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Financial conflicts of interest of OncoAlert: An informal oncology professional network

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ABSTRACT

Importance: Social media platforms have allowed the formation of informal professional healthcare networks. Transparency in funding, membership requirements, financial conflicts of interest (FCOI), and messaging are necessary to ensure best practices for similar networks in the future.

Objective: To analyze the FCOIs of US-based physician members of the OncoAlert Network and appraise the content of their public Twitter account.

Design, setting, participants: This cross-sectional study assessed the FCOIs among US-based physician members of the OncoAlert Network between 2015 and 2020. FCOI data were obtained through the Open Payments Database. Additionally, tweets were examined for content analysis.

Main outcomes and measures: The number of US-based physician members with FCOIs with the pharmaceutical industry; the amount of general, research, and associated research payments; and the perceived attitude of tweet content from the OncoAlert Network Twitter account.

Results: Of 34 US physician members of the OncoAlert Network, 31 (91.2%) received general payments from pharmaceutical companies according to the Open Payments Database. Between 2015 and 2020, US physician members of the OncoAlert Network received a median of $83,600 in general payments (interquartile range [IRQ], $7,200-$221,500). Fourteen members (41.1%) received more than $100,000 in general payments. Additionally, 480 (15.7 %) of 3064 tweets retrieved from the OncoAlert Twitter account mentioned a drug or clinical trial. Of these, 31.6 % (n = 152) had a positive disposition and 3.3 % (n = 16) were negative or critical.

Conclusions and relevance: Over 90% of US physician members of the OncoAlert Network had FCOIs between 2015 and 2020. Despite the network's non-profit status, FCOIs amongst its members may influence content produced on the network's social media platforms, such as Twitter, where content discussing drugs and clinical trials are often positive and seldom negative or critical. For future informal professional networks, further research is required to establish best practices for issues such as membership requirements, funding, and FCOI disclosure.

1. Introduction

Over the past decade, there has been a surge in the use of social media by oncologists [1]. Online oncology social networks facilitate a range of behavior: discussion of recent trial results, new drug approvals, and support for patient advocacy. Additionally, social media platforms have enabled the creation of informal social networks, such as the OncoAlert Network [2]. In contrast with professional organizations such as the American Society of Clinical Oncology (ASCO) or European Society for Medical Oncology (ESMO), OncoAlert is an informal global network of oncology experts whose members vary from healthcare professionals to patient advocates. This non-profit organization seeks to strengthen cancer care education, spotlight patient advocacy organizations, and communicate current oncology trial news [2]. The OncoAlert Network engages the online oncology community via major social media platforms, annual colloquiums, meeting summaries from ASCO and ESMO, roundtable discussions, newsletters, YouTube videos, and podcasts. To our knowledge, OncoAlert is the first and largest informal online oncology network, with over 23,000 Twitter followers at the time of our study. Currently, there are no publicly available criteria or

processes for admission for membership in the network.

Given the network's engagement with the oncology community, we sought to examine the FCOIs of OncoAlert–an informal social media network–between 2015 and 2020. Additionally, we evaluated the FCOIs of physicians that the network's account followed on Twitter. Finally, we analyzed a sample of tweets to assess attitudes towards new oncology drug products and clinical trials.

2. Methods

2.1. Data selection

We sought to construct a data set of physicians linked to or amplified by the OncoAlert Network. First, we created a data set of the members from the OncoAlert Network. This was accomplished by visiting the network's website (http://www.oncoalert360.com) and referencing the member page. All persons listed on the member page at the time of our analysis were assessed to determine whether they fit the study's selection criteria. For the purposes of this study, only medical doctors practicing in the United States (US) were considered eligible for further analysis. Members who were not medical doctors or were not living in the US were excluded from the data set, as they would not be covered under the Physician Payments Sunshine Act/Open Payments provision of the Affordable Care Act at the time of our investigation [3].

Second, all accounts that the professional network followed on Twitter were extracted on March 2nd, 2022. Accounts that were (1) not based in the US; (2) OncoAlert members (as previously discovered to prevent data duplication); or (3) not medical doctors were excluded.

