Citizens Communicating Health Information: Urging Others in their Community to Seek Help During a Flood

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ABSTRACT

When wide-scale flooding occurs in a community not accustomed to floods, health concerns emerge. While official organizations tasked with communicating emerging health information exist, the proliferation of social media makes it possible for average citizens to participate in this conversation. This study used a combination of semi-structured interviews and photo elicitation techniques to explore how citizens used private social media sites to share health information. We found two main categories of health concerns: existing medical conditions and water-created. We further identified six themes that describe the common approaches average citizens used to share health information: Narrating a personal experience, presenting it as a Public Service Announcement, downplaying the contribution, bringing a credible source into the conversation, including external links and sources, and using humor. Together, these findings suggest that citizens need health information during a flood disaster, and when they do not have it available from official sources, they use their private social media to tap into a shared community identity and carefully help one another.

Keywords

Disaster, crisis communication, health information, community, social media, flooding, credibility, identity.

INTRODUCTION

Floods are the most common natural disaster around the world (Doocy, Daniels, Murray, & Kirsch, 2013), and when they affect an entire community, they can cripple the official emergency response (Fritze & Kray, 2015). Formal official responses often assume that responding organizations are known ahead of time, have trained together, and are available when needed (Bigley & Roberts, 2001). Despite the existence of extensive training, and bureaucratic structures, when the authority structures break down, so do the formal plans (GAO, 2005). In 2005, the response to Hurricane Katrina had provided evidence that many Americans lack the means to adequately address their medical and sheltering needs during a disaster, particularly among vulnerable communities (Eisenman, Cordasco, Asch, Golden, & Click, 2007). The unanticipated flooding of entire communities during Hurricane Katrina caused systems to break down (GAO, 2005), and this appears to have happened when the flooding that resulted from Hurricane Harvey and affected the greater Houston, Texas USA area.

Healthcare systems, including entities responsible for sharing information with communities, are not immune to the

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Kees Boersma and Brian Tomaszewski, eds.

catastrophic effects of wide-spread floods (Ryan et al., 2016). Emergency workers in affected areas often need to care for their own crisis-stricken families, making coordination and response difficult (Majchrzak, Jarvenpaa, & Hollingshead, 2007). Yet, when citizens believe they need health information, and they do not receive it from official sources, they find other ways to reduce their uncertainty and get that information (Auf der Heide, 1989). Understanding how citizens communicate health information to one another is the focus of this research.

It's my Group so I Need to Help

Online and private social networking sites are often composed of groups of friends, family and co-workers who make a conscious effort to stay connected (Robertson & Kee, 2017). While the terms social networking site (SNS) and/or social media are often used interchangeably, here we concentrate on the networking component of social media because our questions center on what people share through *private, not public* online media.

Social identity theory (SIT) was originally developed to explain how groups interact (Tajfel & Turner, 1979), and it rests on the idea that the "extent to which people identify with a particular social group determines their inclination to behave in terms of their group membership" (Ellemers, Kortekaas, & Ouwerkerk, 1999, p. 372). One "group" where this theory has been applied and extended is in studies of organizations (e.g., Ashforth & Mael, 1989; Stephens & Zhu, 2016; Zoller, 2003). In their summary of existing research literature on organizational identification and health, Stephens and Zhu (2016) found five reasons that identification can serve as a form of glue when communicating about health: identification is linked to persuasion, can influence health information sharing at work, can help community groups reduce turnover, can work in conjunction with technologies to influence health outcomes, and is often connected to emotions. While their work was specific to an organizational context, there are many reasons to believe that online social media sites, like Facebook, can function to bring people together into groups where identification is salient.

