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Differences Between Florida and the Rest of the United States in Response to Local Transmission of the Zika Virus: Implications for Future Communication Campaigns

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For those at risk for Zika virus infection, prevention requires an approach that includes individual, interpersonal, and community-level support for behavior change. In August 2016, the announcement of local Zika transmission in Florida provided an opportunity to determine whether Zika-related knowledge, attitudes, and behaviors might be affected differentially in Florida compared to the rest of the nation. From August 8–October 3, 2016, we conducted nationally representative weekly surveys ($N = 12{,}236$), oversampling Florida residents, measuring Zika virus news exposure, knowledge about transmission and prevention of the infection, and attitudes and behaviors toward prevention. We tested two classes of models: those focused on individual Zika risk perceptions (e.g., protection motivation theory) and one focused on community action beyond those directly at risk (social consensus model). Analyses assessed differences between Florida and the rest of the nation by survey week. Consistent with both models, Floridians demonstrated significantly higher levels of perceived susceptibility and knowledge, more positive attitudes toward Zika virus prevention, and higher likelihood of engaging in protective behavior than non-Floridians. Consistent with theories of individual risk perception, response was greater among respondents who saw themselves at risk of infection. However, consistent with the SCM, irrespective of personal risk, response was greater among Floridians. Nevertheless, more than half of the public took no direct action to prevent the spread of Zika. Communities at increased risk for a novel infection such as Zika may quickly acquire Zika-related knowledge, attitudes, and behavior, but large-scale community-wide response might be difficult without further community-level public education.

KEY WORDS: Attitudes; behaviors; community response; knowledge; perception of risk; Zika virus

1. INTRODUCTION

1.1. Zika Virus Background

Zika virus infection poses unprecedented challenges to public health. It is the first mosquito-borne illness that causes birth defects in infants via perinatal transmission and is also the first mosquito-borne illness to be sexually transmitted (Frieden, Schuchat, & Petersen, 2016). Most infected people do not experience any symptoms, and for those who do, they are typically mild and resolve within a week. Severe

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outcomes, which are rare, are seen only among infants born to mothers infected with Zika virus during pregnancy, including microcephaly and other birth defects, and a small number of adults who may have acquired Guillain–Barré syndrome as a consequence of Zika virus infection. At present, there is no known cure or vaccine. While cases of Zika virus infection have been reported across the United States, people are only at substantial risk for contracting the virus if they live in or travel to an area with active Zika virus transmission, or if they have sex without a condom with someone who lives in or travels to an area with active Zika virus transmission.[3]

The novelty of the virus has necessitated the issuance of public health guidance and the development of risk communication messages based on limited evidence. For example, on January 15, 2016, the Centers for Disease Control and Prevention (CDC) issued guidance for pregnant women and women trying to become pregnant for travel to countries with active Zika transmission based on "reports in Brazil of microcephaly and other poor pregnancy outcomes in babies of mothers who were infected with Zika virus while pregnant" (CDC, 2016). It was not until May 19, 2016 that more definitive claims of causality were published (Rasmussen, Jamieson, Honein, & Petersen, 2016). On February 5, 2016, the CDC issued the first guidance to prevent sexual transmission of the Zika virus based on three cases: a report published five years earlier of a symptomatic man who transmitted Zika to his nontraveling wife (Foy et al., 2011), a study of the persistence of Zika virus in semen (Musso et al., 2015), and a recent case of transmission between a traveling man and his nontraveling sex partner that was under investigation (Oster et al., 2016) .

For those at risk for Zika virus infection, prevention requires an ecological approach that includes individual, interpersonal, and community-level support for behavior change (Frieden et al., 2016; Rather, Kumar, Bajpai, Lim, & Park, 2017). At the individual level, personal protective behaviors include using insect repellent and long clothes to prevent mosquito bites. At the interpersonal level, prevention behaviors such as installing screens, using fans or air conditioning, and removing standing water can protect not only oneself but also those in one's household susceptible to the most severe consequences. At both the personal and interpersonal level, using condoms protects oneself from spreading the disease to one's partner. Community-level support for vector control strategies can contribute to whether all of these strategies are employed (Coto, 2016), and community efforts to remove standing water and to spray insecticide can reduce the mosquito population (Frieden et al., 2016). Support for such actions necessarily extends beyond those most at risk. While there are many recommended prevention strategies, knowledge about the efficacy of some approaches, and the relative efficacy of each, is still evolving. This has resulted in a long list of prevention recommendations, with limited ability to prioritize based on efficacy. For example, the relative prevalence of transmission via sex or mosquito is unknown; therefore, it is difficult to determine if condoms during sex should be prioritized over insect repellent.

Before local transmission of Zika virus occurred in Florida, Zika virus-related public knowledge, attitudes, and behaviors in the United States were informed by news from countries and U.S. territories with local Zika virus infection or from travel-related cases. However, on August 1, 2016, after the Florida Department of Health identified the first cases of locally transmitted Zika virus infection in the United States in Miami-Dade and Broward counties, CDC issued guidance for pregnant women and women of reproductive age regarding travel to Florida (Likos et al., 2016). All previously reported cases of Zika virus infection in the 50 U.S. states were travel related (including sexual transmission), with more cases in Florida than any other state except for New York (Zika Epidemiology and Surveillance Task Force, 2016). The onset of local transmission provided an opportunity to understand how individuals' knowledge, attitudes, and preventive behavior may respond to the increased risk for Zika virus infection, with potential implications for how to enhance these outcomes in future prevention communication programs.

1.2. Behavior Change Models and Theories

Several theories of behavior change that focus on risk perceptions predict that awareness of the elevated risk in Florida would lead to greater behavior change in that state than the rest of the country. For example, protection motivation theory (Rogers, 1975, 1983) and the health belief model

[3]In the United States, Zika virus infection has been found in most states (mainly due to travel-related infection), with limited local vector borne transmission in Florida and Texas, and widespread local vector borne transmission in Puerto Rico and the U.S. Virgin Islands (https://www.cdc.gov/zika/intheus/maps-zika-us.html#zika-cases-us).

(Rosenstock, 1974; Strecher & Rosenstock, 1997) posit that behavior is a function of perceived threat, which is a function of perceived susceptibility (probability of acquiring an outcome) and perceived severity of the outcome. Individuals will be most likely to take protective action if they believe themselves to be at risk for a negative health outcome and believe that the outcome is sufficiently severe. If the perceived threat is sufficiently high, the benefits to performing the preventive behavior outweigh the barriers, and people have the self-efficacy or confidence in their ability to perform the behavior, then behavior change is likely to occur. Because Florida was the first state to experience local transmission in the United States, we would expect that residents of that state would experience greater perceived risk of Zika virus transmission. However, given that the severity of Zika virus infection resides primarily in women who were or intended to become pregnant, it was unclear if heightened perceived susceptibility alone would be sufficient for generating increased knowledge about the transmission and severity of the infection, factors that would lead to supportive attitudes and protective behaviors.

