



HHS Public Access

Author manuscript

Disaster Med Public Health Prep. Author manuscript; available in PMC 2016 January 07.

Published in final edited form as:

Disaster Med Public Health Prep. 2013 April ; 7(2): 191–200. doi:10.1017/dmp.2013.23.

Health-Related Quality of Life Domains and Household Preparedness for Public Health Emergencies: Behavioral Risk Factor Surveillance System, 2006-2010

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Abstract

Background—This study examined the association between self-reported levels of household disaster preparedness and a range of physical and mental health quality of life outcomes.

Methods—Data collected from 14 states participating in a large state-based telephone survey were analyzed (n 5 104 654). Household disaster-preparedness items included having a 3-day supply of food, water, and prescription medications; a working battery-powered radio and flashlight; an evacuation plan; and a willingness to evacuate when instructed to do so. Quality-of-life items were categorized into 2 domains: physical health (general health, unhealthy physical days, and activity-limited days) and mental health (unhealthy mental days, social and emotional support, and life satisfaction).

Results—Persons with self-reported impaired mental health were generally less likely to report being prepared for a disaster than those who did not report impairment in each domain. Persons with low life satisfaction were among the least likely to be prepared, followed by those with inadequate social and emotional support, and then by those with frequent mental distress. Persons reporting physical impairments also reported deficits in many of the preparedness items. However, after adjusting for sociodemographic characteristics, some of the associations were attenuated and no longer significant

Conclusion—Persons reporting impaired quality of life are vulnerable to increased mental and physical distress during a disaster, and their vulnerability is compounded if they are ill-prepared. Therefore, persons reporting impaired quality of life should be included in the list of vulnerable populations that need disaster preparedness and response outreach.

Keywords

Quality of life; Public health preparedness; General health status; BRFSS

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Disclaimer

The findings and conclusions in this article are those of the authors and do not necessarily represent the views of the Centers for Disease Control and Prevention.

Natural and manmade disasters are an inevitable part of human existence. In fact, global trends have shown an increase in the incidence and severity of disasters in the past decade.¹ Fortunately, many of the physical and mental effects of disasters can be mitigated by personal disaster preparedness.¹ In spite of this, only 25% of US households currently adhere to the minimum American Red Cross, Federal Emergency Management Agency, and Department of Homeland Security preparedness guidelines (ie, an established disaster plan and at least a 3-day supply of food, water, and prescription medications for each member of a household).² According to Citizen Corp, a national service program under the Department of Homeland Security, the largest barriers to preparedness are a perceived lack of importance and time.³

Research conducted thus far has focused on identifying obstacles to disaster preparedness. For example, social, economic, and demographic characteristics (eg, income, age, health status, community support, self-efficacy, knowledge, motivation, resources) influence the likelihood that an individual or their household has prepared for a disaster.^{1,4} Other studies have noted that medical vulnerabilities such as disabilities and chronic medical conditions correlate with disparities between those who prepare for disasters and those who do not.^{1,5} Notably, very few, if any, studies have examined factors that influence the desire to prepare for disasters. Such factors include quality of life, a broad, subjective, nonclinical, and multidimensional concept that usually includes self-reported measures of physical and mental health as well as physical and mental health perceptions and their correlates (eg, health risks and conditions, functional status, social support, socioeconomic status).^{6,7}

Studies that have examined the association between quality of life and disaster preparedness have concentrated primarily on individual perception of general health. In a 2006-2008 Behavioral Risk Factor Surveillance System (BRFSS) study conducted by Bethel et al,⁵ persons with fair or poor general health as compared with persons reporting excellent, very good, and good health, were less likely to report all 4 preparedness items (food, water, radio, and flashlight). They were, however, more likely to report a 3-day supply of prescription medications.⁵ In a random digit-dial telephone survey of Los Angeles County residents conducted by Eisenman et al,⁸ people reporting fair or poor general health were less likely to report having disaster supplies and an emergency plan than their healthier counterparts. Finally, in a group of adults with rheumatoid arthritis in Japan, those with poorer perceived health were less likely than those with more favorable perceived health to carry medications and prescription and treatment records.⁹

It is notable that a variety of impaired physical and mental quality of life outcomes have been associated with detrimental behaviors of omission. In a study of older adults with hypertension in a managed care organization conducted by Holt et al,¹⁰ people with low mental or physical quality of life scores were less likely than those with higher scores to take prescribed antihypertensive medication. Moreover, persons reporting frequent mental distress and inadequate social and emotional support were 1.6 and 1.8 times less likely, respectively, than their counterparts to engage in physical activity.^{11,12} We hypothesized that many of these quality of life outcomes may also affect level of household preparedness.

