Zika-Related Knowledge, Attitudes, and Practices

PROGRAMMATIC IMPLICATIONS FOR ZIKA PREVENTION IN GUATEMALA

This brief provides key insights for implementers of social and behavior change (SBC) activities for Zika prevention in Guatemala. The insights are based on data from a representative sample of people living in select United States Agency for International Development (USAID) Zika program implementation communities and support an evidence-based approach for programming directed toward increasing the practice of prevention behaviors for Zika and other *Aedes aegypti*-transmitted viruses. The data indicate a need to: (1) narrow existing knowledge gaps related to the Zika virus, particularly its health consequences and effective preventive practices; and (2) communicate more specifically about preventive behaviors to enable effective action.

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Background

The first outbreak of Zika detected in the Americas occurred in 2015, with a spike in suspected congenital malformations and other neurological complications.[1] In April 2016, the U.S. Department of State dedicated funding for the USAID Zika response, prioritizing prevention efforts and programming to minimize negative pregnancy outcomes in affected countries.

A key component of the USAID Zika response is SBC programming that aims to promote the uptake of effective prevention behaviors to reduce Zika transmission. Programs emphasize ensuring personal protection for pregnant women, engaging high-risk communities in prevention practices, and improving women's demand for and access to antenatal care services.*

WHY ZIKA MATTERS

- Zika virus (ZIKV) is a communicable disease spread by *Aedes aegypti* mosquitoes, which also transmit other arboviruses including dengue and chikungunya.[1]
- ZIKV can also be transmitted through sexual intercourse and from pregnant mother to unborn child.[1] ZIKV is known to cause neurological impacts, such as Congenital Zika Syndrome (CZS).[2,3]
- Many people infected with ZIKV do not develop symptoms, leading to a lower perceived risk of infection.[2]

Why Did We Collect Information on Knowledge, Attitudes, and Practices?

Behavior change theories help us understand what enables and motivates people to act the way they do.[4] The social-ecological model of behavior change highlights the importance of individual factors (such as knowledge, perceptions, and attitudes about a disease and how to prevent it), community-level factors (such as normative environment), and social and structural factors (such as access to resources and services) for understanding whether or not a person carries out a particular behavior. The extended parallel processing model highlights how a person's perception of risk associated with a disease, as well as their beliefs in the effectiveness of solutions and their own confidence to practice them, will influence whether people will take preventive action.[4] These and other theories provide the groundwork to measure constructs that help SBC implementers make decisions about how best to influence behavior within target communities.

How Was the Data Collected?

In 2018, the Breakthrough RESEARCH project conducted cross-sectional household surveys in Guatemala, Honduras, El Salvador, and the Dominican Republic. The survey assessed knowledge, attitudes, and practices, among other factors related to Zika and other diseases transmitted by the *Aedes aegypti* mosquito. The multistage cluster random sample included men and women ages 18 to 49 living in USAID program implementation areas. In Guatemala, the survey was carried out between August and October 2019 within implementation areas of four provinces: Quetzaltenango, Suchitepequez, Santa Rosa, and Chiquimula. Interviews were conducted with 668 individuals, of which 28 percent were men and 72 percent women. Data were weighted by sociodemographic characteristics to reflect the population in the implementation areas.

This study collected information in five main areas:

- Sociodemographics: Age, education, sex, household assets.
- Knowledge: Transmission, health effects, prevention for each disease.
- Attitudes: Perceptions of disease risk, effectiveness of prevention behaviors, feasibility of conducting prevention behaviors.
- Self-reported prevention practices: Behaviors to prevent mosquito bites and mosquito breeding in the last 30 days and last seven days.
- Observed practices: Observation of the use of secure lids for water storage containers in which mosquitoes are known to breed.

* For more information visit www.usaid.gov/what-we-do/global-health/zika.

Programmatic Implications

These insights for SBC programs are based on key findings from the surveys in Guatemala.

1. **Prevention programming and messages should emphasize the links between the Zika virus and birth defects, including CZS,** especially among pregnant women and their partners, as having a healthy child may be a key motivator for prevention.
2. **Prevention programming should continue to include messages that highlight the role of Zika's sexual transmission,** particularly among pregnant women and their partners, emphasizing the importance of condom use for preventing transmission during pregnancy.
3. **Prevention programming should prioritize behaviors that have greater evidence of effectiveness against Zika,** particularly those for personal protection during pregnancy, which have lower perceived effectiveness than other less-effective behaviors.
4. **Prevention programming should include messages that contain specific instructions** for carrying out complex preventive behaviors.
5. **Prevention programming should include messages that continue to specify that mosquitoes can bite at any time** to emphasize continuous use of personal protection such as repellents, especially for pregnant women and their partners.
6. **Prevention messages delivered through interpersonal communication during household visits by vector control educators are a promising practice** for promoting prevention behavior.

