
Correlation Or Cause: Brand-Name Drug Prescription Rates

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In their March 2016 ProPublica report, *Matching Industry Payments to Medicare Prescribing Patterns: An Analysis*, Ryann Grochowski Jones and Charles Ornstein set out to determine if physicians who received industry money from pharmaceutical or medical device companies prescribed different rates of brand-name drugs than peers who didn't.

At first glance, what they found seemed quite striking:

- Doctors who received payments were, in general, two times as likely to be high brand name prescribers than doctors who did not receive payments.
- Among doctors who received payments, the more money received (in the form of speaking fees, meal expenses or other types of payments) the higher the prescribing.
- Doctors who received speaking fees had higher rates of brand name prescribing than those who received other types of payments.
- When compared with doctors who received no payments, those who received only meals still had higher rates of brand name prescribing.

This report has already generated substantial attention along with ProPublica's accompanying news story: "Now There's Proof: Docs Who Get Company Cash Tend to Prescribe More Brand-Name Meds: The more money doctors receive from drug and medical device companies, the more brand-name drugs they tend to prescribe, a new ProPublica analysis shows. Even a meal can make a difference." For example, our home town Boston Globe carried a front page story about it on March 18, with a related full-page article.

The immediate inference that many readers are likely to draw from these stories concerns causality — that paying doctors in the form of speaking, consulting, business travel, meals, royalties or gifts causes them to prescribe more drugs. After all, if “even a meal can make a difference,” this logic chain implies that paying doctors for meals leads to more prescribing. And although ProPublica cautions that its analysis does not prove that industry payments induce doctors to prescribe more, that is precisely the inference that some have already made. For example, Dr. Aaron Kesselheim at Harvard Medical School noted in response to these findings that: “This [study] feeds into the ongoing conversation about the propriety of these sorts of relationships. Hopefully we’re getting past the point where people will say, ‘Oh, there’s no evidence that these relationships change physicians prescribing practices.’”

But to change physicians prescribing practices is to assert a causal connection resulting from the payments. Of course, the age-old wisdom that correlation does not establish causation is sage advice. In this regard, there are at least four overarching points of caution that are merited.

The first concern is that the causal pathway may well run in the opposite direction. To the extent pharmaceutical companies choose as speakers those doctors who have the greatest familiarity with their products, a strong correlation is indeed likely to be found but for a very different reason than that implied by ProPublica. Similarly, doctors chosen to be speakers may be thought leaders in their field and more likely to treat patients with complex treatment histories. Such patients may not have responded to traditional, generic therapies, thereby resulting in a greater reliance on novel, branded therapies. Stepping back, it is easy to understand the logic of the sponsoring company in this light; there are likely no better spokespeople than existing high prescribers and thought leaders to describe their first-hand experiences with the drug to less experienced doctors. And yet, a casual assessment of the relationship could mistakenly lead the reader to the exact opposite causal inference if only the correlation is considered.

This observation points to a second overarching concern with the study’s main findings. Told in the aggregate, they imply a systematic relationship between overall payments and overall prescribing behavior. But reality is no doubt far more complex. The authors have not considered these relationships on a disaggregated basis, nor the possibility that there exist counterexamples to that simple narrative. For instance, some doctors might indeed have had a growing prescribing trend, but that trend might have already been growing prior to being invited to the speaker’s bureau. Other doctors might have received high (low) speaking fees but always had low (high) levels of prescribing. Still other doctors might have continued to write a lot of prescriptions even after the flow of payments ended. These, and many other counterexamples told at the granular level, can shed substantial light on the causation question in ways that an aggregate analysis tends to gloss over.

A third overarching concern also focuses on granular level data of a type that the ProPublica article did not consider — payments to physicians from competing manufacturers. The ProPublica website, as well as the Centers for Medicare & Medicaid Services’s open payments website, make data available on payments to specific doctors from many

different drug companies. One insight that can be gleaned from these rich data sources is that many doctors have received payments over time from several different manufacturers in the same therapeutic space. In such circumstances, any one company's payments are unlikely to have induced added prescribing of its product given the contemporaneous payments from manufacturers of competing drugs.

A fourth key concern is that there are many different factors that affect prescribing decisions, none of which are controlled for in this study. This includes: the efficacy, safety and side-effects profile of the drug; the state of the medical literature concerning the drug; disease practice guidelines and compendial listings that mention the drug; the drug's reimbursement status; the physician's past experience with the drug; the patient's medical history and past experience being treated with the same or similar drugs; and physician-specific characteristics (e.g., age, specialty, region of the country). Even if speaking fees or meal expenses affected physician decision making in this context, without controlling for these and other potential influences on prescribing choices, it is not possible to draw much insight from the aggregate correlation results of the type reported by ProPublica.

Given all of these concerns, it would be inappropriate to use these findings in support of a legal theory that physician prescribing was driven by payments from a manufacturer. From an analytical perspective, it is very helpful that ProPublica has made available enormous amounts of data that can provide real insights into important questions in the pharmaceutical industry. At times, these data can shed light on individual physicians whose financial relationships with manufacturers may well be problematic. But when using these data in an aggregate way, substantial caution is in order in interpreting correlation results.

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