PUERTO RICO DEPARTMENT OF HEALTH
Assistant Secretariat of Family Health and Integrated Services
Division of Maternal, Child and Adolescent Health

Puerto Rico Pregnancy Risk Assessment Monitoring System - Zika Postpartum Emergency Response (PRAMS-ZPER)

PRAMS-ZPER 2.0 PROTOCOL

DP-16-001 PRAMS

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1 Protocol Summary

The Pregnancy Risk Assessment Monitoring System – Zika Postpartum Emergency Response (PRAMS-ZPER) is a collaborative project between the Puerto Rico Department of Health (PRDH) and the Centers for Disease Control and Prevention (CDC). The main purpose of the second year of implementation of the PRAMS-ZPER survey is to conduct a rapid population-based assessment of concerns, behaviors and experiences related to the Zika virus exposure among recently pregnant women who deliver a live-born infant in Puerto Rico, and available fathers.

The overall goal will be achieved by implementing activities which have been divided into two phases:

Phase I: In-hospital Survey and Educational Intervention

Phase II: Telephone Follow-up survey

PRAMS- ZPER Survey has several objectives: 1) Describe the knowledge, awareness and behaviors related to Zika virus exposure amongst women who deliver a live-born infant through the implementation of a rapid, hospital-based sampling plan; 2) Describe father's knowledge, awareness and behaviors related to encouraging Zika virus prevention through implementation of a hospital-based sampling plan; 3) Educate sampled postpartum women and available fathers on maternal-child health and Zika-related guidelines; 4) Assess parental behavior modification through a two to six month follow-up telephone survey; 5) Provide comprehensive analyses of PRAMS-ZPER data based on an analysis plan designed to update data on programmatic activities and public health practices to prevent Zika virus infection among women of reproductive age in Puerto Rico; and 6) Translate and disseminate analytic results into useable information for public health action that can guide efforts to prevent Zika virus infection in collaboration with the CDC.

The PRAMS-ZPER 2.0 Phase I data collection will take place in all hospitals in Puerto Rico with 100 or more births per year through a survey developed by subject matter experts from the CDC and PRDH . According to 2016 birth data obtained from Demographic Registry, 34 hospitals meet this eligibility criteria and represent 99.2% of all Puerto Rico births. A total of 30 hospitals will participate in the PRAMS-ZPER survey representing 96.2% of all Puerto Rico births. One qualifying facility in the Metro region will not be included as a PRAMS-ZPER field site as their delivery ward closed down during September 2016. Due to the effects of hurricane María, two additional hospitals (one in Caguas and another in Aguadilla) will not be included since the maternity wards will not be working throughout the sampling period due to the damages suffered from the hurricane. Lastly, one hospital in the metro area did not agree to participate in the survey. Data collection will take place over a 2-month period in the fall of 2017.

The In-hospital survey (HS) will be used to collect information from sampled women. The survey includes questions about Zika-related concerns, attitudes and behaviors during pregnancy, counseling and testing for Zika virus by prenatal care providers, interactions between women and their providers regarding Zika virus, other sources of information consulted by women, and use of preventive measures against Zika virus exposure and transmission. Additionally, in cases where the male partner is available, they will be provided a HS focused on their knowledge, experiences, awareness and behaviors related to encouraging Zika virus prevention throughout the pregnancy.

The PRAMS-ZPER 2.0 Phase II data collection will take place in the PRDH, where PRAMS-ZPER offices are located. Telephone Follow-up Survey (TS) will follow procedures established by the CDC's Pregnancy Risk Assessment Monitoring System. The contact information for selected participants will be obtained from linking PRAMS-ZPER participants with the Demographic Registry's database on a monthly basis. Participants will be contacted between two to six months after giving birth.

The TS will be used to collect unique information on the early postpartum period for mothers and their babies that is not available during the hospital surveying. The TS survey includes questions about current Zika-related concerns, attitudes and behaviors after pregnancy, postnatal counseling and testing for Zika virus by health care providers, postnatal interactions between women and their providers regarding Zika virus, postnatal interactions between infant and their

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providers regarding Zika virus, access to Zika-related services for infants, and continued use of preventive measures against Zika virus exposure and transmission.

The expected outcomes of PRAMS-ZPER Survey are: 1) To obtain statistically representative data on postpartum women within months of data collection to gain a better understanding of interactions between women and their providers regarding Zika virus, women and their male partners, counseling and testing for Zika virus by prenatal care providers, other sources of information that women consult regarding Zika virus, and use of preventive measures to prevent Zika exposure and transmission; 2) Gather data to inform emergency response efforts and public health programs and policies about current behaviors in preventing Zika virus exposure before, during and after pregnancy; and observed the paternal role throughout pregnancy. 3) Use observed the PRAMS-ZPER in-hospital educational intervention and will evaluate its success in implementing similar interventions for future programs 4) Complete an operations manual for PRAMS-ZPER that will allow other state or local health departments to replicate as part of their emergency preparedness plans, allowing for rapid data collection during emergencies affecting pregnant and postpartum women. 5) Make PRAMS-ZPER data available for complex studies surrounding parental behaviors and experiences related to Zika virus exposure occurring before, during and after pregnancy.

2 Goal, Objectives & Expected Outcomes

Goal

PRAMS – Puerto Rico Zika Postpartum Emergency Response (PR-ZPER) Survey pursues to assess maternal behaviors and experiences related to Zika virus exposure in Puerto Rico in order to recommend future initiatives and policies to prevent the ZIKAV infection within the community.

General Objectives

1. Describe the knowledge, awareness and behaviors related to Zika virus exposure amongst women who deliver a live-born infant through the implementation of a rapid, hospital-based sampling by December 2017.
2. Describe father's knowledge, awareness and behaviors related to encouraging Zika virus prevention through implementation of hospital-based sampling by December 2017.
3. Educate sampled postpartum women and available fathers on maternal-child health and Zika-related guidelines by December 2017.
4. Assess parental behavior modification through two to six month telephone follow-up surveys by April 2018.
5. Provide comprehensive analyses of PRAMS-ZPER data based on an analysis plan designed to update data on programmatic activities and public health practices to prevent Zika virus infection among women of reproductive age in Puerto Rico by April 2018.
6. Translate and disseminate analytic results into useable information for public health action that can guide efforts to prevent Zika virus infection in collaboration with the CDC by April 2018.

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Specific Objectives

Phase I

Activity I.A: In-hospital Survey

1. Conduct a population-based assessment of maternal behaviors and experiences related to Zika virus infection amongst postpartum women in Puerto Rico who deliver a live-born infant through the implementation of a rapid, hospital-based sampling by October 2017.
2. Assess father's knowledge, awareness and behaviors related to encouraging Zika virus prevention through implementation of in-hospital sample by October 2017.

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Activity I.B: In-hospital Educational Intervention

3. Educate sampled postpartum women and available fathers on maternal-child health and Zika-related guidelines by December 2017.

Phase II

Activity II.A: Telephone Follow-up Survey

1. Assess maternal behavior modification, awareness, received health services, and adherence to guidelines related to Zika virus exposure after birth through a postnatal telephone follow-up surveys to PRAMS-ZPER surveyed moms by April 2018 using a methodology based the Center for Disease Control and Prevention's (CDC) Pregnancy Risk Assessment Monitoring System (PRAMS).

Expected Outcomes

1. The Puerto Rico Department of Health (PRDH) and CDC will have statistically representative data on postpartum women within months of data collection to gain a better understanding of interactions between women and their providers regarding Zika virus, women and their male partners, counseling and testing for Zika virus by prenatal care providers, other sources of information that women consult regarding Zika virus, and use of preventive measures to prevent Zika exposure and transmission.

2. The PRDH and CDC will have used PRAMS-ZPER data to inform emergency response efforts and public health programs and policies about current behaviors in preventing Zika virus exposure before, during and after pregnancy; and observed the paternal role throughout pregnancy.

3. The PRDH and CDC will have used the PRAMS-ZPER in-hospital educational intervention and will evaluate its effectiveness and the feasibility of implementing similar interventions for future programs.

4. The PRDH and CDC will have an operations manual for PRAMS-ZPER that will allow other state or local health departments to replicate as part of their emergency preparedness plans, allowing for rapid data collection during emergencies affecting pregnant and postpartum women.

5. PRAMS-ZPER data will be available to CDC and the Puerto Rico Department of Health for complex studies surrounding maternal behaviors and experiences related to Zika virus exposure occurring before, during and after pregnancy.

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3 Research Strategy

3.1 Significance

PRAMS is focused on collecting representative data for selected maternal behaviors and experiences that occur prior to, during, and after pregnancy. PRAMS sites, such as Puerto Rico, can implement methods and survey supplements to respond to emerging issues that arise during the data collection cycle including the response to post-disaster or pandemic surveillance needs. One such emerging issue is the outbreak of Zika virus, a mosquito-borne flavivirus that spread to the Region of the Americas in mid-2015, and is related to congenital microcephaly and Guillain-Barré syndrome. On February 1, 2016, the World Health Organization (WHO) declared the occurrence of microcephaly cases in association with Zika virus infection to be a Public Health Emergency of International Concern. During February 2016 Puerto Rico Department of Health also declared a public health emergency due to active transmission confirmed throughout several municipalities in the island.

In December 2015, Puerto Rico Department of Health (PRDH) reported the first locally acquired (index) case of Zika virus disease in a jurisdiction of the United States in a patient from southeastern Puerto Rico. Subsequently, passive and enhanced surveillance for Zika virus disease identified 30 laboratory-confirmed cases. Because the most common mosquito vector of Zika virus, *Aedes aegypti*, is present throughout Puerto Rico, the island was designated at the highest level of risk according to a 3-tiered scale of Zika infection risk as defined by CDC's Emergency Operations Center (EOC). Zika virus spread across the island with all 78 municipalities showing active transmission by July 2016. Currently, based on the Weekly Arboviral (ArboV) Illnesses Reports released by the Puerto Rico Department of Health (PRDH), by April 12, 2017, Puerto Rico has seen 39,984 confirmed cases of infection with Zika virus between 2016 and 2017, with a total of 3,448 being pregnant women positively diagnosed for ZIKV (55% symptomatic, 45% asymptomatic).[1]

Given the significant health concerns for offspring, including severe birth defects, increased education has been provided to pregnant women. Nonetheless, there is particular interest in assessing risk factors for Zika infection in Puerto Rico, specifically in fathers due to their additional risk towards their female partners given the virus can transmit sexually. Males may be more likely to be exposed to and infected with Zika virus, and may potentially transmit the virus to a pregnant partner thus increasing the risk of adverse health outcomes for their newborn. Regardless of Zika ongoing community based educational efforts, there is also the need for continuing education of the parents of newborns regarding maternal and infant health, as well as Zika-related care and prevention. The in-hospital educational intervention will be evaluated to assess effectiveness and parental receptiveness of information during early postpartum period.

Health promotion among women is essentially critical in reducing and preventing Zika virus infection during pregnancy. Health promotion must necessarily address attitudes and behaviors of women during pregnancy. But very little is known about women's knowledge of, attitudes and behaviors concerning the Zika virus in PR. The gap in information resulted in the Maternal, Child and Adolescent Health Division of the Puerto Rico Department of Health (PRDH), working in collaboration with the CDC, and developed an analysis of maternal behaviors and experiences related to Zika virus exposure through the PRAMS - Zika Postpartum Emergency Response (ZPER). PRAMS-ZPER has provided first-hand, representative data regarding maternal current knowledge, attitudes and protective behaviors, testing, and acceptability of guidelines concerned to ZIKV in Puerto Rico.

The PRAMS – Zika Postpartum Emergency Response Survey (PRAMS-ZPER), was successfully conducted from August-December 2016. The information collected helped fill data gaps and address the urgent need to understand the Zika-related concerns of pregnant women, interactions regarding Zika between pregnant women and their providers, sources of information that pregnant women consult regarding Zika virus, and adherence to recommended precautions by pregnant women to reduce the risk of exposure to Zika virus. As a result of this study, several additional gaps were identified. One is the lack of information on knowledge and prevention practices of the fathers of newborn infants, and another was a need for continued education among new parents regarding general maternal postpartum health and

[1] "Informe Semanal de Enfermedades Arbovirales (ArboV)" (Weekly Report of Arboviral (ArboV) Illnesses). (Report Week 13). (April 12, 2017). http://www.salud.gov.pr/Estadisticas-Registros-y-Publicaciones/Informes%20Arbovirales/Reporte%20ArboV%20semana%2013-2017.pdf

newborn care, Zika-related information to assist with recognizing symptoms in potentially affected infants, and preventing future infection in mothers, fathers and babies, and assessing the effectiveness of this kind of educational intervention. Current investigations and interventions triggered by the Emergency Response to Zika in Puerto Rico, including PRAMS-ZPER, have provided useful information about the virus, yet the epidemic continues to hold a large set of unknown effects that characterize the worry and stresses accompanying the current health state, not only in Puerto Rico, but worldwide; justifying the continuation of PRAMS-ZPER survey as a valuable source of information for understanding parental behaviors through a Zika epidemic during pregnancy which has justified a the project year 2 implementation (PRAMS-ZPER 2.0).

The PRAMS-ZPER 2.0 study will allow inclusion of three additional components added to the in-hospital surveying. The additional component address identified gaps from the initial PRAMS-ZPER study identified by project staff, and observed needs. These elements are 1) the assessment of the father's concerns and use of Zika prevention strategies, 2) the provision of continuing education on newborn health and Zika prevention for the family in the hospital following delivery, and 3) the assessment of the education provided.

The PRDH will use PRAMS-ZPER data to assess current programs and develop new strategies to help prevent future Zika related health risks amongst women, children and adolescents. Lastly, the PRAMS-ZPER will also have significance to other countries and US jurisdictions that may replicate the study in order to enhance their understanding of risk and protective factors in the daily lives of pregnant women.

3.2 Innovation

In contrast to the PRAMS methodology (sampling and data collection methods) based on live birth certificate files and mailed questionnaires with telephone follow up, the PRAMS-ZPER is based in part on the methodology of the Puerto Rico Maternal and Infant Health Survey (*Estudio Materno Infantil de Puerto Rico*, ESMIPR). Similarly to ESMIPR, the PRAMS-ZPER samples women who recently delivered a live-born infant in a hospital during the study period. Additionally, PRAMS-ZPER 2.0 will complete a paternal survey in instances with the father is available.

