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Patient characteristics and healthcare utilization patterns associated with unused medications among medicare patients

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ABSTRACT

Objective: To examine what patient characteristics and healthcare utilization patterns are associated with the likelihood of having unused medications among elderly Medicare patients.

Design: Secondary data analysis combining insurance claims and phone survey data of Medicare Advantage members.

Setting: Regional health plan in Central Pennsylvania.

Participants: 528 Medicare Advantage members (age 65 and older), who had Medicare Part D coverage through Geisinger Health Plan as of December 31, 2013, and completed the phone survey in May of 2014.

Main outcome: Member survey response indicating whether or not the member had any unused medication at the time of the survey.

Results: 27% of the patients in the sample (142 out of 528) indicated having one or more unused medications. In a bivariate analysis, these patients had higher prevalence of chronic conditions, utilized more medical care (more emergency department visits and physician office visits), and incurred higher cost of care. In a multivariate analysis, patients who received medications with days' supply greater than 30 (odds ratio (OR) = 1.59; $p = 0.03$) and utilized more acute care (defined as inpatient admissions or emergency department visits) (OR = 4.2; $p = 0.04$) were more likely to have unused medications. Moreover, patients who were advised by health care professionals about proper medication disposal were less likely to have unused medications (OR = 0.52; $p = 0.04$).

Conclusion: These findings suggest potential ways to develop effective strategies to reduce amounts of unused medications. Such strategies are likely to involve limiting quantities of medications dispensed at each fill, and patient education on proper disposal of unused medications, particularly during care transitions.

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1. Introduction

Reliance on prescription medications to treat health conditions in the United States has intensified in recent years, as indicated by a study that reported an increase in overall use of prescription medications among adults in the United States.¹ Comparing medication use over a 12 year period from 1999 to 2011, the proportion of adults in United States using any prescription medications rose from 51% to 59%, while prevalence of polypharmacy (use of five or more prescription medications) also rose from estimated

8%–15% during the same period. Interestingly, these increases seem to have persisted even after accounting for changes in the age distribution of the population.

Such an increased use of prescription medications implies, among others, the possibility that more prescription medications may be left unused by patients. For various reasons, patients often fail to take all of the medications that were prescribed to them, and the unused portions are usually kept in patients' homes or inappropriately disposed.^{2–4} A recent study found the most common prescription medications left unused by patients include medications for pain, hypertension, and antibiotics; some of these medications are controlled substances.⁵ The study also reports that the reasons for having unused medications vary by the type of medication – e.g., for pain medications, adverse side effects and over-prescribing were the most commonly cited reasons; for

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hypertension medications, “Dosage Changed by Doctor” was the most common.⁵

These findings suggest that a lack of patient adherence alone does not explain unused medications and more information is needed to better understand how and why some patients end up with unused medications. As such, the aim of this study is to empirically identify patient characteristics and healthcare utilization patterns that are associated with patients' likelihood of having unused medications. More specifically, this study examines what patient demographics and health profile (e.g., age, gender, and chronic conditions) and what patterns of healthcare utilization (e.g., number of filled scripts, days' supply, frequency of physician office visits, acute care use, and cost of care) are significantly correlated with patients' likelihood of having any unused medication. In addition, this study explores whether patients' awareness of having any unused medication issues also correlated with their likelihood of having any unused medication. Findings from this study may provide useful insights into designing effective strategies to reduce the presence of unused medications in the home.

2. Data

This study has been reviewed and approved by Geisinger Health System's Institutional Review Board as a research project involving human subjects. This study focuses on Geisinger Health Plan (GHP) Medicare Advantage members 65 years of age or older, because elderly Medicare beneficiaries typically have higher prescription medication utilization than younger population⁶ and thus more likely to have unused medications. GHP is a regional health plan that in 2015 had more than 540,000 total members and more than 87,000 Medicare Advantage members, with the majority of its membership residing in Central Pennsylvania. Reflecting the demographic composition in GHP's service area, this study does not consider race and ethnicity because GHP members are predominantly white Caucasian (>90%).

