

Rapid Review 9

Accountable Care Organizations and the Canadian Context

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Introduction and Background

Since the establishment of Accountable Care Organizations (ACO) in the United States (US), under the Patient Protection and Affordable Care Act in 2010, there has been much consideration as to the potential for ACOs to be adopted in the Canadian context as a means to improve health care delivery and costs (Guta, Wilson, & Lavis, 2016; Huynh et al., 2014). ACOs include groups of doctors, hospitals, and other health care providers, who voluntarily come together to deliver and coordinate high quality care to the patients they serve (Centers for Medicare and Medicaid Services, 2013). They broadly aim to achieve better coordinated and integrated care by aligning incentives among providers and payers.

The need for improved integration across hospitals and community services is widely recognised within Canada (Health Canada, 2004; Lazar, 2011; Lazar, Lavis, Forest, & Church, 2013; Romanow, 2002). There is a wide range of opinions about whether elements of ACOs may be one way to achieve this goal. Some argue that ACOs are the route to improved health systems while others see them as a means to cutting services or a path towards “privatization” (Alderwick, Shortell, Briggs, & Fisher, 2018; Moberly, 2017).

Beginning in 1997, Canada has been pushing to integrate, re-organize, and strengthen our health system in line with the health ministers’ *Renewed Vision for Canada’s Health System* (Conference of Provincial/Territorial Ministers of Health, 1997). Beyond the goals of integration and coordination, financial sustainability remains a top concern for the Canadian health care system. More recently, there has been interest in achieving the following “Triple Aim Outcomes”: improving the patient/caregiver experience of care, improving population health, and keeping per capita costs of healthcare sustainable.

As ACOs continue to expand across the US, there is also a growing body of literature evaluating these models. As of January 2018, there were 480 public ACO models within the US (Centers for Medicare & Medicaid Services, 2018b), with several models receiving wide-ranging attention from policy makers across the globe: Kaiser Permanente, the Cleveland Clinic, and the Geisinger Health System. However, an understanding of how ACOs are formed, and how incentives are aligned remains limited.

Despite this growing attention, there is also limited understanding of the extent to which the ACO model could be implemented within the Canadian context. To fill this gap, we conducted a rapid review of the secondary literature to highlight the key characteristics of ACOs, and identify if there have been any reforms within Canada that resemble these organizations as they exist in the US. We conclude with an assessment of the degree to which the ACO model has adapted to the Canadian context.

This rapid review intended to address three broad objectives:

1. To characterize *public* ACOs, in particular their approach to shared savings and financial risk, accountability and monitoring, as well as funding and incentive mechanisms
2. To synthesize the results of evaluations of ACOs conducted between 2015-2018 in the US
3. To explore initiatives across Canada with respect to implementing ACO-like models based on criteria identified in objective one.

Methods

Literature Search Strategy

Objectives 1 and 2

We used a combination of structured and iterative techniques to obtain the relevant evidence. First, we conducted an open search in Google and the Health Systems Evidence Service (healthsystemsevidence.org) to identify current literature reviews on ACOs. In addition, we searched Medline (Ovid) using the exploded Medical Subject Heading (MeSH) term “Accountable Care Organizations” strictly using the “reviews only” filter (optimized sensitivity and specificity) and combining search terms using the “AND” Boolean operator. We also searched the Data & Reports section of the Centers for Medicare and Medicaid Services (CMS) website (cms.gov) using the term “accountable care organization(s)”. We scanned the reference lists of the retrieved publications for relevant sources, including a rapid synthesis conducted by the McMaster Health Forum (Guta et al., 2016), a systematic review (Kaufman, Spivack, Stearns, Song, & O’Brien, 2017), and a white paper (Koury et al., 2014). In this search we identified a framework for evaluating ACOs and searched for papers in PubMed that had cited this framework (Fisher, Shortell, Kreindler, Van Citters, & Larson, 2012). Subsequent references were found by way of a snowballing technique. We performed all searches on September 18-19, 2018.

Eligibility criteria: We included sources in the rapid review if they (1) explicitly aimed to define ACOs or classify their taxonomies (*Objective 1*), or (2) evaluated the impact of ACOs during the past three years (*Objective 2*).

Objective 3

Objective 3 involved a search to identify relevant Canadian examples across provincial/territorial (P/T) jurisdictions. We searched Medline (Ovid interface) on September 25, 2018 with the MeSH term “Canada/” combined using the Boolean operator “AND” with the following MeSH terms: (1) “Accountable Care Organizations/” (2 results) or (2) “Reimbursement, Incentive/,” limited to publication years 2015-2018 (12 results). One reviewer screened the retrieved titles and included sources addressing federal- or province-level health system initiatives. For reasons of feasibility, we excluded studies pertaining to health services related to a specific health condition (e.g., cancer screening, diabetes control, and childhood immunization).

We conducted a Custom Google grey literature search (Canadian government documents and Canadian health departments and agencies) on September 26, 2018 to supplement the secondary literature search. We developed keywords pertaining to the two defining concepts of ACOs, identified from the first rapid review: (1) collaborative health service delivery and (2) accountability for quality of care (e.g. “collaborative accountability,” “collaborative care,” “collaborative practice,” “accountable care systems,” “accountable care services”).

Finally, we scanned websites of individual Canadian provinces for current initiatives that aim to increase provider accountability and reorganize health service delivery and financing. Once we identified possible models, an open search was conducted using model-specific terms (e.g., “health links”). We then

assessed the Canadian programs based on the common characteristics of ACOs as identified in objective 1. We provided a summary of the program provided it incorporated two or more of the following characteristics:

1. A defined population of patients/clients
2. A shared savings agreement between providers and payer
3. A network of providers
4. Access to shared health or medical records
5. A mission to achieve all domains of the Triple Aim Outcomes

Limitations: This was a review completed over the course of 10 business days and therefore is not a comprehensive assessment. Rather, it is a rapid synthesis of recent evaluations of ACOs across the US and descriptions of programs that appear to incorporate some features of ACO models that exist within Canada.

Analytic Overview

Objective 1: The ACO Experience in the United States

Brief History of the Development of ACO Models

The first iteration of an ACO was a demonstration program implemented by the Centers for Medicare and Medicaid Services (CMS) in 2005. The pilot, called the “Physician Group Practice Demonstration” was in place from 2005 to 2010. It included incentive payments for providers to coordinate care for Medicare beneficiaries. Under this program, physician groups earned bonus payments for any savings generated, and for performance based on 32 quality measures (Centers for Medicare & Medicaid Services, 2011).

As one of the first ACO-like models developed in the US, the experience of the Physician Group Practice Demonstration program, informed the roll-out of additional ACO models (Guta et al. 2016). Scholars at Dartmouth College had initially proposed the concept of an ACO to shift providers out of the fee-for-service (FFS) payment model and into a model that pays provider groups for their ability to achieve efficiencies in care delivery. The ACO model, formally implemented as part of the Affordable Care Act (2010), permits hospitals, networks of physician groups, or partnerships between physician groups and hospitals to participate in a shared savings program. A shared savings program allows providers who incur costs below an established threshold to share in all or part of the difference between actual costs and the threshold. Costs are shared on the condition that lowered costs do not occur at the expense of the quality of care provided.

