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# Accountable Care Organization Attribution Methods

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# ACCOUNTABLE CARE ORGANIZATION ATTRIBUTION METHODS

Implications for Risk Management

Jay Knowlton  
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MPH Capstone 2018

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## Executive Summary

ACOs function by aligning providers, attributing patients to those providers, and holding those providers accountable for the quality and cost of care provided to the attributed population. A variety of methods are used to attribute patients to providers for Accountable Care Organization (ACO) value-based payment contracts. Patient attribution is of foundational importance to ACO success.

Patients are generally attributed to an ACO using claims data or patient attestation. Methods may only incorporate claims for primary care services or may include a broader set of services, such as certain specialty care for chronic disease management. Claims based methods may also include a volume-based or dollar-based threshold to attribute a patient to a provider (i.e., minimum of 50% of services or 50% of total claims paid). Attribution methods may prospectively or retrospectively assign patients. Patients may be attributed to an individual provider or to a group of providers. Each of these approaches and methods has implications for providers. For example, if a patient with multiple co-morbidities is clearly attributed to a primary care provider but also seeks care from an endocrinologist on a monthly basis to manage their diabetes, this patient will still be attributed to the primary care physician even if they only have one fifteen-minute primary care visit in that calendar year. However, if the endocrinologist does a poor job helping the patient manage their condition or does not accurately code for the severity of the patient's condition, then the primary care physician's quality and financial outcomes are negatively impacted while the endocrinologist's quality and financial outcomes are not necessarily affected. At scale, this becomes a systemic misrepresentation of value-based healthcare.

The purpose of this capstone is to summarize what is known about patient attribution methods and to determine from local experience how ACOs are managing complexities associated with current methods. Additionally, the report discusses the implications of different patient attribution methods used in ACO risk contracts and suggests opportunities to improve methods in the future. A review of the literature identified relatively few peer-reviewed publications discussing attribution methods. Further review of the grey literature revealed substantially more timely and relevant information. Semi-scripted

interviews with leaders at the MaineHealth ACO (MHACO) supported and augmented findings from the literature while also providing an applied context for the theoretical examples identified in the literature.

Despite the varying (and sometimes unknown) implications of different methods, hundreds of ACOs across the country are managing multiple value-based payment contracts with different attribution models, many with great success. ACO leaders can consider management complexities associated with patient attribution within a general framework of four inter-related challenges:

1. Data Reliability and Availability;
2. Team-Based Attribution;
3. Prospective and Retrospective Approaches; and
4. Model Testing and Evaluation.

The MHACO and similar organizations have approached these challenges by developing increased data management and reporting capabilities, streamlining messaging to front-line care providers, partnering closely with payers, and staying apprised of new industry developments related to patient attribution factors. As the Centers for Medicare and Medicaid Services (CMS) continue to drive and incent ACOs to form and grow as one of the primary organizational vehicles to support population health, quality improvement, and efficient healthcare delivery while achieving the Triple Aim (improving the health of the population, lowering costs, and enhancing patient experience), considerably more research and greater investment in attribution methods will be fundamental to advancing the concepts and designs of ACOs if we are to find success under value-based payment models.

## Introduction

The transition to value-based healthcare delivery in the United States has increasingly pushed provider organizations to assume financial risk for performance on measures of resource utilization, care process, and health outcome. Novel care models have been introduced to improve value within defined clinical episodes of care as well as for population-level health. Many healthcare leaders have recognized that a combination of episodic and population-based payment models is necessary to engage all provider stakeholders in managing value-based care for their patients (Alaigh, 2018; Rutledge, Asher, Raymond, & Patel, 2017). This context has spurred the rise of accountable care organizations (ACOs) as a structural vehicle for provider groups to integrate across the continuum of care in support of population health management (Karen & Walker, 2013).

ACOs are networks of providers that join together to be held accountable by payers for the quality and cost of care that they deliver to a defined population. Researchers at the Dartmouth Institute for Health Policy & Clinical Practice (TDI) proposed the concept which was adopted by the Centers for Medicare & Medicaid Services (CMS) under the Affordable Care Act (ACA) (Fisher et al., 2009).

As of the first quarter of 2017, there were over 900 ACOs in the United States, representing more than a 550% growth in five years, and covering the lives of more than 10% of the US population (59% of commercially-covered lives, 29% of Medicare-covered lives, and 12% of Medicaid-covered lives) (Muhlenstein, Saunders, & McClellan, 2017). Along with this explosive growth comes a variety of challenges for ACO implementation and management, including but not limited to: legal structures for provider networks to be governed, contractual arrangements for defining specific quality and cost metrics and the appropriate financial targets, and the very definition of which patients are within the accountable population and which are not.

Patient attribution is the method used to determine which provider group is responsible for a patient's care and costs and, as such, is fundamental to population-based payment (PBP) programs,

including ACOs (Population-Based Work Group, 2016). In recent years, many providers and health services researchers have critiqued ACO approaches to defining accountable patient populations. One commonly voiced challenging scenario is where patients are attributed to a provider group's accountable population when, in practice, they have not been a part of that provider group's patient panel; similarly, the reverse scenario (where patients who are among a provider group's panel are not incorporated in the ACO's attributed population) is another challenge that can have varying implications based on the attribution methods. When attribution fails to appropriately assign patient outcomes and costs, an ACO can be negatively impacted for poor quality care from non-ACO providers (e.g., up to 15% of Medicare reimbursement at risk under the Shared Savings Program and newly-proposed Pathways to Success program (CMS, 2018)). With an increasing percentage of financial reimbursement at risk with ACO contracts, the stakes are getting higher (CMS, 2018). ACOs are financially rewarded for effectively managing care for high-risk patients by performing high-value interventions to the right patient at the right time in the right setting, while simultaneously minimizing use of low-value services that do not demonstrably improve patient care. Understanding attribution methods and their potential effects is critical for ACOs to manage their attributed populations and effectively manage population risk in order to achieve long-term success (Lewis, McClurg, Smith, Fisher, & Bynum, 2013). In Maine, the MaineHealth ACO (MHACO) has focused on learning the complexities of attribution since its first ACO risk contract in 2012 (Medicare Shared Savings Program). The organization – like many other ACOs – has adopted a strategy to minimize management challenges related to patient attribution by focusing on core quality measures for all patients, regardless of contracted attribution method or quality metrics. This has proved effective to-date and has helped to keep clinical leaders engaged, yet, according to senior leaders, the challenges of accurate attribution continue to be a priority area to master (Johnson, 2018).

