Financial relationships between neurologists and industry

The 2015 Open Payments database

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Abstract

Objective

To analyze research and nonresearch payments from the pharmaceutical and device industry to neurologists in 2015 using the Centers for Medicare and Medicaid Services (CMS) Open Payments database.

Methods

In this retrospective database analysis, we computed the percentage of neurologists in the United States receiving payments, the median/mean payments per neurologist, payment categories, regional trends, and sponsors. We computed the number of practicing neurologists from the Association of American Medical Colleges State Physician Workforce data book, 2015.

Results

In 2015, approximately 51% of US neurologists received nonresearch payments totaling \$6,210,414. The median payment per physician was \$81. Payments to the top 10% of compensated neurologists amounted to \$5,278,852 (84.5%). Food and beverage was the most frequent category (86.5% of the total number of payments). The highest amount was paid for serving as faculty/speaker for noncontinuing medical education activities (58%). The top sponsor of nonresearch payments was Teva Pharmaceuticals (\$1,162,900; 18.5%). A total of 412 neurologists received \$2,921,611 in research payments (median \$1,132). Multiple sclerosis specialists received the largest proportion (\$285,537; 9.7%). Daiichi Sankyo paid the largest amount in research payments (\$826,029; 28%).

Conclusions

The Open Payments program was established to foster transparent disclosure of physician compensation from industry, in response to legislative and public concerns over the effect of conflicts of interest on practice, education, and research. The effects of this program remain unclear and studies of changes in prescribing practices, costs, and other outcomes are necessary. CMS should ensure that incorrect information can be rectified quickly and easily.

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Editorial

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Glossary

AAMC = Association of American Medical Colleges; CI = confidence interval; CMS = Centers for Medicare and Medicaid Services; COI = conflicts of interest; IQR = interquartile range; MS = multiple sclerosis; NAM = National Academy of Medicine; NPI = National Provider Identifier Standard; OPD = Open Payments database.

Physicians and industry (drug and device manufacturers) have long collaborated, in many instances positively, to accomplish scientific discoveries and advance patient care. 1-3 Although physicians tend to perceive most such collaboration as appropriate, 4,5 these financial relationships raise concerns that physician conflicts of interest (COI) may bias prescribing patterns,^{6,7} education, and research,^{8,9} affect outcomes, and increase health care costs.^{2,10,11} There is evidence that industry-sponsored meals and physician payments are associated with an increase in the prescription rate of the promoted brand. 11,12 Industry payments have been associated with greater Medicare Part D prescription costs and higher use of branded medications. 12,13 In research, industry sponsorship has been associated with a higher likelihood of positive effects and less agreement between results and conclusions.^{8,9,14} There is intense media and public scrutiny of the potential effects of physicians' COI on the practice of medicine. Even perceptions of COI may be enough to erode patients' trust, and there seems to be a general desire among patients for transparency and disclosure. 15-19

The Centers for Medicare and Medicaid Services (CMS) Open Payments program was initiated by the Physician Payments Sunshine Act of 2007 and enacted as part of the 2010 Affordable Care Act. The program mandates public reporting of payments to physicians and teaching hospitals from drug and device manufacturers. The CMS publicly reports this information through the online Open Payments database (OPD).²⁰

The aim of this study was to evaluate the number, amounts, and categories of nonresearch and research payments from industry to neurologists and industry-related ownership/investment interests held by neurologists in 2015, and to identify the most influential sponsors of these transactions.

Methods

This was a retrospective analysis using 2 publicly available databases.

Standard protocol approvals, registrations, and patient consents

The study was considered exempt by the Committee for Clinical Investigations, Beth Israel Deaconess Medical Center, Boston. Informed consent is not applicable.

Data sources

We used the 2015 CMS OPD and the Association of American Medical Colleges (AAMC) State Physician Workforce Data Book, 2015. The 2015 industry payment data to

physicians are publicly available online through the CMS OPD. Payments of less than \$10 are not required to be reported unless the total yearly value of all payments provided to a physician by the same entity is greater than \$100. The payments are categorized into 3 types in the database: general, research, and physician ownership. ²⁰ The AAMC State Physician Workforce Data Book is a freely available online database published twice yearly and provides the number of active and licensed physicians in each state in the United States (including Puerto Rico and Hawaii). The database also includes physician specialty categories. ²¹ We used the US Census Bureau definition of states divided into specific geographic regions in the United States to evaluate differences in regional payments. ²²

