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Mapping of Health Communication and Education Strategies Addressing the Public Health Dangers of Illicit Online Pharmacies

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Illicit online pharmacies are a growing global public health concern. Stakeholders have started to engage in health promotion activities to educate the public, yet their scope and impact has not been examined. We wished to identify health promotion activities focused on consumer awareness regarding the risks of illicit online pharmacies. Organizations engaged on the issue were first identified using a set of engagement criteria. We then reviewed these organizations for health promotion programs, educational components, public service announcements, and social media engagement. Our review identified 13 organizations across a wide spectrum of stakeholders. Of these organizations, 69.2% ($n = 9$) had at least one type of health promotion activity targeting consumers. Although the vast majority of these organizations were active on Facebook or Twitter, many did not have dedicated content regarding online pharmacies (Facebook: 45.5%, Twitter: 58.3%). An online survey administered to 6 respondents employed by organizations identified in this study found that all organizations had dedicated programs on the issue, but only half had media planning strategies in place to measure the effectiveness of their programs. Overall, our results indicate that though some organizations are actively engaged on the issue, communication and education initiatives have had questionable effectiveness in reaching the public. We note that only a few organizations offered comprehensive and dedicated content to raise awareness on the issue and were effective in social media communications. In response, more robust collaborative efforts between stakeholders are needed to educate and protect the consumer about this public health and patient safety danger.

Illicit or no-prescription online pharmacies are a growing public health concern that remains largely underrecognized in health education and promotion initiatives. Though no uniform international regulation or code specifically defines an illicit, illegal, or rogue online pharmacy, law enforcement groups, regulatory agencies, national governments, and international organizations have begun to recognize the importance of addressing this unique form of cybercrime that negatively impacts global patient safety (World Health Organization [WHO], 2011). Generally speaking, an *illicit* online pharmacy is defined as a website that dispenses prescription drugs directly to consumers while intentionally not complying with applicable laws and regulations, both foreign and domestic. The WHO has further categorized various Internet pharmacy models into legitimate, subscription, lifestyle, and no-prescription models (WHO, 2011). We use the same no-prescription designation as used by the WHO when referring to an *illicit online pharmacy*, defined as a website that “offers mail-order delivery of drugs . . . without a prescription in return for online credit card payment” (WHO,

2011, p. 11). Specifically, by dispensing prescription drugs to consumers without requiring a valid prescription, these websites are in violation of laws and regulations in the vast majority of countries that control the dispensing of prescription pharmaceuticals (Mackey & Liang, 2013b).

It is important to note that the operation of illicit “cyberpharmacies” introduces several patient safety concerns. These include consumers gaining unregulated access to potentially fake, fraudulent, falsified, counterfeit, and substandard medicines that have the potential to injure and even result in patient death (Cicero & Ellis, 2012; Fittler, Bösze, & Botz, 2013; Institute of Medicine, 2013; Jena, Goldman, Foster, & Califano, 2011; Liang & Mackey, 2009; Mackey & Liang, 2013a, 2013b; Mackey, Liang, & Strathdee, 2013; Orizio et al., 2010). Furthermore, this global public health threat extends beyond national borders given the current lack of centralized governance over the Internet and fragmented regulation of online marketing (Mackey & Liang, 2013b). Accelerating the growth in this illicit digital enterprise is the constantly increasing volume of Internet users as a consequence of improved accessibility to the Internet through both traditional Internet access and mobile technology, and growing utilization of these technologies in searching for health-related information and services (International Telecommunication Union, 2013; Mackey, Liang, Kohler, & Attaran, 2014; Pew Research Center, 2013).

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With growing utilization of health information online, the proliferation of illicit online pharmacies continues, though consumer outreach and education efforts communicating the risks associated with these websites remain relatively insignificant in comparison to the variety and volume of aggressive online marketing used by Internet pharmacies to target consumers. This is alarming, given that organizations such as the National Association of Boards of Pharmacy (NABP) have reviewed more than 10,500 online pharmacies and found that 97% of sites visited were not in compliance with applicable pharmacy laws and practice standards specific to the regulation of the sale of prescription drugs online in the U.S. market (NABP, 2011, 2012). Adding additional context to this problem are results from a recent U.S. Food and Drug Administration (FDA) survey of adult Internet consumers indicating that nearly 1 in 4 (23%) respondents reported buying a prescription medicine online, even though 29% of these same respondents stated that they lacked confidence in making safe online drug purchases (FDA, n.d.).