The plan calls for PRAMS-ZPER surveyors to visit each mother selected for the study (from the hospital birth log) and offer her the opportunity to complete the survey, they survey mode is tablet or paper. This methodology not only allows the collection of needed data in a shorter period of time, but also allows personal contact with research participants, that is still an important socio-cultural aspect of Puerto Rican society, and will allow interviewers to promote parents to participate in both the in-hospital surveys and the follow-up questionnaire.

The PRAMS-ZPER Telephone Survey (TS) will collect important information from new parents who had a live-born infant in the fall of 2017, when their infants are two to four months. The purpose is to gain an understanding of postnatal experiences such as interactions between women and their postpartum health care providers regarding Zika virus, maternal postpartum health and well-being, infant health and well-being, and use of preventive measures to prevent Zika exposure and transmission, need for support services, and postpartum contraceptive use among women who may have had Zika-affected pregnancies and infants, and those who did not.

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All PRAMS-ZPER activities will provide an overall outlook on the behaviors, experiences and attitudes of new parents during and after their pregnancy which has been directly or indirectly affected by the ZIKV epidemic.

3.3 Approach

The Pregnancy Risk Assessment Monitoring System – Zika Postpartum Emergency Response (PRAMS-ZPER) is a collaborative project between the Puerto Rico Department of Health (PRDH) and the Centers for Disease Control and Prevention (CDC). The main purpose of the second year of implementation of the PRAMS-ZPER survey is to conduct a rapid population-based assessment of concerns, behaviors and experiences related to the Zika virus exposure among recently pregnant women who deliver a live-born infant in Puerto Rico, and available fathers. An island-wide proportional sample will be utilized.

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The overall goal will be achieved by implementing activities which have been divided into two phases:

Phase I: In-hospital Survey and Educational Intervention

Phase II: Telephone Follow-up survey

3.3*a* **Phase I: In-hospital Survey (HS) and Educational Intervention (EI).** The PRAMS-ZPER HS data collection will take place in all hospitals in PR with 100 or more births per year that agree to participate. According to 2016 birth data obtained from Demographic Registry, 34 hospitals meet this eligibility criteria and represent 99.2% of all Puerto Rico births. A total of 30 hospitals will participate in the PRAMS-ZPER survey representing 96.2% of all Puerto Rico births. One qualifying facility in the Metro region will not be included as a PRAMS-ZPER field site as their delivery ward closed down during September 2016. Due to the effects of hurricane María, two additional hospitals (one in Caguas and another in Aguadilla) will not be included since the maternity wards will not be working throughout the sampling period due to the damages suffered from the hurricane. Lastly, one hospital in the metro area did not agree to participate in the survey. An island-wide proportional sample will be utilized.

The hospital-based sampling frame is identified by the hospital's delivery log. PRAMS-ZPER surveyors will visit each hospital on the designated day, select the sample from the hospital birth log, and enter the information onto a data form and tablet for each sampled mother. Each sampled mother will be assigned a study ID that will be later used to link information from the birth log to information from the questionnaire. PRAMS-ZPER project staff will then visit each mother individually and offer her the opportunity to complete the survey. Also, in instances when the infant's father is the available, the surveyor will offer him the opportunity to complete the paternal survey. Completed surveys will be collected, tracked, and passed on for data entry and verification.

After the survey has been completed a short educational intervention will be provided.

3.3*b* **Phase II: Telephone Follow-up Survey (TS).** Between two to six months after giving birth, PRAMS-ZPER participant mothers whose ZPER records were able to be matched with the Demographic Registry's database will be contacted to participate in the PRAMS-ZPER TS. The TS will be used to collect information from sampled women. The survey includes questions about current Zika-related concerns, attitudes and behaviors after pregnancy, postnatal counseling and testing for Zika virus by health care providers, postnatal interactions between women and their providers regarding Zika virus, postnatal interactions between infant and their providers regarding Zika virus, and continued use of preventive measures against Zika virus exposure and transmission.

The CDC will perform data processing and generation of preliminary results. At the end of the study period, the final dataset will be weighted by CDC and data analysis and dissemination will initially be executed by the Puerto Rico Department of Health (PRDH). After the plan has been executed, data will be made available to other researchers for additional analysis. The PRAMS-ZPER database may include pertinent information from other sources for data analysis purposes.

3.4 Research Plan

3.4*a* **Background and Need.** In early 2015, an outbreak of Zika virus was identified in northeastern Brazil[1]. Zika is a flavivirus primarily transmitted by the bite of Aedes mosquitoes that are found in much of the region of the Americas including parts of the United States[2]. Aedes mosquitoes also transmit dengue and chikungunya viruses[3]. More recently, evidence has emerged of the transmission of Zika virus through sexual contact[4]. As of January 2016, there has been confirmed transmission of Zika virus in 19 countries in the Americas outside of Brazil, including territories of the United States[5].

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Clinical illness from Zika virus infection is usually mild, with symptoms including fever, rash, joint pain, and conjunctivitis lasting from several days to a week[6]. However, evidence of increased risk for congenital microcephaly and other abnormalities of the brain and eye associated with Zika virus infection in pregnant women, prompted the World Health Organization to declare Zika virus outbreak a Public Health Emergency on February 1, 2016[7]. Zika virus infection also has possible association with Guillain-Barré syndrome. A causal link between Zika virus and birth defects was confirmed in April 2016[8].

In December 2015, the PRDOH reported the first locally acquired Zika virus infection. The patient had symptom onset on November 23, 2015. Currently, based on the Weekly Arboviral (ArboV) Illnesses Reports released by the Puerto Rico Department of Health (PRDH), by April 12, 2017, Puerto Rico has seen 39,984 confirmed cases of infection with Zika virus between 2016 and 2017, with a total of 3,448 being pregnant women positively diagnosed for ZIKV (55% symptomatic, 45% asymptomatic).[2]

The target population for the PRAMS-ZPER is all women who delivered a live-born infant in PR during the surveillance period and available fathers. A total of 28,321 live births were reported in PR by 2016; 0.09% to mothers 10 to 14 years, 11.98% to mothers 15 to 19 years, 77.06% to mothers 20 to 34 years and 10.87% to mothers 35 years or older. About 70.2% of these mothers were beneficiaries of the Government Health Plan (GHP) and only 31.9% were married by the time of birth.

According to 2016 birth data obtained from Demographic Registry, 34 hospitals meet this eligibility criteria and represent 99.2% of all Puerto Rico births. One qualifying facility in the Metro region will not be included as a PRAMS-ZPER field site as their delivery ward closed down during September 2016. Due to the effects of hurricane María, two additional hospitals (one in Caguas and another in Aguadilla) will not be included since the maternity wards will not be working throughout the sampling period due to the damages suffered from the hurricane. Lastly, one hospital in the metro area did not agree to participate in the survey, allotting a total of 30 field sites to PRAMS-ZPER 2.0 which will represent 96.2% of all births in Puerto Rico.. An island-wide proportional sample will be utilized.

A rapid population-based assessment – like PRAMS-ZPER – on maternal behaviors and experiences related to Zika virus exposure among recently pregnant women in was done for the first time during 2016. This rapid assessment provided information on prenatal experiences such as discussions with providers, testing for Zika and sources of information, as well as behaviors employed to reduce sexual and vector-based exposure to the Zika virus.

Little is known about the incidence of Zika in pregnant women, and data on pregnant women infected with Zika are limited. What is known is that infection can occur in any trimester of pregnancy. There is no evidence of increased susceptibility to Zika virus infection in pregnant women or that they experience more severe disease once infected[2].

Currently no vaccine or medication exists to prevent or treat Zika virus infection[6]. CDC issued interim guidelines for health care providers caring for pregnant women and women of reproductive age with possible Zika virus exposure, as well as guidelines for the evaluation and testing of infants with possible congenital Zika virus infection. This guidance includes screening and testing recommendations for symptomatic and asymptomatic pregnant women[2]; recommendations for contraception counseling, family planning, preconception health counseling[7]; and screening and testing of infants born to mothers who traveled to or resided in areas of Zika virus transmission[3]. As more recent data have emerged, CDC has also issued interim guidance on the prevention of sexual transmission of the Zika virus by men to pregnant and non-pregnant partners[4].

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[2] "Informe Semanal de Enfermedades Arbovirales (ArboV)" (Weekly Report of Arboviral (ArboV) Illnesses). (Report Week 13). (April 12, 2017). http://www.salud.gov.pr/Estadisticas-Registros-y-Publicaciones/Informes%20Arbovirales/Reporte%20ArboV%20semana%2013-2017.pdf

3.4*b* **Study Design.** The PRAMS-ZPER will utilize an island-wide, proportional sample of women who recently delivered a live-born infant in one of the selected field sites during the sampling period.

3.4*c* **Sampling.** The sample for PRAMS-ZPER data collection will take place over a 2-month period in the fall of 2017. The overall sample size is 1,470 women and 1,000 male partners.

3.4*d* **Profile of Births Registration Process.** Based on PRAMS-ZPER implementation during 2016, the process of birth registration differs greatly by hospital. There is no standardized process for the collection of information at the hospitals. However, most of the hospitals reported that the process begins in the delivery room. Some important information related to the mother begins to be completed at the time of delivery. Most hospitals complete this information at birth. The complete process of birth registration concludes at the time when the baby is admitted to the nursery. Based on previous year implementation, about 72% of birthing hospitals complete the delivery log in less than 24 hours after delivery. However, some hospitals informed that this process could be longer, up to 72 hours after delivery.

Based on PRAMS-ZPER 1.0, only one hospital has an electronic record, and two hospitals have a combination of computerized and handwritten files. Maternal address, date of birth, marital status, education level, insurance at delivery, infant due date, and maternal municipality of residence are available on the maternal record. Date birth log checked, time birth log checked, mother's name, date of birth, time of birth, plurality, and birth weight are available on the delivery log.

Based on previous year implementation, about 78% of hospitals have a process to verify, correct and update the information on the delivery log. This process is completed up to 24 hours after delivery.

There are no laws or policies that place restrictions on the release of vital records data for surveillance purposes. Based on the MOU between Demographic Registry Office and MCAH Division, the birth certificates information can be used for linking purposes. The birth certificate database will be available for linkage one month after the livebirths. The delivery log will collect minimal information to match each record with the birth certificate.

3.4*e* **Collaboration Plan.** The PRAMS-ZPER questionnaire was initially developed with input from subject matter experts from CDC's National Center for Birth Defects and Developmental Disabilities, the National Center for Immunization and Respiratory Disease, and the National Center for Emerging and Zoonotic Infections; and the Puerto Rico Department of Health. Questionnaires have been evaluated and adjusted based on previous year implementation.

PRAMS-ZPER paternal survey questions, the PRAMS-ZPER telephone follow-up survey and educational assessment questions were developed with input from subject matter experts from CDC and PRDH.

A finalized verification of all the surveys will be done in collaboration with subject matter experts from PRDH with careful review to ensure questions do not duplicate information being collected from postpartum women through other efforts. All survey and questions will be evaluated in terms of the correct translation in Spanish according to the cultural context of Puerto Rico. It's important that every person that completes the multiple surveys, understand each question asked.

To assure the collaboration and participation of many organizations for the use and promotion of PRAMS-ZPER data, the Evaluation, Monitoring, Research and System Development Section (EMRSDS) of the MCAH Division will provide support in the PRAMS-ZPER establishment in some areas of data analysis, dissemination and translation of information that can be used as part of the Tittle V Annual Report, Needs Assessment Study for 2020 and also by others program in the MCAH Division such as: Comprehensive Adolescent Health Program (SISA Spanish Acronym), Puerto Rico Abstinence Education Grant Program(PRAEGP), Personal Responsibility Education Program (PREP), Maternal Infant Early Childhood Home Visiting Program (MIECHV), Title V Home Visiting Program, professionals and community groups.

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Maternity hospitals will be the setting for the PRAMS-ZPER in-hospital surveys. Project/Field sites will collaborate by providing access to the delivery log and thus to the participants that will complete the survey and available fathers.

Vital Records (VR) will provide support in terms of providing birth certificate records for linking to PRAMS-ZPER data. Also, VR will provided contact information for mothers through PRAMS established procedures in order to conduct PRAMS-ZPER telephone follow-up surveys and educational assessment. PRAMS-ZPER telephone follow-up surveys will be conducted from the MCAH division in PRDH. Linking of PRAMS-ZPER and DR/VR database will allow further analysis in order to evaluate some additional variables, such as protecting or risk factors that can be associated to Zika virus infection.

Once the analysis is completed, findings will be presented during a meeting to the MCAH Division stakeholders, such as: non-profit associations (ex. United Way), Hospital Association, HRSA Funded Health Centers, PR Chapter of the ACOG, PR Chapter of the AAP, WIC, College of Physicians and Surgeons and the PR Zika Surveillance System. During this meeting, the survey results will be discussed and recommendations for developing strategies and community activities geared to prevent the infection of Zika virus among the Puerto Rican population. Also the findings and the recommendations will be published via the Health Department webpage and disseminated in professional and community forums, as part of the routine activities carried out by the organizations represented among these stakeholders.

3.4*f* Challenges and potential study limitations for the PR-ZPER. One limitation of the study is lacking representation of women who had miscarriages or stillbirths, which are women who might have been exposed to the Zika virus. Other challenges for the project are:

- Short allotted time for data collection
- Possibility of natural events (e.g. hurricanes, tropical storms) that can affect HS data collection, which will be estimated to be during hurricane and tropical storm season in Puerto Rico
- Loss of one or more field workers (personnel turn over)
- Paternal surveying may be challenging if fathers are not available or willing to participate in the survey
- Overburdening of population due to other Zika-related interventions
- Bias (recall bias, interviewer bias, response bias)
- Decreasing birth rates in Puerto Rico might affect the easiness of achieving the proposed sample during a short data collection time

3.4*g* Previous experience conducting surveillance.

<u>PRAMS-Zika Postpartum Emergency Response (ZPER) 2016 Implementation</u>

During 2016, the MCAH in collaboration with CDC implemented the PRAMS-Zika Postpartum Emergency Response (ZPER) 2016 survey throughout 36 hospitals throughout Puerto Rico in order to assess maternal behaviors and experiences related to Zika virus exposure among postpartum women in Puerto Rico to recommend initiatives and policies to prevent the Zika virus infection among women of reproductive age.

The PRAMS-ZPER identified 2,933 eligible births throughout the sampling period (August 28th, 2016 to December 3rd, 2016) and obtained a participation rate of 81% (N=2,364), 271 refusals, 220 moms that were missed or discharged, and 78 non-participants. The obtained sample was representative of all women in the island by health region.