Data compilation

We accessed the CMS OPD and first downloaded information regarding all nonresearch (general) transactions between January 1 and December 31, 2015. We consolidated the database to identify payments to neurologists using the CMS Healthcare Provider Taxonomy Code 2084N0400X for neurology, thus excluding all other specialties. In the OPD, physicians who receive multiple payments are represented with separate entries for each payment. We consolidated all individual payments under a single unique 10-digit physician identifier, the CMS National Provider Identifier (NPI) standard,²³ to obtain the total payment for each physician. Similarly, we consolidated all payments by each sponsoring entity to obtain total payments by each entity. We similarly downloaded the research payment database, consolidated it to identify payments to neurologists, and combined multiple entries to obtain the total research payment per clinician in the 2015 calendar year. We then downloaded the 2015 database of physician ownership and investments, sorted the data to include only neurologists, and consolidated multiple individual investments as described above. Finally, we computed the total number of practicing neurologists in the United States from the AAMC 2015 State Physician Workforce Data Book by obtaining the sum of neurologists in each state.²⁴

Data analysis

Nonresearch payments

Using the total number of US neurologists from the AAMC database as the denominator, we calculated the proportion of neurologists who received industry payments and used the consolidated and sorted OPD to compute the total and median/mean payment per neurologist. We analyzed geographic patterns of payment by region—Northeast, Midwest, West, and South—by combining the data for each US state

represented in these regions. We computed the median payment value and the proportion of neurologists receiving industry compensation in each region. We evaluated the nature/categories of payments and the major pharmaceutical companies responsible for these payments.

Research payments

We computed the total number of neurologists (Taxonomy Code 2084N0400X) who received research payments by combining multiple payments to a specific physician using the NPI to identify the physician; we then calculated the total and median payments. We examined research payments to subspecialties within neurology. We determined the likely subspecialty qualitatively based on the type of intervention that was evaluated in each research study linked to a payment. We recorded the identity of the industry sponsors and calculated the total amount paid by each pharmaceutical/drug device company. Finally, we evaluated the regional distribution of research payments.

Value of ownership

We calculated the total and median value of ownership/investment amounts and the total and median amounts of interest from the investments, identified the manufacturers involved, and categorized them by the type of ownership/investment.

Statistical analysis

Descriptive statistics were used for most analyses. The χ^2 test was used to calculate significance of the regional differences in the **number** of nonresearch and research payments. Mean difference and 95% confidence interval (CI) were calculated for the amounts of payment by region. Significance was set at p < 0.05. Since the sample size was large, parametric statistics were used, assuming normal approximation by the central limit theorem. The SD was estimated by dividing the interquartile range (IQR) by 1.35. Statistical testing was performed using JMP version 13 and Microsoft (Redmond, WA) Excel.

Data availability

The data used in this study are derived from 2 publicly available databases, 2015 CMS OPD²⁰ and the AAMC State Physician Workforce Data Book, 2015.²¹ The data were downloaded as Microsoft Excel spreadsheets, and all sheets and analyses are available for review upon request.

Results

Nonresearch payments

In 2015, there were 13,479 practicing neurologists in the United States, of whom 6,893 (51%) received payments from industry, amounting to a total value of \$6,210,414, with 36,514 distinct payments. The median per-physician payment was \$81 (range \$0.47 to \$49,782, IQR \$164, quartile 1: \$28, quartile 4: \$41,043, mean: \$901). Approximately 23% of compensated neurologists (1,571) received ≤\$25. Fifteen percent of neurologists (1,047) received ≤\$50. Amounts ≥\$500 were paid to

997 neurologists (14.5%). Only 2% (146) received ≥\$10,000 and 6 neurologists (0.08%) received \$40,000 to \$50,000. The payments to these 6 neurologists totaled \$2,59,858, amounting to 4% of the total payment value. The payments received by the highest 10% of compensated neurologists accounted for 84.5% (\$5,278,852) of the total payment value.

