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Appendix 1

Data Sources and Sample

The population of U.S. hospitals was constructed from hospitals that participated in the 2012 American Hospital Association Annual Survey and had a Medicare provider number in 2012, so they could be linked across data sources. Our final hospital database with information linked across sources contains 5,634 hospitals. The sample of hospitals from the MedPAR data is slightly smaller (N=4,474 hospitals) because it only includes information on hospitals that bill to Medicare.

1. The National Survey of Accountable Care Organizations (NSACO) collects detailed information about the formation and development of accountable care organizations. The first wave of the survey was conducted between October 2012 and May 2013, and all ACOs formed before August 2012 were eligible respondents. Wave 2 was implemented from September 2013 to March 2014 and all ACOs that were formed between September 2012 and July 2013 were considered eligible. In total there were 270 complete survey responses for a 66% response rate, based on the American Association for Public Opinion Research (AAPOR) methodology(1). The survey was designed based on published frameworks for evaluating accountable care organizations(2), interviews and qualitative work with multiple ACOs(3-5), and questions from existing surveys where available, including the National Survey of Physician Organizations, the American Medical Group Association's ACO Readiness Assessment, and the American Hospital Association's Care Coordination Survey. The survey included questions on contracts with payers, organizational structure (including relationships with hospitals), capabilities, ACO activities, and attitudes on the ACO model(6). For the purposes of the survey, we identify ACOs as organizations with meaningful accountability for total cost of care and quality in a contract with a payer.

2. The Leavitt Partners ACO Database, a primary data source collected by Leavitt Partners (LP) and validated by linkage to the NSACO survey, is a comprehensive database of accountable care organizations, which has been in existence since 2010 and now contained 627 ACOs at the time of this analysis. Information on ACOs in the database is updated regularly from press releases, news articles, government announcements, conferences, personal and industry interviews and other public records. Hospitals were considered part of an ACO if they were identified as either being owned by or affiliated with the ACO(7). ACOs are defined as health care providers bearing risk for the cost and quality outcomes of a defined population.

3. Medicare Cost Report data from Definitive Healthcare contains provider information including facility characteristics, utilization data, cost and charges by cost center, Medicare settlement data, and financial statement data(8). From this data, we use the variables: hospital ownership, hospital size, staffed beds, patient discount percentage, payer mix, operating income, net patient revenue, Medicare DSH payments, net Medicaid revenue, and net Medicare revenue.

4. The American Hospital Association Annual Survey Database (2012) is based on primary survey data from the AHA Annual Survey of Hospitals, AHA membership data and U.S. Census Bureau identifiers. Data fields included in this study were: pediatric beds, admissions, occupancy, average daily census, inpatient days, surgical operations, emergency department visits, Medicare discharges, Medicare days, Medicaid discharges, Medicaid days, hospital services, teaching status of hospital, region, core based statistical area, and staffing ratios (9).

The population of U.S. hospitals was constructed from hospitals that participated in the 2012 American Hospital Association Annual Survey and had a Medicare provider number in 2012, so they could be linked across data sources.

5. The Medicare Provider and Analysis Review (MedPAR) File (2011 and 2012) contains inpatient hospital and/or skilled nursing facility (SNF) records for all Medicare beneficiaries. MedPAR files contain: procedures, diagnoses, and DRGs, length of stay, beneficiary and Medicare payment amounts, and summarized revenue center charge amounts. From the MedPAR files, we create a number of hospital characteristics, including: payment per Medicare discharge, length of stay, percent of discharged beneficiaries black, percent of discharged beneficiaries Hispanic, and Hospital Referral Region-level Herfindahl–Hirschman Index.

6. From The 2010 American Community Survey (ACS) we included the percent in the zip code of hospital under poverty line.

7. The Provider of Services (POS) Extract (2012) from the Center for Medicare and Medicare Services is created from the QIES (Quality Improvement Evaluation System). The file contains an individual record for each Medicare-approved provider and is updated quarterly. The file includes information for provider number, provider demographics, facility size, and facility staffing. We used this file to supplement bed size and admission where we could not locate the hospital in the AHA Survey Database.

8. The Centers for Medicare and Medicaid Innovation's 2014 Bundled Payments for Care Improvement Extract comprises a list of hospitals that participate in the Bundled Payments for Care Improvement initiative, which holds hospitals accountable for financial performance for episodes of care(10).