PRAMS-ZPER participants were linked with Demographic Registry birth certificated for additional analysis. The results of PRAMS-ZPER will be published and have abided by procedures for data dissemination according to established timelines.

The continued transmission and cases of Zika virus infection throughout the overall population, including pregnant women prompted PRDH and CDC to continue PRAMS-ZPER surveying for the upcoming year (2017).

The Maternal and Infant Health Survey (ESMIPR)

Since 2002 MCAH has been carrying out the "Estudio Materno Infantil de Puerto Rico-ESMIPR (Maternal and Infant Health Survey) aimed at obtaining data on maternal health attitudes, experiences and behaviors before and during pregnancy (e.g. obstetric history, PNC, oral health, intended pregnancy, stressful situations, tobacco, alcohol and drug consumption, breastfeeding, safety baby information, education received by a health provider, problems to access services).

The ESMIPR is carried out every other year and uses a sample drawn from women who had a live born delivery in hospitals with an average of 10 or more births a week (520 births in a year). The sample is calculated based on the total of births of the most recent year available form Vital Statistics. Then, the sample is distributed proportional to the numbers of births in the hospital. The ESMIPR protocol is submitted to the IRB in each study cycle. A survey package (letter, questionnaire, and informed consent form) is provided to post-partum women selected for the survey. Up to date, participation in the post-partum questionnaire has been quite successful with about 95% response. A follow up telephone is done at 6 and 12 months after. Contacting survey respondents for follow up telephone interviews has been a challenge. For example, in ESMIPR 2012 about 1,654 women - out of the sample of 1,728 - gave their contact information, but only 982 (56%) were able to be contacted for follow up telephone survey.

The current ESMIPR cycle which began in July 2015 has increased the sample by offering the survey to all women registering a live born infant in the Demographic Register offices, thus increasing the probability of participation.

The results of the ESMIPR survey are an important information source for Tittle V Annual Report, Needs Assessment Study and for specific programs in the MCAH Division such as: Comprehensive Adolescent Health Program, Puerto Rico Abstinence Education Grant Program (PRAEGP), Personal Responsibility Education Program (PREP), Maternal Infant Early Childhood Home Visiting Program (MIECHV), and Title V Home Visiting Program. The results have been used in the development of Public Policies for the promotion of breastfeeding by the Breastfeeding Promotion Coalition. ESMIPR data is used to develop the Healthy People Objectives on maternal and child health for PR, which has its own objectives due to the higher rates among these indicators that do not allow the use of National HP Objectives.

ESMIPR findings are publicly available by publishing a report in the PRDOH web page accessed by other agencies and academicians. For example, the ESMIPR data was used in the evaluation of risk factors related to premature births. This year, the data was used in posters presentations at the Academy of Breastfeeding and the American Academy of Pediatrics Breastfeeding Section at the 2015 National Conference.

3.4*h* **IRB Approval.** CDC will obtain IRB and OMB approval for the PRAMS-ZPER through the CDC's Emergency Operations Center. The Puerto Rico Department of Health will obtain additional IRB approval locally.

3.4*i* **Funding.** The proposed funding mechanism for PRAMS-ZPER is as a supplement to the PRAMS Cooperative Agreement RFA-DP-16-001. The submitted budget was submitted should cover all project cost which include, but are not limited to, training, planning, study materials, personnel, contractual costs, project implementation, and personnel payroll. Specific budget information for PRAMS-ZPER 2.0 implementation can be found in Chapter 11 – Budget.

4 Plan of Operations

The PRAMS-ZPER project will be divided into four stages:

Stage I	Project Development & Preparation
Stage II	In-Hospital Activities (Phase I of data collection)
Stage III	Telephone Follow-up Survey (Phase II of data collection)
Stage IV	Data Analysis & Dissemination

A more detailed description of the projected duration and timeline can be seen in Chapter 5.

4.1 First Stage

This stage involves staff recruitment, development of the PRAMS-ZPER Protocol and purchase of equipment and supplies.

Based on the CDC PRAMS-ZPER Protocol, the PI and the Coordinator will develop the PRAMS-ZPER protocol which includes the methods based on previous year implementation for the selection of women after delivery of a live-born infant in selected hospitals throughout Puerto Rico. The PRAMS-ZPER Protocol also includes the questionnaire to obtain data, the data management, surveyor's manual procedure, educational intervention procedures, telephone interview procedures, the analysis plan and the data dissemination and sharing procedures.

Letters, and copies of project findings will be sent to assure the qualifying hospitals' participation. The PRAMS-ZPER Staff will be required to receive training on the protocol and present the protection of human subjects and HIPAA certificates of completion.

Once the PRAMS-ZPER protocol is completed, the authorization from the local IRB will be obtained. Upon IRB approval, a pilot study will be performed to verify PRAMS-ZPER protocol, validate the questionnaire and measure staff readiness for the implementation of the PRAMS-ZPER. Depending on the findings, PRAMS-ZPER team will make any final adjustment.

4.1*a* **Data sources.** PRAMS-ZPER data collection will take place in all hospitals of PR with 100 or more births per year. According to 2016 birth data obtained from Demographic Registry, 34 hospitals meet this eligibility criteria and represent 99.2% of all Puerto Rico births. One qualifying facility in the Metro region will not be included as a PRAMS-ZPER field site as their delivery ward closed down during September 2016. Due to the effects of hurricane María, two additional hospitals (one in Caguas and another in Aguadilla) will not be included since the maternity wards will not be working throughout the sampling period due to the damages suffered from the hurricane. Lastly, one hospital in the metro area did not agree to participate in the survey, allotting a total of 30 hospitals to PRAMS-ZPER 2.0 which will represent 96.2% of all births in Puerto Rico.. The data collection process will be performed over 7 weeks in 2017 for in hospital sampling of mothers and available fathers. A sample method will be applied. The sampling frame is based on the hospital's delivery log –the registration and official firsthand information of the delivery. In regards to paternal surveying, the sample will be dependent on availability of fathers at the hospital throughout the PRAMS-ZPER study period.

4.1*b* **Sampling description.** The sample size will be approximately 1,470 women who recently delivered a live-born in a Hospital of PR in 2016 and the male survey will be approximately 50-80% of mothers sample size. CDC will provide the sample frame and the sampling scheme for PRAMS-ZPER, and will determine the distribution of sample based on the data provided by PRDOH. An island-wide proportional sample will be utilized. A more detailed description of the project sampling can be seen in Appendix C.

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4.1*c* **Staffing.** The PRAMS-ZPER staff will consist of the Principal Investigator, a Coordinator, Interviewers (Telephone & in hospital), Regional Lead Interviewers, Data Manager and an Accounting Assistant. The Principal Investigator will be assumed by the current Director of the Maternal, Child and Adolescents Health Division at the PRDOH (in-kind). The Coordinator will oversee the project start-up, field work, and closeout activities. The Coordinator will be a full-time position, which coordinated PRAMS-ZPER project during the previous funding period. Based on the required sample, it is estimated that 16 full-time surveyors are needed for the data collection period and 8 regional lead interviewers; and one Data Manager. This staff should be hired in the second month (1 month before data collection period) to be trained, to complete the protection of human subjects and HIPAA certifications and to participate in the pilot study. The number of surveyors suggested takes into account the distance and time needed to travel between hospitals, the number of participants that have to be reached and the time needed to complete the questionnaire, and the time required for the educational intervention. A more detailed description of the personnel requirements can be seen in Chapter 6 – Management & Staffing Plan.

4.2 Second Stage

The second stage of the PRAMS-ZPER will be the data collection process, including the daily data quality control and the data entry. Data will be sent regularly to the CDC for ongoing compilation, evaluation, processing, and generation of preliminary results. These tasks will be performed by the field and/or core staff in collaboration with the CDC.

4.2*a* **Data Collection Plan.** The surveyors will visit the selected hospitals on the designated days and will revise the delivery logs in order to select those women that had a delivery during the 24 hours of the sampling day, who were not previously selected to participate in the PRAMS-ZPER survey, and to extract needed information for the questionnaire. Women who have a stillbirth will be excluded from the research (see Appendix C, section C.7*b*) The PRAMS-ZPER surveyors will enter the information extracted from the delivery log onto a data form (see Appendix K) for each selected mother. The surveyors will visit each mother individually and offer the opportunity to participate in the survey and complete the informed consent form and the questionnaire on a paper or electronic form. Available fathers will be provided a paternal survey in the event they are available for participation. Once the participant completes the questionnaire, a brief educational intervention will be provided to selected participants. Research documents will be supplied to regional lead interviewers for verification and will be later relayed to project coordinator for verification and storage.

4.2*b* **Survey instrument.** Questions were initially developed by the CDC and revised by experts from PRDH. The questionnaire will contain data extracted from the delivery log and information provided by the eligible woman to participate. Topics covered include interactions between women and providers regarding Zika virus, counseling and testing for Zika virus, other sources of Zika information that women consult, and use of preventive measures for Zika exposure and transmission. The paternal survey was developed throughout the first stage of project implementation through collaboration of the CDC, PRDH and subject matter experts. Copies of the In-Hospital Survey can be seen in Appendix E (maternal survey) and Appendix F (paternal survey).

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4.2*c* **Data Management Plan.** CDC will provide a secure data collection platform. PRDH will conduct the data entry and verification procedures. Data will be uploaded by the coordinator, data manager, or additional staff regularly to CDC. CDC will perform data management functions and assist PRDH with addressing data questions. At the conclusion of data collection activities, CDC will weight the data and provide a final dataset to PRDH. A more specific Data Management Plan can be seen in Chapter 7.

4.3 Third Stage

The third stage will consist of the telephone follow-up survey, including vital records matching of birth certificated with PRAMS-ZPER participants, daily data entry, data quality assurance, conducting telephone interviews, and following up on pending cases. Data will be sent regularly to the CDC for ongoing compilation, evaluation, processing, and generation of preliminary results. These tasks will be performed by the field and core staff in collaboration with the CDC.

4.3*a* **Data Collection Plan.** Once all PRAMS-ZPER participants have been linked with Demographic Registry, the project staff will send introductory letters to women who participated in the HS to inform them about the TS procedures and provide them the opportunity to opt-out (see Appendix H for an example of the introductory letter). Telephone Interviewers will proceed to contact women by telephone to complete the survey. Each woman will have a maximum of 15 call attempts in each contact phone provided. The women will be divided into monthly batches (according to the month of infant's birth). All batches will be expired after one month of active telephone follow-up. When first contacted, interviewers will confirm the mother's identity, and provide a consent script (see Appendix I). Data will be collected in an electronic data collection platform established by CDC.

4.3*b* **Survey instrument.** Questions were developed by subject matter experts from CDC and PRDH. The questionnaire will contain data extracted from the Demographic Registry and information provided by the eligible woman during In-Hospital Survey. Topics covered include interactions between women, infants and providers regarding Zika virus after birth, counseling and testing for Zika virus, services received after pregnancy, and continued use of preventive measures to avoid Zika exposure and transmission. Copies of the Telephone Follow-up Survey can be seen in Appendix J (maternal survey).

4.3*c* **Data Management Plan.** CDC will provide a secure data collection platform. PRDH will conduct the data entry and verification procedures. Data will be uploaded by the coordinator, data manager, or additional staff regularly to CDC. CDC will perform data management functions and assist PRDH with addressing data questions. At the conclusion of data collection activities, CDC will weight the data and provide a final dataset to PRDH. A more specific Data Management Plan can be seen in Chapter 7.

4.4 Fourth Stage

The fourth stage will consist of the development and implementation of the data analysis and dissemination plan see Chapter 8). The plan will be developed through collaboration between CDC and the PRDOH, and will focus on quickly sharing important findings through the appropriate channels to inform programs and policies. This plan includes a data sharing agreement (see Chapter 9) specifying the terms through which data can be released to researchers within each agency, as well as to external researchers who may request the data. After the plan has been executed, data will be made available to other researchers for additional analyses.

5 Project Duration & Timeline

The funding period for PRAMS-ZPER 2.0 is May 1, 2017 to April 30, 2018 (12 months). Throughout this time PRAMS-ZPER staff will complete the protocol development, obtain IRB approval, data collection procedures, data analysis and dissemination and project close out. Following are the projected timelines and estimated for project duration.

PRAMS-ZPER 2.0 will be divided into phases:

Phase I PRAMS-ZPER 2.0 In-hospital Survey

Phase II PRAMS-ZPER 2.0 Telephone Follow-up Survey

A more detailed description of activities included within each phase can be found in Chapter 3 (Research Strategy) and Chapter 4 (Plan of Operations).