The original criteria establishing an ACO was quite loose and contributed to considerable heterogeneity in the application of the ACO model. In the following sections we highlight the different iterations of this approach, paying particular attention to public ACO models, as well as the characteristics they have in common.

Key Characteristics of Public ACO Models in the United States

As of January 2018, there were 480 public shared savings program ACOs across 50 states, Washington, D.C., and Puerto Rico, up from 404 in 2015 (Centers for Medicare & Medicaid Services 2018b).

While different entities could sponsor an ACO, between 2010 and 2012 hospital systems were the predominant entity involved in the ACO model. In 2013, physician led groups surpassed hospitals accounting for 51% of all ACOs. A small number of ACOs are led by insurers and community organizations, yet providers run the ACO even in these models (Barnes et al., 2014). There are a total of 324 (58%) of Medicare Shared Savings Program (MSSP) ACOs that involve physicians, hospitals, and other facilities (58%) (Centers for Medicare and Medicaid Services, 2018b).

There is a wide variety of ACO contracts in place in the US that involve both public and private payers. There are three primary types of public Medicare ACO structures, with Medicare Shared Savings Program (MSSP) being the largest federal program (Please see Table 1).¹

The second model is the Pioneer ACO model, which ran as a demonstration between 2012 and 2016. This model targeted hospitals or provider groups with existing health information technology infrastructures and with experience providing coordinated, managed, and patient-centered care. These organizations had at least 15,000 assigned beneficiaries (5,000 for rural ACOs). Organizations had to apply to and be selected by the CMS based on the strength of their applications in demonstrating their infrastructure capabilities and past experience with coordinated care. The CMS selected 32 organizations to participate in this model with eight currently in operation (Centers for Medicare and Medicaid Services, 2018a).

The third model is the Advanced Savings (or payment) model (ASM). This new model aimed to engage providers from across the care continuum (involving hospitals, primary care, and community organizations). The ASM constitutes a subgroup of MSSP ACOs, designed to encourage smaller and more rural health care organizations, lacking the infrastructure and beneficiaries to participate in MSSP, to adopt the ACO model. In this model, the CMS provides ACOs one up-front payment and 24 monthly payments adjusted for the number of historically assigned beneficiaries to cover the costs of establishing and running an ACO (L&M Policy Research, 2916).

All ACOs participate in a shared savings program. Specifically, providers must meet at least 70% out of a total of 33 quality indicators categorized in each of the following four domains: (1) patient experience of care, (2) care coordination and safety, (3) preventive healthcare, and (4) chronic disease management (US Government Accountability Office, 2015). ACOs must sign a three-year contract (based on three calendar years beginning January 1 no matter the start date of the program). Benchmarks are determined based on three calendar years immediately preceding the start of the agreement period. Basically, the CMS estimates its future spending through a process of modifying payments and benchmarks to reflect the degree of illness. This process is done through the use of Medicare cost amounts and diagnosis codes.²

Under shared savings models, providers are reimbursed via FFS, and at the end of the year split savings with the payer (as measured against predetermined benchmarks). If providers are embedded within models that share both savings and losses (e.g., “two-sided” MSP as noted in Table 1), they are also entitled to a larger proportion of these savings, due to increased risk. Public ACO models do not rely on global budgets and capitated payment models like private ACO structures. In the former, providers receive a budget based on population case-mix, and if costs at the end of the year are below the global

¹ Though beyond the scope of this rapid review, there are also two primary models for private ACOs – insurance-led and provider-driven (usually hospitals and physician organizations)—although in both cases providers lead the ACO.

² For a detailed description and break down refer to Centers for Medicare & Medicaid Services (2015) and Centers for Medicare & Medicaid Services (2018). Shared savings and losses and assignment methodology. Retrieved from <https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/sharedsavingsprogram/Downloads/Shared-Savings-Losses-Assignment-Spec-V6.pdf>

budget, the ACO providers retain the savings. The latter providers are paid in advance and are responsible for any costs they incur above their payment (Lewis et al., 2014). Of the 173 ACOs surveyed by Lewis et al (2014), the majority of those only had one contract. There were 10 that had Medicaid-only contracts, 67 that had Medicare-only contacts, and 35 had private contacts.

ACO's have at minimum 5,000 beneficiaries assigned to them by the CMS. Beneficiary assignment varies based on ACO type (e.g., MSSP track 1 and track 2 utilize preliminary prospective assignment while Next Generation uses prospective assignment). That being said assignment is typically determined based on the use of primary care services. Beneficiaries can be assigned to an ACO if the beneficiary receives at least one primary care service from a physician embedded within that ACO. Beneficiaries are assigned to an ACO if they receive a greater proportion of primary care services (as measured based on charges allowed within the ACO) from a primary care practitioner within an ACO (as identified by taxpayer identification numbers and primary care cost codes) than from services outside of the ACO. This can be less than a majority of the total number of primary care services provided. A primary care practitioner is defined as physicians with one of the following five specialty designations: internal medicine, general practice, family practice, pediatric medicine, or geriatric medicine. Beneficiaries enrolled in a group health plan or who have any months of private health plan enrollment are not eligible for assignment to an ACO under the traditional Medicare FFS Shared Saving Program (Centers for Medicare & Medicaid Services, 2015).

Common Elements Across ACO Models

While models vary considerably, there are common elements associated with ACOs. All ACO models engage in a shared saving program—where savings are contingent on meeting quality benchmarks. Each ACO has at minimum 5,000 beneficiaries assigned (or enrolled) to them by the CMS for a span of three years, and are responsible for the total cost of care for beneficiaries (regardless if the ACO provides the service or not). All ACOs are intended to have an embedded care coordinator, and have electronic medical records and information systems. Lastly, they are all, in theory, expected to achieve the Triple Aim outcomes of improving experience of care, health of populations, and reducing per capita costs.

