



Assessing the domino effect: Female physician industry payments fall short, parallel gender inequalities in medicine



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ABSTRACT

Background: Physician–industry relationships have been complex in modern medicine. Since large proportions of research, education and consulting are industry-backed, this is an important area to consider when examining gender inequality in medicine.

Methods: The Open Payments Program (OPP) database from August 2013 to December 2016 was analyzed. In order to identify physicians' genders, the OPP was matched with the National Provider Index dataset. Descriptive statistics of payments to female compared to male surgeons were obtained and stratified by payment type, subspecialty, geographic location and year.

Results: 3,925,707 transactions to 136,845 physicians were analyzed. Of them, 31,297 physicians were surgeons with an average payment per provider of \$131,252 to male surgeons compared to \$62,101 to female surgeons. Significantly fewer women received consultant, royalty/licensure, ownership and speaker payments. However, women received a higher average amount per surgeon compared to their male counterparts within research payments. Overall payments to women trended upwards over time.

Conclusion: Gender inequality still exists in medicine, and in industry–physician payments. Industry should increasingly consider engaging women in consultancies, speaking engagements, and research.

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Introduction

Physician–industry relationships have long posed a complex ethical dilemma.^{1,2} On one hand, advances in technology, medical devices, and new drug development are central facets of modern medicine and dependent on a close collaboration between physicians and industry. However, literature as early as the 1990s showed a correlation between physicians receiving industry payments and explicit or implicit favoring of their products, especially in regards to pharmaceuticals.^{3–5} This prompted the Office of Inspector General to develop a compliance guidance program in 2002.⁶ This program was one of the first attempts at defining the physician–industry

relationship and aimed to highlight potentially concerning areas where the two interface.⁷ The program called for more conservative spending practices and a shift from money given as gifts to money given for education, with an emphasis on compliance.⁷

A 2008 Institute of Medicine report attempted to characterize physician–industry relationships and describe ways in which commercial entities can create conflicts of interest within medical practice.⁸ The report concluded that little data exists on how to structure a successful relationship between industry and physicians, to foster research and development, while avoiding negative consequences of bias or compromising the integrity of commercially-funded research. The Physicians Payment Sunshine Act, also known as section 6002 of the Affordable Care Act of 2010, began to collect data to answer these complex questions. To promote transparency, the Sunshine Act requires companies to disclose any payments or transfers of value made to physicians on a publicly available open payments program database (OPP), maintained by the Centers for Medicare and Medicaid Services.⁹ While

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many legislators thought the creation of the OPP would promote responsible healthcare spending, early data suggests that the landscape has not changed drastically since its implementation.^{10,11}

Despite this, the OPP represents a powerful tool to study physician-industry relationships. Previous research has shown that as many as 94% of physicians report receiving benefits from industry relationships.¹² Surgeons are reportedly more comfortable with industry collaboration,¹³ and have a more favorable perception of industry gifts than other physicians.¹⁴ Previous research has speculated this is due to constant technology and device development, and a close working relationship with medical device representatives.^{14,15} Several subspecialties have analyzed the OPP and reported payment trends within their field.^{16–18} The aim of our study is to describe industry payments to providers by gender, examining payment type, specialty, geographic location, and year.

Materials and methods

The open payments database from August 1, 2013 to December 31, 2016 was analyzed. The data is divided into several subsets including general payments, physician ownership, and research payments. In addition, a physician profile dataset is provided which includes the name, a unique identifying number, and demographic information limited to business and licensure location. Providers identified as dentists, podiatrists or with a practice location outside of the US and US territories were excluded from the analysis, leaving 714,691 providers.

To identify physicians' genders, the data from the physician profile dataset was linked with the National Plan and Provider Enumeration System National Provider Identifier (NPI) database. Providers were matched in a three-step process. First, they were matched based on first name, last name and zip code. This successfully matched 398,899 providers (55.8%). Next, those remaining were matched based first name, last name and state, matching another 212,679 (29.8%). Lastly, if a first name appeared more than ten times in the database, the rate at which that name was matched with a female versus male provider (by the first two methods) was calculated. A rate of >0.8 match to female was deemed a female provider, and <0.2 male. This method was used to assign a gender to another 98,356 providers (13.8%). Of the remaining 4757 providers, 1485 (0.2%) had their gender identified manually in hospital websites or state licensure systems. This resulted in an overall match rate of 99.5% or a total of 711,419 providers, with a 100% match rate of physicians in surgical specialties.

