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Communicating about Infectious Disease Threats: Insights from Public Health Information Officers

Abstract

The public health communication challenges that arise in times of infectious disease threats (IDTs) were examined using the Risk Amplification through Media Spread (RAMS) Framework and in-depth phone interviews with 40 national, state, and local public health information officers (PIOs). Interviewees shared their experiences and insights related to how IDTs are communicated to the public, including the different types of traditional and social media used, how they develop and assess IDT messages, and their perceptions regarding the IDT risk amplification process. Theoretical and practical implications for health public relations and public health communication are discussed.

Keywords: infectious disease threats, health information officers, risk amplification, social media, health communication

Communicating about Infectious Disease Threats: Insights from Public Health Information Officers

Introduction

In the past few years, cases and outbreaks of influenza, Ebola, Zika, Dengue fever, and foodborne illness in the United States have highlighted the importance of sound and effective infectious diseases-related communication, including by public relations practitioners who are often engaged in crisis and risk communication responses (Akpabio, 2008; Bowen & Heath, 2007; Parmer et al., 2016). Infectious diseases, which often can be quickly spread by human-to-human, water, food, or non-human vectors (e.g., mosquitoes, ticks, fleas), can quickly imperil the health of large numbers of individuals and severely threaten the social and economic well-being of communities (Wurz, Nurm, & Ekdahl, 2013). Infectious diseases also bring many challenges to conventional conceptualizations and approaches to communication campaigns and public relations strategies (Lee, 2014), including little or no awareness or knowledge among the public or affected sub-populations regarding the disease, its transmission, or symptoms (Wray et al., 2008); lack of rapid and available diagnostic tests; illness incubation periods that range from days to weeks (e.g., it can take weeks for symptoms of hantavirus infection to appear); and much initial uncertainty regarding the actual and potential number of people affected (Lin, McCloud, Bigman, & Viswanath, 2016; Nowak & Thompson, 2007; Reynolds & Seeger, 2005; Freimuth, 2006). Communication plans and messages to the public media and key stakeholders (e.g., healthcare providers) must be developed in a context, where limited and often unverified information and high uncertainties are the initial norm (Lee, 2014). In addition, two major immediate communication channels, social media and the internet, both facilitate and inhibit effective infectious disease-related communications (Kim, 2016).

As a type of emergency risk communication, infectious disease communications is a vitally important public health element (Toppenberg-Pejcic et al., 2018). In the U.S., public health organizations, particularly the Centers for Disease Control and Prevention (CDC) and state and local health departments, are primary communicators to news media, the public, affected or potentially affected sub-populations, and key stakeholders (e.g., healthcare providers and advocacy groups) when it comes to infectious disease-related communication (Cummings, 2014; Lederberg, 2000). This is true in the case of ever-present infectious disease threats, such as seasonal influenza, HIV/AIDS, and foodborne or waterborne illnesses, as well as in the case of new or emerging threats, such as Ebola, Zika, and Dengue fever (Park & Reber, 2010; Reynolds & Seeger, 2005). These organizations, in turn, typically rely on public health information officers (PIOs) or senior health communication specialists for infectious disease-related communication plans, messaging, news media outreach and relations, social/digital media strategies and use, monitoring of traditional and social/digital media, and assessment of communication efforts (Dausey et al., 2008). Infectious disease cases and outbreaks also often engage public relations practitioners, particularly those working with government agencies involved in a response, hospitals and healthcare facilities affected or potentially affected, or experts in health and risk communications.

Despite the central role played by PIOs, senior health communication specialists, and public relations risk and crisis communication professionals in infectious disease case and outbreak responses, few studies have focused on or assessed their approaches and efforts used, especially with respect to infectious disease-related communication. Evans, Blitstein, Hersey, Renaud, and Yaroch (2008) affirmed the central role that information and communication officers played in a wide range of public health communication efforts, including mass media

campaigns, community outreach, and community mobilization, while Freimuth (2006) identified five communication challenges facing public health organizations in health crises and disasters: communicating uncertainty, selecting a credible spokesperson, collaborating with other organizations, satisfying news media demands, and quickly providing needed information. More recently, Avery (2017) found that PIOs indicated Facebook, Twitter, websites, and traditional new media outlets were the most common ways to reach the public with health crisis information. Previous studies, however, have found that public health agency PIOs reported lacking resources to undertake research or use media that enable greater targeting and tailoring of health information and that health journalists often had little interest in broader health issues facing communities (Avery, Lariscy, & Sohn 2009). A subsequent study that involved interviews with 280 local PIOs found those who practiced in large urban areas were most satisfied with their crisis planning, while those in large and smaller towns were much less satisfied (Avery & Lariscy, 2011).

Studies also have found effectively coordinating with affected communities, other organizations, and the media in emergency risk communication remains a major challenge for public health agencies (Miller et al., 2017). In evaluating the outcomes of emergency risk communications from local, national, and international public health organizations, PIOs noted “a lack of coordination among professionals working in risk communication, risk assessment, crisis communication, health promotion, social mobilization, and preparedness” (Savoia, Lin, & Gamhewage, 2017; p. S212). Similarly, Hobbs, Kittler, Fox, Middleton, and Bates (2010) found health authorities were often not well coordinated at the federal and state levels when it came to communicating up-to-date risk information.