METHODS

The BRFSS is a state-based surveillance system, operated by state health departments in collaboration with the Centers for Disease Control and Prevention. The objective of the BRFSS is to collect uniform, state-specific data on preventive health practices and risk behaviors that are linked to chronic diseases, injuries, and preventable infectious diseases in the adult population.¹³ Trained interviewers collect data from a standardized questionnaire on a monthly basis using an independent probability sample of households with landline telephones in the noninstitutionalized US adult population. The BRFSS questionnaire consists of 3 parts: (1) core questions asked in all 50 states, the District of Columbia (DC), Puerto Rico, Guam, and the US Virgin Islands; (2) supplemental modules, which are a series of questions on specific topics (eg, adult asthma history, intimate partner violence, mental health) that a state can choose to include in their survey; and (3) questions added by the states individually. All BRFSS questionnaires, data, and reports are available at <http://www.cdc.gov/brfss/>.

General Preparedness Module Questions

The general preparedness module was included in the BRFSS in select states from 2006 to 2010. Preparedness data were available for Connecticut, Montana, Nevada, and Tennessee in 2006; Delaware, Louisiana, Maryland, Nebraska, and New Hampshire in 2007; Georgia, Montana, Nebraska, New York, and Pennsylvania in 2008; Mississippi in 2009; and Montana and North Carolina in 2010. Overall household disaster preparedness, as defined by the BRFSS questionnaire, included the following 7 criteria: having a 3-day supply of food, water, and prescription medications, a working battery-powered radio and flashlight, an evacuation plan, and an expressed willingness to evacuate when instructed to do so (Figure 1).

Quality of Life

The quality of life questions were available in the core questionnaire from 2006 to 2010. The health status section contained 1 question regarding general health: “Would you say that in general your health is excellent, very good, good, fair, or poor?” Responses were dichotomized into (1) excellent, very good, or good, versus (2) fair or poor.

Three questions constituted the Healthy Days—Health-Related Quality of Life section: physically unhealthy days, mentally unhealthy days, and activity limiting days. The physically unhealthy days question was assessed by asking the respondent, “Now thinking about your physical health, which includes physical illness and injury, for how many days during the past 30 days was your physical health not good?” Respondents reporting 14 or more days were identified as having frequent physical distress (FPD). The mentally unhealthy days question was assessed by asking the respondent, “Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?” Respondents reporting 14 or more days were identified as having frequent mental distress (FMD). A similar question was asked for activity limitations: “During the past 30 days, for about how many days did poor physical or mental health keep you from doing your usual activities, such as self-care, work,

or recreation?” Respondents reporting 14 or more days were identified as having frequent activity limitations (FAL).

The social and emotional support section contained 2 questions. Social and emotional support was assessed by asking respondents, “How often do you get the social and emotional support you need? (Always, Usually, Sometimes, Rarely, Never).” Responses were dichotomized into (1) always or usually, versus (2) sometimes, rarely, or never. Finally, life satisfaction was assessed by asking respondents, “In general, how satisfied are you with your life? (Very satisfied, Satisfied, Dissatisfied, Very dissatisfied).” The responses were dichotomized into (1) very satisfied or satisfied, versus (2) dissatisfied or very dissatisfied.

For purposes of this study, quality of life items were categorized into a physical health domain and a mental health domain. The physical domain includes items assessing general health, physically unhealthy days, and activity-limited days. The mental domain includes items assessing unhealthy mental days, social and emotional support, and life satisfaction.

Statistical Analysis

We conducted a univariate analysis to explore the characteristics of the entire sample, including sociodemographics, preparedness, and quality of life. A bivariate analysis was used to explore the relationships between each of the sociodemographic variables and quality of life; a second bivariate analysis was then carried out to explore the relationship between quality of life and self-reported level of general household disaster preparedness. Significance was assessed using a χ^2 test. Finally, the association between quality of life and household disaster preparedness was adjusted for a set of covariates using logistic regression.

Covariates included in the adjusted models were age in years (18-24, 25-34, 35-44, 45-54, 55), gender, race/ethnicity (white non-Hispanics, black non-Hispanics, Hispanics, other non-Hispanics), education (less than high school, high school graduate, greater than high school), marital status (currently married, previously married, never married), and employment status (currently employed, unemployed, retired, unable to work, homemaker/student). All analyses were weighted to reflect the complex survey design, resulting in weighted percentages, confidence intervals, and adjusted odds ratios. The unweighted and weighted sample size, response rate, and cooperation rate for each state in each year is reported in Table 1.

Significance was assessed using an alpha level of 0.05. All analyses were conducted using SAS callable SUDAAN (Research Triangle, release 9.2).

Data were available for 104 654 participants in the 14 states. For the purposes of this study, data were combined across all states and all years.