Each subset of the OPP (general, ownership, and research payments) was analyzed individually and in combination. Within the general payments dataset, payments that were classified by type as consultant payments, royalties/license payments or speaker/education payments were analyzed. Other payments, including food and beverage, entertainment, travel and charitable contributions were excluded from the analysis. This was done in order to focus our study on company-provider relationships which represent a larger commitment and greater monetary amount.

Descriptive statistics were calculated for the number and amount of total transactions, the number of physicians receiving payments, and the average payment amount per physician by male and female provider. Top recipient specialties, top payer companies, and research payments to teaching hospitals were described. Among surgical specialties, payments were described by specialty, year and state and stratified by gender and payment type. Provider characteristics including state and specialty were described as coded in the OPP database. Statistical analysis was performed with Stata MP statistical software, version 14.1 (StataCorp LP, College Station, Texas).

Results

The characteristics of transactions for all physicians are presented in [Table 1](#). In total, there were 3,925,707 transactions to 136,845 physicians between 2013 and 2016, totaling almost 21 billion dollars. The total payments to female physicians was 3.5 billion compared to 17.3 billion to male physicians. The average payment per physician was \$152,200, with the average payment to female physicians being \$114,863 and to male physicians \$163,077. Stratified by category of payment, the average consultant payment per female physician was \$9200 compared to \$17,200 per male physician. A similar trend was observed in royalty and licensure payments, with an average payment of \$149,569 to women and \$604,353 to men as well as payments related to physician ownership with an average of \$136,035 to women compared to \$402,104 to men. The opposite was true for research payments, however, with an average payment to women of \$296,980 and to men \$289,767.

[Table 2](#) provides a summary of total payments between 2013 and 2016 made to surgeons. A total of 469,486 transactions totaling almost 4 billion dollars were made to 31,297 surgeons. Among these, 4511 surgeons were women and 26,786 were men. The average payment per surgeon in the time period was \$121,285 with the average payment to female surgeons being \$62,101 and to male surgeons \$131,252. The top recipients by specialty and top companies are noted as well. The distribution of payment amounts among surgeons by gender is described in [Fig. 1](#), noting a higher percent of female recipients in lower payment categories compared to male recipients.

A further characterization of payments made to surgeons by category of payment is shown in [Table 3](#). A total of 19,465 surgeons received consultant payments, with an average payment of \$22,770 per surgeon. Of these, 16,797 surgeons were male with an average payment of \$26,072 and 2668 were female with an average payment of \$8282. Similarly, the average royalties and licensure payment per male surgeon was \$660,774 and per female surgeon was \$304,697. Conversely, the average payment per female surgeon was higher than male counterparts in research payments (\$129,050 and \$106,777 respectively) and physician-ownership payments (\$399,393 and \$229,302 respectively).

Payments to female surgeons are broken down by type of payment and subspecialty in [Table 4](#). This is compared to an estimated percent of female surgeons in that subspecialty as based on previous reports.^{19–24} An overall trend is noted with female surgeons receiving a smaller percent of total payments than the percent of women in the subspecialty in consulting and royalty and licensure payments for all subspecialties and in speaker/education and ownership payments in most subspecialties. Among research payments, however, a higher percent of payments were made to female colorectal surgeons, general surgeons, surgical oncologists and pediatric surgeons than would be expected. When all categories of payments to female surgeons are combined, and the percent given to women is compared to the percent of women in that subspecialty, higher than anticipated payments are seen in female general surgeons, surgical oncologists and pediatric surgeons ([Fig. 2](#)).

[Fig. 3](#) demonstrates an overall trend of increasing payments to female surgeons over time, which is particularly striking in research and speaker/education payments. Of note one transaction labeled as ownership payment was excluded in order to better illustrate the trend. A geographic breakdown is given in [Fig. 4](#), which displays the percent of payments to female surgeons by state, noting a wide variation anywhere between 0.01% and 45.9%. In the majority of states, less than 10% of payments are made to female surgeons (45/50 states, 90%). Only three states exceed 15% of

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