



Trends in Within-Class Changes in US Average Wholesale Prices for Brand-Name Medications for Common Conditions From 2015 to 2020

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Introduction

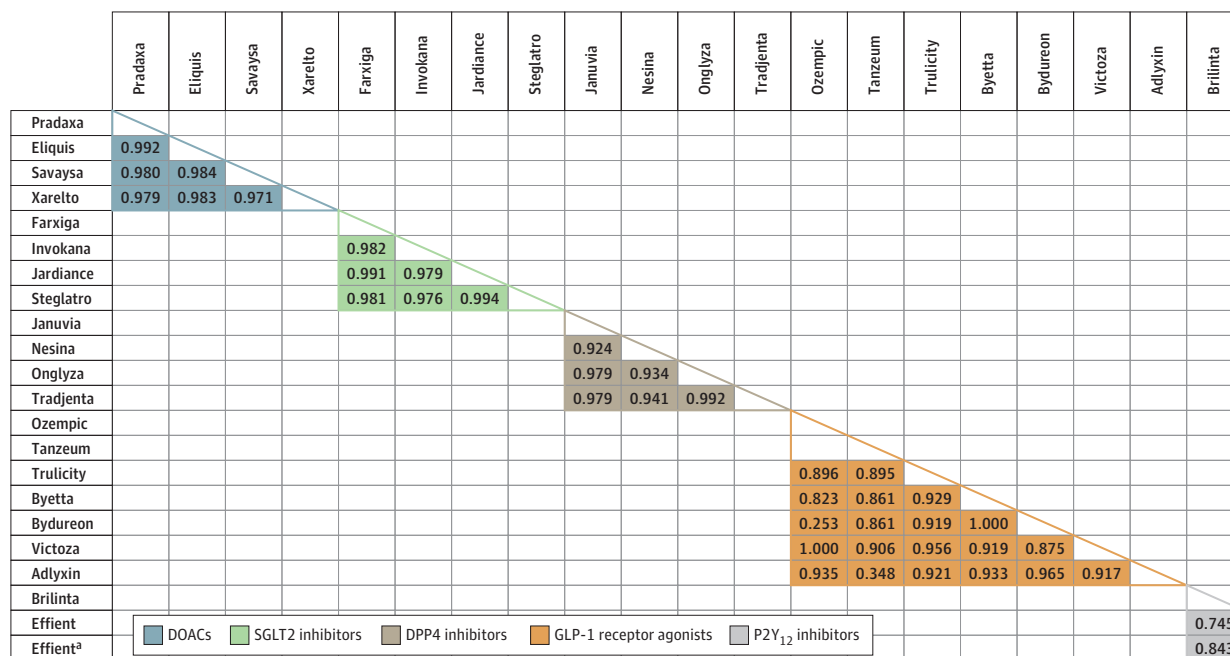
Several new medications for treating common chronic conditions have come to market in the US in recent years. While such increased competition might be expected to decrease drug prices, policies promoting competition among brand-name drugs within the same class have not been associated with lower list prices.¹ In fact, an analysis of the wholesale acquisition costs of insulins from 2012 to 2016, when only branded formulations were available, demonstrated compound annual growth rates (CAGRs) in costs ranging from 15% to 17%.² The objective of this cross-sectional study was to assess patterns in price changes for multiple brand-name medications within the same drug class existing in the US market contemporaneously.

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Methods

We conducted a cross-sectional study of per-pill average wholesale prices (AWPs) in the US from August 13, 2015, to August 13, 2020, obtained the Micromedex Red Book (IBM).³ The study did not require institutional review board approval or patient informed consent because it was based on publicly available information and involved no patient records. This study is reported following the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) reporting guideline.

Figure 1. Trends in Kendall τ_b Coefficients Among Brand-Name Medications Within the Same Drug Class from 2015 to 2020

