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Post-disaster Health Indicators for Pregnant and Postpartum Women and Infants

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Abstract

United States (U.S.) pregnant and postpartum (P/PP) women and their infants may be particularly vulnerable to effects from disasters. In an effort to guide post-disaster assessment and surveillance, we initiated a collaborative process with nationwide expert partners to identify post-disaster epidemiologic indicators for these at-risk groups. This 12 month process began with conversations with partners at two national conferences to identify critical topics for P/PP women and infants affected by disaster. Next we hosted teleconferences with a 23 member Indicator Development Working Group (IDWG) to review and prioritize the topics. We then divided the IDWG into three population subgroups (pregnant women, postpartum women, and infants) that conducted at least three teleconferences to discuss the proposed topics and identify/develop critical indicators, measures for each indicator, and relevant questions for each measure for their respective population subgroup. Lastly, we hosted a full IDWG teleconference to review and approve the indicators, measures, and questions. The final 25 indicators and measures with questions (available online) are organized by population subgroup: pregnant women (indicators = 9; measures = 24); postpartum women (indicators = 10; measures = 36); and infants (indicators = 6; measures = 30). We encourage our partners in disaster-affected areas to test these indicators and measures for relevancy and completeness. In post-disaster surveillance, we envision that users will not use all indicators and measures but will select ones appropriate for their setting. These proposed indicators and measures promote uniformity of measurement of disaster effects among U.S. P/PP women and their infants and assist public health practitioners to identify their post-disaster needs.

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Keywords

Disaster; Indicators; Pregnant; Postpartum; Infant

Purpose

Pregnant and postpartum (P/PP) women and their infants in the United States (U.S.) may be particularly vulnerable to effects from disasters [1, 2]. The number of federally declared disasters (natural and man-made) has steadily increased over the past half-century [3], affecting every U.S. State and Territory [4]. The highest number was declared in 2011, with 99 major disaster declarations [3] resulting in at least 59.4 billion dollars of damages [5]. The U.S. continues to rank as one of the five countries most frequently affected by natural disasters.

Although the need to understand the impacts of U.S. disasters on P/PP and infant populations has been recognized [6–8], our knowledge about the effects of disaster on their health outcomes and service needs remains limited. Disaster exposure in the U.S. may be associated with poor birth outcomes such as low birth weight, preterm birth, and intrauterine growth restriction [1, 2]. Studies suggest various reasons for these associations, including stress, poor mental health outcomes, exposure to environmental toxins, and the degree of disaster exposure [2, 6, 9–12]. Disasters have also been associated with changes in fertility [13, 14], prenatal care [14], intimate partner violence [15, 16], and substance use [17]. However, many of these associations have not been shown consistently, perhaps partly due to stand-alone studies of limited duration and disparate study designs, measures of exposure and outcomes [2, 18, 19]. Furthermore, there are few post-disaster studies of this population [2]. Even so, in the 2013 Pandemic and All-Hazards Preparedness Reauthorization Act (PAHPRA), pregnant women and children are specifically named as populations with special clinical needs [20].

In an effort to guide post-disaster assessment and surveillance, promote uniformity of measures, and affect public health interventions for disaster-affected P/PP women and infants, the Division of Reproductive Health (DRH) Emergency Preparedness and Response Program at the Centers for Disease Control and Prevention (CDC) initiated a collaborative process with partners nationwide to identify a list of common post-disaster epidemiologic indicators for these at-risk groups. Health status indicators have been created by various governing bodies and organizations to focus on both individual and collective determinants that can affect the health of the public and the adaptation or creation of health programs and policy [21]. Use of health status indicators is familiar to the 59 states and jurisdictions that receive Title V maternal and child health (MCH) Block Grants [22]. Furthermore, newly proposed life course indicators for MCH programs were recently released [23]. However, standardized use of core indicators to measure post-disaster health outcomes is less common even though World Health Organization experts recently advocated use of health indicators to monitor human health aspects and health system resilience and capacity related to disaster [24].