9. Centers for Medicare and Medicaid Services (CMS) Hospital Compare is a consumer-oriented website provides publicly reported hospital-level information on various measures of quality. Hospital Compare allows consumers to directly compare performance measure information related to heart attack, heart failure, pneumonia, surgery and other conditions. Hospital Compare is typically updated, or refreshed, each quarter in April, July, October, and December; however, the refresh schedule is subject to change and not all measures update during each quarterly release.

10. The Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) Patient Survey is a survey instrument and data collection methodology for measuring patients' perceptions of their hospital experience. The HCAHPS survey contains patient perspectives on care and patient rating items that encompass key topics: communication with hospital staff, responsiveness of hospital staff, pain management, communication about medicines, discharge information, cleanliness of hospital environment, quietness of hospital environment, and transition of care. The Medicare program compiles a composite measure of these scores.

11. The Medicare Hospital Readmission Reduction Program (HRRP) utilizes financial incentives to attempt to reduce preventable hospital readmissions. Beginning in fiscal year 2013 (October 1, 2012), the HRRP imposed a financial penalty on hospitals with excess Medicare readmissions. Hospitals that exceed projected readmissions for defined illnesses and procedures receive reduced Medicare reimbursements over the following year, expressed as a readmission penalty percentage. The HRRP applies to all general hospitals paid under Medicare Inpatient Prospective Payment System (IPPS).

12. The first set of interviews occurred between June and September 2013 and consisted of a sample of 15 safety-net ACOs. We interviewed a senior leader at the 15 ACOs, and additionally interviewed a community health center leader at 10 of these ACOs for a total of 25 interviews. We identified safety net ACOs based on their inclusion of a federally qualified health center, rural health clinic, or Medicaid contract. We aimed to sample ACOs with high care coordination capabilities, and varying leadership and organizational structures, and payer mix. The goal of these interviews was to understand clinical integration at the ACO and community health center level, so the interview guide included questions on governance and leadership, communication within the ACO, care delivery changes, and for the community health center leaders, whether they had confidence in the ACO's goals.

13. The second round of 2013 interviews were completed over six months from July to December, consisting of 16 interviews with 15 ACOs. Interviewees were clinical leaders, including CMOs and directors of specialty mental health or primary care. Sites were identified by their participation in the safety net, high level of activity in behavioral health, and for varying types of partnerships. The interview guide used questions on priority areas, clinical changes as a result of ACO formation, behavioral health providers, behavioral health services, and integration of behavioral health in primary care to understand each ACO's behavioral health integration and approaches.

14. The third set of interviews was done in July and August 2014, totaling 17 interviews with 16 clinical leaders (predominantly CMOs). We selected sites of which we had previous knowledge, that participated in the safety net, and that were actively working on care transformation or ACO development. We ensured the sample represented a mix of partnerships, capabilities, experience, leadership, approach, geography, patient demographics, number of contracts, and degree of urbanicity. This resulted in selecting 14 ACOs we previously interviewed in 2013. These interviews were framed to understand the clinical priorities and tactics of ACOs. Interview guide questions included changes to structure since last interview, clinical and population priorities, and clinical tactics.