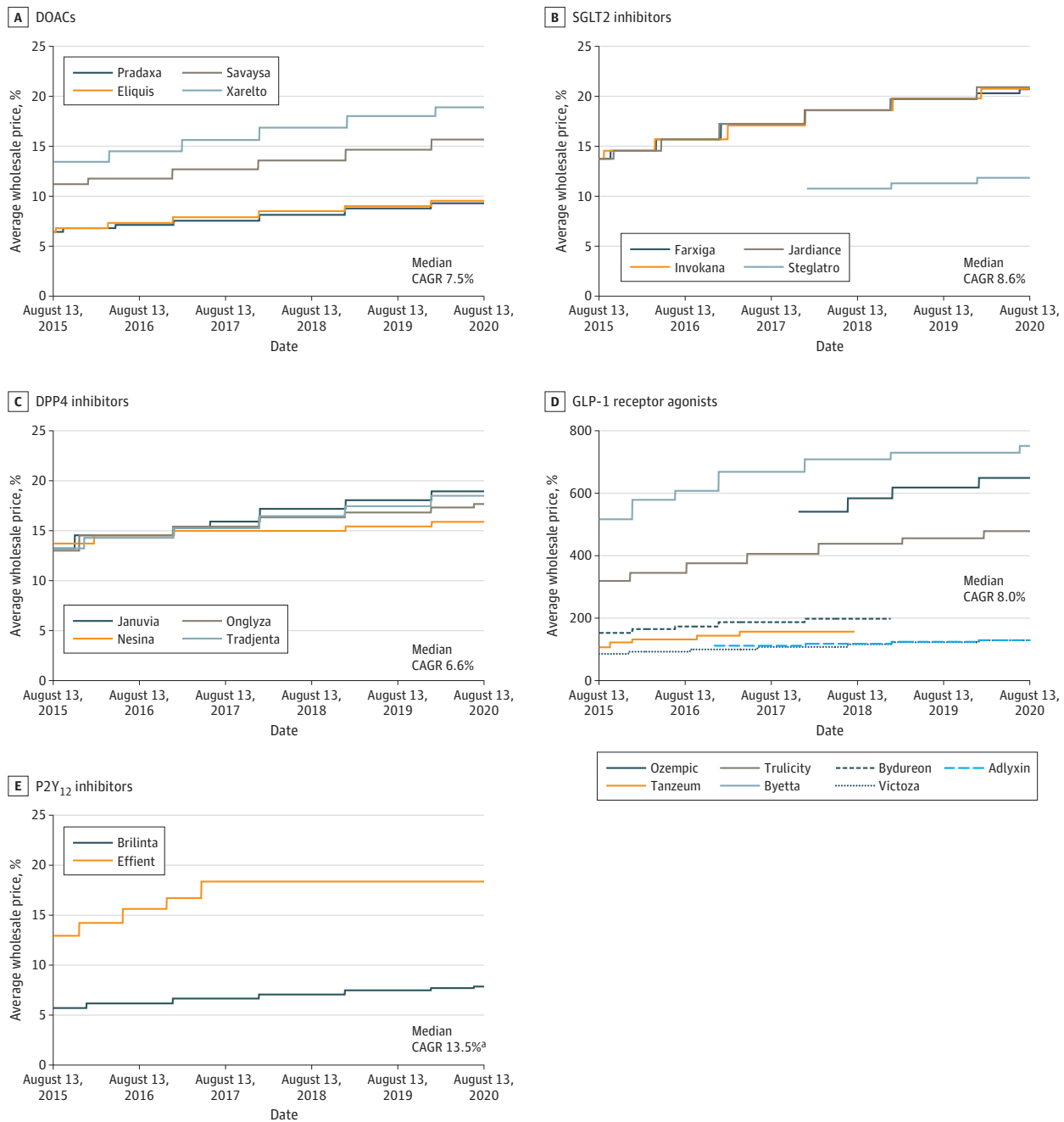


^a A generic form of prasugrel was introduced in August 2017; this value represents the Kendall τ_b coefficient between Brilinta and Effient prior to August 2017. DOAC

indicates direct oral anticoagulant; SGLT2, sodium-glucose cotransporter-2; DPP4, dipeptidyl peptidase-4; and GLP-1, glucagon-like peptide-1.

We limited our study sample to brand-name medications used for chronic conditions available for purchase before January 1, 2018, to better characterize pricing trends for prescription medications used over a prolonged period. There were multiple brand-name medications on the market contemporaneously in the following classes: direct oral anticoagulants (DOACs), sodium-glucose transport protein-2 (SGLT2) inhibitors, dipeptidyl peptidase-4 (DPP4) inhibitors, glucagon-like peptide-1 (GLP-1) receptor agonists, and platelet P2Y₁₂ inhibitors. For each medication, we

Figure 2. Trends in Average Wholesale Prices Among Brand-Name Medications Within the Same Drug Class from 2015 to 2020



^a A generic form of prasugrel was introduced in August 2017; this value represents the median compound annual growth rate (CAGR) of Brilinta and Effient prior to August 2017.