Though consumers may have existing suspicions about online pharmacies, they often turn to this method of medicine sourcing because of readily available Internet access, the convenience of ordering online, the ability to have medicines directly shipped to their home, and the lower prices of medicines online (Liang & Mackey, 2009; Orizio et al., 2010, 2009). To foster this demand, illicit online pharmacies use misleading online marketing strategies, including misrepresenting the legality of importing medicines from foreign countries, informing consumers that a medical questionnaire or other form of online consultation can replace a valid prescription, and misrepresenting the location of their operation or business (i.e., many illicit online pharmacies claim to be Canadian though they operate in other riskier markets; Liang & Mackey, 2009; Mackey & Liang, 2013b). Specifically, illicit online pharmacies utilize various marketing mediums including Web ads, e-mail spam, affiliate networks, social media, and other forms of direct-to-consumer marketing in order to reach a broad demographic of consumers online (Mackey & Liang, 2013a, 2013b; Orizio et al., 2010, 2009).

Despite existing concerns over illicit online pharmacies as a patient safety hazard, stakeholders engaged on this issue have not been identified or assessed regarding their activities in educating the public on the dangers presented by illicit online pharmacies. Hence, we wished to identify and characterize current health promotion activities targeted at illicit online pharmacies by various public health, drug regulatory, law enforcement, and civil society stakeholders and measure their utilization of social media and other communication strategies.

Methods

Identification of Illicit Online Pharmacy Advocacy Organizations

We first conducted a review to identify organizations that are currently actively engaged on the illicit online pharmacy issue. This was accomplished by searching the PubMed/MEDLINE and Google Scholar databases to review the peer-reviewed literature for discussion about organizations addressing illicit online pharmacies (searched September 1, 2013, to September

28, 2013). We also conducted general Google search engine inquiries (searched September 1, 2013, to September 28, 2013) using key words associated with illicit online pharmacies in order to identify organizations engaged on the issue using sources including news reports, press releases, organization websites, and public service announcements. Key words and phrases searched included *Internet pharmacies*, *online pharmacies*, *rogue online pharmacies*, *online pharmacy awareness*, *online pharmacy consumer awareness*, *online pharmacy health behavior*, and *buying drugs online*. Organizations that met at least one or more of the following criteria were identified as engaged on the illicit online pharmacy issue:

1. Have dedicated programs associated with outreach to patients on the risks of illicit online pharmacies;
2. Provide services or technical assistance to address illicit online pharmacies and also engage in public awareness;
3. Have official documents or public statements recognizing the risks posed by illicit online pharmacies and have committed to addressing the issue; and/or
4. Create or enforce the laws, policies, and regulations regarding online pharmacies or otherwise engage in public safety measures attempting to address illicit online pharmacies.

Assessment of Health Promotional and Education Efforts

After identifying qualifying organizations, we then reviewed each identified organization's website to establish whether consumer engagement specific to online pharmacies actually existed. If such health promotion was present, the types of communication and outreach the organization utilized were then documented and reviewed. We note in some cases that the general outreach mechanisms may not have been singularly focused on consumer awareness of online medicine safety but may nevertheless have contained pertinent safety information regarding online pharmacies. After the organization's initial website review, we then assessed any Internet pharmacy-related programs and initiatives, official documents, and whether the organization used the popular social media platforms Facebook and Twitter. Online pharmacy consumer awareness and engagement efforts were documented for all identified stakeholders and included general safety information, educational videos, links to other websites and outreach programs, press releases, fact sheets, e-mail updates, and other applicable materials.

Both Facebook and Twitter pages, if the organization participated in this method of social media-based communications, were monitored for 6 months (October 1, 2013, to March 31, 2014). Over this period, the number of posts and/or tweets that were directly related to consumer protection and information regarding illicit online pharmacies was tracked and recorded for descriptive analysis. For Facebook pages, the total number of likes (current as of July 2014) for each organization was registered and recorded. The use of this quantitative measure enabled us to assess the potential number of users who were exposed to content the organization posted, and it also represented a possible measure of user support for the organization and its overall operational goals. We then tracked and logged all Facebook posts originating from the identified organization that specifically discussed consumer awareness of online medicine safety and then

calculated the average number of likes, comments, and shares per post. This analysis provided basic information on the utilization, scope of outreach, dissemination, and popularity of such content.

For Twitter, we documented the total number of tweets that the organization had made (since joining the platform and during the study period), the percentage of total tweets discussing online pharmacies, and the number of current followers (as of July 2014.) We collected data by reviewing tweets generated by querying the Twitter search application programming interface (API) for tweets made from the specific Twitter usernames (e.g., @[USERNAME]) of the identified organizations on no less than a monthly basis. The total number of tweets that an organization had made since joining Twitter provided a basic frame of reference for the volume of communication to the organization's followers. The percentage of total tweets discussing illicit online pharmacies provided a better understanding of the priority assessed to the issue of online pharmacies in the context of the organization's overall use of Twitter. Twitter followers, similar to likes on Facebook, represented the total number of individuals who saw the tweets that the organization made. For the study period we manually tracked the total number of tweets made and then calculated the percentage of tweets specifically addressing consumer awareness of online medicine safety. From these data we were also able to determine the average number of retweets (i.e., tweets that were then reposted on another individual's or group's Twitter account) as well as the average number of individuals who tagged the tweet as one of their favorites. This analysis also provided a measure of the potential reach and popularity of such content.

