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# Differences between National and Local Media in News Coverage of the Zika Virus

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## ABSTRACT

Do national and local papers report on health threats in the same way? This question is investigated in an important and increasingly common context: the outbreak of an infectious disease. Although there is a large literature on how to measure the quality of health reporting, scant attention has been devoted to the role of audience considerations. We address this gap by comparing coverage of the 2016 Zika outbreak in the *New York Times*, a prestigious national newspaper, and the *Tampa Bay Times*, a well-regarded Florida newspaper. Based on an original content analysis, we find that audience considerations led to higher quality coverage in the local paper, particularly as it relates to avoiding infection. However, certain features of reporting, such as sensationalist language and imprecise risk information, were indistinguishable across the two outlets, which illustrates the challenges faced by reporters at both kinds of papers when it comes to accurately portraying risk.

Outbreaks of infectious disease have been growing in frequency over the last several decades. Both the total number of outbreaks and the diversity of diseases have increased significantly since 1980 (Smith et al., 2014), making viral epidemics and pandemics a relatively common occurrence. Successfully containing such threats depends on the public's willingness to learn about a disease and take precautions to prevent its spread. One recent study, reflecting upon the 2014 Ebola outbreak, concluded that "an informed, activated public is of utmost importance in protecting the health of the public" (Ratzan & Moritsugu, 2014, p. 1215). Aside from the presence of a vaccine, some scholars believe that communication (e.g., from the mass media) is the most important weapon against a pandemic (Barry, 2009).

There is a growing literature on how scientific/health issues are portrayed in the media, some of which focuses on news coverage of infectious diseases (e.g., Evensen & Clarke, 2012; Ihekweazu, 2017; Roche & Muskavitch, 2003). Yet, gaps remain in our understanding of how health crises are portrayed in the media, especially whether differences between national and local papers relate to reporting quality. This is a pressing question because local media remain a key information source for many people, a tendency that might be greater when an infectious disease strikes a particular region of the country.

Using an original dataset of newspaper coverage, we examine reporting quality in an elite national newspaper (*New York Times*) and a well-regarded local paper (*Tampa Bay Times*) from Florida, a state heavily affected by the Zika virus. We find differences in disease reporting that reflect the distinctive audiences of the two papers. In particular, audience

considerations lead to *higher* quality coverage in the local paper, particularly as it relates to avoiding infection. That said, certain features of reporting, such as sensationalist language and imprecise risk information, were indistinguishable across the two outlets, which illustrates the challenges faced by reporters at both kinds of papers when it comes to accurately portraying risk.

## Existing literature

Researchers have identified various indicators of quality when it comes to coverage of infectious disease. We characterize this literature and then discuss how we contribute to it.

## Quality reporting of health threats

Among scholars, risk information is viewed as an essential component of effective health reporting. Quantitative information about risk (i.e., data about the number of affected people) is more precise and thus more useful than qualitative information (e.g., non-numerical representations such as the claim that a disease is spreading "rapidly"). Additionally, citizens need information about the *relative* likelihood that an individual or population will be affected by a specific threat. According to Roche and Muskavitch, that entails information about the "known or likely incidence of an effect (the *numerator*) and the size of the population within which the effect is, or is likely to be, observed (the *denominator*)" (2003, p. 354, emphasis added). Such contextualizing information is essential because it conveys the incidence of a threat as well as the size of the population within which the threat is estimated.

In addition to the use of qualitative or quantitative language describing the risk of contracting a disease, other types of content can shape the public's risk perceptions. Fung, Namkoong, and Brossard (2011) highlight three features of news reporting: worst case scenarios, loaded language, and perceptions of controllability.<sup>1</sup> Reporting that emphasizes the most negative extreme outcome or that uses sensationalistic language can induce feelings of dread, which increase the perceived risk of a health threat. Conversely, information about symptoms, methods of transmission, and self-protection measures can reduce feelings of uncertainty and increase perceptions of self-efficacy (e.g., Slovic, 1992).

Evensen and Clarke (2012) further argue that efficacy information, at both the individual- and societal-level, is an important component of reporting quality. Self-efficacy information helps the audience understand the risks of a disease and informs them of the behaviors that reduce those risks. While the precise content depends on the nature of the threat, the key ingredient is the focus on self-protection. As such, self-efficacy information includes specific measures that can be taken at the *individual* level (e.g., "use bug repellent," or "remove standing water near your home"), along with facts about symptoms and methods of transmission. In contrast, societal-efficacy information describes what *societal* actors (e.g., the government, health organizations) are doing to respond to the risks of a disease. This type of coverage makes people aware of the actions that societal actors can (or should) take to deal with a health threat. As a result, Evensen and Clark write, societal efficacy messages "provide citizens with means to hold such actors and entities accountable for actions taken or not taken" (Evensen & Clark, 2012, p. 398). In comparison to personal efficacy messages, societal efficacy information is more closely aligned with the "watchdog" role in which journalists monitor elected officials in times of crisis.