2.2. Financial conflict of interest analysis

FCOI analysis was assessed for each data set using the Open Payments Search Tool located at https://openpaymentsdata.cms.gov. FCOI data (2015–2020) were collected, which included general payments such as consultancy fees, honoraria, travel, accommodation, and food and beverage expenditures, as well as the pharmaceutical company that distributed the highest amount of these payments to each member. Data on research payments and associated research funding were also collected. Amounts of each type of payment were summed for an overall total. We abstracted data for physicians who were members of OncoAlert, as well as data for other physicians who were followed by the OncoAlert Twitter account.

2.3. Content analysis

Mozdeh, a big data software, was used to retrieve the most recent 3064 tweets (default settings download approximately 2700–3200 tweets per user), including retweets and quote tweets, from the OncoAlert Network Twitter account. The data were retrieved on March 2nd, 2022.

Tweets eligible for analysis either mentioned a drug or clinical trial. Three independent reviewers were assigned a portion of the sample to interpret. Reviewers coded whether the context of each tweet was positive, negative, or ambiguous. Positive tweets were considered any post that contained explicit praise for drug approvals and clinical trial outcomes through uplifting remarks, the usage of cheerful emoticons, or a combination of the two. Negative tweets were considered those that contained criticism or skepticism, constructive or otherwise. Tweets were considered ambiguous if there was an unbiased tone (i.e., objectivity, impartial without a point-of-view). Coded interpretations were blinded until completion. Additionally, reviewers coded the type of tweet (e.g., quote tweet, retweet, original tweet). Then, each reviewer was assigned a separate portion of the sample for consistency in evaluation. Conflicts were resolved with an additional blinded reviewer.

Table 1

Characteristics of US-based physicians who are (a) members of the OncoAlert Network or (b) followed on Twitter by the OncoAlert Network account but not members of the OncoAlert Network.

Characteristic	Members (n = 34)[a]	Non-members (n = 31)[a]
General Payments ($) from 2015 to 2020		
Minimum Payment	0	0
1st quartile	7200	200
Median	83,600	4900
Mean	141,000	64,000
3rd quartile	221,500	80,700
Interquartile Range (IQR)	214,300	80,500
Maximum Payment	709,200	526,000
Distribution of General Payments ($) from 2015 to 2020		
Received $0, n (%)	3 (8.8)	6 (19.4)
Received < $10,000,[b] n (%)	8 (23.5)	11 (35.5)
Received > $10,000,[c] n (%)	9 (26.4)	7 (22.6)
Received > $100,000, n (%)	14 (41.1)	7 (22.6)
Research Payments ($) from 2015 to 2020		
Minimum Payment	0.00	0.00
1st quartile	0.00	0.00
Median	1500	0.00
Mean	14,700	3900
3rd quartile	14,800	1700
Interquartile Range (IQR)	14,800	1700
Maximum Payment	196,200	27,600
Distribution of Research Payments ($) from 2015 to 2020		
Received $0, n (%)	15 (44.1)	20 (64.5)
Received < $10,000,[b] n (%)	7 (20.6)	6 (19.4)
Received > $10,000,[c] n (%)	11 (32.4)	5 (16.1)
Received > $100,000, n (%)	1 (2.9)	0
Associated Research Payments ($) from 2015 to 2020		
Minimum Payment	0.00	0.00
1st quartile	27,400	0.00
Median	1137,700	115,300
Mean	4943,800	1489,800
3rd quartile	3850,700	861,900
Interquartile Range (IQR)	3823,300	861,900
Maximum Payment	30,344,500	9622,900
Distribution of Associated Research Payments ($) from 2015 to 2020		
Received $0, n (%)	9 (26.5)	10 (32.3)
Received < $10,000,[b] n (%)	0	1 (3.2)
Received > $10,000,[c] n (%)	0	4 (12.9)
Received > $100,000, n (%)	25 (73.5)	16 (51.6)
Top 3 Companies making General Payments 2015–2020 ($)		
	AstraZeneca (569,300)	Merck (147,800)
	Pfizer (305,300)	EMD Serono (122,000)
	Merck (198,100)	Genentech (91,500)

[a] Only includes US physicians.
[b] Excludes the $0 value.
[c] Does not include values > $100,000.