RESULTS

Respondent Characteristics

Approximately 21.4% (95% CI: 20.8%-22.0%) of respondents were aged 35 to 44 years, and 31.7% (95% CI: 31.2%-32.2%) were aged 55 years and older. Slightly more women than men responded to the survey (51.8%, 95% CI: 51.2%-52.5% vs 48.2%, 95% CI: 47.5%-48.8%). The majority of the respondents were white non-Hispanics (74.3%, 95% CI: 73.7%-75.0%), had a greater than high school education (60.6%, 95% CI: 60.0%-61.3%), were currently married %, 95% CI: 60.0%-61.3%), and were currently employed (61.1%, 95% CI: 60.4%-61.7%) (Table 2).

An estimated 82.9% (95% CI: 82.4%-83.5%) of the respondents reported that they had a 3-day supply of food for each household member; 53.6% (95% CI: 52.9%-54.3%) had a 3-day supply of water for each household member; and 89.7% (95% CI: 89.2%-90.1%) had a 3-day supply of prescription medications for those in the household requiring them. More than three-quarters of respondents (77.7%, 95% CI: 77.2%-78.3%) reported having a working battery-operated radio; 94.8% (95% CI: 94.4%-95.1%) reported having a working battery-operated flashlight; 21.1% (95% CI: 20.6%-21.7%) reporting having a written evacuation plan; and 94.9% (94.6%-95.2%) reported that they would leave their community if public authorities issued a mandatory evacuation notice (Table 2).

One-quarter of all respondents (25.3%, 95% CI: 24.8%-25.9%) reported that their household was well-prepared to handle a large-scale disaster or emergency; 55.5% (95% CI: 54.9%-56.2%) felt somewhat prepared; and nearly one-fifth of those surveyed (19.1%, 95% CI: 18.6%-19.7%) did not feel that their household was at all prepared.

In the physical health domain, 10.9% (95% CI: 10.5%-11.3%) reported FPD; 15.5% (95% CI: 15.1%-16.0%) reported fair or poor general health; and 6.9% (95% CI: 6.6%-7.2%) reported FAL (Table 2). In the mental health domain, 10.1% (95% CI: 9.7%-10.6%) reported FMD; 5.4% (95% CI: 5.1%-5.7%) reported being dissatisfied or very dissatisfied with life; and 20.1% (95% CI: 19.5%-20.7%) reported sometimes, rarely, or never receiving social or emotional support. Sometimes, rarely, or never receive social and emotional support

Characteristics of Persons With Impaired Quality of Life

The prevalence of reported FPD, FAL, and fair/poor general health all increased with advancing age. The reported prevalence of FMD and life dissatisfaction was lowest for those 55 years and older, while the reported prevalence of inadequate social and emotional support was lowest for those in age groups 25 to 44 years and 55 years or older. Women were slightly more likely than men to report FMD, FPD, FAL, and fair/poor general health. Men, however, were more likely to report inadequate social and emotional support (Table 3). Race was significantly associated with reported FMD ($P = 0.0040$), fair/poor general health ($P < 0.0001$), inadequate social and emotional support ($P < 0.0001$), and dissatisfaction with life ($P < 0.0001$). Black non-Hispanics were more likely to report FMD; white and other non-Hispanics were less likely to report fair/poor general health; and white non-Hispanics were less likely to report inadequate social and emotional support and dissatisfaction with life.

The reported prevalence of FPD, FAL, and fair/poor general health increased as age increased.

Persons with less than a high school education (vs a high school education or greater), those previously married (vs currently or never married), and those unable to work (vs working, retired, or a homemaker/student) were most likely to report impaired quality of life (FPD, FAL, FMD), fair/poor general health, inadequate social and emotional support, and life dissatisfaction.

Association Between Quality of Life and Level of Household Preparedness: Physical Health Domain

Frequent Physical Distress—Persons with FPD were less likely to report having a radio or flashlight or to indicate a willingness to leave during a mandatory evacuation, but they were more likely to report having a 3-day supply of water and an evacuation plan than those without FPD, according to the unadjusted models (Table 4). The estimated differences in proportions between the groups for the significant preparedness items ranged from 2.9% (leave during mandatory evacuation) to 5.3% (working radio and batteries). After adjusting for other covariates, the odds of a person reporting FPD to report having a 3-day supply of food, a working battery-powered radio and flashlight, and a willingness to evacuate during a mandatory evacuation were significantly less than the odds of someone without FPD (Figure 2A).