To our knowledge, this DRH collaborative project is the first attempt to identify self-report post-disaster reproductive health indicators related to P/PP women and infants in the U.S. Although we understood the need for large system issues to be addressed at the public health system level (e.g., electronic prenatal care records), we focused on information that P/PP women would report about disaster effects on themselves and/or their family, in the hope that these indicators will guide future researchers and lead to more uniform measurement across studies. Thus, our objectives for developing these indicators were to:

1. identify salient conditions and exposures (e.g., infant feeding, gender-based violence) and outcomes (e.g., maternal and birth outcomes) to be monitored via surveillance or post-disaster data collection,
2. promote use of consistent measures across post-disaster studies, and
3. build scientific knowledge regarding disaster effects on P/PP women and infants.

In this paper we describe the process used to develop the indicators and report the proposed indicators. We believe the proposed indicators can guide the expansion of knowledge of disaster effects on these populations and affect post-disaster public health services, programs, and policies for these at-risk populations.

Description

Throughout this process our efforts focused on *catastrophic events* defined as any disaster ‘‘including terrorism, that results in extraordinary levels of mass casualties, damage, or disruption severely affecting the population, infrastructure, environment, economy, national morale, and/or government functions’’ [25]. We did not focus on infectious diseases or pandemic illnesses. We started the process by having conversations at national meetings, then working with a small group of experts using a structured methodology.

We began the twelve-month process of developing a list of post-disaster epidemiologic indicators for P/PP women and infants by meeting with partners at two national conferences, the 2011 MCH Epidemiology Conference (http://www.cdc.gov/reproductivehealth/MCHEpi/) and the 2012 Association of Maternal and Child Health Programs (AMCHP) Conference (http://www.amchp.org/Pages/default.aspx). At each conference we asked partners to draw from their experience and expertise to identify critical topics for P/PP women and infants affected by disaster. Partners who participated at either conference were invited to be part of the Indicator Development Working Group (IDWG). We also invited other public health subject matter experts in disaster reproductive health epidemiology who had expertise in one or more of the critical topics identified above for disaster-affected P/PP women and infants. The final working group included MCH epidemiologists, health department staff, representatives from MCH partner organizations, and national experts in reproductive health and disaster. In total, the IDWG (N = 23) was composed of nine federal employees from CDC and the U.S. Health Resources and Services Administration (HRSA), five staff members from different state and local health departments, and nine representatives from academia and MCH partner organizations (see ‘‘Appendix’’ section). Fifteen working group members (65 %) were either physicians or nurses. Members met monthly via teleconference.

The first meeting of the IDWG was held in March 2012. Members revised the list of critical topics to eliminate those that applied to all disaster-affected populations and were not specific to P/PP women or infants. Over the next month, members independently scored each topic for the three populations based on his/her: (1) perception of the topic's importance, and (2) knowledge of available data sources that collect information on the topic. The scores were aggregated and yielded a final priority score for each topic. Topics were then put in order from highest to lowest priority for each population of interest.
As the IDWG moved forward, we evaluated whether these topics should be identified as indicators, especially focusing on whether the topics are actionable, i.e., where public health programs, interventions, and policy can be used or adapted to meet needs. Other criteria were considered, such as whether the respective item: (1) could be measured quantitatively; (2) was clearly important to health or health care; (3) could yield information on health-related behaviors or health system performance; and (4) could be applied across diverse settings and cultures [26, 27].

The IDWG divided into three subgroups, one for each population of interest, i.e., pregnant women (n = 8), postpartum women (n = 8), and infants (n = 7), to review the topics, propose the indicators, and identify self-report measures for each indicator and relevant questions for each measure. Staff from the DRH Program for Emergency Preparedness and Response facilitated each subgroup. Focusing on their respective subgroup population, IDWG members worked independently and collectively on the above tasks via three or more teleconferences over 4 months. Questions for each measure were taken directly, or slightly adapted, from pre-tested questionnaire items in the Behavioral Risk Factor Surveillance System (BRFSS), Reproductive Health Assessment after Disasters (RHAD) Toolkit, Natural Disaster Morbidity Surveillance Individual Form (NDMSIF), National Immunization Survey (NIS), National Intimate Partner and Sexual Violence Survey (NISVS), National Survey of Children's Health (NSCH), and the Pregnancy Risk Assessment Monitoring System (PRAMS). Usually the adaptation involved changing the time period referenced in the question, e.g., from 'during this last year' to 'since the disaster'. When an existing question could not be identified for a particular measure, the subgroup created a new question adhering as closely as possible to previously pretested language found in other questionnaires. When multiple questions existed for a measure, preference was given to questions in (1) the RHAD Toolkit because they are specifically designed for and tested for use among disaster-affected P/PP women or (2) PRAMS since users would have an understanding of the respective characteristic among their statewide PRAMS population of P/PP women.

