

Medical Cost Offsets from Prescription Drug Utilization Among Medicare Beneficiaries

M. Christopher Roebuck, PhD, MBA

SUMMARY

This brief commentary extends earlier work on the value of adherence to derive medical cost offset estimates from prescription drug utilization. Among seniors with chronic vascular disease, 1% increases in condition-specific medication use were associated with significant ($P < 0.001$) reductions in gross nonpharmacy medical costs in the amounts of 0.63% for dyslipidemia, 0.77% for congestive heart failure, 0.83% for diabetes, and 1.17% for hypertension.

J Manag Care Pharm. 2014;20(10):994-95

Copyright © 2014, Academy of Managed Care Pharmacy. All rights reserved.

In November 2012, the Congressional Budget Office (CBO) changed its methodology for estimating the financial impact of legislation affecting prescription drug utilization among Medicare beneficiaries. The CBO now assumes that a 1% increase in the number of prescriptions filled prompts a 0.20% decrease in spending on other medical services, such as emergency department visits and hospitalizations.¹ This literature-based assumption applies to the use of all prescription drugs by the general Medicare population. Greater medical cost savings may be realized from specific pharmacotherapy, such as that for chronic disease management. And, the growing body of evidence on the value of medication adherence may serve as an additional source of medical cost offset estimates.

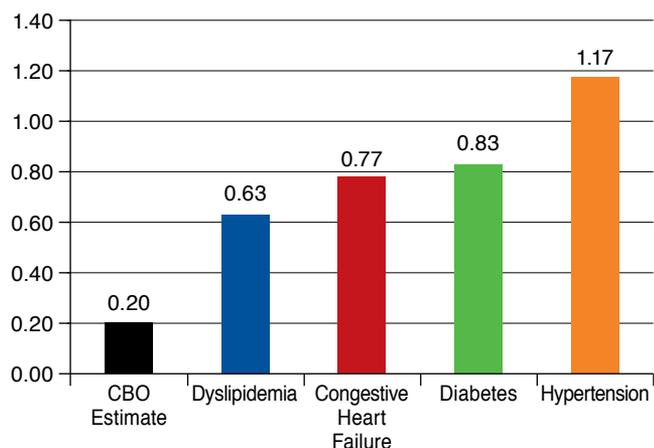
With about half of patients not taking their medications as directed, avoidable adverse health events and use of medical services are estimated to add up to \$290 billion in U.S. health care expenditures annually.² Improvements in clinical and economic outcomes from medication adherence have been demonstrated across a variety of conditions and patient cohorts. As an example, in 2011 my colleagues and I (Roebuck et al.) determined that adherence to medication for chronic vascular disease was associated with fewer inpatient hospital days and emergency department visits and lower overall health care costs.³ Specifically, annual net savings in health care expenditures for an adherent (compared to nonadherent) elderly beneficiary were estimated to be \$7,893 for congestive heart failure, \$5,824 for hypertension, \$5,170 for diabetes, and \$1,847 for dyslipidemia—or approximately 9% to 28% of total health care costs. This research employed a rigorous observational study design that addressed a key concern and limitation of prior analyses—the potential endogeneity (confounding) of adherence. More plainly, results reported in earlier publica-

tions may have been biased if patients who took medications as directed also engaged in other unmeasured healthy behaviors (i.e., the “healthy adherer effect”).

In this brief commentary, I extended our earlier work by estimating the impact of condition-specific prescription drug use on nonpharmacy medical spending among seniors with chronic vascular disease. I analyzed the subset of data from Roebuck et al.³ on elderly individuals (aged ≥ 65 years) who were continuously enrolled in employer-sponsored insurance during the study period (January 1, 2005, through June 30, 2008) and were diagnosed with and on pharmacotherapy for 1 or more of 4 chronic vascular diseases: congestive heart failure ($n = 8,080$), hypertension ($n = 53,859$), diabetes ($n = 19,035$), and dyslipidemia ($n = 22,813$). Gross medical (excluding pharmacy) spending was based on claims and included payments made by the member, plan sponsor, and any supplemental payers including Medicare. Prescription drug utilization was measured using the number of days of medication supply on hand for each condition.