2.4. Statistical analysis

R statistical software (version 2022.02.1; Build 461), Microsoft PowerPoint (version 16.61), and Microsoft Word (version 16.61) were used for descriptive statistical analysis (e.g., tendencies, frequencies, variation, position) and data visualization. A Wilcoxon rank sum test with continuity correction was performed to analyze the difference in the total general payments between OncoAlert members and the other physicians OncoAlert Network follows on Twitter. Because all data we examined are publicly available, our study did not constitute human subjects research, and we did not seek institutional review board (IRB) approval [4].
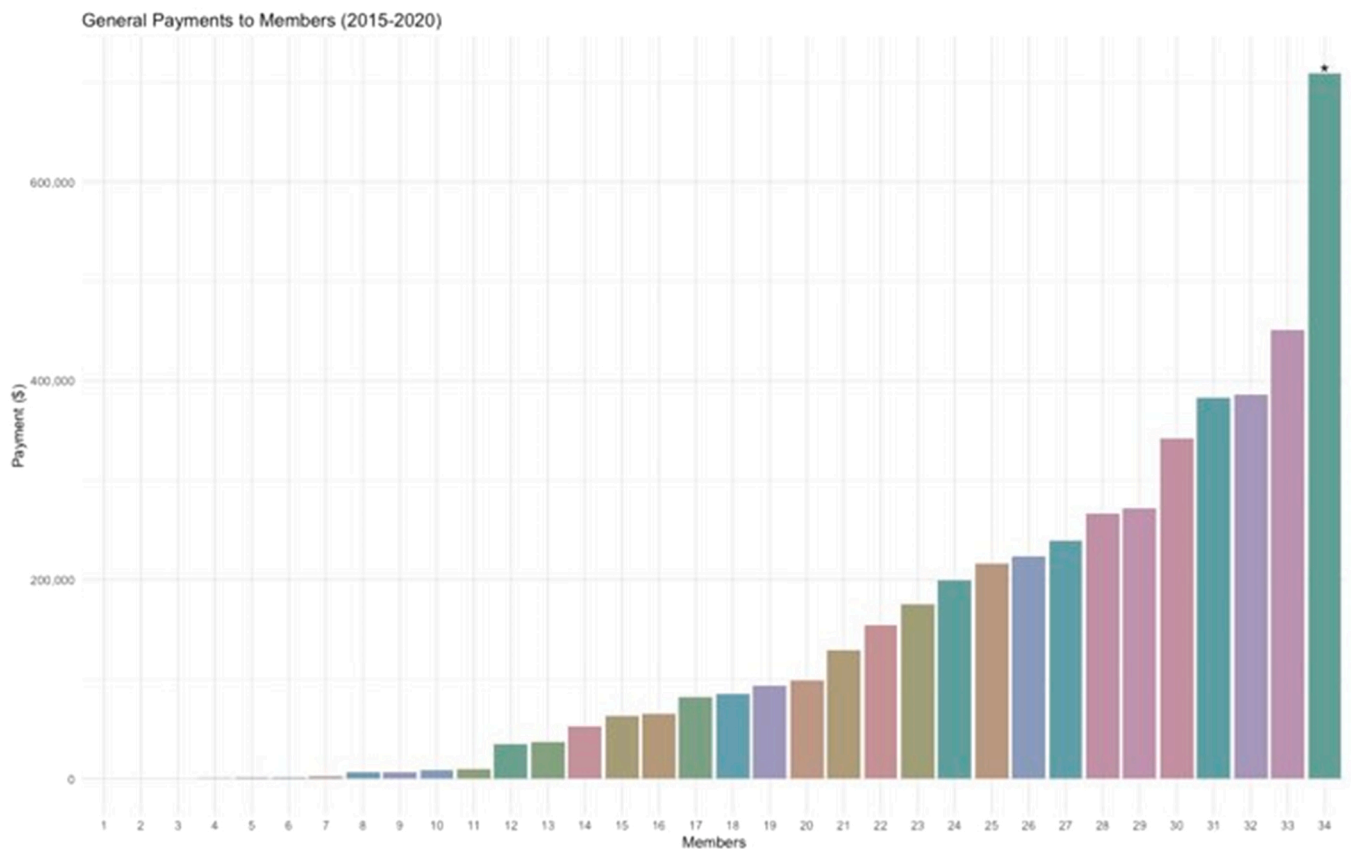
Fig. 1. The total amount ($) in general payments paid to 34 US-based OncoAlert Network physician members from 2015–2020. *One individual met outlier criteria, receiving $709,200 in general payments.