For example, one study exploring how social media sites can be used to communicate health messages at work found that when an organization has highly identified members, these sites can be used effectively to communicate about non-stigmatized illnesses like skin cancer (Stephens, Goins, & Dailey, 2014). These scholars explain that the theoretical mechanism at play is that a social medium—i.e., Facebook—can heighten the salience of organizational membership through visible shared symbols, like logos, and through other member's comments. Furthermore, when these organizational members were more identified, they also felt less overloaded with the health information being presented. It was as if "identification buffers the overload individuals experience when they consume health information" (Stephens et al., 2014, p. 406). Overload is highly salient when communicating health information because people feel heightened uncertainty when there is medical jargon and ambiguity present in health messages (Thompson et al., 2011); a similar reaction people have when they experience a disaster.

Having the ability to share information—a common feature of many social media platforms—has been shown to be important for disasters (Murthy, 2013; Vieweg, Hughes, Starbird, & Palen, 2010) and health communication (Southwell & Yzer, 2009). Sharing health information leads to positive outcomes like providing opinion verification, improving self-esteem, and facilitating shared personal goals (Southwell & Yzer, 2009). Furthermore, when the shared information matches the needs of others, they can continue to pass it on and broaden the reach (Rioux, 2005). Past research has shown that the level of identification with an organization also influences how people share health information with others (Crook, Stephens, Pastorek, Mackert, & Donovan, 2016).

Individuals incorporate those organizational membership cues into their construction of personal and social identity, which ultimately influences their attitudes and behavior (Larson & Pepper, 2003). Furthermore, during disasters like floods, people often feel a need to help others, a concept referred to as a culture of responsibility (Marincioni, 2001). But we know very little about the health information that concerns citizens the most during a widespread flood disaster. Therefore, our first research question asks:

      RQ1: What are the primary flooding-related health concerns raised by citizens on their private social media?

Murthy (2013) argues that the dissemination of health-related information on social media suggests our society has shifted to one of an "update culture," where individuals have a frequent desire to share content about health on their personal social media pages as soon as new information arises. This desire is heightened during a disaster, and these same citizens may want to move beyond simply sharing information and instead prompt others to take action.

In the health education and communication research literature, the concept of mobilizing information is defined as a type of information that can prompt individuals to action in response to a particular health threat (Damond, Winters, Jack, Cropper, Londono, & Stoddard, 2003). The concept is derived from mass communication research (Lemert,

WiPe Paper – Social Media Studies
Proceedings of the 15th ISCRAM Conference – Rochester, NY, USA May 2018
Kees Boersma and Brian Tomaszewski, eds.

1981), but it could be an especially helpful concept in a disaster context because it compartmentalizes specific content that needs to be included in messages to move publics to action: location, identification, and tactics. Perhaps multiple groups—including citizens—are using mobilizing information to cue their community members to take action to protect their health. While past research often focuses on posting and sharing, it has not explored if and how citizens share information in ways that can motivate others to take action. Thus our second research question:

> RQ2: What communicative strategies do citizens use when sharing health information through their private social media?

METHOD

This study is part of a larger project examining social media use and rescues during Hurricane Harvey. Here we focus specifically on community members who communicated health information through their private social networks.

Data Collection

Participants were recruited from one heavily flooded community in the greater Houston, Texas area. They were invited to participate in one-on-one interviews that lasted 20-80 minutes and were organized around using a photo elicitation (Harper, 2002) approach. This form of data collection assumes that images—defined as photos and textual posts—and people's decisions to share those images, are a richer form of data than simply responding to interview questions. Visual social media research moves beyond text-based analyses and includes images as important parts of the communication process (Vis, 2013). However, including images in data analysis can be quite time consuming, methods for analyzing these data are only now developing (e.g., Murthy, Gross, & McGarry, 2016), and virtually all studies have only included publicly available images. The protocol used in this study was unique because our IRB and commitment to the funder of our research was that we ask people to share private data, not simply social media data posted to public sites. This meant that our team needed to build close relationships with the participants and thus we focused on specific communities where members could help facilitate a meaningful and trusting snowball sample. To build this trust, we spent weekends volunteering in this community, as well as identifying opinion leaders. These community engagement practices, well as our interview guide and photo elicitation techniques allowed our team to become part of the communities we studied, and community members became part of the research by sharing and describing their lived experience through their personal photos, videos and social media posts. This created a unique environment in preparation for, during, and after the interviews (Ahmed and Palermo, 2010; Ahmed et al., 2012). Finally, we carefully explained—in the informed consent document and verbally—how we would redact private data and use pseudonyms. All but one of our interviewees voluntarily shared photos and private social media posts.