A substantial literature has identified the features of high-quality disease reporting. For the most part, however, this research is based on analyses of national newspapers such as the *New York Times* or *Washington Post*. Insofar as health threats affect some parts of the country more heavily than others, local and national papers might cover health threats differently due to the varying needs/interests of their audiences (Hamilton, 2004).<sup>2</sup>

More generally, gatekeeping theory states that what gets reported (and how) depends on characteristics of an event and its relation to news values such as timeliness, importance, proximity, and novelty (Shoemaker & Vos, 2009). One of the most powerful predictors of news coverage is geographic proximity, with journalists giving more attention to events that are close to home (e.g., Shoemaker, Lee, Han, & Cohen, 2007). A local paper's geographic proximity to a disease could therefore lead to distinctive content relative to a national paper. Yet journalists can make an event "psychologically" relevant to readers when physical proximity is absent (e.g., by highlighting economic, cultural, or public health implications; Shoemaker et al., 2007). This occurs when local reporters emphasize the community angle of a distant event, such as war (e.g., Chang & Lee, 1992). Alternatively, national journalists might report on regional events in a distinctive manner, as has been reported in studies comparing the use of frames in national and local reporting of racial incidents (Holody,

Park, & Zhang, 2013). Thus, the process by which local and national papers filter events into news might vary substantially; our question is whether such differences influence reporting quality.

In the area of disease reporting, there is evidence that sensationalism on television increases as distance to the threat grows (Ihekweazu, 2017). Likewise, Fung et al. (2011) compared avian flu coverage in the *New York Times* and the *South China Morning Post* (SCMP) and found that loaded words were more prevalent in the *NYT* compared to the more proximate paper, SCMP (no significant differences emerged for worst case scenarios). In both of the previously mentioned studies, the "distant" news outlet sought to generate interest in an event through sensational coverage. Based on this research, we hypothesize that news coverage of the Zika virus will have higher levels of sensational reporting in the *New York Times* than the *Tampa Bay Times* (**Hypothesis 1**).

Geographic proximity to a disease threat might lead national and local reporting to vary in other ways. In the case of an infectious disease that poses a regional threat, local journalists have an incentive to provide high-quality coverage regarding self-protection, symptoms, and modes of transmission because that type of content is highly relevant to their audiences (Hamilton, 2004). Given the greater urgency of the Zika virus for people living in Florida as opposed to other parts of the United States, we expect the *Tampa Bay Times* will provide higher levels of self-efficacy information than the *New York Times* (**Hypothesis 2**).

At the same time, the difficulty of risk reporting could lead to similarities in coverage across national and local papers. For example, in their wide-ranging analysis of the West Nile Virus, Roche and Muskavitch (2003) reported that the quality of risk information was low across a range of North American newspapers. They explain the pattern by noting the difficulties journalists encounter: "Reporting on risk issues often requires attention to nuances outside of the traditional 'who,' 'what,' 'when,' framework ..." (p. 362). The implication of that study is that risk information will be imprecise across most types of newspapers. Yet, Dudo, Dahlstrom, and Brossard (2007) observed the opposite pattern for avian flu coverage in a smaller sample of largely elite national papers (*New York Times*, *Washington Post*, *Los Angeles Times*, and *Atlanta Journal Constitution*). Thus, when it comes to differences between a national and local paper in risk reporting, our expectations are unclear. On the one hand, the lack of "prolonged exchanges" with the expert community (Roche & Muskavitch, 2003, p. 362) might lead to poor quality risk information in both national and local newspapers. On the other hand, reporters at a national paper might provide higher quality risk information if they work for a large commercial organization with substantial resources or have a desire to uphold a reputation for journalistic quality (see Carpenter, 2007 for discussion). We therefore pose the following research questions:

**Research Question 1a:** Do national and local newspapers report on disease risk differently, by providing different levels of qualitative risk information?

**Research Question 1b:** Do national and local newspapers provide different levels of quantitative risk information, with and without contextual denominators?

The existing literature does not provide guidance when it comes to the prevalence of societal efficacy information. Evensen and Clark (2012) report high levels in three national papers (*New York Times*, *Washington Post*, *USA Today*) as well as the *Associated Press* newswire (also see Fung et al., 2011). Yet, Evensen and Clarke (2012) acknowledge that the watchdog norm might manifest differently in locally written articles, and that “smaller newspapers may direct less attention to the role of the federal government in managing [disease] risks” (p. 410). Thus, this study will seek to answer the following research question:

**Research Question 2:** Do national and local newspapers provide different levels of societal efficacy information in disease reporting?