3. Results

We examined 79 members on the OncoAlert Network website, with 34 US-based physicians meeting our inclusion criteria. Among these, 31 (91.2%) had FCOIs according to the Open Payments Database.

Between 2015 and 2020, US physician members of the OncoAlert Network received a median of $83,600 in general payments (interquartile range [IQR], $7,200-$221,500), a median of $1500 (IQR, $0-$14,800) in research payments, and a median of $1,137,700 in associated research funding (IQR, $27,400-$3850,700). Fourteen members (41.1 %, n = 14/34) received more than $100,000 in general payments between 2015 and 2020 (Table 1). Fig. 1 depicts the individual payments made to these 34 US-based physician members.

We also examined 162 accounts followed by the OncoAlert Network on Twitter, of which 31 (19.1 %) were US-based physicians and not members of OncoAlert. Twenty-five of these physicians (80.1 %) had FCOIs (Table 1). Between 2015 and 2020, US physicians followed by the OncoAlert Network on Twitter received a median of $4900 (IQR, $200-$80,700) in general payments and a median of $115,300 in associated research payments (IQR, $0-$861,900). Seven individuals (22.6 %) received more than $100,000 in general payments between 2015 and 2020 (Table 1).

We found that OncoAlert members earned significantly more in general payments compared to the US-based physicians OncoAlert Network followed on Twitter ($83,600 vs $4900; p = 0.01).

The top three companies that made the most general payments to OncoAlert Network members between 2015 and 2020 were AstraZeneca Pharmaceuticals ($569,300), Pfizer Inc. ($305,300), and Merck Sharp & Dohme Corporation ($198,100). The top three companies with the most general payments to individuals followed by the OncoAlert Network on Twitter were Merck Sharp & Dohme Corporation ($147,800), EMD

Serono ($122,000), and Genentech ($91,500) (Table 1). Fig. 2 represents a plot of the general payments from pharmaceutical companies (2015–2020) to OncoAlert Network Members and those the account follows on Twitter. Fig. 3 represents a timeline of general payments (2015–2020) to US-based physician members of the OncoAlert Network and those they follow on Twitter.

Four hundred and eighty (15.7 %) of 3064 tweets retrieved from the OncoAlert Network Twitter account mentioned a drug or clinical trial. Four hundred and thirty-eight (91.3%) of these tweets were retweets, 33 (7 = 6.9 %) were quote tweets, and 9 (1.9 %) were original tweets. Among all 438 tweets, 31.6 % (n = 152) had a positive disposition, 3.3 % (n = 16) were negative, and 65.4 % (n = 312) were ambiguous (Supplemental Appendix). Table 2 provides examples of tweets and our interpretation of tone. To preserve anonymity, the sample tweets include redactions of the author's or referenced accounts' names or @handles, hashtags, and hyperlinks to other tweets or web content.

4. Discussion

The OncoAlert Network is the first of its kind, an informal professional network in the cancer social media space, amplifying the latest news in oncology. Key opinion leaders have long been central in bridging the gap between pharmaceutical companies and practicing clinicians, and as technology has advanced, digital opinion leaders have emerged [5].