Our semi-structured interview guide contained six primary questions with multiple probes, and one set of demographic questions. The questions asked how people became involved with the rescue, how they used social media and mobile devices during rescues, the emotions they experienced, and their communication successes and challenges. As people shared the stories of how they were involved in rescues, they also showed text and photos that they posted on social media such as personal Facebook profiles, community Facebook groups, private community Facebook groups, private NextDoor neighborhood groups, private WeChat group messages, and images downloaded from news media and government websites that they forwarded and shared with their own private networks. As they showed photographs and text, the interviewer asked permission and took screen shots of those posts, or the participant emailed or texted their social media posts to our dedicated project mobile device.

We completed 17 interviews and collected 485 images (containing photos and textual posts) for this analysis of our work-in-progress study. Nine people from this community participated as volunteer rescuers, seven were rescued from their homes, and one person in this study was a Public Information Officer for a local emergency response organization, but he was also a member of the affected community. The participants were predominantly white (88%) had an average age of 38, and lived in an upper to middle-class community. Two of the rescuees reported their income as less than $40,000 USD, but all other participants made over $75,000 USD.

All interviews were audio recorded and transcribed with pseudonyms. The data were analyzed by listening to audio recordings, reviewing field notes, and coding all the images. Our research team examined the images—photos and captured textual posts—and looked specifically for those that addressed the research questions. We coded those images by discussing the data in team meetings and identifying what was physically present in the photo. For example, Figure 5: medicine bottle and prescription. Then, in the textual component of that post, Figure 6, we coded it thematically: medical problem, public service announcement, persuasive communication. We also examined the interview conversation pertaining to the post, and coded that data thematically as well. We used Owen's (1984) criteria of recurrence, repetition, and forcefulness to identify key themes that addressed our research questions. For example, Figures 4 and 6 are different posts that were coded as containing many of the same themes. At the conclusion of the coding process, we re-examined our research questions and used the coded data to respond. The interview data

WiPe Paper – Social Media Studies
Proceedings of the 15th ISCRAM Conference – Rochester, NY, USA May 2018
Kees Boersma and Brian Tomaszewski, eds.

and direct quotes, serve as important context that helps understand the value of collecting and analyzing multiple forms of data.

FINDINGS

Research Question 1: What are the health concerns raised by citizens in a flood disaster?

To address research question one, we examined our interview and photo data and found that health concerns fell into two primary categories: *existing medical conditions* and *water-created health concerns*. Within water-created health concerns, we found they could be further categorized into: *dirty water, immediate physical dangers*, and *emerging health concerns*. This research question is more descriptive and categorical, so while we present these findings here, we elaborate on them when addressing research question two.

Existing Medical Conditions

The flooding in this community was pervasive. Flood waters lasted almost two weeks affecting at least 25% of the buildings and shutting down transportation (Moravec, 2017). The severity of the flooding meant that healthcare facilities were flooded as well as the homes of healthcare providers. This is important context information because a key concern among people who evacuated was how to get a fresh prescription of the medication they left behind when they were evacuated from their homes. In many cases, their best bet at getting the medication they needed was to return to their flooded homes, go into the medicine cabinet, and be escorted—often by boat—back to safety. In some areas medical needs were prioritized along with pets (see Figure 1), but in other areas, people had to cajole the National Guard or private citizens with boats to help them retrieve their medication.