5.1 Timeline

PRAMS-ZPER 2.0 Implementation Timeline
Month 1: May 2017
- Funding Award Month: Insure all requirements for the funds have been established for purchasing and contracting procedures; obtain copy of purchasing account number for the project - Initiate required contracts (Manpower) - Hire project coordinator - Initiate interview process for core and field staff that need to be hired - Identify Data Manager and complete hiring processes - Initiate contact with Vital Records (Demographic Registry), identify contact person, and complete Collaboration Agreements - Begin procedures for project purchasing (office supplies, equipment, computers, materials, etc.) - Investigate local IRB procedures, review processes, and timelines - Participate in initial CDC site visit - Evaluate lessons learned from PRAMS-ZPER 1.0 implementation ***Administrative:*** - Provide action plan to principal investigator and PRDH required staff - Attend weekly conference calls with CDC PRAMS Program Manager
Month 2: June 2017
- Develop PRAMS-ZPER 2.0 Protocol and Field Operations Manual - Complete PRAMS-ZPER 2.0 sampling - Identify qualifying hospitals, identify contact person, and complete Collaboration and Participation Agreements - Provide required training for core staff - Complete pending hiring of needed personnel - Identify changes in priority areas for the analysis plan and for state-specific questions - Develop or modify questions in previous year maternal questionnaires for in-hospital sampling and telephone follow-up - Develop paternal questionnaires for in-hospital sampling and telephone follow-up - Develop in-hospital educational intervention - Submit protocol to IRB and CDC and secure dates to go before IRB if necessary

Administrative:

- Provide monthly update to principal investigator and PRDH required staff
- Attend weekly conference calls with CDC PRAMS Program Manager

Month 3: July 2017

- Obtain official department identifications for field staff
- Train field staff (human subjects, HIPAA, ethics)
- Introduce Regional Lead's to local hospital staff
- User Acceptance Testing (UAT) for tablets
- Complete Questionnaire pre-testing

Administrative:

- Secure IRB approval
- Submit IRB amendments of protocol, material or procedure changes if needed
- Provide monthly update to principal investigator and PRDH required staff
- Attend weekly conference calls with CDC PRAMS Program Manager

Month 4: August 2017

- Train field staff (project protocol)
- In-hospital pilot run for the educational intervention
- Finalize pending documentation forms required from the hospitals

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Administrative:

- Attend weekly conference calls with CDC PRAMS Program Manager
- Provide monthly update to principal investigator and PRDH required staff

Month 5: September 2017

- Train field staff (project protocol)
- In-hospital pilot run for the educational intervention

In-hospital Survey: *(delayed to October 2017 because of pending approvals)*

- Begin in-hospital data collection procedures
- Start procedure for data assurance, management and quality for HS
- Bi-weekly conference calls with Regional Leads
- Monthly drop-off and pick-up of research documents and necessary materials
- Evaluate participation rates and address gaps with interviewers

Telephone Follow-up Survey: *(delayed to February 2018)*

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- User Acceptance Testing (UAT) for electronic caddy for TS

Administrative:

- Attend weekly conference calls with CDC PRAMS Program Manager

- Provide monthly update to principal investigator and PRDH required staff

Month 6: October 2017

In-hospital Survey: *(delayed to November 2017 due to hurricane)*

- Continue data collection procedures
- Mid-project Check-up with interviewer and hardware assurance
- Continued procedure for data assurance, management and quality for HS
- Bi-weekly conference calls with Regional Leads
- Monthly drop-off and pick-up of research documents and necessary materials
- Evaluate participation rates and address gaps with interviewers
- Evaluate participation rates and sampling for compliance with sample goals and make adjustments if necessary to sampling schedules

Telephone Follow-up Survey:

- Identify candidates to be hired as Telephone Interviewers

Administrative:

- Attend weekly conference calls with CDC PRAMS Program Manager
- Provide monthly update to principal investigator and PRDH required staff

Month 7: November 2017

In-hospital Survey:

- Procedure for data assurance, management and quality for HS
- Bi-weekly conference calls with Regional Leads
- Monthly drop-off and pick-up of research documents and necessary materials
- Evaluate participation rates and address gaps with interviewers

Telephone Follow-up Survey: *(delayed to February 2018)*

- Provide Training to Telephone Interviewers (human subjects, HIPAA, ethics, project protocol, and effective interviewing strategies trainings)
- Field Testing for Telephone Follow-up interviewers

Administrative:

- Attend weekly conference calls with CDC PRAMS Program Manager
- Provide monthly update to principal investigator and PRDH required staff

Month 8: December 2017

In-hospital Survey:

- Complete data collection for the HS
- Complete data matching between PRAMS-ZPER participants and demographic registry
- HS closing procedures and meeting
- Collection of pending research documents for storage in PRDH

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- Complete master tally sheets for analysis of obtained hospital sampling and data weighting
- Finalize procedure for data assurance, management and quality for HS

Telephone Follow-up Survey: *(delayed to January 2018)*

- Calculate TS sample size based on PRAMS-ZPER participants (See Appendix C)
- Obtain contact file from Demographic Registry for PRAMS-ZPER TS participating women who gave birth in September

Administrative: *(delayed to January 2018)*

- Provide hospitals staff participation appreciation letters
- Attend weekly conference calls with CDC PRAMS Program Manager
- Provide monthly update to principal investigator and PRDH required staff

Month 9: January 2018

In-hospital Survey:

- Start data analysis procedures for HS
- Start identifying conferences and publications for data dissemination

Telephone Follow-up Survey:

Finalize TS questionnaire.

Administrative:

- Complete continuing application for CDC
- Attend weekly conference calls with CDC PRAMS Program Manager
- Provide monthly update to principal investigator and PRDH required staff

Month 10: February 2018

In-hospital Survey:

- Continue data analysis and dissemination procedures
- Complete databases for HS

Telephone Follow-up Survey:

- Obtain contact file from Demographic Registry for TS participating women who gave birth in November and December
- Obtain variable file for full sample of PRAMS-ZPER 2.0 HS participants
- Merge Demographic Registry database with PRAMS-ZPER 2.0 database
- Start TS for participants whose infants were born in November
- Continued procedure for data assurance, management and quality for TS

Administrative:

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Start TS for participants whose infants were born in October¶
Start procedure for data assurance, management and quality for TS¶

- Attend weekly conference calls with CDC PRAMS Program Manager - Provide monthly update to principal investigator and PRDH required staff
Month 11: March 2018
- Start TS for participants whose infants were born in December - Complete data collection for the Telephone Follow-up Survey - Finalize procedure for data assurance, management and quality for TS - Complete data weighting for databases - Create full database of HS, Demographic Registry and TS participants - Formulate data analysis for TS and dissemination procedures ***Administrative:*** - Attend weekly conference calls with CDC PRAMS Program Manager - Provide monthly update to principal investigator and PRDH required staff
Month 12: April 2018
- Completion of data dissemination activities - Finalize and close out all databases to be made available to the general public - Core staff closing meetings and evaluations - Project closing procedures ***Administrative:*** - Attend weekly conference calls with CDC PRAMS Program Manager - Provide annual final report of project to principal investigator and PRDH required staff

Legend:

PRAMS = Pregnancy Risk Assessment Monitoring System

ZPER = Zika Postpartum Emergency Response

HS = In-hospital Survey

EI = Educational Intervention

TS = Telephone Follow-up Survey

6 Management & Staffing Plan

Staffing, training, and performance evaluations are important to the operational success of PRAMS-ZPER. Selected personnel for PRAMS-ZPER should have thorough knowledge regarding the methodology, be enthusiastic, understand the value of the activities being performed, and possess an invested interest for the project success. Also, to achieve the PRAMS-ZPER objectives, the staff must have leadership skills. The characteristics are important for ensuring the highest quality operations, data collection, and rate of participation.

Because ZPER is considered under the PRAMS surveillance system, project staff must adhere to the ethical principles and standards for surveillance activities. Most importantly, they must respect and protect the privacy, confidentiality, and autonomy of participants. In addition, project staff should conduct themselves in a professional manner when interacting with participants, fellow staff members, and the general public. The PRAMS–ZPER staff will be divided into two teams: (1) ZPER Core team, and (2) ZPER Field Staff.

6.1 ZPER Core Staff

The core staff will be directly focused on the development, implementation, management and analysis of the project; and remain active throughout the life-span of the project. The positions included within the core team are: Project Investigator (PI), a Project Coordinator (PC), and a Data Manager (DM). Table 1 describes the specific responsibilities and descriptions for the positions.

6.2 ZPER Field Staff

The field staff team will be active during the data collection portion of the project; focusing on data collection quality, coordinating and managing interviews within project sites (hospitals), participation assurance, efficient and high quality data entry procedures. Table 2 describes the specific responsibilities and descriptions for the positions. The positions included within the field team are: regional lead interviewers (RLI), field interviewers/surveyors (IS), telephone interviewers (TI), and data entry (DE). Back-up's for field staff should be identified and trained accordingly in order to insure compliance with project timeline and guidelines in the event of contacted personnel's inability to complete project or data collection tasks.

To effectively achieve PRAMS-ZPER goals, the selected staff should be appointed based on a combination of leadership skills, personal characteristics, experience and educational qualifications.

6.3 Project Staff and Requirements

PRAMS-ZPER Project Investigator – 5% of time on project.

Minimum Educational Requirements and Qualifications:
MD specialist in pediatric or OG/GYN, with a master degree in public health and prior experience as Director of MCAH services, supervision experience, knowledge of policies and procedures of care and treatment of early childhood and women in reproductive age, experience leading population-based epidemiological research and surveys; bilingual, excellent communication skills, organization and planning skills, skills to manage effective collaboration and partnership, willing to travel and participate in CDC visits.

Roles:
To manage and coordinate all the phases of the PRAMS-ZPER development; of oversee its administrative aspects; recruit and supervise the project staff.

The PRAMS-ZPER Project Investigator (PI) will be assumed by the current Director of the MCAH Division. He is an MD with a master degree in public health. His experience in the administration of the PRAMS – Like (ESMIPR), provides the skills as leader in a public health practice setting to manage and coordinate the successfully development of the PRAMS-ZPER. The PI will provide in-kind support through the Title V funds (Refer to the bio-sketch).

PI Responsibilities:
To coordinate the tasks and the tracking progress with the entities involved in the PRAMS-ZPER, such as hospitals and CDC; contribute to data management and analysis; supervise the proper implementation and workflow of the PRAMS-ZPER protocol and its methods; collaborate in the PRAMS-ZPER analytical results for program evaluation, translate and disseminate the PRAMS-ZPER information report to policy makers, local and state programs, and other users; produce the PRAMS-ZPER report and submit to the CDC in a timely manner; participate in the CDC site visits.

PRAMS-ZPER Coordinator – 100% of time on project.

Minimum Educational Requirements and Qualifications:
Candidate must have a post graduate degree in public health or related field, data management experience, high level of proficiency in organization and planning skills, analytical skills to manage and develop epidemiological research methods, surveillance and surveys, skills in statistical and epidemiological analysis, high level computers skills, knowledge of SAS programing (e.g. SPSS), knowledge of the vital records and other related data sources, knowledge of polices related to MCAH population, skills to manage translation of study findings, collaboration and partnership, willing to travel to national meetings on mainland and participate in CDC visits and workshop; bilingual, oral/written communication skills, willing to travel and participate in CDC site visits.

Roles & Responsibilities:
To provide overall management in the implementation of the PRAMS-ZPER project. Assist in the recruitment and supervision of the PRAMS-ZPER staff; maintain the workflow and communication with the CDC; report and perform data processing; train staff on CDC-ZPER protocol and software, HIPAA and Human Subject certifications. Write and revise the PRAMS-ZPER protocol; assure the CDC revision of the PRAMS-ZPER methodology is performed; design the logistic and protocols to the questionnaire administration; supervise the testing and implementation of the PRAMS-ZPER questionnaire; comply with the required Institutional Review Board to obtain the approvals; supervise the sampling procedures that will be done daily and in a timely manner and comply with the PRAMS-ZPER method, send the birth file to the CDC and link the data to the birth file to help CDC perform weighting; select and supervise availability of the incentives and inventory of the supplies; supervise the data entry process, perform statistical analysis; perform the data quality control (revision and validation of data); prepare and edit tables containing frequencies, percent, medians, means; perform association, relative risk, and odds ratios measures, as well as statistic tests; send the requested reports to the CDC; prepare reports and presentations to disseminate findings; keeping the confidentiality and security of the data collected; direct the analysis plan and the identification of the analytic workgroup; contribute in the implementation of the PRAMS-ZPER analytical results; participate in the CDC conference call or site visits and trainings; preparation of the final report. Supervise the data entry process, evaluate the databases in an ongoing basis, and furnish the requested reports to the CDC; ensure the adequacy of the mailing procedure when needed and the telephone interviews according to PRAMS-ZPER protocol. The confidentiality and security of the data collected are responsible of the PC.

PRAMS-ZPER Data Manager – 100% of time on project.

Minimum Educational Requirements and Qualifications:
Master degree in Public Health, a high level of proficiency in analytical skills to manage and develop research methods and surveys, high level proficiency in computers. Bilingual, oral/written communication skills, knowledge of information systems. Willing to travel to the mainland and participate in CDC visits and workshop.

Roles & Responsibilities:
Debug and validate the data files in order to comply with the quality and specifications provided by the PRAMS-ZPER software and other related software and CDC; secure and maintain confidentiality of PRAMS-ZPER data. Supervise the data entry process, evaluate the databases in an ongoing basis, and ensure the adequacy of the mailing procedure when needed and the telephone interviews according to PRAMS-PRAMS protocol. Provide reports to project coordinator when requested. Perform the data collection process using the PRAMS-ZPER protocol when needed; review the Delivery Log and other medical documents to extract requested information; review questionnaire for completeness; complete data

entry procedures based on established guidelines. Educate mothers based on trainings provided by PRAMS-ZPER staff. Provide support to project Coordinator at a regional level when needed.

PRAMS-ZPER Regional Lead Surveyors/Abstractors – 100% of time on project.

Minimum Educational Requirements and Qualifications:
Professional with a degree in Health, Social Work or Health Care related field with previous research or customer service experience; ability to speak English and Spanish; strong interpersonal and communication skills; basic computer skills and the ability to accurately record the data receive, willing to travel in PR and participate in trainings.

Roles & Responsibilities:
Responsible to accomplish operational activities and the administration of the questionnaire. Perform the data collection process using the PRAMS-ZPER protocol; review the Delivery Log and other medical documents to extract requested information; review questionnaire for completeness; complete data entry procedures based on established guidelines. Educate mothers based on trainings provided by PRAMS-ZPER staff. Provide support to project Coordinator at a regional level; verify births throughout identified project/ field sites by functioning as hospital record abstractors; provide support throughout high birth hospitals; transfer of research documents.

The PI and Co will recruit this professional in the first month of PRAMS-ZPER period.

The RLI responsibilities include, but are not limited to, implement the PRAMS-ZPER sampling frame; visit each selected hospital to review the Delivery Log and other medical documents to extract requested data according to the PRAMS-ZPER questionnaire; visit each eligible women individually to offer the opportunity to participate in the study; ensure follow up those participants who have pregnancy and delivery complications and do not respond in the first attempt; send the data collected to the CDC and PRDOH; perform accountability of the incentives and the supplies; participate actively in the CDC of PRDOH conference call or site visits and trainings when necessary; keep data collected confidential and secure. Provide support to regional interviewers; provide educational interventions to participants; complete data entry procedures when required.

PRAMS-ZPER Interviewers/Surveyors – 100% of time on project.

Minimum Educational Requirements and Qualifications:
Professional with a degree in Health, Social Work or Health Care related field with previous research or customer service experience; ability to speak English and Spanish; strong interpersonal and communication skills; basic computer skills and the ability to accurately record the data receive, willing to travel in PR and participate in trainings.

Roles & Responsibilities:
Responsible to accomplish operational activities and the administration of the questionnaire. Perform the data collection process using the PRAMS-ZPER protocol; review the Delivery Log and other medical documents to extract requested information; review questionnaire for completeness; complete data entry procedures based on established guidelines. Educate mothers based on trainings provided by PRAMS-ZPER staff.

The PI and Co will recruit this professional in the first month of PRAMS-ZPER period.