Prior research has examined hematologist-oncologists active on Twitter and noted extensive conflicts of interest [6], and bias in the content of tweets, which were more likely to favor specific drug products [7]. Other research has examined the nature and content of oncology podcasts, which also often have financial biases that are rarely disclosed and, when bias is present, deliver more favorable conclusions [8].
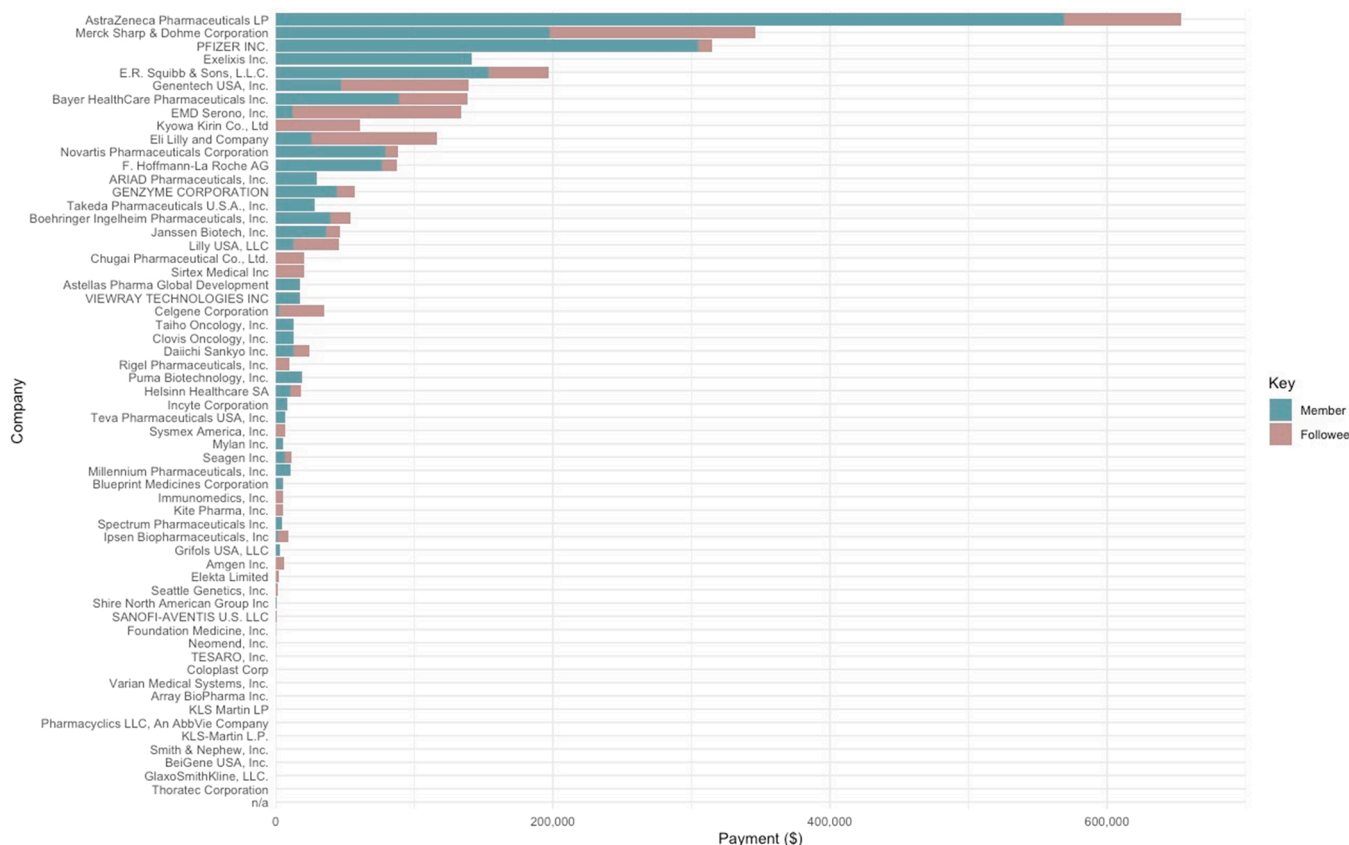
Fig. 2. General payments from pharmaceutical companies (2015–2020) to OncoAlert Network member physicians and physicians that OncoAlert follows on Twitter.

However, no research has been conducted to date on the role and nature of an informal professional network. As such, our study complements and expands on existing research and yields several unique findings.

First, the vast majority of OncoAlert members (> 90 %) have FCOIs, specifically general payments paid to the individual. The median payment to US physician members of this informal network was $83,600 between 2015 and 2020 ($\approx$ $13,933/year). This exceeds the national median annual payment of $632 to medical oncologists [9]. Additionally, OncoAlert members received significantly higher general payments than physicians followed by the professional account who are not a part of the network (median payment, $83,600 vs $4900; p = 0.01). High general payments among network physicians raise concerns regarding impartiality and interpretation of cancer trials and drug approvals, notably members of the network themselves are aware of this concern from prior publications [10].

