

Adherence to Medications for the Treatment of Congestive Heart Failure and Its Association with Health Care Expenditures

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Background

- Congestive heart failure (CHF) affects 2.6% of all Medicaid beneficiaries and 10.7% of dual eligibles
- Medication adherence plays a key role in managing CHF
- CHF is a target for disease management and medication therapy management programs
- Few studies have examined CHF drug use within the Medicaid population

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Research Objectives

- Determine the proportion of Medicaid beneficiaries with CHF drug fills
- Estimate CHF medication adherence rates among beneficiaries with at least one fill
- Examine association of CHF drug adherence with utilization and total health care costs

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Data

- 1998 State Medicaid Research Files (SMRF)
 - Used to identify beneficiaries with a CHF diagnosis
- 1999 Medicaid Analytic eXtract (MAX) files
 - Provided information on diagnoses, drug use, and Medicaid-covered services and expenditures
- 1999 Medicare Standard Analytic File (SAF)
 - Provided information on Medicare-covered services and expenditures

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Inclusion/Exclusion Criteria

- 45,572 beneficiaries in four states: AR, CA, IN, and NJ
- Continuously enrolled in Medicaid fee-for-service 1998-1999 or until death
- Diagnosed with CHF in either:
 - One inpatient stay, or
 - Two or more ambulatory care visits
- Excludes beneficiaries with any nursing home stays

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Outcome Measures

- CHF drug fills
 - Receipt of any CHF prescriptions
 - Adherence levels
- Health care costs (Medicare and Medicaid)
 - Total (excluding and including drug costs), prescription drug, inpatient, outpatient, and other medical services
- Health care utilization
 - Inpatient hospitalizations
 - Emergency department

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Measuring Adherence

- **Medication Possession Ratio (MPR)**
Ratio of total days supply to number of days between index prescription and last prescription date
- **Medication persistence**
Number of days of continuous drug use per month

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Statistical Methods

- **Drug fills**
 - Logit models to predict any CHF prescriptions filled
 - OLS models to identify predictors of CHF drug adherence
- **Health care costs**
 - Generalized linear model for cost data with no non-zero values
 - Two-stage model for skewed data with many zero values
- **Health care utilization**
 - Logit models for inpatient admission or emergency room visit
 - OLS used for admissions, ER visits, and hospital days

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Findings on CHF Drug Fills

- 85% of patients had at least one CHF drug claim
- Those with at least one prescription filled, on average, 1.4 prescriptions per month
- Likelihood of filling a prescription was lower for:
 - Individuals aged 64 and younger
 - African Americans
 - Males
 - Individuals with health comorbidities

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Findings on CHF Drug Adherence

- Median adherence values were higher than the means, indicating outliers with significantly lower adherence
 - MPR: median = 82.8% and mean = 71.9%
 - Persistence: median = 28.6 days and mean = 24.8 days
- Adherence rates were lower for:
 - Individuals aged 64 and younger
 - African Americans
 - Males
 - Individuals with health comorbidities

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Non-Adherent Patients Had Higher Levels of Health Care Utilization in the Year

Utilization Measures	Non-Adherent	Adherent	Difference (* p < 0.01)
Any Hospitalization	47.9%	47.5%	0.4*
Number of Hospitalizations	1.6	1.4	0.2*
Number of Inpatient Days	8.0	5.9	2.1*
Any ER Visit	45.1%	43.7%	1.4*
Number of ER Visits	4.0	3.6	0.4*

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Non-Adherent Patients Had Higher Health Care Costs in the Year

Cost Measures	Non-Adherent	Adherent	Difference (* p < 0.01)
Total: Including Drugs	\$25,312	\$19,402	\$5,910*
Total: Excluding Drugs	\$23,101	\$16,338	\$6,763*
Drugs	\$2,322	\$3,516	-\$1,194*
Inpatient	\$10,686	\$7,809	\$2,877*
Outpatient	\$9,267	\$7,766	\$1,501*
Other	\$1,347	\$1,313	\$34

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Health Care Costs Have a Graded Association with Drug Adherence

Adherence Level	Total Costs	Total Costs (excluding drugs)
99% or more (comparison group)	\$16,989	\$13,691
95% to 99%	\$18,141*	\$14,733*
80% to 95%	\$20,730*	\$17,675*
50% to 80%	\$24,350*	\$21,768*
Less than 50%	\$36,486*	\$24,349*

13 * Predicted costs are significantly larger than the predicted costs of the group with adherence of 99% or more at $p < 0.01$ using a two-tailed t-test. 

Conclusions and Policy Implications

- The association of adherence to health care utilization was small but significant
- CHF drug adherence is associated with lower health care costs among Medicaid beneficiaries
- Even small changes in the level of adherence could significantly affect health care spending
- State Medicaid agencies and Medicare prescription drug plans should consider developing targeted interventions to improve adherence with CHF drugs

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