Conflict of Interest at Plastic Surgery Conferences: Is It Significant?

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Background: The Physician Payment Sunshine Act requires biomedical companies to disclose financial relationships between themselves and physicians. The authors compared the amount of money received by speakers at the American Society of Plastic Surgeons and the American Society for Aesthetic Plastic Surgery annual conferences with that received by the average plastic surgeon.
Methods: General payments data were gathered from the Open Payments database for physicians listed as a presenter, moderator, panelist, lecturer, or instructor at the 2017 annual American Society of Plastic Surgeons and American Society for Aesthetic Plastic Surgery conferences. Means and medians of payments to speakers were calculated for each conference. One-tail *t* tests were used to evaluate differences.
Results: The mean and median for general payments made to conference speakers at American Society for Aesthetic Plastic Surgery ($n = 75$) and American Society of Plastic Surgeons ($n = 249$) meeting were $75,577 and $861 and $27,562 and $1021, respectively. In comparison with the average general payment received by plastic surgeons (mean, $4788; median, $3209), these differences were significant (American Society for Aesthetic Plastic Surgery, $p = 0.015$; American Society of Plastic Surgeons, $p = 0.0004$).
Conclusions: The significant difference in payments to speakers at conferences compared with the average plastic surgeon suggests that biomedical companies may have influence over some of the conference content. Speakers must make clear the full extent of industry relationships that could potentially bias their presentations. (*Plast. Reconstr. Surg.* 144: 308e, 2019.)

An estimated 54 percent of plastic surgeons have industry relationships.[1] These relationships vary and range from small gifts and dinners to significant research funding and considerable consulting fees. Although it is suggested that the prevalence of these relationships is downtrending, their impact is still significant.[2] In an effort to increase transparency, the Physician Payment Sunshine Act of 2010 required companies to report any payments to physicians. However, reporting financial conflicts does not negate their impact.

Industry appears to play a significant role in the funding of research.[2] However, this is not without drawbacks. For example, research published by those with conflicts of interest tends to have more positive outcomes for the tested products, with fewer complication rates compared with similar studies published by those without conflicts of interest.[3–6] Outside of significant findings, it is also possible that the more frequently a plastic surgeon reads of a product used for a procedure, the more likely he or she is to associate and use that product for that procedure,[7] suggesting that industry can market their products by publishing more articles about them.

In addition to their influence on research, industry spends an increasingly significant amount of resources influencing physicians through their relationships with other physicians, by paying some physicians to be consultants or key opinion leaders.[8,9] Key opinion leaders are often well-known innovators in their field who are paid to

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disseminate information about a specific product or service.[10] Although they are required to disclose their conflict of interest, disclosures are frequently underreported.[11] Furthermore, disclosure may be reported only in a slide that is projected before a lecture, and may be flashed for only a few seconds, without specific information given about the relationship. Finally, despite reporting, physician-to-physician discussion remains a powerful form of marketing for biomedical companies, exerting a strong influence on physician decisions.[12]

Each year, thousands of plastic surgeons and trainees congregate to discuss the latest innovations in plastic and reconstructive surgery at annual conferences. However, little has been done to assess the role that industries may play in these research conferences. Given the significant impact industry has on research and physician-to-physician interactions, it would pose a significant ethical concern if the speakers at these conferences were disproportionately influenced by the biomedical industry. This study aims to compare the amount of money received by speakers at the American Society of Plastic Surgeons and the American Society for Aesthetic Plastic Surgery annual conferences with the amount of money received by the average plastic surgeon. In addition, the study assesses which companies are the largest contributors and may thus have the largest influence at these conferences.

METHODS

General payments and research payments data were gathered from the Open Payments database for each physician listed as a presenter, moderator, panelist, lecturer, or instructor at the 2017 annual American Society of Plastic Surgeons and American Society for Aesthetic Plastic Surgery conferences for the years 2016 and 2015. General payments include payments for consulting fees, speaking fees, travel and lodging, food and beverage, honoraria, and royalty and license fees. General payments do not include use of a product for up to 90 days per year, use of equipment for up to 90 days per year, and donations to an affiliated foundation. An average general payment and research payment value was calculated between the 2 years, as significant differences over the 2 years were observed. The companies responsible for each payment and the amount they paid each physician were also aggregated. Speakers were excluded if they could not be found in the Open Payments (i.e., foreign plastic surgeons).

