Estimating the Use of Potentially Inappropriate Medications Among Older Adults in the United States

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OBJECTIVES: Inappropriate prescribing of medications is common in health care, and is an important safety concern, especially for older adults, who have a high burden of comorbidity and are at greater risk for medication-related adverse events. This study aims to estimate the extent and cost of potentially inappropriate prescribing of medications to older adults in the United States.

DESIGN: A cross-sectional study.

SETTING: Medicare Part D Prescription Drug Program data set (2014–2018).

PARTICIPANTS: Older adults who were enrolled in Medicare Part D Prescription Drug Program between 2014 and 2018.

MEASUREMENTS: Potentially inappropriate medications were identified using the 2019 American Geriatrics Society Beers Criteria®.

RESULTS: In 2018, 7.3 billion doses of potentially inappropriate medications were dispensed. The most common medications by number of doses dispensed were proton pump inhibitors, benzodiazepines, and tricyclic antidepressants, and the top five unique medications by reported spending were dexlansoprazole, esomeprazole, omeprazole, dronedarone, and conjugated estrogens. From 2014 to 2018, 43 billion doses of potentially inappropriate medications were dispensed, with a reported spending of $25.2 billion.

CONCLUSION: Potentially inappropriate medication use among older adults is both common and costly. Careful attention to potentially inappropriate medication use and deprescribing when clinically appropriate could reduce costs and potentially improve outcomes among older adults. **J Am Geriatr Soc 68:2927-2930, 2020.**

Keywords: potentially inappropriate prescribing; older adults; Medicare Part D

INTRODUCTION

Inappropriate prescribing of medications is common, especially among older adults.[1-3] Due in part to high rates of polypharmacy and medical comorbidity, older age is one of the strongest risk factors for medication-related adverse events.[1] We sought to estimate the extent and cost of potentially inappropriate prescribing of medications to older adults in the United States.

METHODS

We conducted a cross-sectional study using the Medicare Part D Prescription Drug Program data set (2014–2018).[4,5] The data set includes information for Medicare beneficiaries enrolled in Part D, which represents about 70% of Medicare beneficiaries.[4,5]

To identify potentially inappropriate medications, we reviewed the 2019 American Geriatrics Society (AGS) Beers Criteria®, a commonly used resource to identify potentially inappropriate medications among adults older than 65 years (Supplementary Appendix S1).[1] Each medication has an accompanying evaluation of the level of evidence (low to high) and the strength of the recommendation (weak to strong). We included medication classes with high-quality evidence and a strong recommendation (i.e., proton pump inhibitors (PPIs), tricyclic antidepressants, sulfonylureas, estrogen-containing medications, antiarrhythmics, somatotropin, and barbiturates; Supplementary Table S1). We also included benzodiazepines, which carried a strong recommendation but "moderate-quality" evidence because it is well established that these medications are

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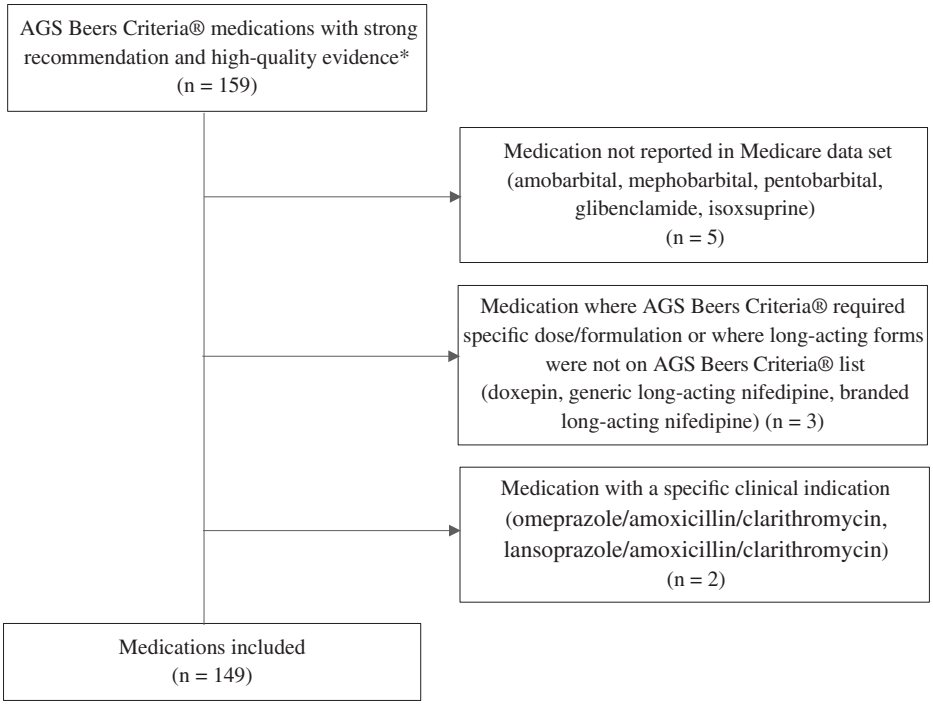