Figure 1: Sign Located at the Entry of a Neighborhood

When interviewing a middle-aged woman who had survived multiple hurricanes, she mentioned that in her prior job she worked as a call taker for a mail-order pharmacy. Her comments provided helpful context concerning the medicine needs of flood and hurricane evacuees. At her company, they were allowed to put some medicine orders through early, before the official date when the medicine could be refilled. She explained: "If they were in a flood zone zip-code, and we anticipated a hurricane, no matter what [we put their refill through]. Because if you didn't have the hurricane, you had an extra supply of medicine." Her company had learned this strategy over time as she explained:

> Basically, we heard from them, "I ran out" or "I evacuated," or "I ran out in the middle…what can I do? I can't go back to the house to get my medicine." Or "the medicine spoiled." Or "The electricity went out, the refrigerator stopped." I feel bad now if they just can't get an extra supply. You can't say [to justify the refill] it's a "vacation supply," because a hurricane is not a vacation. You have to ask for an emergency supply. We had a special code for emergencies.

Water-Created Health Concerns

The second core health concern centered around the fact that there was water throughout this community during the flooding and it lasted for days and even weeks in some areas. The first sub-category in water-created health concerns was the *"dirty water."* What started as fairly clear water that resembled a lake out of its bounds (see Figure 2) quickly became "dirty" water, muddy brown sludge that was everywhere once the water rose and wastewater treatment plants could not handle the overflow (see Figure 3).

WiPe Paper – Social Media Studies
Proceedings of the 15th ISCRAM Conference – Rochester, NY, USA May 2018
Kees Boersma and Brian Tomaszewski, eds.

Figure 2: Early Flooding   **Figure 3: The Dirty Water**

Members of these communities in the greater Houston area shared these photos, and similar photos were also on the news, because most the evacuations occurred when people could not see their feet due to the "dirty" water. We use the word "dirty" because that was the term most frequently used on the social media posts we captured.

The second sub-category in water-created health concerns was *immediate physical danger*. While we elaborate these in the second research question, they ranged from concerns that animals might harm people during the evacuation, to fears that objects under the water—e.g., manholes, fire hydrants, curbs—could cause people to trip or hurt themselves.

We differentiated immediate physical dangers from the third sub-category of *emergent health concerns* because it was after individuals were rescued, or they rescued others, that people who had been in the water began to see new health concerns emerge. They had rashes on their bodies, felt sick at their stomachs, and some people realized that getting Tetanus shots might be prudent considering that the water was contaminated with fecal and decaying matter.

RQ2: How do citizens communicate health information through social media?

The descriptive findings from research question one informed the analyses we conducted to address research question two. There are six themes that describe the approaches average citizens used to share health information: *Narrating a personal experience, presenting it as a Public Service Announcement, downplaying the contribution, bringing a credible source into the conversation, including external links and sources*, and *using humor.*

Narrating a Personal Experience

As a part of narrating their rescue and recovery experiences, many people simply made comments that speculated about health concerns and they shared the actions they took.   Jason commented about the dirty water and how he could not see his own feet. This is how he explained the actions he took because he was in the dirty water.

> "And I was like God forbid they go far enough down there to where the water like sweeps them away like trash. We don't know what's in there, and it's just like it was like scary because you don't know what's in this water and you know all these things that people have been like in the water, like people could get sick now because it was like fecal matter and all this crazy stuff. And you know, I even went to the doctor because I know I was like that one guy on the first night who was walking around in it, and I know and I was like OK, I mean probably go get blood tests and all that stuff just make sure I'm not sick or anything like that.