Several measures required the development of new questions by the IDWG, most of which are directly related to disaster-effects on access to different types of health and social services. This is attributed to the IDWG's decision to measure access through a series of four questions: (1) did the women perceive a need for the service, (2) was she able to obtain the service, (3) if yes, where did she obtain the service, (4) if she did not, why not (barriers). These four questions were used as consistently as possible across all topics pertaining to access.

Some issues frequently came up in discussions across subgroups but were beyond the scope of this initiative because our focus was on capturing self-report measures. Large systems issues, such as use of vital statistics or screening tools, were moved to a section in the indicator document called ‘‘Other Measures.’’ This section includes mental health assessments and screening tools, vital statistics to identify infant birth outcomes, forms to collect information on reportable communicable diseases, and a screening tool for alcohol use and dependence.

Other topics, such as electronic prenatal care records and newborn screening, were eliminated during the process because they were not self-report measures. Even though electronic prenatal care and newborn screening records are important after disaster, we felt that those large system issues need to be addressed at the public health system level where the ecological impact of a disaster on health systems can be tracked.

After the subgroup work was completed, the DRH program staff examined all indicators and measures with corresponding questions selected by the different subgroups, focusing as much as possible on uniformity of indicators and measures for all subpopulations. Therefore, not every decision made by the subgroups was included in the final list of indicators and measures, but deviation from subgroup decisions was uncommon. Also, rarely subgroups advocated different approaches to measuring an indicator in their local area; if so, both measures were included so the user can choose what works best among his/her population. For example, when choosing measures of family and social support, the subgroup identifying indicators for postpartum women advocated use of the more general measure of presence of social support using the question from BRFSS while the subgroup identifying indicators for pregnant women advocated use of PRAMS standard items that list the perceived tangible supports. As a result, in the final list of indicators the measures and questions for support are different for P/PP women.

The revised indicators and measures with corresponding questions for each subpopulation were then distributed to all members of IDWG. We focused the last conference call on final comments, and the IDWG approved the indicators and measures. The final 25 indicators selected with their 90 measures for disaster-affected P/PP women and infants are available at http://www.cdc.gov/reproductivehealth/Emergency/PDFs/PostDisasterIndicators_final_6162014.pdf. The indicators and corresponding measures are organized by population subgroup: pregnant women (Indicators = 9; Measures = 24; Table 1); postpartum women (Indicators = 10; Measures = 36; Table 2); and infants (Indicators = 6; Measures = 30; Table 3). Indicators appear in the order in which they were prioritized, with those of highest priority listed first. Some indicators, i.e., breast-feeding, access to infant supplies, and access to WIC, are the same in the postpartum women and infants sections but appear in different order due to their priority for the respective subgroup.

In the indicator document, each indicator includes a declarative title, an explanation of its public health importance, and its corresponding measure(s) found in http://www.cdc.gov/reproductivehealth/Emergency/PDFs/PostDisasterIndicators_final_6162014.pdf. Each indicator includes a series of questions complete with skip patterns that may reflect the varying needs of the populations of interest. This design allows the series of questions for

each topic to become direct inserts into existing or new questionnaires, acknowledging that users may need to act quickly if responding to a disaster. The largest proportion of questions (36 %) were taken directly or adapted from questionnaire items included in the RHAD Toolkit, 31 % were new, and 18 % were from PRAMS, 11 % from other questionnaires, and 4 % combined RHAD and other questionnaires (Fig. 1).