Other models of behavior change, including the social consensus model (SCM) (Romer & Hornik, 1992), posit that effective community response requires support beyond those most at risk. Even as knowledge about Zika virus diagnosis, transmission, and prevention increase, fundamental challenges to the development of effective Zika risk communication messages remain. For example, although the severe consequences of Zika virus infection impact a limited group, primarily pregnant women and their unborn babies, there are a range of prevention strategies that require support and action on behalf of family, sexual partners, and the community at large.

Originally developed in the context of the newly emerging HIV epidemic, the SCM also has relevance to the more recently emerging Zika health threat. From the perspective of the SCM, knowledge about the health threat will be insufficient to motivate action in the larger community until the appropriate responses are socially accepted. In the case of Zika, ways of avoiding infection may be less salient for those not at risk for severe outcomes. But if those not at risk engage in preventive behaviors like removing standing water, repairing screens, and supporting the spraying of insecticide by local municipalities, they will help those most susceptible and therefore the wider community. Thus, it is also important for the larger public to take action that will support the prevention of infection from the Zika-carrying mosquito. We were interested, therefore, to see how engaged the larger public was in Florida compared to the rest of the country in becoming actively involved in preventing the spread of the virus. This could take the form of individual action (e.g., removing stagnant water from yards) to endorsing community-wide action (e.g., spraying of insecticide).

The SCM makes the prediction that in the absence of widespread support for preventive action, even action among those at risk will be limited. Thus, we were interested to determine whether persons who did not see themselves directly at risk of infection engaged in greater individual protective action or supported community-wide action in Florida compared to the rest of the country. We expected greater efforts to prevent the spread of the infection among those not personally at risk in Florida than in that of the rest of the United States. In addition, because of this greater albeit still limited community support in Florida, we expected even greater levels of effective action among those who perceived themselves at risk in Florida than in the rest of the United States.

We were able to answer these questions in a study that tracked national awareness of the infection, its symptoms, perception of risk, and potential actions that could be taken by residents of the United States over a period of eight weeks. In particular, the study was able to track an oversample of residents of Florida, where local transmission was occurring, separately from the rest of the United States. Before local transmission of Zika virus was confirmed in Florida, concern about the infection focused mainly on isolated travel-related cases from countries and U.S. territories with local Zika virus infection. However, shortly after CDC issued guidance for pregnant women and women of reproductive age regarding the risks of travel to Florida (Frieden et al., 2016), we began to oversample Florida residents, which enabled us to study the effects of this increased risk on residents of Florida versus the rest of the country where the risk of infection was much lower.

1.3. Hypotheses

We anticipated that effects predicted by both individual and social models of behavior change would be evident in the early phases of the Zika epidemic. First, because Florida was already the focus of Zika transmission in the United States and became the

first site of local transmission, we anticipated that residents of that state would exhibit greater awareness and knowledge of the health threat, and greater perceptions of personal susceptibility to it.

H1: *Residents of Florida will report differentially greater awareness of news about Zika virus as the study period progressed than residents of the rest of the United States.*

H2: *Residents of Florida will report differentially greater perception of susceptibility, knowledge of transmission and severity, and greater action and attitudes toward preventing Zika infection as the study period progressed than residents of the rest of the United States.*

H3: *Households with an imminent or planned pregnancy will report greater perceived susceptibility, knowledge of transmission and severity, and greater action and attitudes toward preventing Zika infection than others, a difference that will be greater in Florida.*

The heightened susceptibility to the Zika virus in Florida may result in greater knowledge of transmission and severity, more positive attitudes toward prevention, and greater preventive actions. At the same time, we anticipated that in the early phases of the epidemic when appropriate community responses were not yet crystalized, there would be weaker support in the general public for actions to prevent the spread of the virus than among those most likely to be adversely affected. Nevertheless, on the basis of the SCM, we expected support for preventive action to be stronger among residents of Florida than in the rest of the United States whether they were personally at risk of infection or not.

H4: *Although residents of Florida will report greater susceptibility to Zika infection than residents of the rest of the United States, whether they report susceptibility or not, residents or persons not considering themselves at risk in Florida will also take greater personal action and support greater community efforts to prevent the spread of the virus than residents of the rest of the United States.*

We also expected that the community-level differences between residents of Florida and residents of the rest of the United States would remain even after controlling for demographic variables, including age, sex, race, education, and whether or not a member of the household was pregnant or intending to become pregnant.

2. METHOD

2.1. Survey Design

Starting on February 12, 2016, the Annenberg Public Policy Center of the University of Pennsylvania (APPC) conducted nationally representative weekly surveys of adults ages 18 and older regarding knowledge of and attitudes and behavior toward the Zika virus outbreak. A dual frame sample consisting of cell and landline telephone was constructed. The surveys were conducted in English or Spanish in all 50 states and Washington, DC. Beginning the week of August 8, 2016, after the first case of Zika in Florida unrelated to travel was reported, APPC oversampled a representative cross-section of respondents from Florida to enable a comparison of residents from that state with residents in the rest of the country. Sample sizes for the United States (excluding Florida) and Florida were approximately 1,000 (average margin of error not exceeding $\pm 4\%$) and 500 respondents (average margin of error not exceeding $\pm 6\%$), respectively, each week. The final national weekly survey with the Florida oversample was conducted from September 22 through September 26, 2016. The week of October 3, 2016 included Florida residents only. Average response rates were 6% nationally and 15% in Florida (AAPOR RR3). The total number of survey respondents across the nine weeks used in this analysis was 12,236.[4] Several questions on attitudes were not asked during two or three weeks of data collection.

The survey included multiple items related to Zika virus, including a measure of reported familiarity with Zika virus news coverage that was used as a proxy for interest in Zika virus information. There was one measure of perceived susceptibility of infection ("What is the risk that you will be infected with Zika in the next six months?"). Although there were no direct measures of personal perceived severity, four measures assessed knowledge about the consequences of Zika, and they were used as a proxy for perceived severity. Eight items measured

[4]Additional information about the methodology, including sampling, within household respondent selection, weighting variables and procedures, is available at http://ssrs.com/wp-content/uploads/2017/11/SSRS-Omnibus-Methodology-November-2018.pdf.