Statistical Analysis

All statistical analysis was performed using MATLAB (MathWorks, Natick, Mass.). Means, medians, and ranges of payments to speakers were calculated for each conference. The distribution of payments at each conference was evaluated for skew and kurtosis and for multimodality using the dip test. Skew measures the degree of asymmetry of a distribution: the larger the skew, the more a distribution lies to one side of the mean than the other (i.e., the farther the median from the mean). Kurtosis measures the degree of tailedness to the data: the larger the kurtosis, the more data are distributed in the tail. Skew and kurtosis combined can give a quantitative sense of the distribution of the data; for example, a large positive skew and large kurtosis in this study would suggest the distribution of many payments that are above the mean in a large tail. The dip test (alpha = 0.01) measures the degree of bimodality of the data, meaning a significant dip test result would suggest that a sample set results in two separate distributions. In this study, a significant dip test would suggest that the payments fell into two different groups, with one being lower and the other being higher. Mann-Whitney *U* tests (alpha = 0.01) were used to compare payments across the two conferences, and to compare the average payment received by physicians at each conference to the national average payment received by plastic surgeons. The sum of all payments, the average amount paid per physician, and the number of payments from each company were also calculated. The role of each individual was also collected, and the average amount paid for each role and the number of people with each role was calculated. In addition, the category under which the payment was received (e.g., food and beverage or consulting fee) by the top five individuals at each conference was collected for the year 2016, as some were missing data for 2015, and the average amount paid across the different categories and the percentage each category received of the total amount paid for the top five was calculated. Mann-Whitney *U* tests (alpha = 0.01) were used to assess for significance across payment category.

RESULTS

There were a total of 100 physicians who presented at the American Society for Aesthetic Plastic Surgery meeting and 337 who presented at the American Society of Plastic Surgeons meeting. Information regarding payments was gathered for 75 physicians for the American Society for

Aesthetic Plastic Surgery meeting and 249 physicians for the American Society of Plastic Surgeons meeting, and data for the remaining presenters were not available because they were either international presenters or residents. The distribution of these payments is shown in Figure 1. Both American Society for Aesthetic Plastic Surgery and American Society of Plastic Surgeons meetings were skewed to the right (American Society for Aesthetic Plastic Surgery, 8.42; American Society of Plastic Surgeons, 9.67), and both exhibited evidence of kurtosis (American Society for Aesthetic Plastic Surgery, 72.3; American Society of Plastic Surgeons, 116). The dip test revealed that both distributions were unimodal (American Society for Aesthetic Plastic Surgery, 0.0078, p = 1; American Society of Plastic Surgeons, 0.0021, p = 1). The average amount paid to each physician at the American Society for Aesthetic Plastic Surgery meeting over 2015 to 2016 was $75,577 ± $538,270, with a median value of $861 (range, $10 to $4,669,215), and that by physicians at the American Society of Plastic Surgeons meeting was $27,562 ± $112,106, with a median value of $1012 (range, $7 to $1,191,164).

When compared to the general payments for plastic surgeons in 2016 with an average of $4788 ± $79,628 and a median of $3615 (range, 0 to $2,205,635), physicians presenting at both the American Society for Aesthetic Plastic Surgery and the American Society of Plastic Surgeons meetings received significantly more money (U = 3,790,875, U = 378,505, p < 1 E-50 for the American Society for Aesthetic Plastic Surgery and American Society of Plastic Surgeons meetings). A total of 12.8 percent of American Society of Plastic Surgeons speakers and 13.2 percent of American Society for Aesthetic Plastic Surgery speakers received more than $37,000, or more than 10 percent of the average annual salary of plastic surgeons of $371,000.[13] In addition, 17 American Society of Plastic Surgeons speakers (6.7 percent) and four American Society for Aesthetic Plastic Surgery speakers (5.3 percent) received over $100,000 from industry.