Assessment

We encourage our partners in disaster-affected areas to use these indicators and measures—testing them for relevancy and completeness—and report their experiences. These reports and future conversations will assist the field of disaster reproductive epidemiology related to U.S. P/PP women and infants (currently in early stages) to grow.

It is important to note that we do not envision that all indicators or measures will be used in every assessment or surveillance, but that the user will select indicators and measures based on his/her data needs, data availability, and those that are most appropriate for the setting. For users with less familiarity with MCH issues, we felt it important to present them in priority order. This may also be useful when the number of questions on post-disaster data collection forms pertaining to P/PP women and infants is limited, and choices must be made about which to include.

Since most existing survey tools and surveillance systems do not measure disaster effects, many of the items from other questionnaires that were selected to serve as questions had to be adapted. New and adapted questions will need to be pretested before general use. We recommend that these items be pretested using cognitive and/or field-testing procedures described in PRAMS Model Protocol 2009 version [28].

Because of limited data to inform the identification of critical indicators and supporting measures for disaster-affected P/PP women and infants, the IDWG drew from their own experience and expertise in addition to peer-reviewed literature and surveys. Therefore, we believe that the indicators and measures will be especially relevant to users serving these populations and meet a wide spectrum of data needs. Furthermore, we found that because the IDWG comprised various partners from different perspectives, our discussions were rich and deep and included real life examples of how these indicators can be used across public health systems.

Conclusion

We believe that use of these proposed indicators and measures will promote uniformity of measurement of disaster effects among U.S. P/PP women and their infants and assist public health practitioners to identify these populations' post-disaster needs and public health resources to aid in their recovery. However, we also recognize that while we used a systematic approach to identifying these indicators and measures, this set will need further examination, use, and conversation as the field of reproductive health disaster epidemiology further develops. Therefore, we encourage our partners to share their experiences using these indicators by reporting their experiences to the DRH Program for Emergency Preparedness and Response at this website http://www.cdc.gov/reproductivehealth/Emergency/index.htm

or by email at drhemergencyprep@cdc.gov. We look forward to continuing the conversation and improving our understanding about how best to identify and address post-disaster needs among U.S. P/PP women and their infants.