## Methods

This study summarizes information on patient attribution from the peer reviewed literature and the grey literature and contextualizes findings based on interviews with leaders at the MHACO. A review

of the peer reviewed literature identified limited findings on patient attribution approaches used for ACOs; much of it is focused on early ACO development and research at The Dartmouth Institute for Health Policy & Clinical Practice (TDI). Further review of the grey literature revealed a much greater amount of information that is both timelier and more relevant. For example, the National Quality Forum, the Healthcare Payment Learning and Action Network, the National Association for ACOs, the Centers for Medicare and Medicaid Services, the Health Affairs blog, and the NEJM Catalyst blog all revealed important content (including peer-reviewed literature sources that were not identified in the initial review). Four key themes related to challenges with patient attribution were identified:

1. Data Reliability and Availability;
2. Team-Based Attribution;
3. Prospective and Retrospective Approaches; and
4. Model Testing and Evaluation.

In addition to the literature review, I conducted a series of semi-structured interviews with four leaders at the MHACO. These interviews focused on the MHACO experience with patient attribution methods, including (but not limited to) the topics of data management and analytics, payer contracting and provider compensation, patient care management, and performance management. Interview findings were summarized and grouped by themes identified in the literature review, and specific case examples were added to support literature findings. An overview of the MaineHealth ACO is provided in Table 1.

*Table 1: MHACO Overview*

<b>MaineHealth ACO</b>	
Inception	July 2012
Participating Providers	1,556
Participating Hospitals	10
Practice Locations	378
Covered Lives	230,000+
Value-Based Contracts	16



## The Evolving Science of Patient Attribution

Patient attribution has been an important foundation for all pay-for-value (also known as pay-for-performance) programs. Attribution was initially a relatively straightforward process of identifying which patients were admitted to which hospitals, thus allowing hospital inpatient stays to be measured based on performance metrics of cost and quality (i.e., “value”). When the concept of the “Accountable Care Organization” was first conceived in the mid-2000’s, the healthcare delivery landscape consisted largely of independent providers practicing in small groups, which was believed to be one of the most significant drivers of fragmented patient care (Fisher, Staiger, Bynum, & Gottleib, 2006). This fragmentation presented a challenge to measuring healthcare value beyond the inpatient setting, across the continuum of care. To develop a more holistic and patient-centered value metric, policy makers needed to define the patient’s relationship with an individual or a group of providers who represent the care team not only in the inpatient setting, but also in the outpatient / office setting. Because of organizational fragmentation, it was not possible to hold a patient’s primary care provider (PCP), specialist, and hospitalist jointly accountable for managing value-based care. The ACO model provides a mechanism for joint accountability via a single legal entity consisting of provider groups who agree to assume responsibility for their patients based on metrics of cost and quality (Fisher et al., 2009).

The initial ACO proposals included a definition of the accountable population (i.e., the patient attribution model) that is similar to the most common approach used today: the predominant provider for any given patient is identified based on the “plurality of non-inpatient claims for evaluation and management services, excluding consultations, over a two-year period centered on the current year”. All of the patients with predominant providers who are a part of the ACO constitute the ACO’s accountable population (Fisher et al., 2009).

The National Quality Forum (NQF) recently performed an environmental scan of attribution approaches, which identified 171 unique methods; the most common use a similar plurality of claims visit counts to make an attribution of patient to provider (Ryan, Linden, Maurer, Werner, & Nallamothu,

2016). From an academic perspective, this retrospective claims assessment is a sensible, empirical approach for attributing patients to providers in ACOs, particularly because “assigned patients receive the major fraction of their care, inpatient and physicians services, from their assigned hospital and its [extended medical staff]”. This approach also means there are natural networks of providers (“physician-hospital networks”) that can form ACOs and capture patient populations via evaluation and management claims (Bynum, Bernal-Delgado, Gottlieb, & Fisher, 2007). Early academic scenario models – used for policy proposals – constructed ACOs using physician-hospital networks defined based on characteristics of patients’ historical service utilization and demonstrated that 75% of patient care happens within the same physician-hospital network. In practice, however, there are a variety of local market factors such as competition among health systems that limit the accuracy of a purely data-driven model to ACO formation. Further, at least 25% of patient care – based on plurality of evaluation and management claims – occurs outside of the defined physician hospital network. This method also does not account for the fact that some services are much more expensive than others, exacerbating the difficulty of managing value metrics when patients can be attributed to one network after a primary care visit but also receive tens of thousands of dollars of high-cost services from providers in another network.

Not long after the initial ACO proposals, Medicare began rapidly adopting the model with the Pioneer ACO and Medicare Shared Savings Programs, leading to increased scrutiny of the components of ACO success, including appropriate attribution methods. Only a year after the Medicare Pioneer ACO program was launched, researchers focused on attribution models after noting, “The [ACO] model requires that each ACO have a defined patient population for which the ACO will be held accountable for both total cost of care and quality performance. However, there is no empirical evidence about the best way to define how patients are assigned” (Lewis et al., 2013). They went on to suggest that retrospective attribution approaches tend to be more effective at identifying the appropriate patients than prospective attribution approaches despite the management challenge of not knowing which patients are in the

accountable population until the end of the performance year. They refrained from taking a position on other aspects of attribution, such as:

- Using evaluation and management claims vs. any other claim type;
- Using claims only for primary care providers vs. any other provider type;
- Using plurality of service vs. another threshold to define the attributed provider;
- Using claim service counts vs. total claim costs; and
- Using claims vs. clinical data or any other data source (e.g., EHR, patient attestation).

The literature has not yet identified all downstream implications of varying attribution approaches on patients, providers, and payers, and as a result there is a lack empirical evidence for when to use which attribution approach. In fact, NQF observed in its first attribution report that “implications of alternative attribution methods have not been rigorously evaluated and the field has not coalesced around best practices for attribution” and that “there is a lack of objective evidence to recommend one approach over another” (Ryan et al., 2016). The lack of objective evidence to define the appropriate attribution approach represents a fundamental challenge for ACO leaders managing multiple value-based contracts with various attribution approaches. For example, some contracts use retrospective attribution, leaving providers blind to performance on accountable value metrics, while others prospectively attribute patients to ACOs, leaving providers with limited confidence in early performance on accountable value metrics because of population shifts over the program period. The following are the core challenges resulting from the complexity of attribution approaches:

5. Data Reliability and Availability;
6. Team-Based Attribution;
7. Prospective and Retrospective Approaches; and
8. Model Testing and Evaluation.