Given the importance of timely, accurate, and coordinated communication, this study sought to gain insights into how infectious disease-related information is provided to news media and the public by U.S. public health agencies, including ethical issues and considerations. This study used a relatively new conceptual model—the Risk Amplification through Media Spread (RAMS) Framework (Vijaykumar, Jin, & Nowak, 2015)—to examine how PIOs and public health communicators approach and conduct infectious disease communication.

Theoretical Underpinnings: The RAMS Framework

Assessments of the influence of digital health communication in the discourse, sentiment, and response to epidemics has become an increasingly important focus of health communication research (Roberts, Seymour, Fish, Robinson, & Zuckerman, 2017; Sastry & Lovari, 2017). Over the past decade, social media have generated new forms of disease surveillance such as “infodemiology” (using vast amounts of digital data to detect disease signals) (Chew & Eysenbach, 2010), digital epidemiological surveillance (Eysenbach, 2011), and “participatory epidemiology” (where disease reports are sought from the public through crowdsourcing technologies) (Pagliari & Vijaykumar, 2016). An examination of social media messages in an emerging health crisis was recently conducted by Vos and Buckner (2016). Their analysis of tweets about H7N9 avian influenza found predominance of sense-making information. However, efficacy information, encouraging self-efficacy and response efficacy that lead to appropriate emergency response (Reynolds & Seeger, 2005), was found to be insufficient in the same study (Vos & Buckner, 2016). A recent systematic review of health-related disaster communication and social media (2003-2016) (Eckert et al. 2017), further revealed that: 1) social media, as public communication tools, have yet to become routine practice in government health agencies; 2) health agencies need to “contextualize the use of social media for particular populations and

crises” (p. 1); and 3) for those who use social media for health risk communication, social media can help “spread truthful information to verify information or to dispel rumors during disasters” (p. 1).

Gurman (2015) called for urgency in improving the conceptualization and operationalization of health communication models that link local, state, and national level efforts with social and behavioral change communication. Drawing from the health risk communication and social mediated crisis communication literature, Vijaykumar et al. (2015) developed the Risk Amplification through Media Spread (RAMS) Framework (see Figure 1). This framework identifies key risk communication processes, media influence pathways, and potential social media roles in publicizing infectious disease threats and influencing risk perceptions among the general public.

[INSERT FIGURE 1 ABOUT HERE]

According to Vijaykumar et al. (2015), a risk event is any instance of a public health community confirmed infectious disease threat (IDT) or outbreak (IDO) that has the potential to spread through a social system, thereby posing a real or perceived threat to the health of the general public. Centered in the RAMS framework is the public health community, which includes governmental and non-governmental entities (e.g., health departments, community-based organizations), private sector health care organizations and providers, and the scientific community (e.g., researchers who examine or comment on public health issues).

IDT information includes fact-based and opinion-based messages related to the scientific, social, physical, or mental aspects of infectious diseases, disseminated via traditional, online, or social media. However, the RAMS framework differentiates these three media types. First, it defines traditional print and broadcast media as the physical forms of print and broadcast media

(e.g., newspapers, magazines, TV, and radio). Second, online media are defined as internet-based media channels, including websites that are “static” or non-interactive (e.g., not allowing for nor providing tailored information). Third, social media refers to web and mobile-based technologies and platforms that enable content creation, collaboration, and exchange by participants and members of the public, including those provided by traditional media outlets (Vijaykumar et al., 2015). The RAMS framework thus encompasses traditional media that have websites and utilize social media to promote IDT stories, disseminate IDT stories, or solicit input for IDT stories.

The RAMS model considers a “typical” IDT scenario to be one where one or more public health agencies, in collaboration with clinical experts, confirm a case or cases of a potentially harmful transmissible disease (Vijaykumar et al., 2015). From a public communications standpoint, public health authorities would develop a risk communication strategy commensurate with the type and level of current and potential infectious disease threat, with targeted audiences including: 1) people who may have been exposed (e.g., by being in close recent contact with an infected individual or individuals); 2) the local population or community; and 3) the broader public (e.g., recent air travel by infected or infectious people can have implications for cities beyond those that have confirmed cases). Vijaykumar et al. (2015) posited that the public health community usually disseminates their messages by engaging one or more of four main communication channels: face-to-face (such as community awareness workshops or town hall sessions), print and broadcast media, online media (organizational websites providing in-depth non-interactive information), and social media (including social networking sites and others).

In general, the RAMS framework recommends tailoring communication activities based on the phase of an IDT or IDO, with the phases being preparedness, initial case(s), increasing

number of cases, “outbreak” (many cases in many places), and “recovery” (significant decrease in number of cases). The framework also recognizes the phase often affects the selection and use of communication channels (e.g., online vs. offline), media type (e.g., print and broadcast media), and type of social media engagement. All these elements, in turn, can inhibit or foster IDT information spread, which makes it important to understand the roles that PIOs play and seek to play. PIOs and their IDT communication efforts are a key RAMS component, and as such, Vijaykumar et al. (2015) recommended that an important next step would be to learn more about how PIOs use social and traditional media to communicate public health risks and crises.