Overall, our study contributes to the literature by using established indicators to examine whether there are differences in reporting quality across a national and local newspaper. Our focus on the Zika virus also is significant: to date, there is no vaccine to prevent the virus and no medicine to treat it, making media coverage an important tool for containing the disease.

## The Zika virus

The Zika virus is a mosquito-borne disease spread by the *Aedes aegypti*, an aggressive day-biting mosquito. The current Zika outbreak began in 2015 when the World Health Organization (WHO) discovered instances of local transmission in Brazil. Since that time, cases have been identified in dozens of other countries, and the virus was labeled as a Public Health Emergency of International Concern (PHEIC) by the WHO in February of 2016. Although Zika is not fatal, it is a dangerous virus. Pregnant women are at particular risk because the virus has been associated with serious birth defects. In addition, there is a link between the Zika virus and Guillain-Barré syndrome, a neurological condition that can lead to paralysis. Finally, the effects of Zika can be compounded by other mosquito-borne viruses (e.g., dengue fever; Kindhauser, Allen, Frank, Santhana, & Dye, 2016). Given the presence of at least one “mystery case” of the virus in Utah (Maron, 2016), there remain concerns about new routes of transmission. Perhaps as a result, even though few people report feeling personally threatened by the Zika virus, Kaiser Health Tracking Polls indicate that roughly two-thirds of the public were following this story “very closely” during the period of our study.

## Data and methods

### Sample

To evaluate the quality of media coverage related to the Zika virus, we rely on an original dataset comprised of Zika-related stories from the *New York Times* (NYT) and the *Tampa Bay Times*. Thus, we compare a prestigious national paper with

the primary local newspaper for the geographic area of interest, which in this case is the state of Florida (see Holody et al., 2013 for a similar approach). We selected the *Tampa Bay Times* because it is the largest circulating paper in the state of Florida (Munzenrieder, 2016) and has a reputation for excellence. The *New York Times* is the third largest circulating national paper (behind the *Wall Street Journal* and *USA Today*), and is widely viewed as an elite national newspaper. Thus, both papers in our study have a reputation for high-quality reporting, but vary in terms of their proximity to the threat.

The time frame of the content analysis is December 28, 2015 to December 31, 2016. During this period, there were 81 stories in the *Tampa Bay Tribune* and 262 in the *New York Times* with the word “Zika” or “zika” in the headline.<sup>3</sup> Using the reconstructed week method (Riffe, Aust, & Lacy, 1993) and the *Lexis-Nexis* database, we constructed a sample of six weeks of coverage for both newspapers ( $N_{\text{NYT}} = 42$  and  $N_{\text{TBT}} = 39$ ).<sup>4</sup>

### Coding

Using the story as the unit of analysis, we coded for various indicators of story quality (all on a 1–0 basis for presence or absence) and other details of the story (see Appendix for an abbreviated coding instrument). Following Roche and Muskavitch (2003), risk information was evaluated with three categories: qualitative risk information, quantitative risk information, and quantitative risk information that includes a denominator. The first designation, qualitative risk information, refers to the presence of generic (i.e., verbal) information about the risk of catching Zika, its spread, or the incidence of cases. A dictionary of signal words and phrases was developed to identify stories that conveyed qualitative risk information.<sup>5</sup> The quantitative risk category refers to information about the likelihood/risk of contracting Zika presented in the form of specific numbers and figures (e.g., “50 cases” or “four cases in the Tampa area”). Among stories that were coded as quantitative, a further designation indicated whether population-level information (i.e., the denominator) was provided to contextualize the number/figure in question. For example, contextualizing information might include the number of cases of Zika in a geographic area (e.g., a state).

The quality of risk information also was assessed with two categories of sensational language (Dudo et al., 2007). The first category indicates mentions of the most extreme negative outcome, which in Zika’s case includes references to fetal birth defects (or brain damage) and Guillain-Barré syndrome (or paralysis). The second category represents the use “loaded” or emotionally charged language in reference to any aspect of the Zika virus (e.g., references to the virus as “heartbreaking,” “sinister,” “calamitous”; see Fung et al., 2011). Additionally, because information about symptoms and transmission are widely viewed as indicators of quality reporting, we included separate categories identifying stories that provided symptom information and information about methods of transmission.