The IS responsibilities include, but are not limited to, implement the PRAMS-ZPER sampling frame; visit each selected hospital to review the Delivery Log and other medical documents to extract requested data according to the PRAMS-ZPER questionnaire; visit each eligible women individually to offer the opportunity to participate in the study; ensure follow up those participants who have pregnancy and delivery complications and do not respond in the first attempt; send the data collected to the CDC and PRDOH; perform accountability of the incentives and the supplies; provide educational interventions to participants; participate actively in the CDC of PRDOH conference call or site visits and trainings; keep data collected confidential and secure. Complete data entry procedures when required.

PRAMS-ZPER Telephone Interviewers – 100% of time on project.

Minimum Educational Requirements and Qualifications:
Professional with a degree in Health, Social Work or Health Care related field with previous research or customer service experience; ability to speak English and Spanish; strong interpersonal and communication skills; basic computer skills and the ability to accurately record the data receive, willing to travel in PR and participate in trainings.

Roles & Responsibilities:
Responsible to accomplish operational activities and the administration of the telephone questionnaire. Perform the data collection process using the PRAMS-ZPER telephone follow-up survey protocol; review qualifying participants and other research documents to extract requested information; review questionnaire for completeness; complete data entry procedures based on established guidelines.

The PI and Co will recruit this professional in the first month of PRAMS-ZPER period.

The TS responsibilities include, but are not limited to, implement the PRAMS-ZPER sampling frame for the telephone questionnaire; ensure follow up those participants who do not respond in the first attempt; send the data collected to the CDC and PRDOH; perform accountability of the incentives and the supplies; provide educational interventions to participants if required; participate actively in the CDC of PRDOH conference call or site visits and trainings; keep data collected confidential and secure. Complete data entry procedures when required.

General Language Staff Requirement.

Language requirements are dependent on the region and population being addresses and specific project needs. Nonetheless, in order to communicate and understand all project documentation, guidelines, and procures, staff should be competent in both English and Spanish. Additional language requirements can be considered according to project site needs and specifications.

Inclusively, all documents that will be provided to project participants will be available in English and Spanish to comply with standardization for project protocol; this includes, but is not limited to: questionnaires, consents/assents, brochures, promotional items

6.4 Staff Training, Quality Assurance and Evaluation

Staffing, training, and performance evaluations are important to the operational success of PRAMS-ZPER. Selected personnel for PRAMS-ZPER should have thorough knowledge regarding the methodology, be enthusiastic, understand the value of the activities being performed, and possess an invested interest for the project success. The characteristics are important for ensuring the highest quality operations, data collection, and rate of participation.

6.4*a* **Skill Standardization and Quality Assurance.** Skill and procedure standardization is important for data quality. Standardization should occur for both staff procedures and project implementation standards and techniques.

Referring to project implementation, standardization is focused on assuring that every participant has similar experiences throughout the project regardless of region, project site, or interviewer conducting the intervention. Staff procedure standardization refers to providing universal guidelines for all of the projects staff and it is focused on assuring that every staff member has the same knowledge regarding procedures, methodologies, and project guidelines regardless of the position. For example, if one interviewer has a question regarding a technical procedure with a data collection tool that hadn't been addressed throughout previous trainings, the answer that was provided to that interviewer should be shared with the remaining staff in order to provide clarification and knowledge to all project staff members.

Aspects such as personnel demeanor, attitudes, and appearance; concerns related to confidentiality; and interruptions while taking the survey are all examples of factors that can influence a patient's participation and answers which can consequently affect data quality.

6.4*b* **Project Staff Training.** Project coordinator is responsible for arranging and/or conducting field operations training for all staff members. Auxiliary personnel may be contracted to provide supplementary trainings. All trainings must be completed prior to project implementation, inability to do so from project staff should be assessed and addressed by the project coordinator.

A list of all trainings required for the project staff are displayed in Appendix S, along with a completion verification checklist required for project staff training completion certification.

After training has been done for all contracted/hired staff, training for back-up interviewers should be coordinated.

6.4*c* **Staff Evaluations and Retraining.** All project staff will be evaluated on a regular basis to ensure tasks are being performed adequately and consistent to protocol. Evaluations are focused on:
(1) Insuring that data quality is consistent throughout the project
(2) Confirming that procedures are being done according to protocol
(3) Assure that project standardization is being maintained.
(4) Identify training or information gaps

It is possible to observe shifts in established procedures throughout the data collection process within regions due to the variant environment throughout the multiple project sites, and the number of personnel working on data collection. Consistent individual evaluation must be in place to detect these shifts and take corrective measures immediately. The coordinator should assess the evaluation and determine if immediate retraining is necessary for non-compliant personnel. In the event that personnel is unable to effectively conduct procedures after trainings, retraining, and post- evaluation guidance; replacement or relocation of specific staff member should be considered.

The coordinator is prompted to communicate with regional interviewers individually between evaluations in order to address questions, gaps, successes and problems throughout project implementation. A list of problems and solutions should be maintained by project coordinator as project accomplishments and the development of lessons learned.

A final project individual evaluation will be done once each staff member has completed their project tasks. The final evaluation will provide personnel a measure of their performance throughout the study.

6.4*d* **Procedure/Methodology Evaluations and Retraining**. Procedure and methodology evaluation should be done regularly throughout the projects implementation. Weekly evaluations should be considered throughout the first month of implementation, and may shift to bi-weekly or monthly evaluations dependent on project site behavior. In the event of internal or external institutional changes that may affect data collection procedures, continuous evaluation should be considered.
Given that all project sites have distinct internal procedures, ZPER established procedures may require regional or project site specific adjustments that are in accordance to interviewer needs, will facilitate project site participation and continues to assure data quality.

Changes or modifications can be evaluated and applied as long as they do not compromise project standardization. Instances where changes or modifications are to be implemented, retraining for areas that are affected by those changes must be done. All personnel that are or may be effected by these changed must participate in retraining.

Example: ZPER Protocol establishes that all hospitals have a birth registration log that includes all information being solicited in the Participant Tracking Sheet. Due to lack of standardized procedures for hospital birth registration, hospitals have institution specific procedures for birth registration established by the institutions administration; and may not have all required information in the birth registration log, requiring interviewers to solicit additional documents or undergo additional steps in order to get all the information required for the Participant Tracking Sheet.

By conducting evaluations of procedures, the coordinator can identify these additional steps and provide retraining for in-hospital sampling for all staff working within that region. Changes to project site methodologies will be recorded and used in training of back-up, replacement or assisting interviewers.

A final project methodology/ procedure evaluation will be done once each project phase has been completed. The final evaluation will provide a measure of performance throughout project implementation which will aid in the development of yearly lessons learned.

7 Data Management Plan

The Maternal, Child and Adolescent Health Division (MCAHD) of the Puerto Rico Department of Health (PRDH) is focused on reducing mortality in infant, children, adolescents, and mothers by: (1) implementing a variety of research methodologies to identify current risks within the target population, and (2) carrying interventions that will improve the health and well-being of the population of women within reproductive age, infants, children, adolescents, and their family. Therefore, MCAHD understands the importance of sharing valuable information for not only public knowledge, but also for the development of public health policies and scientific advancement. Additionally, the Division is dedicated with releasing high quality data in a timely manner while protecting sensitive or confidential information by setting forth the following data management plan. A description of the PRAMS-ZPER Data Sharing Plan can be seen in Chapter 10.

7.1 Hardware

CDC will provide the electronic hardware (tablets) required for data collection throughout Puerto Rico. The proposed hardware to be provided by CDC is a Microsoft Surface. Additionally, CDC will provide all required materials needed to adequately work with the tablets (keyboards, stylus, chargers, and cases). All hardware will include a warning for users indicating the correct use and management.. CDC will establish all basic requirements for hardware required for data collection.

A formal agreement will be signed between field personnel and PRDH accepting responsibility for hardware provided by CDC.

7.2 Software

PRAMS-ZPER will be using a combination of software's provided by CDC and PRDH for data storage, recollection, management, and dissemination. The software that will be used during the implementation of PRAMS-ZPER will cover all security guidelines established by both CDC and PRDH to protect identifiable information and assure high data quality.

The software provided by CDC may include, but is not limited to:

- PRAMS Integrated Data Collection System (PIDS)
- SugarCRM, Word plug-in used to produce personal correspondence to participating women
- IBM SPSS, used to record women's responses
- Access to Secure Access Management System (SAMS) which provides identity verification and authentication SAMS also provides a secure platform for transferring documents and files.

Security precautions such as screen saver login and SAMS document user login activity are implemented in order to protect all personal identifiable information being managed. Additional physical security measures will be implemented when managing confidential information such as: controlled access to files that include PRAMS-ZPER documents, password protected computers/tablets, physical documents placed under lock and key, permanent destruction of document that include identifiable information when they are no longer needed, reformatting of hard drive for computers/tablets no longer being used for PRAMS-ZPER .

PIDS and additional data collection platform access will be controlled through SAMS authentication. When PRAMS-ZPER staff is working directly with personal identifiable information they must log out from PIDS before leaving their desks or tablets unattended, even for a short time. In the event of staff turnover, all user accounts must be deactivated and deleted to avoid security breaches.

Communication and data or file transfer between vital records and MCAHD PRAMS-ZPER team will be done through Secure File Transfer Protocol (SFTP) sites set up by Information Technology staff in the PRDH. The SFTP site will only be available to designated personnel of the PRAMS-ZPER team and demographic registry/vital records.

All computers used by PRAMS-ZPER core personnel will additionally be protected with AntiVirus Software established by the Puerto Rico Health Department, which is Microsoft System Center Endpoint Security:

- AntiMalware Client version: 4.5.216

- Engine version: 1.1.13504.0

- AntiVirus definitions: 1.237.1702.0

- AntiSpyware definition: 1.237.1702

- Network Inspection Engine version: 2.1.12706.0

- Network Inspection definition version: 116.87.0.0

- Email AntiVirus /AntiSpam: Symantec Mail Security 7.5

All updates are applied and distributed thru a MS System Center centralized server and all policies are updated on a daily basis.

7.3 Management of Identifiable Information

PRAMS-ZPER is committed to complying with the Health Insurance Portability and Accountability Act of 1996 (HIPAA), the Freedom Information Act (FOIA), and the office of Management and Budget Circular A110; as well as abiding by the Information Quality Guidelines.

PRAMS-ZPER will be collecting participant's personal identifiable information throughout the HS in order to match participants with the Demographic Registry database. Additionally, contact information will be obtained from vital records in order to contact mothers for follow-up survey participation. Information such as names, contact information (address and phone numbers), amongst others, will be obtained from vital records in order to contact mothers using birth certificated as a sampling frame. A complete list of HIPAA identifiers that will be collected throughout PRAMS-ZPER can be seen in Appendix N.

All identifiable information will be shared through a secure network established by PRDH between vital records and PRAMS-ZPER staff which abides by all security measures for data sharing required by PRDH. Additionally, FTP sites will be established by CDC for secure data sharing. Data files including identifiable information will not be available to additional entities who have access to the PRAMS-ZPER data base during data dissemination.

7.4 Data Quality

Quality data will be reached by obtaining a minimum of 81% (based on PRAMS-ZPER 1.0 implementation) response rate in the overall population. Also, assuring the quality of the obtained data through the surveys will be done by:

- Conducting monthly data cleaning and editing
- Verification of data entry
- Monitoring of birth logs in field sites
- Analyzing individual and regional field site tally sheets
- Monitoring individual interviewer/surveyor participation rates by field site and regionally
- Monitoring telephone interviews

In addition, CDC will conduct additional sampling verification procedures, data weighting, data cleaning, and editing as needed.

7.4*a* **Data Cleaning and Editing.** Data editing is the process of checking the data files for data entry errors and inconsistencies. Data editing should be done after questionnaire and data entry are completed and the case is closed (completed) in the tablets. CDC has developed guidelines for the general cleaning and editing of all data files, and CDC will produce a Compare Report to assist in this process.

7.4*b* **Telephone Interviewer Monitoring.** CDC has developed procedures for monitoring the consistency and quality of telephone interviewing. A proportion (at least 10%) of calls made by each telephone interviewer should be monitored for each batch (month). The phone module of PIDS allows state staff to monitor phone interviews and observe real-time phone interview data entry. This feature does not provide any audio monitoring capability. This feature will be set up by the state using the established protocol implemented by PRAMS.

7.5 Creating the PRAMS-ZPER Analysis File

CDC will create for PRDH a master analysis data set from which all PRAMS-ZPER analyses will be conducted, provided the criteria below are satisfied. This analysis data set contains birth certificate, operations, testing, and questionnaire data, and includes weights, other variables required by SUDAAN, and additional computed variables. For specific analyses, PRDH will create smaller subsets of this master file, selecting the particular variables of interest. For CDC to create the PRAMS analysis file, the following criteria must be met:

7.5*a* **Successful File Linkage.** To permit linkage of the birth certificate, questionnaire, and operations files into the analysis data set, Puerto Rico needs a common identification number for each mother in each file, which will be the PRAMS-ZPER study ID. The Study ID will be included in the database provided by Demographic Registry one the PRAMS-ZPER personnel have completed the case linkage, and have complete verification procedures.

7.5*b* **Proper Data Management Procedures.** PRAMS-ZPER staff must have carried out all data management procedures properly. These procedures include proper usage of software, monthly cleaning and editing of data, questionnaire verification, monthly batch report generation, and releasing information based on establish guidelines.

7.5*c* **Adequate Response Rates.** PRAMS-ZPER must have achieved an adequate weighted response rate for meaningful analyses to be undertaken. The weighted response rate indicates the proportion of women sampled who completed a survey, adjusted for sample design. If PRDH follow sound operational procedures they will be provided with a weighted dataset. However, if PRAMS-ZPER meets or exceeds the established threshold (81%)

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should be used for analyses that will be presented outside the health department. Nonetheless, PRDH will use data internally for program development, evaluation, and collaboration.

7.5*d* **Evaluation of Sampling Procedures.** CDC and PRDH must have evaluated the PRAMS-ZPER sampling procedures. PRDH will provide CDC with the total birth database for all sampled field sites.

7.5*e* **Sending of Final Birth File.** PRDH will send CDC the final birth file in requested format (currently the 1999 or 2003 NCHS format with some additional PRAMS and state-specific variables appended) for PRAMS-ZPER participants. This birth file is necessary to create the weighted data set that is used for data analysis. This file is compared with the PRAMS-ZPER Sampling Frame files to identify births that were omitted from the frame that were in fact eligible for PRAMS-ZPER. Birth files, once uploaded, are transmitted directly to the primary weighting statistician.

