Price Comparison of Human and Veterinary Formulations of Common Medications

In 2021, the US Food and Drug Administration oversaw the marketing of approximately 20,000 medications for human use and 1,600 for veterinary use. Some medications are common to both pets and humans, and price differences can be extreme. In 1991, levamisole—introduced in the 1960s as a veterinary antiparasitic medication—demonstrated efficacy in treating human colon cancer. The introductory human price of Janssen’s Ergamisol (brand-name levamisole; $5 per 50-mg tablet) was 100 times the then veterinary price (approximately $0.05 for an equivalent amount). In 2021, demand for ivermectin for treatment of COVID-19, fueled by misinformation, led to people seeking veterinary formulations of the drug, increasing the price 15-fold over a month ($6 to $92 for 3 tubes). In this cross-sectional study, we sought to compare prices of commonly prescribed medications used to treat both humans and pets.

Methods | We identified the 200 human medications with the most prescription fills using the ClinCalc database. For medications with the same ingredients also used in pets, we obtained the price per unit (eg, per tablet) in humans and pets. For human prices, we used GoodRx, a national-level price comparison website to calculate the average retail price (ARP) and a discounted price at Costco pharmacy for a typical fill of the most common human dosage. We obtained pet (dog) prices from online pharmacies via Google (eg, Chewy). We selected generic medications when available and human-equivalent doses (eg, lisinopril, 20 mg, in humans and pets). The primary outcome was the human-to-pet price ratio. Because this study involved secondary, deidentified data from a publicly available source, the University of Minnesota institutional review board considered this to be not human research and waived need for approval.

Figure 1. Human-to-Pet Per-Unit Price Ratios for Medications

Human-to-pet per-unit price ratios for 20 medications with the highest human average retail price-to-pet price ratio (A) and 20 medications with the most prescription fills for humans (B). The x-axis is log₁₀ scale.
Results | Of the 200 human medications identified, 120 (60.0%) with unique active ingredients and a pet formulation were studied. All medications except 1 (insulin detemir) had generic human formulations. The human ARP and discounted price was higher than the pet price for 112 (93.3%) and 77 (64.2%) medications, respectively.

The median (IQR) human ARP-to-pet price ratio was 5.5 (2.9-10.7), and the human discounted price-to-pet price ratio was 1.4 (0.7-2.5). The human ARP-to-pet price ratio was more than 10 for 35 (29.1%) medications. The human discounted price-to-pet price ratio was more than 3 for 20 (16.7%) medications (Figure 1). Figure 2 presents absolute differences in human and pet prices for a 30-day supply.

Of the medications studied, 15 (12.5%) were antimicrobials. The human ARP-to-pet price ratio was more than 1 for all antimicrobials, with a median of 4.4. The human discounted price-to-pet price ratio was more than 1 for 8 (53.3%) antimicrobials, with a median of 1.3.

Discussion | In this cross-sectional study, we found that prices of most medications were higher for humans than for pets. Almost all medications were generics. Given that generic markets are more competitive than brand-name markets, price differences may reflect differences in manufacturing, regulatory standards, and distribution, as well as price discrimination (different prices in different markets with the same costs). Online pet pharmacies face less overhead in storage, and veterinary formulations may contain harmful (to humans) additives. Additionally, higher prices for humans may reflect pharmaceutical company investment, as well as differences in effectiveness and willingness to pay.1

Absolute price differences between human and pet prices for a 30-day supply were sometimes substantial, even for human discounted prices. A noteworthy example from 2018 involves a 5-mg tablet of phytonadione (oral vitamin K1) for humans costing $70.51, and a 50-mg veterinary-grade tablet costing $0.61.4

The human ARP of antimicrobials was 4 times the pet price. When antimicrobial access is appropriately limited through human sources by requiring a prescription, patients may turn to more accessible—and cheaper—pet antimicrobials.5,6

This work has limitations, including medication prices being dynamic, opaque rebates underlying discounted prices, and prices for humans often not being proportional to drug strength or fill quantity. Nonetheless, this study demonstrates that cash prices for generic medications should be
transient and accessible to people, for their own use and for their pets.

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Invited Commentary | HEALTH CARE POLICY AND LAW
The Price of Human and Veterinary Formulations—Price Discrimination and Innovation in Prescription Drug Markets

It is well known that drug prices in the US are greater than those in many other countries.1 In this issue of JAMA Internal Medicine, Haque and colleagues2 report that within the US, prices for human formulations of drugs generally exceed that of veterinary formulations. The authors raise the important issue of price discrimination in the prescription drug market, meaning that consumers are charged different prices for essentially the same product. Many readers may infer that the existence of price discrimination for prescription drugs implies that policy actions should be taken to lower the price of human formulations. However, while there are many reasons why we may want to reduce drug prices, a focus on price discrimination may distract from the core policy trade-offs.

From an economics perspective, the problem with price discrimination is not that it reduces economic efficiency. Specifically, economic efficiency requires that all consumers who value a product at or above the cost of producing the incremental unit consume the product. In this case, if human and pet prices were set at the average price (ie, eliminating price discrimination), some consumers who want to use a drug for veterinary purposes (and are paying for the drug out of pocket) would likely be priced out of the market, which would be inefficient if they valued the drug more than its production cost.

The problem with price discrimination is that it transfers a greater share of the monetized “value” of the (human) medications to the manufacturers and away from patients (who face increased out-of-pocket spending or premiums). This distributional concern should not be understated, and one might ask, “Why do we not just drive prices down to the level of the veterinary products (or cost of production)?” The answer is that we allow drug companies to charge prices above (often substantially above) cost to fulfill a past commitment designed to encourage innovation and a mechanism to incentivize future innovation.

Importantly, innovations vary in the value they provide. While innovation is generally good, some innovations generate immense value (think COVID-19 vaccines), and others are less valuable and priced above that value (though some “me too” drug development is desirable as it increases competition).3

Many point to high drug company profits, government funding of research, and manufacturer behaviors that impede postexclusivity competition (via activities like pay for

Letters

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