Payments by category

Approximately 89% of payments were in-cash or cash equivalent, 11% as in-kind items or services. The most frequent category of payments was food and beverage: 86.5% of the total number of payments (31,584 payments), amounting to \$716,127 or 11.5% of the total payment value. The category with the highest payment amount was nonconsulting services (defined by CMS as serving as a faculty member or speaker at a venue other than for continuing medical education, i.e., industry-sponsored talks), 25 accounting for 57% (\$3,588,683) of the total payment value, but only for 4% of the total number of payments. Consulting fees accounted for the second highest payment amount (\$1,221,818; 19.5%), but only for 5% of the total number of payments. Consulting fees are defined by CMS as payments for advice and expertise on a specific drug or device, usually provided under a written agreement in response to a business need (figures 1 and 2).²⁵

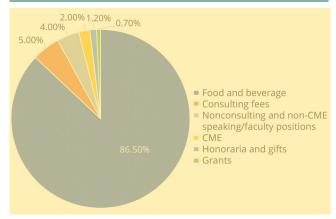
Industry sponsors

A total of 211 companies provided compensation to neurologists. The 15 highest-paying sponsors accounted for 80% of the total payments (\$4,974,505). Teva Pharmaceuticals (Petah Tikva, Israel) contributed nearly one-fifth of the total payment value (\$1,162,900; 18.6%) (table 1).

Regional differences in industry payments

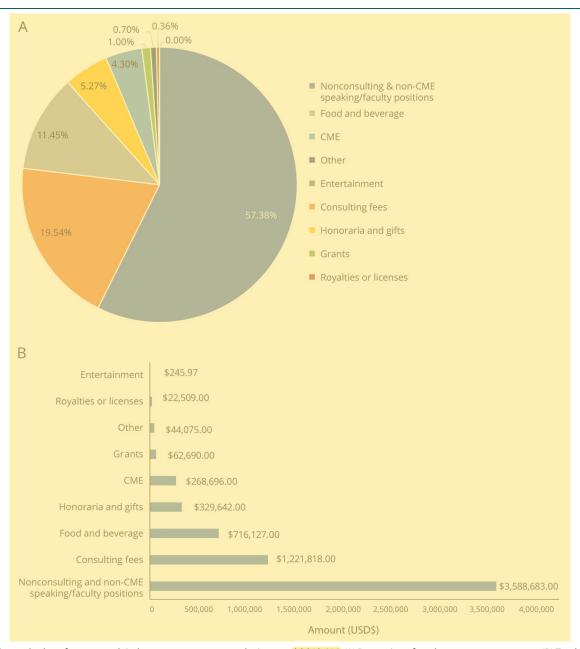
The largest number of payments were made to neurologists in the South as designated by the US Census Bureau (South: 60.7%, Northeast: 45%, Midwest: 46.9%, West: 45.8%, *p* < 0.001 for difference between South and other regions, no

Figure 1 Total number of nonresearch payments by category



In 2015, there were 36,514 distinct nonresearch industry payments to neurologists, of which the majority (31,584 payments, 86.5%) were for food and beverage. The second most frequent category was for consulting fees (1,826 payments; 5.0%). CME = continuing medical education.

Figure 2 Total nonresearch payment amounts by category



In 2015, the total value of nonresearch industry payments to neurologists was \$6,210,414. (A) Proportion of total payments per category. (B) Total payment amount per category. The largest amount was paid for speaker reimbursements, amounting to \$3,588,683, or 57% of the total value. Consulting fees, amounting to over a million dollars, accounted for the second highest payment value. In contrast to the number of payments, where food and beverage was the most frequent, the amount paid to neurologists for food and beverage was only 11.5% of the total value of all payments. Although speaker reimbursements only accounted for 4% of the distinct number of payments, the payment amount was 57% of the total (\$3,588,683). CME = continuing medical education.

difference between the other regions, p = 0.32). In contrast, the compensation amount was lowest in the South and highest in the Northeast (median: South: \$80, Northeast \$89). The mean compensation amount was lowest in the South (\$765) and highest in the West (\$1,071, mean difference \$306, 95% CI \$318 to -\$295) (table 2).

Research payments

A total of 412 neurologists received research payments totaling \$2,921,611 (median \$1,132, IQR \$312,103, quartile 1:

\$310, quartile 4: \$312,413) from 64 pharmaceutical and biotechnology companies. The highest dollar amount was paid by Daiichi Sankyo Inc. (Tokyo, Japan) (\$826,029, 28%) (table 1). Based on the research protocols listed in the OPD, multiple sclerosis (MS) specialists received the highest proportion of the gross payment amount (\$285,537; 9.7%). The next highest paid subspecialty category was stroke (\$141,473, 4.8%) (table 3). The MS disease-modifying agent teriflunomide (Aubagio; Genzyme, Cambridge, MA) represented 30% of the total payments to MS specialists (\$86,079).