Online Survey of Key Stakeholders

In order to augment findings from the review of the organization's communication strategies and social media analysis, we also developed and administered an online survey using the SurveyMonkey® platform and administered it to six employees working at organizations identified in this study. Some sample (nonspecific) titles of respondents included director of national outreach, advisor, director, and communications manager. The organizations chosen as key respondents were those that were the most actively engaged in health promotion communication activities regarding online pharmacies (see the Results section). The survey's purpose was to further explore communication engagement and media planning strategies and to measure the perception of an organization's outreach/education effectiveness directly among those working for the organizations reviewed. Specifically, the survey examined in greater detail an organization's activities in educating the public, clinicians, and policymakers about the dangers of illicit online pharmacies by asking questions to (a) identify the types of media the organization utilized in educational activities, (b) determine whether the organization had a media planning strategy, (c) identify whether the organization was active in establishing partnerships with other organizations on the issue, and (d) ask respondents to rate the overall effectiveness of their organization in different outreach/educational categories. Respondents had the choice of either including their affiliation in the survey results or keeping their responses completely anonymous. The survey was administered in June 2015, and all research activities in this phase of the study received institutional review board (IRB) approval and followed IRB guidelines.

Results

Organizations Engaged on the Issue of Illicit Online Pharmacies

The 13 organizations we identified as engaged on the public health problem of illicit online pharmacies are summarized in Table 1. The organizations comprised a variety of global stakeholders. We define a *global stakeholder* in alignment with stakeholder analysis methods used in public health as an actor who has a vested interest in an issue or policy that is being promoted through a process (Schmeer, 1999). These stakeholder categories included civil society (defined by the WHO [2016] as nonstate, not-for-profit, voluntary organizations formed by people in the social sphere), law enforcement organizations, regional organizations, drug/pharmacy regulatory bodies, private companies, trade or professional organizations, and international organizations. The most common organization types that met the study's engagement and inclusion criteria were civil society organizations and government agencies, with both categories making up 69.2% ($n = 9$) of all identified organizations.

Of the three identified civil society actors, two were focused solely on the illicit online pharmacy issue. Specifically, the Alliance for Safe Online Pharmacies (ASOP), a 501(c)(4) social welfare organization, lists participation and support from a diverse array of partnerships, including the pharmaceutical industry, pharmacy/pharmacist organizations, technology providers, health care providers, trade association organizations, and other nonprofits associated with public health and drug safety. Members and observers of ASOP consist of pharmaceutical companies (Amgen, Boehringer Ingelheim, Eli Lilly & Company, Johnson & Johnson, Merck, and Takeda) as well as associations including the American Pharmacists Association, National Association of Chain Drug Stores, and the International Pharmaceutical Federation, along with other corporations and organizations. The Center for Safe Internet Pharmacies (CSIP) is primarily composed of companies that make up the Internet ecosystem and whose services/platforms support e-commerce. CSIP's members represent some of the largest technology and service providers globally, including those from the fields of Internet advertising, search, domain name registration, shipping, and payment, such as Google, Yahoo!, Visa, MasterCard, American Express, Facebook, Microsoft, Go Daddy, UPS, and more. The Partnership for Safe Medicines (PSM) is another organization that focuses more broadly on counterfeit drugs and is composed of a group of organizations supported by a mix of members from industry, the nonprofit sector, trade associations, and health care coalitions.

In addition to civil society, two of the reviewed organizations represented law enforcement: One was the internationally based International Criminal Police Organization (INTERPOL), and the other was the U.S.-based Federal Bureau of Investigation (FBI). Three of the organizations identified also represented national drug regulators: the FDA, the U.K. Medicines and Healthcare Products Regulatory Agency (MHRA), and the General Pharmaceutical Council covering England, Scotland, and Wales. International organizations that are United Nations specialized agencies and that focus on crime prevention and