Given the focus on self- and societal-efficacy in previous studies (e.g., Evensen & Clarke, 2012), we coded for both

types of messages. A story was characterized as including “self-efficacy” information if it provided instructions about how to protect oneself from the Zika virus (e.g., using DEET, wearing long sleeves, removing standing water, putting screens on windows, or staying inside). Stories were coded as providing “societal efficacy” information if they described how societal actors (government officials, the CDC, academics/scientists) are responding to the risk, including actions like policy statements, public warnings, specific response efforts (e.g., spraying), or scientific research.

Coders went through extensive training which involved three rounds of evaluating “test sets” of stories not included in the main sample. Inter-coder reliability was assessed with a random sample of 26 stories (approximately a third) from the main sample. Table 1 shows the reliability estimates (Cohen’s kappa) broken down by coding category.

## Empirical results

We begin by showing the distribution of stories in our sample arrayed against the universe of articles in both newspapers. Figure 1a and 1b shows that the reconstructed sample represents the universe of coverage in both papers quite well. Peaks in coverage in the universe of stories were accompanied by a corresponding uptick in the number of stories in the sample.

Our premise is that national and local papers have distinctive audience considerations which may influence how they report on emerging health threats. We present some initial evidence on this point by comparing the placement of news stories in our two papers. In the *New York Times*, over a third of the Zika stories in our sample (35%) appeared in the “Foreign Desk” section, while roughly a quarter (26%) appeared in the “National Desk” section. The remaining *NYT* stories appeared in various places throughout the paper (e.g., Science Desk, Metropolitan Desk, Travel, and Health). Overall, the *NYT* covered Zika through its foreign desk, and most of this reporting focused on cases of the disease outside of the United States. In contrast, the modal section for a *Tampa Bay Times* story was the “National” section (38%) followed by the “Local” (26%) and *PolitiFact* (23%) sections. Coverage of Zika in the *TBT* focused on cases in Florida and the political aspects of the outbreak (e.g., lack of federal money to fight the virus). Next, we investigate whether the

distinctive focus of each paper relates to the quality of disease reporting.

## Comparing the quality of reporting

According to H1, levels of sensational reporting via the use of worst-case scenarios and loaded language will be higher in the *NYT* compared to the *TBT* (because of the former’s incentive to dramatize a “remote” threat for its readers). According to H2, self-efficacy information will be more common in the *TBT* compared to the *NYT* because of the distinctive interests of readers residing in a state threatened by Zika. Figure 2 presents the evidence.

The left side of Figure 2 shows the percentage of stories providing sensational coverage, defined as the use of *Worst Case Scenarios* and *Loaded Words* (Fung et al., 2011). There are no significant differences in the percentage of stories highlighting the worst possible outcome ( $|t| = .48$ ,  $df = 79$ ,  $p = .63$ ) or the use of loaded words ( $|t| = .31$ ,  $df = 79$ ,  $p = .76$ ). In both papers, upwards of 80% of stories mention the worst possible outcome (birth defects or Guillain-Barré syndrome), and in both cases close to half of the stories used emotionally charged language (e.g., “devastating,” “calamitous,” “sinister”) to discuss the Zika virus. Contrary to the idea that a national paper might have a stronger incentive to dramatize a disease that was largely an international threat (and prevalent only in parts of the U.S.), sensational coverage was common in both papers examined here. Thus, H1 was not supported in our data.