Table 1 Industry payments to neurologists in 2015: Top 15 industry sponsors

Industry sponsors	Sum of total payment in USD	Proportion of total payment, %
Nonresearch payments (total: <mark>\$6,210,414</mark>)		
Teva Pharmaceuticals	1,162,900	18.6
Genzyme Corporation	1,065,513	17.0
Biogen Inc.	831,627	13.3
Novartis Pharmaceuticals	280,542	4.5
Sunovion Pharmaceuticals	222,119	3.6
Allergan Inc.	220,586	3.5
Lundbeck LLC	196,752	3.2
UCB Inc.	175,756	2.8
Eisai Inc.	155,780	2.5
Acorda Therapeutics Inc.	148,968	2.4
Pfizer Inc.	133,387	2.1
Avanir Pharmaceuticals Inc.	105,641	1.7
US World Meds LLC.	100,576	1.6
EMD Serono Inc.	89,188	1.4
Genentech USA Inc.	85,165	1.3
Research payments (total: \$2,921,611)		
Daiichi Sankyo Inc.	826,029	28.3
Sanofi US Inc.	255,386	8.7
Biogen Inc.	194,348	6.7
Eli Lilly and Company	146,688	5.0
H. Lundbek AS	144,260	4.9
Functional Neuromodulation Inc.	133,432	4.5
AbbVie Inc.	128,729	4.4
AstraZeneca	101,099	3.5
Navidea Biopharmaceuticals	100,897	3.4
Genzyme Corporation	91,179	3.1
Novartis Pharmaceuticals Corporation	87,557	2.9
Allergen Inc.	65,287	2.2
Zoll Circulation Inc.	64,283	2.2
Avanir Pharmaceuticals	54,467	1.8

A total of 140 neurologists (34%) located in the South received research payments, compared to the Midwest, where only 19% received research payments (p < 0.05 for difference between South and all other regions, table 2). The median

Table 2 Industry payments to neurologists in 2015: Regional data

Region	Proportion of neurologists receiving payment, % ^a	Median payment by region (IQR), USD	Mean payment, USD
Nonresearch payments ^a			
Northeast	45	89 (31–209)	947
Midwest	46.9	81 (25–198)	959
West	45.8	80 (28–212)	1,071
South	60.7 ^b	79 (28–179)	765
Research payments ^c			
Northeast	95/412, 23 ^d	1,131 (382–136,530)	6,679
Midwest	78/412, 19 ^d	1,018 (216-63,517)	4,568
West	99/412, 24 ^d	1,310 (427–101,408)	6,475
South	140/412, 34	1,116 (270–312,412)	9,448

^a Calculated using total number of neurologists in the region as de-

payments were not substantially different between regions. Mean compensation amount was lowest in the Midwest (\$4,568) and highest in the West (\$9,448, mean difference \$4,480, 95% CI -\$48,250 to \$58,010, table 2) (tables 1-3).

Table 3 Research payments to neurologists in 2015 by subspecialties

Subspecialty	Gross payment (%; proportion of total research payments)	Median payment (IQR), USD
Multiple sclerosis	285,537 (9.7)	165 (66–20,000)
Stroke	141, 473 (4.8)	215 (149–50,000)
Epilepsy	82,972 (2.8)	761 (77–12,407)
Neuro-oncology	53,797 (1.8)	139 (42–9,000)
Cognitive neurology	40,761 (1.4)	4,295 (3,137–17,000)
Headache	79,412 (2.7)	1,472 (717–14,125)
Movement disorders	47,976 (1.6)	3,288 (1,446–8,166)
Pain management	3,015 (0.1)	42 (15–1,077)
Noncovered drug/biologic ^a	50,087 (1.7)	847 (508–7,990)

^a A covered drug is any drug for which (1) payment is available under Medicare, Medicaid, or the Children's Health Insurance Program, and (2) requires a prescription to be dispensed.

nominator, hence does not add up to 100%. $^{\rm b}$ Chi-square p < 0.001 for difference between South and other regions. No difference between the other regions, p = 0.32.

 $^{^{\}mathrm{c}}$ Calculated using total number of neurologists receiving research payments in the United States (412).