In concert with that recommendation, this study sought information from PIOs about IDT communication efforts and challenges. The specific research questions were:

RQ1: What do PIOs perceive as the major IDT communication challenges?

RQ2: What are PIOs’ communication considerations and uses of different media types?

RQ3: How do PIOs develop and assess IDT messages?

RQ4: How do PIOs perceive the process of IDT risk amplification?

RQ5: What ethical challenges, if any, confront PIOs in IDT communications?

Method

Forty in-depth phone interviews were conducted with regional, state, and national public health information officers (PIOs). Respondents shared their experiences and insights related to how infectious disease threats, cases, and outbreaks are communicated to the public, including their use of traditional and social media.

Participants and Sampling

Participants were recruited through the National Public Health Information Coalition (NPHIC), a professional network of public health communicators in the U.S. Purposive

sampling strategies were employed to ensure maximum variation of locations, health organizations, and communication experiences. The NPHIC membership directory was used as a sampling frame, which allowed the researchers to search for members according to locations and job titles. All NPHIC members whose job titles were associated with PIO duties were contacted via individual email and invited to participate in a phone interview. Participants represented 23 states and a variety of rural, suburban, and urban locations. States and districts most represented in the sample included Georgia (due to the proximity to CDC offices), Maryland, Kentucky, Utah, and Washington, D.C. Participants worked in city, county, district, and state health departments; regional health commissions; national health professional associations; contractors at federal agencies; and federal government organizations. Participants' mean age was 46.4 years ($SD = 11.7$) and their mean number of years specifically as a public health PIO or communication manager was 9.8 years ($SD = 7.7$). Seventy percent identified as female and 30% as male. Specific job titles held by participants included: "Public Information Officer," "Public Health Information Administrator," "Public Health Emergency Preparedness Public Information Specialist," "Public Relations Information Manager," "Director of Communications and Outreach," "Communication Specialist," "Communications Director," and "Risk Communicator."

Procedures

Participants' informed consent was obtained at the start of the phone interview, which lasted 35 minutes on average and was audio-taped. A semi-structured interview guide included a series of 23 main questions and 12 probes. Main questions included: 1) what issues and challenges exist in communicating about infectious disease threats and outbreaks; 2) what are infectious disease communication considerations, including for different media platforms; 3)

what outcomes are sought in infectious disease-related health communication efforts and messages; 4) what are the most influential individuals or institutions for amplifying infectious disease information; and 5) what ethical considerations arise when doing infectious disease communication. Interviews were conducted until the answers to the research questions exhibited both variations and depth (Corbin & Strauss, 2008).

Analysis

Interview transcripts were analyzed following the qualitative data analysis guidelines recommended by Miles, Huberman, and Saldana (2013). Interviews were coded manually in MAXQDA qualitative analysis software, which served to organize the data and help to develop larger categories and subthemes. Following Miles et al.'s (2013) recommendations, the data were initially reduced during coding by removing irrelevant information. Data were then reorganized and merged into common themes. The last stage—conclusion drawing/verification—involved identifying and interpreting categories and patterns. In addition, illustrative example quotes were identified and linked to each main theme.

Results

Infectious Disease Types

Participants said the infectious disease threats that required the most time and attention were mosquito, tick and insect-borne diseases (e.g., Zika, West Nile virus, Lyme disease), influenza, sexually-transmitted diseases and infections (STD/STIs) (including chlamydia, syphilis, gonorrhea), food and water-borne illnesses (e.g., noroviruses, E-coli, salmonella, Legionnaires disease), vaccine-preventable diseases (e.g., pertussis/whooping cough, measles, mumps, hepatitis), meningitis, rabies, and new or emerging threats (e.g., Ebola).

Communication Challenges

With respect to *RQI*, which focused on perceived IDT communication challenges, consistent themes were:

Accurately and appropriately conveying the risk and risk severity. According to participants, communicating information about the likelihood of harm and severity of harm in a way to motivate the public or those individuals likely to be most affected to take actions without causing undue fear is a major challenge. As one participant stated, it is the importance of “getting the word out. But also stressing the urgency to get treatment or be tested.” Another noted, “We want people to know the information but we do not want to scare them. We want them to act on the message.” Along these lines, another participant stated, “I think a big thing is not to scare people. The tone and type of messaging is critical. There’s already enough wild things happening so when you are telling people about something that can affect their health, it is important to empower and not scare. Be clear about what can happen, but give people clear actionable steps.”