This study uses detailed health plan claims information augmented by patient phone survey data. The survey data contain information that is not typically available in health plan claims data, such as whether or not the patient had any unused portion of their prescription medications, how much was left unused, and why it was unused. The survey data also contain information about each member's awareness of unused medication issues. For more detailed information about the survey, refer to the previously published article that contains the full survey instrument.⁵

The study sample included GHP Medicare Advantage members 65 years of age or older with prescription drug coverage as of December 31, 2013. A random sample of 2000 members was drawn from this population, and the corresponding home addresses and phone numbers were obtained from GHP's member profile database. In addition, the corresponding GHP claims (including both medical and pharmacy) data for the calendar year of 2013 were also obtained. Each of the 2000 randomly selected members was sent a pre-notification letter ten days prior to the first call attempt. No financial incentive was offered for completing the survey. The first call was made on February 26, 2014 and the last call was made on May 19, 2014. The average length of interview was 6 min and 36 s.

Based on the available budget and the length of the survey, the target number of completed surveys was 700. Because GHP Medicare Advantage members often use multiple medications in a given period, the maximum number of unique medications (as identified by the generic name) that a survey could address per respondent was set to seven. Therefore, in cases where a member had seven or more medications in their claims data, seven drugs were randomly selected and included in the survey.

As shown in Table 1, out of the 2000 potential responders, 375

Table 1
Survey response calculation.

Response rate components	Subtotal/ Count
A. Total number of randomly selected phone numbers	2,000
B. Excluded from response rate calculation	428
Not attempted	53
Excluded because of known ineligibility:	
Non-working phone numbers	260
Nursing home and commercial	75
Prescription not handled by member	40
C. Total number of non-response	851
Non-response for unknown reason	124
Non-response for known reason:	
Refusal after introduction	416
Deceased or other illness	155
Respondent not available	156
D. Completed survey	721
E. Total number of eligible respondents (A–B or C + D)	1572
Response rate (D/E):	46%

were excluded because of known ineligible for the survey. The reasons for ineligibility included disconnected or commercial phone numbers, others handling their prescription medications (and thus presumably unable to provide information about what medications were left unused), and living in nursing homes (because nursing home residents often do not handle their own medications). In addition, 727 were considered non-responders due to known refusal and 124 due to unknown reasons. Finally, 53 phone numbers were never attempted, yielding a response rate of 46%.

Out of the completed 721 survey respondents, 23 did not confirm having taken or currently taking at least one of the medications that were identified and selected from their GHP claims data for the survey. These respondents were excluded from the final sample because the accuracy of their claims data and their corresponding responses could not be verified. Furthermore, 36 respondents had been enrolled in GHP Medicare Advantage plans for less than six months during 2013. These respondents were also excluded from the final sample because the available claims data for these respondents were assumed to be not representative of their total yearly healthcare utilization in 2013. Lastly, 134 respondents were excluded because they had missing or invalid responses to the questions relevant to this analysis. Therefore, excluding these two groups of respondents, the final analytic sample included 528 respondents.

The survey data showed that 142 out of the 528 respondents, or 27%, indicated having one or more prescription medications that were left unused. These respondents were then compared against the remaining 386 respondents who did not report having any unused portions of the prescription medications that were identified from their claims data and discussed in the survey. These two groups of patients were compared in terms of selected key explanatory variables that captured respondents' patient characteristics, health profile, healthcare utilization patterns, and awareness of unused medication issues.

GHP claims data was used to inform patient demographic and health conditions, such as age, gender, and comorbidity (i.e., presence and count of up to nine selected chronic conditions, as identified by available diagnosis codes in the claims data – chronic kidney disease, diabetes, asthma, congestive heart failure, coronary artery disease, chronic obstructive pulmonary disease, hypertension, cancer, and depression). In addition, information on whether each respondent's primary care provider (PCP) site was considered a patient-centered medical home during the study period as well as

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