 $^{^{}m d}$ South vs Northeast, χ^2 p < 0.02; South vs Midwest, p < 0.001; South vs West, p < 0.03.

Physician ownership

CMS defines ownership as stock or stock options, limited liability company memberships, partnership shares, loans, or bonds.²⁶ Fifteen neurologists had 17 distinct ownership interests with industry in 2015, totaling \$882,322 (median \$30,000, range \$2.2 to \$251,443, IQR \$53,695, Q1 \$1,866, Q4 \$251,443, mean \$58,821). Sixteen neurologists received interest from ownerships/investments (total \$1,550,981, median \$47,285, range \$16 to \$548,698, IQR \$89,143, Q1 \$1,523, Q4 \$548,698, mean \$96,936). The business entities were Neuropace Inc. (Mountain View, CA) (manufacturer of the responsive neurostimulation device RNS Therapy), Renovis Surgical Technologies Inc. (Redlands, CA), MRI Interventions Inc. (Irvine, CA), Ablative Solutions, Inc. (San Jose, CA), Synapse Biomedical, Inc. (Oberlin, OH) (manufacturer of the diaphragm pacing system for amyotrophic lateral sclerosis NeuRx DPS), Rapid Pathogen Screening Inc. (Sarasota, FL), SonoCiné Inc. (Reno, NV), Jan Medical, Inc. (Mountain View, CA) (manufacturer of the skull motion sensing device Brain-Pulse), and CCPA Purchasing Partners, LLC (Chicago, IL), a group purchasing organization that negotiates competitive discounts on products and services on behalf of its members.

The highest grossing investment type was "private ownership in C-corp" (privately owned corporation by a small number of shareholders) in Renovis Surgical Technologies, Inc. (\$306,447), followed by "shares of common stock which are publicly traded" in MRI Interventions, Inc., at \$201,789.

Discussion

Using the CMS OPD, we found that approximately half of all US neurologists received nonresearch payments and 412 received research payments from industry in 2015. Although many neurologists received nonresearch compensation for food and beverages, the individual amounts were small. In contrast, fewer neurologists were compensated for faculty and speaker fees, but compensation amounts were substantially higher.

The highest-paying industry sponsors differed for nonresearch and research payments. Teva Pharmaceuticals spent the highest dollar amount for nonresearch payments. Teva is the manufacturer of several medications for neurologic indications, including glatiramer acetate (Copaxone, Teva Pharmaceuticals, Cambridge, MA), a disease-modifying agent for MS; modafinil (Provigil, Teva Pharmaceuticals-Cephalon, Frazer, PA) and armodafinil (Nuvigil, Teva Pharmaceuticals, North Wales, PA), which are wakefulness-promoting agents; deutetrabenazine (Austedo, Teva Pharmaceuticals, North Wales, PA), indicated for the treatment of chorea in Huntington disease and tardive dyskinesia in adults; rasagiline (Azilect, Teva Pharmaceuticals, North Wales, PA) for Parkinson disease; tiagabine (Gabitiril, Teva Pharmaceuticals, North Wales, PA), an antiepileptic agent; and zinc acetate (Galzin, Teva Pharmaceuticals, North Wales, PA), used to reduce absorption of dietary copper in Wilson disease.

Daiichi-Sankyo Inc. sponsored the highest amount of research payments. Notably, in 2014, this company partnered with the University of California, San Francisco, to fund research in neurodegenerative disorders including Alzheimer disease, frontotemporal dementia, and Creutzfeldt-Jacob disease. The fact that the highest proportion of the research payments was to MS subspecialists is not surprising, since several MS disease-modifying treatments have been developed over the last few years.

Pharmaceutical companies spend a considerable amount of money in direct (nonresearch) payments to physicians, including consulting and speaker fees, conference travel, and meals to promote their products. In a US national survey of 3,167 physicians in 6 specialties, 94% reported some relationship with industry, mainly receiving meals or drug samples.²⁸ Precise estimates of the amount spent by pharmaceutical companies on professional detailing (excluding direct-to-consumer advertising) are difficult to ascertain. Dollars for Docs is a search engine for physician payments, maintained by ProPublica, a nonprofit investigative news organization.²⁹ Dollars for Docs data reveal that general payments disclosed by pharma amounted to \$6.25 billion between August 2013 and December 2015.²⁹ According to the Cedegim Strategic Data audit, pharmaceutical spending on professional detailing was \$14.9 billion in 2012.³⁰ The discrepancies in these amounts may be related to the definitions of spending categories, but are difficult to resolve from the data provided. Regardless of the exact amount, the fact remains that the pharmaceutical and device industry spends a significant amount in nonresearch payments to physicians and hospitals. These payments, despite attempts to foster transparency, remain difficult to track accurately. Contrary to the belief that physicians who receive pharma payments are usually experts in their fields, information from Dollars for Docs suggests that some physicians who receive substantial payments are not experts in their fields, may not be board certified, and others may have been sanctioned by their state medical boards.31