When the preceding criteria have been met, CDC will compute analysis weights. The analysis weight for each observation can be divided into three components, each accounting for a different factor. The adjustment components are:

- Sample Design
- Nonresponse
- Omissions from the Sampling Frame (i.e., Noncoverage of the Sampling Frame)

CDC will provide Puerto Rico with a written summary of the analysis weight computation.

8 Data Analysis & Dissemination

The information obtained on selected Zika-related maternal behaviors and experiences that occur during and after pregnancy will help identify strategies to accomplish the goals and priorities of the CDC and PRDH to prevent the Zika virus infection among reproductive age women. The information obtained on selected Zika-related paternal behaviors and experiences will help identify support strategies for women during their pregnancy to accomplish the goals and priorities of the CDC and PRDH to prevent the Zika virus infection among reproductive age women.

The PRDH in collaboration with CDC will develop a research translation and dissemination plan to ensure that findings are translated into policies or programs for Zika exposure prevention. Some of the data to be collected include: contraception, pregnancy intention, concerns about getting infected with Zika virus & having a child with microcephaly or another birth defect linked to Zika virus, consult with a healthcare worker about Zika virus, offering test for or get tested for Zika virus, sources did the mother trust the most for receiving information about Zika virus; and if mother had Zika virus infection.

Once the PRDH and CDC conclude with the Data Management plan, the CDC EOC, and CDC PRAMS will be evaluating the PRAMS-ZPER data to meet their analytic objectives. This plan includes a data sharing agreement specifying the terms through which data can be released to researchers within each agency, as well as to external researchers who may request the data. Findings are made publicly available by publishing a report in the web page of the PRDH. After the plan has been executed, data will be made available to other researchers for additional analyses. This data will contribute in identifying risk factors to guide programs and policies development, prioritize resource allocations and evaluate effectiveness programs and Interventions to reduce the spread of Zika virus.

The findings obtained from the PRAMS-ZPER survey will be disseminated through various channels: the MCAH Division, WIC, PR Department of Family Affairs, PR Chapter of March of Dimes, legislators, and community leaders and organizations, health care providers under the government and private insurances, leaders in health policy making of the PR Department Health and the Academy.

Feedback on utilization of PRAMS-ZPER findings will be obtained through a meeting with the stakeholders. During this meeting PRDOH will explore for which programs or public policies the data and findings were used, the utility of the data and the outcome of interventions. The information obtained from the meeting will be shared to the CDC.

8.1 Data Analysis

CDC will provide PRAMS-ZPER team with a Master Analysis Data Set once data collection is concluded, which will be used for PRAMS-ZPER analysis. PRAMS-ZPER team will create smaller subsets of the master data file for specific analysis. The Master Analysis Data Set includes birth certificate variables, operations, and questionnaire data. Also, the set will be weighted and will include additional variables that may be required by the statistical software, SUDAAN. A minimum of three types of analysis will be done: (1) descriptive studies, (2) inferential or analytic studies, and (3) methodologic studies.

Deleted: SUDAN

Analysis of recollected PRAMS-ZPER data will be done locally, with the collaboration of CDC. Analysis include, but are not limited to:

- Prevalence of selected health behaviors that assess Title V Block Grant needs.
- Descriptive statistics of topics of interest for Puerto Rico such as breastfeeding, Zika virus testing, dental hygiene, amongst others.
- Descriptive or analytic articles for MMWR or alternate journals,
- Periodic evaluation of data collection procedures including, but not limited to: rate of participation, interviewer success rate, stratum-specific response rate, and non-respondent characteristics.

Comparison of data amongst state and territories will be done by CDC PRAMS-ZPER team. Nonetheless, PRDH PRAMS-ZPER team will carry:

(1) Statewide analysis, describing the tendencies of the state as a whole.

(2) Stratum-specific analysis, describing data according to a specific sub-population, or strata

(3) Domain analysis, evaluates health behaviors with domains, instead of strata, as can include comparing PRAMS-ZPER women from a specific racial group, age or geographical region.

A specified Data Analysis Plan will be developed in accordance the current information and data needs in accordance to Puerto Rico maternal, child and adolescent population priorities.

8.2 Dissemination

The Puerto Rico Department of Health (PRDH) is committed to the open and timely dissemination of research data and results. The PRAMS-ZPER data will be unique and important to other researches from a variety of health and social science disciplines.

Our plan includes the following:

1. Raw data without identifiers will be made available to researchers external to the PRDH and CDC. These researchers may request access to PRAMS-ZPER data by signing an agreement prior to granting approval for access. A full description of the Data Sharing Plan for PRAMS-ZPER can be found in Chapter 10.

2. The processed data and results generated by PRAMS-ZPER will be disseminated through presentations at public lectures, PRDH Maternal, Child and Health Division Stakeholders Meeting, and professional conferences.

3. The findings will be published via the PRDH web page. The PRDH maintains a Web site where information about the Zika virus is posted. The results of the PRAMS-ZPER project will be available in this web site.

9 Data Sharing Plan

The Puerto Rico Department of Health (PRDH) is the principal health agency in Puerto Rico. As such, the PRDH through the Puerto Rico Pregnancy Risk Assessment Monitoring System – Zika Postpartum Emergency Response (PRAMS-ZPER) collects, manages, and interprets scientific data. The following policy on data release and sharing ensures the dissemination of data in an appropriate and timely manner while maintaining high standards and protecting sensitive information. This policy will also ensure that the PRDH is in full compliance with local, State, and Federal laws, such as the Health Insurance Portability and Accountability Act (HIPAA). Through this data release/sharing policy the PRDH will provide de-identified data to its partners for appropriate public health purposes and all data will be released and/or shared as soon as feasible without compromising privacy concerns, federal and state confidentiality concerns, proprietary interests, national security interests, or law enforcement activities.

The purpose of the PRAMS-ZPER is to collect population-based data on maternal and paternal behaviors and attitudes towards avoiding Zika virus infection during pregnancy in Puerto Rico. Data collected include indicators of high scientific quality that can inform programs and policies related to maternal and infant health regarding maternal and paternal behaviors during regarding Zika virus prevention; therefore, it is essential to develop data sharing agreements that support the release of PRAMS-ZPER data to further public health research efforts.

Deleted: regionally specific,

The Puerto Rico Department of Health (PRDH) is committed to the open and timely dissemination of research data and results. The PRAMS-ZPER data will be unique and important to other researches from a variety of health and social science disciplines. PRAMS-ZPER data offer researchers from a variety of health and social science disciplines the opportunity to investigate research questions. As such, researchers who work in a state agency, but are not members of a state's PRAMS Working Group, or researchers who are not aligned with a state agency may request access to PRAMS data. Providing access to PRAMS data to external researchers offers several benefits: data analysis efforts extend beyond persons directly involved with PRAMS, state PRAMS staff gain insight from an external perspective, and dissemination activities are expanded.

Because PRAMS-ZPER data contain confidential and sensitive information regarding parental behaviors before, during, and after pregnancy, PRAMS-ZPER has developed a policy for how PRAMS-ZPER data will be shared with external researchers, should such a request arise for data requests that come directly to the PRDH, or the PRAMS-ZPER team. The PRAMS-ZPER Coordinator will be designated to handle such requests, and may include the PRAMS-ZPER Data Manager to monitor adherence to security and confidentiality requirements. The PRDH PRAMS-ZPER staff will keep a log of all data requests and releases. The PRAMS-ZPER staff will hold agreements with the Demographic Registry regarding the release of data, as birth certificate variables are included in the PRAMS-ZPER dataset. In the even additional variables other than the Demographic Registry are included in the PRAMS-ZPER dataset, agreements should be signed with such divisions or organizations.

In summary, the PRAMS-ZPER Data Sharing Plan in focused on providing the following:

1. Raw data without identifiers will be made available to researchers external to the PRDH and CDC. These researchers may request access to PRAMS-ZPER data by signing a Dara Sharing Agreement prior to granting approval for access.

2. The processed data and results generated by PRAMS-ZPER will be disseminated through scientific publications; presentations at public lectures; PRDH Maternal, Child and Adolescent Health Division Stakeholders Meeting; and professional conferences.

3. The PRDH web page has current information on Zika virus, PRAMS-ZPER findings will be published in the PRDH web page for access by the general public.

9.1 State Policy for External Partner Request

All external partners requesting the PRAMS-ZPER data set must:

1. Provide documentation of the proposed research. Document should address how the data will be used, any proposed data linkages, the variables to be included, the person responsible for compliance with the agreement, and all collaborators on the project. The document must indicate the personnel working on the study will not use these data except for statistical analysis and reporting as described.

2. Sign the Data Sharing Agreement Form in order to protect CDC, PRDH, and other PRAMS-ZPER staff against breaches of confidentiality by preventing any potential misuse of the data. All aspects of the agreement must be complied with by all external research investigators and/or collaborators.

3. The solicited dataset will be prepared by the PRAMS-ZPER staff and distributed to the external partner's utilizing a Secure File Transfer Protocol (SFTP). Files that contain sensitive information should be encrypted and compressed.

4. All breaches in security must be informed to CDC and PRAMS-ZPER team. A report of all security procedures during and after the analysis must be submitted.

5. Once the data has been analyzed, all documents pertaining to the investigation must be provided to the PRAMS-ZPER team. Physical documentation must returned to PRAMS-ZPER, and electronic versions must be deleted. When the proposed analyses are completed, all copies of these data will be destroyed (confirmed in writing to the PRAMS-ZPER Staff or PRDH identified person).

9.2 Data Sharing Application Instructions

Applicants must submit to the PRAMS-ZPER project the Data Sharing Agreement Form and all supplemental documentations required described in the PRAMS-ZPER Data Sharing Plan. The submitted proposal must include a list of all solicited variables and justifications. Successful submission and approval of all required documentation will allow CDC and PRDH to release a pre-determined, restricted list of birth certificate variables and other variables to external researchers for analytic purposes. The Data Sharing Agreement Form will be valid once signed by an authorized representative from the state Demographic Registry, the Director of the Division of Maternal Child and Adolescent Health of the Department of Health, a representative from the PRAMS-ZPER project, and CDC; who have reviewed all submitted documents and agree that the external research complies with all guidelines established in the PRAMS-ZPER Data Sharing Plan.

9.2*a* Documents Required from External Researchers for Data Sharing

The following documents must be submitted by the soliciting external researchers in order to gain access to the PRAMS-ZPER database:

- Research Proposal/Protocol
  - Summary of Procedures
  - Goals/Objectives

    - Plan of Operations
    - Project Timeline
    - Study Design
- Sample Population/Sample Size
- Data Management Plan
    - Include list of solicited years and variables
- Data Analysis Plan
- Data Dissemination Plan
- IRB Approval Form if available
- References
- PRAMS-ZPER Data Sharing Agreement Form

9.2*b* Review Process

Researchers will submit an application form, proposal, and supplemental required documentations with a specific list of states and years of data. Any standard or state-specific PRAMS variables will also need to be listed and submitted. PRAMS-ZPER will conduct a review of research proposals using benchmarks to assess each proposal's compliance with the application requirements and to ensure the suitability of PRAMS data to answer the research question. PRAMS-ZPER may provide comments directly to researchers within a 2 week period. Once all required documentation has been submitted and all required personnel and representative have signed the PRAMS-ZPER agreement form, CDC will prepare the requested dataset for the researcher.

i. **Time frame to grant access to the data.** The time frame to grant access to the data will be no more than one year after data are collected, scrutinized for errors and validated.
ii. **Restrictions on use of data.** Restrictions are described in the Data Sharing Agreement.

9.3*c* Procedures for Releasing Data

i. **Evaluation of data quality.** Tests for completeness, validity, reliability, and reproducibility.

ii. **Evaluation of the risk of disclosing private or confidential information.** Before releasing/sharing any data, the data steward must assess the risk that personal information will be disclosed and decide whether some data need to be further de-identified. For example, under the Health Insurance Portability and Accountability Act (HIPAA), 18 variables are considered identifiers, the removal of which would render the dataset de-identified. This rule serves as a useful guide for creating de-identified data and information. Those assessing the risk that confidential information will be disclosed should recommend the statistical methods to be used for disclosure protection. The recommended methods should balance the risk of disclosure against the possibility that reducing the risk of disclosure will also reduce the usefulness of the data for public health practice and research.

iii. **Documentation.** All released data must have documentation that shows the conditions under which the data were collected, what the data represent, the extent of the data's completeness and accuracy, and any potential limitations on their use. Careful documentation increases the likelihood that secondary data users will interpret data correctly.

iv. **Public release disclosure statement.** Information that will preclude misinterpretation of data should accompany all released data. All released data must be as complete and accurate as possible, and data must be released to particular parties with restrictions. Restrictions can be imposed because of legal constraints or because releasing the data would risk disclosing

proprietary or confidential information or compromising national security or law enforcement interests. It is recommended that data be released in the form that is closest to microdata and that still preserves confidentiality.

v. **How the data will be given to the researcher.** The researchers will need to comply with the established policy. The solicited dataset will be prepared by CDC and distributed to the external partner.

9.3 Data Sharing Agreement Form

The final weighted dataset will reside at both CDC and the Puerto Rico Department of Health (PRDH). CDC and the PRDH will draft and sign a data sharing agreement specifying the terms through which data can be released to researchers within each agency, as well as to external researchers who may request the data. After CDC EOC, CDC/DRH and PRAMS, and PRDH have completed analytic objectives, CDC will coordinate the release of the data to external researchers as part of the existing PRAMS-ZPER data release process, or researchers may contact the PRDH directly for access to the data.

The data sharing agreement enables the creation of an aggregate data set for analysis by the PRAMS-ZPER data managers for researchers requesting access to data/variables. It also establishes a data use agreement for external researchers to sign in advance of receiving the data files. The agreement requires explicit, jurisdictional vital registry involvement/approval of any research requests for birth certificate data.

Before releasing a data set, PRDH will collect the following agreement that each researcher must sign to assure compliance with the data sharing requirements. The Data Sharing Agreement Form addresses:

1. External researchers' procedures for releasing data to other collaborators and ban on releasing data to other parties.
2. Addresses the external researcher's limitations on use of data, including prohibition on identifying individuals and linkages without prior permission.
3. Limitations on the use of the data, data access and a promise not to release it to others.
4. Agreements to avoid identify anyone, not to link the data to other datasets without previous permission, and notification to the state of any inadvertent identification of individuals.
5. Requirements for appropriate acknowledgements and review.
6. Request to include the keyword "PRAMS-ZPER" on any journal articles.
7. A statement of return or destruction after analysis is completed.
8. Procedures for monitoring compliance and penalties for failing to comply.