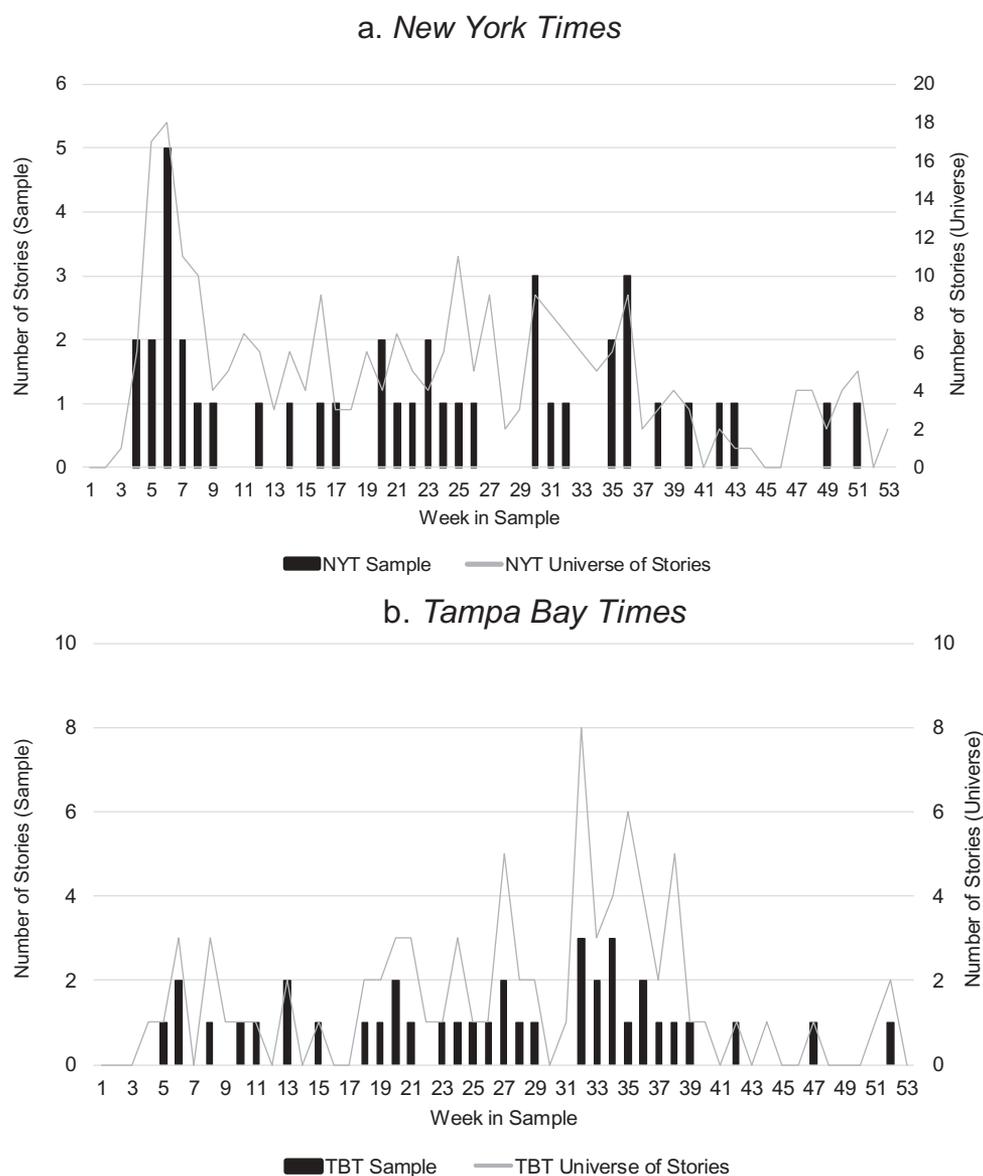
The right-hand portion of Figure 2 displays the percentage of stories providing different kinds of efficacy information. Stories were coded as containing *Self-Protection Information* if they discussed specific actions people should take to avoid contamination (i.e., this category corresponds to Evensen & Clark’s [2012] notion of self-efficacy). Following Ihekweazu (2017), we also created a related category called *Individual Efficacy Information*, which combines the Symptom, Transmission, and Self-Protect (self-efficacy) categories. Consistent with H2, there is a large and statistically significant difference between the *TBT* and the *NYT* when it comes to self-protection information ( $|t| = 2.87$ ,  $df = 79$ ,  $p < .01$ ) as well as individual efficacy information ( $|t| = 2.55$ ,  $df = 79$ ,  $p < .05$ ). Nearly 60% of the stories in the *Tampa Bay Times* provided explicit recommendations about how to protect oneself from the Zika virus (compared with 26% in the *New York Times*). When it came to *Individual Efficacy Information*, the difference was also substantively large (38% versus 14%). Both findings are consistent with the idea that local reporters anticipate the interests of their audience, who had a higher risk of contracting Zika than people in other parts of the country.

Another interesting finding emerges when one considers how often sensationalist language occurs in conjunction with self-protection information. In the case of the *TBT*, the percentage of stories mentioning worst-case scenarios was high (87%; see Figure 2); however, two-thirds of these stories were accompanied by self-protection information. In other words, when a *TBT* story focused on the most extreme outcome, it also was likely to contain information about how people could protect themselves from Zika ( $\chi^2(1) = 7.42$ ,  $p < .01$ ). The opposite pattern appears in the *NYT*. Again, over 80% of

Table 1. Inter-coder reliability statistics.

	Expected agreement (%)	Agreement (%)	Cohen’s Kappa
Qualitative risk	74	100	1.0
Quantitative risk	52	100	1.0
Quantitative risk(with denominator)	54	88	.71
Self-efficacy	49	85	.70
Symptom	55	100	1.0
Methods of transmission	78	100	1.0
Societal efficacy	50	100	1.0
Worst case	80	100	1.0
Loaded language	50	100	1.0

Note: Stories also coded for presence of specific facts and images, but those data are not analyzed here. Kappa statistics for the fact and image categories (8 in total) range from 80 to 1.0 (perfect agreement).