As employed in the 2011 study, condition-specific linear fixed effects models of nonpharmacy medical spending were estimated as a function of prescription drug utilization, health status as measured by the Charlson Comorbidity Index,⁴ and year indicators. To account for nonlinear relationships between prescription drug utilization and nonpharmacy medical costs, days' supply and days' supply-squared were entered into the equations. Ramsey's (1969) RESET test results supported this choice of functional form.⁵ To be comparable with the CBO's reported metric—the percentage change in nonpharmacy medical costs associated with a percentage change in prescription drug utilization—marginal effects of prescription drug utilization in each of the chronic conditions were calculated as elasticities. As noted earlier, the linear fixed effects modeling approach used represents an improvement over cross-sectional analysis because it controls for potential unobserved confounders as long as they do not vary over time. For example, if adherent individuals also routinely exercise, then not including this attribute in the models would not lead to biased coefficient estimates for medication adherence. Despite the strengths of this method, however, one still cannot strictly infer causality, since unmeasured characteristics that do vary over time remain potential confounders. A complete description of the econometrics employed is published online as a technical appendix to Roebuck et al.³

FIGURE 1 Percentage Decreases in Medical Costs Associated with a 1% Increase in Prescription Drug Utilization Among Seniors



CBO = Congressional Budget Office.

Figure 1 presents the new findings and includes the CBO estimate for reference. Specifically, 1% increases in condition-specific prescription drug utilization were significantly ($P < 0.001$) associated with reductions in seniors' gross nonpharmacy medical costs in the amounts of 0.63% for dyslipidemia, 0.77% for congestive heart failure, 0.83% for diabetes, and 1.17% for hypertension. These results demonstrate that medical cost offsets from prescription drug utilization likely vary by chronic condition and that impacts for therapeutic classes used to treat these 4 conditions—which represent 40% of Medicare Part D utilization—may be between 3 and 6 times greater than the CBO's assumption.⁶ In dollar terms, these relative impacts are not trivial. For example, 53% of Medicare (fee-for-service) beneficiaries have the comorbidity combination of hypertension plus high cholesterol—with average annual medical costs of \$13,825.⁶ The current findings suggest that a 5% increase in the use of antihypertensive medication by patients with those 2 conditions may prompt reductions in medical (Parts A and B) costs of more than \$800 annually per beneficiary.

The present analysis examined retirees with employer-sponsored insurance in addition to Medicare. To the extent that these individuals differed from the broader Medicare population, the generalizability of study findings may be limited. More research is needed to improve upon these results and derive a

comprehensive set of condition-specific medical cost offset estimates from prescription drug utilization. Future studies should include populations not only in Medicare, but also in Medicaid, Veteran Affairs, and private insurance—recognizing that use of pharmaceuticals will likely differ by demographic, socioeconomic, and health-related characteristics. This work will better equip policymakers to design, evaluate, and implement programs that optimize prescription drug utilization and minimize overall health care costs.

Author

M. CHRISTOPHER ROEBUCK, PhD, MBA, is President and CEO, RxEconomics LLC, Hunt Valley, Maryland.

AUTHOR CORRESPONDENCE: M. Christopher Roebuck, PhD, MBA, 11350 McCormick Rd., Executive Plaza II, Ste. 705, Hunt Valley, MD 21031. Tel.: 410.215.8380; E-mail: mcr@rxconomics.com.

DISCLOSURES

Funding for this study was provided by the Pharmaceutical Research and Manufacturers of America.

REFERENCES

1. Congressional Budget Office. Offsetting effects of prescription drug use on Medicare's spending for medical services. November 2012. Available at: <http://www.cbo.gov/sites/default/files/cbofiles/attachments/43741-Medical-Offsets-11-29-12.pdf>. Accessed August 4, 2014.
2. New England Healthcare Institute. Thinking outside the pillbox: a system-wide approach to improving patient medication adherence for chronic disease. A NEHI Research Brief. August 2009. Available at: http://www.nehi.net/writable/publication_files/file/pa_issue_brief_final.pdf. Accessed August 4, 2014.
3. Roebuck MC, Liberman JN, Gemmill-Toyama M, Brennan TA. Medication adherence leads to lower health care use and costs despite increased drug spending. *Health Aff (Millwood)*. 2011;30(1):91-99. Appendix is available at: http://content.healthaffairs.org/content/suppl/2011/01/05/30.1.91.DC1/2009-1087_Roebuck_Appendix.pdf. Accessed August 18, 2014.
4. Charlson ME, Pompei P, Ales KL, MacKenzie CR. A new method of classifying prognostic comorbidity in longitudinal studies: development and validation. *J Chronic Dis*. 1987;40(5):373-83.
5. Ramsey JB. Tests for specification errors in classical linear least-squares regression analysis. *J Royal Stat Soc. Series B (Methodological)*. 1969;31(2):350-71. Available at: <http://cooley.libarts.wsu.edu/soc521/ramsey.pdf>. Accessed August 4, 2014.
6. Centers for Medicare & Medicaid Services. Chronic conditions warehouse report. Released May 5, 2011. Available at: <http://www.ccwdata.org/web/guest/home>. Accessed August 4, 2014.