Quickly providing information and reaching specific groups. Many noted barriers existed when it came to quickly releasing information. One participant noted, “It’s a question of wanting to get information out quickly... And sometimes working in a bureaucracy, I feel pretty fortunate that I don’t have many layers above me where I have to get approval from this person and this person... but I do think sometimes just the time it takes to get something out [*is*] too long, it’s not going out fast enough.” Participants also noted challenges in reaching specific groups and sub-populations with information and tailored information regarding an infectious disease threat or outbreak. Part of this issue related to language/literacy and cultural barriers as well. For example, as a participant stated, a challenge was “reaching vulnerable populations whether they are vulnerable to the disease or have limited English proficiency.”

Lack of trust in government officials and information. Many participants stated there was often a lack of trust in government officials, information, and recommendations. For example, as a participant stated, “I think there’s so much skepticism. People don’t trust the government as much as they used to and that makes our job difficult. Many of these diseases supposedly haven’t been around for a long time, and people don’t know what they are or how dangerous they are.” Along these lines, another participant stated, “Most of what we do centers around prevention. There are people who do not trust government agencies, so that also can be a challenge.”

Effectively addressing rumors and misinformation. Many participants noted that it was difficult to stay ahead of, and effectively address, rumors and misinformation. As one participant stated: “That is a very careful balance, because, if you withhold (information), people make it up or hear on Facebook. So, number 1: rumor control; and, number 2: empower people to take action and minimize fear they may have...the rumors are the challenging piece, doing rumor control and listening to what people are saying and how to combat that, and what messages to say to get people to really listen to the issue.”

Lack of resources. Communication challenges were also tied to a lack of resources. For example, when asked about the biggest challenges faced, one participant stated, “Probably the best answer to give you is resources... funding is what inhibits us the most.” Other participants particularly noted the challenges with lack of “resources at the state and local level.” Success in communication, as described by participants, was resource dependent; as one participant queried, “How do you judge situations that are moving towards outbreaks when you have limited resources? At what point do you drop everything, and how do you manage that with your normal day-to-day?” [obligations]?” Some desired elements, like evaluation of success, also seemed

particularly taxing on resources. For example, as a participant noted: “Communications is not an easy thing to evaluate, so even though we can spend a considerable amount of time and resources trying to get the information out to our community, it’s not always easy to evaluate how successful that effort was. Not always having the best tools to evaluate our messaging strategies and their impact is one of the big challenges.”

Communication Considerations and Media Types

RQ2 examined PIOs’ communication considerations and uses of different media types.

The following themes were surfaced in the interviews:

Clear and understandable recommendations and messages are essential. Participants frequently noted that messages and recommendations needed to be easy for news media and targeted audiences to understand, which tied back to the earlier theme of language and literacy barriers, as a communication challenge. One participant expressed this as: “Once we get the message out, we need to make sure people understand it and follow the directions (as) they are supposed to. If it’s an infectious disease they need to know where to get medication and what they are (should be) looking out for. If they don’t know what the symptoms are because our words are too big, it (our communication efforts) will be useless and a waste of time.”

Accurate information needs to be disseminated rapidly. Many participants indicated it was vital to get accurate information out quickly to the news media and others who were or might be affected. As a participant expressed, “I always think of being first, being right and being credible. So, getting information out as quickly as we can and being as accurate as we can, providing updates when we don’t know everything at first and if we find out more info. Also making sure we are credible to the public and the media.” As another noted, “our main thing is

to get an accurate picture of what is going on. Send out accurate and timely information and make sure it gets to the right people and agencies.”

Most participants believed social media were the quickest way to share information. As one participant described, “Social media is the fastest way to get news out and wherever you are you can see it... Twitter and Facebook are critical and getting emails out quickly and that is really how we get the word out here.” As another participant described, “I would say social media first because ... the information travels so fast, and then, certainly because we have seniors in the community, then we would use newspaper and radio and traditional types but primarily at first we would use social media.”

Spokespeople and experts need to be credible and perceived as credible. The importance of effective and credible spokespeople and subject matter experts was repeatedly stressed by participants. One participant noted, “I think it is important to have a very credible and authoritative voice during an emerging public health crisis. [You want] one person as the leader of messaging for your state; [this should be] one authoritative subject matter expert to say here’s the risk, here’s the info, here’s what you should do.” As another participant expressed, “I think choosing the wrong spokesperson, putting someone in front of a camera who isn’t relatable to people or who people have an issue with, it doesn’t help with your (communication) effectiveness at all. I always like to pick the people in the Department of Health who are subject matter experts, who can explain the situation so that people understand it better.”

Tailoring communication to specific groups and sub-populations helps. Participants repeatedly stressed the importance of tailoring messages, recommendations, and materials to match the needs of targeted groups or sub-populations and/or increase the likelihood of reaching them. As one participant stated, “I think identifying the target and making sure you are using the

appropriate strategy to hit that target market (is essential). In some cases it may not always be the typical media. For instance, with syphilis we had to use some of the social media hook-up sites to make sure our messages were getting out and to the right target.” As another participant stated, “I would say know your audience, meaning identify it and then know it. Know their health literacy level, know how they best take in information, know the cultural aspects that matter and that help improve message receipt, and tailor your messages to those audiences or that particular audience as best you can.”