Table 1. Organizations with relevance to online pharmacy safety

Organization	Type of organization	Size of organization	Primary purpose of the organization
Alliance for Safe Online Pharmacies	Civil society (professional societies/associations)	Small	Coalition of members aimed at patient protection and access to safe online pharmacies on a global level
The Center for Safe Internet Pharmacies	Civil society (alliance/advocacy organizations)	Small	Nonprofit association dedicated to providing consumers with access to safe online pharmacies and medications
European Parliament	Government (parliamentary institution)	Large	Parliamentary institution of the European Union that serves as the legislative function of the European Union
Federal Bureau of Investigation	Government (law enforcement)	Large	U.S. government entity that focuses on federal crime investigation and serves as an internal intelligence agency
U.S. Food and Drug Administration	Government (drug/pharmacy regulator)	Large	U.S.-based agency tasked with the protection and promotion of public health through regulations and the general oversight of food and drug safety
General Pharmaceutical Council	Government (drug/pharmacy regulator)	Large	Council, formerly part of the Royal Pharmaceutical Society of Great Britain, that is responsible for the regulation of pharmacies and the pharmacist profession in England, Scotland, and Wales
International Criminal Police Organization	International organization (law enforcement)	Large	Intergovernmental organization engaged in international police efforts
LegitScript	Private company	Small	Organization that monitors and authenticates online pharmacies
Medicines and Healthcare Products Regulatory Agency	Government (drug/pharmacy regulator)	Large	U.K.-based agency responsible for regulating all medicines and medical devices and ensuring that they are safe
National Association of Boards of Pharmacy	Civil society (professional societies/associations)	Small	International organization that aids in the development, enforcement, and implementation of uniform standards for pharmacies
Partnership for Safe Medicines	Civil society (promotion of business [chambers of commerce])	Small	Coalition of organizations and individuals focused on drug safety and counterfeit drug education
United Nations Office on Drugs and Crime	International organization (United Nations specialized agency)	Large	Office established by the United Nations to concentrate on drug control and crime prevention
World Health Organization	International organization (United Nations specialized agency)	Large	Agency of the United Nations focused on international public health

international public health were also represented and included the United Nations Office on Drugs and Crime (UNODC) and WHO, respectively. A regional parliamentary institution, a private company, and a trade/professional association were also identified as participating organization types. These were the European Parliament; LegitScript, LLC; and the NABP, respectively.

Collectively, this identification and characterization of illicit online pharmacy stakeholders depicts a relatively diverse participation of entities from both the public and private sectors; from domestic and international constituencies; and covering subject areas including patient safety, information technology, crime prevention, drug/pharmacy regulation, and global public health.

Health Promotion and Outreach Activities

Engagement in health promotion by the identified stakeholders in educating consumers regarding the potential dangers of illicit online pharmacies is summarized in Table 2. Of the organization

websites reviewed, 69.2% ($n = 9$) had at least one type of health promotion outreach activity targeted to consumers regarding illicit online pharmacies. The four organizations that did not actively engage in a dedicated externally facing consumer health promotion activity included both of the international organizations (UNODC and WHO) as well as the FBI and the European Parliament.

Among the organizations that actively engaged in health promotion efforts, websites operated by drug regulators, including the FDA's BeSafeRx website (see <http://www.fda.gov/drugs/resourcesforyou/consumers/buyingusingmedicinesafely/buying-medicinesovertheinternet/besaferxknowyouronlinepharmacy/default.htm>) and the MHRA's consumer safety website (<http://www.mhra.gov.uk/Safetyinformation/Generalsafetyinformationandadvice/Adviceandinformationforconsumers/BuyingmedicineovertheInternet/index.htm>), were some of the most robust and included videos; fact sheets; downloadable information leaflets; e-mail updates; press releases; consumer reporting mechanisms; and a toolkit filled with additional downloads, such as palm cards, stickers, Quick Response Codes, and brochures. The

three civil society organizations (ASOP, CSIP, and PSM) as well as the international law enforcement agency INTERPOL also offered considerable outreach programs for online pharmacy safety, including consumer awareness and public announcement videos, fact sheets, as well as links to external websites providing additional information.

We note that INTERPOL engaged in public awareness on the issue by highlighting its coordination of international enforcement activities against illicit online pharmacies. INTERPOL's Operation Pangea is a public-private partnership initiative operated by INTERPOL that combats the sale of illegal medicines online and includes the participation of national police, health regulators, customs agencies, and organizations from the private sector. When Operation Pangea began in 2008, there were only 10 participating countries, and specific data regarding the number of commercial websites taken down and counterfeit drugs seized were not publicized (Interpol, n.d.). However, since its inception results have begun to take shape, with Operation Pangea VII in 2014 reporting 111 participating countries, 237 arrests worldwide, 10,000 websites shut down, and some 19,000 illicit online pharmacy advertisements removed from social media platforms (Interpol, 2014). Consequentially, results from Operation Pangea have been widely publicized in general media outlets. Though the overall effectiveness of Operation Pangea has not been validated, INTERPOL's broad stakeholder participation and the publicity generated from this yearly international week of action against illicit online pharmacies appears to provide important opportunities to engage in education and awareness building around the issue.