Although the challenges overlap across these categories (e.g., the challenge of provider access to claims data for prospective attribution approaches) they offer a useful framework to consider key challenges,

promising approaches to effectively manage within current constraints, and opportunities to improve models in the future.

## Core Challenges

The patient-provider relationship is unique to each patient. Current attribution methods attempt to define these relationships algorithmically, inherently introducing potential discrepancies between what is observable in the data and what happens in practice. In the end, ACOs must manage providers and patients under different attribution models recognizing that all methods are imperfect, and that some methods are better suited under certain circumstances than others. For example, one provider may have a panel of 1800 patients that have ten different types of insurances, each using different attribution approaches. That provider establishes a doctor-patient relationship every time s/he sees a patient, but attribution models may designate a completely different provider as the rendering provider of care. Payers then generate report cards that do not reflect who actually took care of that patient and the provider is held accountable for the cost and quality of another provider's patient. Effectively managing attribution models requires **reliable data** that are **available to all parties**, methodologies that account for the **team-based** nature of **patient care**, understanding **prospectively** which patients are attributed or knowing **retrospectively** that the attributed patient panel is accurate, and ongoing **testing and evaluation** of the models used. Examples of these challenges are highlighted in Table 2 and explored in depth throughout the following sections.

*Table 2: Attribution Challenges and Implications*

<b>Challenge</b>	<b>Patient Implications</b>	<b>Provider Implications</b>	<b>Payer Implications</b>
Lack of data transparency	Care team may not know all medical history or current clinical status	Potentially missing information on patients' clinical profiles; Challenges tracking contract performance.	Providers hindered in improving care and reducing costs to health plan
Patient attributed to wrong provider(s)	Lack of coordinated care by primary care provider	Held accountable for performance on other providers' patients	Paying providers for performance of others rather than their own
Prospective vs. Retrospective	High-risk patients may be less likely to receive care management services under retrospective	Prospective allows for early engagement of high-risk patients to manage performance (See Table 3 for more)	Different timing of enrollment processing; prospective may include additional patient / member outreach
Unknown evaluation and testing criteria	Potential for ongoing "cherry picking" healthy patients and "lemon dropping" high-risk patients	Mistrust in methods used to determine performance	Paying providers for performance that may or may not be accurate

## Data Reliability and Availability

Most patient attribution approaches use a claims-based model; of 171 unique attribution approaches identified in the NQF environmental scan, about 40% use claims visit counts and about 30% use claims paid amounts to define attribution (Ryan et al., 2016). Using a claims-based attribution model presents a challenge for both payer and provider: payers must standardize and manage complex datasets and make them available to providers groups; providers often must further manipulate data so that it is in a format that can be used to generate actionable insight for frontline care teams. The Health Care Payment Learning and Action Network (HCPLAN) identified "data sharing" as one of three key priority issues foundational to population-based payment success (along with "financial benchmarking" and "performance measurement") (Population-Based Work Group, 2016). The NQF guide to attribution model selection identified key recommended questions for stakeholders to consider including: "how is the attribution model performed – what data are used, and do all parties have access to the data?" (National

Quality Forum, 2016). These questions shed light on management challenges such as when payers present an enrollment list of attributed patients that does not align with providers' data and practical understanding of their respective patient panels. For example, at MHACO it is common practice for providers to maintain separate lists of attributed patients generated from internal administrative and clinical record systems, which can be used to reconcile payer-supplied claims-based enrollment files. This has the benefit of deeper clinical information available to providers (and in turn increased provider trust) and more timely availability (internal data are available near real-time, while claims can have several-month lag times before being received from payers) (Callahan, Neff, & Ridge, 2018).

Provider organizations like the MaineHealth ACO are investing in and developing increased data and analytic capacities to ensure patient panels are aligned with payer expectations. This is important for regular reporting on performance metrics, such as contracted quality and financial goals. MHACO uses a dashboard of ten key performance indicator (KPI) metrics for all providers to monitor how effectively they are managing quality care for their patient panel (Figure 1). Internal data are linked with payer-supplied data to generate these reports. Internal data are generally more timely for quality improvement efforts, while payer-supplied claims data are more accurate for financial performance monitoring. Sharing, standardizing, linking, and reporting on these data is a complicated and resource-intensive effort. Not surprisingly, a recent survey of attribution subject matter experts noted that "operational data challenges for developing and sharing attribution models and results persist" and one of the key themes from interviews with similar subject matter experts was "data challenges" (National Quality Forum, 2018).

Figure 1: MHACO Key Performance Indicators

Maine Health Accountable Care Organization												
MHACO Quality Heat Map												
Measure	Falls Screening	Depression Screening	Colorectal Cancer Screening	Breast Cancer Screening	HbA1c > 9%	DM Eye Exam	HTN Control	Tobacco	Peds BMI 5210	Adolescent Well Visit	Measure Gap	Measure gap change from prior month
Target	92.0%	82.0%	80.0%	80.0%	17.5%	62.0%	75.0%	96.0%	84.0%	50.0%		
Hospital A	93.5%	81.3%	73.3%	74.2%	17.0%	62.5%	71.8%	96.3%	79.1%	59.3%	3,358	
Hospital A	93.3%	88.2%	75.2%	78.8%	15.7%	62.5%	61.3%	98.9%	na	na	1,823	
Hospital B	92.0%	85.0%	70.5%	77.4%	18.3%	61.9%	73.3%	97.9%	78.4%	47.1%	1,392	
Hospital A	90.5%	87.8%	81.3%	82.4%	17.3%	66.4%	77.1%	97.4%	78.4%	na	1,582	
Hospital B	94.3%	90.8%	76.8%	78.0%	17.2%	67.3%	76.0%	97.6%	88.4%	52.4%	249	
Hospital B	93.7%	84.7%	76.2%	83.8%	16.5%	62.6%	70.6%	98.4%	85.9%	66.7%	445	
Hospital C	85.0%	75.2%	73.7%	80.3%	21.0%	53.1%	68.4%	95.9%	66.4%	52.1%	7,904	
Hospital B	90.8%	82.5%	69.6%	76.8%	14.6%	58.2%	71.6%	98.0%	67.5%	30.6%	990	
Hospital C	95.2%	57.6%	61.0%	56.5%	15.3%	47.3%	76.4%	85.7%	14.6%	57.7%	4,509	
Hospital C	77.7%	65.1%	82.4%	78.1%	19.6%	70.2%	71.7%	79.6%	74.8%	46.8%	4,204	