Key Findings on Zika Knowledge

Awareness of Disease

The majority of people surveyed had heard about Zika, dengue, or chikungunya, and at least three out of every four participants had heard about all three diseases (see Table 1). However, out of the three, Zika was the least commonly known. Significantly fewer of the most economically vulnerable people (those in the lowest wealth quintile) knew about Zika compared to those in the highest wealth quintile (84 percent v. 97 percent, p<.001).[†]

TABLE 1. **AWARENESS OF *AEDES AEGYPTI*-TRANSMITTED DISEASES**

DISEASE	% OF PEOPLE WHO HAD EVER HEARD OF DISEASE
Zika	**91%**
Dengue	**95%**
Chikungunya	**97%**

Transmission and Health Effects

By mosquitoes: Among those who had heard of each disease, nearly everyone knew that mosquitoes transmit Zika (89 percent), dengue (96 percent), and chikungunya (91 percent). Only one-third (33 percent) of those respondents who were aware that Zika is transmitted via a mosquito, 35 percent of those aware of dengue's transmission by mosquito, and 42 percent of those aware of chikungunya's transmission by mosquito knew that the mosquito can bite at any time of the day or night.

Through sexual and vertical transmission: Only 18 percent of participants who had heard about Zika knew that it can be sexually transmitted, and 3 percent knew that it can be transmitted from mother to child during pregnancy.

Only 22 percent of people who were aware of Zika identified birth defects as a potential adverse health outcome. The most economically vulnerable (lowest wealth quintile) individuals were significantly less aware that birth defects can be a health effect of Zika than wealthier individuals (16 percent v. 32 percent, p<.05).

[†] Chi-square test for independence was used for all bivariate analyses.

Prevention Methods

Among participants who were aware of Zika, 82 percent knew at least one method with a high potential to prevent the virus.‡

The most commonly identified methods for reducing the risk of Zika were clearing stagnant water (67 percent), cleaning up trash that harbors mosquitoes (*deschatarrización*) outside of the home (41 percent), changing water (28 percent), and cleaning water containers (27 percent).

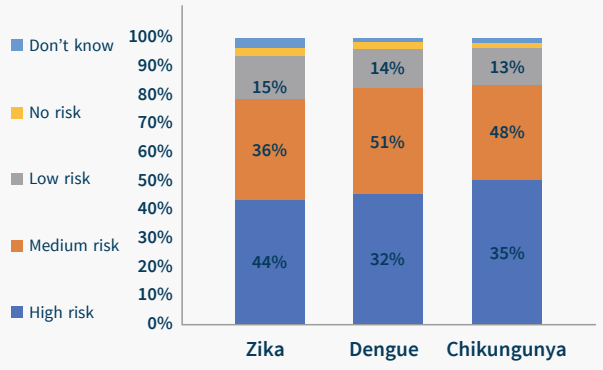
Only 20 percent of participants identified repellent, 11 percent identified covering water storage containers, and less than 3 percent identified condoms as a Zika prevention mechanism.

Key Findings on Attitudes About Zika

Perceived Risk of Zika, Dengue, and Chikungunya

The overwhelming majority of people in this survey perceived themselves to be at risk of Zika to some degree, whether it was low, medium, or high. Very few people reported no risk or did not know their risk of Zika, and even fewer reported the same for dengue and chikungunya. Almost half of participants perceived themselves to be at high risk of Zika (44 percent), dengue (46 percent), or chikungunya (50 percent), as presented in Figure 1. About one-third of participants reported to be at medium risk of Zika (36 percent), dengue (37 percent), and chikungunya (34 percent).

FIGURE 1. **RISK PERCEPTION BY DISEASE**



In addition, most participants reported that they would be very concerned if they contracted Zika (80 percent), dengue (80 percent), and chikungunya (81 percent).

Perceived Feasibility of Prevention Behaviors

When asked about their perceptions of how easy it is to carry out certain prevention behaviors listed in Table 2, the majority of respondents do not report behaviors as being very easy. Less than 8 percent of people in this study perceived it was easy to use condoms in general or during pregnancy, or to use repellents or larvicide.

Perceived Effectiveness of Prevention Behaviors

When asked to rank prevention behaviors by how effective they are to prevent mosquito breeding and illnesses such as Zika, more than half of participants (58 percent) thought clearing stagnant water was the most effective method, followed by using mosquito spray (45 percent) and using bed nets (32 percent) (see Table 3).