Table I. Weekly Survey Questions Related to Zika Virus Knowledge, Attitudes, and Behaviors—Florida and the Rest of the United States, August 8 to October 3, 2016 (Full Wording and Responses Can Be Found in Appendix)

Items
Reported familiarity with Zika (proxy for interest in Zika virus information):
Very or somewhat familiar with Zika virus news
Perceived susceptibility:
At least moderate perceived risk of becoming infected with Zika virus next six months
Perceived severity:
Zika virus always produces noticeable symptoms
Adults can die if infected with Zika virus
Zika virus causes microcephaly
Zika virus causes Guillain–Barré syndrome
Knowledge about transmission:
Mosquitoes very or somewhat likely transmission route
Sexual intercourse very or somewhat likely transmission route
Coughs or sneezes not too likely or unlikely transmission route
Knowledge about travel restrictions:
Correctly identified Florida as state of travel restrictions
Attitudes—community prevention:
Strongly or somewhat approve of ground spraying
Strongly or somewhat approve of aerial spraying
Strongly or somewhat favor genetically modified mosquitoes to fight Zika virus
Behavior:
Have searched for information about Zika virus
Have spoken to a doctor about Zika virus in past three months
Have spoken to family or friends about Zika virus in past week
Have done something to protect themselves from Zika virus in past three months

knowledge about the infection, including the four measures of severity, three regarding transmission routes, and one about travel to Florida. Because the various knowledge items measured unrelated aspects of the Zika epidemic, we did not expect them to form reliable composites. Nevertheless, as an indication of reliability, we assessed correlations of the items with reported exposure to news about the virus. Those correlations ranged from 0.046 ($p < 0.001$) for knowledge that mosquitoes were the likely transmission route to 0.277 ($p < 0.001$) that Zika causes microcephaly. The survey also included three measures of attitudes toward potential community preventive actions and four items regarding potential individual behaviors taken to cope with the threat (Table I).

2.2. Analysis

Distributions of variables are reported separately for Florida and the rest of the United States by week of data collection. Outcomes were coded such that refused responses were set to missing (and typically represented less than 1% of the sample), 1 equaled a positive response, and a 0 equaled all other responses (including neutral, negative, and "don't know"). Logistic regression was used to assess two primary comparisons: (1) differences between Florida (coded as a 1) and the rest of the United States (coded as a 0) and (2) interactions between location (Florida and not Florida) and week (time), with week coded as a mean-centered variable (week-5). The logistic regression analyses included data only from August 8 to September 26, 2016, and adjusted for age, sex, education, race/ethnicity, and whether or not a household member was pregnant or intending to become pregnant during the next 12 months. To test Hypothesis 4, the logistic regression model was extended to include whether someone indicated they thought themselves to be at least at moderate risk for Zika virus in the "next six months." Outputs for all regressions were reported as adjusted odds ratios with levels of significance indicated.

3. RESULTS

3.1. Hypothesis 1

As predicted, familiarity with Zika virus news coverage from August 8 to October 3 remained relatively higher as the study period progressed among Floridians than in the rest of the United States (Table II). Both the effect of time ($X^2 = 155.8$, $p < 0.001$) and the interaction between time and location ($X^2 = 3.9$, $p < 0.01$) were significant.

3.2. Hypothesis 2

Consistent with predictions, Floridians were more than twice as likely to express at least moderate perceived susceptibility, or risk of becoming infected with Zika virus in the next six months (overall 37.1% of Floridians vs. 16.0% of non-Floridians, $X^2 = 619.3$, $p < 0.001$) (Table II). This concern remained higher across the survey period. Floridians were more likely to know that their state was the subject of travel restrictions (62.6% vs. 48.9%, $X^2 = 139.2$ $p < 0.001$), a difference that was present at the start of the survey period and remained so throughout. Most respondents, regardless of location, knew that mosquitoes were the likely transmission route, with a small advantage for residents of Florida

Table II. Percentage Responding Affirmatively/Correctly to Weekly Survey Questions Related to Zika Virus Awareness and Risk Perception—Florida and the Rest of the United States, August 8 to October 3, 2016

	Week										Florida (Other States)	Florida × Week Number
Responses	8/8	8/15	8/22	8/29	9/4	9/12	9/19	9/2	10/3	Total	AOR[a] (X^2) **(bold = sig)**	AOR[a] (X^2) **(bold = sig.)**
Very or somewhat familiar with Zika virus news:												
Florida	88.8	88.8	90.8	89.5	90.7	88.3	90.3	89.0	90.5	89.6	**2.104*** (155.81)**	**1.048* (3.88)**
Other states	82.9	82.8	80.0	80.8	79.2	79.9	77.1	79.4		80.3		
At least moderate perceived risk of becoming infected with Zika virus next six months:												
Florida	37.3	40.1	35.8	40.2	38.6	38.3	34.5	32.4	36.2	37.1	**3.188*** (619.30)**	1.006 (0.11)
Other states	17.9	17.1	14.2	15.6	16.2	17.7	16.8	12.6		16.0		

[a]AOR = Adjusted odds ratio controlling for age, sex, education, race/ethnicity, and whether a hh member was pregnant/intending to get pregnant in next 12 months.
$^{***}p < 0.001$, $^{*}p < 0.05$ at 95% CI.

Table III. Percentage Responding Affirmatively/Correctly to Weekly Survey Questions Related to Zika Virus Knowledge—Florida and the Rest of the United States, August 8 to October 3, 2016

	Week										Florida (Other States)	Florida × Week Number
Responses	8/8	8/15	8/22	8/29	9/4	9/12	9/19	9/26	10/3	Total	AOR[a] (X^2) **(bold = sig)**	AOR[a] (X^2) **(bold = sig.)**
Mosquitoes very or somewhat likely transmission route:												
Florida	83.9	84.9	86.8	84.1	85.2	84.0	82.7	82.7	82.8	84.1	**1.195** (11.55)**	0.996 (0.31)
Other states	83.2	81.6	82.4	83.0	82.9	81.6	80.9	80.1		82.0		
Sexual intercourse very or somewhat likely transmission route:												
Florida	67.4	65.8	61.2	63.2	70.0	66.3	67.7	64.1	65.3	65.7	**1.213*** (22.45)**	1.030 (3.26)
Other states	61.5	62.9	63.8	61.5	61.0	60.3	60.1	60.1		61.4		
Coughs or sneezes not too likely or unlikely transmission route:												
Florida	65.8	68.7	69.2	67.5	69.7	65.6	67	65.6	68.1	67.4	**1.186*** (16.70)**	1.000 (0.001)
Other states	63.7	65.1	64.1	63.3	65.3	61.8	60.3	64.9		63.6		
It is not too accurate, or not at all accurate, that Zika virus always produces noticeable symptoms:†												
Florida	55.9	55.1	54.2	54.9	56.9	55.4	51.1	53.2	56.8	54.8	**1.207*** (22.10)**	0.972 (3.23)
Other states	47.5	51.6	47.4	53	50.6	53.9	48.7	50.9		50.4		
It is not too likely, or unlikely, that adults can die if infected with Zika virus:†												
Florida	64.0	65.2	60.7	59.8	62.0	66.3	64.5	61.3	63.4	63.2	**1.356*** (54.20)**	1.014 (0.68)
Other states	59.1	58.8	53.9	57.0	54.7	56.8	52.5	56.1		56.3		
Correctly identified Florida as state of travel restrictions:												
Florida	59.2	58.2	62.9	66.9	64.2	63.5	65.5	60.5	62.2	62.6	**1.628*** (139.24)**	0.992 (0.23)
Other states	46.6	45.9	45.2	52.9	51.9	51.0	48.1	49.7		48.9		
Scientists established Zika virus causes microcephaly:†												
Florida	77.8	76.5	72.7	76.0	78.7	76.3	75.9	75.9	75.0	76.1	**1.216*** (18.68)**	1.032 (3.03)
Other states	74.9	74.6	70.2	72.6	68.5	70.4	67.9	71.4		71.3		
Scientists established that Zika virus causes Guillain–Barré syndrome:†												
Florida	18.6	23.2	24.6	21.9	22.2	24.2	20.9	21.0	22.2	22.1	0.930 (2.41)	0.995 (0.007)
Other states	21.9	22.1	23.8	24.8	24.0	23.6	23.8	22.9		23.4		