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Appendix

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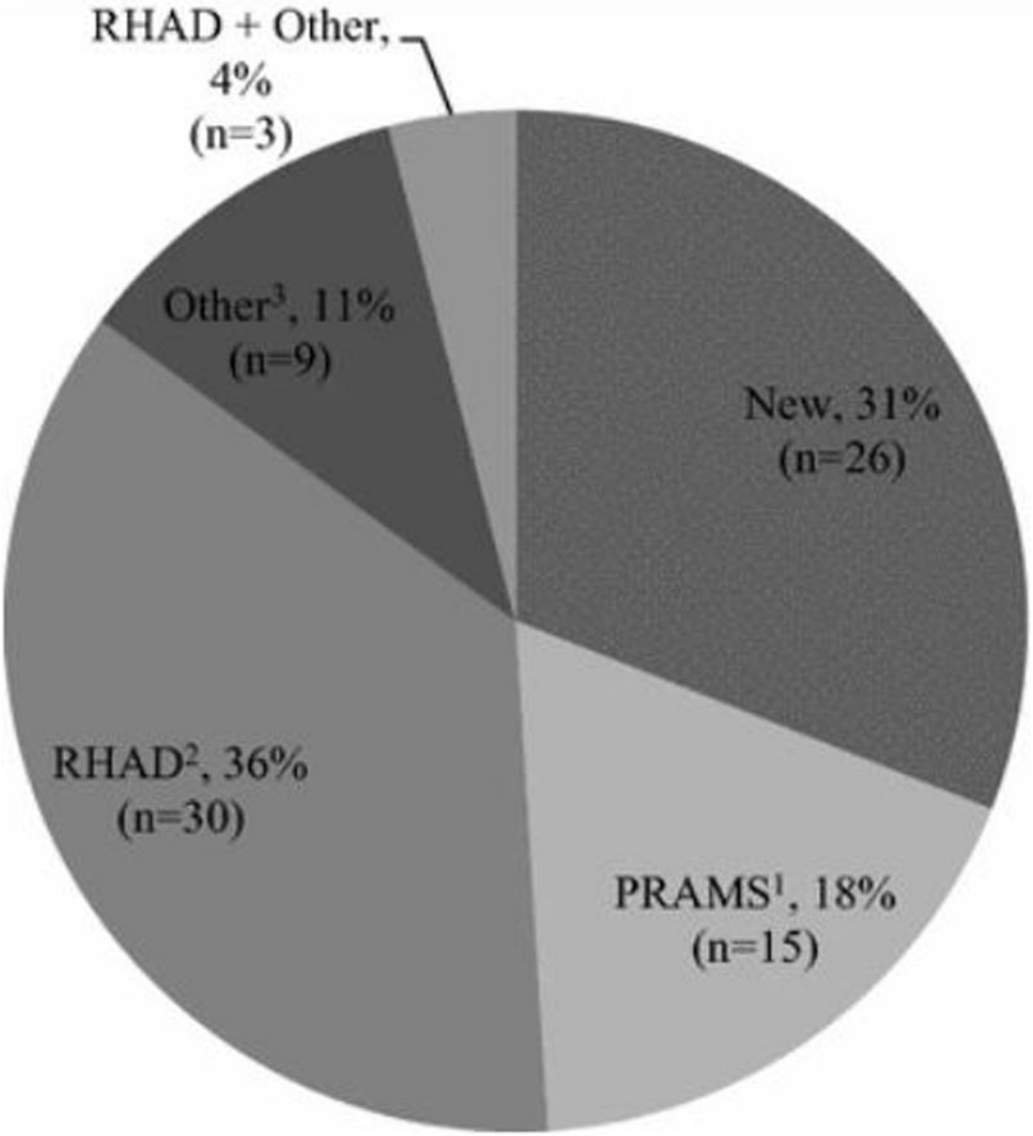

Fig. 1.

Sources of questions (N = 83) for post-disaster indicators for pregnant and postpartum women and infants. [1]*PRAMS* Pregnancy Risk Assessment Monitoring System. [2]*RHAD* Reproductive Health Assessment After Disaster. [3]Other includes *BRFSS* Behavioral Risk Factors Surveillance System, *NIS* National Immunization Survey, *NDMSIF* Natural Disaster Morbidity Surveillance Individual Form, *NISVS* National Intimate Partners and Sexual Violence Survey, and *NSCH* National Survey of Children's Health

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Table 1

Indicators and definitions for pregnant women affected by disaster

Indicators and measures	Definition of measures
1. Health problems during pregnancy	
1.1 Health problems during pregnancy	Proportion of women reporting health problems that require ongoing care. Includes diabetes, vaginal bleeding, urinary tract infections, severe nausea and vomiting, hypertensive disorders, heart problems, and any others identified by the interviewee
2. Access to prenatal care (PNC)	
2.1 Trimester of PNC initiation	PNC initiation reported in weeks or months of pregnancy and then converted to trimester
2.2 Access to PNC since disaster	Series of questions about whether a woman obtained PNC since the disaster, site where a woman obtained PNC, and barriers if she did not obtain PNC
3. Access to the special supplemental nutrition program for women, infants, and children (WIC)	
3.1 Use of WIC services before disaster	Proportion of pregnant women reporting that they were on WIC before the disaster
3.2 Access to WIC or other nutritional services	Series of questions about whether a pregnant woman has used WIC services since the disaster, location where services were obtained, and barriers to access if services were not obtained
4. Disaster exposure and access to mental health services	
4.1 Access to mental health services since disaster	Series of questions about perceived need for mental health services, whether the woman could access the service, site where woman obtained mental health services, and barriers if she did not obtain mental health services
4.2 Disaster exposure	Measures eight severe experiences, including feeling that one's life was in danger, experiencing illness or injury to self or a family member, walking through floodwaters, significant home damage, not having electricity for more than 1 week, having someone close die, or seeing someone die. High exposure has been defined as having a score ≥3
5. Gender-based violence	
5.1 Physical intimate partner violence since disaster	Proportion of pregnant women reporting physical violence by husband or partner since the disaster
5.2 Physical violence by persons other than intimate partners since disaster	Proportion of pregnant women reporting physical violence by person other than husband or partner since the disaster
5.3 Sexual violence by anyone, including intimate partners since disaster	Proportion of pregnant women reporting sexual violence by anyone including husband or partner since the disaster
5.4 Perpetrator of sexual violence since disaster	Pregnant woman's relationship to the perpetrator of the sexual violence
5.5 Perceived effect of violence on physical or emotional health	Proportion of pregnant women reporting perceived effects of the violence on physical or emotional health
5.6 Sought treatment for effects of violence	Proportion of pregnant women who have experienced violence since the disaster and sought treatment from a doctor, counselor, or any other medical care provider for resulting physical and/or emotional problems
5.7 Current need for services for family violence	Proportion of pregnant women reporting current need for services to reduce violence in family
6. Substance use	
6.1 Current number of cigarettes smoked per day	Average number of cigarettes currently smoked per day
6.2 Needs help to quit smoking	Proportion of pregnant women who report that they currently need services to help them quit smoking
6.3 Average weekly alcohol consumption since disaster	Average number of alcoholic drinks consumed during an average week since the disaster