A total of 46 companies made payments to American Society for Aesthetic Plastic Surgery speakers, and a total of 113 companies made payments to American Society of Plastic Surgeons speakers. The details on payments are provided for the top 10 companies at each conference in Tables 1 and 2. Allergan had the top industry presence at each conference, paying $4,973,340 to roughly 46 percent of the speakers at the American Society for Aesthetic Plastic Surgery meeting and $1,598,901 to 34 percent of the speakers at the American Society of Plastic Surgeons meeting.

The roles collected at the American Society for Aesthetic Plastic Surgery meeting included panelist, audience moderator, moderator, chair, discussant, presenter, vice chair, and representative. Moderator and audience moderator were combined into one role. The role that received the highest payment was panelist, which received on average $209,987 per person (Table 3). At the American

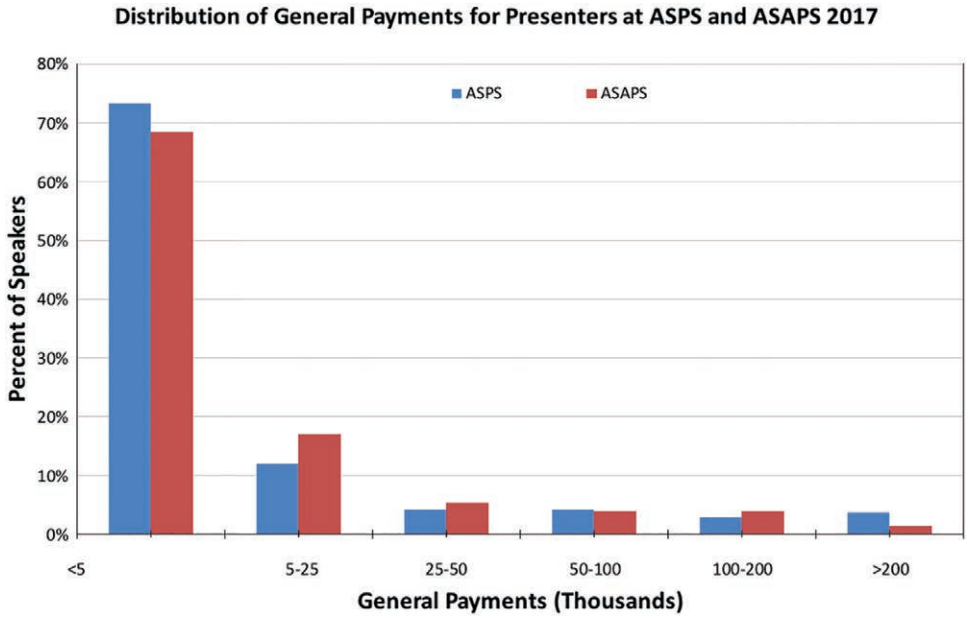

Fig 1. Distribution of general payments for presenters at the 2017 American Society of Plastic Surgeons (*ASPS*) and American Society for Aesthetic Plastic Surgery (*ASAPS*) conferences.

Table 1. Company-Specific Details for the Top 10 Companies That Made Payments to American Society for Aesthetic Plastic Surgery Speakers

Company	Total Paid ($)	Average Paid ($)	STD ($)	No. of Payments	Speakers Paid (%)	*z* Score	*p*
Allergan	4,973,341	108,116	677,688	46	46	42.84	0.00
Mentor Worldwide LLC	194,388	5554	20,187	35	35	0.38	0.70
Merz North America	126,456	4684	14,616	27	27	0.06	0.95
Galderma Laboratories, LP	117,309	3910	12,346	30	30	–0.20	0.84
Musculoskeletal Transplant Foundation, Inc.	38,653	2973	9491	13	13	–0.34	0.74
Sofregen Medical, Inc.	28,080	28,080	—	1	1	1.44	0.15
LifeCell Corp.	27,668	1318	3790	21	21	–0.89	0.37
Sientra, Inc.	25,638	986	2267	26	26	–1.09	0.27
Merz Pharmaceutical GmbH	25,239	3155	5415	8	8	–0.23	0.82
TELA Bio, Inc.	16,293	16,293	—	1	1	0.72	0.47