[a]AOR = Adjusted odds ratio controlling for age, sex, education, race/ethnicity, and whether a hh member was pregnant/intending to get pregnant in next 12 months.
†Perceived severity items, $^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$ at 95% CI.

(84.1% vs. 82.0%, $X^2 = 11.6$, $p < 0.01$). Floridians were also more likely to know of the sexual transmission route (65.7% vs. 61.4%, $X^2 = 22.4$, $p < 0.001$). However, that knowledge of sexual transmission was lower than knowledge of transmission through mosquitoes and remained so throughout the field period. Floridians were also more likely to know that coughing and sneezing was not a transmission route (67.4% vs. 63.6%, $X^2 = 16.7$, $p < 0.001$) (Table III).

Table IV. Percentage Responding Affirmatively/Correctly to Weekly Survey Questions Related to Zika Virus Attitudes and Behavior—Florida and the Rest of the United States, August 8 to October 3, 2016

	Week										Florida (Other States)	Florida × Week Number
Responses	8/8	8/15	8/22	8/29	9/4	9/12	9/19	9/26	10/3	Total	AOR[a] (X^2) **(bold = sig)**	AOR[a] (X^2) **(bold = sig.)**
Attitudes												
Strongly or somewhat approve of ground spraying:												
Florida				90.3	89.5	85.0	83.4	87.7	87.1	87.2	**1.640***** **(29.46)**	1.120 (0.03)
Other states				81.9	80.4	79.7	78.1	79.5		79.9		
Strongly or somewhat approve of aerial spraying:												
Florida			79.7	80.0	74.7	73.4	69.9	71.9	71.0	74.4	**1.432***** **(41.71)**	0.980 (0.57)
Other states			74.3	66.0	64.3	65.8	66.9	64.5		67.0		
Strongly or somewhat favor genetically modified mosquitoes to fight Zika virus:												
Florida			61.6	63.8	61.8	63.0	61.1	62.9	60.3	62.1	**1.129*** **(5.79)**	0.964 (2.29)
Other states			54.5	56.7	59.8	58.1	57.5	59.1		57.6		
Behavior												
Have searched for information about Zika virus:												
Florida	31.9	28.6	27.7	24.8	28.3	25.2	28.2	25.7	32.1	28.1	**1.501***** **(75.25)**	1.009 (0.24)
Other states	25.2	22.4	19.9	20.7	23.5	24.3	22.3	19.6		22.2		
Have spoken to a doctor about Zika virus in past three months:												
Florida	8.7	9.5	9.6	9.1	12.4	11.6	9.7	10.6	11.9	10.3	**1.397***** **(24.12)**	1.010 (0.14)
Other states	6.6	6.6	8.6	7.7	8.6	8.7	7.7	7.6		7.8		
Have spoken to family or friends about Zika virus in past week:												
Florida	59.2	59.3	50.6	56.7	53.1	49.9	46.3	37.1	38.6	50.2	**2.529***** **(493.79)**	**1.037*** **(4.71)**
Other states	41.7	37.7	29.1	29.9	31.1	27.5	23.3	18.7		29.9		
Have done something to protect themselves from Zika virus in past three months:												
Florida	42.2	45.3	40.9	41.6	44.9	46.3	45.4	46.8	50.8	44.9	**2.421***** **(445.01)**	1.004 (0.06)
Other states	26.0	24.7	20.8	22.3	26.7	26.1	28.3	29.0		25.5		

[a]AOR = Adjusted odds ratio controlling for age, sex, education, race/ethnicity, and whether a hh member was pregnant/intending to get pregnant in next 12 months.
$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$ at 95% CI.

For most items, Floridians were more knowledgeable about the consequences of Zika than the rest of the United States. Floridians were more knowledgeable that Zika does not always produce noticeable symptoms (54.8% vs. 50.4%, $X^2 = 22.1$, $p < 0.001$) and that adults are unlikely to die from Zika (63.2% vs. 56.3%, $X^2 = 54.2$, $p < 0.001$), and Floridians were also more likely to report the severe consequence of microcephaly for babies born to infected mothers (76.1% vs. 71.3%, $X^2 = 18.7$, $p < 0.001$). However, Floridians were not more likely to report that Zika can cause Guillain–Barré syndrome (Table III).

The attitudinal items measured favorability toward various vector control strategies (Table IV). Floridians regarded all strategies more favorably (e.g., overall, 87.2% of Floridians vs. 79.9% of non-Floridians favored the use of ground spraying to control mosquitoes, $X^2 = 29.5, p < 0.001$). However, support for the use of genetically modified mosquitoes was not as strong as the other control strategies (only 62.1% of Floridians supported this strategy vs. 57.6% of non-Floridians, $X^2 = 5.79, p < 0.05$).

Floridians were significantly more likely than non-Floridians to take action on the four Zika virus-related behaviors (Table IV). For example, overall, Floridians were more likely to have reported talking with family and friends in the past week about Zika virus (50.2%) than were non-Floridians (29.9%) ($X^2 = 493.8$, $p < 0.001$) and to have taken some steps in the past three months to protect themselves from Zika virus (Floridians = 44.9%, non-Floridians = 25.5%, $X^2 = 445.0, p < 0.001$).