Indicators and measures	Definition of measures
6.4 Self-reported need for help for an alcohol or drug problem	Proportion of pregnant women who report that they currently need services to help with an alcohol or drug problem
7. Family and social support	
7.1 Effect of disaster on social network	Proportion of women reporting that they were separated from loved ones whom they felt close to because of disaster
7.2 Frequency of receipt of social and emotional support since the disaster	Reported frequency of receipt of social and emotional support since the disaster among pregnant women
7.3 Presence of social support since the disaster	Proportion of pregnant women who report that someone would help them if a problem came up since the disaster
7.4 Perceived tangible support since the disaster	Series of questions that list tangible supports that the pregnant woman perceives as available to her since the disaster: someone would loan her $50, someone would help her if she was sick and needed to be in bed, someone would take her to the clinic or doctor's office if she needed a ride, and someone would talk with her about her problems
8. Access to sexually transmitted infection (STI) services	
8.1 Access to STI services since disaster	Series of questions about perceived need for STI services, whether the woman could access the service, site where woman obtained STI services, and barriers if she did not obtain STI services
9. Need for services	
9.1 Identified need for services	Self-reported need for health and social services, including housing, food stamps, school or vocational training, transportation, medical services, dental services, and various social support services

Table 2

Indicators and definitions for postpartum (PP) women affected by disaster

Indicators and measures	Definition of measures
1. Breastfeeding	
1.1 Ever breastfed	Proportion of postpartum (PP) women who breastfed or pumped any amount of breast milk to feed their infant at any point after delivery
1.2 Currently breastfeeding	Proportion of PP women who are currently breastfeeding or feeding any amount of pumped milk to their infant
1.3 Relactation because of disaster	Proportion of PP women who initiated relactation because of the disaster. For some mothers and infants, once breastfeeding has stopped, it may be resumed successfully
1.4 Disaster impact on breastfeeding	Proportion of PP women who chose not to initiate breastfeeding, to stop breastfeeding, or to supplement breastmilk with formula because of the disaster
1.5 Reasons for not initiating, adding formula, or stopping breastfeeding	Reasons given for not initiating breastfeeding, stopping breastfeeding, or supplementing breastmilk with formula
2. Access to supplies to care for infant	
2.1 Access to supplies needed to care for infant	Series of questions identifying the proportion of PP women reporting difficulty accessing supplies to care for their infant because of the disaster, the specific supplies that were difficult to access, location where supplies were sought, and barriers to access if supplies were not obtained
2.2 Difficulty accessing potable water to mix formula or clean bottles	Proportion of PP women who needed potable water to mix formula and/or clean bottles, but had difficulty accessing it because of the disaster
2.3 Difficulty storing and/or preparing formula or milk	Proportion of PP women who experienced difficulty refrigerating and/or heating formula or pumped milk because of the disaster
3. Access to the special supplemental nutrition program for women, infants, and children (WIC)	
3.1 Use of WIC services before disaster	Proportion of PP women reporting that they were on WIC before the disaster
3.2 Access to WIC	Series of questions about whether a PP woman has used WIC services since the disaster, location where services were obtained, and barriers to access if services were not obtained
4. Access to contraception	
4.1 Current use of a permanent method	Proportion of PP women who have had their tubes tied or whose partner has had a vasectomy; identifies those who should not be asked the series of questions below about access to contraception
4.2 Use of family planning before disaster	Proportion of PP women who were using a contraceptive method just before the disaster
4.3 Currently practicing family planning	Proportion of PP women who are currently practicing family planning with their partner, including natural family planning methods
4.4 Family planning method currently used	The method being used among PP women who are currently practicing family planning with their partner; includes natural family planning methods
4.5 Source of contraception	Location where PP women currently using contraception last obtained their contraceptive method
4.6 Preferred family planning method	The desired method of contraception among PP women
4.7 Difficulty accessing contraception after the disaster	Proportion of PP women who have had difficulty accessing their contraceptive method since the disaster
5. Access to postpartum care	