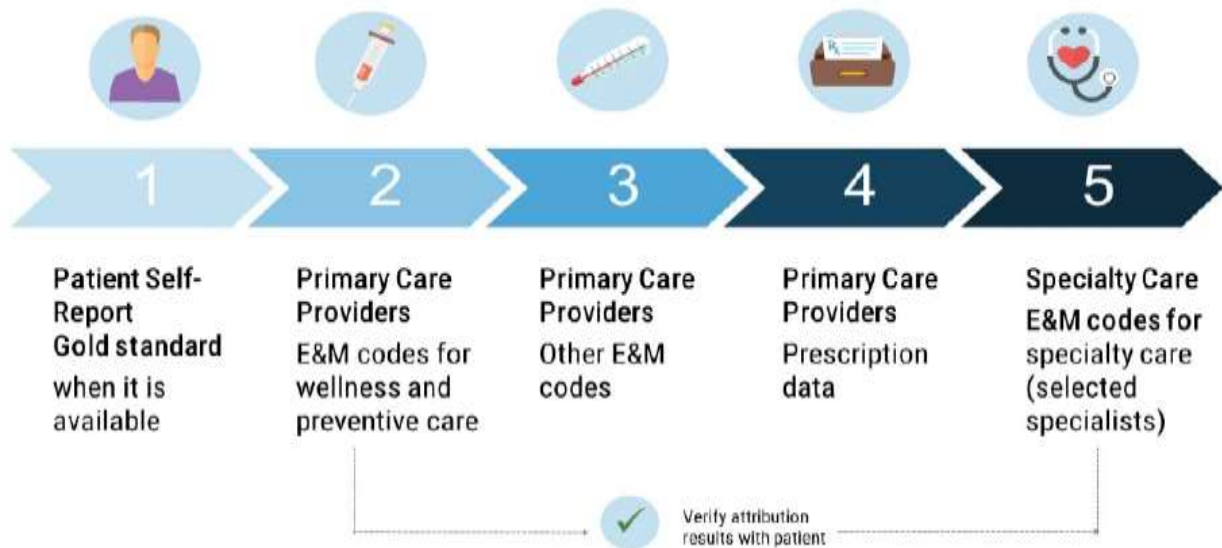
### Team-Based Attribution

The typical patient care team, particularly for high risk patients who drive the vast majority of spending and are therefore most closely managed, includes a primary care provider, one or more specialists, nurses, pharmacists, and other clinical staff. Further, the typical Medicare patient sees two PCPs and five specialists that are associated with up to four different provider organizations in one year (Pham, Schrag, O’Malley, Wu, & Bach, 2007). Despite the team-based nature of patient care, most attribution models (about 80%) only recognize one provider per year (Ryan et al., 2016). It is common for patients to be attributed to a PCP under the assumption that primary care manages patient care and coordinates across specialists. As shown in Figure 2, the HCPLAN recommends prioritizing primary care but also including certain specialists providing evaluation and management (E&M) services as a secondary tier to attribute patients, similar to the approach used by Medicare (Population-Based Work Group, 2016). Under many circumstances, this approach can make sense, such as attributing elderly patients to geriatricians, cancer patients to oncologists, and heart failure patients to cardiologists (Ryan et al., 2016).

It is also becoming increasingly common practice, particularly in contracts with commercial payers, to use attribution models that initially rely on the patient’s attestation to their primary provider (Callahan et al., 2018); this is the preferred method recommended by the HCPLAN (Figure 2). Many

providers prefer this approach, as it has the benefit of prospectively knowing which patients are attributed and can foster a closer patient-provider relationship. However, as noted by the MHACO team, this comes with challenges as well, particularly when payers do not regularly maintain patient attestation information or when patients can easily mis-select which provider they attest to (e.g., provider with last name beginning with “A” over-selected due to being at the top of the list) (Callahan et al., 2018). Additionally, patients may attest to a primary provider and then never end up seeing that provider and instead seeing other providers (e.g., patient moves – seasonally or permanently, patient is diagnosed with a chronic condition and sees a qualifying specialist who ends up coordinating the patient’s care).

Figure 2: HCPLAN Recommended Attribution Flow



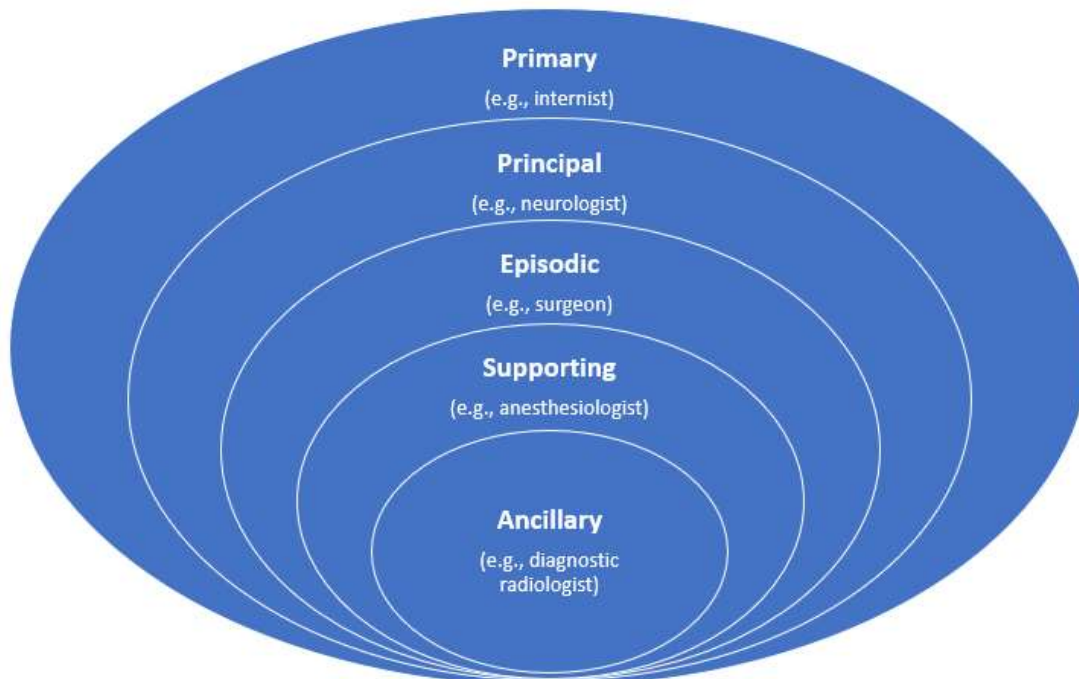
Although most patient attribution models attribute patients to a single provider, it is also common for models to attribute patients to groups of providers, largely to minimize technical challenges of attribution algorithms that fail to accurately generate a patient-provider relationship (e.g. one in five patients for the MaineHealth ACO fail to match with a single provider) (Callahan et al., 2018). One of the advantages of assigning patients to larger units is that more patients can be attributed and thus estimates of provider performance can be more reliable (Fisher et al., 2006). However, because care is fragmented across providers, organizations, and geographies, choosing attribution approaches based on their ability to