As already noted, familiarity declined slightly over time among non-Floridians and remained stable among residents of Florida (Table II). Unexpectedly, however, Floridians did not report significant increases in any of the eight knowledge items, in perceived susceptibility to infection, or in attitudes toward prevention strategies over time (Tables II–IV). With regard to taking personal action to prevent the spread of the virus, declines

Table V. Multivariate Logistic Regression Models Predicting Perceived Risk of Zika Infection and Behaviors to Prevent Zika Comparing (1) Floridians with Survey Respondents Over Time in the Rest of the United States and (2) Pregnant Households Versus Not, Controlling for Sex, Age, Education, and Race, August 8 to September 26, 2016 (Predictor Variable in Bold Type)

	Wald	Adjusted OR
Perceived risk of Zika virus		
Florida (other states)	619.30	3.188***
Week number[a]	4.35	0.971*
Florida × week number[b]	0.11	1.006
Pregnant/intending to be pregnant household member (no)	9.36	1.317**
Constant	364.42	0.151***
Behaviors		
Spoken to doctor about Zika virus		
Florida (other states)	24.12	1.397***
Week number	1.11	1.021
Florida × week number	0.14	1.010
Pregnant/intending to be pregnant household member (no)	71.26	2.400***
Constant	479.38	0.042***
Spoken to family or friends about Zika virus		
Florida (other states)	493.79	2.529***
Week number	154.89	0.866***
Florida × week number	4.71	1.037*
Pregnant/intending to be pregnant household member (no)	60.12	1.889***
Constant	116.41	0.407***
Searched for information about Zika virus		
Florida (other states)	75.25	1.501***
Week number	2.52	0.980
Florida × week number	0.24	1.009
Pregnant/intending to be pregnant household member (no)	14.83	1.383***
Constant	188.362	0.285***
Done something to protect themselves from Zika virus		
Florida (other states)	445.01	2.421***
Week number	10.15	1.039**
Florida × week number	0.06	1.004
Pregnant/intending to be pregnant household member (no)	21.13	1.461***
Constant	433.50	0.156***

[a]Sequentially numbered such that August 8, 2016 = 1 and September 26, 2016 = 8.
[b]Interactions between location and week coded as a mean-centered variable (location × week-5).
***$p < 0.001$, **$p < 0.01$, *$p < 0.05$ at 95% CI.

Table VI. Multivariate Logistic Regression Models Predicting Zika News Familiarity and Zika Transmission Knowledge (1) Floridians with Survey Respondents in the Rest of the United States Over Time and (2) Pregnant Households Versus Not, Controlling for Sex, Age, Education, and Race, August 8 to September 26, 2016 (Predictor Variable in Bold Type)

	Wald	Adjusted OR
Zika virus news familiarity		
Florida (other states)	155.81	2.104***
Week number[a]	8.48	0.962**
Florida × week number[b]	3.88	1.048*
Pregnant/intending to be pregnant household member (no)	0.07	1.029
Constant	40.46	1.830***
Transmitted by mosquitoes		
Florida (other states)	11.55	1.195**
Week number	3.01	0.977
Florida × week number	0.31	0.996
Pregnant/intending to be pregnant household member (no)	3.41	1.236
Constant	281.56	5.818***
Sexual transmission		
Florida (other states)	22.45	1.213***
Week number	5.30	0.976*
Florida × week number	3.26	1.030
Pregnant/intending to be pregnant household member (no)	10.06	1.309**
Constant	26.81	1.504***
Not transmitted by coughs or sneezes		
Florida (other states)	16.70	1.186***
Week number	0.86	0.990
Florida × week number	0.00	1.00
Pregnant/intending to be pregnant household member (no)	0.063	0.979
Constant	21.37	1.444***

[a]Sequentially numbered such that August 8, 2016 = 1 and September 26, 2016 = 8.
[b]Interactions between location and week coded as a mean-centered variable (location × week-5).
***$p < 0.001$, **$p < 0.01$, *$p < 0.05$ at 95% CI.

across weeks in the percentage of adults who reported talking to family and friends about Zika were slightly smaller among Floridians than among non-Floridians. On all other behavioral variables, relative to non-Floridians, Floridians did not differentially report Zika virus-related behaviors over the survey period (Table IV).

The main finding that Floridians reported greater Zika virus-related awareness, risk perceptions, knowledge, attitudes, and behaviors for 16 of 17 variables (than did non-Floridians) remained consistent when controlling for time, sex, age, race, education, and whether or not a member of the household was pregnant or intending to become pregnant. The interaction between Florida/other states and time remained significant for familiarity with news coverage and speaking with family and

friends about the Zika virus but nonsignificant for the 15 other knowledge, attitude, and behavior items, after controlling for demographic variables (Tables V–VIII).

3.3. Hypothesis 3

Regarding predictions for households with greater pregnancy status, multivariate analyses showed that in addition to residing in Florida, residing in a home with someone who was or intended to be pregnant was also a significant predictor of perceived susceptibility. However, the interaction between pregnancy status and living in Florida did not significantly add to the prediction (not shown). Residing in homes with someone who was or intended to become pregnant was significantly related to knowledge of sexual transmission of Zika (adjusted odds ratio [AOR] = 1.309, $p < 0.01$) (Table VI) but only significantly related to one of the four severity measures: the knowledge that the Zika virus does not always produce noticeable symptoms (AOR = 1.208, $p < 0.05$) (Table VII). No differences were observed for knowledge that Zika virus causes microcephaly or Guillain–Barré syndrome. Again, none of the interactions was significant (not shown).

Regarding taking action, responses were stronger among households with women potentially at risk of adverse child outcomes, an effect that did not differ by region. These actions included information-seeking behaviors such as speaking with one's doctor (AOR = 2.400, $p < 0.001$) and speaking with family or friends about Zika virus (AOR = 1.889, $p < 0.001$), searching for information about Zika virus (AOR1.383, $p < 0.001$), and more direct action such as doing something to protect oneself from Zika virus (AOR = 1.461, $p < 0.001$) (Table V). Finally, those individuals residing in homes with someone who was or intended to be pregnant were not more positive toward aerial spraying to minimize the spread of the virus, nor more likely to favor ground spraying or introducing genetically modified mosquitoes to minimize the spread of the virus (Table VIII).

