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Research note

Trend in industry payments to infectious disease physicians in the United States: a seven-year analysis of nonresearch payments from the Open Payments Database between 2014 and 2020

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ABSTRACT

Objective: To evaluate the trend in nonresearch payments made by the industries to the infectious disease physicians in the United States since the launch of the Open Payments Database and during the COVID-19 pandemic.

Methods: Descriptive analysis was performed for the nonresearch payments made to all infectious disease physicians listed in the Open Payments Database between 2014 and 2020. Using the generalized estimating equation models with panel data of monthly and yearly payment per physician, the payment trend since the inception of the Open Payments Database and during the early stage of the COVID-19 pandemic were evaluated.

Results: A total of 7901 (81.5%) infectious disease physicians received \$156 837 987 in nonresearch payments between 2014 and 2020. Median annual payments were \$197 to \$220. Monthly nonresearch per-physician payments and number of physicians with payments rapidly decreased by 58.6% (95% CI: 49.7%–65.9%, $p < 0.001$) and by 54.4% (95% CI: 52.7%–56.1%, $p < 0.001$) at the beginning of the COVID-19 pandemic, respectively. However, the per-physician payments and number of physicians with payments slightly increased every month right after onset of the pandemic. Both per-physician payments and the number of physicians with payments decreased by 2.6% (95% CI: 0.45–4.7, $p 0.018$) and 2.0% (95% CI: 1.6%–2.4%, $p < 0.001$) since the inception of the Open Payments Database, respectively.

Discussion: The nonresearch payments and number of infectious disease physicians accepting payments had decreased since the inception of the Open Payments Database. Furthermore, the non-research payments to infectious disease physicians suddenly decreased by more than half due to the COVID-19 pandemic. **Anju Murayama, Clin Microbiol Infect 2022;■:1**

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Introduction

In response to the increasing social demand for transparency in financial relationships between healthcare professionals and industry, the Open Payments Database, a legal-binding database of

payments made by nearly all pharmaceutical companies and device companies, has launched since 2013 in the United States [1]. This transparency initiative put pressure on physicians accepting payments from industries and led to the decline in the number of physicians receiving payments across specialties [2]. Furthermore, the rapid COVID-19 pandemic would have been estimated to have restricted the physician behaviours as well as promotional activities by the healthcare industries. However, no study has assessed the financial relationships between the U.S. infectious disease physicians

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and the industries during early stage of the COVID-19 pandemic as well as since the launch of the Open Payments Database.

Methods

This study examined the trend in the nonresearch payments made to the infectious disease physicians by the industries during early stage of the COVID-19 pandemic and since the launch of the Open Payments Database. All general (nonresearch) payments made to physicians whose primary specialty was categorized as “Infectious Disease” or “Pediatric Infectious Diseases” in the Open Payments profile database were extracted from January 2014 to December 2020. Descriptive analyses of the annual payments were performed. Trend in payments before and after the COVID-19 pandemic were evaluated by the interrupted time series (ITS) analysis using generalized estimating equation models of monthly payments per physician, as in previous studies [3,4]. As the national emergency concerning the COVID-19 pandemic was declared in the U.S. on March 13, 2020, we considered March 2020 as the onset of the COVID-19 pandemic and the period before and after March 2020 as before the COVID-19 pandemic and after the COVID-19 pandemic for the analysis of monthly trend, respectively. To stabilize the seasonality of payment patterns, we included month as a categorical variable in the monthly ITS model. As a sensitivity analysis, we also evaluated the yearly trend using the same generalized estimating equation models with individual yearly payment data. The proportion of infectious disease physicians receiving payments were calculated based on number of active infectious disease physicians reported in the Association of American Medical Colleges' Physician Specialty Data Report each year. The Gini index was used to evaluate inequality in payment distribution [4].

Results

The Open Payments Database included 7901 (equal to 81.5% of all active infectious disease physicians in the U.S. in 2019) infectious disease physicians receiving a total of \$156 837 987 general payments between 2014 and 2020. Monthly general payments per physician and the number of physicians with payments substantially decreased by 58.6% (95% CI: 49.7%–65.9%, $p < 0.001$) and by

54.4% (95% CI: 52.7%–56.1%, $p < 0.001$) at the onset of the COVID-19 pandemic (Fig. 1 and Supplemental Table 1). However, the payments and the number of physicians with payments slightly increased every month after the pandemic (Fig. 1). The payments per physician significantly decreased among the physicians with lower payments since the inception of the Open Payments Database (Supplemental Table 1). The payment trends by payment categories were described in Supplemental Figure 1. Although the payments for travel and food/beverage significantly decreased, there was fewer decrease or no change in consulting, education payments, and speaking compensations during the pandemic.