**Figure 1.** Comparing study sample to universe of stories in both newspapers.

those stories noted the most extreme outcome associated with Zika, but less than a third (29%) contained self-protection information. Specific facts about how to protect oneself from Zika were rare in the *NYT* and tended to occur independently of sensationalist language regarding worst case scenarios ( $\chi^2(1) = .62, p = .43$ ).<sup>6</sup>

Figure 3 examines the distribution of different types of risk information across outlets (Research Questions 1a and 1b). *Qualitative Information* (shown in the left-most set of columns) represents verbal references to the risk of becoming sick with the Zika virus, while *Quantitative Information* refers to numerical representations of risk. The final category, *Quantitative with Denominator* (shown in the right-most set of columns), signifies quantitative risk information that was contextualized with population-level figures (i.e., it is a subset of the *Quantitative Information* category).

The patterns shown in Figure 3 are largely consistent with prior research. Like the Roche and Muskavitch (2003) study, the most common way of conveying the risk of becoming ill with an infectious disease was with qualitative information (e.g., describing the Zika threat as “escalating”). Irrespective of source, this more imprecise way of conveying risk appeared in upwards of 8 out of every 10 stories ( $M_{\text{NYT}} = .90, SD_{\text{NYT}} = .05$ , and  $M_{\text{TBT}} = .82, SD_{\text{TBT}} = .06$ ).

Moving on to the other categories of risk information in Figure 3, nearly 80% of *NYT* stories contained quantitative (i.e., numerical) information about risk ( $M = .78, SD = .06$ ), and among stories in this category, a little more than half contextualized the raw numerical data with appropriate denominator ( $M = .48, SD = .08$ ). Interestingly, the *Tampa Bay Times* provides more contextualizing information than the *New York Times*. About 70% of *TBT* stories contained quantitative information about risk ( $M = .69, SD = .07$ ), but a

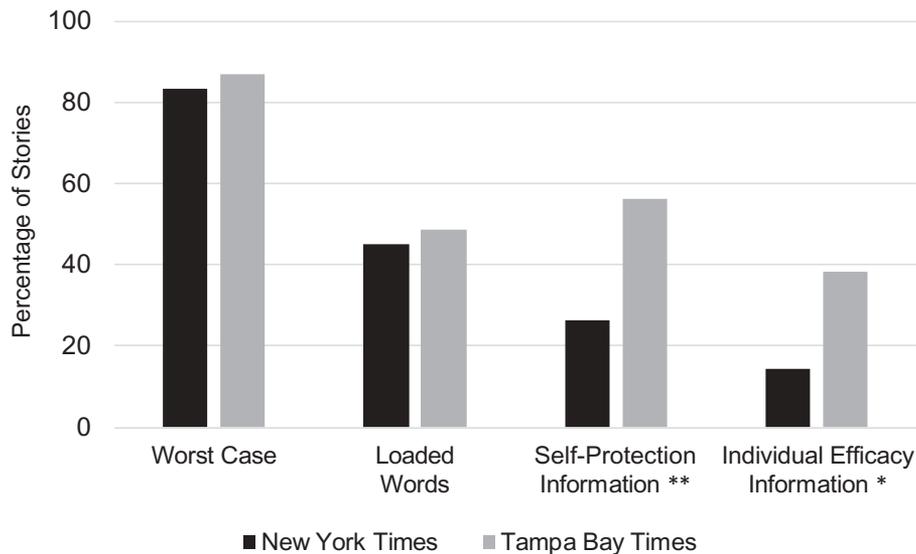


Figure 2. Comparing sensationalism and self-efficacy information across the *New York Times* and *Tampa Bay Times*.

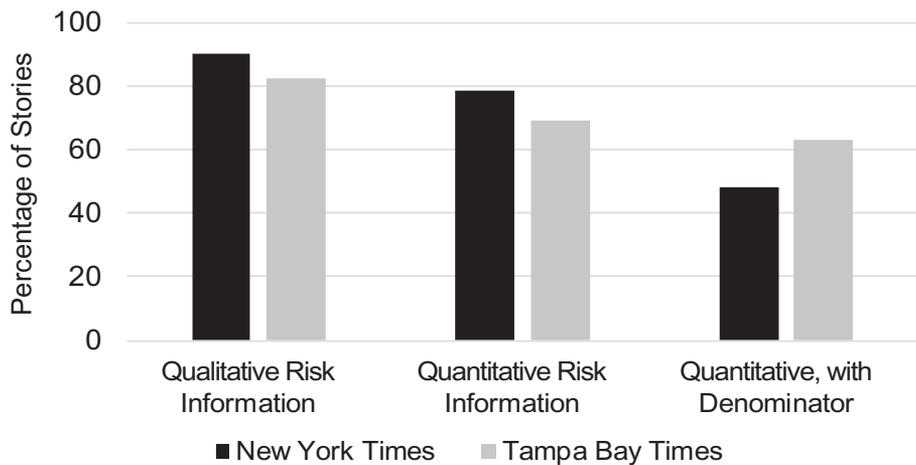


Figure 3. Risk information across the *New York Times* and *Tampa Bay Times*.

