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# An analysis of expenditures on primary care prescription drugs in the United States versus ten comparable countries

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ABSTRACT

*Objective:* We sought to estimate size and sources of differences in per capita expenditures on primary care medications in the US versus ten comparable countries combined: Australia, Canada, France, Germany, the Netherlands, New Zealand, Norway, Sweden, Switzerland, and the United Kingdom.
*Methods:* Using market research data on year 2015 volumes and sales of medicines, we measure total per capita expenditures on six categories of primary care prescription drugs: hypertension treatments, pain medications, lipid lowing medicines, non-insulin diabetes treatments, gastrointestinal preparations, and antidepressants. We quantified the contributions of five drivers of the observed differences in per capita expenditures.
*Results:* We estimated that the US spent 187% more per capita on primary care pharmaceuticals than did the ten comparable countries. Despite the difference in spending levels, on average, Americans actually purchased 14% fewer days of related therapies than residents of the comparator countries. Most of the observed difference in expenditures was due to higher transaction prices of medicines and the use of a more expensive mix of medicines in the US.
*Conclusions:* If utilization patterns and pharmaceutical prices in the US were similar to those in the 10 comparator countries combined, total spending on primary care pharmaceuticals would fall by 30% or more. Such evidence on the level and drivers of US pharmaceutical expenditures should inform policies in this sector.



## 1. Introduction

Concern about the cost of prescriptionmedications in the United States (US) is growing, in large part due to recent increases in the prices of new drugs and older ones. [1,2] Prudent management of pharmaceutical expenditures is important so that health systems can ensure universal and affordable access to available medicines [3], and so that the pricing system provides appropriate incentives for valued innovation.

While most recent attention has focused on the rising cost of specialty pharmaceuticals, health systems must also manage the cost of more commonly used primary care prescription medicines. Because of the large volume of use, primary care pharmaceuticals are expected to account for the majority of pharmaceutical expenditures in the US and comparable health systems for the foreseeable future [4]. Further, competition within primary care drug categories with many off-patent medicines can create savings to expand coverage of medicines still on patent, including specialty medicines.

In this study, we quantify the level and drivers of US expenditures on primary care pharmaceuticals relative to ten comparator countries. We do so using economic price and quantity indexes developed to compute cost-drivers in the pharmaceutical sector. Our focus on primary care categories of medicine illustrates differences in these high-volume therapeutic categories. This focus also facilitated the selection of categories wherein drugs are typically sold in oral solid dosage forms (as compared to drug classes where medicines frequently come in varied dosage forms), and are predominantly purchased from community pharmacies (as opposed to institutional settings such as hospitals or cancer clinics). Both

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of those characteristics of the drugs classes under study increase the reliability and comparability of market research data across countries.

## 2. Design and methods

This is a comparative economic analysis of 2015 prescription drug sales and volume for the US and ten comparator countries: Australia, Canada, France, Germany, the Netherlands, New Zealand, Norway, Sweden, Switzerland, and the United Kingdom. These countries were chosen because their combined population in 2015 was similar to the US population of (318 million versus 321 million) and they are all high-income countries (average GDP per capita of US$45,018 in 2015) whose health care systems are used for comparison to the USA in the annual Commonwealth Fund's International Health Policy surveys [5].

Residents of all of the comparator countries except Canada were eligible for universal health coverage that included universal coverage of outpatient prescription drugs. Residents in Canada were eligible for universal public health insurance for medical and hospital care (including inpatient prescription drugs) but may or may not have access to either public or private coverage for prescriptions used in the community setting depending on their age, occupation, income, and province of residence [6]. The systems of drug coverage in Australia, New Zealand, Norway, Sweden, and the United Kingdom can be described as universal public systems. In these countries, prescription medicines are financed predominantly by government and either government or an arms-length public body manages the selection and the price setting of medicines to be covered by the universal system of public financing. Prescription drugs in France, Germany, the Netherlands, and Switzerland are financed through multiple-payer, social insurance systems with various statutory policies governing minimum coverage and pricing for originators and generics.