For the yearly analyses, the total annual payments decreased from \$24 831 760 in 2019 to \$13 418 203 in 2020 (Table 1). The annual payments per physician and annual number of physicians with payments decreased by 37.6% (95% CI: 28.5%–45.6%, $p < 0.001$) and 21.2% (95% CI: 19.3%–23.1%, $p < 0.001$) in 2020, the year of the COVID-19 pandemic, compared to those between 2014 and 2019, respectively.

For the payment trend between 2014 and 2019, the number of infectious disease physicians receiving payments decreased from 4715 in 2014 to 4279 in 2019, with the average relative yearly change rate of -2.0% (95% CI: -2.4% to -1.6% , $p < 0.001$). Median payments per physician ranged from \$197 (IQR: \$59–\$859) in 2018 to \$220 (IQR: \$67–\$1038) in 2015, whereas the average ranged from \$4511 (SD: \$22 428) in 2018 to \$5605 (SD: \$26 656) in 2019. There was a slightly decreasing trend in payments per physician. The Gini coefficient for annual payments per physician was 0.925, indicating that large amounts of nonresearch industry payments significantly concentrated on small number of infectious disease physicians. The top one third physicians received 98.7% (\$154 734 828) of overall payments, mainly for speaking compensations (\$69 918 633; 45%) and consulting payments (\$45 695 571; 30%). Meanwhile, food and beverage payments accounted for more than three quarters of total payments made to middle and bottom one third of physicians (Supplemental Figure 2).

Discussion

This study highlighted that the nonresearch payments made to infectious disease physicians by the pharmaceutical and medical

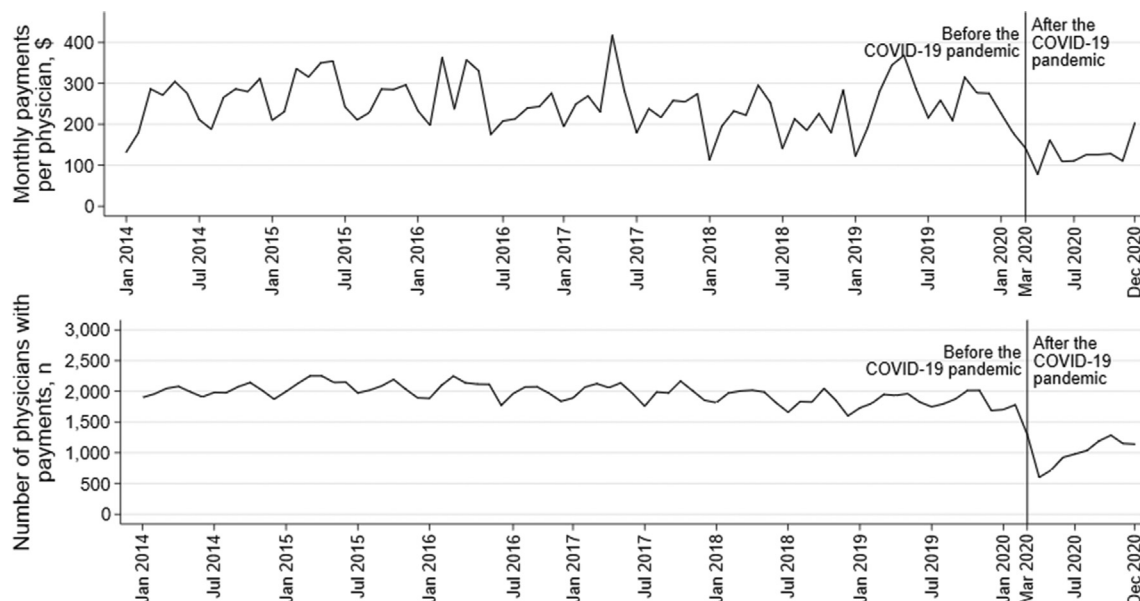


Fig. 1. Monthly trend in general payments per physician and number of physicians with payments between 2014 and 2020.