DOAC indicates direct oral anticoagulant; SGLT2, sodium-glucose cotransporter-2; DPP4, dipeptidyl peptidase-4; and GLP-1, glucagon-like peptide-1.

selected the recommended maintenance dosage on the label, limiting to medications sold by the manufacturer that received initial Food and Drug Administration approval.

Our primary outcome was the correlation in AWP unit prices among the multiple brand-name medications within each class available over time, measured using Kendall τ -b (τ_b) coefficient. We additionally calculated CAGRs for brand-name medication costs within each class. All analyses were performed using Stata statistical software version 15.1 (StataCorp) and Excel spreadsheet software version 14.7.6 (Microsoft). Data were analyzed in August 2020.

Results

This study included 4 DOACs, 4 SGLT2 inhibitors, 4 DPP4 inhibitors, 7 GLP-1 receptor agonists, and 2 P2Y₁₂ inhibitors. The median (range) τ_b values for drugs within each class were 0.98 (0.97-0.99) for DOACs, 0.98 (0.98-0.99) for SGLT2 inhibitors, 0.96 (0.92-0.99) for DPP4 inhibitors, 0.92 (0.25-1.00) for GLP-1 receptor agonists, and 0.75 between P2Y₁₂ inhibitors; however the τ_b value for P2Y₁₂ inhibitors was 0.84 when restricted to August 2015 and August 2017, after which generic prasugrel became available (**Figure 1**). The median (range) CAGRs in costs over this 5-year period ranged from 6.6% (3.0%-7.4%) for the 4 DPP4 inhibitors to 13.5% (8.0%-19.1%) for the 2 P2Y₁₂ inhibitors (**Figure 2**).

Discussion

This cross-sectional study found high correlations between AWP among drugs within 5 classes used to treat chronic conditions that had multiple brand-name medications on the market contemporaneously from 2015 to 2020. Moreover, the median CAGR in costs for each of these medication classes outpaced annual growth rate of the consumer price index for prescription drugs at 2.1% over the same time period.⁴ These results suggest there was little price competition among the sponsors of these products. In fact, for 1 class, P2Y₁₂ inhibitors, the correlation between rising AWP was higher when our analyses were restricted to the period prior to the market introduction of a within-class generic equivalent.

There are some limitations to our analysis. For instance, our findings may not generalize to other drug classes. Moreover, we did not investigate competition across drug classes, which may affect within-class price dynamics. In addition, AWP do not account for rebates, which are negotiated annually. Rebates, list prices, and net prices have been growing for brand-name medications, and rebate growth has been shown to positively correlate with list price growth, thereby impacting costs faced by patients paying a percentage of (or the full) list price.^{5,6} Therefore, the lock-step price increases of brand-name medications, without evidence of price competition, raise concerns and would be expected to adversely affect patient adherence to medications and thus clinical outcomes. Policies that limit lock-step price increases, shorten patent durations, and encourage development of generic equivalents may mitigate rising drug prices.

ARTICLE INFORMATION

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Author Contributions: Mr Liu had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

Concept and design: Liu, Ross.

Acquisition, analysis, or interpretation of data: All authors.

Drafting of the manuscript: Liu.

Critical revision of the manuscript for important intellectual content: All authors.

Statistical analysis: Liu.

Administrative, technical, or material support: Shah.

Supervision: Ross.

Conflict of Interest Disclosures: Dr Dhruva reported receiving research funding support from the National Heart, Lung, and Blood Institute (NHLBI) of the National Institutes of Health (NIH); the Greenwall Foundation; and the National Evaluation System for Health Technology Coordinating Center and travel support from the Food and Drug Administration Center for Drug Evaluation and Research Office of Medical Policy. Dr Shah reported receiving research support through Mayo Clinic from the Food and Drug Administration (FDA) to establish Yale-Mayo Clinic Center for Excellence in Regulatory Science and Innovation program; the Centers of Medicare and Medicaid Innovation under the Transforming Clinical Practice Initiative; the Agency for Healthcare Research and Quality (AHRQ); the NHLBI of the NIH; the National Science Foundation; and the Patient Centered Outcomes Research Institute to develop a clinical data research network. Dr Ross reported receiving grants from FDA, Johnson and Johnson, Medical Devices Innovation Consortium, AHRQ, NHLBI of the NIH, Laura and John Arnold Foundation, Centers for Medicare and Medicaid Services, and Medtronic outside the submitted work. No other disclosures were reported.

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