Indicators and measures	Definition of measures
5.1 Access to PP care	Series of questions about whether or not a PP woman received a PP checkup after giving birth, location where PP care was obtained, and barriers to access if PP services were not obtained
5.2 Disaster related difficulty when accessing PP care	Proportion of PP women who experienced difficulty obtaining a PP checkup because of the disaster
6. Access to mental health services	
6.1 Access to mental health services since the disaster	Series of questions about perceived need for mental health services, whether the PP woman could access services, location where mental health services were obtained, and barriers to access if mental health services were not obtained
7. Gender-based violence	
7.1 Physical intimate partner violence since the disaster	Proportion of PP women reporting physical violence by an intimate partner since the disaster
7.2 Physical violence by persons other than intimate partners since the disaster	Proportion of PP women reporting physical violence by a person other than a husband or partner since the disaster
7.3 Sexual violence since disaster	Proportion of PP women reporting sexual violence since the disaster; includes acts perpetrated by intimate partners
7.4 Perpetrator of sexual violence since disaster	PP woman's relationship to the perpetrator of the sexual violence
7.5 Perceived effect of violence on physical or emotional health	Proportion of PP women who have experienced violence since the disaster and perceive an impact to their physical or emotional health
7.6 Sought treatment for effects of violence	Proportion of PP women who have experienced violence since the disaster and sought treatment from a doctor, counselor, or any other medical care provider for resulting physical and/or emotional problems
7.7 Current need for family violence services	Proportion of PP women reporting current need for services to reduce violence in their home
8. Substance use	
8.1 Current number of cigarettes smoked per day	Average number of cigarettes currently smoked per day
8.2 Change in smoking behavior since disaster	Proportion of PP women whose smoking behavior increased since the disaster
8.3 Needs help to quit smoking	Proportion of PP women who report that they currently need services to help them quit smoking
8.4 Self-reported need for an alcohol or drug problem	Proportion of PP women who report that they currently need services to help with an alcohol or drug problem
9. Family and social support	
9.1 Effect of disaster on social network	Proportion of PP women reporting that they were separated from loved ones whom they felt close to because of disaster
9.2 Frequency of receipt of social and emotional support since the disaster	Reported frequency of receipt of social and emotional support since the disaster among PP women
9.3 Presence of social support since the disaster	Proportion of PP women who report that someone would help them if a problem came up since the disaster
9.4 Perceived tangible support since the disaster	Series of questions that list tangible support that the PP woman perceives as available to her since the disaster: someone to loan her $50, someone to help her if she was sick and needed to be in bed, someone to talk with her about her problems, someone to take care of her baby, and someone to help if she was tired and feeling frustrated with her new baby
10. Need for services	
10.1 Identified need for services	Self-reported need for health and social services, including housing, food stamps, school or vocational training, transportation, medical services, dental services, and various social support services