Table 1 Comparison of Public ACO Models in the United States

Model Type (Year initiated/ended)	Risk	Financial Risk and Shared Savings	Quality Performance Standards (measure) – Four Domains	Reporting	Number of ACOs	Number of Beneficiaries
Medicare Shared Savings Program (2012-ongoing)	one sided	Share savings with the CMS up to a maximum of 50% (if quality performance standards are met).	Patient /carer experience (7) Care coordination (6) Preventative health (8) Chronic disease Management (8)	After the close of every performance year. Designated compliance official and a detailed compliance plan.	460	Mean in 2018: 18,716
	two-sided	Larger share of savings in exchange for sharing losses with CMS. Maximum 60% (if quality performance standards are met)			101	
Pioneer ACO Program (2012-2016)	one sided	Originally, less financial risk. Not responsible to pay CMS for any losses during first contract period.	As identified above	Quarterly Financial Reports, monthly expenditure reports, and claims and claim line feeds.	9	Mean in 2014: 35,494
	two-sided					
Advanced Saving/payment Model (2012-2015)	one sided	Share savings only with the CMS 50% (if quality performance standards are met).	As identified above		33 with 15 remaining	Between 4,000-13,000
	two-sided	Larger share of savings in exchange for sharing losses with CMS. Maximum 60% (if quality performance standards are met). The loss is calculated based on the difference between a benchmark and the actual spending costs. The loss rate will not be less than 40% and will not exceed 60%.				
New/next Generation (2016-ongoing)		Providers take on higher levels of financial risk for greater rewards. If spending exceeds benchmark 80-100% loss share rate. If spending is below the benchmark 80-100% savings share rate. Physicians eligible for 5% bonuses starting in 2019.	As identified above. Quality score does not affect share rate but does affect spending benchmark (higher quality = lower benchmark).	Quarterly Financial Reports, monthly expenditure reports, and claims and claim line feeds.	51	Unable to determine

Sources: Center for Medicare and Medicaid Services 2013, 2018a,2018b; Henry J Kaiser Family Foundation, 2018; Muhlestein, 2015; Barnes et al. 2014; L&M Policy Research, 2016

Objective 2: The ACO Evidence in the United States

Our review of the evidence found a number of observational and quasi-experimental studies evaluating the impact of ACO models. In this synthesis, we focused specifically on studies published in peer-reviewed journals during the past three years. Most studies evaluated the impact of ACOs on one or more outcomes related to: health service utilization, cost, and quality of care. Despite the focus on making improvements to the dimensions of the Triple Aim, measures of patient/caregiver experience and population health were generally not evaluated. Evidence concerning ACOs is mixed, as is the quality of the studies. The vast majority of the studies reviewed were observational and used secondary data sources. Most involved natural experiments, employing regression analysis to estimate the treatment effect of ACOs relative to standard models of care.

Utilization

The majority of studies we reviewed evaluated the impact of ACOs on health care utilization. These measures varied from use of primary care services, to re-hospitalizations, to smoking cessation, to the use of behavioural health services. It is clear that ACOs broadly aim to reduce utilization. However, in the case of preventive and primary care services, you might see an increase in utilization in order to reduce the use of unnecessary and costlier specialty care.

Most studies focus on a specific component of health care utilization so it is difficult to assess the impact of ACOs on overall health system use, and associated costs. For instance, one study reported reductions in the use of “low-value” services amongst ACO patients relative to non-ACO patients. This corresponded to a statistically significant reduction in service quantity and spending on “low-value” services (Schwartz, Chernew, Landon, & McWilliams, 2015). Another study found a reduction in the use of mental health services for patients who were part of an Alternative Quality Contract compared to control patients (Barry et al., 2015).

There is mixed evidence of the impact that ACOs have on hospital use. Several studies found that the implementation of ACOs had an impact on hospital admissions or re-admissions (Christensen & Payne, 2016a, 2016b; Colla et al., 2016; Hewner, Casucci, & Castner, 2016; McConnell et al., 2017; Winblad, Mor, McHugh, & Rahman, 2017); however, some of these studies did not have a control group (Christensen & Payne, 2016a, 2016b) and others found null results (Herrel et al., 2016; Stuart et al., 2017).

We also found mixed results for the impact of ACOs on the use of outpatient services. Some studies found that the implementation of ACO models reduced emergency department visits compared to controls (Colla et al., 2016; Schwartz et al., 2015), others found null results for all outpatient services (Hewner et al., 2016; McConnell et al., 2017; Stuart et al., 2017), and one study found increases in emergency department (ED) visits, office visits and prescriptions following implementation (Christensen & Payne, 2016a).

Cost

Many of the reviewed studies evaluated the impact of the implementation of ACO models on costs and cost-savings relative to standard models of care. These studies are generally favourable. Several studies reported reductions in healthcare costs relative to controls (Barry et al., 2015; Colla et al., 2016; L&M

Policy Research, 2016; McWilliams, Chernew, Landon, & Schwartz, 2015; McWilliams et al., 2017; Nyweide et al., 2015; Schwartz et al., 2015). One study also reported significant cost reductions, but lacked a control group (Christensen & Payne, 2016a). Some studies reported mixed or null results with respect to health system costs (McConnell et al., 2017; Zhang, Caines, & Powers, 2017).

Quality and Patient Outcomes

Some studies also reported the impact of ACO models on quality measures or processes of care. Much of the evidence concerning quality and patient health outcomes were mixed. One study found statistically significant impacts on rates of mammography after receiving care from ACO providers, but the magnitude of these effects were small and the study did not include a comparison group (Narayan, Harvey & Durant, 2016). Another study reported modest improvements in paediatric quality indicators following the implementation of an ACO model, but also did not include a comparison group (Kelleher et al., 2015). One study evaluated the impact of enrolling in an ACO model on processes of care for diabetes, hypertension, and coronary artery disease. The study found that quality improved for all ACO enrollees relative to non-enrollees, and improved more for those living in geographical areas with low socioeconomic status (Song, Rose, Chernew & Safran 2017).

There appears to be limited evidence of the impact of ACOs on quality and patient outcomes. One study evaluated the impact of an Alternative Quality Contract on processes of chronic disease management and found null results (Barry et al., 2015). Another study compared trauma centre patients transferred from within an ACO to those transferred from outside an ACO and found no differences in rates of mortality (L&M Policy Research, 2016). A study evaluating patient outcomes following major cancer surgery in ACO versus non-ACO hospitals found no differences in length of stay, readmissions, complications, or mortality (Herrel et al., 2016).

Objective 3: The ACO Experience in Canada

In the following section we present the results of our review of Canadian ACO-like initiatives. In total we found nine interventions, but only three possessed two or more ACO features. Others included regional coordination of care (Quebec 2 reforms), physician remuneration reforms (Alberta and BC), and financial incentives for provision of preventive or chronic disease management services in primary care (BC).

We found initiatives in Ontario and Alberta that share some (two or more) of the common elements across all ACO models (see above). However, none of these initiatives adopt a shared savings program (Table 2), which is one of the ACO's core features. In the following sections, we provide details on these initiatives and how they align (or do not align) with the ACO model.

Ontario

Health Links

Beginning in 2012, the Ministry of Health and Long-Term Care launched the Health Links Initiative. There are now 82 Health Links across the province, aiming to improve care for patients with complex conditions through improved coordination and information sharing. The Health Links are a network of providers that may include family doctors, specialists, hospitals, home care organizations, and long-term care. Health Links covers complex patients in a given geographical location who are living with multiple

chronic diseases, mental illness and/or addictions. One of the providers of the Health Links is intended to play a coordinator role (the degree to which this occurs and the success of this role remains unclear), and each patient is supposed to have a coordinated care plan. One purpose of Health Links is to improve communication and coordination between different providers to reduce gaps in care and duplication of services. Health Links does not have access to shared electronic health records, shared savings mechanisms, nor can we find specific mention of the intention to achieve Triple Aim goals.