A sample data sharing agreement is provided in Appendix R.

10 Staffing

10.1 Staff PRAMS-ZPER 2.0 (May 1, 2017- April 30, 2018, 12 months)

10.1a Personnel Costs: The (PRAMS-ZPER) Survey requires personnel with expertise in the public health field and data analysis in order to address the target population and accomplish the project objectives and goals. To cover the salaries for the project proposed staff we are requiring the following amounts:

i. Project Principal Investigator – Manuel I. Vargas Bernal, MD, MPH. (5% FTE IN-KIND)

ii. Project Coordinator – Beatriz A. Salvesen, MPH. A professional with a post graduate degree in public health or health related field, with data management experiences and high level of proficiency in information systems management, a degree of knowledge in computer programs (e.g.MS Office Professional), understanding in statistical software programs (SAS, SPSS) and willing to develop skills to manage any required software, experience in surveillance systems development, organization and planning skills (100% FTE 150 hours, per 12 months).

iii. Accounting Assistant – (TO BE HIRED) A professional with a minimum of 3 credits of university level accounting (100% FTE 150 hours, per 12 months).

iv. Data Manager – Carmen García Rodríguez, MPH. A professional with a post graduate degree in public health or health related field, with data management experiences and high level of proficiency in information systems management, a degree of knowledge in computer programs (e.g.MS Office Professional), understanding in statistical software programs (SAS, SPSS) and willing to develop skills to manage any required software, experience in surveillance systems development, organization and planning skills (100% FTE 150 hours, per 12 months).

v. Hospital Surveyors – (TO BE HIRED) Professional with a degree in Health, Social Work or other Health Care related field to collect data at target maternity hospitals. This professional will be committed to work on daily operations and coordination of ZPER. A total staff of fourteen (10) surveyors will be placed in the Maternity Hospitals Island-wide to conduct the survey. This position also requires an effective listener and communicator professional with good interpersonal skills and social/culturally sensitive. An amount of $101,250.00 was set aside for this budget year (4.5 months). (100% FTE; 10 surveyors, per 4.5 months).

vi. Regional Lead Surveyors (hospital-based) – (TO BE HIRED) Professional with a degree in Health, Social Work or other Health Care related field to collect data at target maternity hospitals. This professional will be committed to work on daily operations and coordination of PRAMS-ZPER survey. A total staff of fourteen (5) Regional Lead Interviewers will be placed in the Maternity Hospitals island wide to conduct the survey, provide region specific birth verification throughout project sites. Help with trainings, and provide support to regional interviewers throughout data collection and education interventions. Additional surveyors are required to compensate for additional time required for paternal inclusion and educational intervention. This position also requires an effective listener and communicator professional with good interpersonal skills and socially/culturally competency (100% FTE; 3 additional Regional Lead Surveyors, per 150 hours, per 5 months).

vii. Telephone Interviewers (central offices) – (TO BE HIRED) Professional with a degree in Health, Social Work or other Health Care related field to collect data at target maternity hospitals. This professional will be committed to work on daily operations and coordination of PRAMS-ZPER survey. A total staff of fourteen (2) telephone interviewers will be identified to conduct PRAMS-ZPER telephone follow-up surveys. Additional

surveyors are required to compensate for additional time required for paternal inclusion and educational intervention assessment questions. This position also requires an effective listener and communicator professional with good interpersonal skills and socially/culturally competency (100% FTE; 2 telephone interviewers, per 100 hours, per 5 months).

10.2 Staff PRAMS-ZPER 2.0 Supplement (2017-2018, 12 months)

10.2a Personnel Costs: The (ZPER) Survey requires personnel with expertise in the public health field and data analysis in order to address the target population and accomplish the project objectives and goals. To cover the salaries for the project proposed staff we are requiring the following amounts:

i. Interviewers/Surveyors (hospital-based) – (TO BE HIRED) Professional with a degree in Health, Social Work or other Health Care related field to collect data at target maternity hospitals. This professional will be committed to work on daily operations and coordination of PRAMS-ZPER survey. A total staff of fourteen (6) additional surveyors will be placed in the Maternity Hospitals island wide to conduct the survey. Additional surveyors are required to compensate for additional time required for paternal inclusion and educational intervention. This position also requires an effective listener and communicator professional with good interpersonal skills and socially/culturally competency. (100% FTE; 6 additional surveyors, per 150 hours, per 4 months).

ii. Regional Lead Interviewers/ (hospital-based) – (TO BE HIRED) Professional with a degree in Health, Social Work or other Health Care related field to collect data at target maternity hospitals. This professional will be committed to work on daily operations and coordination of PRAMS-ZPER survey. A total staff of fourteen (3) additional Regional Lead Interviewers will be placed in the Maternity Hospitals island wide to conduct the survey, provide region specific birth verification throughout project sites. Help with trainings, and provide support to regional interviewers throughout data collection and education interventions. Additional surveyors are required to compensate for additional time required for paternal inclusion and educational intervention. This position also requires an effective listener and communicator professional with good interpersonal skills and socially/culturally competency. (100% FTE; 3 additional Regional Lead Interviewers, per 150 hours, per 5 months).

iii. Telephone Interviewers (central offices) – (TO BE HIRED) Professional with a degree in Health, Social Work or other Health Care related field to collect data at target maternity hospitals. This professional will be committed to work on daily operations and coordination of PRAMS-ZPER survey. A total staff of fourteen (2) additional telephone interviewers will be identified to conduct PRAMS-ZPER telephone follow-up surveys. Additional surveyors are required to compensate for additional time required for paternal inclusion and educational intervention assessment questions. This position also requires an effective listener and communicator professional with good interpersonal skills and socially/culturally competency. (100% FTE; 2 additional surveyors, per 100 hours, per 4 months).

11 Protection of Human Subject

11.1 Human Involvement, Characteristics, and Design

The Pregnancy Risk Assessment Monitoring System – Zika Postpartum Emergency Response (PRAMS-ZPER) survey is a rapid population-based assessment of maternal behaviors and experiences related to Zika virus exposure among recently pregnant women in Puerto Rico (PR) using a rapid assessment methodology from, CDC's (PRAMS). Also, the PRAMS-ZPER looks to assess knowledge, awareness, and behaviors related to Zika virus prevention through a hospital-based convenience sampling of fathers of newborn infants within hospitals that registered 100 births or more during the previous calendar year (2016).

The target population for the PRAMS-ZPER is all women who delivered a live-born infant in PR during the surveillance period and available fathers. A total of 28,321 live births were reported in PR by 2016; 0.09% to mothers 10 to 14 years, 11.98% to mothers 15 to 19 years, 77.06% to mothers 20 to 34 years and 10.87% to mothers 35 years or older. During 2016, about 70.2% of these mothers were beneficiaries of the Government Health Plan (GHP) and only 31.9% were married by the time of birth.

Additionally, the PRAMS-ZPER supplemental survey population of interest is all men who had a live-born infant in Puerto Rico during the surveillance period and whose infants' mother was eligible for PRAMS-ZPER participation. During 2016 births a total of 28,321 live births; 0.01% to fathers 10 to 14 years, 4.45% to fathers 15 to 19 years, 69.65% to fathers 20 to 34 years, 20.93% to fathers 35 years or older, and 4.96% fathers of unknown age.

Exclusions to the PRAMS-ZPER sampling frame may be implicit or explicit. Because of the definition of the PRAMS-ZPER targeted population and the use of the hospital delivery logs as the sampling frames, certain mothers will implicitly be excluded from eligibility in the PRAMS-ZPER sample. An implicit exclusion is any restriction inferred by the definition of the targeted population (i.e., women who deliver at home or at hospitals with fewer than 100 births per year) or the choice of the hospital delivery log as the PRAMS-ZPER sampling frame (i.e., stillbirths and fetal deaths). All other exclusions arise from concerns or operational difficulties in sampling certain types of births, and are termed explicit exclusions.

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i. **Stillbirths and Fetal Deaths.** By definition, the targeted population of PRAMS-ZPER is limited to pregnancies resulting in a live-born infant.

ii. **Multiple Gestation Pregnancies.** Mothers with a multiple gestation regardless of the order will be included in the sample if at least one infant is delivered in the sampling window. Since the survey questions are about the mother and her pregnancy and not specifically about the baby, the mother will complete one survey for this pregnancy, regardless of how many babies were delivered.

iii. **Mothers Discharged Early From the Hospital or Otherwise Missed in the Hospital.** For hospital-based supplementation, mothers discharged early from the hospital or otherwise missed in the hospital are not to be excluded from follow-up. Procedures for locating and contacting them may be developed. Similarly, mothers transferred to another hospital after delivery are not to be excluded. Identifying location and follow-up of transferred mothers will be similar to that of mothers discharged early or missed.

iv. **Deceased Infants.** Women with deceased infants will be approached at the hospital and offered the opportunity to complete survey, the interviewers approach in such cases will be in accordance to guidelines set forth by the PRDH. Cases where hospital staff indicate distraught women will not be contacted. No further follow-up will be attempted on these women if they are not able to complete the survey in the hospital.

v. **Mothers with Pregnancy Complications.** Mothers who are ill or suffering from complications of pregnancy and/or delivery will not be excluded. Contact with these women may need to be delayed until their condition has improved. However, they should be approached before they are discharged to complete the survey.

PRAMS-ZPER data collection will take place in all hospitals in Puerto Rico with 100 or more births throughout the previous year (2016). According to 2016 birth data obtained from Demographic Registry, 34 hospitals meet this eligibility criteria and represent 99.2% of all Puerto Rico births. One qualifying facility in the Metro region will not be included as a PRAMS-ZPER field site as their delivery ward closed down during September 2016. Due to the effects of hurricane María, two additional hospitals (one in Caguas and another in Aguadilla) will not be included since the maternity wards will not be working throughout the sampling period due to the damages suffered from the hurricane. Lastly, one hospital in the metro area did not agree to participate in the survey. Therefore, a total of 30 hospitals will participate in PRAMS-ZPER 2.0 which will represent 96.2% of all births in Puerto Rico. Rapid in-hospital data collection will take place over a 2 month period in 2017 and the sampling frame is identified by the hospital's delivery log. The PRAMS-ZPER follow-up survey will take place over a 2 month period.

The PRAMS-ZPER sampling plan is based upon an island-wide proportional sample. A sample size of about 1068 (n = 1068) is necessary to estimate a prevalence for a dichotomous variable with a reasonable precision of 3% and a confidence level of 95%, assuming an infinitely large population size (N). A more detailed description of PRAMS-ZPER sampling can be found in Appendix C.

PRAMS-ZPER focus on all women of reproductive age who gave birth during the period under observation and men who recently had a child and the infants' mother was eligible for PRAMS-ZPER surveying. There is a possibility that children 21 years or younger could be selected to participate in the survey. The behavior of this specific population is highly important to observe in order to develop effective strategies or programs that address their specific health needs.

11.2 Source of Material

PRAMS-ZPER research data will be collected thru a self-administrated questionnaire that will be later linked to the infants' birth certificate information provided by Vital Records. Potentially, PRAMS-ZPER may consider to link participants with additional resources available to PRDH.

11.2a **PRAMS-ZPER in-hospital survey.** PRAMS-ZPER 2.0 (year 2) will use the previously implemented questionnaires for women and make changes accordingly based on lessons learned throughout year 1 implementation. Additional needs established by CDC, and PRDH will be considered for inclusion within the evaluated variables. Efforts will carefully review current Zika virus related programs to ensure questions do not duplicate information being collected from postpartum women through other projects. Topics covered may include interactions between women and their providers regarding Zika virus, counseling and testing for Zika virus by prenatal care providers, other sources of information that women consult regarding Zika virus, and use of measures or adherence to guidelines focused on Zika virus infection prevention, exposure and transmission.

Additionally, PRAMS-ZPER 2.0 will develop a paternal survey through the collaboration of subject matter experts within the CDC and PRDH. Topics covered may include interactions between men and their female counterparts' providers regarding Zika virus, support during pregnancy to avoid Zika virus infection, counseling and testing for Zika virus by providers, other sources of information that men consult regarding Zika virus, and adherence to guidelines focused on Zika virus infection prevention, exposure and transmission.

11.2b **PRAMS-ZPER telephone follow-up survey.** PRAMS-ZPER 2.0 (year 2) will use the previously implemented telephone follow-up questionnaires for women and make changes accordingly based current needs. Additionally, PRAMS-ZPER 2.0 will develop a paternal telephone follow-up survey through the collaboration of subject matter experts within the CDC and PRDH. Questions that evaluate effectiveness of educational intervention offered throughout the in-hospital sampling will be included in the PRAMS-ZPER 2.0 Telephone Survey.

Efforts will carefully review current Zika virus related programs to ensure questions will not duplicate other projects efforts. Topics covered may include interactions between parents and their health providers after infants' birth, postnatal counseling and testing for Zika, sources of information consulted regarding Zika virus

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The main advantage of stratified sampling is that for a given overall sample size, stratifying will permit separate estimates of subgroups of interest and permit comparisons across these subgroups. The sampling plan is designed so that inferences about prevalence rates for maternal behaviors and knowledge related to Zika can be estimated with sufficient precision both overall in Puerto Rico and within selected strata. For PRAMS-ZPER, 8 geographic regions will serve as the strata. The 8 regions are Arecibo, Aguadilla, Bayamón, Caguas, Fajardo, Mayaguez, Metro, and Ponce. The sampling will be further stratified by hospital, although proportional allocation will be used (each hospital within a region will have the same sampling fraction). Unlike region, hospital is not a subgroup of analysis interest.¶

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infection prevention after pregnancy, adherence to guidelines focused on Zika virus infection prevention, exposure and transmission, and evaluation of educational intervention during in-hospital sampling.

To minimize unauthorized disclosure of individually identifiable data, all information collected must be held in confidence to the extent allowed by law. All of Puerto Rico's staff and contractors involved in data collection shall be trained concerning procedures and practices to ensure privacy of data, security, confidentiality and ethical management of project data. All personnel working on PRAMS-ZPER procedures must complete Human Subject Training and Public Health Ethics Training on a yearly basis. All new hires will be trained concerning these procedures and practices as their initial work task.

11.2c **Human Subjects Training.** All PRAMS-ZPER staff will complete the CDC PRAMS-ZPER Human Subjects Training to ensure the protection of human subjects participating in PRAMS-ZPER, adherence to the PRAMS-ZPER protocol, and understanding of the implications of breaches in protocol. The training includes 4 modules covering 1) human subjects protections, 2) adverse events, 3) human subjects considerations in mail and telephone surveys, and 4) maintaining confidentiality.