Use multiple media channels. A recurring theme was that a multitude of media channels were needed to achieve infectious disease threat communication objectives, whether they involved broad public awareness or reaching specific groups. Many participants noted that multiple channels were needed to achieve broader public awareness of the threat or public health recommendations and to reach the individuals and sub-populations that were or could be affected. As a participant noted, “There’s a whole different group (of people) in social media. The over 50 (years old population) still reads the newspaper. My Spanish population listens to Spanish radio, and then again sometimes we go through schools to have the kids send out our message so it changes depending on the media types.” As another participant noted, “We use newspaper, radio, television, and social media, and also share information with county partners and staff, in order to get it out as much as possible. But we use traditional and social media... so (getting information) as widely distributed as possible (is the goal).” As another participant expressed, “Audiences are very segmented so you need to be able to reach audiences where they are; so you need to have a multifunctional approach (to do that).”

Develop productive relationships with news media. In addition to utilizing different media channels, many participants noted that relationships with journalists mattered. As one

participant noted “We have TV reporters that we have really good relationships with. We go ahead and send it (information related to an infectious disease case or outbreak) out to all members of the news and we follow up with the ones we are close with... We just try to reach as many reporters as possible but usually we have found that they’ll be calling us rather than us calling them, and we try to get them to come to the press conference for emergencies.” Another participant noted “we have to make sure we have good relationships with media partners because if you don’t, it can affect how our messages are perceived by the public because it’s all about how they edit their story, the tone they use, and how they frame the story to the public.”

Development and Evaluation of Media and Public Communication

RQ3 was focused on how PIOs developed and evaluated IDT communications and messages. Key themes were:

Communication plans and responses go through a chain of command. Many participants noted the IDT communication plans and messages were developed and reviewed through a standardized process, with the process involving review and clearance through a chain of command within the organization. For example, a participant stated, “we usually utilize the incident command structure, so, essentially, it’s the PIO’s job to collect as much info as possible, provide support, and work with the information manager to determine what goes out and when it goes out.”

Subject matter experts and expertise is an essential part of the process. Many PIOs noted that the input of scientists and subject matter experts was critical when it came to formulating key messages and developing communication plans or materials. As a participant stated, “So myself and a colleague would create the flyers, fact sheets and media releases, but the content would have input from really whoever in the department is the subject matter expert for

that specific infectious disease, so our medical director, our health officer, but then our communicable disease and infectious disease nurses.”

Many possible outcomes are used to assess communication effects and effectiveness.

Participants listed a number of different types of metrics and outcomes to gauge the effects or effectiveness of their IDT communication efforts. These included process measures (e.g., media placements, media reach, appearances in the media, media visibility) as well as responses or outcomes (e.g., questions from the public, calls to call centers, increases in vaccination). For example, a participant stated: “First of all, I listen to make sure it’s (information about the threat) on TV and radio, it’s in the newspaper. I also look at how many hits I get on social media and how many times it’s shared. Also, if I get questions from the public. Then I know we need to set up a call center, and sometimes at the beginning of an outbreak we set up one, and I measure the number of calls we get to see if we are reaching the right people and if there are rumors we need to address.” Another participant stated, “we don’t get to see the effects of what we are doing at [the community] levels, but the things we look for are numbers, social media analytics, statistics on our blog, how many times has something been read, so that’s how we track our information.”

Amplification of Risk

RQ4 focused on IDT risk amplification process. Here, participants identified the types of individuals and institutions that had the greatest impact on the spread of information and how IDT information was interpreted and used by the public and targeted groups. Participants often said the most trusted sources depended on the specific disease threat. For example, a participant stated, “I don’t know exactly who everyone’s trusted agent is, but that’s going to be who people listen to.” However, most participants noted there were specific entities that many people often

considered to be highly influential, with these including news media, local experts and physicians, state and federal government health officials, and trusted community organizations.

Traditional and social media. Many participants had mixed views on the helpfulness of traditional media, but most agreed that both traditional and social media were usually influential. One participant stated: “The news media for sure. If you pitted the news media against the CDC, I’m not sure who would come out on top [as the greatest influence], which is distressing.” With respect to social media, a participant stated, “I think social media is huge, and that’s definitely where you get your followers to retweet or share the message, then it goes beyond what you can imagine as far as reach.”

Experts and physicians—including hospitals. Most participants indicated infectious disease experts, physicians, and hospitals had much influence in terms of disseminating IDT information and acceptance of IDT-related advice. Many participants, in fact, believed these individuals and institutions had the greatest influence on the public’s reaction about infectious disease threats or outbreaks. As one participant stated: “subject matter experts like infectious disease physicians... that has meaningful impact for the public.” Another participant stated, “I would say the medical community, like provider practice-based providers,” while a third said, “I would say physicians and hospitals. Of course, anytime there’s an outbreak we send information out to them and ask them to help spread our messages.” Some participants also noted the importance of individuals’ doctors: “A lot of people from what I hear anecdotally will ask their own doctor. And they might not listen to someone they don’t know on TV, but they will go to their local doctor.” As another expressed: “The medical community as a whole is our best ally.”

