Prescription drug spending and medication adherence in a national heart failure sample

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Background
- Heart failure (HF) is a common cause of hospitalization in the U.S. and costs $30 billion annually.1,2
- Survival depends on adherence to a complex daily regimen of prescription medications
- The cost of prescription drugs can pose a barrier to adherence, even with health insurance
- Medicare Part D plans, which offer prescription coverage to seniors and the disabled, require cost-sharing (i.e., deductible and co-pays)

Methods
- Secondary analysis of data from the Medicare Current Beneficiary Survey (MCBS), a nationally representative sample of Medicare beneficiaries
- MCBS comprises health and financial questionnaires linked to claims data from the Centers for Medicare & Medicaid Services
- <11,000 participants enter survey each year and are interviewed three times yearly for 4 years
- Multistage, clustered, stratified sample design with sampling weights for parameter estimation
- Variances were estimated with Taylor-Series linearization to account for complex design
- Data from 2010-12 were pooled and weighted averages of sampling weights were applied

Results
Table 1. Bivariate associations between non-adherence and average patient spending on a 30-day supply, community-dwelling Medicare Part D enrollees with heart failure, 2010-12 (n=5834)*

<table>
<thead>
<tr>
<th>% of monthly income* spent</th>
<th>Unadjusted odds ratio (MPR &lt; .8)</th>
<th>95% Wald confidence limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>On ACE inhibitor</td>
<td>1.054</td>
<td>0.548 – 2.027</td>
</tr>
<tr>
<td>On ARB</td>
<td>1.000</td>
<td>0.769 – 1.301</td>
</tr>
</tbody>
</table>

Table 2. Logistic regression of non-adherence to β-blocker, community-dwelling Medicare Part D enrollees with heart failure, 2010-12 (n=5834)*

<table>
<thead>
<tr>
<th>% of monthly income spent on β-blocker</th>
<th>Adjusted odds ratio</th>
<th>95% Wald confidence limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.8</td>
<td>1.434</td>
<td>1.038 – 2.029</td>
</tr>
</tbody>
</table>

Summary and Conclusions
- Despite some prescription drug coverage, this national sample may have faced a financial barrier to optimal HF therapy.
- Odds of β-blocker non-adherence were elevated as percent of income spent on β-blocker prescription rose.
- Finding was robust to adjusting for effects of age, race, and diabetes comorbidity.
- Notable because HF burdens the health care system and β-blocker use prevents hospitalization.
- Next steps are to evaluate hospitalization for HF and address time dimension with a serial cross-sectional approach.

References

Acknowledgments
- Rebecca A. Gary, PhD, RN, Javed Butler, MD, PhD, Melinda Higgins, PhD, David Howard, PhD, and Virginia Phillips, DPh.
- Technical advisors and colleagues at the Research Data Assistance Center (ResDAC), the Centers for Medicare & Medicaid Services, and the Kaiser Family Foundation
- Emory University Laney Graduate School’s Professional Development Support funds

Figure 1. Standard Medicare prescription drug benefit, 2017*

Figure 2. Beneficial moral hazard
- Rationale for cost-sharing is the conventional model of moral hazard: health insurance → lower prices → excess health care consumption
- Alternative model of "beneficial moral hazard": under-consumption of high-value services is impossible

Figure 3. Multi-stage sampling design
- Percent of average monthly income spent on an average 30-day supply of each HF drug served as a proxy for cost-sharing
- Adherence was measured by the medication possession ratio (MPR): total days supplied for all but the last refill divided by number of days between the first and last refill
- MPR can range from 0 (perfectly non-adherent) to 1 (perfectly adherent) – .8 is a common cutoff
- Spending and adherence were estimated separately for β-blockers, angiotensin-converting enzyme (ACE) inhibitors, and angiotensin receptor blockers (ARBs)
- Switching drugs within a class infras MPR estimate and led to exclusion
- Facility-dwelling patients and Low-Income Subsidy recipients were excluded due to negligible impact of co-pays and deductibles on behavior

Figure 4. Sample selection
- 60,559 were enrolled in a Part D plan every month of survey year
- 10.0% lived in the community (not a facility) for entire year
- 1.44% (892) had congestive heart failure on survey
- Another 492 were identified in the Medicare claims records
- 46.67% did not receive the Low-Income Subsidy (LIS) for Part D
- Strayed on same drug within class and had ≥18 during year
- ACE inhibitor n = 447, ARB n = 182, and β-blocker n = 100