General Health—We found statistically significant unadjusted associations between reported general health and all general household disaster preparedness items, with the exception of having a 3-day supply of prescription medications (Table 4). Persons reporting fair or poor general health were significantly less likely than those reporting excellent, very good, or good general health to report having a 3-day supply of food and a working radio or flashlight, and were less likely to indicate a willingness to leave during an evacuation. However, they were more likely than persons reporting excellent, very good, or good general health to report having a 3-day supply of water and an evacuation plan. The range of the estimated significant differences between those reporting excellent, very good, or good general health (vs fair or poor general health) for reporting that they were prepared was 1.3% (leave during mandatory evacuation) to 6.6% (working radio and batteries). After adjusting for sociodemographic characteristics, the odds of having a 3-day supply of food and a working battery powered radio and flashlight for a person reporting fair or poor general health were significantly less than those for someone reporting excellent, very good, or good general health (Figure 2A).

Frequent Activity Limitations—Among those reporting FAL (vs not reporting FAL), we found significant unadjusted associations with all household disaster preparedness items except for having a 3-day supply of water and a 3-day supply of prescription medications. Estimated differences ranged from 3.6% (leave during mandatory evacuation) to 6.4% (working radio and batteries). Persons reporting FAL were more likely than those not reporting FAL to report having an evacuation plan (estimated difference 5.1%). After adjusting for sociodemographic characteristics, the odds of persons reporting FAL to report

having a 3-day supply of food or a working battery-powered radio or flashlight were significantly less than for those not reporting FAL. The odds of reporting a willingness to leave during a mandatory evacuation was also significantly lower among those with FAL (Figure 2A).

Association Between Quality of Life and Level of Household Preparedness: Mental Health Domain

Frequent Mental Distress—Persons reporting FMD were significantly less likely than those reporting no FMD to report having a 3-day supply of food ($P<0.0001$), water ($P<0.0001$), or prescription medications ($P<0.0001$), and a working battery-powered radio ($P<0.0001$) or flashlight ($P<0.0001$), according to the unadjusted results (Table 4). Respondents reporting FMD were also less likely to report that they would leave the community in the event of a mandatory evacuation, as compared to those reporting no FMD ($P<0.0001$). The estimated differences in proportions between the groups for the significant preparedness items ranged from 2.7% (leave during a mandatory evacuation) to 7.1% (working radio and batteries). After adjusting for sociodemographic characteristics, the odds of reporting household disaster preparedness for all items among persons reporting FMD were significantly less than the odds for a person reporting no FMD (Figure 2B).

Life Satisfaction—Persons reporting that they were dissatisfied or very dissatisfied with life were significantly less likely than those who reported being satisfied or very satisfied with life to report all preparedness items except for having an evacuation plan (Table 4). When comparing across quality of life domains, in general, persons reporting that they were dissatisfied or very dissatisfied with life reported a lower percentage of general household preparedness compared to persons reporting all other impaired mental and physical health-related quality of life items. Moreover, the estimated difference in proportions between those who reported they were and were not satisfied with life was also greater for many of the preparedness items when comparing across the quality of life domains (range 4.4% for leaving during mandatory evacuation to 13.7% for having a working radio and batteries). The adjusted odds of someone who reported that they were dissatisfied or very dissatisfied with their life reporting each of the seven BRFSS general household disaster preparedness criteria were significantly less than the adjusted odds of someone who reported being very satisfied or satisfied with their lives reporting the same (Figure 2B).

Social and Emotional Support—Individuals reporting adequate social and emotional support were more likely to report having a 3-day supply of food, a 3-day supply of prescription medications, a working battery-powered radio, a working battery-powered flashlight, and an expressed willingness to evacuate when instructed to do so than those who reported inadequate social and emotional support (Table 4). The estimated differences in proportions ranged from 3.0% (leave during mandatory evacuation) to 10.8% (working radio and batteries), which was in many cases the second highest after life satisfaction. Conversely, persons reporting inadequate social and emotional support were more likely to report having an evacuation plan (estimated difference in proportion, 2.3%). After adjusting, all associations between reported social and emotional support and household preparedness except for having an evacuation plan remained significant (Figure 2B).

Association Between Quality of Life and Level of Household Preparedness: Summary

In the physical health domain, after adjusting for covariates, those reporting impaired physical health (whether measured as having FPD, poor general health, or FAL) were less likely to report having a battery-powered radio or flashlight or a 3-day supply of food. For 2 of the categories (FPD and FAL), respondents were also less likely to report being willing to leave their residence during a mandatory evacuation. No difference in preparedness was significant, with regards to reporting a 3-day supply of water, a 3-day supply of prescription medications, or an evacuation plan.

In the mental health domain, after adjusting for covariates, those reporting impaired mental health (whether captured as FMD, a dissatisfaction with life, or inadequate social or emotional support) were less likely to report having a 3-day supply of food, water, or medication, a battery-powered radio or flashlight, and a willingness to evacuate. Two groups (persons reporting FMD and persons reporting dissatisfaction with life) were also less likely to report having an evacuation plan.