Second, a content analysis of tweets amplified by OncoAlert shows tweets are approximately 10 times more likely to be favorable toward a drug product or clinical trial than unfavorable. Given that, in oncology, the average improvement in median overall survival for a novel drug is 2.1 months [11], and the average price per year of therapy is over $100,000 [12], it seems counterintuitive for such a high percentage of tweets to be laudatory. Moving forward, we suggest that OncoAlert avoid the amplification of unbalanced messaging to portray an impartial assessment of the cancer landscape.

Third, despite extensive review of OncoAlert's websites, tweets, and other materials, we could not identify a clear set of inclusion criteria or how membership is determined [2]. This is in contrast to established, professional organizations (e.g., ASCO). Therefore, how OncoAlert determines membership remains unknown and opaque.

Our results suggest that the creation of informal social media networks in medicine require greater scrutiny. Issues of fairness and equity may arise in membership when criteria to join are unclear. The potential

that these networks work to promote corporate interests is a salient concern. This is particularly the case when the network is enriched with physicians who receive sizable general payments, and the content they produce is overwhelmingly positive.

Members of the OncoAlert Network are no doubt caring physicians and often thought leaders in their fields, and the OncoAlert Network social media platform has a high level of engagement with the community. In place of its present promotional role, such an organization has the opportunity to offer constructive critique of trial design, drug regulation, and policy choices–shaping public discourse and facilitating positive change. Our analysis is in no way meant to disparage the network, its goals, or credo, but to aid in transparency and fairness in its processes.

What specific actions could OncoAlert and other burgeoning networks do to strengthen the reporting, transparency, and balance of content? We are careful to caution that our suggestions should be, when possible, subject to empirical testing. Yet, we see several opportunities for improvement. First, a clear statement of membership rules or criteria and a clear application process would benefit future informal medical networks. Transparency and auditing would be important to ensure that no discrimination is present on the basis of race, gender, geographic location, age, socioeconomic factors, or academic rank.

Second, clear rules regarding the handling of financial conflicts of interest may be beneficial. Ultimately, divestiture may be the ideal mechanism to handle conflict [13], but disclosure is a key pre-requisite. Elsewhere we have advised physicians tweeting regarding drug products for which they received payments from the manufacturer to label such tweets #FCOI or #FinancialConflict to indicate to the audience the potential for bias [6]. This solution should be empirically tested.