Social Media Utilization

Data on Facebook use by identified organization are summarized in Table 3. In total, 84.6% ($n = 11$) of organizations had a dedicated Facebook page that they used for a variety of communication purposes. However, of the organizations active on Facebook, only 45.5% ($n = 5$) had content specific to consumer awareness regarding online pharmacies. The number of Facebook users who liked the Facebook pages of these organizations ranged widely from only 213 users to more than 1.5 million directly attributable to the size of the organization. In fact, after we categorized the identified organizations based on size (i.e., number of employees), none of the small organizations had more than 1,000 likes. Conversely, three of the organizations with the highest number of likes were large government or international bodies: the European Parliament, the WHO, and the FBI. None of these large organizations had a post directly related to consumer awareness of online medicine safety during the review period.

Conversely, the smaller and more issue-focused organizations, including ASOP, CSIP, PSM, and LegitScript, had some of the highest levels of consumer awareness posts regarding online medicine safety, but as a group these organizations had the fewest Facebook page likes. Hence, these organizations were actively posting information on illicit online pharmacies on Facebook but did not have the same reach and impact on public awareness given that far fewer Facebook users were exposed to their content. Furthermore, the average number of likes and shares for each online medicine safety post was extremely low

(<0.91), indicating that even within these smaller and more concentrated user groups, content may not have been receiving much attention.

Table 4 summarizes the data from Twitter accounts for the 13 identified organizations. Overall, organizations were more active on Twitter than Facebook, with 92.3% ($n = 12$) having an active Twitter account. Of the organizations active on Twitter, 58.3% ($n = 7$) had content specific to consumer awareness regarding online pharmacies. The organizations also had a wide range of Twitter followers, with the least number of followers attributed to ASOP at just 178 and the highest number of followers attributed to the WHO at more than 1.34 million. This again tracked with the size of the organization, such that none of the smaller organizations exceeded 2,500 Twitter followers, and most had less than 500.

The total number of tweets by the 12 organizations with Twitter accounts and the number of tweets that were directly related to consumer awareness of online medicine safety are summarized in Table 4. As with trends observed for Facebook, we observed a general pattern emerge in which the most popular Twitter accounts had the lowest percentages of posting/content regarding online pharmacy safety. Conversely, the organizations with the fewest Twitter followers had the highest number of online medicine safety consumer awareness tweets.

Specifically, the FDA had the highest volume and number of average tweet favorites per online pharmacy awareness content compared to other organizations, including ASOP and CSIP, which are solely devoted to the issue. Although the FDA had a lower absolute percentage of tweets regarding online medicine safety, it had one of the highest levels of retweets and favorites. These findings have implications for health promotion aimed at informing consumers about Internet pharmacy risks, as organization-specific social media analytics appear to have a high degree of influence on the reach and impact of risk communication and should be considered a critical element in media planning strategies and the formation of potential organizational partnerships to better effectuate education and awareness programs for consumers.

Survey Results

Our online survey utilized a convenience sample of seven adults and yielded a response rate of six (85.7%) respondents employed by organizations identified as actively engaged on the issue, including respondents from ASOP, CSIP, LegitScript, NABP, and two respondents from organizations who preferred to remain anonymous. Respondents were asked questions about their organization's forms of communication, social media usage, media planning strategies, partnerships with other organizations, and their perception of the effectiveness of their organization's outreach and education efforts regarding the public health dangers of online pharmacies. All of the respondents stated that their organizations had dedicated patient outreach or education programs and reported using an average of three types of media in their communication strategies, with dedicated website content (100%), press releases (100%), public service announcements (83.3%), and social media (83.3%) being the most commonly utilized (see

Table 2. Health promotion communication mediums for online pharmacies

Organization	Engagement in health promotion	Types of health promotion	Website	Facebook	Twitter	RSS feed	LinkedIn	YouTube	Google +	Flickr
Alliance for Safe Online Pharmacies	Yes	Links to videos and websites Press releases Video of past presentations Government relations	Yes	No	Yes	Yes	No	No	No	No
The Center for Safe Internet Pharmacies	Yes	General safety information Links to videos and websites Public service announcement videos	Yes	Yes	Yes	No	No	No	Yes	No
European Parliament	No		Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Federal Bureau of Investigation	No		Yes	Yes	Yes	Yes	No	Yes	No	No
U.S. Food and Drug Administration	Yes	Videos and Fact sheets Press releases E-mail updates Downloads of educational materials	Yes	Yes	Yes	Yes	No	Yes	No	Yes
General Pharmaceutical Council	Yes	General safety information	Yes	Yes	Yes	Yes	No	No	No	No
International Criminal Police Organization (Operation Pangea)	Yes	Press releases	Yes	Yes	Yes	No	No	Yes	No	No
LegitScript	Yes	General safety information Links to websites	Yes	Yes	Yes	No	Yes	Yes	Yes	No
Medicines and Healthcare Products Regulatory Agency	Yes	General safety information Links to videos and websites Downloads of educational materials Leaflets	Yes	Yes	Yes	Yes	No	Yes	No	No
National Association of Boards of Pharmacy	Yes	Links to videos and websites	Yes	No	No	Yes	No	No	No	No
Partnership for Safe Medicines	Yes	Downloads of educational materials Fact sheets Press releases Drug safety alerts Links to websites E-mail updates	Yes	Yes	Yes	Yes	No	Yes	No	Yes
United Nations Office on Drugs and Crime	No		Yes	Yes	Yes	Yes	No	Yes	No	Yes
World Health Organization	No		Yes	Yes	Yes	Yes	No	Yes	Yes	No