DISCUSSION

To our knowledge, this is the first study to examine the association between a broad range of mental and physical quality of life items and disaster preparedness. Results of the study indicate that persons reporting mental health impairment tend to be the least likely to report being prepared for a major disaster. Among the mental and physical health-related quality of life domains, persons who reported being dissatisfied with life almost always had the lowest percentages for each preparedness item, followed by those reporting inadequate social and emotional support, and finally by those reporting FMD. Persons who reported impairments in the physical health-related quality of life domain also often had lower levels of household preparedness; however, after adjusting for sociodemographic characteristics, some of the associations were attenuated and no longer significant.

Regardless of whether the respondent reported impairment in the physical or mental health-related quality of life domains, those indicating a self-assessed impairment were generally less likely to have basic preparedness supplies such as a 3-day supply of food or a battery-powered radio or flashlight. Those reporting physical health impairment (as compared to those without physical health impairment), while often being more likely to have an evacuation plan, indicated that they would be less likely to leave their residence during a mandatory evacuation. This finding draws into question the feasibility of the evacuation plan, and may indicate a need to provide household-level notification and transportation in the event of a widespread disaster for this community. While it is encouraging that people reporting physical health impairments were not significantly different from those not reporting physical health impairments to have a 3-day supply of medication—given the increased reliance on medical services in this population and the potential for disruption in such services after a disaster—it is important to assure that the physically disabled population is more likely to have an adequate supply of prescription medication on hand. In general, those reporting mental health impairments were less likely to be prepared than those who did not report mental health impairments across almost all of the preparedness items. This finding may indicate a lack of desire to plan ahead and more of a focus on getting

through daily responsibilities, suggesting the potential need for the availability of basic household preparedness supplies for communities with increased levels of mental impairment.

Research indicates that disasters can have an impact on quality of life by increasing emotional and physical problems and the risk of dysfunctional behavioral response.¹⁴⁻¹⁶ Given that people reporting FMD, FPD, FAL, fair or/poor general health, lack of social and emotional support, and dissatisfaction with life already experience impaired quality of life, they are a particularly vulnerable population. While emergency planning and response efforts have consistently focused on physical well-being,¹⁷ only recent attention has been given to incorporating mental illness into disaster preparedness and response.^{14,15,17,18} The need for inclusion of mental health in these efforts is evidenced in this report by the difference in preparedness between those who did and did not report impairments in the mental health quality of life domain.

Limitations

This study has several limitations. First, the BRFSS data are derived by sampling households with a landline telephone, Disaster Medicine and Public Health Preparedness thus excluding households with only cell phones. Second, only respondents who were physically and mentally capable of completing the survey were included; therefore, the actual association between impaired quality of life, social and emotional support, life satisfaction, and general preparedness may be attenuated in this study, as we may be missing from the study sample the subjects with the lowest levels of quality of life and preparedness. Third, the survey was limited to the questions contained in the BRFSS that addressed physical and mental health impairment. These questions may not capture the complexity of the physical or mental health impairment and may preclude the use of the results to suggest specific planning mechanisms. Fourth, it is possible that the associations reported between the quality of life, general health, social and emotional support, and life satisfaction indicators and preparedness are further diminished by assessing preparedness using items commonly found in the household (ie, these common items may not be indicative of disaster preparedness). Finally, the general preparedness module was only used in a total of 14 states between 2006 and 2010, with a few states using the module in any given year; therefore, the findings are not generalizable to the US population.

CONCLUSIONS

The findings in this report offer an important contribution to the study of potentially vulnerable populations as they relate to disasters and preparedness. Previous studies have shown that individuals with physical and mental limitations have increased vulnerability during a disaster.^{18,19} This study indicates that perception of one's physical and mental health is also associated with vulnerability. As several researchers have suggested, public health entities should partner with community organizations and service providers to improve preparedness among individuals with physical and mental limitations.^{5,8} While this task appears daunting due to the heterogeneity of the population, we believe that persons with impaired quality of life should also be included in the list of vulnerable populations that

need disaster preparedness and response outreach, particularly those with perceived impaired mental health.

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1. Does your household have a 3-day supply of water for everyone who lives there? A 3-day supply of water is 1 gallon of water per person per day.
2. Does your household have a 3-day supply of non-perishable food for everyone who lives there? By non-perishable we mean food that does not require refrigeration or cooking.
3. Does your household have a 3-day supply of prescription medication for each person who takes prescription medicines? (This question includes a response for households in which no one requires prescription medication).
4. Does your household have a working battery operated radio and working batteries for your use if the electricity is out?
5. Does your household have a working flashlight and working batteries for your use if the electricity is out?
6. Does your household have a written evacuation plan for how you will leave your home in case of a large-scale disaster or emergency that requires evacuation?
7. If public authorities announced a mandatory evacuation from your community due to a large-scale disaster or emergency, would you evacuate?