Integrated Comprehensive Care Program—Bundled Care Demonstration Project

The Integrated Comprehensive Care program was the first team to pioneer the bundled care model in Ontario in 2015. This approach is implemented in the Hamilton Niagara Haldimand Brant Local Health Integration Network. This model targets three client groups (hip and knee replacement, lung cancer surgery, and chronic conditions such as lung disease and heart failure). There is a team of care coordinators that organize the client’s care from acute setting to community settings. The primary aim of this demonstration project is to prevent readmissions and complications. Those members of the team have a shared electronic health record and facilitate communication through the use of technology.

Alberta

Primary Health Care Integration Network

The Primary Health Care (PHC) Integration Network connects zones of Alberta Health Services with primary care networks, Strategic Clinical Networks, Alberta Health, and academic partners who work together to make improvements to care transitions. In particular, the PHC Integration Network’s mission is to make improvements in the domains of the Triple Aim by enhancing care transitions for persons at risk of avoidable hospitalization and emergency department visits.

Table 2: Canadian ACO-like Models

Canadian ACO-like Models		Features of ACO models					
	Prov.	Defined Population ¹	Shared Savings ²	Network of providers ³	Electronic Health Records ⁴	Embedded Care Coordination ⁵	Triple Aim Goals ⁶
Health Links	ON	✓		✓		✓	
Integrated Comprehensive Care Demonstration Project (ICCP)	ON	✓		✓	✓	✓	
Primary Health Care Integration Network	AB			✓			✓

1. Providers in model share responsibility for coordinating care for a defined population of patients/clients. 2. Provider in model can retain savings generated through improved quality and efficiencies in care delivery. 3. Linkage of provider networks (e.g., physician groups, hospitals, other care provider organizations). 4. Patients and provider networks have access to shared electronic health (or at the very least medical) records. 5. embedded care coordinator that supports an individual through the care delivery system. 6. Mission of the model is to make improvements in all domains of the Triple Aim.

Health Links, and the ICCP both have defined populations they are intending to serve. The PHC Integration network does not and it appears to take on a more general population focus working to improve care transitions for all Albertans. All models are attempting to bring together networks of providers, a common trend among many of the initiatives across Canada. Electronic health records that span beyond traditional medical care remain underdeveloped across Canadian jurisdictions with small jurisdiction specific initiatives growing (e.g., Champlain BASE eConsult Service, and Alberta Netcare e-referral technology). Alberta seems to be the one province that is fully taking on the Triple Aim outcomes and using them to promote integration, communication, and networks of providers.

Conclusion

With the possible exception of cost savings, the evidence for the effectiveness of ACO models remains mixed. Two primary challenges appear to exist across Canada with respect to implementing ACO-like models. First, access to and use of shared electronic health records continue to offer limited function across the Canadian context. A challenge that becomes increasingly difficult for ACO-like models that are attempting to span boundaries across health and social care divides. Second, care coordination continues to remain a challenge across Canadian jurisdictions. While the ACO model was intended to incentivise value based care, the incentive structure also has potential for unintended challenges where providers and hospitals report incorrectly and attempt to attract low-risk patients to balance out indicators.

At the same time, a shared savings program would permit publicly funded hospitals and provider networks to generate revenue for themselves through savings and efficiencies in care delivery. This would be novel in the Canadian context, where such savings would typically be returned to governments and reallocated to other areas of public interest. It is unclear if and how accountability mechanisms could be revised sufficiently in order to allow for this type of redistribution of public dollars.

Appendix 1: ACO Evaluation Studies in US (2015-2018)

Study	Methods	ACO Model	ACO Impact
Barry 2015 ³	<p><i>Design:</i> Quasi-experimental difference-in-differences model and leadership semi-structured interviews.</p> <p><i>Data sources:</i> Blue Cross Blue Shield of Massachusetts (BCBSMA) inpatient, outpatient, and pharmacy claims.</p> <p><i>Study period:</i> 2006-2011.</p> <p><i>Population:</i> BCBSMA enrollees aged 18-64 years.</p>	<p>Alternative Quality Contract (AQC) (with and without behavioural risk).</p> <p><i>Comparison:</i> Enrollees in practices that have not yet entered or that never entered an AQC contract.</p>	<p>Reduced probability of mental health service use (greater in behavioural risk group).</p> <p>No change in chronic disease management quality indicators (high at baseline, ceiling effect).</p> <p>No effect on mental health spending.</p>
Busch 2016 ⁴	<p><i>Design:</i> Quasi-experimental difference-in-differences model.</p> <p><i>Data sources:</i> Medicare claims.</p> <p><i>Study period:</i> 2008-2013.</p> <p><i>Population:</i> Medicare beneficiaries with a mental health diagnosis.</p>	<p>Medicare Shared Savings Program (MSSP) and Pioneer ACO.</p> <p><i>Comparison:</i> Medicare beneficiaries not assigned to a Medicare ACO.</p>	<p>Reduced spending on mental health hospital admissions. No changes in total mental health spending.</p> <p>No changes in hospital readmissions, outpatient follow-up after a mental health admission, rates of depression diagnosis, number of enrollees with a mental health diagnosis.</p>
Chien 2015 ⁵	<p><i>Design:</i> Descriptive analysis and semi-structured interviews.</p>	<p>Alternative Quality Contract (AQC) (pediatric services).</p>	<p>AQC pediatric infrastructure characterized as limited and basic based on the following factors: (1) the size of AQCs' pediatric-trained primary care workforce;</p>

³ Barry, C. L., Stuart, E. A., Donohue, J. M., Greenfield, S. F., Kouri, E., Duckworth, K., . . . Huskamp, H. A. (2015). The early impact of the 'alternative quality contract' on mental health service use and spending in Massachusetts. *Health Affairs*, *34*(12), 2077-2085.

⁴ Busch, A. B., Huskamp, H. A., & McWilliams, M. (2016). Early efforts by Medicare accountable care organizations have limited effect on mental illness care and management. *Health Affairs*, *35*(7), 1247-1256.

⁵ Chien, A. T., Schiavoni, K. H., Sprecher, E., Landon, B. E., McNeil, B. J., Chernew, M.E., & Schuster, M. A. (2015). How accountable care organizations responded to pediatric incentives in the alternative quality contract. *Academic Pediatrics*, *16*(2), 200-207.