The influence of the Open Payments program on patients' perceptions, physicians' prescribing practices, and conflicts of interest between medicine and pharma remains unclear. A study of the Massachusetts state reporting database established in 2009 found that in the second year of the program, the number of physicians receiving payments declined by about 10%, with the decline affecting mainly food and beverage payments, while the payments for "bona fide services" remained stable. A study of antidiabetic medication—associated industry payments found that although monthly payments from industry to physicians decreased by 2%, there was considerable variability in prescribing practices, and the decline was smaller for drugs with larger prescription volumes. Little data are available for neurology.

Industry payment data from the OPD have been studied previously for specialties and primary care. 34-36 Tringale

et al.³⁷ published an analysis of payments to primary care and several specialties. In this study, approximately 48% of all US physicians received payments in 2015, which is comparable to our results. Approximately 60% of neurologists received general payments, with a median value of \$541 (IQR \$125-\$2,120), compared to our median value of \$81, a substantial difference. In addition, the number of neurologists (the denominator) was substantially different (18,002 vs 13,479 in our study). This study used the CMS National Plan and Provider Enumeration System database, which includes all physicians with a NPI number, while we obtained the number of neurologists from the AAMC workforce snapshots resource,²⁴ which has also been used in previous studies analyzing this database in previous years.36 The reason for the discrepancy is unclear, but it is possible that it reflects differences in the databases used, or the taxonomy codes used, and underscores the difficulties of research using public databases.

There are concerns about the accuracy of the OPD in correctly identifying physicians and appropriately documenting payments. Of 1,113 presenters at the American Academy of Orthopedic Surgeons annual meeting in 2014, 11% who selfreported disclosures were not included in the OPD, and 23% were either not reported or were incorrectly classified, resulting in a 35% inconsistency between physician selfdisclosures and OPD information.³⁸ A recent personal story details the attribution of 3 payments to the wrong physician and the difficulty in rectifying these errors.³⁹

CMS has a process to review and dispute payments. Data are published on June 30 each year and updated early in the following calendar year. Physicians can review and dispute data at any time, although data published in one calendar year can only be disputed in that year. There is a 45-day formal review period starting in April of each calendar year, followed by a 15-day period for pharmaceutical and device companies to rectify disputed records in advance of the publication date of June 30. Any dispute not resolved by June 30 will be published as disputed until it is resolved. However, records disputed outside this time frame will not be marked as disputed and changes will not be reflected in OPD until the next update. 40 The review and dispute process is onerous and time-consuming. The physician is required to create an account and go through several steps on a less than optimal website.³⁹ It is not surprising, therefore, that physicians may not attempt to rectify their records, or give up after several attempts. In a 2014 report, only 0.4% of physicians (26,000/546,000) registered to dispute their records. Of these, fewer than half were eventually disputed.⁴¹ The authors describe in detail the multiple steps in disputing a record, compounded by page loading errors and loss of information. 41 CMS has a responsibility to make the dispute and review process brief and simple to protect the reputations of physicians.

The OPD only discloses financial relationships between industry and physicians; it does not determine the appropriateness or otherwise of these relationships. The intent is to facilitate disclosure and transparency and assist patients in making informed decisions, but the extent to which the database is used by patients is unclear. Moreover, it is uncertain how patients interpret the data and how the data affect their impressions about potential effects on their care. Since physician reputations may be at stake if the data are not interpreted correctly, transparent information exchange between patients and physicians is necessary to put these data in context and avoid misperceptions. However, if done in person during the clinical visit, this requires additional time and reduces clinical interaction time.