Table 3. Consumer awareness posts on Facebook regarding illicit online pharmacies (October 1, 2013, to March 31, 2014)

Organization	Facebook page	Likes ^a	No. of consumer awareness posts	Average no. of post likes	Average no. of post comments	Average no. of post shares
Alliance for Safe Online Pharmacies	No					
The Center for Safe Internet Pharmacies	Yes	213	102	0.05	0	0.02
European Parliament	Yes	1,503,152	0			
Federal Bureau of Investigation	Yes	763,009	0			
U.S. Food and Drug Administration	Yes	155,337	1	50	10	36
General Pharmaceutical Council	Yes	910	0			
International Criminal Police Organization	Yes	27,130	0			
LegitScript	Yes	785	15	1.07	0	0.07
Medicines and Healthcare Products Regulatory Agency	Yes	856	2	1.50	2	0
National Association of Boards of Pharmacy	No					
Partnership for Safe Medicines	Yes	900	2	1	0	0
United Nations Office on Drugs and Crime	Yes	65,411	0			
World Health Organization	Yes	1,036,633	0			

^aCurrent as of July 9, 2014.**Table 4.** Consumer awareness tweets on Twitter regarding illicit online pharmacies (October 1, 2013, to March 31, 2014)

Organization	Twitter	Total tweets ^a	Twitter followers ^a	No. of tweets	Percentage of consumer awareness tweets	Average no. of retweets per awareness tweet	Average no. of tweet favorites per awareness tweet
Alliance for Safe Online Pharmacies	Yes	671	178	116	42.24	0.37	0.10
The Center for Safe Internet Pharmacies	Yes	851	371	160	80.63	0.25	0.01
European Parliament	Yes	9,662	47,900	759 ^b	0.00		
Federal Bureau of Investigation	Yes	7,162	900,000	408	0.00		
U.S. Food and Drug Administration	Yes	2,401	61,600	329	2.73	8.11	1.67
General Pharmaceutical Council	Yes	682	5,920	160	0.00		
International Criminal Police Organization	Yes	1,748	30,600	266	0.75	13	3
LegitScript	Yes	905	220	35	25.71	0.44	0.33
Medicines and Healthcare Products Regulatory Agency	Yes	177	1,896	57	1.75	2	0
National Association of Boards of Pharmacy	No						
Partnership for Safe Medicines	Yes	7,043	2,457	622	4.66	0.17	0
United Nations Office on Drugs and Crime	Yes	5,856	47,600	331	0.00		
World Health Organization	Yes	11,200	1,340,000	795 ^c	0.00		

^aCurrent as of July 9, 2014. ^bTweets between December 19, 2013, and March 31, 2014. ^cTweets between December 5, 2013, and March 31, 2014.

Table 5). Among those respondents reporting social media use, Twitter (100%), Facebook (80%), YouTube (60%) and blog sites (60%) were reported as the most utilized. These results generally align with study findings on general media and social media usage by these organizations.

Despite widespread use of different forms of media, only half ($n = 3$) of respondents reported actually having a media planning strategy in place to measure the effectiveness of their outreach/education activities. The absence of a media planning strategy could consequentially have an impact on the dissemination of content, number of impressions/level of public exposure, and effectiveness of countermarketing campaigns. In contrast, investment in partnership building on the issue was robust, with all respondents reporting that they currently partnered with other organizations to improve public outreach and education on the issue. Many of these partnerships were concentrated within respondent networks, with ASOP and CSIP the most represented in partnership networks, though other organizations not reviewed in this study were also named. It remains to be seen whether these partnership and alliance-building strategies will actually translate to comarketing or joint communication campaigns, as few were observed during the study period. Finally, respondents' perceptions regarding the effectiveness of their organization's outreach and education efforts were positive overall. Respondents reported a weighted "above average" rating (Likert scale of 1–5, with 1 representing *extremely poor* and 5 *outstanding*) for overall effectiveness of outreach and education efforts, with partnership building/alliance and public outreach having the highest positive response ratings (see [Figure 1](#)).