The personal experiences were especially vivid when the people who had to evacuate from their homes had chronic health conditions like diabetes. These evacuees were not only concerned about their fitness to evacuate—e.g., did they have the endurance to walk through flowing water, did they have open wounds that could get exposed to dirty water—but legitimate stories of alligators, rodents, and reptiles in the water compounded their stories. Ann Sharp was one such evacuee:

> I keep looking back and I was telling my friends to stop but I said I thought about that alligator. I said that alligator gonna get me on my way back to my home. And I got to walk through this water. It's scary because you had to feel your way around. I knew if I really didn't know that apartment where I was I probably would have fell down. Because that water was coming in, so I was with my hands in the air, and I'm diabetic, I knew I was gonna fall anyway. He was telling me I gotta keep up walking. I was saying, No I got it. I got it. I got to feel my weight. I know what a sidewalk is. And I know it's a step down. Yeah. And if I step down, I might fall.

While these two examples were shared during interviews, many of these same types of stories were posted on social

WiPe Paper – Social Media Studies
Proceedings of the 15th ISCRAM Conference – Rochester, NY, USA May 2018
Kees Boersma and Brian Tomaszewski, eds.

media. The data we share next will illustrate how this theme also emerged in social media posts. The difference between what was said in the interviews and what was posted on social media was that chronic health conditions were not mentioned as frequently in social media posts. The fears people put in writing related to falling, drowning, animals, and getting sick from the dirty water.

Presenting Private Comments as a Public Service Announcement

Public Service Announcements (PSAs) are "designed to inform or induce certain behavior in specific audiences, generally for noncommercial profit using mass media approaches" (Bator & Cialdini, 2000, p. 527). PSAs are a central part of health campaigns around the globe and as the technology landscape changed in the early 2000's, researchers began studying their use in user-generated media like YouTube (e.g., Walther, DeAndrea, Kim, & Anthony, 2010). Health PSAs are normally crafted in advance and some use health communication theory principles to guide their content creation (e.g., Walther et al., 2010). So when the acronym, *PSA*, began appearing in private social media posts, our team dug into these more deeply.

Shared health information that was prefaced with *PSA*, contained several features of other private social media posts concerning health, but the details moved beyond description and reflected the persuasive goals to induce behavior change. It is difficult to know if the citizens truly designed their posts with these persuasive goals in mind, and it even appears that *PSAs* might be a way for these citizens to communicate their desires to share information without sounding pushy. Despite their intentions, these posts contained many compelling persuasive components of actual PSAs. For example, Figure 4 is a photo of a private Facebook post where a community member presented the information she was sharing as a PSA. Notice that the crafting of the PSA utilized persuasive wording and provided a specific call to action.
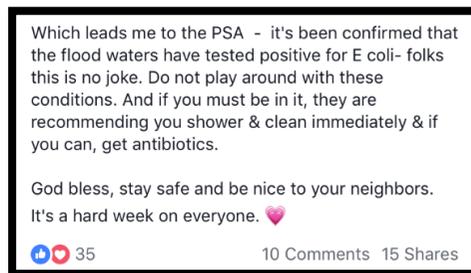

Figure 4: A Public Service Announcement

In other examples of posting a citizen-created PSA, the message contained elements of narrating one's experience that was woven into the information shared and cemented a connection back to the community. The stories contained narrative fidelity and probability (Fischer, 1985); the details are sufficient to convince a reader they are true and if people lived in flooded areas, the narrative could convince them that the same issues could happen to them. Second, the posts referenced medical sources like physicians, and not only did the person posting the information visit a healthcare professional, but they also repeated things they said the physician told them to do and shared that with others. Third, there was a call for action—often multiple calls—with specific instructions for what to look for and when and how to seek help. Finally, by including images, the persuasive elements of the post got an added boost: they showed the medications prescribed by the physician. See Figures 5 and 6 for the photo and the text that appeared in one of these Facebook posts.

