Evaluation of Colorado’s Accountable Care Collaborative

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Colorado’s Accountable Care Collaborative (ACC)

• **Primary Goals¹:**
  - Improve member health
  - Improve the member and provider experience
  - Contain cost

• **Major elements of the ACC**
  - **Regional Care Collaborative Organizations (RCCOs)**
    - Receive PMPM to develop network of providers
    - Eligible for PMPM bonuses based on performance on Key Performance Indicators (KPIs)
  - **Primary Care Medical Providers (PCMPs)**
    - Under contract with RCCOs to serve as medical homes
    - Paid PMPM and eligible for portion of bonuses based on RCCO performance on KPIs
  - **Statewide Data and Analytics Contractor (SDAC)**
    - HIT contractor that analyzes and reports on information gleaned from claims data

1. Accountable Care Collaborative 2014 Annual Report, Colorado Department of Health Care Policy and Financing
Colorado School of Public Health

Colorado’s Accountable Care Collaborative (ACC)

• Regional Care Collaborative Organizations (RCCOs)
  • Develop a network of providers
  • Support through coaching and information
  • Manage and coordinate care
  • Connect members to non-medical services
  • Report on costs, utilization and outcomes of their population

• Seven regions defined using the Medicaid client’s residence
  • Currently being revised to be based on the PCMP’s location

• Enrollment into the ACC began May 2011
  • Medicaid Clients attributed to a PCMP in the RCCO defaulted into the ACC.
  • Caps were lifted over time and more PCMPs (and their clients) joined.
  • By June 2014 about 58% of Medicaid Clients enrolled

1. Accountable Care Collaborative 2014 Annual Report, Colorado Department of Health Care Policy and Financing
Research Question

- Is the ACC associated with changes in spending?
  - No significant changes in reimbursement
    - FFS reimbursement
    - Bonuses tied to benchmarked levels of
      - ED visits,
      - High-cost imaging (7/11-6/14)
      - Well-child visits (7/12-present), and
      - 30-day readmissions (7/11-6/14)
  - Data analytic support
    - Reports on utilization provided to PCMPs
    - Improved data sharing
  - Emphasis on care-coordination and case management
    - PMPM case management payment to RCCOs and PCMPs
Analysis Sample

ACC enrolled & Control Group of ACC-eligible

• Difference-in-differences analysis by cohort
  • Cohort 1 began FY2011-12
  • Cohort 2 began FY2012-13
  • Cohort 3 began FY2013-14

• Pre-period
  • ≤6 quarters of spending prior to the ACC

• Adjustment period:
  • Exclude data during quarter enrolled & quarter before and after enrollment.

• Post Period
  • Cohort 1: ≤12 Quarters
  • Cohort 2: ≤ 8 Quarter
  • Cohort 3: ≤4 Quarters
Analysis Sample (Continued)

• Unit of analysis: $i =$ Person $t =$quarter

• Unbalanced Sample
  • Individuals cycle on and off Medicaid (Churn)

• Exclusions:
  • Quarters with less than 3 months enrollment
  • People with less than 6 months of continuous enrollment at any time
    • Lagged 3 month CDPS Scores used for risk-adjustment
Quantitative Analysis: Methods

![Diagram showing the analysis process involving different cohorts and outcomes.]

- **Cohort 1:** 6 quarters
  - Cohort 2: 8 quarters
  - Cohort 3: 8 quarters
  - Contemporaneously Matched Control Group

- **All Cohorts:**
  - Exclude 2 quarters
  - Adjustment Period

- **Cohort 1:** 12 quarters
  - Cohort 2: 8 quarters
  - Cohort 3: 4 quarters
  - Contemporaneously Matched Control Group

- **Pre ACC Period Outcome**
- **ACC Enrollment**
- **Post ACC Enrollment Outcome**

**Pre ACC Difference between Cohort and Control Group**

$$\Delta^{Pre} = \frac{Outcome_{Pre}^{ACC} - Outcome_{Pre}^{Control}}{Outcome_{Pre}^{ACC} - Outcome_{Pre}^{Control}}$$

**Post ACC Difference between Cohort and Control Group**

$$\Delta^{Post} = \frac{Outcome_{Post}^{ACC} - Outcome_{Post}^{Control}}{Outcome_{Post}^{ACC} - Outcome_{Post}^{Control}}$$

**Difference in Differences Estimate**

$$\Delta^{Post} - \Delta^{Pre}$$
Controlling for Selection into ACC

- **Enrollment into ACC (Persons enrolled in first year)**
  - Enter ACC by default if attributed to a PCMP who joined a RCCO
  - Could opt-out of ACC back into FFS