Table VII. Multivariate Logistic Regression Models Predicting Zika Knowledge Comparing (1) Floridians with Survey Respondents in the Rest of the United States Over Time and (2) Pregnant Households Versus Not, Controlling for Sex, Age, Education, and Race, August 8 to September 26, 2016 (Predictor Variable in Bold Type)

	Wald	Adjusted OR
Zika virus does not always produce noticeable symptoms		
Florida (other states)	22.10	1.207***
Week number	1.95	1.015
Florida × week number	3.23	.972
Pregnant/intending to be pregnant household member (no)	5.50	1.208*
Constant	14.08	.747***
Unlikely that adults can die from Zika virus		
Florida (other states)	54.20	1.356***
Week number	4.18	.978*
Florida × week number	0.68	1.014
Pregnant/intending to be pregnant household member (no)	2.78	1.149
Constant	5.28	1.200*
FL is state with travel guidance		
Florida (other states)	139.24	1.628***
Week number	8.37	1.032**
Florida × week number	0.23	0.992
Pregnant/intending to be pregnant household member (no)	5.27	1.207*
Constant	264.38	0.265***
Zika virus causes microcephaly		
Florida (other states)	18.68	1.216***
Week number	8.81	0.966**
Florida × week number	3.03	1.032
Pregnant/intending to be pregnant household member (no)	0.80	1.082
Constant	22.68	1.488***
Zika virus causes GBS		
Florida (other states)	2.41	0.930
Week number	0.50	1.009
Florida × week number	0.07	0.995
Pregnant/intending to be pregnant household member (no)	0.71	1.078
Constant	141.93	0.349***

[a]Sequentially numbered such that August 8, 2016 = 1 and September 26, 2016 = 8.
[b]Interactions between location and week coded as a mean-centered variable (location × week-5).
***$p < 0.001$, **$p < 0.01$, *$p < 0.05$ at 95% CI.

3.4. Hypothesis 4

To test this hypothesis, we compared the proportion of respondents who did not see themselves at risk of infection but who took action in Florida compared to the rest of the United States. In Florida, 37.6% took action despite not seeing themselves at risk, whereas the comparable proportion in the rest of the country was 22.5%, which represented a significant difference ($X^2 = 226.9$, $p < 0.001$). In Florida, 57.5% took action thinking they were at risk, whereas only 40.9% in the rest of the United States did so ($X^2 = 78.26$, $p < 0.001$) (Table IX). These differences remained even after controlling for knowledge that Zika causes microcephaly. This supported the hypothesis that Floridians would report greater

Table VIII. Multivariate Logistic Regression Models Predicting Attitudes Toward Zika Action Comparing (1) Floridians with Survey Respondents in the Rest of the United States Over Time and (2) Pregnant Households Versus Not, Controlling for Sex, Age, Education, and Race, August 8 to September 26, 2016 (Predictor Variable in Bold Type)

	Wald	Adjusted OR
Support for ground spraying		
Florida (other states)	29.46	1.640***
Week number	3.13	0.954
Florida × week number	0.03	1.120
Pregnant/intending to be pregnant household member (no)	0.82	1.120
Constant	50.61	3.778***
Support for aerial spraying		
Florida (other states)	41.71	1.432***
Week number	13.59	0.939***
Florida × week number	0.57	0.980
Pregnant/intending to be pregnant household member (no)	0.89	1.095
Constant	46.33	2.257***
Support for genetically modified mosquitoes		
Florida (other states)	5.79	1.129*
Week number	2.94	1.029
Florida × week number	2.29	0.964
Pregnant/intending to be pregnant household member (no)	2.02	1.140
Constant	1.38	1.144

[a]Sequentially numbered such that August 8, 2016 = 1 and September 26, 2016 = 8.
[b]Interactions between location and week coded as a mean-centered variable (location × week-5).
***$p < 0.001$, *$p < 0.05$ at 95% CI.

action to prevent the spread of the virus even if they were not personally threatened by the virus. Nevertheless, more than half of those surveyed in Florida (55.1%) reported taking no action to prevent the spread of the infection (Table IV).

Although Floridians were more supportive of aerial spraying, ground spraying, and the use of genetically modified mosquitoes than the rest of the United States, Floridians at risk did not differ from those not at risk in supporting these policies (Table X). Ironically, those at risk were less supportive of ground spraying than those not at risk in both Florida and the rest of the United States. These patterns failed to support the hypothesis regarding greater community support for preventive action among those not at risk in Florida versus the rest of the United States.

4. SUMMARY, DISCUSSION, AND CONCLUSION

4.1. Summary of Findings

By the week of August 8, one week after local Zika virus transmission was reported, Floridians reported greater familiarity with Zika virus news stories than non-Floridians, and there was a small but significant difference over time such that news familiarity appeared to decline among all respondents except Floridians. Floridians also had a more accurate understanding of the severity of Zika than non-Floridians, correctly noting that adults are unlikely to die, that it is often asymptomatic, and that severe outcomes occurred among infants born to infected pregnant mothers. Although households with a pregnant woman or a woman intending to become pregnant were more knowledgeable about sexual transmission of the virus, they were only significantly more likely to know that Zika doesn't always produce noticeable symptoms and no more likely to know about microcephaly. This was also true of pregnant households outside of Florida.

With respect to knowledge, most differences were small. The largest difference in knowledge pertained to awareness of Florida as the state in which local travel restrictions were advised for pregnant women and women of reproductive age. There

Table IX. Percentage Taking Action to Protect Against Zika Virus in the Past Three Months, Favoring Aerial or Ground Spraying, or Genetically Modified Mosquitoes by Those Who Do or Do Not See Themselves at Risk for Zika Virus

	Taken Action in Past Three Months	Favor Aerial Spraying	Favor Ground Spraying	Favor Introducing Genetically Modified Mosquitoes
Floridians not perceived to be at risk	37.6***	74.3	87.5	62.7
Rest of U.S. not perceived to be at risk	22.5	66.4	86.5	58.1
Floridians perceived to be at risk	57.5***	74.4	79.7	61.1
Rest of U.S. perceived to be at risk	40.9	70.7	81.4	55.2

***$p < 0.001$.

Table X. Multivariate Logistic Regression Models Predicting Support for Community Prevention Efforts Against Zika (Ground Spraying, Aerial Spraying, and Releasing Genetically Modified Mosquitoes) Comparing (1) Floridians with Survey Respondents in the Rest of the United States Over Time, (2) Pregnant Households, and (3) Those at Perceived Zika Risk, Controlling for Sex, Age, Education, and Race, August 8 to September 26, 2016 (Predictor Variable in Bold Type)

	Wald	Adjusted OR
Support for ground spraying		
Florida (other states)	27.02	1.620***
Week number[a]	2.80	.956
Florida × week number[b]	0.01	1.002
Pregnant/intending to be pregnant household member (no)	0.70	1.111
Perceived moderate or greater risk for infection	0.49	1.057
Constant	48.64	3.694***
Support for aerial spraying		
Florida (other states)	34.44	1.398***
Week number	13.56	0.939***
Florida × week number	0.56	.981
Pregnant/intending to be pregnant household member (no)	0.70	1.084
Perceived moderate or greater risk for infection	3.48	1.116
Constant	45.46	2.246***
Support for genetically modified mosquitoes		
Florida (other states)	5.08	1.124*
Week number	2.85	1.028
Florida × week number	2.25	.964
Pregnant/intending to be pregnant household member (no)	1.84	1.13
Perceived moderate or greater risk for infection	.093	1.017
Constant	1.51	1.151

[a]Sequentially numbered such that August 8, 2016 = 1 and September 26, 2016 = 8.
[b]Interactions between location and week coded as a mean-centered variable (location × week-5).
***$p < 0.001$, *$p < 0.05$ at 95% CI.

were larger differences between Floridians and non-Floridians with respect to attitudes, with Floridians being more likely than non-Floridians to support community-wide vector control strategies to combat the Zika virus. Although there were significant differences between Floridians and non-Floridians in all of the behavioral actions reported, the magnitudes were varied. The largest difference in behavior was that Floridians were more than twice as likely as non-Floridians to report taking preventive action to protect themselves from the Zika virus. Although this increase in action was concentrated among persons with greater perceived risk of infection, there was also an increase in action among those not personally at risk of infection. Support for community-wide efforts such as aerial spraying was also higher in Florida but did not differ by risk status. However, about half of those surveyed reported taking no action, despite the finding that more than eight in ten residents knew of the virus and that mosquitoes were a likely transmission route.