FIGURE 1.
Selected Questions From the Behavioral Risk Factor Surveillance System (BRFSS) Disaster Preparedness Module

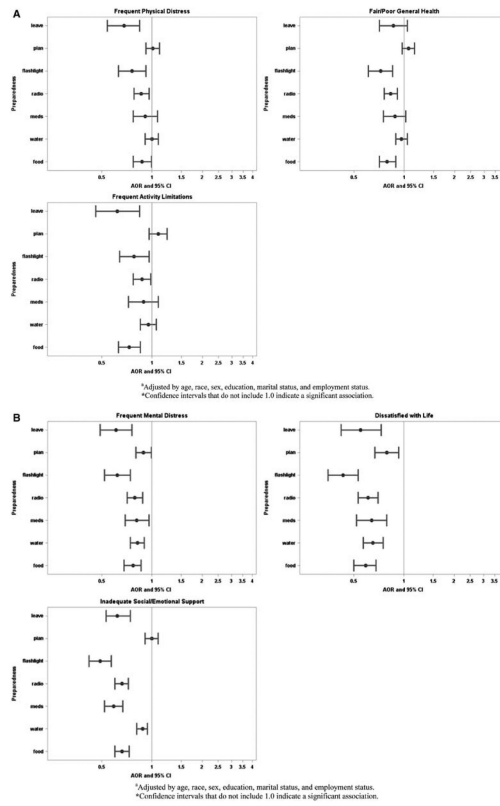


FIGURE 2. Adjusted^a Odds Ratios* of Respondents With Reported Impaired Quality of Life for Each Behavioral Risk Factor Surveillance System (BRFSS) Preparedness Item. A, Physical Health Domain; B, Mental Health Domain.

TABLE 1

States Participating in the General Preparedness Module 2006-2010 by Year

Year and State	Unweighted n	Weighted n	Response Rate ^a , %	Cooperation Rate ^b , %
2006				
Connecticut ^c	4842	2 697 438	44.3	74.0
Montana	6059	727 026	54.8	72.5
Nevada	3591	1 825 459	50.1	80.2
Tennessee	4416	4 583 404	56.7	81.3
2007				
Delaware	3991	663 748	43.2	70.4
Louisiana	6684	3 249 264	41.0	60.1
Maryland ^c	4403	4 265 213	31.4	57.8
Nebraska ^c	5514	1 338 549	65.4	80.0
New Hampshire	5990	1 027 463	37.7	64.0
2008				
Georgia	5716	7 163 610	55.1	85.8
Montana	6846	738 769	48.3	69.4
Nebraska ^c	5373	13 333 476	65.5	80.2
New York ^c	3989	1 484 027	40.0	63.4
Pennsylvania ^c	6603	9 696 488	45.6	66.7
2009				
Mississippi	11 194	2 170 140	49.3	70.9
2010				
Montana	7304	760 685	65.4	80.6
North Carolina	12 139	7 174 410	41.1	64.5

^aThe percentage of completed interviews of all eligible respondents.

^bThe percentage of eligible respondents who were contacted and who completed the survey.

^cSplit sample.

TABLE 2

Characteristics of Respondents

Characteristic	% (95% CI)
Demographic	
Sex	
Male	48.2 (47.5-48.8)
Female	51.8 (51.2-52.5)
Race	
White non-Hispanic	74.3 (73.7-75.0)
Black non-Hispanic	14.0 (13.5-14.4)
Hispanic	6.5 (6.1-6.9)
Other non-Hispanic ^a	5.2 (4.9-5.5)
Age, y	
18-24	9.9 (9.4-10.5)
25-34	17.8 (17.2-18.4)
35-44	21.4 (20.8-22.0)
45-54	19.2 (18.8-19.7)
55	31.7 (31.2-32.2)
Education	
Less than high school	9.3 (8.9-9.7)
High school diploma	30.1 (29.5-30.7)
Greater than high school	60.6 (60.0-61.3)
Employment status	
Currently employed	61.1 (60.4-61.7)
Unemployed	5.8 (5.5-6.2)
Retired	16.3 (15.9-16.6)
Unable to work	5.6 (5.3-5.9)
Homemaker/student	11.3 (10.9-11.8)
Marital status	
Currently married	60.6 (60.0-61.3)
Previously married ^b	17.7 (17.3-18.1)
Never married ^c	21.7 (21.1-22.4)
Preparedness items	
3-day supply of food	82.9 (82.4-83.5)
3-day supply of water	53.6 (52.9-54.3)
3-day supply of prescription medications	89.7 (89.2-90.1)
Working radio and batteries	77.7 (77.2-78.3)
Working flashlight and batteries	94.8 (94.4-95.1)
Evacuation plan	21.1 (20.6-21.7)
Leave if mandatory evacuation	94.9 (94.6-95.2)
Quality of life	