Table 3

Indicators and definitions for infants affected by disaster

Indicators and measures	Definition of measures
1. Birth outcomes	
1.1 Place of delivery	Location of delivery
1.2 Full term low birth weight (LBW)	Proportion of postpartum (PP) women who reported their infants weighed <2,500 g (5.5 lb.) at birth
1.3 Preterm birth	Proportion of PP women who reported they delivered a live singleton baby at least 3 weeks before their due date
2. Infant feeding and access to WIC	
2.1 Ever breastfed	Proportion of PP women who breastfed or pumped any amount of breast milk to feed their new baby at any point after delivery, regardless of whether or not they are currently breastfeeding
2.2 Currently breastfeeding	Proportion of PP women who are currently breastfeeding or feeding any amount of pumped milk to their new baby
2.3 Relactation because of disaster	Proportion of PP women who initiated relactation because of the disaster. For some mothers and infants, once breastfeeding has stopped, it may be resumed successfully
2.4 Reasons for not initiating, adding formula, or stopping breastfeeding	Reasons given for not initiating breastfeeding, stopping breastfeeding, or supplementing breastmilk with formula because of the disaster
2.5 Reasons for not initiating, adding formula, or stopping breastfeeding completely	Reasons given for not initiating breastfeeding, stopping breastfeeding, or supplementing breastmilk with formula
2.6 Access to supplies needed to care for infant	Series of questions identifying the proportion of PP women reporting difficulty accessing supplies to care for their infant because of the disaster, the specific supplies that were difficult to access, location where supplies were sought, and barriers to access if supplies were not obtained
2.7 Use of WIC services before disaster	Proportion of PP women reporting that they were on WIC before the disaster
2.8 Access to WIC or other nutritional services	Series of questions about whether a PP woman has used WIC services since the disaster, location where services were obtained, and barriers to access if services were not obtained
3. Infant health and safety outcomes	
3.1 Ever vaccinated	Proportion of caregivers who reported infants received immunization in the form of a shot or drops
3.2 Access to immunization records	Proportion of caregivers who had access to infant immunization records
3.3 Help seeking for infant medical concerns	Proportion of caregivers who sought medical help for infant
3.4 Reasons for seeking medical help for infant	Reasons why caregiver sought medical help for infant, includes a list of symptoms for acute illness and communicable diseases
3.5 Type of injury	Types of injuries reported
3.6 Cause of injury	Cause of injury reported
4. Access to subspecialty services	
4.1 Access to subspecialty services	Proportion of caregivers who reported that (1) infant required subspecialty care, (2) infant received/did not receive subspecialty care, (3) reasons why infant did not receive subspecialty care
4.2 Infant transferred	Proportion of infants transferred before mother's discharge
4.3 Mother transferred	Proportion of PP women who reported that they were transferred prior to delivery

Indicators and measures	Definition of measures
4.4 Needed assistance in care coordination	Proportion of caregivers who reported they needed extra help coordinating care for their infant
4.5 Received assistance in care coordination	How often caregivers received assistance in coordinating their infant's care
5. Safe sleep environments	
5.1 Baby sleeps in a crib	Proportion of PP women who reported that their infant sleeps in crib or portable crib
5.2 Bed sharing	Proportion of PP women who reported that their infant sleeps in the same bed as mother or someone else
5.3 Sleep position and surface	Proportion of PP women who reported the position in which their infant sleeps (her/his sides, back, and/or stomach), as well as the surface on which the infant sleeps (firm or hard mattress, with pillows, with pads, with blankets, with stuffed toys, and/or with another person)
6. Access to well baby care	
6.1 Ever well-baby checkup	Proportion of women reporting their infant had at least one well-baby checkup
6.2 Well-baby visit location	Self-reported location of well-baby checkup by PP women
6.3 Type of well-baby checkup	The type of care received by infant at a well-baby checkup
6.4 Well-baby visits impacted by disaster	Proportions of women who report it has been more difficult to get well-baby checkups because of a disaster event
6.5 Barriers to well-baby checkup	Proportion of PP women who report barriers to attending well-baby checkups