- **Attribution Process**
  - Replicated attribution based on prior 12 month E&M visits for all ACC eligible beneficiaries
    - Actual attribution available only for ACC enrollees
    - Common attribution for both ACC and control group
  - Added provider characteristics to “pseudo attributed” providers
    - Controls for selection related to enrollee — primary care relationship (future PCMP)

- **Propensity score weighting**
  - Model probability of ACC enrollment using “pseudo” attributed physician and beneficiary characteristics
    - Provider type, patient language, race, age, CDPS risk-adjustment
  - Weight regressions using \((ATET)\) inverse probability weights
  - Controls for selection on observable characteristics
Propensity score matching and “churn”

- Reference category: Pre-period ACC group
- Compute the inverse probability average treatment effect on the treated (ATET) weights
- Stuart and colleagues (2014)
Variables used in Propensity Score

- **Client characteristics**
  - Age categories
    - Infant, Age 1-4; Age 5-14; 15-24; 25-44; 45-64
  - Gender
  - Chronic Illness and Disability Payment System (CDPS) V6.0 grouper
  - Primary language
    - English, Spanish or other
  - Attributed Practice type
    - Private Clinic, Hospital-based, FQHC, RHC, Peds, OB-GYN, None, or Other
  - Share of prior E&M visits at PCMP’s organization

- **Interacted age, language, and gender to achieve balance and overlap**
  - \(|\text{Standardized differences}| < 0.07\) (0.10 benchmark e.g. Guo and Fraser, 2014)
  - Variance Ratios within 0.9-1.1 benchmark (e.g. Guo and Fraser, 2014)
Propensity Score – Overlap Graph: Pre v. 1-year Post ACC
## Standardized Differences

<table>
<thead>
<tr>
<th>Age Categories</th>
<th>Cohort 1</th>
<th>Cohort 2</th>
<th>Cohort 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unweighted</td>
<td>Weighted</td>
<td>Unweighted</td>
</tr>
<tr>
<td>Infant&lt;1</td>
<td>-0.30</td>
<td>-0.03</td>
<td>-0.06</td>
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<tr>
<td>Aged 1-4</td>
<td>-0.20</td>
<td>0.07</td>
<td>0.12</td>
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<tr>
<td>5-14*Male</td>
<td>-0.08</td>
<td>0.02</td>
<td>0.11</td>
</tr>
<tr>
<td>5-14*Female</td>
<td>-0.06</td>
<td>0.02</td>
<td>0.12</td>
</tr>
<tr>
<td>15-24*Male</td>
<td>-0.12</td>
<td>-0.02</td>
<td>-0.13</td>
</tr>
<tr>
<td>15-24*Female</td>
<td>-0.01</td>
<td>-0.03</td>
<td>-0.14</td>
</tr>
<tr>
<td>25-44*Male</td>
<td>0.18</td>
<td>-0.04</td>
<td>-0.03</td>
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<tr>
<td>25-44*Female</td>
<td>0.37</td>
<td>0.00</td>
<td>-0.12</td>
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<td>45-64*Male</td>
<td>0.09</td>
<td>-0.02</td>
<td>-0.03</td>
</tr>
<tr>
<td>45-64*Female</td>
<td>0.12</td>
<td>-0.02</td>
<td>-0.05</td>
</tr>
<tr>
<td>Male</td>
<td>-0.15</td>
<td>0.00</td>
<td>0.04</td>
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</table>
## Standardized Differences (continued)