Figure 1. Study flow diagram. *We also included benzodiazepines. Note that only estrogens that were oral and/or patch were included, as per the American Geriatrics Society (AGS) Beers Criteria®, with the exception of Premarin (conjugated estrogens) and Estradiol (estradiol), which come in multiple formulations (e.g., tablet, injection, transdermal, vaginal cream, and vaginal tablet), and were included as this data set does not stratify results by formulation.

associated with an increased risk of falls, which is the leading cause of injury-related death among older adults (Figure 1). We calculated descriptive statistics using R version 3.4.2.

RESULTS

In 2018, 7.3 billion doses of potentially inappropriate medications were dispensed to patients enrolled in Medicare Part D. The most common medications by number of doses dispensed were PPIs (45%), benzodiazepines (31%), and tricyclic antidepressants (9%). This corresponded to $4.4 billion in reported spending in 2018. The top five unique medications by reported spending were dexlansoprazole ($602 million), esomeprazole ($506 million), omeprazole ($390 million), dronedarone ($313 million), and conjugated estrogens ($298 million). The average number of doses per medication per beneficiary ranged from 112 to 433 (dexlansoprazole = 231 doses, esomeprazole = 250 doses, omeprazole = 276 doses, dronedarone = 433 doses, and conjugated estrogen = 112 doses). From 2014 to 2018, 43 billion doses of potentially inappropriate medications were dispensed, with a reported spending of $25.2 billion (Figure 2).

DISCUSSION

Beyond the substantial financial consequences, potentially inappropriate medication use among older adults is concerning given the associated increased risk of delirium, falls, hip fracture, and hospitalization.[1,2] Previous studies have shown that up to 50% of community-dwelling older adults are taking at least one potentially inappropriate medication.[3] Our study helps to contextualize the frequency of potentially inappropriate prescribing on a population level, as well as the associated financial costs.

The data set used in this study lacks patient-level data to identify why medications were prescribed. In some cases, the potential benefits may have outweighed the risks after thoughtful assessment. Furthermore, although approximately 85% of patients in Medicare are older than 65 years,[6] some may be younger (e.g., those with end-stage renal disease); thus, we may have misclassified some medications as potentially inappropriate. Also, this data set does not account for rebates paid for brand-name medications, so we may be overestimating spending. However, this is balanced by two factors. First, there were other AGS Beers Criteria® list medications that we did not include because they were not based on the highest-quality evidence (e.g., antipsychotics, muscle relaxants, and nonsteroidal anti-inflammatory drugs). Second, the Centers for Medicare and Medicaid Services data set only includes the 70% of Medicare beneficiaries enrolled in Part D.

The use of potentially inappropriate medications among older adults is both common and costly. Careful attention to potentially inappropriate medication use and deprescribing when clinically appropriate are important opportunities to reduce costs and to potentially improve outcomes among older adults.