	<p><i>Data sources:</i> Massachusetts Health Quality Partners 2011 Provider Database (MHQP-PD) and American Hospital Association 2009 Annual Survey Database (AHA-ASD).</p> <p><i>Study period:</i> 2009-2010.</p> <p><i>Population:</i> ACO medical and operational directors.</p>	<p><i>Comparison:</i> None.</p>	<p>(2) the range of pediatric-trained primary care providers' pediatric subspecialist types; (3) the scope of AQC pediatric inpatient services.</p>
Christensen 2016a ⁶	<p><i>Design:</i> Retrospective cohort.</p> <p><i>Data sources:</i> Medicaid claims.</p> <p><i>Study period:</i> 2013-2015.</p> <p><i>Population:</i> Pediatric Medicaid enrollees at Children's Hospitals and Clinics (CHC) of Minnesota.</p>	<p>Integrated Health Partnership (Pediatric Medicaid ACO).</p> <p><i>Comparison:</i> None.</p>	<p>Continuous receipt of pediatric primary care services from ACO for 2 years associated with reduced inpatient days, but increase in office visits, emergency department visits, and use of pharmaceuticals.</p> <p>Changes in health service utilization were mirrored by cost reductions.</p>
Christensen 2016b ⁷	<p><i>Design:</i> Retrospective cohort.</p> <p><i>Data sources:</i> Medicaid claims.</p> <p><i>Study period:</i> 2013-2015.</p> <p><i>Population:</i> Pediatric Medicaid enrollees at Children's Hospitals and Clinics (CHC) of Minnesota (< 20 years of age).</p>	<p>Integrated Health Partnership (Pediatric Medicaid ACO).</p> <p><i>Comparison:</i> None.</p>	<p>Continuous receipt of pediatric primary care services from ACO for 2 years associated with reduced 30-day readmission rate at hospitals other than the discharging hospital, but not the discharging hospital.</p> <p>Reduction in the cost per inpatient episode of care for all patients.</p>
Colla 2016 ⁸	<p><i>Design:</i> Quasi-experimental difference-in-differences model.</p>	<p>Medicare Shared Savings Program (MSSP).</p>	<p>Reduction in beneficiary-level spending in ACO Medicare beneficiaries and clinically vulnerable subgroup.</p>

⁶ Christensen, E. W., & Payne, N. R. (2016a). Effect of attribution length on the use and cost of health care for a pediatric Medicaid accountable care organization. *JAMA Pediatrics*, 170(2), 148-154.

⁷ Christensen, E. W., & Payne, N. R. (2016b). Pediatric inpatient readmissions in an accountable care organization. *The Journal of Pediatrics*, 170, 113-119.

⁸ Colla, C. H., Lewis, V. A., Kao, L. S., O'Malley, J., Chang, C. H., & Fisher, E. S. (2016). Association between Medicare accountable care organization implementation and spending among clinically vulnerable beneficiaries. *JAMA Internal Medicine*, 176(8), 1167-1175.

	<p><i>Data sources:</i> Medicare claims.</p> <p><i>Study period:</i> 2009-2013.</p> <p><i>Population:</i> Medicare beneficiaries (general) and clinically-vulnerable subgroup (at least 3 hierarchical condition categories, HCC).</p>	<p><i>Comparison:</i> Medicare beneficiaries not assigned to a Medicare ACO.</p>	<p>Reduction in hospitalizations, emergency department visits in both general and clinically-vulnerable ACO groups.</p>
GAO 2015 ⁹	<p><i>Design:</i> Descriptive analysis.</p> <p><i>Data sources:</i> Medicare claims.</p> <p><i>Study period:</i> 2012-2013.</p> <p><i>Population:</i> Medicare beneficiaries.</p>	<p>Pioneer ACO (32 practices in 2012, 23 in 2013).</p> <p><i>Comparison:</i> None.</p>	<p>Over half of ACOs earned savings during both periods. Each amount is 4% of total expenditures for the ACOs that produced shared savings per year.</p> <p>ACOs that participated in both years had higher quality scores in 2nd year for 22/33 quality measures.</p>
Geyer 2016 ¹⁰	<p><i>Design:</i> Retrospective cohort.</p> <p><i>Data sources:</i> Medical records and registries of 2 American College of Surgeons-verified level 1 trauma centers.</p> <p><i>Study period:</i> 2005-2009</p> <p><i>Population:</i> Adult trauma patients transferred to tertiary care hospitals.</p>	<p>Pioneer ACO (transfer from acute care ACO-affiliated hospitals).</p> <p><i>Comparison:</i> Acute care to tertiary trauma care transfers outside of the Pioneer ACO network.</p>	<p>Reduced cost of hospitalization.</p> <p>Reduced number of imaging studies during hospitalization.</p> <p>No difference in mortality, ICU length of stay, overall hospitalization length of stay.</p>
Green 2015 ¹¹	<p><i>Design:</i> Quasi-experimental difference-in-differences matched comparison model and leadership focus groups.</p>	<p>Pioneer ACO.</p> <p><i>Comparison:</i> Medicare beneficiaries eligible for</p>	<p>10 ACOs showed savings in both performance years evaluated.</p>

⁹ United States Government Accountability Office, Report to the Ranking Member, Committee on Ways and Means, House of Representatives. (2015). *Results from the first two years of the pioneer accountable care organization model*. Retrieved from <https://www.gao.gov/assets/670/669782.pdf>

¹⁰ Geyer, B. C., Peak, D. A., Velmahos, G. C., Gates, J. D., Michaud, Y., . . . Raja, A. S. (2016). Cost savings associated with transfer of trauma patients within an accountable care organization. *American Journal of Emergency Medicine*, 34(3), 455-458.

¹¹ L&M Policy Research. (2015). *Pioneer ACO evaluation findings from performance years one and two* (Report prepared for Centers for Medicare & Medicaid Services). Retrieved from <https://www.abtassociates.com/insights/publications/report/evaluation-of-cmmi-accountable-care-organization-initiatives-pioneer>

	<p><i>Data sources:</i> Medicare claims.</p> <p><i>Study period:</i> 2012-2013.</p> <p><i>Population:</i> Medicare beneficiaries.</p>	but not assigned to Pioneer or MSSP ACO.	
Green 2016 ¹²	<p><i>Design:</i> Quasi-experimental difference-in-differences model, key informant interviews, and physician surveys.</p> <p><i>Data sources:</i> Medicare claims.</p> <p><i>Study period:</i> 2012-2014.</p> <p><i>Population:</i> Medicare beneficiaries.</p>	<p>Advance Payment (AP) ACO (20 practices in 2012, 36 in 2013).</p> <p><i>Comparison:</i> Medicare beneficiaries in the AP ACO market, not assigned to any Medicare ACO.</p>	<p>No significant change in quality indicators or Medicare spending.</p> <p>More AP ACO physicians were involved in the decision to participate in an ACO model. Compared to physicians in non-AP ACO models, more AP ACO-involved physicians agreed that the ACO model is effective at providing high-quality cost-effective care and that staying competitive in the local market is important .</p>
Herrell 2016 ¹³	<p><i>Design:</i> Quasi-experimental difference-in-differences matched comparison model and leadership semi-structured interviews.</p> <p><i>Data sources:</i> Medicare claims, American Hospital Association Annual Survey, Medicare Provider Analysis and Review (MEDPAR) file.</p> <p><i>Study period:</i> 2011-2013.</p> <p><i>Population:</i> Medicare beneficiaries aged 65 years and older undergoing major surgical resection for colorectal, bladder, esophageal, kidney, liver, ovarian, pancreatic, lung, or prostate cancer.</p>	<p>Medicare Shared Savings Program (MSSP).</p> <p><i>Comparison:</i> Acute care and critical access hospitals not affiliated with ACO.</p>	No difference in 30-day mortality rate, complication rate, prolonged length of stay rate, and adverse perioperative outcomes.