Characteristic	% (95% CI)
Physical domain	
Frequent physical distress	10.9 (10.5-11.3)
Fair or poor general health	15.5 (15.1-16.0)
Frequent activity limitations	6.9 (6.6-7.2)
Mental domain	
Frequent mental distress	10.1 (9.7-10.6)
Dissatisfied or very dissatisfied with life	5.4 (5.1-5.7)
Sometimes, rarely, or never receive social and emotional support	20.1 (19.5-20.7)

^a Asian, non-Hispanic; Native Hawaiian/Pacific Islander, non-Hispanic; American Indian/Alaska native, non-Hispanic; other race, non-Hispanic; multirace, non-Hispanic.

^b Previously married includes those divorced, widowed, or separated.

^c Never married includes those never married or member of unmarried couple.

TABLE 3
Sociodemographic Characteristics of the Study Population by Impaired Quality of Life Status

Demographic Characteristic	Physical domain				Mental domain							
	Frequent Physical Distress		Fair or Poor General Health		Frequent Activity Limitations		Frequent Mental Distress		Dissatisfied or Very Dissatisfied With Life		Sometimes, Rarely, or Never Has Social and Emotional Support	
	% (95% CI)	Sig	% (95% CI)	Sig	% (95% CI)	Sig	% (95% CI)	Sig	% (95% CI)	Sig	% (95% CI)	Sig
Sex												
Male	9.6 (9.1-10.2)	*	14.5 (13.8-15.2)	*	6.2 (5.7-6.7)	*	8.2 (7.7-8.9)	*	5.4 (4.9-6.0)		21.1 (20.2-22.0)	*
Female	12.1 (11.6-12.6)		16.5 (16.0-17.1)		7.6 (7.3-8.0)		11.9 (11.4-12.5)		5.3 (5.0-5.7)		19.2 (18.6-19.9)	
Race												
White non-Hispanic	10.9 (10.5-11.3)		14.0 (13.5-14.4)	*	6.7 (6.4-7.1)		9.7 (9.3-10.2)	*	4.7 (4.4-5.1)	*	16.5 (15.9-17.0)	*
Black non-Hispanic	10.8 (9.9-11.8)		21.3 (19.9-22.7)		7.6 (6.9-8.5)		12.2 (11.0-13.5)		7.8 (6.8-9.0)		30.1 (28.4-31.9)	
Hispanic	9.8 (8.1-11.8)		20.7 (18.3-23.3)		6.1 (4.8-7.9)		10.1 (8.3-12.2)		6.3 (4.7-8.2)		30.3 (27.2-33.6)	
Other non-Hispanic ^a	12.2 (10.0-14.7)		15.5 (13.5-17.7)		8.6 (6.7-10.9)		10.6 (8.8-12.6)		7.3 (5.6-9.5)		32.0 (28.8-35.4)	
Age, y												
18-24	4.3 (3.2-5.7)	*	7.1 (5.8-8.7)	*	3.3 (2.3-4.5)	*	11.7 (10.0-13.7)	*	5.4 (4.1-5.7)	*	21.0 (18.5-23.7)	*
25-34	6.0 (5.2-7.1)		8.9 (7.8-10.1)		4.2 (3.5-5.1)		10.6 (9.5-211.8)		5.3 (4.4-6.3)		19.4 (17.8-21.0)	
35-44	8.0 (7.2-8.8)		11.0 (10.0-11.9)		5.3 (4.7-6.0)		10.5 (9.6-11.4)		5.6 (5.0-6.4)		18.9 (17.7-20.2)	
45-54	12.3 (11.5-13.2)		16.0 (15.1-17.0)		8.3 (7.6-9.0)		11.9 (11.1-12.7)		6.6 (6.0-7.3)		21.8 (20.7-22.9)	
55	16.9 (16.3-17.6)		24.7 (24.0-25.4)		9.9 (9.4-10.4)		8.1 (7.7-8.6)		4.5 (4.2-4.9)		19.9 (19.3-20.6)	
Education												
Less than high school	24.0 (22.2-25.9)	*	37.3 (35.3-39.3)	*	16.3 (14.7-17.9)	*	17.5 (15.9-19.2)	*	9.5 (8.2-10.9)	*	40.3 (38.1-42.5)	*
High school diploma	13.1 (12.3-13.8)		20.1 (19.2-21.0)		8.4 (7.8-9.0)		11.3 (10.6-12.1)		6.3 (5.7-7.0)		24.0 (23.0-25.1)	
Greater than high school	7.9 (7.5-8.3)		10.0 (9.5-10.4)		4.8 (4.5-5.2)		8.5 (8.0-9.0)		4.3 (4.0-4.7)		15.2 (14.6-15.9)	
Employment status												
Currently employed	5.3 (4.9-5.7)	*	8.20 (7.6-8.5)	*	2.5 (2.2-2.8)	*	8.0 (7.5-8.5)	*	3.7 (3.4-4.1)	*	17.7 (17.0-18.4)	*
Unemployed	15.8 (13.8-18.1)		22.4 (20.0-25.0)		13.4 (11.6-15.4)		20.2 (17.9-22.7)		13.9 (12.0-16.2)		31.1 (29.1-24.1)	
Retired	16.6 (15.8-17.5)		26.0 (25.0-27.0)		9.2 (8.5-9.9)		6.2 (5.7-6.7)		3.2 (2.9-3.7)		19.9 (19.0-20.9)	
Unable to work	57.4 (54.8-59.9)		68.7 (66.3-71.0)		48.5 (45.9-51.0)		36.5 (34.2-38.9)		24.5 (22.4-26.8)		42.3 (39.8-44.8)	
Housewife/student	8.6 (7.6-9.8)		11.5 (10.4-12.7)		4.7 (4.0-5.5)		9.5 (8.4-10.8)		3.8 (3.1-4.7)		16.9 (15.4-18.6)	
Marital status												
Currently married	9.3 (8.9-9.8)	*	12.9 (12.4-13.4)	*	5.6 (5.3-6.0)	*	7.9 (7.4-8.3)	*	3.1 (2.8-3.5)	*	15.3 (14.6-15.9)	*