TABLE 2. **PERCENTAGE OF PEOPLE REPORTING PREVENTIVE BEHAVIOR TO BE VERY EASY**

BEHAVIOR	%
Use repellent	**23%**
Change water	**21%**
Clean water containers	**20%**
Remove water	**20%**
Cover water containers	**18%**
Use condoms in general	**18%**
Clear standing water	**17%**
Use condoms during pregnancy	**17%**
Use larvicide	**14%**

‡ Effective behaviors: repellent use, clearing stagnant water, cleaning water storage containers, covering water storage containers, using larvicide, and using screens on windows and doors.

TABLE 3. **PERCENTAGE OF PEOPLE WHO PERCEIVE BEHAVIOR AS AMONG THE TOP THREE MOST EFFECTIVE**

BEHAVIOR	%
Clear stagnant water	**58%**
Use mosquito spray (e.g. Raid®)	**45%**
Use bed nets	**32%**
Clear trash outside the house	**31%**
Use repellent	**30%**
Clean water storage containers	**16%**
Use coils	**13%**
Change stagnant water	**12%**
Use condoms	**10%**
Use screens on windows and doors	**10%**
Use larvicide	**9%**
Cover containers	**6%**

Key Findings on Prevention Practices

Practices to Prevent the Sexual Transmission of Zika

Although slightly more than one-sixth of people surveyed (16 percent) reported using condoms during sex in the last 30 days, only 1 percent of people surveyed reported using condoms to prevent Zika.

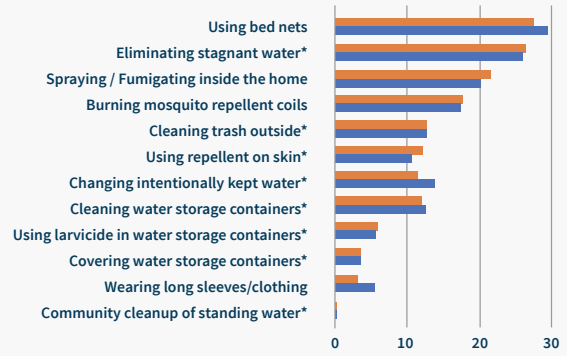
Practices to Prevent Mosquito Bites and Mosquito Breeding

Out of people interviewed:

- 77 percent of all participants said they had done something to prevent mosquito bites **in the last 30 days**, but only 39 percent of participants had carried out at least one behavior that had a high potential to be effective.
- 70 percent of all participants said they had done something to prevent mosquito bites **in the last seven days**, but only 36 percent had carried out at least one behavior that had a high potential to be effective.

The most common responses to an open-ended question about prevention behaviors carried out in the last 30 days and the last seven days are presented in Figure 2. The most commonly reported behavior is using bed nets, and the least common is using screened windows and doors. Behaviors with the greatest potential to be effective are marked with an asterisk.

FIGURE 2. **PREVENTION BEHAVIORS IN LAST 30 AND LAST SEVEN DAYS**



Nearly one-quarter (23 percent) of people surveyed reported not carrying out any type of mosquito prevention behavior in the past 30 days. Among them, the most common barriers to use were having no time or being too busy (38 percent) and requiring too much effort (15 percent). For repellent use specifically, the most salient barriers were cost and access, with 32 percent of those who had not used repellent in the last seven days saying they did not have the materials and 24 percent saying the cost was too high to use it.

Practices Concerning Water Storage Containers

To understand how people in Guatemala clean their water storage containers, we asked those who reported doing so in the last seven days to specify steps taken. Table 4 shows in rank order the actions reported to clean water storage containers. Over half of respondents mentioned scrubbing the walls of the container with a brush (65 percent) and applying detergent to the container's walls (57 percent). In addition, 57 percent mentioned adding bleach to the water, which is not an effective means of eliminating mosquito larvae or pupae. Almost half (45 percent) mentioned emptying the container as a step to cleaning it. One-third (33 percent) reported applying bleach to the container's walls. And about one-quarter of participants reported rinsing the container (23 percent). Only 13 percent of respondents reported that they let cleaning ingredients act on the water storage container's surface for a few minutes.

In addition to the survey, data were collected through observation of storage containers in participants' homes. Out of 672 respondents, 582 (87 percent) allowed surveyors to view their water storage containers. These included 662 wash basins (*pilas*) and 332 long-term water storage containers (commonly plastic drums). Surveyors observed containers for covers to assess the quality of the lids used. For a container to be effectively covered, lids must cover the container completely and fit tightly to avoid any gaps at any point in the circumference of the lid. If they are made from hard plastic, they must not be warped or allow water to pool on their surface. If they are made from a malleable material, they must not touch the surface of the water to form secondary breeding sites.