result in a large patient population for each provider risks including patients that only receive a small portion of care from an individual provider (Ryan et al., 2016). The NQF articulates this dynamic as “the locus of control,” meaning that a provider group should not share patient attribution unless that group is equally responsible for the quality and cost of an attributed patient’s care. Understanding the locus of control when developing attribution models and assigning accountability metrics has profound implications for patient care and “can take resources away from underserved areas if clinicians and providers are held accountable for outcomes that are outside of their control” (National Quality Forum, 2016).

Researchers working to map patient-provider relationships are beginning to explore new attribution methods that use a tiered approach for assigning portions of a patient’s interaction with the healthcare system to the respective providers responsible for those services. This approach, using a series of nested relationships in claims records, has identified five tiers (Figure 3) that providers can be identified by: primary, principal, episodic, supporting, and ancillary.

*Figure 3: Tiered provider attribution framework*



*Adapted from Jennifer Perloff, Brandeis University, unpublished.*

Each provider tier receives a weighted accountability factor; to-date there has been significant tension in how the weighting structure should be implemented. (Lloyd, Mehrota, & Perloff, 2018). These methods have not yet been tested in practice and are still under development, though they show promise for more accurately representing the team-based nature of patient care.

The literature discusses the concept of an “aspirational” versus a “realistic” locus of control, where an attribution approach can be used as a tool to incentivize desirable (“aspirational”) system outcomes such as greater care coordination via new relationships among providers (Pham et al., 2007). One common “aspirational” model that is proliferating throughout healthcare reimbursement is the concept of 90-day bundled payments for defined clinical episodes. These “bundles” assign total 90-day episode costs and specific quality measures to a single entity, generally a hospital. Hospitals have little influence outside of the acute care setting – and therefore little control over 90-day episode cost and quality – without developing new data capabilities to understand post-acute care utilization and building community partnerships with post-acute care providers (which is the incentivized “care coordination” behavior under bundled payments). It is important to balance aspirational goals with realistic expectations, as it can take time for providers to develop relationships and data capacities to achieve further integration of clinical pathways, data infrastructure, and subsequent performance management. If a model is too “aspirational” it may risk provider pushback, particularly if the compensation model used is related to metrics that providers feel they are unable to control (e.g., a dermatologist complaining about being held accountable for performance on a mammography measure when they have nothing to do with mammograms (Lloyd et al., 2018)).

Depending on the ACO’s provider compensation model, understanding individual provider performance can be critical to determining financial incentives. ACOs contract with payers to be held accountable for high-value care collectively, which may or may not be distributed proportionally to individual providers. At the MHACO, each provider group that is a part of the ACO manages their respective provider compensation models. This does not mean that improvement activities are

uncoordinated – all providers are expected to monitor and improve on the ten KPIs set by the ACO (Figure 1) – but it does mean that the ACO as an organization has incentive structures that are not aligned with its employees / contracted teams to varying extents. MHACO, and others like it, believe that by focusing on a small set of core measures for improvement, all accountability contract terms (regardless of attribution method and specific quality measures) will be met.

### Prospective and Retrospective Approaches

Attribution approaches that assign patients to providers prospectively (i.e., in advance of the program year) can have significantly different populations in the attributed patient panel than approaches that assign patients retrospectively (i.e., after the end of the performance year). Prospective and retrospective models for the same performance year can result in a 30% variation in attributed patient panels (NAACOS, 2018). The size and clinical profile of an attributed patient panel directly impact an ACO's performance on quality and financial benchmarks, as well as end of year reconciliation.

Many providers, including some affiliated with the MHACO, prefer prospective attribution approaches because they offer clarity upfront on which patients are included in the risk contract and afford the opportunity to actively invest in managing patient care within bounds of the defined accountability metrics (Callahan et al., 2018; Ryan et al., 2016). The HCPLAN recommends using prospective patient attribution and clearly communicating attribution status to patients and their providers, though the group also notes that safeguards need to be built “to ensure provider groups do not deliberately send information to patients encouraging them to de-select their providers, as might happen with complex, high-risk patients. Consistent information should be sent to all patients.” (Population-Based Work Group, 2016).

Despite the apparent provider preference for prospective attribution, the vast majority of attribution models (about 90%) have used a retrospective approach (Ryan et al., 2016). This is because retrospective attribution has the advantage of precise overlap between the patients attributed to the ACO and the patients receiving services from the ACO during the performance year. Interestingly,

retrospective attribution models increase the size of attributed panels by 10% on average with lower risk-adjusted cost per patient; a larger patient population can lead to greater diversity in patient clinical profiles and financial risk, and generally leads to higher total reimbursement, which in turn allows for higher shared savings potential (i.e., 20% shared savings for \$1M is less than 20% shared savings for \$5M) (NAACOS, 2018). Although there are many benefits to retrospective attribution approaches, there is a real management challenge for providers who do not know who is in the attributed patient panel until after the performance period ends.

