Financial Incentives and the Delivery of Low- and High-Value Care

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Disclosures

- No conflicts of interest

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  - National Institute of General Medical Sciences / Advance-CTR
Outline

- Cost-sharing elimination and breast cancer screening
- Insurance enrollment and low-value care
Elimination of Cost Sharing for Screening Mammography in Medicare Advantage Plans

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The Affordable Care Act (ACA) required most insurers and the Medicare program to eliminate cost sharing for screening mammography.

We conducted a difference-in-differences study of biennial screening mammography among 15,085 women 65 to 74 years of age in 24 Medicare Advantage plans that eliminated cost sharing to provide full coverage for screening mammography, as compared with 52,035 women in 48 matched control plans that had and maintained full coverage.
### Table 1. Characteristics of the Study Sample.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Intervention Plans</th>
<th>Control Plans</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of unique enrollees</td>
<td>15,085</td>
<td>52,035</td>
</tr>
<tr>
<td>No. of observations</td>
<td>16,202</td>
<td>61,164</td>
</tr>
<tr>
<td>Age (yr)</td>
<td>67.6±1.2</td>
<td>67.8±1.2</td>
</tr>
<tr>
<td>Race or ethnic group (%)†</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>81</td>
<td>80</td>
</tr>
<tr>
<td>Black</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>Hispanic</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>ZIP Code–level characteristics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Completed high school (%)‡</td>
<td>86</td>
<td>87</td>
</tr>
<tr>
<td>Below poverty level (%)§</td>
<td>16</td>
<td>15</td>
</tr>
</tbody>
</table>
# Table 2. Changes in Adjusted Rates of Biennial Screening for Breast Cancer.

<table>
<thead>
<tr>
<th>Plans</th>
<th>No. of Plans</th>
<th>No. of Observations</th>
<th>Rate of Screening (95% CI)</th>
<th>Difference in Differences (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>2-Yr Period before Cost-Sharing Elimination</td>
<td>2-Yr Period after Cost-Sharing Elimination</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>percent</td>
<td>percentage points</td>
</tr>
<tr>
<td>All plans</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intervention plans</td>
<td>24</td>
<td>15,841</td>
<td>59.9 (54.9 to 65.0)</td>
<td>65.4 (61.8 to 69.0)</td>
</tr>
<tr>
<td>Control plans</td>
<td>48</td>
<td>60,119</td>
<td>73.1 (69.2 to 77.0)</td>
<td>72.8 (69.7 to 76.0)</td>
</tr>
<tr>
<td>Eliminated cost sharing in 2009</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intervention plans</td>
<td>17</td>
<td>13,265</td>
<td>57.5 (52.3 to 62.6)</td>
<td>62.9 (59.3 to 66.5)</td>
</tr>
<tr>
<td>Control plans</td>
<td>34</td>
<td>30,020</td>
<td>70.4 (67.5 to 73.3)</td>
<td>70.3 (67.7 to 73.0)</td>
</tr>
<tr>
<td>Eliminated cost sharing in 2010</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intervention plans</td>
<td>4</td>
<td>1,696</td>
<td>63.3 (55.1 to 71.5)</td>
<td>68.2 (62.3 to 74.0)</td>
</tr>
<tr>
<td>Control plans</td>
<td>8</td>
<td>11,370</td>
<td>73.5 (67.8 to 79.2)</td>
<td>71.6 (66.4 to 76.8)</td>
</tr>
<tr>
<td>Eliminated cost sharing in 2011</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intervention plans</td>
<td>3</td>
<td>880</td>
<td>55.2 (47.5 to 62.9)</td>
<td>66.4 (64.1 to 68.7)</td>
</tr>
<tr>
<td>Control plans</td>
<td>6</td>
<td>18,729</td>
<td>72.3 (66.5 to 78.4)</td>
<td>77.7 (74.1 to 81.3)</td>
</tr>
</tbody>
</table>
Figure 1. Trends in Adjusted Rates of Biennial Screening Mammography in Intervention and Control Plans.

Intervention plans were 24 Medicare Advantage plans that eliminated cost sharing for mammography, and control plans were 48 matched Medicare Advantage plans that maintained full coverage of mammography.
Figure 2. Adjusted Difference-in-Differences Estimates for Rates of Biennial Screening Mammography across 24 Matched Groups of Intervention and Control Plans.
A Multifactorial Problem

Use of Low-Value Care

1. Rapid technological advances
   2. Abundance of options without a well-developed evidence-base

1. Patient behavior
   2. May opt to receive services that are unnecessary but available and cost-subsidized

Financial incentives
   Capitated payments vs. fee-for-service

Insurance coverage
   Policies that subsidize low-value care

1. Clinician behaviors
   2. Delayed or no adaptation of evidence-based practices
Combating Low-Value Care in RI

- **Choosing Wisely® State**
  - endorsed by the RI Business Group on Health;
  - implementation initiatives

- Gubernatorial Proclamation by the Governor
Low-Value Care in RI

- National-level analyses demonstrate substantial geographical variation in the use of low-value care across the U.S.

