patients.

"Identify small pockets that will have the biggest impact." —— Care coordination lead

8. How to decrease "regression to the mean" for within-ACO model evaluation efforts:

- Require a patient to have a constellation of conditions to join the high-risk group, for example, one or more chronic conditions as well as high prior utilization.
- Update population's risk scores weekly or monthly, so that patients who are not chronically high-risk tend to "fall out over time."
- Care management programs can have "enrollment and disenrollment criteria" that incorporates "clinical judgment" to help identify patients who could "graduate" from case management.
- Obtain clinician input to exclude particular diagnoses (such as those that are likely to have time-limited costs) from the risk stratification and segmentation model.

9. Risk stratification and segmentation can inform:

- Identification of high-risk, high-cost patients.
- Understanding of reasons why these patients are high-risk, high-cost.
- How to allocate needed resources to care teams, including prioritizing team workloads.
- The type of staff training needed for managing care.
- Identification of manageable panel sizes for care managers/teams.

DISCUSSION

In this report, we described how 18 mature ACOs approach population segmentation and tailor their resources. While all the ACOs in our sample risk-stratify their entire population to identify high-need, high-cost patients, only two-thirds segment the HNHC patient population into smaller subgroups to identify those with similar needs. Most have in place a sequential process, with risk stratification preceding the segmentation of HNHC patients into subgroups. A few first identify patients with particular conditions, or combinations of conditions, and then perform risk stratification and segmentation within those groups. This latter approach is similar to one taken by Denver Health.[14]

Similar to the results of prior research,[15] our study finds that algorithms based solely on claims data do not capture sufficient information on clinical, behavioral health, or social needs. On the other hand, prior research documents the challenges of solely relying on patient-completed health risk assessments or clinician judgment to identify individual patients for care management.[16] Like others,[17] we find that hybrid approaches — using both quantitative and qualitative data to segment a population and identify patients most likely to benefit from care management — offered the best compromise between consistent implementation and clinical salience. Although there are no consistent sets of subgroups into which ACOs further segment their high-risk patients, ACO respondents in our study frequently identify certain subgroups. High-risk subgroups sometimes correspond to categories supported by their existing care management programs, in part because of funding and expediency. Others adapt existing programs or create new ones for some subgroups. ACOs use their segmentation results to help determine manageable patient panel sizes, as well as how to allocate staff resources and workforce training to their care management teams.

Although our qualitative sample has good variation by ACO and respondent characteristics, we cannot generalize from our study to all ACOs, or even to all mature ACOs.

Challenges and Emerging Opportunities

Respondents identified several challenges to population segmentation and resource tailoring, as well as potential strategies to address them. Ongoing needs include:

- Improving the availability of current, accurate data on patients' clinical, functional, social, and behavioral health needs.

- Strengthening analytic and clinical resources.

- Improving the evaluability of segmentation and care management programs.

Limited availability of current and accurate data. ACO respondents reported the need for timely, high-quality clinical data that can capture patients' current risk factors more accurately than claims data; this sentiment has been described by others.[18] Using the most recent patient information recorded in the EHR might allow the segmentation results to more accurately reflect the current needs of the patient, particularly compared to using claims data.

ACOs also struggle to capture data on their patients' social and behavioral health needs that can systematically be used in the segmentation process. Although clinicians may already record social and behavioral health needs in a text field in the patient's record, these data cannot be readily used in an algorithm that stratifies patients by risk.

ACOs could especially benefit from tailoring enhanced care management services to patients' functional status. Frail people with poor functional status, for example, are challenged by carrying out activities of daily living, and drive higher costs over time. To tailor services, however, ACOs would need to create new structured data or access existing data. For example, ACOs could work with their EHR vendors to develop a standardized assessment of social and behavioral health needs, including functional status. Moreover, health care delivery organizations and government and social service programs (for example, corrections, foster care, or the Supplemental Nutrition Assistance Program) could enter into data-sharing agreements. These collaborations could help ACOs determine which patients need particular services.

Resource-intensive processes. Though many mature ACOs do their risk stratification and segmentation in-house, others lack the technical infrastructure, funding, and workforce to do so. ACOs without in-house analytic capabilities often find the risk stratification and segmentation process to be a "heavy lift," and some relied on third-party vendors to support their work.

Involving frontline clinicians in the segmentation process was a time-intensive activity, but one that could make the overall process more efficient. Involving frontline clinicians reportedly makes them more likely to accept the results of segmentation, which in turn affects whether patients accept enhanced care management services. Clinician input also helps tailor services to patients' needs. To reduce the burden on busy clinicians, some ACOs seek this input from a select subgroup of knowledgeable physicians, as well as from other clinical staff.

Improving the evaluability of segmentation and tailored care programs. A very large ACO may be able to quantitatively evaluate its own program,[19] but small and medium ACOs often lack adequate sample sizes of HNHC patients. Methods for real-world evaluations of such programs across health delivery organizations exist,[20] but we first need a better understanding of what population segmentation looks like on the ground. We hope this paper adds to a growing knowledge base.