¹² L&M Policy Research. (2016). *Advance payment ACO final report* (Report prepared for Centers for Medicare & Medicaid Services). Retrieved from <https://innovation.cms.gov/Files/reports/advpayaco-fnevalrpt.pdf>

¹³ Herrell, L. A., Norton, E. C., Hawken, S. R., Ye, Z., Hollenbeck, B. K., & Miller, D. C. (2016). Early impact of Medicare accountable care organizations on cancer surgery outcomes. *Cancer*, 122(17), 2739-2746.

<p>Hewner 2016¹⁴</p>	<p><i>Design:</i> Retrospective cohort.</p> <p><i>Data sources:</i> New York State Medicaid Data Warehouse (MDW).</p> <p><i>Study period:</i> 2013.</p> <p><i>Population:</i> Adult Medicaid recipients in 2 counties in western New York recently discharged from an acute care hospital.</p>	<p>Medicaid ACO.</p> <p><i>Comparison:</i> Medicaid enrollees discharged from a hospital not associated with an ACO.</p>	<p>Reduced 90-day rehospitalizations (inpatient and emergency department treat-and-release).</p> <p>Initial hospitalization in an ACO-affiliated hospital was associated with longer time to readmission in the first 90 days post-discharge.</p>
<p>Huskamp 2016¹⁵</p>	<p><i>Design:</i> Quasi-experimental difference-in-differences model.</p> <p><i>Data sources:</i> Blue Cross Blue Shield of Massachusetts (BCBSMA) inpatient, outpatient, and pharmacy claims.</p> <p><i>Study period:</i> 2006-2011.</p> <p><i>Population:</i> BCBSMA enrollees aged 18-64 years.</p>	<p>Alternative Quality Contract (AQC).</p> <p><i>Comparison:</i> Enrollees in practices not in an AQC contract.</p>	<p>Overall increased rates of tobacco-cessation treatment use among enrollees at risk for tobacco-related complications, and among behavioural health service users.</p>
<p>Joyce 2017¹⁶</p>	<p><i>Design:</i> Quasi-experimental difference-in-differences model.</p> <p><i>Data sources:</i> Blue Cross Blue Shield of Massachusetts (BCBSMA) inpatient, outpatient, and pharmacy claims.</p> <p><i>Study period:</i> 2006-2011.</p>	<p>Alternative Quality Contract (AQC).</p> <p><i>Comparison:</i> Enrollees in practices that have not yet entered or that never entered an AQC contract.</p>	<p>Increase in outpatient visits, number of medication management visits among children and youths with ADHD in the AQC group.</p> <p>No difference in spending and no evidence of reductions in health service utilization.</p>

¹⁴ Hewner, S., Casucci, S., & Castner, J. (2016). The roles of chronic disease complexity, health system integration, and care management in post-discharge healthcare utilization in a low-income population. *Research in Nursing & Health*, 39(4), 215-228.

¹⁵ Huskamp, H. A., Greenfield, S. F., Stuart, E. A., Donohue, J. M., Duckworth, K., . . . Barry, C. L. (2016). Effects of global payment and accountable care on tobacco cessation service use: An observational study. *Journal of General Internal Medicine*, 31(10), 1134-1140.

¹⁶ Joyce, N. R., Huskamp, H. A., Hadland, S. E., Donohue, J. M., Greenfield, S. F., Stuart, E. A., & Barry, C. L. (2017). The Alternative quality contract: Impact on service use and spending for children with ADHD. *Psychiatric Services*, 68(12), 1210-1212.

	<i>Population:</i> BCBSMA enrollees aged 20 years and younger diagnosed with attention-deficit and hyperactivity disorder (ADHD).		
Kelleher 2015 ¹⁷	<i>Design:</i> Quasi-experimental difference-in-differences model. <i>Data sources:</i> Medicaid fee-for-service (FFS) and managed care claims, 15 Agency for Healthcare Research and Quality (AHRQ) Pediatric Quality Indicators, and 4 Partners for Kids (PFK) quality indicators. <i>Study period:</i> 2008-2013. <i>Population:</i> Pediatric Medicaid recipients at Nationwide Children’s Hospital in Ohio.	PFK Pediatric Medicaid ACO 2011-2013. <i>Comparison:</i> Same population 2008-2010.	Reduced growth in costs over time per beneficiary. Increase in quality of care on 5 quality measures (including 2 composite measures), decline on 3 quality measures, and no difference on remaining 8 quality indicators.
Lowell 2018 ¹⁸	<i>Design:</i> Retrospective cohort. <i>Data sources:</i> Medicare claims. <i>Study period:</i> 2013-2017. <i>Population:</i> Medicare beneficiaries.	New Generation ACO Model (NGACO) (18 practices launched in 2016). <i>Comparison:</i> Medicare beneficiaries not aligned with NGACO.	Decrease in hospital length of stay and number of outpatient and wellness visits. Reduction in Medicare spending (reduction in post-acute care spending was the most important contributor). Value of preventive care, comprehensive care management, and provider partnerships emphasized in interviews.
McConnell 2017 ¹⁹	<i>Design:</i> Quasi-experimental difference-in-differences model.	Oregon’s Coordinated Care Organization (CCO) model.	Oregon’s CCO model saw a reduction in emergency department visits, primary care visits, and acute preventable hospital admissions. Improvement in 3

¹⁷ Kelleher, K. J., Cooper, J., Deans, K., Carr, P., Brill, R. J., Allen, S., & Gardner, W. (2015). Cost saving and quality of care in a pediatric accountable care organization. *Pediatrics*, 135(3), e582-e589.

¹⁸ NORC at the University of Chicago. (2018). *Next Generation Accountable Care Organization (NGACO) Model Evaluation: First Annual Report* (Report prepared for Centers for Medicare & Medicaid Services). Retrieved from <https://innovation.cms.gov/Files/reports/nextgenaco-firstannrpt.pdf>

¹⁹ McConnell, J., Renfro, S., Chan, B. K. S., Meath, T. H. A., Mendelson, A., Cohen, D., . . . Lindrooth, R. C. (2017). Early performance in Medicaid accountable care organizations: A comparison of Oregon and Colorado. *JAMA Internal Medicine*, 177(4), 538-545.