larger percentage of them (63%) contextualized the raw numerical data ( $M = .63$ ,  $SD = .09$ ). This difference is seen in the right-most set of columns, where there is a 49% versus 63% difference ( $|t| = 1.11$ ,  $df = 58$ ,  $p = .27$ ).

Overall, however, there are no statistically significant differences across the *NYT* and *TBT* for any of the risk categories shown in Figure 3, suggesting that the national versus local distinction does not have a discernible influence on how newspapers convey risk information. A reliance on imprecise risk information dominates both types of newspapers, a weakness that others have attributed to the lack of communication between experts and journalists on topics related to risk (Roche & Muskavitch, 2003). The evidence from our study suggests that these relationships are weak at both kinds of newspapers.

Finally, we turn to the evidence regarding our second research question on the prevalence of societal efficacy messages. Past studies have documented this information in national reporting of disease threats (e.g., Evensen & Clark, 2012; Fung et al., 2011),

but it is unclear whether this pattern would extend to a local paper. The analyses indicate a high level of societal efficacy messages in both national and local reporting of the Zika virus ( $M_{NYT} = .98$ ,  $SD_{NYT} = .02$ , and  $M_{TBT} = .93$ ,  $SD_{TBT} = .04$ ), with no significant differences across papers ( $|t| = 1.10$ ,  $df = 79$ ,  $p = .28$ ). There were some differences in how societal efficacy information was conveyed, with each paper focusing on the appropriate governmental official (e.g., state and county officials in the *TBT* and New York City officials in the *NYT*). That said, there was considerable overlap in content due to the routine reliance on official sources (Shoemaker & Voss, 2009). Organizations such as the WHO and CDC regularly issued Zika-related policy statements which were reported in both papers we examined.

## Discussion

Despite the rich literature exploring how the media cover health threats, there has been no systematic effort to compare quality across newspapers in this issue area. We contribute to

the literature by presenting empirical evidence about how the print media communicate infectious disease information, with a focus on how the varying incentives of national versus local papers influence reporting quality.

When there was variation in content across a local and national newspaper, the differences often reflected the distinctive audience considerations of each paper. For example, the *Tampa Bay Times* provided more coverage of self-protective and individual efficacy information than the *New York Times*. In anticipating their readers' greater concern with protecting themselves against Zika, the *TBT* devoted significantly more coverage to this topic than the *NYT* (Figure 2), and there was a tendency for the *TBT* to devote more attention to the *relative* risk of becoming ill with Zika (Figure 3). Thus, certain features of quality reporting were more aligned with the interests of a local newspaper. While there is evidence that audience considerations can lead to lower quality reporting (e.g., Branton & Dunaway, 2009), our study illustrates that market concerns can result in highly effective disease communication.

At the same time, the analyses revealed similar deficiencies in both types of papers: an abundance of sensationalist language and a reliance on imprecise risk information. Contrary to the idea that a national paper had a stronger incentive to dramatize a disease that was largely an international threat, the use of loaded words and worst-case scenarios were common in both the *NYT* and *TBT*. This pattern contradicted H1, but it was in line with a different finding: the heavy use of qualitative risk information. In the case of the Zika virus, journalists at both outlets used a higher proportion of qualitative than quantitative risk language. This result suggests that reporters at local and national papers face similar challenges in reporting on disease risks.

Although our study offers new insights into the differences in how local and national papers report on disease threats, it has limitations. We selected the *New York Times* and the *Tampa Times* because each newspaper has a reputation for quality reporting. That said, our conclusions regarding the *TBT* may not generalize to other local papers because of the variation in resources, staffing, and ownership structure across outlets. In this regard, a comparison between the *New York Times* and the *Miami Herald* might yield different conclusions.