Table 1
Yearly trends in general payments per physician and number of physicians with payments among infectious disease physicians between 2014 and 2020

Variables	Programme year							Change in 2020, %	Seven-year total
	2014	2015	2016	2017	2018	2019	2020		
Total payments, \$	23 633 270	26 423 645	24 282 286	24 187 800	20 061 022	24 831 760	13 418 203	-36.3 (-61.8 to -10.6) ^a	156 837 987
Number of physicians with payments, n (%) ^d	4715 (NA) ^c	4769 (56.0)	4712 (NA) ^c	4607 (50.4)	4447 (NA) ^c	4279 (44.2)	3365 (NA)	-2.0 (-2.4 to -1.6) ^b	7901 (81.5)
Payments per physician ^e	198 (56-976)	220 (67-1038)	216 (77-1078)	218 (64-1022)	197 (59-859)	203 (61-980)	130 (33-720)	-2.6 (-4.7 to -0.45) ^b	574 (125-3770)
Median (IQR), \$	5012 (21 852)	5541 (26 772)	5153 (26 134)	5250 (26 935)	4511 (22 428)	5605 (26 656)	3988 (23 005)	-37.6 (-45.6 to -28.5) ^b	19 850 (115 785)

^a $p < 0.05$.

^b $p < 0.001$.

^c NA, not available.

^d The proportion of infectious disease physicians receiving payments were calculated based on number of active infectious disease physicians reported in the Association of American Medical Colleges' Physician Specialty Data Report each year.

^e The payments per physician were calculated based on physicians receiving one or more payments in each year.

device industries significantly decreased at the beginning of the COVID-19 pandemic in the United States. Both the payments per physician and number of physicians with payments decreased >50% at the onset of the COVID-19 pandemic. We observed there were decreasing trends in the per-physician payments and number of infectious disease physicians receiving the payments since the inception of the Open Payments Database in the U.S.

Similar to previous studies [5–7], most infectious disease physicians received small amounts of payments from the industries. The decrease in payments per physician since the launch of the Open Payments Database was observed among the physicians with lower payment values and not among those with higher payments. These findings suggest that most physicians with lower payment values quit or decreased opportunities of accepting nonresearch payments, whereas the physicians with large payments continued their financial relationships with the industries in the form of speaking and consulting payments, as in the previous study among the U.S. oncologists [6]. Although the primary aim of the Open Payments Database was to improve transparency in healthcare, the public scrutiny and pressure on physicians accepting payments was expected to prevent physicians from receiving payments and to decrease the industrial influence on downstream patient care [1]. However, our study elucidated that the longitudinal effects of the Open Payments Database differed by the payment amounts of each physician in the field of infectious disease.

Additionally, we found that there were recovering trends in both payments and number of physicians with payments after the COVID-19 pandemic. This finding indicated these decreases in payments and number of physicians with payments would be just a temporary effect due to the COVID-19 pandemic, and not continuous. The financial relationships between the healthcare industries and infectious disease physicians have repeatedly raised concerns in the U.S., as in the case of Lyme disease guideline issued by the American Society for Infectious Diseases [8] and the government advisory experts for COVID-19 vaccine [9]. However, few studies have been conducted in infectious diseases so far. Considering that even the small amounts of payments that physicians receive were not accepted by the patients [10] and influence the physician behaviours [11–13], all infectious disease physicians should pay more attention on the industry payments and refrain from accepting nonresearch payments from the industries.

However, this study also had limitations: possibilities of unmeasured confounding factors for payment trend, inaccuracies of the Open Payments Database, and underestimate of financial relationships with industries uncovered by the Open Payments Database. Nevertheless, the study elucidated the nonresearch payments and number of infectious disease physicians accepting payments had decreased since the inception of the Open Payments Database. Furthermore, we observed that nonresearch payments to infectious disease physicians suddenly decreased by more than half at the beginning of the COVID-19 pandemic in the U.S.

Transparency declaration

HS received nonresearch fees from Taiho Pharmaceutical Co. Ltd outside the scope of the submitted work. AO and TT received nonresearch fees from Medical Network Systems, a dispensing pharmacy, outside the scope of the submitted work. TT also received nonresearch fees from Bionics Co. Ltd, a medical device company, outside the scope of the submitted work. Regarding non-financial conflicts of interest, all are engaged in ongoing research examining financial and non-financial conflicts of interest among healthcare professionals and pharmaceutical companies in Japan and the United States. The other authors have no example conflicts of interest to disclose. There was no funding source for this study.

Author contributions

AM was responsible for conceptualization, methodology, software, formal analysis, investigation, resources, data curation, writing the original draft, review and editing, visualisation, and supervision. KN was responsible for methodology, software, investigation, resources, and review and editing. SK was responsible for conceptualization, methodology, investigation, resources, writing the original draft, and review and editing. MS was responsible for methodology, software, data curation, formal analysis, investigation, resources, and review and editing. HS was responsible for conceptualization, methodology, software, writing the original draft, and review and editing. TT was responsible for conceptualization, methodology, writing the original draft, review and editing, and supervision. AO was responsible for conceptualization, methodology, software, writing the original draft, review and editing, and study administration.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.cmi.2022.07.023>.

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