<table>
<thead>
<tr>
<th></th>
<th>Cohort 1</th>
<th>Cohort 2</th>
<th>Cohort 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unweighted</td>
<td>Weighted</td>
<td>Unweighted</td>
</tr>
<tr>
<td><strong>Primary Language:</strong></td>
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<td></td>
<td></td>
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<tr>
<td>East and SE Asian</td>
<td>0.00</td>
<td>0.01</td>
<td>-0.02</td>
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<tr>
<td>Spanish</td>
<td>0.10</td>
<td>-0.06</td>
<td>0.28</td>
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<tr>
<td>Middle East South Asia</td>
<td>-0.01</td>
<td>0.01</td>
<td>-0.01</td>
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<tr>
<td>Other</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td><strong>Ethnicity/Race:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td></td>
<td></td>
<td>0.24</td>
</tr>
<tr>
<td>Black</td>
<td>0.00</td>
<td>0.00</td>
<td>0.02</td>
</tr>
<tr>
<td>Other</td>
<td>-0.06</td>
<td>0.04</td>
<td>-0.05</td>
</tr>
<tr>
<td><strong>Attributed Practice Type</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FQHC</td>
<td>-0.06</td>
<td>0.00</td>
<td>0.10</td>
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<tr>
<td>RHC</td>
<td>0.65</td>
<td>-0.08</td>
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<tr>
<td>None</td>
<td>-0.18</td>
<td>0.00</td>
<td>-0.10</td>
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<tr>
<td>Hospital Based</td>
<td>-0.08</td>
<td>0.06</td>
<td>-0.15</td>
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<tr>
<td>Pediatric</td>
<td>-0.05</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>OBGYN</td>
<td>-0.32</td>
<td>0.02</td>
<td>-0.04</td>
</tr>
<tr>
<td>Other</td>
<td>-0.03</td>
<td>0.00</td>
<td>-0.08</td>
</tr>
<tr>
<td>Share Visits at PCMP</td>
<td>0.06</td>
<td>-0.05</td>
<td>0.14</td>
</tr>
</tbody>
</table>
ACC and FSS Trends in Spending by Age Group (GLM)

**Adults**

- **Unadjusted**
- **IPW Regression-Adjusted**

**Cohort 1**

- **Pre-ACC**
- **Post-ACC**

**Children**

- **Unadjusted**
- **IPW Regression-Adjusted**

**Pre-ACC**

- **Post-ACC**

Quarter:
- 2009 Q4
- 2010 Q1
- 2010 Q2
- 2010 Q3
- 2010 Q4
- 2011 Q1
- 2011 Q2
- 2011 Q3
- 2011 Q4
- 2012 Q1
- 2012 Q2
- 2012 Q3
- 2012 Q4
- 2013 Q1
- 2013 Q2
- 2013 Q3
- 2013 Q4
- 2014 Q1
- 2014 Q2
- 2014 Q3
- 2014 Q4
- 2015 Q1
- 2015 Q2
Spending Specification

- IPW-weighted Two-part model
  - Controls for prevalence of $0$ spending (i.e. no utilization)
    - Part 1: Probability of any spending with Logit specification
      - \( \Pr(\text{Spending}_{it}>0|X_{it})=\text{Logit}(X_{it}) \)
  - Part 2: Spending conditional on any spending
    - A. Generalized Linear Model
      - Log-link, Family: Gamma
      - Robust standard errors clustered by PCMP

- Separate specification by cohort
- Adjust for same variables as propensity score
  - Necessary to pass pre-period parallel trends tests
  - Overlap graphs unsatisfactory in year 3 and 4.
### Results: PMPM Spending, Traditional Enrollees

<table>
<thead>
<tr>
<th>Year</th>
<th>Adults</th>
<th>Children</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cohort 1</td>
<td>Cohort 1</td>
</tr>
<tr>
<td>First Year</td>
<td>−38.2**</td>
<td>−17.1***</td>
</tr>
<tr>
<td>Second Year</td>
<td>−56.5**</td>
<td>−40.4***</td>
</tr>
<tr>
<td>Third Year</td>
<td>−51.8**</td>
<td>−29.5***</td>
</tr>
<tr>
<td>Fourth Year</td>
<td>−73.1**</td>
<td>−23.6***</td>
</tr>
</tbody>
</table>
Other findings

• Variation across RCCOs
  – Lower spending on children concentrated in 3-4 RCCOs
  – One RCCO significant reduction in any use (Implications for access?)
  – Other RCCOs had reductions in intensity of spending (More desirable)

• Variation across practice size (preliminary)
  – Smaller practices (2-5 PCMP) Higher intensity (conditional on a visit)
  – Large practices (50+ PCMPs) Higher probability of any use

• Performance on KPIs
  – No significant difference between FFS and ACC
  – No significant difference on other measures

• Why are there differences across RCCOs and Populations?
  – Currently investigating changes by type of service
  – Qualitative findings
Summary and Conclusions

- **Reductions in PMPM spending were sustained over time**
  - First year reduction is smaller
  - Significantly larger in later years
  - Net Savings: Reduction larger than PMPM payments

- **Results are robust to:**
  - Restricted control group (FFS that didn’t enroll before Jan 2014)
  - Different continuous enrollment assumptions
    - One-year

- **Why are there differences across RCCOs and Populations?**
  - Any utilization vs. intensity of utilization
  - Spending by type of service