The intent of the OPD is to manage COI by transparent public posting of all industry payments received by physicians. The National Academy of Medicine (NAM) defines COI as "a set of circumstances that creates a risk that professional judgment or actions regarding a primary interest will be unduly influenced by a secondary interest."² In clinical care, the primary interest is the patient. The integrity of research and provision of unbiased medical education are other primary interests in medicine. The most common secondary interests are financial gains; enhancing professional reputation and career advancement/promotions are others. Disclosure, such as that mandated by the Sunshine Act, is the most frequently used strategy to manage COI, although it does not eliminate the conflict. One theory behind disclosures is that physicians will behave differently when observed.42

COI are not unique to medicine. A NAM report suggests that COI in accounting, law, architecture, and engineering are of less concern than COI in medicine because clients are less vulnerable and better informed about their situation than patients and emergencies are unusual in these professions.² These professions generally specify codes or rules of conduct to manage COI in practice. Except for engineering, COI affecting research and education appear to be less relevant to these professions. One reason provided for holding physicians to a higher standard is that they are gatekeepers for prescribing treatments, diagnostic tests, and procedures.²

The outcome of OPD reporting on clinical care, education, and research is uncertain. 43,44 Systematic evaluation of changes over time in pharmaceutical spending on physician compensation (research and nonresearch), changes in physician prescribing practices and prescription drug costs, and effect on patients' impression of their physicians are necessary to evaluate the effect of the Open Payments program.

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Financial relationships between neurologists and industry: The 2015 Open Payments database

Aditi Ahlawat and Pushpa Narayanaswami
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Disputes & Debates: Editors' Choice

Steven Galetta, MD, FAAN, Section Editor

Editors' note: Demoralization in Parkinson disease

In the article "Demoralization in Parkinson disease," Koo et al. reported that demoralization, with a prominent inability to cope, was common in their sample of 94 participants with Parkinson disease (PD), and that it was associated with motor dysfunction. In response, Bruno et al. report the findings of an exploratory study in patients with advanced PD, which found that while demoralization and depression tended to coexist, demoralization was correlated with PD severity, whereas depression increased caregiver strain, further suggesting that these are different constructs. In reply, author Koo agrees that their findings are complementary, and discusses their favored conceptualization of depression vs demoralization, suggesting that social support and perceived social support may safeguard against demoralization.

Aravind Ganesh, MD, and Steven Galetta, MD Neurology® 2018;91:1029. doi:10.1212/WNL.0000000000006566

Reader response: Demoralization in Parkinson disease

Veronica Bruno (Calgary, Canada), Deborah Mancini (Toronto, Canada), Mateusz Zurowski (Toronto, Canada), and Janis M. Miyasaki (Edmonton, Canada) Neurology® 2018;91:1029. doi:10.1212/WNL.0000000000006568

We read with interest the article by Koo et al. 1 and agree with the authors about the relevance of demoralization in Parkinson disease (PD). Adding to their results, we performed an exploratory study in a movement disorders palliative care clinic on demoralization and depression in patients with advanced PD (\geq 2.5 on the Hoehn & Yahr scale) and their relationship with caregiver burden. Patients were assessed using the Beck Hopelessness Scale (BHS), the Beck Depression Inventory (BDI), the caregivers Zarit Burden Interview, as well as scales for anxiety, quality of life, and motor symptoms.

In our population (n = 43), 100% of the demoralized patients were depressed. Ten patients had depression; of those, 70% were demoralized. Linear regression models adjusting for age and sex showed that BDI scores strongly correlated with BHS (β = 0.98, p = 0.002) and with the caregiver burden (β = 0.42, p = 0.008). The BHS score correlated with the Movement Disorders Society–sponsored revision of the Unified Parkinson's Disease Rating Scale III (MDS-UPDRS III) (β = 0.15, p = 0.04).

Our results support those by Koo et al.: demoralization and depression are different constructs. Demoralization seems to correlate to MDS-UPDRS III, but not depression. Depression, but not demoralization, appears to increase caregiver strain. Therefore, differentiating demoralization from depression may be important because of the possibility of different therapeutic approaches, even for patients with advanced disease.

Koo BB, Chow CA, Shah DR, et al. Demoralization in Parkinson disease. Neurology 2018;90:e1613–e1617.