Table 2. Company-Specific Details for the Top 10 Companies That Made Payments to American Society of Plastic Surgeons Speakers

Company	Total Paid ($)	Average Paid ($)	STD ($)	No. of Payments	Speakers Paid (%)	*z* Score	*p*
Allergan	1,598,902	14,150	129,954	113	34	6.02	0.00
Mentor Worldwide LLC	512,899	6106	23,643	84	25	0.85	0.40
LifeCell Corp.	929,960	11,341	45,744	82	24	3.63	0.00
Sientra, Inc.	81,440	1537	7495	53	16	–1.29	0.20
Galderma Laboratories, LP	17,179	419	1543	41	12	–1.56	0.12
NovaDaq Technologies, Inc.	461,324	11,829	34,726	39	12	2.68	0.01
Merz North America	68,123	1841	5829	37	11	–0.97	0.33
Musculoskeletal Transplant Foundation, Inc.	666,768	20,205	54,377	33	10	5.30	0.00
Stryker Corp.	95,971	4173	14,568	23	7	–0.10	0.92
Axogen	261,245	$ 12,440	29,073	21	6	2.13	0.03

Society of Plastic Surgeons meeting, roles included moderator, panelist, instructor, lecturer, and course director. Moderators received the largest average payment at the American Society of Plastic Surgeons meeting, with an average of $53,377 per person, but this number did not appear to be much larger than the other roles (Table 3).

The categories of payment types included royalty/licensing fees, consulting fees, nonconsulting services, travel/lodging, honoraria, ownership, food/beverage, gifts, and education. Nonconsulting services included payments as defined by the Open Payments database as "compensation for services other than consulting, including serving as faculty or as a speaker at a venue other than a continuing education program." The majority of payments for speakers at both conferences fell into the royalty and licensing fee category, with the second largest category of payments being consulting fees (Table 4). The top five largest recipients of payments at the American Society of Plastic Surgeons meeting did not receive money for ownership or education. There were no significant differences across payment types received at each conference.

DISCUSSION

The role of industry in research is increasingly coming into question. The findings in this article suggest that, given the significant amount of income paid to speakers of plastic surgery conferences compared with the average plastic surgeon, biomedical companies may have a significant influence over conference content. Other industries have found that conflicts of interest significantly impact results at their conferences; thus, it is likely that this is also the case for plastic surgery.[14]

Biomedical companies may influence conferences through research results. Studies associated with industry sponsorship and author conflict of interest have been shown to have more significant findings, more positive outcomes, fewer complications, and fewer side effects associated with the tested product than studies that do not involve industry sponsorship.[3–6,13,14] Potential reasons for these discrepancies include suppression of negative data and manipulation of data to show favorable results.[15,16] Internal documents have even shown that companies may "cherry pick" the studies they are willing to allow researchers to publish.[17] Given these findings, it is concerning that

Table 3. Average Payment Received by Role at the American Society for Aesthetic Plastic Surgery and American Society of Plastic Surgeons Meetings

	ASAPS		ASPS	
	Average Paid ($)	No. of People	Average Paid (%)	No. of People
Panelist	209,987.38	25	19,986.17	108
Moderator	8370.94	25	53,376.81	28
Instructor	1640.98	2	30,437.66	104
Discussant	15,290.98	17	—	—
Course director	—	—	12,487.19	5
Vice chair	5229.83	1	—	—
Chair	1865.47	2	—	—
Presenter	1825.23	3	—	—
Representative	1640.98	2	—	—
Lecturer	—	—	695.23	5

ASAPS, American Society for Aesthetic Plastic Surgery; ASPS, American Society of Plastic Surgeons.