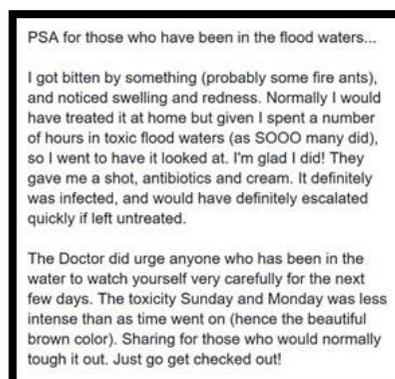**Figure 5: Image of Medicine Prescribed by Physician**   **Figure 6: Persuading Though a Personal PSA**

WiPe Paper – Social Media Studies
Proceedings of the 15th ISCRAM Conference – Rochester, NY, USA May 2018
Kees Boersma and Brian Tomaszewski, eds.

Bringing a Credible Source into the Conversation

Several people who posted health information on their private social media sites appeared to want to increase the impact of their message by reposting, or sharing a message communicated by a health expert. For example, one citizen who had contributed substantially as a behind-the-scenes rescue support person, seemed to use a strategy of priming people in her social media feed, supporting her claims by posting a comment made by a nurse who was her friend, then reinforcing the nurses comments. She brought in this outsider—a nurse—to help her better persuade her Facebook followers that floods heighten specific health considerations. See Figures 7 and 8.
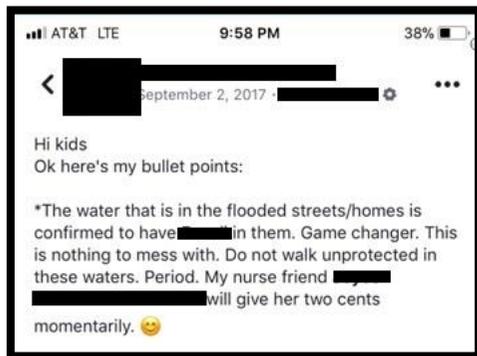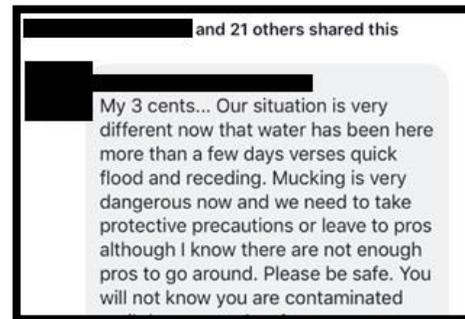

Figure 7: Priming Followers

Figure 8: Bringing in Nurse for Credibility

Downplaying the Contribution

In both of the posts found in Figures 8 and 9, the citizens were trying to persuade, but they also downplayed their contributions. The most common way this happened was with introductory phrases like "My 3 cents…," "Just my opinion," or "I think this might help." Note that the comment that began, "My 3 cents," was written by a nurse. She was not posting as part of her official job, but her friend introduced her in an earlier post and even said she would "give her two cents…" There are other hedging comments found in many posts: tentative statements, vague comments, and warnings advising others to double check the information they post.

Including External Links and Sources

In some posts, it was obvious that the citizen wanted to demonstrate the veracity of a statement because along with the statement, there would be a hyperlink or the name of an organization where they retrieved the information. They were citing their sources, even in a private social media friend and neighborhood group. One woman in our sample who used external citing extensively said she did this "because I didn't want people to doubt me. We didn't have time for people to be bothering me with lots of questions, that is why I primarily posted on Facebook. People who don't know me, might question my information and I wanted them to act and appreciate that I had done the background research to help people who needed it the most."

Using Humor

One final way that citizens shared health and safety information was through humor, but they also including images that depicted the humorous danger as real. Past research on visual social media has also reported humorous depictions (e.g., Murthy & Gross, 2017), but here we find a mix of emotions and sources of the humorous information. For example, the local news channel posted a photo of a snake climbing up the side of a home. Individuals in the Facebook message thread viewed the photo as frightening, but also made it a bit of a joke concerning snakes also wanting to escape the rain. The citizen who shared the post captioned this with "Hell no!" See Figure 10 for this example.