11.2d **Public Health Ethics Training.** All PRAMS-ZPER staff will complete the CDC "Good Decision Making in Real Time: Practical Public Health Ethics for Local Health Officials" in order for staff to 1) understand public health ethics, 2) learn how to apply ethics framework to public health decision making, 3) addressing of common public health ethical challenges , 4) integrating ethical considerations in the day-to-day decision making. ****No personal identifiable information (PII) will be provided to persons other than PRDH PRAMS- ZPER staff, and contractors working on the PRAMS-ZPER project, or CDC system administrators as they maintain the data collection system. In special circumstances where it is required to debug software, it may be necessary to share this information with technical support staff to correct the problem. PRDH staff will ensure that these staff have signed a confidentiality agreement form prior to releasing any PII, and that have taken the correct measures to protect the projects confidentiality agreements. ****No information, including information related to a woman recent birth, will be released to a woman's friends or family. PII may be released only if authorization is explicitly granted by the affected individual or legal guardian. No PII will be presented in any reports arising from analysis of data collected as part of PRAMS-ZPER.*****Completed questionnaires and any files with personal identifiers will be kept in a locked file cabinet or a locked room; access to these files will be limited to authorized personnel. All electronic files will have restricted access; the operations tracking software will be password-protected. Backup files of PRAMS-ZPER data will also be secured. Only a few individuals from CDC and the CDC contractor may have access to identifiable data. In all other cases, data sent to CDC will be de-identified.

11.3 Potential Risk

Answering the PRAMS-ZPER survey or PRAMS-ZPER telephone follow-up survey poses no physical risks to participants. However, the PRAMS-ZPER questionnaire and procedures will obtain sensitive and individually identifiable data on participants. IRB review and approval must be completed prior to data collection.

All events where breach of PII management protocol was not complied with or adverse events must be documented and reported to the CDC and the local IRB (if applicable). An adverse event is defined by the CDC IRB and PRDH as an incident in which the protection of the respondent may have been violated. CDC and PRDH are required to report all adverse events to the CDC IRB and the PR IRB as they occur.

11.3a Adequacy of protection Against Risk

i. **Recruitment and Informed Consent of in-hospital Survey.** The target population of PRAMS-ZPER is limited to pregnancies resulting in a live-born infant. Therefore, the hospital-based sampling frame is identified by the hospital's delivery log. Hospitals with more than 100 deliveries throughout 2016 will be selected to participate.

Proportional sampling, for women, is used for drawing the sampling schedule based on the time of birth. The time and date of birth is written on the hospital delivery log. All births that fall within the pre-established sampling time intervals are selected for the study provided they do not satisfy an exclusion criterion. Where possible, sampling intervals will consist of complete days (midnight to midnight) for ease of selection. The sampling schedule is designed to be balanced by weeks in the surveillance period and days within each week. Hospitals will be visited every sampling day of the study period.

Based on the desired sample size and the number of live births occurring at each hospital, sampling fractions for women can be computed. The length of the sampling interval is determined from the sampling fractions. For a multiple birth, the mother is selected only once. The selection procedures must satisfy the probability requirements of the sample. The sample is chosen so that each record has an equal probability of being selected. Based on these probabilities, weights can be determined for island-wide estimates.

Because of shorter hospital delivery stays and earlier discharges of mothers, the hospital delivery log must be frequently monitored during defined sampling intervals. No more than 24 hours should lapse between the beginning of the sampling interval and when the delivery log is checked. Similarly no more than 24 hours should lapse between checks of the delivery log within a sampling interval. PRAMS-ZPER supplemental paternal survey will be distributed based on a convenience sampling of available fathers when contacting PRAMS-ZPER eligible mothers. Sample size for fathers is expected to be 50-80% of the sample size determined for mothers (see Appendix C, Table C.5).

A questionnaire will be distributed to all women that fulfill the inclusion criteria and whose infants' birth was registered in hospitals delivery log. A questionnaire will be distributed to all available fathers that fulfill the inclusion criteria and whose infant qualified under PRAMS-ZPER sampling. Each questionnaire includes an informed consent document that includes all required elements of informed consent. Individual consents will be provided for mother surveys, and for father surveys. A signed, written consent form is required for participation; participants will be provided a copy of their written consent.

The ZPER informed consent document includes the following required elements of informed consent:

1. Statement informing CDC support of the project.
2. Explanation of the projects purpose.
3. Duration of the subject's participation.
4. Description of the projects procedures.
5. Notification that data may be linked to other sources.
6. Description of possible risks or discomforts to the subject, including a statement regarding questions with sensitive information.
7. Description of benefits to the subject or to others which may reasonably be expected from the project.
    - For PRAMS-ZPER, indirect benefits to society may include health improvements for women and infants.
8. A statement describing the extent, if any, to which confidentiality of records identifying the subject will be maintained.
    - For PRAMS-ZPER, confidentiality is protected "to the extent permitted by law."
9. Contact information for questions related to the project.
10. Contact information related to participant's rights throughout the project.
11. Identifying voluntary participation.
12. Statement identifying that refusal to participate will not involve penalty or loss of benefits to which the subject is otherwise entitled.
13. Statement that the subject may discontinue participation at any time or choose not to answer certain questions without penalty or loss of benefits to which the subject is otherwise entitled.

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14. Explanation of how the mother was chosen, the approximate number of people chosen for the study, and the reason for the identification number on the questionnaire.
15. For a tablet survey, the introductory scripts must include an explicit prompt for permission to continue with the survey.

Since all women of reproductive age should be included, minors of 21 years or younger that had a live birth during the observation period will be included. Minors will be provided with an assent form which must be read and signed prior to survey completion. Solicitation of waiver for parental or guardian permission for research involving children (eligible parents less than 21 years of age) will be submitted to the PR-IRB. PR-IRB approve parental or guardian permission waiver in events where one of the following two conditions are met, under 45 CFR 46.116 *(d)*:

45 CFR 46.116 *[(d) An IRB may approve a consent procedure which does not include, or alters, some or all of the elements of informed consent set forth in this section, or waive the requirements to obtain informed consent provided the IRB finds and documents that:*

(1) The research involves no more than minimal risk to the subjects;
(2) The waiver or alteration will not adversely affect the rights and welfare of the subjects;
(3) The research could not practicably be carried out without the waiver or alteration; and
(4) Whenever appropriate, the subjects will be provided with additional pertinent information after participation.]

ii. Recruitment and Informed Consent of Telephone Follow-up Surveys. A signed, written consent form is not required for participation in the PRAMS-ZPER Telephone Follow-up Survey. Nonetheless, the mother's provides consent to be contacted in the telephone follow-up survey during the initial contact with the mother during the in-hospital survey consent. During the telephone survey, the mother's informed consent is inferred when she completes the questionnaire.

The sample informed consent documents for the ZPER in-hospital survey can be seen in Appendix D for both female and male participants, in English and Spanish.

The ZPER Telephone Follow-up Survey informed consent document includes the following required elements of informed consent:

1. A statement that CDC provides support for the project.
2. An explanation of the purposes of the project.
3. The expected duration of the subject's participation.
4. A description of the procedures to be followed.
5. For ZPER Telephone Follow-up Survey, this includes a notification that data may be linked to other sources.
6. A description of any reasonably foreseeable risks or discomforts to the subject, including a statement that some questions may be sensitive.
7. A description of any benefits to the subject or to others which may reasonably be expected from the project.
    - For ZPER Telephone Follow-up Survey, indirect benefits to society may include health improvements for women and infants.
8. A statement describing the extent, if any, to which confidentiality of records identifying the subject will be maintained.
    - For ZPER Telephone Follow-up Survey, confidentiality is protected "to the extent permitted by law."
9. An explanation of whom to contact for answers to pertinent questions about the project.
10. An explanation of whom to contact for answers to pertinent questions about the participant's rights in the project.
11. A statement that participation is voluntary.

12. A statement that refusal to participate will involve no penalty or loss of benefits to which the subject is otherwise entitled.
13. A statement that the subject may discontinue participation at any time or choose not to answer certain questions without penalty or loss of benefits to which the subject is otherwise entitled.
14. An explanation of how the mother was chosen, the approximate number of people chosen for the study, and the reason for the identification number on the questionnaire.
15. For a tablet survey, the introductory scripts must include an explicit prompt for permission to continue with the survey.

The list above includes only those elements of informed consent that apply to PRAMS-ZPER Telephone Follow-up Survey.

The sample informed consent documents for the ZPER Telephone Follow-up Survey can be seen in Appendix I for both female and male participants, in English and Spanish.

11.3b Protections Against Risk. No physical risks will occur to participant through PRAMS-ZPER. However, the PRAMS-ZPER questionnaire will obtain sensitive and individually identifiable data on participants. The Puerto Rico Maternal, Child and Adolescent Health (PR-MCAH) Program will complete a review with the local IRB prior to data collection. All adverse events will be documented and reported to the CDC and PR IRB according to established procedures.

All information collected will be held in confidence. All MCAH staff and contractors involved in PRAMS-ZPER will be trained concerning procedures and practices to ensure privacy of data and will sign a confidentiality agreement. No identifiable information will be provided to persons other than those authorized. PII will not be presented in any PRAMS-ZPER reports derived from analysis of data collected. All questionnaires and confidential files will be kept lock on a file cabinet or room. Additionally, all electronic files will have restricted access with a password that only authorized personnel will know. Once research is finalized and data is complete and analyzed, completed questionnaires and files with identifiable information will be properly shred in order to protect the subject information.

11.3c Potential Benefits of the Proposed Research to Human Subjects and Others. Risk in this study is minimal to the participants, yet the value of recollected data that can be derived from the study is of great importance for developing future. Participants will not receive direct benefit, the benefits will be indirect as these research findings will help throughout the development of strategies and activities for the community aimed towards Zika virus infection prevention.

11.3d Importance of the Knowledge to be Gained. A rapid assessment of maternal-related behaviors and experiences in regard to Zika virus in Puerto Rico will provide information on prenatal experiences such as discussions with providers, testing for Zika, trusted sources of information, as well as behaviors employed to reduce sexual and vector-based exposure to the Zika virus in parents of live-born infants within the sampled field sites (hospitals).

Additionally, the study will provide 1) a rapid, site-specific sampling of fathers' knowledge, awareness, and behaviors about Zika virus preventions; 2) Deliver educational information to new parents about infant care and Zika prevention for themselves and their infant, and 3) assess effectiveness of an in-hospital postpartum educational intervention related to Zika virus prevention.

The PRAMS-ZPER study helps support the Puerto Rico Department of Health's responsibility to monitor the health of all Puerto Ricans, and specifically helps the PRDH-MCAH Division support its mission to monitor the health of mothers, children and adolescents throughout the island. The Division achieve their mission by gaining information from different sources through collected and research studies. The findings generated from this study are essential in the development of services, identification of successful

strategies or programs for the Maternal, Child and Adolescent (MCA) population in terms to the Zika virus exposure.

Due to Puerto Rico's emergency status due to hurricane María, supplemental disaster questions have been included in the questionnaire in order to provide valuable information about the additional burden of pregnant women throughout a natural disaster. The supplemental questions will allow us to understand: (1) burden due to the disaster, and (2) accessibility to health care services, and (3) worries associated with the disaster.

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11.3e Data and Safety Monitoring Plan. No clinical trial will be performed.

11.3f ClinicalTrials.gov Requirements. No clinical trial will be performed.

12 Inclusion of Women and Minorities

Using 2016 Vital Statistics (VS) data the estimated distribution on the sample by sex/gender, race and ethnicity is as follows:

For females (♀): 141 women of no Hispanic or Latino origins (0 American Indian/Alaska Native, 2 Asian, 0 Native Hawaiian or Other Pacific Islander, 15 Black or African American, 123 White and 0 more than one race) and 2,859 women of Hispanic or Latino origins (3 American Indian/Alaska Native, 0 Asian, 0 Native Hawaiian or Other Pacific Islander, 281 Black or African American, 2,321 White and 5 more than one race).

For males (♂): 83 males of no Hispanic or Latino origins (11 Black or African American and 70 White), and 1717 males of Hispanic or Latino origins (1 American Indian/Alaska Native, 0 Asian, 0 Native Hawaiian or Other Pacific Islander, 216 Black or African American, 1494 White and 5 more than one race).

The population of interest of PRAMS-ZPER is all women, residents of Puerto Rico (PR), who deliver a live-born infant in hospitals with 100 or more births during 2016 throughout the surveillance period; and their available male partners.

The Puerto Rico's Demographic Registry provides race and ethnic information obtained during the infant's birth registration. PR is mainly a Spanish speaking country, recognized as Hispanic. The majority of its residents are Puerto Ricans (95.4%) based on the 2010 Census, followed by other foreign Hispanic ethnic groups like Dominicans and Cubans. Regarding racial composition, 75.8% of people in PR identified themselves as white, 12.4% as black, 7% as some other race, and 3.3% as two or more races in the 2010 US Census.

We must consider that the race variable has proven to be misleading and somewhat unreliable in in relation to the Puerto Rican population. Race taxonomies in Puerto Rico, contrary to the U.S. polarized white/non-white racial system, are constructed on the basis of phenotype traits such as texture of hair, skin tone, and lip and mouth shape. Additional intermediate categories exist in Puerto Rico between white and black, which are not represented in the U.S. Census.

We can consider some examples of intermediate categories recognized throughout the Puerto Rican population, such as:

- "*Indio*'', Spanish word for Indian, persons characterized by light brown to brown skinned and straight hair
- "*Jabao*'', a person with fair skin, and kinky hair
- ''*Trigueño*'', a person with light to dark brown skin.

According to Puerto Rican cultural standards, a person is considered white if he/she has light skin color (fair and light brown), relatively thin lips and straight and/or curly hair, regardless of ancestry. We must consider that a number of people in PR may report their race as white (despite skin tone) due to cultural and/or historical implications associated with being dark or black skinned.

For PRAMS-ZPER sampling the recruitment of sex/gender, racial, and ethnic group members as subjects is not necessary since the sampling focuses its attention on all mothers and the vast majority of PR women residents are Puerto Rican/Hispanic. The women's male partners will be sampled based on availability without consideration of their ethnic or racial background.

Female participants will be selected based on proportional sample of all Puerto Rico births. Male participants will be selected through convenience sampling, the expected sample size for fathers is expected to be 50-80% of the sample size determined for women.

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