Surprisingly, there were only two differences over time between Floridians and non-Floridians. Floridians were more familiar with Zika virus news, with Floridians' awareness staying stable during the study period and that of the rest of the United States declining. The only other difference that reached statistical significance was in regard to talking with family and friends about the epidemic, a behavior that declined less in Florida than in the rest of the country.

4.2. Discussion

As expected, Floridians perceived greater susceptibility to Zika, had more knowledge about it, more positive attitudes about community action, and took more preventive actions than non-Floridians. All of these effects are consistent with theories that focus on risk perception as the motivator of behavior change. In addition, in the absence of any evidence of increased susceptibility or severity in Florida after local transmission was announced, Floridians did not differentially increase their attitudes or behavior compared to non-Floridians. It is important to recognize that Zika virus news familiarity among Floridians exceeded 85% at the start of this study period, constraining additional increased familiarity after local transmission was confirmed. Similarly, at the start of the study period, the largest difference pertained to perceived susceptibility, with more than twice as many Floridians as non-Floridians believing themselves to have at least a moderate risk of contracting the Zika virus. The high number of travel-related cases in Florida, coupled with predictions of local Zika virus transmission in Florida (Monaghan et al., 2016), might have primed Floridians before local transmission was confirmed, thereby limiting further movement on knowledge, attitudes, and behavior, even though some types of knowledge were relatively low (e.g., knowledge of sexual transmission and that Zika virus can be asymptomatic). Additionally, non-Floridians may have experienced optimism bias (Weinstein & Klein, 1995), believing they were not susceptible to infection. Floridians were less optimistic since they were more likely than

non-Floridians to believe, early in the study, they were at risk, perhaps a result of media coverage raising the possibility of that risk.

The finding that respondents in Florida in a household with a pregnant woman or a woman intending to become pregnant were not more likely to know about the severe consequences than comparable households in the rest of the United States is somewhat surprising. There were also no significant differences in preventive actions taken by persons in households in Florida with a pregnant woman or a woman intending to become pregnant compared to other Floridian households, a finding that again is consistent with theories that focus on individual perceived threat. If households with women in Florida did not see themselves at increased risk or greater severity of consequences compared to similar women in the rest of the United States, then they would not be expected to take greater action either.

One possible explanation for the lack of enhanced response among households with pregnant members is that the confirmation of local transmission by CDC was not noteworthy to residents of Florida. Floridians had already been the focus of intense concern about Zika's spread in that state, and it is possible that the distinction between travel-related transmission and the potential for local transmission escaped Floridians. Surveys conducted in Florida prior to the oversample suggested that Floridians were already more concerned about the infection than residents of other states, and the announcement of local transmission may not have altered the perceived threat. Alternatively, it might be that residents of Miami–Dade County, where there were more intensive education efforts by CDC and the Florida Department of Health, did experience increases in knowledge along with more favorable attitudes and behaviors toward prevention, but that those effects were diluted within the larger Florida sample.

From the perspective of the SCM, the greater action taken to prevent the infection among those not at personal risk of infection in Florida compared to non-Floridians suggests that residents there did become more attuned to the need for greater action in the wider community. This concern was also reflected in greater support for community-wide action such as ground spraying. However, the lack of comparable support for the release of genetically modified mosquitoes reflects the incomplete development of consensus for this potentially effective response to the epidemic. In addition, the finding that less than half of the public had done anything personally to prevent the spread of the virus may also indicate that effective messages about ways to prevent the spread of the virus had not yet been assimilated. This may also have attenuated the response among households that were most at risk in Florida as the SCM suggests that preventive action even among those most at risk depends on social support for that action among the rest of the population. In the absence of strong action by the majority of the population, even those at high risk may not be as motivated to see themselves at risk and to take action. This may again reflect the inevitable need to develop messages about appropriate responses that the wider public can take.

4.3. Limitations

Survey research is subject to a number of limitations, including sampling error, question wording bias, question order bias, and nonresponse (Groves, 2006; Visser, Krosnick, & Lavrakas, 2000). Nonresponse for this study, though high, is within industry standards for dual frame sample telephone surveys, and studies conducted across time show that higher response rates do not yield significantly different estimates for items similar to ones asked here (social, economic, and political items) (Pew Research Center, 2012; Keeter, Kennedy, Dimock, Best, & Craighill, 2006). Further, because of the repeated cross-sections in this study, changes are less likely to be due to these errors, which are likely to be stable from week to week. It is also possible that Floridians' knowledge, attitudes, and behaviors increased immediately after the announcement of local transmission but before the first week of data collection, that is, between August 1 and August 8. However, inspection of APPC's national surveys, including a nonrepresentative sample of Florida residents in the survey weeks before the oversampling, suggests that Floridians might have had higher knowledge, attitudes, and behaviors for weeks or even months before the announcement of local transmission. We were also not able to determine whether respondents were partners in at-risk couples who could have prevented the sexual transmission of Zika and so may have underestimated this response. We also did not have direct measures of perceived severity of the various effects of the Zika virus and relied on knowledge of those effects as a proxy. Finally, we did not measure perceived efficacy of actions to prevent the spread of the virus. However, our hypotheses rested on predictions that were likely to occur apart from those beliefs. Nevertheless, future research on community-wide responses to the threat of Zika infection should include those measures.

4.4. Conclusions

Although Floridians compared to others were more likely to take action if they recognized their personal risk, the majority of Floridians took no action. Even households with a member at risk of an adverse pregnancy outcome did not report greater action in Florida than similar households in the rest of the United States. These outcomes are consistent with theories of risk perception inasmuch as those households in Florida did not experience enhanced perceptions of susceptibility or severity. Future efforts to combat outbreaks of the virus may require enhancing perceptions of severity by highlighting the potential for Zika to cause Guillain–Barré syndrome or microcephaly. Increasing the understanding that Zika can be transmitted sexually may also elevate perceived threat sufficiently to generate greater preventive action.