Limitations

Our study has certain limitations. We undertook a review and conducted online search queries to identify stakeholders actively engaged on the issue of illicit online pharmacies and also conducted a review of social media content and analytics used by identified organizations. These searches were conducted at a

prescribed point of time, with the results similarly limited to the study period examined. Since our review was conducted, identified organizations may have increased or diminished their online presence and social media engagement. Also, new organizations have emerged with the aim of educating the public on the dangers of illicit online pharmacies. For example, one new online campaign addressing both Internet pharmacies and counterfeit drugs that was not assessed, called Fight the Fakes (www.fightthefakes.org), is notable given its diverse partnership network, widespread use of social media platforms, and relatively robust content offering. Assessment of social media-derived analytics also has its limitations. Specifically, the number of likes may not be an accurate or valid indicator of content reach, public engagement, or advertising effectiveness, as these metrics can be fraudulently purchased online (Sullivan, 2014). Our sample of Twitter data might also have been limited in scope, as we used publicly available data from the Twitter search API and did not query the full Twitter firehose, which requires a fee to gain access. Furthermore, our online survey results were limited to a small convenience sample of a subset of organizations that we examined during the study period and are not a representative sample of stakeholders or consumer perceptions on the issue.

Discussion

The public health threat of illicit online pharmacies is a global concern, as it is enabled by digital technologies that lack appropriate monitoring for illegal activity and misleading marketing that is aimed at consumers (Mackey & Liang, 2011, 2013b; WHO, 2011). The lack of regulation and ease of establishing an online pharmacy allows unscrupulous actors to take advantage of online anonymity, an increasingly accessible e-commerce environment, and fragmentation of legislation that regulates the marketing and sale of medicines online (Liang & Mackey, 2009; Mackey & Liang, 2013b). Specifically, a survey of WHO member states found that 66% of the respondents'

Table 5. Respondents' use of media to educate the public or other stakeholders

Answer option	%	Count
Dedicated website content	100.0	6
Public service announcements	83.3	5
Press releases	100.0	6
Educational offerings/courses	33.3	2
Print media	50.0	3
Radio media	33.3	2
Television/broadcast media	33.3	2
Internet ads/promotion	66.7	4
Mailing lists	66.7	4
Customized educational materials	33.3	2
RSS feed	33.3	2
Social media	83.3	5
Other (please specify)	16.7	1
Answered question		6
Skipped question		0

Note. Respondents were asked "What types of media do you use to educate the public or other stakeholders? (list all)."

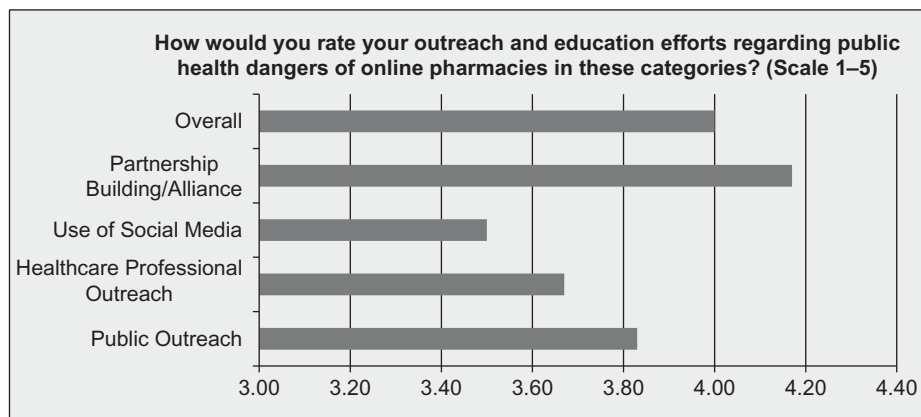


Fig. 1. Respondents' perceptions of their organization's overall outreach and education effectiveness in different categories. Respondents used a Likert rating scale from 1 to 5 (1 = extremely poor, 2 = poor, 3 = average, 4 = above average, 5 = outstanding).

countries do not have legislation regulating Internet pharmacies, with those countries with legislation tending to be the higher income countries (WHO, 2011). The same WHO report also found that *only* 47% have a government-sponsored initiative for educating the public on Internet safety (WHO, 2011). Collectively, these challenges reify the need for more robust education and consumer outreach efforts to educate patients on the potential safety risks associated with illicit online pharmacies.