Other proffered solutions may be to ensure a balance between conflicted and unconflicted physicians, perhaps by membership quotas, although we are concerned about the risk for unintended consequences
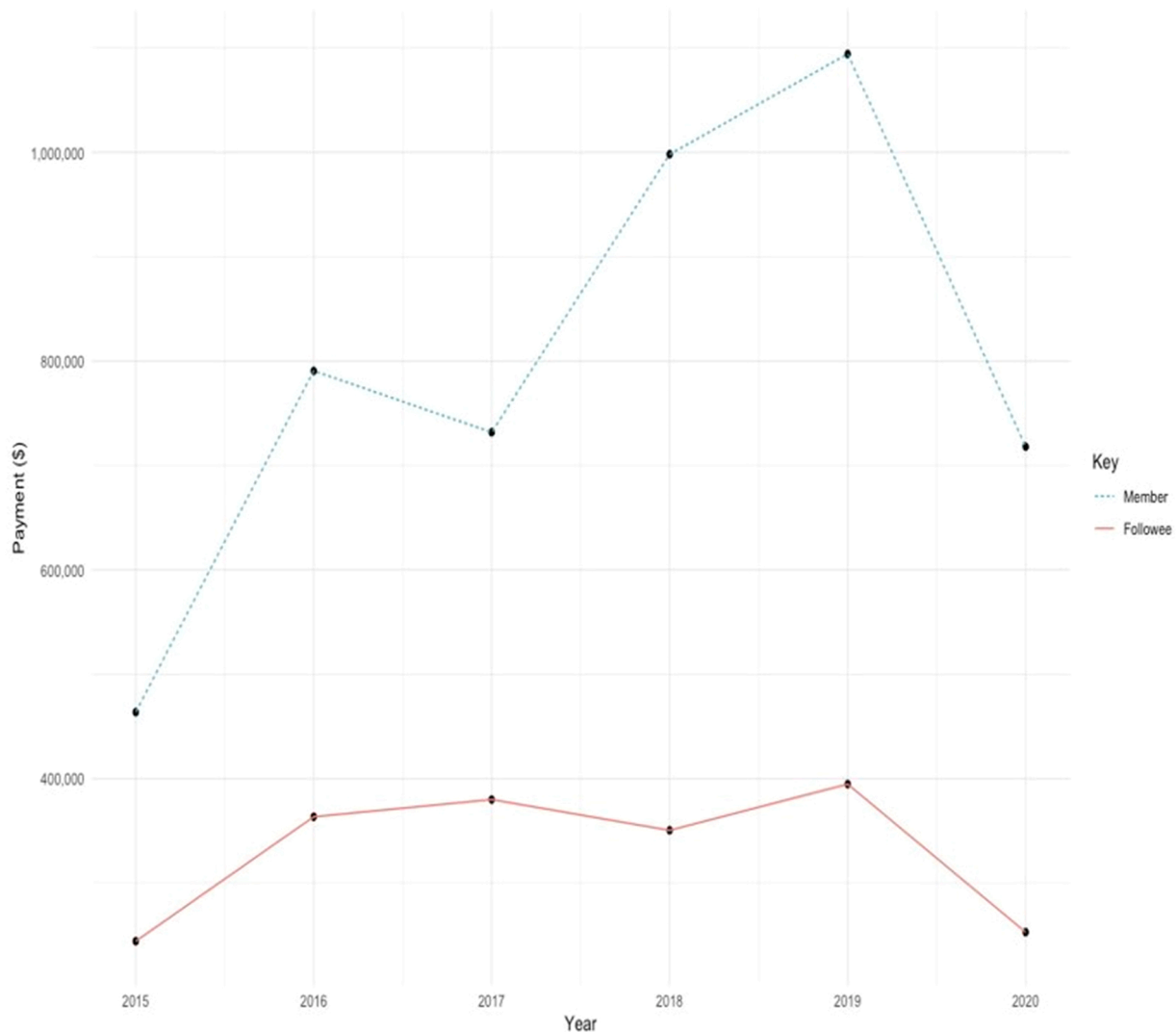
Fig. 3. Timeline of general payments (2015–2020) to US-based physicians members of the OncoAlert Network and those the OncoAlert Network follows on Twitter.

if such a measure were implemented. This may lead to a two-tiered organization and intra-organizational conflict. It might also lead organizations to heavily recruit junior faculty, who are less likely to have conflict, merely to sate this requirement, rather than to think more deeply about the role of and mitigation of conflict.

Self-assembled healthcare networks are expected to continue to arise in the realm of social media, and it is critical to establish core principles for best practices to ensure equal opportunity of membership among women and minorities, transparency in membership standards, and disclosures of conflicts of interest (both of organizational funding and among members). Additionally, future networks should state goals that are clear and tangible. Using social media to combat cancer and other diseases is a laudatory goal. At a minimum, future networks should create content that provides a comprehensive and objective evaluation of healthcare landscapes, and issue clear guidance for inclusion and reporting of conflicts of interest.

5. Limitations

Our study has two strengths and five limitations. Strengths include that this is the first analysis of an emergent phenomenon—an informal professional organization. Moreover, our content analysis was performed in duplicate, and only tweets with consensus were included for analysis. Five limitations include: we analyzed only a subset of tweets

from the OncoAlert Network Twitter account. Because this sample was taken during a specific time span, it may not be representative of the account's regular content. Second, most tweets were retweets and quote tweets, content promoted by the OncoAlert Network Twitter account but not created by it. Therefore, the underlying motive for amplifying these tweets remains limited. Third, a portion of our analysis was contingent on the subjective evaluation of these tweets. This limitation was mitigated through blind reviewing, and an additional blind review in the event of discordant interpretations. Fourth, because the Open Payments Database only includes data for US physicians, we could not collect a comprehensive FCOI profile for every OncoAlert Network physician member. At the time of analysis there were 79 members listed, however the website description indicated there were more members of the network than displayed [2]. It is possible that we did not have access to the full OncoAlert membership list. Fifth, FCOIs amongst the members of OncoAlert may not be intrinsic to the network, but rather a larger issue, the concept of key opinion leaders. Opinion leadership is fraught with apprehensions in the medical space and may signify a broader problem independent of OncoAlert membership [14–16].