The complex financing of health care in the United States also complicates ACOs' abilities to evaluate their programs. ACOs find themselves torn between meeting the reporting requirements and quality measure goals of different payers and programs and analyzing data for internal evaluations of program impact. Furthermore, some respondents note that payer initiatives' concern for annual costs influence ACOs. It leads them to apply that narrow, short-term focus to their internal evaluations of segmentation and tailored care programs, instead of considering the impact on multiyear costs or broader population health outcomes. If ACOs could move beyond these short-term requirements, they might focus more on true population health by segmenting along the lifespan to address the root causes of patients' needs.[21]

HOW WE CONDUCTED THIS STUDY

We studied Medicare ACOs and a few Medicaid ACOs operating under Centers for Medicare and Medicaid Services authority that had been in place for at least three years, or that had a long history of risk contracting before becoming an ACO. We wanted to hear from well-established health care delivery organizations that had developed incentives to control costs. We did not interview representatives from Medicare Advantage plans because they are typically not health care providers, and they face a variety of local issues that affect how they interact with their network and local payers. We focused on their approaches to risk stratification, segmentation, and tailoring care to their adult patient population. The New England Institutional Review Board (NEIRB) determined that this study was exempt from NEIRB review (WO-1-20071-1).

Sample Identification
Before interviewing ACO respondents, we interviewed national experts knowledgeable about risk stratification and segmentation; we identified them based on our literature review and referrals from experts in the field.[22]

We used two data sources to identify ACOs for interviews. The National Association of Accountable Care Organizations (NAACOS) provided us with a list of the 50 "most mature" ACOs participating in NAACOS activities and events. We emailed the contact for each ACO, explaining the purpose of our study, and asked the following: whether they pursued risk stratification and segmentation; whether they used that information to decide how to deliver care to high-risk subgroups; and whether they would be willing to put us in touch with the individual who led those efforts, for a potential interview. To reach ACOs in regions not captured by volunteers from the NAACOS' list, we purposively identified additional ACOs from *Becker's Hospital Review.*[23]

Semistructured Interview Content
We used two separate protocols with parallel content that was tailored to either national expert or ACO respondents. We asked national experts about their experiences with, and views of, ACOs' approaches to risk stratification, segmentation, and tailoring of health care resources. Within these three areas, we explored a variety of topics:

1. Terminology ACOs use for risk stratification and segmentation.

2. How ACOs define their target population for segmentation.

3. Types of staff participating on the teams conducting population segmentation.

4. Segmentation goals.

5. Description of processes and data sources, and involvement of third-party vendors in population segmentation.

6. Whether and how social support and behavioral health needs are incorporated into risk stratification and segmentation.

7. How clinicians are involved in population segmentation.

8. How clinicians have reacted to risk stratification, segmentation, and output.

9. Strengths and weaknesses of population segmentation approaches.

10. How, if at all, ACOs assess or consider patient interest in care management as part of the segmentation process.

11. How, if at all, they assess and refine their risk stratification and segmentation approaches over time.

12. How they used segmentation results to tailor care, and if they try to evaluate health outcomes.

13. How respondents would approach risk stratification and segmentation if they could focus on long-term, multiple year outcomes rather than annual outcomes.

14. Advice for ACOs or other entities interested in segmenting their HNHC population and tailoring care to resulting subgroups.

Data Collection
We interviewed national experts in early 2017 and ACO respondents in mid-2017. On average, we interviewed two respondents per ACO. Interviews lasted from 60 to 90 minutes. We audio recorded and transcribed all interviews. Characteristics of our respondents are summarized in the Appendix.

Analysis
We developed our initial code dictionary based on our literature review[24] and refined it based on themes that emerged from respondents' comments.[25] We coded the interview transcripts using Atlas.ti qualitative analysis software (version 7.5.10), meeting weekly to verify coding and minimize researcher bias.

NOTES

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APPENDIX. CHARACTERISTICS OF RESPONDENTS AND ACOS

Respondent characteristics	Frequency
Total completed interviews	**44**
National experts	10
Respondents from ACOs	34
Type of ACO respondent[a]	
ACO medical director	6
Care management/care coordination program leads	6
ACO chief executive	5
Other ACO program executives (e.g., population health lead)	3
Data analytics lead	3
Third-party vendor representative	2
Frontline physicians (excluding medical directors who also saw patients)	2
ACO finance executive	2
Other[b]	5
ACO characteristics	
ACO type	
Medicare Shared Savings Program, Track 1	5
Medicare Shared Savings Program, Track 2	0
Medicare Shared Savings Program, Track 3	3
Next Generation	8
Medicaid	2
Does the organization also have commercial ACO contracts?	
Yes	12
No	6
Ownership type	
Physician-owned	6
Hospital/system-owned	5
Jointly owned	5
Publicly owned	1
Other[c]	1
ACO population size (for Medicare or Medicaid ACOs only)	
5,001–10,000 patients	1
10,001–30,000 patients	9
30,001–50,000 patients	3
>50,000 patients	5
Does the ACO use a third-party vendor for some aspect of its risk stratification and segmentation approach?	
No, in-house analytics only	9
Mix of third-party vendor and in-house analytics	7
Yes, third-party vendor only	2
Region	
Northeast	4
Mid-Atlantic	1
Southeast	3
Midwest	6
Southwest	1
West Coast	3

[a] We interviewed 34 respondents from 18 ACOs.

[b] "Other" included a director of quality segmentation, a vice president of provider engagement, an ACO project manager, and two managers of an accountable care cooperative (ACC) that provides support to Medicaid ACOs in its state.

[c] Characteristics of the 18 unique ACOs from which we interviewed respondents.

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