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Author response: Demoralization in Parkinson disease

Brian B. Koo (Orange, CT) Neurology® 2018;91:1030. doi:10.1212/WNL.000000000006569

I thank Bruno et al. for their comment on demoralization in Parkinson disease (PD). Certainly, it makes sense to explore feelings of hopelessness when studying demoralization, as hopelessness is more specific to demoralization than is depressed mood. I am curious if Bruno et al. found this to be the case in their PD cohort. It is interesting that their findings mirror ours, ¹ in that demoralization was associated with the Movement Disorders Society-sponsored revision of the Unified Parkinson's Disease Rating Scale III. The finding that depression, but not demoralization, is associated with caregiver burden is interesting and also makes sense. Demoralization and depression are overlapping yet distinct feeling states. Demoralization is characterized by subjective incompetence and a loss of a cognitive map, but willpower remains. In depression without demoralization, the cognitive map is intact but willpower is gone. Social support and perceived social support are also important factors that safeguard against demoralization. I commend Bruno et al. for looking at the important issue of demoralization in PD and for having the foresight to include an assessment of the caregiver and his or her burden.

Koo BB, Chow CA, Shah DR, et al. Demoralization in Parkinson disease. Neurology 2018;90:e1613-e1617.

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Editors' note: Teaching NeuroImages: Multimodality imaging of carotid web

In "Teaching NeuroImages: Multimodality imaging of carotid web," Renard et al. presented representative images of a carotid web identified in a 52-year-old woman presenting with an ipsilateral acute middle cerebral artery infarction on 3 modalities: Doppler ultrasound, CT, and magnetic resonance angiography. In response, Dr. Sharma discusses the relative strengths and limitations of different modalities in identifying carotid webs. Dr. Sharma notes that in an ongoing study of high-resolution MRI in patients with significant symptomatic carotid stenosis, carotid webs were identified in about 22% of cases, but that the role of such webs in cryptogenic stroke remains unknown.

Aravind Ganesh, MD, and Steven Galetta, MD Neurology® 2018;91:1030. doi:10.1212/WNL.000000000006570

Reader response: Teaching NeuroImages: Multimodality imaging of carotid web

Vijay K. Sharma (Singapore) Neurology® 2018;91:1030-1031. doi:10.1212/WNL.000000000006571

I read with interest the ultrasound and CT angiographic (CTA) findings of carotid web. This entity is recognized more often, probably due to improved resolution of various diagnostic modalities. Duplex ultrasonography and CTA can identify large webs, especially when associated with secondary mild calcification or a superimposed thrombus. Presence of larger amount of calcium interferes with the spatial resolution of CTA.² These limitations may be overcome by high-resolution MRI (HR-MRI) of the carotid wall. HR-MRI enables visualization of the webs that are small, thin, membranous, filamentous, or diaphragm-like.^{3,4} A recent large acute stroke trial reported carotid web on the symptomatic side in 2.5% of patients.⁵ In an ongoing prospective study of HR-MRI in patients with >50% symptomatic carotid stenosis, we observed carotid webs of various morphologies in about 22%. Various protocols may help with in-depth evaluation of carotid web morphology, composition, as well as associated hemodynamic alterations. Whether carotid webs play an etiopathogenic role in cryptogenic stroke remains unknown. This important question can be answered only by larger prospective studies with uniform imaging protocols.

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CORRECTIONS

Clinical Reasoning: Transient speech deficits in a patient with history of medulloblastoma

Neurology® 2018;91:1031. doi:10.1212/WNL.0000000000006706

In the Clinical Reasoning piece "Transient speech deficits in a patient with history of meduloblastoma" by Schulte et al., the byline is missing degrees for two authors. The author list should have included "Tony J.C. Wang, MD" and "Angela Lignelli, MD." The authors regret the error.

Reference

 Schulte JD, Hargus G, Canoll P, et al. Clinical Reasoning: Transient speech deficits in a patient with history of medulloblastoma. Neurology 2018;91:e1196–e1201.

Financial relationships between neurologists and industry: The 2015 Open Payments database

Neurology® 2018;91:1031. doi:10.1212/WNL.000000000006707

In the Contemporary Issues piece "Financial relationships between neurologists and industry: The 2015 Open Payments database" by Ahlawat and Narayanaswami, there is an error at the top of the second column on page 1065, which should state "The payments to these 6 neurologists totaled \$259,858" rather than "The payments to these 6 neurologists totaled \$2,59,858." The authors regret the error.

Reference

 Ahlawat A, Narayanaswami P. Financial relationships between neurologists and industry: the 2015 Open Payments database. Neurology 2018;90:1063–1070.