6. Conclusion

In conclusion, our study found that the majority (91.2 %) of US-based physician members of OncoAlert–an informal professional

Table 2
Examples of tweets retrieved from the OncoAlert Network account, together with their coded disposition.

Disposition of Tweet	Tweet
Positive	PRACTICE CHANGING news in #▮▮▮▮ #▮▮▮▮▮▮▮. @▮▮▮▮▮▮▮▮ approved tebentafusp for advanced uveal melanoma. This is huge- first drug to show OS benefit in this patient population! Thanks to the patients who participated in this trial and congrats to the investigators! @▮▮▮▮▮▮ https://▮▮▮▮▮▮▮▮
	▯Outstanding Trophy U-01 Oral Presentation by @▮▮▮▮▮▮▮▮ Combo of Sacituzumab Govitecan and Pembrolizumab demonstrated an OUTSTANDING 34% ORR with manageable toxicities. Great honor to be a part of this GU research study. Abstract▯ @▮▮▮▮▮ https://▮▮▮▮▮▮▮▮ https://▮▮▮▮▮▮▮▮
Negative	Clearly one of the biggest disappointments in #▮▮▮▮▮▮ in 21 - CheckMate459 being negative. Median OS (in months) 16·4 nivo vs 14·7 sorafenib HR 0·85; p=0·075; protocol-defined significance level p=0·0419 not reached. @▮▮▮▮▮▮ ▯#▮▮▮▮▮▮▮▮▮ https://▮▮▮▮▮▮▮▮
	#▮▮▮ @▮▮▮▮▮▮ ▯A little bit skeptical for JAP/RESPECT trial▯ ▯First, trial used PS 2 for 70-74 and and PS 0-2 for age>75. Not necessarily good idea to mix different PS▯ ▯Don't have good explanation why very improved ORR with Ox did not translate into PS or OS either. https://▮▮▮▮▮▮▮▮
Ambiguous	Our paper in @▮▮▮▮▮▮▮ today Ph III PACIFIC posthoc analysis of irAEs from durva in stage III NSCLC: - Most common irAEs: pneumonitis, thyroid abn's - 0.8% fatal irAEs, all pneumonitis - Time from prior RT didn't impact irAE incidence/severity @▮▮▮▮▮▮▮▮ @▮▮▮▮▮▮ https://▮▮▮▮▮▮
	#▮▮▮▮▮▮ ARV-471 discussed by Dr. ▮▮▮▮▮ (COI: I am presenting author) ▯CBR 40% (100% prior CDK, 80% fulvestrant, 78% chemo) ▯<30% any grade nausea ▯<20% any grade fatigue Activity across prior fulvestrant or prior oral SERD #▮▮▮▮▮▮ #▮▮▮ @▮▮▮▮▮ https://▮▮▮▮▮▮▮▮

network–had financial conflicts of interest with the biopharmaceutical industry, and over two-thirds received more than $10,000 in general payments between 2015 and 2020. In addition, the network's Twitter account follows US-based physicians of whom (80.1%) had financial ties to the industry. When discussing drugs or clinical trials, the content of the OncoAlert network's tweets were nearly 10 times more likely to be positive than negative or critical. Additionally, no criteria for membership are available. Our analysis raises concerns that informal cancer networks may amplify bias or spin in cancer research and exacerbate inequalities in organizational membership. This study serves as a framework for encouraging future informal professional networks to discuss transparency and best practices.

Funding

Competing Interest

Authorship contribution

VP conceptualized study design; KP reviewed the literature; KP, AK, and AH curated data; VP and AH reviewed and confirmed abstracted data; KP wrote the first draft of the manuscript; and all authors reviewed and revised subsequent and finalized draft of the manuscript.

Declaration of Competing Interest

Appendix A. Supporting information

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