Table 4. Category of Payment Received by the Top Five Speakers at the American Society for Aesthetic Plastic Surgery and American Society of Plastic Surgeons Meetings

	ASAPS		ASPS		Test Statistic	
	Average Paid per Physician ($)	Percentage of Payments	Average Paid per Physician ($)	Percentage of Payments	*U* Statistic	*p*
Royalty/license	943,131	86.02	370,083	62.28	3	0.14
Consulting	81,189	7.40	98,327	16.55	8	0.21
Nonconsulting services	37,320	3.40	29,439	4.95	4	0.25
Travel/lodging	14,407	1.31	18,828	3.17	5	0.04
Honoraria	8293	0.76	71,740	12.07	6	0.02
Ownership	7616	0.69	—	—	—	—
Food/beverage	4048	0.37	4005	0.67	49	0.41
Gift	415	0.04	—	—	—	—
Education	28	0.00	1800	0.30	—	0.09

ASAPS, American Society for Aesthetic Plastic Surgery; ASPS, American Society of Plastic Surgeons.

there are significantly higher levels of conflicts of interest present at annual plastic surgery research conferences.

It is imperative that physicians be made aware of the biases each presenter may have so that they may judge the information they receive carefully. Although research regarding the reporting of conflicts of interest at plastic surgery conferences is limited, studies indicate that at orthopedics conferences, as many as 32 to 38 percent of presenters have discrepancies in their reported conflicts of interest,[18,19] and it is reasonable to conclude that similar practices may occur at plastic surgery conferences. Unfortunately, underreporting and reporting with a lack of detail regarding the extent of conflicts of interest is not conducive to objective research data analysis by conference attendees.

Outside of research results, biomedical companies may also influence conferences through the use of key opinion leaders. Key opinion leaders are often significant contributors to research in their field, but they also receive significant amounts of money from industry. As observed in this study, payment distributions at both the American Society for Aesthetic Plastic Surgery and American Society of Plastic Surgeons conferences showed significant right-side skew, with 18 American Society of Plastic Surgeons speakers and four American Society for Aesthetic Plastic Surgery speakers receiving over $100,000 from industry. These findings suggest that large payments were concentrated among a few individuals, making it likely that key opinion leaders were present at the conference. Key opinion leaders have been shown to have a significant influence on their peer physicians, as they are often very respected in their field and understand the social dynamics and best ways to communicate with their peers.[17,20,21] Although the research of key opinion leaders may be a valuable addition to the wealth of new information presented at conferences, key opinion leaders are not easily identified, as the amount of money or product received by each physician is not disclosed. This makes it hard for conference attendees to discern the influence of industry on their peers' opinions. Disclosing the amount of money and product or device received would help meeting attendees discern for themselves how likely the presenter is to be biased.

As observed in this study, some companies paid significantly more per physician than other companies at the conferences. Appreciating which companies spent the most money at each conference should also help physicians understand biases that may be present. However, it should be noted that the amount of money paid as reported in the Open Payments database likely significantly underestimates the true impact of the company, as it does not include sample products, free product trials, contributions to institutions the speaker may be affiliated with, conflicts from industry relationships to the speaker's family, and other services (such as ghostwriting and data analytic services) supplied to physicians.

There are additional limitations surrounding the use of the Open Payments database to evaluate potential for conflicts of interest. Although the Open Payments database has the potential to underestimate the impact of a company, some of its data may also be inaccurate and as a result actually lead to overestimations of money received by an individual. Furthermore, it is important for conference attendees to keep in mind that the presence of an industry financial relationship does not necessarily indicate a conflict of interest, as presenters may be discussing a topic that is not related to their industry relationship.

The findings from this study suggest that biomedical companies have the potential to significantly impact information presented at national conferences, both through research results and through peer interactions. Despite the potential negative consequences of industry payment to physicians, industry sponsorship of training and use of new products are necessary for the education and training of plastic surgeons and has the potential to drive the advancement of innovative new ideas and products. These sponsorships often promote innovative new ideas that may otherwise not be disseminated. Physicians attending these meetings should be made aware of the full extent of the bias each presenter may have, including the monetary size of the benefits received, so that the attendee may determine the potential extent of how the bias may impact the research.

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