New ACO contracts are beginning to explore hybrid approaches, offering providers flexibility in selecting a prospective or retrospective attribution model, such as the Medicare “Pathways to Success” proposed rule to overhaul the Medicare Shared Savings Program (CMS, 2018). As shown in Table 3, the National Association of ACOs (NAACOS) produced a white paper in June 2018 that outlines key organizational and market dynamics that ACO leaders should consider when selecting prospective or retrospective attribution approaches for Medicare contracts.

*Table 3: NAACOS Medicare ACO Attribution Considerations*

<b>Decision Factor</b>	<b>Description</b>
ACO Size	If the ACO has close to 5,000 assigned beneficiaries, then the ACO may favor retrospective assignment because beneficiary count is lower under prospective assignment versus retrospective assignment.
ACO Market Competitiveness	If competing ACOs in the same local market are prospectively assigned, then the ACO may favor prospective assignment because prospective assignment has precedence over retrospective assignment (thus removing the possibility of patients being prospectively to a competing ACO who would have otherwise been retrospectively assigned to the ACO of interest at the end of the performance year).
Local Medicare Enrollment Growth	If there is a high rate of new Medicare enrollment in the local market or “age-ins,” the ACO may favor retrospective assignment to the new Medicare beneficiary market share (to capture patients who “age-in” to Medicare throughout the performance year).
Duration of Medical Management Programs	If the ACO’s medical management programs require a long duration to produce a return on investment, then the ACO may favor prospective assignment because it allows early identification of assigned beneficiaries for risk identification and stratification to medical management programs.
Member Churn Rate	If there is high member churn to other ACOs, then the ACO may favor retrospective assignment because the ACO will not be financially responsible for beneficiaries who change primary care physicians, move during the performance year or don’t have an office visit.
Beneficiary Engagement	If there is low assigned beneficiary engagement, then the ACO may favor retrospective assignment because the ACO will not be financially responsible for beneficiaries who don’t have an office visit throughout the performance year.
End-of-life Management Program	If the ACO has a robust end-of-life management or outpatient advance directives program implemented, the ACO may favor prospective assignment because the ACO is responsible for a higher assigned rate of deaths having end-of-life expenses.

The scope and complexity of considerations highlighted by the NAACOS report exemplifies how patient attribution is foundational to so many aspects of ACO management and population health in modern healthcare delivery.

### Model Testing and Evaluation

Perhaps the most challenging part of managing population health with current patient attribution methods, as outlined by MHACO leaders, is that “we have yet to find a one-size-fits all methodology, and

there is just not one way to capture the complexities of patient care and attribute care to a single provider.” (Johnson, 2018). Yet at the same time attribution methods do not receive research or operational attention to explore intended and unintended consequences of one model over another – it is clear that the “implications of alternative attribution methods have not been rigorously evaluated and the field has not coalesced around best practices for attribution” (Ryan et al., 2016). This ambiguity presents a practical challenge for providers when negotiating with private payers, evaluating options under public payer models, and in particular, communicating implications to front-line care providers. The MHACO team uses clinical champions that are part of the performance improvement team that includes physician liaisons to communicate key messages clearly to their peers across the network (e.g., focus on care management for heart failure patients) (Johnson, 2018). These physician liaisons become trusted messengers of key ACO priorities but if they communicate data to providers on patients they do not care for, the ACO and these liaisons lose credibility rapidly that is difficult to ever regain.

The choice to attribute a patient’s outcomes and healthcare costs to a certain accountable entity requires evidence, particularly when attribution models are intended to drive health system transformation. The industry needs to better understand how a given attribution model aligns with its use. For example, should an attribution model consider the accountability mechanism of the program, such as quality improvement vs. payment? An attribution model used for payment can affect providers’ reimbursement, creating a tension between the desire for quality? improvement shared by all stakeholders and the need to ensure that a model is holding the right unit accountable. Not all quality improvement initiatives create the same tension, particularly if the quality measures in question are not publicly reported and do not impact providers’ reputation (National Quality Forum, 2016). The need to understand these nuances is quite clear from the lack of evidence coupled with the significant implications for ACO performance (as exemplified in Table 3). However, the challenges in evaluating attribution models continues; specifically, it is unclear how to evaluate methods at either the measure or the program level

(National Quality Forum, 2018). The NQF has suggested six criteria to consider when evaluating attribution models:

1. Does the attribution model assign accountability to an entity that can meaningfully influence the results?
2. How has the model been tested and how were the scientific properties of the model assessed?
3. What data were used to support the attribution model?
4. How does the model align with the context of its use?
5. Have potential unintended consequences of the model been explored and have negative consequences been mitigated?
6. Is the model transparent to all stakeholders?

Unfortunately, there has been little progress in model testing and evaluation published in the past few years – the same NQF panel that called on this acute need for greater testing in a 2016 report made similar observations years later in 2018: “When a measure is adapted for new program contexts or different accountable units, the attribution model must be tested at the level for which it is being proposed or used. It is essential to consider whether the measure performs adequately in this new context before it is used to evaluate the performance of an accountable unit.” Measures should be tested for reliability and sensitivity, answering questions such as “how is performance impacted with different provider networks or patient populations?” (National Quality Forum, 2016).

Attribution subject matter experts have varying opinions on testing models under different circumstances. For example, the HCPLAN workgroup recommends a single approach that “provides clarity, ties together quality and financial goals, and attributes a single group of patients to a provider group” (Population-Based Work Group, 2016). In contrast, a panel presenting at the 2018 AcademyHealth Annual Research Meeting (several of whom are also on the NQF attribution report committee) recommended to “start with attribution for the sake of *what [you’re attributing patients for in the first place]*” (Lloyd et al., 2018). By focusing on the program goals (i.e., the *what*), attribution

methods can be developed to include or exclude specific populations, include or exclude specific provider groups, and much more. The AcademyHealth panel articulated that attribution “often gets swept under the rug” and that stakeholders often use “whatever model is convenient” and warn that choosing the wrong attribution model can result in a 50% difference in the attributed patient panel from what might be expected (Lloyd et al., 2018). Additionally, there are intended and unintended consequences to consider. Intended (and often “aspirational”) consequences may include driving system transformation and integrating provider communication or increasing the size of a provider group’s attributed patient panel. Unintended consequences may include patients being attributed to a provider group incorrectly. Or the method may create incentives for providers to perform more services to “game” the attribution model. Provider “gaming” can occur by performing unnecessary services that capture additional attributed patients at the end of the performance year based on the claims-based attribution logic used. This can ultimately impact patient access to care via “cherry picking” and “lemon dropping” patients to build a healthy, low-cost patient panel (though improved risk adjustment models are limiting the ability to “game” attribution models) (Lloyd et al., 2018).