Results from this study provide important exploratory information that may inform future health education and communication efforts on the issue. To begin, social media continues to play an important role in health promotion and public engagement. We specifically reviewed the use of social media by stakeholder organizations, as illicit online pharmacies themselves have been identified as incorporating social media content into their marketing strategies to increase their online presence, market to consumers, and solicit sales (Liang & Mackey, 2011; Mackey & Liang, 2013a). Hence, social media platforms have the potential to *both* promote dangerous online health behavior and also positively educate consumers on the risks of illicit online pharmacies (Rozenblum & Bates, 2013). As a response, health education and consumer outreach strategies need to more effectively leverage social media technologies to countermarket and inform consumers about the dangers of illicit online pharmacies in an effective and targeted way. This could include the use of existing website and search analytic tools such as Google Analytics and Google AdWords, both reported as tools utilized to observe consumer online behavior and target education efforts by our survey respondent from CSIP. Furthermore, other programs targeted at physical activity, smoking cessation, and weight loss have been proven effective when using social media and Internet-based programs for health promotion (Portnoy, Scott-Sheldon, Johnson, & Carey, 2008). These social media-based interventional models should also be considered for outreach and education on illicit Internet pharmacies.

Finally, social media analytics indicate that larger, more established organizations need to take the lead by partnering with other stakeholders that specifically devote content to educating

consumers about the dangers of online pharmacies but have a smaller presence and social media footprint among the general public. Partnerships utilizing this strategy are key, as they will enable specialized organizations to focus on their respective areas of expertise and also allow them access to a broader network of Internet users/consumers to improve the impact and outreach of their programs. As an example, Table 3 shows the Facebook activity for the FDA. Despite more than 150,000 individuals following the FDA and receiving its posts, the FDA posted only *one* message during the study period regarding consumer awareness of online medicine safety. With this single post, it received 50 likes, 10 comments, and 36 shares. This represents more interactions than the Facebook page impressions of all of the other 10 organizations combined, even with smaller organizations posting multiple consumer awareness messages.

This example provides a compelling reason for organizations such as the FDA, MHRA, and WHO to take the lead in increasing public safety awareness regarding the public health risks of illicit online pharmacies. In addition, these results support the conclusion that smaller organizations with targeted educational messages should formally partner with larger organizations like the FDA and MHRA, a strategy respondents appear to be pursuing based on our survey results reporting active partnership building. However, in order to ensure that organizational partnerships and communication/outreach programs can be successful, stakeholders and national governments must also take into account the need for adequate funding and greater commitment to these efforts by integrating them as a critical strategy in their broader prevention and enforcement mandates for online health and drug safety.

Conclusion

Today's patient is becoming more invested in his or her own health care, with the Internet and social media now acting as primary driving forces for health information consumption (Pew Research Center, 2013; Rozenblum & Bates, 2013). This development has enabled the proliferation of online pharmacies that are taking advantage of the rise of the e-patient and that can also leverage online marketing and social media to promote their

suspect products and services. Although stakeholders identified as engaged in this global public health issue are making some attempts to educate the public on the dangers of illicit online pharmacies, this study indicates that their efforts may be limited because of a lack of strategic partnership on communication/outreach initiatives and an overall absence of media planning strategies. In response, in order for current health promotion activities related to illicit online pharmacies to be more effective, partnerships should be formed and maintained between the subject-specific organizations that actively focus on and create targeted content, such as ASOP and CSIP, and more well-established organizations such as the FDA, MHRA, and WHO that have a greater digital presence. In addition, beyond programmatic efforts, these larger organizations should also be more directly involved in raising awareness regarding the patient safety dangers of illicit online pharmacies through their own public engagement, creating and posting their own content, and leveraging their social media footprint. All organizations should also actively pursue the development and use of media planning strategies to ensure that their campaigns are effective and have the greatest potential to educate the public. As the world continues to embrace technology and the use of tools like social media to engage patients and consumers, so must education efforts when it comes to fighting the public health dangers of illicit online pharmacies.

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Conflict of Interest

Allison Anderson (AA) is currently employed as a part-time research advisor at the Alliance for Safe Online Pharmacies (ASOP), a 501(c)(4) social welfare organization engaged on the issue of illicit online pharmacies and an organization reviewed in this study. Tim Mackey (TM) is a noncompensated member of the ASOP academic advisory panel and is also the recipient of a pilot research grant awarded by ASOP for a research project unrelated to and completely independent of this study. Both AA and TM had no involvement with ASOP when the research was first conducted and first submitted to this journal. Bryan Liang (BL) and TM have been reimbursed for travel to a Partnership for Safe Medicines (PSM) annual meeting during the past 3 years. PSM is a nonprofit membership, dues-driven organization of nonprofit public, private, academic, and patient entities supporting drug supply safety and was an organization reviewed in this study. The researchers are independent of the organizations, and none of these organizations had any role or input in the study. There was no involvement of anyone other than the authors in the conception, design, collection, planning, conduct, analysis, interpretation, writing, and discussion to submit this work. The authors

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