In a related feed, posted by a connected friend, they were also discussing snakes in the water. One commenter joked about the colors that snakes do not like, and a third commenter lightened the mood. Note that humor was emphasized further by using the smiley face emoji. See Figure 11 for this example.

WiPe Paper – Social Media Studies
Proceedings of the 15th ISCRAM Conference – Rochester, NY, USA May 2018
Kees Boersma and Brian Tomaszewski, eds.

Figure 10: Reposting of Photo of a Snake   Figure 11: Humor about Snakes in the Water

DISCUSSION & CONCLUSION

The communicative strategies citizens used to share health information through their private social media accounts reflect their knowledge that they are a part of an online community where they have a sense of shared identity. Furthermore, these are their friends and neighbors and they want to provide information that helps others in their personal networks improve their health. While we used theories of identity and identification to explain why citizens might engage in this health information sharing behavior, the findings further clarify how communication, credibility, and online community identification work together to prompt people to be cautious, caring, and as accurate as possible when they attempt to share and persuade others during a disaster. Prior research suggested that different communities will prioritize hazards differently and agencies must be responsive to this dynamic (Wells et al., 2013). But in addressing health information during Hurricane Harvey, dirty water and physical danger were top concerns over the flooded communities.

Private social media communities are composed of friends and neighbors—not necessarily people we like—but still people we know and people with whom we have ongoing relationships and conversations. One participant explained this well when she said, "I told a newcomer to our neighborhood that we would not flood. I feel so bad, I guess she has forgiven me because she still speaks me when we see each other on the street. " In contrast to her verbal assurance to her neighbor, the general tone of these posts was one of cautiously sharing health information without overstating claims and without creating panic. In this way, members of these private social networking groups drew upon their shared social identities to be responsible with the information they shared. This sense of responsibility is illustrated further when people asked credible experts, nurses, to make a supportive post and then they primed their friends and shared that credible health information. Even the details in their narrated experiences displayed a tone of credibility.

Credibility is a well-studied communicative construct that consists of trustworthiness, expertise, competence and goodwill (McCroskey & Teven, 1999; McCroskey & Young, 1981). The last component, goodwill, was added more recently as a component of credibility, and it means that someone has others' best interests in mind when they communicate. The findings from this study strengthen the value of including goodwill as a part of credibility, and that is why we labeled this overarching finding credibility instead of trustworthiness.

In linking the identification components of their group membership along with their sense of responsibility to provide credible information, it is difficult to determine causality within this variable mix. The value of qualitative work is to unearth these variables and it will be worthwhile for future researchers to build on these findings by designing experiments and careful surveys to elaborate on these relationships. While prior visual social media research examining Instagram images cross-posted to Twitter during Hurricane Sandy revealed humorous, deceptive, and misleading images, their research also revealed that people were "meaningfully narrating one's disaster experience visually in real-time" (Murthy & Gross, 2017, p. 127). What we see in this private social media data does not contain many erroneous posts and exaggerations—not much fake data. Our findings suggest there is social pressure that keeps most of these community members in line, on line.

WiPe Paper – Social Media Studies
Proceedings of the 15th ISCRAM Conference – Rochester, NY, USA May 2018
Kees Boersma and Brian Tomaszewski, eds.

CONCLUSION

When the citizens in this study used their private social media to post health information relevant to the flood, they were clearly communicating to the online community where they felt like they belonged. These posts reflect a tone that was caring, cautious, and as accurate as they could be when trying to educate and share health information. Our data suggest that citizens had many questions about the safety of the dirty water, and how to handle the myriad health issues that arose when they were functioning in the middle of chaos. Not a single interviewee, including emergency management personnel said they saw official information posted from Health and Human Services or other health-related agencies. Two people mentioned hearing this discussed on TV, and people said they knew they needed to "protect themselves" by wearing waders, but their flood-specific health knowledge was vague. These findings should provide healthcare organizations and health and safety agencies a bit of a push to plan their health messages in advance and disseminate them much more widely in future flooding disasters.

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