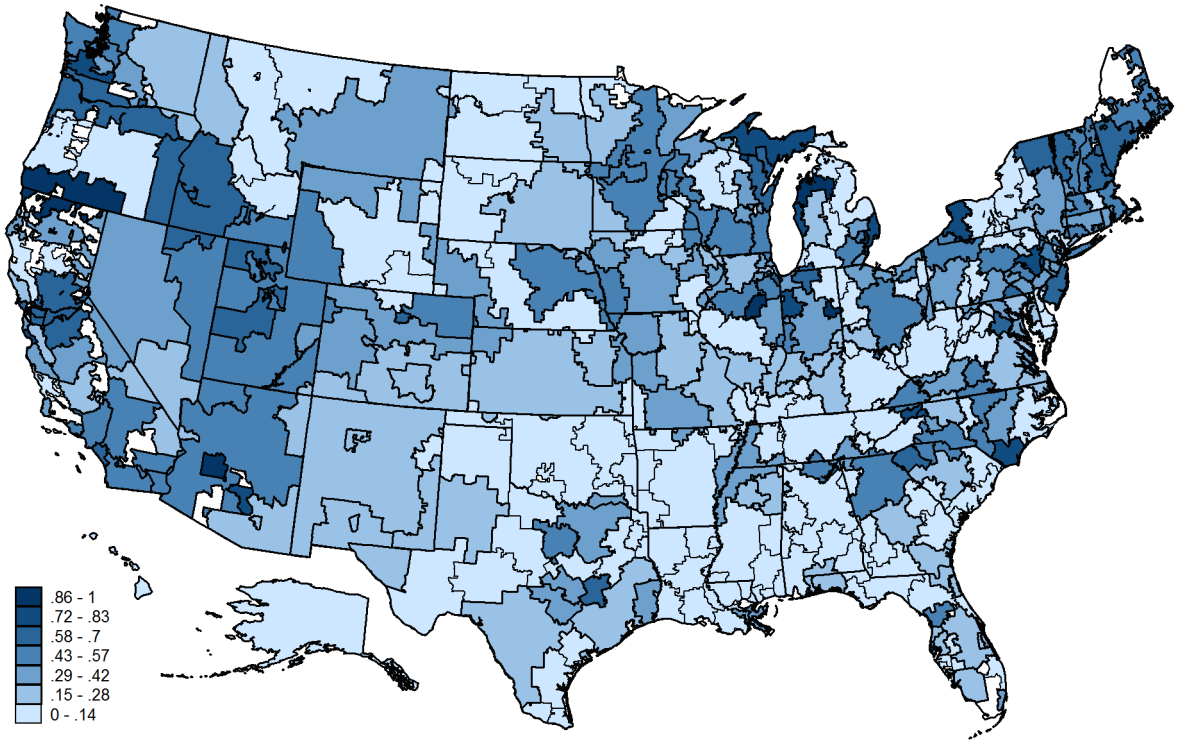
15. Between September 2014 and March 2015, we conducted site visits at four ACOs we had previously interviewed in 2014. They were selected for their high level of development, safety net participation, active work on care transformations, and variation in partnerships, leadership, geography, payer types, and number of contracts. Each site visit consists of half-hour and hour-long semi-structured interviews with ACO leaders, clinical leadership, quality improvement staff, care management staff, and community health center leadership. We also observed meetings, such as board meetings, quality improvement meetings, and meetings with potential payers. Interviews were guided by a topic list with suggested questions that was developed based on each interviewee's role in the ACO.

Appendix 2: Examples of interview questions

Topic	Question examples
Motivations and formation	Can you tell me about the organizations participating in your ACO? Could you describe the process you went through to form an ACO? From your perspective, what allowed the participating organizations to come together when they did? What was the relationship among the participating organizations prior to the ACO initiative? If it has changed, how?
Governance and leadership	Could you briefly describe the leadership structure of your ACO? Who is on the ACO leadership team, and how were its members chosen? What are the responsibilities of the leadership team? Can you give an example of a time when you had difficulty reaching a consensus or a time when there were differing opinions among ACO leadership? How was this issue addressed?
Communication	How is information shared between ACO leadership and clinic leadership? What is being done to inform or engage clinic leaders, providers, and staff at various sites about the ACO's plans?
Care delivery transformation	What changes in clinical operations have taken place as a result of the ACO? To what extent are clinicians and care teams meeting and communicating across care settings or organizations? To what extent are you focused on standardizing initiatives and programs across the ACO as opposed to having individual practices implement their own, tailored programs? Of all the programs, personnel, and activities you've mentioned, which do you think has been most successful in integrating care across sites? Why?
Priorities and Tactics	Broadly, what are your ACO's priorities? What tactics are you using to work on each priority? For each area of focus, do you have specific goals or targets in these priority areas?
Challenges	Are there any additional challenges your ACO is facing?

Notes: Questions related to hospital involvement were pulled from three interview guides. Some questions were consistent across all guides, while others were tailored to one guide.

Appendix 3: Proportion of Hospital Beds Affiliated with ACOs



Source: Leavitt Partners ACO Database.
Notes: We calculated the proportion of hospitals within each region that are part of an ACO, weighted by the number of beds in the hospital.

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