TABLE 4. **PERCENTAGE OF PEOPLE WHO CLEANED THEIR WATER STORAGE CONTAINER REPORTING ACTIONS INVOLVED IN CLEANING**

ACTIONS	%
Scrub walls with brush	**65%**
Apply detergent to walls of container	**57%**
Add bleach to the water	**55%**
Empty the container	**45%**
Apply bleach to walls of container	**33%**
Rinse container	**23%**
Let ingredients act for a few minutes	**13%**

Overall, 17 percent of observed wash basins, and 29 percent of water storage containers were found to have mosquito larvae. No significant difference existed in the number of wash basins identified to have larvae regardless of whether the wash basins were effectively covered. On the other hand, **long-term storage containers that were effectively covered were significantly less likely to have mosquito larvae at the time of observation than those not effectively covered (were not covered or had a cover that did not meet the effectiveness criteria)**. One percent of effectively covered containers had larvae compared to 41 percent of containers that were not effectively covered (p<.001). This effect holds true even when controlling for self-reported cleaning of containers in the last 30 days.

Associations with Prevention Behaviors§

In Guatemala, **the most consistent factor associated with acting to prevent mosquito biting or breeding is knowledge of effective prevention behaviors.** Increased knowledge of effective behaviors is significantly associated with greater self-reported use of covering water storage containers (p<.001), clearing stagnant water (p<.001), and cleaning water storage containers (p<.001), but not for repellent use (p=.213). People with more knowledge about Zika—those who knew about eight different prevention behaviors—were more than three times as likely (87 percent v. 24 percent) to engage in effective behaviors as those who did not know any prevention behaviors. However, knowledge alone is insufficient to ensure behavior adoption.

Home visits were significantly associated with higher self-reported scrubbing or cleaning of water storage containers. People whose households had been visited by someone who talked to them about how to prevent mosquitoes in and around the home were 14 percent more likely to have cleaned their water storage container (p<.05), and 7 percent more likely to have covered their water storage container (p<.05). There was no significant association between receiving a home visit and reporting to eliminate stagnant water or use repellents.

A behavior's perceived effectiveness was significantly associated with self-reported use of repellent and cleaning water storage containers. People who perceived repellents or cleaning water storage containers (respectively) to be among the three most effective methods for mosquito prevention and illnesses such as Zika were 10 and 9 percentage points, respectively, more likely to report carrying out the prevention behavior in the last 30 days (p<.01 for both outcomes).

Implications for Action

Within the surveyed areas in Guatemala, a large majority of people have heard about Zika, and almost all who have heard of the virus know that it can be transmitted by a mosquito. Yet despite this high level of general awareness, only about one-third of surveyed people knew that mosquitoes can bite at any time. **Personal prevention messages promoting the use of repellents should continue to specify the need to protect against mosquito bites at any time of day**, especially among pregnant women.[7] Additionally, knowledge of sexual transmission is very low, and few people reportedly know

§ Results in this section were derived from logistic regression analyses.

the link between Zika disease during pregnancy and adverse pregnancy outcomes. Even though sexual transmission has been estimated to account for only 4 percent to 5 percent of overall Zika transmission, the implications of transmission during pregnancy are so severe that **programs must continue to raise awareness of both sexual transmission of Zika and its potential health effects during pregnancy**, particularly among pregnant women and their partners.[5,6]

Clearing stagnant water was the only vector control prevention practice known by the majority of survey participants. The percentage of people who could name other prevention practices fell precipitously, and the percentage is particularly low for personal protective behaviors such as the use of repellent and condoms. **People are essentially unaware of condom use as a mechanism to protect against Zika**. Furthermore, highly effective prevention behaviors are practiced less frequently than less-effective behaviors such as burning coils or fumigating with spray. **Programs should continue to prioritize activities aimed at raising awareness of specific behaviors to prevent Zika, especially those personal protective behaviors that are particularly important during pregnancy. Messages should contain specific instructions on how to carry out complex preventive behaviors**.[7,8] Missed steps in vector control behaviors, such as scrubbing water storage containers, letting cleaning agents act on the walls of the container, and effectively covering containers used for long-term water storage are crucial for effectively eliminating mosquito breeding sites.

Lastly, **home visits are a promising mechanism through which to engage at-risk populations** to promote preventive practices. Stakeholders who conduct home visits may further incorporate promotion of personal protective behaviors to narrow the practice gap between vector control behaviors and personal protective behaviors.

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