State and Federal government agencies. Many participants believed state and federal government officials and experts were the most influential IDT communication sources. One

participant stated, “I would say the CDC would be number one, then perhaps state health department. There’s been a measles outbreak in Minnesota recently so I’d say the health department there would be more in control. It’s more of a state situation than a national one, I think those are the key agencies that people would be interested in hearing more on what they have to say.” Another participant working in federal government stated, “We are fortunate that we are a trusted agency more than other government agencies. So, if our director said, ‘the flu is really bad; go get a vaccine,’ we do believe people would listen to that and do what she just said.” Others, however, doubted the influence of government. For example, as a participant stated, “Based on what we are seeing with Zika and stubbornness, to me the CDC didn’t have the desired level of influence. We like to think they have a lot of influence but the people still elected not to listen to the guidance.”

Trusted community organizations. Many participants recognized the importance of trusted community organizations, such as faith-based organizations or organizations that have worked with the community on a particular health issue for a sustained period of time. One participant referenced a specific local health organization: “I think some of the more well-known and trusted community-based organizations that would be some of the organizations like AIDS Atlanta. These organizations have been around for years and really work with the community talking about the resources that the government has funded and have worked to disseminate a lot of that information.”

Negative effects. When asked who might have a negative effect on public reaction to an infectious disease threat, many participants mentioned news media, politicians, misinformed publics, and government officials as sources of undesired reactions. As one participant stated about news media, “Sometimes the news media tends to sensationalize things and not always

present the message in an ideal manner... there are some outlets that are more prone to do that in our state.” As another participant said about politicians’ negative influence, “Sometimes politicians... there’s always political groups looking for face time so it’s something to keep in mind.” As an example about misinformed publics, another participant stated, “I hate to say it but that’s probably more the public word-of-mouth, people spreading rumors or not having the right information: the public naysayers.” Another said: “Government officials... because they don’t understand [the threat] themselves, and they think we can very quickly get over [a disease threat] and stop it. If we don’t do it in a manner they feel is timely, then they may publicly say something that augments the public perceptions in terms of fear.”

Ethical Challenges

RQ5 focused on ethical challenges that PIOs may face in IDT communication. The major concerns that almost all participants noted were patient confidentiality and protecting the privacy of infected individuals. Participants consistently stated that their ethical standards were based in their respective organization’s policies.

Privacy of individuals. Virtually all participants emphasized the importance of protecting patient confidentiality and respecting the individuals’ privacy, although this could sometimes be difficult with some infectious diseases. As a participant stated, “You don’t want to release any identifying information, you just want to make sure that person's identity remains safe, but you (also) want to make sure people in the area know they need to protect themselves. You don’t want to give enough clues where they can target one individual.” As another participant noted, “This is not so much an ethical issue as it is a legal issue. We had consultations with our attorney general’s office when Zika first came up, about whether we would disclose if a

patient was a pregnant positive, and what steps we needed to take in order to protect that person's privacy.”

Concealment of information. Some participants noted that very early on it was sometimes necessary to not publicly disclose information or to withhold some information until more was known or confirmation was obtained. For example, a participant noted that sometimes it was necessary to not disclose some information: “If there’s a pandemic flu, one of the things they do is give the medicine to first responders, so it could be something like not telling the public where that location is, or not telling the public certain things about who’s getting vaccines first because you don’t want a riot over there.”

Achieving equal or complete access to information. Just as participants noted it was challenging to communicate effectively about the risks of infectious disease outbreaks to all individuals, this was also an ethical concern. As a participant stated: “I try to reach out to hard-to-reach persons, special needs, and vulnerable populations. One time I tried to reach impaired sensory disabilities people, and it was very difficult. The sensory impaired is a very challenging group to provide information to because they are visually and hearing impaired. So, we simulate how we provide shelters for people in those categories: how do you make a person who can’t hear understand what is going on. How do you get a person to a shelter if they can’t see?”

Sources of ethical standards. As stated above, most participants stated their IDT communication efforts were guided by their organization’s ethical guidelines. As a participant stated, “It’s from the organization; I don’t bring my personal ethics into it. Others referenced laws protecting patients’ media information, such as HIPAA: “HIPAA is a policy all health organizations have in place.”

Discussion

The increased number and visibility of infectious disease threats coupled with a dynamic communication environment brings many, often new, challenges for public health information officers and public relations professionals involved in health-related risk and crisis communication. This study sheds much light on different approaches PIOs might use to respond to major IDT challenges. Such insights help advance IDT communication theory and practice.