	<p><i>Data sources:</i> Medicaid claims.</p> <p><i>Study period:</i> 2010-2014.</p> <p><i>Population:</i> Oregon and Colorado Medicaid beneficiaries.</p>	<p><i>Comparison:</i> Colorado Accountable Care Collaborative (ACC).</p>	<p>of 4 measures of access and 1 of 4 measures of appropriateness of care were also observed.</p> <p>Oregon’s and Colorado’s Medicaid ACO models exhibited similar performance on standardized expenditures for selected services. Oregon’s model, marked by a large federal investment and movement to global budgets, was associated with improvements in some measures of utilization, access, and quality.</p>
McWilliams 2015 ²⁰	<p><i>Design:</i> Quasi-experimental difference-in-differences model.</p> <p><i>Data sources:</i> Medicare claims.</p> <p><i>Study period:</i> 2009-2012.</p> <p><i>Population:</i> Medicare beneficiaries.</p>	<p>Pioneer ACOs.</p> <p><i>Comparison:</i> Local non-participating providers.</p>	<p>Reduction in spending; savings greater in ACOs with higher-than-local average baseline spending than in those with lower-than-local average baseline spending. Similar savings in ACOs with financial integration between hospitals and physician groups and those without, as well as between ACOs that withdrew from the program and those that did not.</p>
McWilliams 2016 ²¹	<p><i>Design:</i> Quasi-experimental difference-in-differences model.</p> <p><i>Data sources:</i> Medicare claims.</p> <p><i>Study period:</i> 2009-2013.</p> <p><i>Population:</i> Medicare beneficiaries.</p>	<p>Medicare Shared Savings Program (MSSP).</p> <p><i>Comparison:</i> Medicare beneficiaries not aligned with ACO.</p>	<p>Increased total and per beneficiary savings; savings consistently greater in independent primary care groups than in hospital-integrated groups among 2012 and 2013 MSSP entrants.</p> <p>No difference on the use of low-value services. But Improvement on some quality indicators.</p>
McWilliams 2017 ²²	<p><i>Design:</i> Descriptive analysis.</p> <p><i>Data sources:</i> Medicare claims.</p>	<p>Medicare Shared Savings Program (MSSP).</p>	<p>Reduction in post-acute spending driven by reductions in acute inpatient care, discharges to facilities other than home, and length of skilled nursing facility (SNF) stays.</p>

²⁰ McWilliams, J. M., Chernew, M. E., Landon, B. E., & Schwartz, A. L. (2015). Performance differences in year 1 of pioneer accountable care organizations. *New England Journal of Medicine*, 372(20), 1927-1936.

²¹ McWilliams, J. M., Hatfield, L. A., Chernew, M. E., Landon, B. E., & Schwartz, A. L. (2016). Early performance of accountable care organizations in Medicare. *New England Journal of Medicine*, 374(24), 2357-2366.

²²McWilliams, J. M., Gilstrap, L. G., Stevenson, D. G., Chernew, M. E., Huskamp, H. A., & Grabowski, D. C. (2017). Changes in postacute care in the Medicare Shared Savings Program. *JAMA Internal Medicine*, 177(4), 518-526.

	<p><i>Study period:</i> 2009-2014.</p> <p><i>Population:</i> Medicare beneficiaries.</p>	<p><i>Comparison:</i> Medicare beneficiaries not aligned with ACO.</p>	<p>No difference in 30-day readmissions, use of highly rated SNF, or mortality.</p>
McWilliams 2018 ²³	<p><i>Design:</i> Descriptive analysis.</p> <p><i>Data sources:</i> Medicare claims.</p> <p><i>Study period:</i> 2015-2016.</p> <p><i>Population:</i> Medicare beneficiaries.</p>	<p>ACO Investment Model (AIM) (47 practices in 36 states during study period).</p> <p><i>Comparison:</i> None.</p>	<p>Reduction in beneficiary-level and aggregate Medicare spending.</p> <p>Reduction in spending mirrored by reduced acute care inpatient visits, reduced post-acute care days, reduced emergency visits.</p>
Muhlestein 2016 ²⁴	<p><i>Design:</i> Descriptive analysis.</p> <p><i>Data sources:</i> Medicare claims, Medicare's acute Inpatient Prospective Payment Systems (IPPS) final rule data files, and Leavitt Partners ACO database.</p> <p><i>Study period:</i> 2013-2016.</p> <p><i>Population:</i> Nationwide hospitals.</p>	<p>Hospitals that became Medicare or commercial ACOs.</p> <p><i>Comparison:</i> Hospitals that did not become Medicare or commercial ACOs.</p>	<p>ACO hospitals performed better on the Hospital Readmissions Reduction Program (HRRP), but not on the Hospital Value-Based Purchasing Program (HVBP) or the Hospital-Acquired Conditions (HAC) Reduction Program. Hospitals joining ACOs did increasingly better than their peers on the HRRP, but had inconsistent results year-over-year with the HVBP.</p>
Narayan 2016 ²⁵	<p><i>Design:</i> Retrospective cohort.</p> <p><i>Data sources:</i> Medicare claims.</p> <p><i>Study period:</i> 2012-2014.</p> <p><i>Population:</i> Screen-eligible female enrollees aged 40-69 years.</p>	<p>Medicare Shared Savings Program (MSSP) (208 practices enrolled for >1 year during study period).</p> <p><i>Comparison:</i> None.</p>	<p>Increase in biennial mammography utilization (ACO-20 quality indicator), but no correlation with overall ACO-composite quality score.</p> <p>No difference in mammography utilization between ACOs that showed cost savings and those that did not.</p>

²³ Abt Associates. (2018). *Evaluation of the accountable care organization investment model: AIM impacts in the first performance year* (Report prepared for Centers for Medicare & Medicaid Services). Retrieved from <https://innovation.cms.gov/Files/reports/aim-firstannrpt.pdf>

²⁴ Muhlestein, D., Tu, T., de Lisle, K., & Merrill, T. (2016). Hospital participation in ACOs associated with other value-based program improvement. *American Journal of Managed Care*, 22(7), e241-e248.

²⁵ Narayan, A. K., Harvey, S. C., Durand, D. J. (2017). Impact of Medicare shared savings program accountable care organizations at screening mammography: A retrospective cohort study. *Radiology*, 282(2), 437-442.

<p>Nyweide 2015²⁶</p>	<p><i>Design:</i> Quasi-experimental difference-in-differences model.</p> <p><i>Data sources:</i> Medicare claims.</p> <p><i>Study period:</i> 2010-2013.</p> <p><i>Population:</i> Medicare beneficiaries with full Part A and B coverage.</p>	<p>Pioneer ACO.</p> <p><i>Comparison:</i> Medicare beneficiaries in the same markets, eligible but not assigned to Pioneer ACO.</p>	<p>Reduced utilization of physician services, emergency department, and post-acute care.</p> <p>Lower rate of spending increase (per beneficiary and aggregate).</p> <p>Higher mean score for timely care and clinician communication.</p>
<p>Peiris 2016²⁷</p>	<p><i>Design:</i> Descriptive analysis.</p> <p><i>Data sources:</i> National Survey of Accountable Care Organizations (NSACO), matched with publicly reported Medicare performance data (Medicare ACOs only).</p> <p><i>Study period:</i> 2012-2015.</p> <p><i>Population:</i> 399 ACOs surveyed by NSACO.</p>	<p>Commercial ACO – an ACO that had at least one contract with a private payer (with or without Medicare or Medicaid contracts).</p> <p><i>Comparison:</i> Non-commercial ACO – an ACO that had contracts only with Medicare, Medicaid, or both.</p>	<p>Compared to non-commercial ACOs, commercial ACOs tended to have a higher degree of engagement in disease-monitoring activities, have taken action in the areas of care processes, unnecessary hospitalizations, and specialist referral processes. More commercial ACOs were investing in processes to reduce emergency department use and taking steps to reduce overuse of health services identified by Choosing Wisely (ABIM-affiliated campaign aimed at reducing unnecessary tests and treatments in health care) as having low value.</p>
<p>Schwartz 2015²⁸</p>	<p><i>Design:</i> Quasi-experimental difference-in-differences model.</p> <p><i>Data sources:</i> Medicare claims.</p> <p><i>Study period:</i> 2009-2012.</p> <p><i>Population:</i> Medicare beneficiaries with full Part A and B coverage.</p>	<p>Pioneer ACO.</p> <p><i>Comparison:</i> Medicare beneficiaries attributed to other healthcare providers.</p>	<p>Reduced utilization of low-value services (low to no clinical benefit).</p> <p>Reduced spending on low-value services.</p>