## 3. Data sources

The local currency value and volume of sales of medicines in the US and comparator countries were obtained from the IMS MIDAS sales database, which captures more than 95 percent of the value of the global pharmaceutical market [7]. These data reflect transaction prices that exclude rebates received from manufacturers of branded products by institutional purchasers in the US and other countries. Foreign sales were converted to US$ by applying a constant exchange rate (Q1 2016). A sensitivity analysis found that the alternative use of purchasing power parities PPPs did not alter findings because ratios of exchange rates to PPPs varied across the comparator countries.

The database tracks sales volumes in terms of standard units of a medicine and kilograms of the primary active ingredient. IMS converted these figures into standardized days of therapy using average daily doses for each medicine as computed from IMS Prescribing Insights, which draws on information from a panel of office-based physicians in each country. Although differences are small, estimated average daily doses of some medicines vary by country, reflecting local prescribing behaviors. Sensitivity analyses based showed that differences in average daily doses by country altered overall findings of price versus volume effects by five percent.

As rebates paid to institutional purchasers are typically confidential, we were unable to measure them directly. Instead, we estimated spending given ranges of relative price rebates for the US in sensitivity analyses.

## 4. Drug categories included in the analysis

We study the use of and expenditure on six therapeutic categories of primary care prescription drugs based on primary indication. In order of their frequency of use in the United States, these categories were as follows: hypertension treatments; lipid lowing medicines; antidepressants; gastrointestinal preparations (primarily drugs for ulcers and heartburn); non-insulin diabetes treatments; and pain medicines, including nonsteroidal anti-inflammatory drugs (NSAIDs) and opioids. Details concerning the drugs within each category are provided in Appendix A. We selected these primary care categories of medicines because they are widely used, typically sold in oral solid dosage forms, and predominantly sold through community pharmacies (as opposed to inpatient settings). All of these factors increase the reliability and comparability of market research data across countries.

We focus on medicines with prescription-only status in the United States, which excludes pharmaceuticals commonly sold over-the-counter (e.g., plain acetaminophen for pain) and herbal therapies (e.g., caraway for digestive problems). A total of 1035 different products were included in the study, identified by active ingredient(s) and whether they were branded or generic. These products were assigned into hierarchical, mutually exclusive groupings using the World Health Organization's Anatomical Therapeutic Chemical (ATC) classification system. In total, the dataset contained 614 different drugs (merging brand and generic versions of the same active ingredients together) that fell into 81 pharmacological classes within the 6 broad therapeutic categories. Collectively, these therapeutics categories account for approximately 25% of prescription drug expenditures in the US.

## 5. Drivers of variation in expenditure

For each therapeutic category, we quantify mutually exclusive sources of the difference in prescription drug expenditures between the US and the combined comparator countries using economic indexes that were developed to compute cost-drivers in the pharmaceutical sector [8–10].

We estimated the effects of five sources of difference in expenditures that fall into three broad categories: volume, choice, and price effects (Fig. 1).

**Volume** reflects the average amounts of prescription drug therapy received by a population. It depicts how much of the difference in expenditures per capita between the US and comparator countries is the result of differences in the average number of days of therapy purchased per capita.

The remaining cost-drivers estimate the sources of differences in costs per day of therapy.

**Choices** describe the differences in average daily cost of treatment that stem from differences in the average mix of medicines selected from within therapeutic categories, holding the relative prices of treatment options constant. Other things being equal, prescribing higher cost therapeutic options will result in higher overall spending.

The "broad mix" cost-driver reflects the cost impact of the pharmacologic classes selected from within each broad therapeutic category. This includes such choices as whether or not to use diuretics or ACE inhibitors for hypertension treatment.

The "narrow mix" cost-driver reflects the cost impact of the selection of specific active ingredients within a particular pharmacologic class. This includes such choices as whether or not to use enalapril or ramipril within the class of ACE-inhibitors; it is, in effect, a choice between a narrower range of therapeutic options than is captured by the broad mix cost-driver.

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