Responding to an Infectious Disease Threat

PIOs' responses, when viewed through the RAMS framework, provide insights into the major facets of the infectious disease communication process. First, while unfamiliar diseases can quickly get media and public attention, PIOs noted that there are actually many types of infectious diseases that can prompt the need for communication. Initially, PIOs must quickly work to identify and confirm what is currently known, identify potential spokespeople and subject matter experts, consider and begin collaborations with external organizations who can reach and influence affected populations and individuals, and develop plans for news media engagement. On the messaging front, they need to work closely with subject matter experts and program managers to determine what should be communicated (e.g., key messages), how to convey uncertainties (e.g., potential or likely risk), what advice and recommendations to provide given the current state of knowledge and the many uncertainties, and how to motivate affected individuals and groups so that public health recommendations are adopted. As the PIO interviews highlighted, effective IDT communication involves successfully dealing with competing demands, with major ones including speed (e.g., rapid information provision), accuracy, and the simultaneous need for general public and specific group awareness of the threat and ways to mitigate it. As such, productive existing relationships, established internal

processes and protocols for developing and clearing messages and materials, organizational credibility, and ability to rapidly use multiple media channels are essential.

The communication approaches and actions taken by PIOs both initially and throughout an infectious disease response align quite well with what would be projected under the RAMS framework. The framework highlights the need for, and value of, strong, established, and multiple relationships when it comes to rapidly, broadly, and strategically disseminating IDT information. As Figure 1 illustrates, when the public health community is adept at using traditional, social, and online media – and not just for directly communicating with citizens – but also for communicating with policymakers, external organizations (e.g., health professional organizations and healthcare providers), and community-based groups, the visibility, targeting, and impact of IDT messages and recommendations will be increased. The insights obtained here indicate the core concepts of the RAMS framework are, in fact, being applied by PIOs.

Implications for Infectious Disease Public Communication Practice

By themselves as well as with respect to findings from other studies involving PIOs, the themes found here revealed many structural and institutional issues affecting the performance and effectiveness IDT communication. In the initial communication stages, particularly when content and materials are being developed, PIOs face both time and resource constraints in their efforts to develop understandable and motivating messages and materials. Despite a number of highly visible and significant infectious disease threats and outbreaks in the past decade in the U.S., little progress has been made on this front. It is not surprising the five challenges identified by Freimuth (2006) still exist, but it is problematic the dearth of communication resources documented ten years ago (Avery, Lariscy, & Sohn 2009) persists. Lack of adequate resources not only makes it harder to achieve visibility in today's highly fragmented media environment, it

means PIOs and public health agencies have little or no ability to use contemporary and new approaches to increase IDT communication efficiency and effectiveness. For example, computerized data visualization, health literacy tools, and infographics improve the impact and understandability of messages and recommendations (Fagerlin, Wang, & Ubel, 2005; Hesse, Beckjord, Rutten, Fagerlin, & Cameron, 2015), while social and digital media monitoring systems can provide real-time information to guide communications, but all require resources. Further, investments are needed to strengthen PIOs' ability to tailor communication materials, use highly targeted media, and better, more consistently, assess the effects of their efforts.

It is also essential the infectious disease threat messages, materials, and recommendations created and disseminated by public health agencies and officials be trusted. Here, PIOs face challenges on at least two fronts. First, many noted the public health organizations they work for face diminishing levels of trust among the public, including because of links to political parties and politicians (e.g., in the U.S., directors of public health agencies are often appointed by elected officials). These findings mirror findings from Edelman's Trust Barometer Report (2018), which shows continued decline for trust in government entities, particularly in the U.S. where trust in government has had a record-breaking drop. A highly partisan political climate (Goethals, 2017) and declines in political approval ratings (Cassino, 2017) can affect public and sub-population trust in government agencies, including those involved in public health. When this happens, public health information, alerts, advice, and materials can be viewed with skepticism or worse, ignored. In the event of an IDT, serious harm and negative health consequences can result if public health recommendations are questioned or ignored (Wray et al., 2012). Notably, this particular trust challenge was not one mentioned in earlier studies with PIOs (Freimuth, 2006; Avery et al., 2009), and is also one that warrants further study.

PIOs noted that trust also mattered in the domain of news media engagement. For instance, PIOs identified the need to build and maintain productive working relationships with journalists and local news media before public health emergencies. One reason is to help achieve needed visibility and accuracy in stories involving infectious disease threats. Another is because journalists and news media are one of the most significant and influential amplifiers of infectious disease information. In the digital age, public health institutions need to recognize that many news media use Twitter to increase the visibility of their stories as well as to provide more and different stories on their website and social media platforms. If PIOs have established, productive working relationships with journalists and other media content creators, that can facilitate both more content and better content (e.g., fewer or no stories over-hyping a threat).

Finally, the findings obtained here reaffirm the need for PIOs and public health agencies to strategically use and integrate traditional, social, and online media in doing infectious disease communication. As PIO comments and the RAMS framework illustrate, infectious disease threat information still gets much play and attention in traditional media, making it a priority. However, PIOs and public health agencies are also likely to use social media to provide real-time alerts and updates and to drive journalists and citizens to online resources for additional information and guidance. IDT communication plans and efforts thus must be multi-faceted, responsive (including to changes in disease patterns or public health recommendations), and cognizant of the inter-relationships between various media types. They also must be equipped to identify and respond to competing demands (e.g., public and media demand for transparency) and conflicting information (e.g., from other sources of expertise or laypeople). This includes being able to identify and respond quickly to rumors and misinformation, including investing in social listening technologies.