Healthcare leaders responsible for managing patient attribution must ask the question, “have multiple methodologies been considered for reliability?” and push for the appropriate attribution model, not simply the most convenient (National Quality Forum, 2016). Further, the industry must continue to develop testing and evaluation frameworks (such as those developed by the National Association of ACOs) to support ACO leaders who find themselves without adequate tools to assess various attribution approaches.

## The Evolving Industry Landscape

Public accountability through quality reporting systems (measuring quality measure performance for attributed populations) and individual provider accountability through financial reimbursement programs (measuring costs for attributed populations) will continue to grow as public payers and individual organizations such as MaineHealth set aggressive goals for rapid adoption of value-based



healthcare (CMS, 2018; Johnson, 2018). As healthcare data systems continue to evolve while provider risk contracts proliferate, the industry will inevitably recognize the need to better understand patient attribution due to its increasing importance in healthcare finance.

### Improving Attribution Models

Although experts differ on which attribution approach is most effective and appropriate under certain circumstances, all agree that current models are flawed and that leaders of ACOs and payer organizations should make every effort to understand what biases a given model may introduce.

To understand flaws and improve systems, progress must be made on data capture, standardization, sharing, and reporting. Payers and providers must both have real-time access to actionable information to adequately manage care for attributed populations within the defined accountability metrics of any given contract. This will require additional – and significant – investment and collaboration from both payer and provider organizations, such as what the MHACO is developing for integrated reporting on payer claims and provider clinical datasets. MHACO has partnered with a data solutions firm to build a population health management system that leverages the speed and detail of internal clinical / EHR data along with the accuracy and breadth of payer-supplied claims data. This system includes end-to-end data input, quality assurance, statistical manipulation and analysis, and end-user reporting functionality. By developing an integrated performance management solution, MHACO is positioning itself to identify patients by which accountable contract they are in, which primary providers they see, what services they use (and the cost of those services), and what their quality outcomes are. (Callahan et al., 2018).

Translating the team-based nature of healthcare delivery to algorithmic attribution models solely using claims data will likely continue to [slowly] give way to new models incorporating patient attestation data, clinical data from electronic health records (EHRs), and patient relationship codes as envisioned in recent policy with the Medicare Access and CHIP Reauthorization Act of 2015 (MACRA). Additionally, new models that use a proportional allocation of attributed risk for relevant value metrics show promise

(i.e., providers receive weighted attribution scores for each patient based on which services they provide over the course of a performance period) but these weighted attribution approaches remain conceptual in nature today (Lloyd et al., 2018).

There are numerous trade-offs to consider when selecting prospective attribution approaches vs. retrospective approaches (Table 3) and it is unclear whether the industry will coalesce around one approach. There is general agreement that patients and providers should know their respective attribution statuses (which requires prospective attribution) in the interest of fostering patient-provider relationships. Yet, there is concern that patient attestation can result in patients selecting the wrong provider. Newly proposed models encourage provider selection of prospective or retrospective approaches, suggesting that as understanding of certain trade-offs increases, more effective and appropriate approaches will be selected based on local circumstances (CMS, 2018). With the flexibility for providers to select prospective or retrospective attribution methods under new payment models, MHACO is investing time and effort to understand which method is preferred given its own organizational context (e.g., actuarial analyses to understand quality and financial implications) (Johnson, 2018).

Without more guidance on attribution model testing and evaluation, it will be difficult for leaders to continuously improve ACO performance and find the shared savings envisioned under value-based care. Published literature on attribution model evaluation is scarce, and the gray literature is not well compiled in the public domain. Recent attention to attribution by the CMS-sponsored Health Care Payment Learning and Action Network, the National Quality Forum, and the National Association of ACOs suggests that more guidance for ACO leaders is on the horizon. Considering the implications (e.g., approximately 30% of patients in an attributed panel varying between retrospective and prospective attribution approaches) for quality and financial accountability, it is clear that further research and additional guidance cannot come soon enough (Johnson, 2018; NAACOS, 2018).

## Managing in the Current Environment

ACO leaders managing risk contracts with various patient attribution models have had to streamline and simplify many of the complexities of patient attribution for the sake of operations. For example, the MHACO has ten KPIs (Figure 1) for providers to focus on, despite having dozens of metrics that the organization is accountable for with various contracts (Callahan et al., 2018; Johnson, 2018). Similarly, MHACO has dealt with data challenges where payers have not always shared updated attributed patient enrollment rosters on a timely basis or with enough data detail to use for performance improvement. The organization has developed reporting systems based on internal EHR data (using different attribution methods than the claims-based methods used by payers) for improvement efforts because internal data are timelier and align more closely with providers' expectations of their patient panel. Ultimately, this results in some level of variation between internally-generated performance monitoring and end-of-performance-period results supplied by payers (Callahan et al., 2018). It is easy to see how this can impact an organization trying to manage clinical care under different patient attribution methods. Consider a scenario where internal reports show positive performance with the expectation of shared savings revenues (often millions of dollars) only to have the payer-supplied reports at the end of the performance year (using slightly different data for slightly different patient populations) show negative performance with downside risk payouts from the provider to the payer. This can have unexpected multi-million dollar budget effects with significant impact on an organization's operations.

Beyond streamlining the complexities of patient attribution, provider organizations like MHACO have also worked to partner closely with payer organizations to develop mutually agreeable contract terms, share data more frequently, and develop linked data management and reporting capabilities to show the whole picture of patient care (i.e., what is available in the payer's claims records linked with what is available in the provider's clinical records). Provider organizations are all at different stages of developing these relationships and data capacities, none of which occur without deliberate and significant investment (Callahan et al., 2018). Making such investments in administrative activities can be difficult

for provider organizations facing slim margins and bond rating pressure for lean balance sheets.