In the future, an effective message frame could also focus on the benefits to others in the community for taking protective action (Kelly & Hornik, 2016). That is, even if residents did not see themselves at personal risk, they could come to recognize their role in preventing the spread of the virus to others at risk. A link between individuals taking action to benefit the pregnant woman, with clear causal explanations for how an individual's use of insect repellent or eliminating standing water could benefit their pregnant neighbor and her baby, might break through the ceiling effects and generate greater support for community level change.

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APPENDIX: SURVEY ITEMS USED IN ANALYSIS (EXPANDED TABLE I)

Reported familiarity with Zika (proxy for interest in Zika virus information):

ZG-01. How familiar are you with news reports about ZIKA (ZEE-ka) virus?

1. Very familiar
2. Somewhat familiar
3. Somewhat unfamiliar
4. Very unfamiliar
5. (DO NOT READ) Don't know
6. (DO NOT READ) Refused

Perceived susceptibility:

ZG-43. What is the risk that you will be infected with Zika (ZEE-ka) in the next six months?

1. Extremely high risk
2. Very high risk
3. Moderate risk
4. Low risk
5. No risk
6. (DO NOT READ) Don't know
7. (DO NOT READ) Refused

Perceived severity:

ZG-15. How accurate, if at all, is it to say that an individual who has been infected by ZIKA (ZEE-ka) virus will know it because ZIKA (ZEE-ka) virus always produces noticeable symptoms?

1. Very accurate
2. Somewhat accurate
3. Not too accurate
4. Not at all accurate
5. (DO NOT READ) Don't know
6. (DO NOT READ) Refused

ZG-08. How likely, if at all, is it that an adult who contracts ZIKA (ZEE-ka) virus will die as a result?

1. Very likely
2. Somewhat likely
3. Not too likely
4. Not likely at all
5. (DO NOT READ) Don't know
6. (DO NOT READ) Refused

ZG-12. I'm going to read **a few** statements. For each one please tell me if you think **scientists** have established it is true, **scientists** have established it is false, or **scientists** are not sure whether it is true or false.

(INSERT ITEM). Would you say that **scientists** have established that is true or false, or **scientists** are not sure whether it is true or false?

1. True
2. False
3. Scientists are not sure
4. (DO NOT READ) Don't know
5. (DO NOT READ) Refused

a. ZIKA (ZEE-ka) virus can cause the birth of babies with unusually small heads
b. ZIKA (ZEE-ka) virus can cause temporary paralysis in humans

Knowledge about transmission:

ZG-03. Just your best guess. How do scientists think someone can get Zika (ZEE-KA) virus?

Is it very likely this is a way someone can get it, somewhat likely, not too likely, or not likely at all that this is a way someone can get Zika (ZEE-ka) virus?

1. Very likely
2. Somewhat likely
3. Not too likely
4. Not likely at all
5. (DO NOT READ) Don't know
6. (DO NOT READ) Refused

a. By being bitten by a mosquito that has already bitten someone who has Zika (ZEE-ka) virus
b. By having sexual intercourse with someone who has Zika (ZEE-ka) virus
c. By being sneezed or coughed on by someone who has Zika (ZEE-ka) virus

Knowledge about travel restrictions:

ZI-26. Have you read, seen, or heard about a CDC recommendation that pregnant women not travel to a part of the United States that has had a number of cases of Zika (ZEE-ka)?

1. Yes
2. No
3. (DO NOT READ) Don't know
4. (DO NOT READ) Refused

(ASK IF ZI-26 = 1)

ZI-27. Could you tell me which state is the subject of that warning?

(DO NOT READ LIST)

1. Florida
2. Other state
3. (DO NOT READ) Don't know
4. (DO NOT READ) Refused

Attitudes—community prevention:

ZI-22. If there were cases of people getting infected with Zika (ZEE-ka) virus in your city or town, would you approve or disapprove of special spraying at the ground level against mosquitoes to prevent the spread of Zika (ZEE-ka) virus? (PAUSE FOR ANSWER): Would that be strongly approve, somewhat approve, neither approve nor disapprove, somewhat disapprove, or strongly disapprove?

ZI-23. If there were cases of people getting infected with Zika (ZEE-ka) virus in your city or town, would you approve or disapprove of special spraying from the air against mosquitoes to prevent the spread of Zika (ZEE-ka) virus? (PAUSE FOR ANSWER): Would that be strongly approve, somewhat approve, neither approve nor disapprove, somewhat disapprove, or strongly disapprove?

1. Strongly approve
2. Somewhat approve
3. Neither approve nor disapprove
4. Somewhat disapprove
5. Strongly disapprove
6. (DO NOT READ) Don't know
7. (DO NOT READ) Refused

ZM.-20. The genetically modified male mosquito produces offspring that die before they reach adulthood. To minimize the spread of Zika (ZEE-ka) virus in the United States, do you favor or oppose scientists releasing these genetically modified male mosquitoes in places in the United States where the mosquito that can carry Zika (ZEE-ka) virus is found

Is that strongly favor, somewhat favor, neither favor nor oppose, somewhat oppose, or strongly oppose?

1. Strongly favor
2. Somewhat favor
3. Neither favor nor oppose
4. Somewhat oppose
5. Strongly oppose
6. (DO NOT READ) Don't know
7. (DO NOT READ) Refused

Behavior:

(E34 Asked of total respondents who are very or somewhat familiar or somewhat unfamiliar with news reports about the Zika virus)

E34. Have you gone to any source online or offline to learn more about the ZIKA virus, or not?

1. Yes
2. No
3. (DO NOT READ) Don't know
4. (DO NOT READ) Refused

ZG-36. In the past three months, have you discussed Zika (ZEE-KA) virus with a medical doctor or other health-care professional, or not?

1. Yes
2. No
3. (DO NOT READ) Don't know
4. (DO NOT READ) Refused

(ASK IF ZG-36 = 1)

ZG-37. In the past three months, how many times have you discussed Zika (ZEE-.ka) virus with a medical doctor or other health-care professional?

1. Once
2. Two times
3. Three times
4. Four times
5. Five or more times
6. (DO NOT READ) Don't know
7. (DO NOT READ) Refused

GM-20. In the past week, how many days, if any, did you discuss the effects of Zika (ZEE-ka) virus with family or friends?

1. _____ (RANGE 0–7)\
2. (DO NOT READ) Don't know
3. (DO NOT READ) Refused

ZG-54. In the past three months, have you done anything to protect yourself from getting Zika (ZEE-ka)?

1. Yes
2. No
3. (DO NOT READ) Don't know
4. (DO NOT READ) Refused

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