Theoretical Implications

As the first study examining infectious disease threats (as one type of public health crisis) from a PIO perspective, it contributes to a new frontier in health public relations and public health communication research. First, the experience and descriptions were directly from PIOs who work at the frontline of public health and risk communication, which shed light on public health crisis communication theory advancement and present important research agenda for health public relations scholars. The focal issue, infectious disease threat (IDT), is one that places unique challenges on the public relations machinery because of its rapidly evolving nature which fuels public anxiety and an information environment where multiple narratives compete for attention. Given the wide array of IDTs, most of them get little or no attention. PIOs must prioritize their time and efforts when it comes to deciding whether, when, and how to amplify and disseminate information about different IDTs, including new and emerging threats.

Second, despite the observed limited resources available to PIOs, the publics and the media, according to PIOs, still seem to expect a high level of crisis management response. These findings lead to further questions in terms of what professional training and institutional support might be most helpful for PIOs to feel prepared and focused on getting their job done, which ranges from communicating to the publics and the media about non-emerging disease to informing them about IDTs. Public relations professional associations need to play a larger role in advocating for their government agency counterparts, the impact of which needs to be further examined in public health crisis theoretical model building and testing.

Third, this study is the first empirical assessment of the RAMS model, by far the only theoretical framework that has been conceptually developed to specifically understand strategic communications in IDT situations. Our study takes the first attempt to gather empirical evidence

for this new theoretical model, thus advancing public relations theory by examining IDTs as an important health issue that concerns PIOs and government health agencies at large. Our key observations are: 1) It appears traditional media often play the most significant role in IDT information amplification and diffusion; 2) It is hard for most IDTs to get amplified, therefore the next key questions for RAMS researchers to explore include when and why some IDTs get amplified and disseminated (e.g., the novelty and/or the potential severity of an IDT, the fact that PIOs are busy and have little resources, etc.); 3) Sometimes there is no need to amplify certain IDT information and amplification itself could create challenges for PIOs, which might divert PIOs' attention and efforts from dealing with more significant threats (e.g., PIOs might have to focus on Ebola communication when seasonal flu is actually a greater threat to their local community); and 4) External experts and physicians are valuable and trusted sources but underutilized in IDT amplifying and disseminating process, which need to be further included in the revised RAMS framework.

Fourth, the findings of this study provide rich descriptions of challenges and opportunities PIOs, as one unique type of public relations practitioners, are facing, which help identify key constructs and variables to be considered in health public relations theory building and empirical testing. Getting timely and accurate IDT information to the publics and the media are getting harder than ever, as PIOs need to tailor their communication approaches to local communities and draw communication synergy of both social media and traditional media (Toppenberg-Pejcic et al., 2018). In addition, the ongoing challenges IDT-related rumor and misinformation reaffirms the importance for PIOs to effectively identify misinformation and timely correct it. Given the decreased trust in government, such an effort often entails teaming up with external credible sources, such as medical and health professionals, who need to step up and

collaborate with PIOs in IDT information amplification and dissemination. Public relations practitioners, either working as in-house communication professionals in these expert groups or brought in by these expert groups as public relations counsels, need to recognize this urgent IDT communication need and be prepared to be more proactive. By putting forward a picture of reality up front, our study paves the way for developing more actionable communication guidelines that are grounded in evidence-based research and tailored toward PIOs at local, state, and federal levels.

Limitations and Future Directions

Although the study provides both significant practical and conceptual applications, it is important to put these findings in context by highlighting study limitations and suggesting future research directions. First, as the first empirical assessment of the RAMS model, this study only focused on the perspective of the PIOs. Future research needs to examine the remaining components of the RAMS model, especially public's cognitive, affective and behavioral responses to different types of IDTs as well as how they seek, share and act upon information from PIOs and other influential health information sources. Equally, there is a need to understand IDT risk communication challenges in the social media age from the perspective of other critical stakeholders such as health journalists and community-based organizations.

Second, variations in the level of influence exerted by PIOs at different levels (local vs. state vs. Federal) are yet to be further explored. Propositions, such as that state health institutions might exert a greater level of influence when the impact of the IDT program is more localized (e.g. measles) while their federal counterparts might wield more influence during IDTs like Zika that bear a national or international threat, need to be further examined in empirical studies. In a similar vein, due to the exploratory nature of qualitative research, the current

findings do not render relational findings or “inter-relationships” between constructs or variables proposed by the RAMS or in the transcripts as described by interviewed PIOs. Future research, using quantitative research methods such as surveys and/experiments, should be conducted to further examine how the key aspects and factors that influence IDT communications, as identified by our qualitative findings, might be related to each other and even exert impact together on the IDT communication process and outcomes.

Last but not least, the RAMS model and key concepts can be applied in other time-sensitive threats that could have health consequences, such as natural disasters, as well as seemingly distal risks (e.g., climate change) that could have profound impact on population health at local, national, and international levels.

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Figure 1: The Risk Amplification through Media Spread (RAMS) Framework (Vijaykumar et al., 2015)