- In these analyses, Rhode Island (RI) stands out as one of the states with the second highest rates of low-value care.
Prevalence of Low-Value Care

Variation in the composite measure of Choosing Wisely test and treatment use, 2006-2011
(N = 306 hospital referral regions)
Our Focus: Financial Incentives

- Commercial insurers pay higher prices for healthcare services compared to public insurers (e.g. Medicare, Medicaid)

- Providers may be inclined to perform more services (including low-value care) to enrollees in commercial plans.

- Important implications arise for the sustainability of both public and private health insurance programs –
Why Focus on Medicaid?

- Medicaid, which is the largest public health insurer in the country covering 77 million people in 2017.

- In RI, the state government’s Medicaid expenditures exceed $2.3 billion.

- (also practical reasons re: data availability)
Aims

1. Determine the association between insurance type and low-value care in RI

   Hypothesis: Enrollment in commercial insurers will be associated with higher rates of low-value care.

2. Develop a predictive algorithm to identify the provision of low-value care

   Outcome: Patient, provider, and payer characteristics predict a provider’s probability to deliver low-value care.
RI APCD ("HealthFacts RI")

- Mandated by state legislation

- Jointly managed by
  - state’s Executive Office of Health and Human Services
  - Department of Health
  - Office of the Health Insurance Commissioner
  - HealthSource RI
RI APCD ("HealthFacts RI")

- Large-scale, administrative database of de-identified healthcare claims, enrollment, and provider data from health insurers with more than 3,000 members.

- Data for >1 million enrollees in
  - traditional Medicare
  - Medicare Advantage (MA)
  - Medicaid
  - 9 largest commercial health insurers in RI
  - between 2011 and 2015
Available Data

- Type of insurance and contract
- Patient demographics (gender, age, ZIP code)
- Diagnoses
- Procedures
- Medications (NDCs)
- Service provider
- Prescribing physician
- Health plan payments
- Member payment responsibility
- Type and dates of bill paid
- Facility type
- Revenue codes
- Service dates
Claims Data are “Big Data”

- Claims data are large, complex, multilevel (patients, providers, payers, healthcare systems), longitudinal, high-dimensional with non-linear relationships.

- Relationships may **not be identifiable** with traditional methods given that their parametric constraints fail to fully account for the size and complex structure of such data.
Indicators of Low-Value Care

1. imaging for nonspecific low-back pain (LBP)
2. head imaging for uncomplicated headache
3. head imaging for syncope
4. imaging for plantar fasciitis
5. triiodothyronine tests for hypothyroidism
6. preoperative chest radiography
7. abdomen CT combined studies
8. simultaneous brain & sinus CT
9. CT for uncomplicated acute rhinosinusitis;
10. arthroscopic surgery for knee osteoarthritis
11. thorax CT combined studies
12. preoperative echocardiography
13. spinal injections for LBP
14. preoperative stress testing;
15. electroencephalogram headache
16. cervical cancer screening for women aged >65 years
17. colorectal cancer screening for older elderly patients
18. prostate-specific antigen (PSA) testing for men aged >75 years
Expected Outcomes – Aim 1

- **Outcomes**
  - association between insurance type and low-value care
  - understand how financial incentives and insurance characteristics affect low-value care

- **Rationale & Implications**
  - inform the development of much-needed strategies to reduce low-value care in RI
  - Inform the design of novel policies and payment models aimed at reducing low-value care (e.g. value-based insurance design)
Expected Outcomes – Aim 2

- **Outcomes**
  - algorithm that identifies providers who have high probabilities of delivering low value care

- **Rationale & Implications**
  - payers: influence, through incentives or selective contracting, the behaviors of providers who deliver low-value services
  - patients: select physicians that meet their needs (e.g. low rates of low-value care)
Approach: Ensemble Super Learner

- Multiple *machine learning algorithms* that learn adaptively from the data
  - random forests, classification and regression trees (CART), least absolute shrinkage and selection operator (LASSO), generalized boosted regression, support vector machines, and others

- Fewer model assumptions (nonparametric); flexibility to capture complex interactions
Collaborators

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Director, Center for Evidence Synthesis in Health

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Thank you!