## Conclusion

The present study provides an initial look at how the incentives of local and national papers relate to the dissemination of public health information. This is an important endeavor because the mass media are the primary way people learn about health threats, serving as a "mouthpiece to communicate important information to the public" (Ihekweazu, 2017, p. 747). Previous scholars have noted that sensational coverage of health threats creates a type of "mental noise" (Dudo et al., 2007, p. 433) that can prevent people from making accurate risk judgments. There may also be downstream consequences for other attitudes. In the case of the Zika virus, national polls indicate that people were following this issue in the news, and that Zika was a consideration in their vote for president in the 2016 election.<sup>7</sup> Anecdotal accounts hint at the potential for even broader effects on public opinion, with surveys showing the Zika outbreak influenced public attitudes about late-term abortion (Ferris, 2016). It is therefore essential to have a

better understanding of how health information is disseminated across the full range of media outlets people turn to in a time of crisis. Unfortunately, our findings suggest that the oft-noted decline of local newspapers could make some communities less equipped to contain the spread of infectious diseases.

## Notes

1. In Fung et al.'s (2011) study, "worst case scenarios" refer to information about the most negative extreme outcome associated with a disease (e.g., death), "loaded language" is emotion-charged and inflammatory language related to a disease, and "perceptions of controllability" refer to the perceived ability to control the magnitude of risk (through the provision of information about symptoms, methods of transmission, or self-protection measures).
2. At the time of this writing, Florida was the U.S. state most threatened by Zika, both in terms of the number of local mosquito-borne cases and the potential for cases due to the state's status as a tourist destination where infected people might visit (Center for Disease Control and Prevention, 2018).
3. This restriction eliminated stories in which the virus was mentioned only tangentially. The starting date corresponds to the beginning of coverage in the U.S. media. The ending date occurs after the WHO declared Zika was no longer a global health emergency (November 18, 2016). Only content-based stories were included (i.e., editorials and letters to the editor were excluded).
4. In the reconstructed week method, sample dates are stratified by the day of the week. Thus, in a sample of six constructed weeks, six Mondays are randomly sampled from the universe of stories, six Tuesdays, and so on. Luke, Caburnay, and Cohen (2011) report that six reconstructed weeks most efficiently characterized coverage of a one-year period. The number of stories for the *Tampa Bay Times* is lower due to lack of coverage of the topic on Sundays.
5. As an illustration, this category includes references to Zika as an "immediate threat" or "spreading rapidly."
6. These analyses are based on a cross-tabulation of the two coding categories. The outcome of significance tests does not change if we use a Fisher's exact test to account for small cell sizes.
7. According to a Kaiser Foundation survey (December 2016), two-thirds of the public said a candidate's plan to address Zika was "somewhat" or "very" important to their presidential vote.

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## Appendix: Abbreviated Coding Instrument

An abbreviated version of the coding instrument is shown below (full version available upon request).

## Worst Case

Story coded as “1” if it notes the most extreme negative outcome experienced with the virus, including microcephaly (or reference to “birth defects,” “brain damage,” “brain abnormalities,” or “neurological disorders”) or Guillain-Barré syndrome (or “paralysis”).

## Loaded Words

Sample dictionary terms include: “alarm,” “crisis,” “panic,” “life-altering,” “scary,” “devastating,” “untreatable,” “heartbreaking,” “tragedy,” “disaster,” “catastrophe,” “damaging,” “grim,” “sinister,” “calamitous,” “life threatening,” “frightening.”

## Qualitative Risk Information

Sample dictionary terms include: “immediate threat,” “risky,” “dangerous,” “spreads easily,” “actively circulating,” “surging,” “escalating,” “accelerating,” “worsening,” “intensifying,” “rising,” “mounting,” “spread widely.”

## Quantitative Risk Information

Quantitative risk information describes likelihood of getting with sick with Zika using specific numbers/figures (e.g., “There have been 4 cases of Zika in the Tampa area.”)

## Quantitative Risk Information, with Denominator

Story coded as a “1” if the raw numerical figure is put in context. Denominator information refers to the number of Zika cases out of a population figure (e.g., number of people in a state, country or other geographic unit).

## Self-Efficacy (Self-Protection)

Story coded as “1” if it provides information about how to protect oneself from Zika (e.g., using DEET, long sleeves, removing standing water, putting screens on windows, or staying inside).

## Symptoms

The most common Zika symptoms include fever, rash, joint/muscle pain, headache. A story is coded as a “1” if the story identifies symptoms by name or accurately notes that many people infected with Zika do not experience symptoms.

## Transmission

Story coded as “1” if it mentions one of the four ways Zika can be transmitted: bite of an infected mosquito, from mother to child, blood transfusion, or sexual intercourse.

## Societal Efficacy

Story coded as “1” if it provides information about how societal actors are responding to the risk, including actions taken by government officials, health organizations (e.g., CDC), or academics/scientists. This response can include, but is not limited to, policy statements, public warnings, specific response efforts (e.g., spraying), and scientific studies.