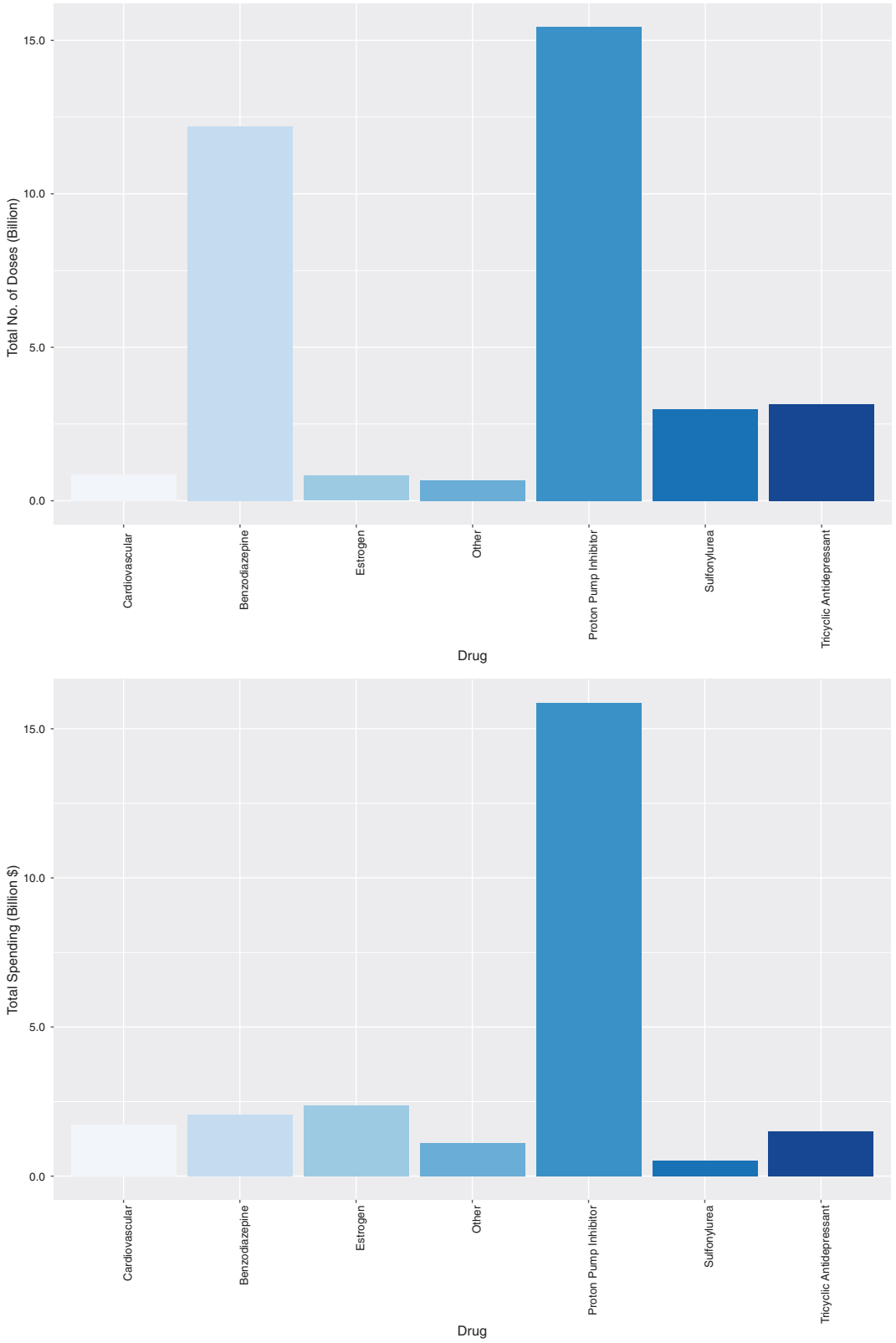

Figure 2. Total number of doses for potentially inappropriate medications (A) and the reported Medicare spending on potentially inappropriate medications (B), 2014 to 2018. "Cardiovascular" included amiodarone, dronedarone, and short-acting nifedipine; and "other" included somatropin and barbiturates.

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SUPPORTING INFORMATION

Additional Supporting Information may be found in the online version of this article.

Supplementary Appendix S1: The supplemental material includes additional details related to the AGS Beers Criteria® and the category of included medications.

Supplementary Table S1: Medication Classes.