²⁶ Nyweide, D. J., Lee, W., Cuerdon, T. T., Pham, H. H., Cox, M., Rajkumar, R., & Conway, P.H. (2015). Association of pioneer accountable care organizations vs traditional Medicare fee for service with spending, utilization, and patient experience. *JAMA*, 213(21), 2152-2161.

²⁷ Peiris, D., Phipps-Taylor, M. C., Stachowski, C. A., Kao, L. S., Shortell, S. M., . . . Colla, C.H. (2016). ACOs holding commercial contracts are larger and more efficient than noncommercial ACOs. *Health Affairs*, 35(10), 1849-1856.

²⁸ Schawrtz, A. L., Chernew, M. E., Landon, B. E., & McWilliams, J. M. (2015). Changes in low-value services in year 1 of the Medicare Pioneer accountable care organization program. *JAMA Internal Medicine*, 175(11), 1815-1825.

Shortell 2015 ²⁹	<p><i>Design:</i> National survey with semi-structured interviews and site visits.</p> <p><i>Data sources:</i> National Survey of Patient Activation and Engagement (PAE).</p> <p><i>Study period:</i> 2012-2014.</p> <p><i>Population:</i> Nation-wide ACOs.</p>	<p>Nation-wide ACOs (regardless of payer or institution type).</p> <p><i>Comparison:</i> None.</p>	<p>Greater ACO use of PAE activities at the point-of-care may influence more positive leadership perceptions of the impact of PAE investments on ACO costs, quality, and outcomes of care. Important practices associated with greater PAE include high-level leadership commitment, goal-setting supported by adequate resources, extensive provider training and use of inter-disciplinary care teams, and frequent monitoring and reporting on progress.</p>
Song 2017 ³⁰	<p><i>Design:</i> Descriptive analysis.</p> <p><i>Data sources:</i> Blue Cross Blue Shield of Massachusetts (BCBSMA) claims and American Community Survey from the Census Bureau.</p> <p><i>Study period:</i> 2006-2012.</p> <p><i>Population:</i> BCBSMA enrollees.</p>	<p>Alternative Quality Contract (AQC).</p> <p><i>Comparison:</i> Enrollees in practices not part of an AQC contract.</p>	<p>Improvement in process-related quality indicators, with greater improvement in areas with lower socioeconomic status compared to those with higher socioeconomic status.</p> <p>No difference in spending or health outcomes, such as hemoglobin A1c, low-density lipoprotein cholesterol, and blood pressure targets in patients with diabetes, coronary heart disease, and hypertension, respectively.</p>
Stuart 2017 ³¹	<p><i>Design:</i> Quasi-experimental difference-in-differences model.</p> <p><i>Data sources:</i> Blue Cross Blue Shield of Massachusetts (BCBSMA) inpatient, outpatient, and pharmacy claims.</p> <p><i>Study period:</i> 2006-2011.</p>	<p>Alternative Quality Contract (AQC) (with and without behavioural risk).</p> <p><i>Comparison:</i> Enrollees in practices that have not yet entered or that never entered an AQC contract.</p>	<p>With behavioural risk: no change in substance-use disorder (SUD) service utilization, SUD spending, or SUD performance metrics.</p> <p>Without behavioural risk: increase in SUD services, reduction in SUD medication use, mixed SUD performance metrics changes.</p>

²⁹ Shortell, S. M., Sehgal, N. J., Bibi, S., Ramsay, P. P., Neuhauser, L., Colla, C. H., & Lewis, V. A. (2015). An early assessment of accountable care organizations' efforts to engage patients and their families. *Medical Care Research and Review*, 72(5), 580-604.

³⁰ Song, Z., Rose, S., Chernew, M. E., & Safran, D. G. (2017). Lower- versus higher-income populations in the alternative quality contract: Improved quality and similar spending. *Health Affairs*, 36(1), 74-82.

³¹ Stuart, E. A., Barry, C. L., Donohue, J. M., Greenfield, S. F., Duckworth, K., Song, Z., . . . Mechanic R. (2017). Effects of accountable care and payment reform on substance use disorder treatment: Evidence from the initial three years of the alternative quality contract. *Addiction*, 112(1), 124-133.

	<i>Population:</i> BCBSMA enrollees aged 13-64 years (at least 1 year of enrollment).		
Winblad 2017 ³²	<p><i>Design:</i> Quasi-experimental difference-in-differences model.</p> <p><i>Data sources:</i> Medicare claims.</p> <p><i>Study period:</i> 2007-2013.</p> <p><i>Population:</i> Medicare beneficiaries discharged from hospitals to post-acute care skilled nursing facilities (SNFs).</p>	<p>Medicare Shared Savings Program (MSSP) (162 hospitals) and Pioneer ACO (64 hospitals).</p> <p><i>Comparison:</i> General metropolitan hospitals not participating in MSSP or Pioneer ACO (1,844 hospitals).</p>	Reduction in 30-day, 1-3-day (premature-discharge indicator), and 4-30-day (SNF-quality indicator) rehospitalization.
Zhang 2017 ³³	<p><i>Design:</i> Quasi-experimental difference-in-differences model.</p> <p><i>Data sources:</i> Medicare claims.</p> <p><i>Study period:</i> 2011-2012.</p> <p><i>Population:</i> Medicare beneficiaries with Part D drug coverage.</p>	<p>Pioneer ACO.</p> <p><i>Comparison:</i> Medicare beneficiaries eligible for but not aligned with Pioneer or Medicare Shared Savings Program (MSSP) ACO.</p>	<p>Savings in overall Medicare Part A and B spending.</p> <p>No difference in Part D (drug) spending, total prescriptions filled, and proportion of brand-name drugs.</p>

³² Winblad, U., Mor, V., McHugh, J. P., & Rahman, M. (2017). ACO-affiliated hospitals reduced rehospitalizations from skilled nursing facilities faster than other hospitals. *Health Affairs*, 36(1), 67-73.

³³ Zhang, Y., Caines, K. J., & Powers, C. A. (2017). Evaluating the effects of pioneer accountable care organizations on Medicare part d drug spending and utilization. *Medical Care*, 55(5), 470-475.

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