Ultimately, to justify the investment in data management and analytic capacity in particular, the provider management team must feel confident that the current interest in ACO models will continue in the relatively unstable policy environment surrounding healthcare.

## Conclusion

Patient attribution models are becoming increasingly more important as more ACOs are established and as existing ACOs assume higher levels of financial risk. Purchasers, payers, and policy makers are all demanding greater provider accountability for value-based performance, and the models used to incentivize this activity require attribution models as foundational building blocks to define the accountable patient population. Since the inception of ACOs there have been challenges with patient attribution approaches used, and there are many nuanced complexities that are not well understood by academics, providers, or ACO leaders. This paper discussed the challenges associated with these complexities and in particular those related to:

1. Data Reliability and Availability;
2. Team-Based Attribution;
3. Prospective and Retrospective Approaches; and
4. Model Testing and Evaluation.

Data management and information sharing continues to be the most commonly cited barrier to advancing patient attribution models (National Quality Forum, 2018). Aligning attribution models meant to generate a patient-provider relationship with the team-based nature of healthcare delivery also remains difficult to achieve, particularly given “clunky” claims-based attribution models that are most commonly used (Lloyd et al., 2018). Knowing whether to use a prospective or retrospective approach is becoming better understood despite the many nuances that exist (Callahan et al., 2018; NAACOS, 2018). Although there has been recent traction around attribution model testing and evaluation (e.g., retrospective vs.

prospective attribution), the level of industry understanding and empirical evidence to suggest using one approach over another is staggeringly low (Johnson, 2018; Lloyd et al., 2018; Ryan et al., 2016).

To advance the transition from volume to value-based healthcare, there will need to be further investment in evaluating patient attribution models, developing frameworks for model evaluation, and rapidly disseminating promising practices for adoption across the healthcare industry. The public sector, professional associations, and payer-provider collaboratives all show promise in helping to advance understanding of sound patient attribution approaches and ultimately allow payers and providers to manage ACO risk and improve patient care at a sustainable cost.

## Personal Statement

I thought for the longest time that I wanted to be a physician – I studied biology and took medical courses, shadowed physicians, and took the medical school placement tests – but when it was time to apply for medical school, I was not confident enough to follow through; instead, I had become fascinated with the way that healthcare is organized. I approached this Master of Public Health program as an open door to grow professionally and really understand why the burden of disease is so high, why it is so hard to change that, and why in the world we spend so much money for such poor outcomes year after year. Over the past few years, I have gone from “totally ignorant” to a “true believer” and now to a “long-term optimist.” There is a lot of change happening in healthcare, particularly in the United States. The policy and market environments are changing seemingly every month as patients, purchasers, providers, payers, and policy makers are all demanding that the system improve. I look forward to being a part of that improvement throughout my career, and I believe I have the building blocks to do that based on my experiences over the past few years.

I chose to focus this capstone on patient attribution because it is a foundational concept to how the industry is organizing itself to support population health and preventive medicine. There is no question that we need to think more broadly about keeping people healthy, rather than treating someone’s symptoms to get them out the door. ACOs are a vehicle to support this concept and they have taken significant hold across the healthcare landscape in a relatively short amount of time. This rapid change has come with steep learning curves for most, notably the people responsible for managing these new organizations while keeping patient care top-notch and financial books sound. This independent study afforded me the opportunity to connect with some of these people and learn more about their work. It also forced me to do my background research and really understand what I told myself I was curious about – for that I am grateful. It may have taken me a little longer than I anticipated to complete, but I would not choose to do it differently if I had to do it again.

## Interviews

### Interview Protocol

#### Key Question:

How does the complexity of patient attribution present a management challenge to advancing risk-based contracts between payer and provider, and what are some of the key barriers and facilitators to success?

#### Opening:

- Thank interviewee for meeting
- Overview of the purpose, relationship with USM and my capstone requirements for MPH
  - IRB approval
- Ask for consent to publish on USM digital commons, with opportunity to approve final document in advance (names will be omitted, but roles/titles and organizational name will not be blinded)
- Ask for consent to record the interview (and begin recording!)
- Discuss allotted time, agenda, and nature of semi-scripted questions
  - Encourage free-form thought
- Ask for background on role / title, organization, how long they've had the position, what their responsibilities are

#### Questions:

- Please provide an overview of your organization's engagement in accountable care
  - Do you have commercial contracts? Are you in CMS programs, and if so, which ones?
  - How are some of the patient attribution models different among these contract?
    - Volume of encounters vs. \$ from claims ("51% rule"); patient attestation
    - Attributing to PCPs (including NPs/PAs?) vs. specialists; single doc vs. group
    - Prospective vs. retrospective
  - How did you decide which contracts to pursue (public and commercial)?

- What is the governance structure for your ACO?
  - What capacities have you had to develop to support your ACO? Specifically, what technology, data, and analytic capacities do you have (or wish you had)?
  - Do you feel these capacities help you manage your attributed populations (i.e., knowing who's in and who's out, and where they stand on KPIs?)
- How do you manage overlapping payment models with differing attribution approaches?
  - Commercial vs. public ACO; episodic vs. population-based
  - Prospective vs. retrospective attribution
    - Not knowing population risk when signing contract to be held accountable
    - Not knowing if patients are eligible for other models you may participate in
- Do you discuss these operational management challenges in your contracting negotiations?
  - Do you have a way to test or evaluate attribution approaches?
  - How to payers react to challenges with data lag times (e.g., for a list of attributed members)?
  - Do you feel that specialty / destination medical centers are at a disadvantage with current ACO attribution approaches?
- Have you actively invested in shaping your provider network to support your ACO?
  - Expand to diversify the attributed patient risk pool?
  - Provider education and resources to manage toward ACO targets for their attributed population?
  - Patient outreach and education to help them understand your accountability?
- What would you summarize to be the biggest management challenges related to ACO attribution?
  - What would you propose (or like to see in a future state) as the most important improvements to how we manage attribution in risk-based contracts?



Closing:

- Ask any remaining clarifying questions to points made earlier
- What did we not talk about that we should have covered?
- Did any topics surprise you and/or feel irrelevant to the purpose (as discussed during opening)?
- What questions do you have for me?
- Review timeline from this point on (analysis / synthesis, writing, presenting)
- Invite to attend presentation
- Leave contact information for any further follow-up

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