Demographic Characteristic	Physical domain			Mental domain			
	Frequent Physical Distress % (95% CI)	Fair or Poor General Health % (95% CI)	Frequent Activity Limitations % (95% CI)	Frequent Mental Distress % (95% CI)	Dissatisfied or Very Dissatisfied With Life % (95% CI)	Sometimes, Rarely, or Never Has Social and Emotional Support % (95% CI)	Sig
Previously married ^b	19.2 (18.3-20.1)	27.9 (26.9-29.0)	12.8 (12.0-13.6)	15.1 (14.2-16.0)	9.9 (9.2-10.7)	29.6 (28.5-30.7)	
Never married ^c	8.6 (7.7-9.6)	12.9 (11.9-14.1)	5.9 (5.2-6.7)	12.6 (11.5-13.8)	8.0 (7.1-9.1)	25.9 (24.3-27.5)	

Abbreviation: Sig. significance.

^a Asian, non-Hispanic; Native Hawaiian/Pacific Islander, non-Hispanic; American Indian/Alaska native, non-Hispanic; other race, non-Hispanic; multirace, non-Hispanic.

^b Previously married includes those divorced, widowed, or separated.

^c Never married includes those never married or member of unmarried couple.

* Chi-square test, $P < .05$.

TABLE 4

Unadjusted Association Between Quality of Life and Preparedness Items

Preparedness Variables in Physical Domain	Physical Distress			General Health			Activity Limitations		
	No FPD	FPD	P	Excellent/ Very Good /Good	Fair/ Poor	P	No FAL	FAL	P
3-day supply of food	83.1 (82.5-83.7)	81.6 (80.1-83.0)	.0679	83.4 (82.8-84.0)	80.6 (79.3-81.9)	.0001	83.3 (82.7-83.9)	78.4 (76.3-80.3)	.,0001
3-day supply of water	53.2 (52.4-53.9)	56.4 (54.6-58.2)	.0015	53.1 (52.3-53.8)	56.7 (55.1-58.2)	<.0001	53.5 (52.7-54.2)	55.3 (52.9-57.6)	.1483
3-day supply of prescription medications	89.6 (89.1-90.1)	90.2 (89.0-91.3)	.3503	89.9 (89.3-90.4)	88.9 (87.8-90.0)	.1291	89.7 (89.2-90.2)	89.4 (87.7-90.9)	.7161
Working radio and batteries	78.4 (77.8-79.0)	73.1 (71.4-74.7)	<.0001	78.8 (78.1-79.4)	72.2 (70.8-73.6)	<.0001	78.2 (77.6-78.8)	71.8 (70.0-73.8)	<.0001
Working flashlight and batteries	95.1 (94.8-95.5)	92.1 (91.0-93.1)	<.0001	95.4 (95.0-95.7)	91.6 (90.7-92.4)	<.0001	95.1 (94.7-95.4)	91.4 (90.0-92.5)	<.0001
Evacuation plan	20.7 (20.2-21.3)	24.2 (22.7-25.7)	<.0001	20.3 (19.8-20.9)	25.5 (24.2-26.8)	<.0001	20.7 (20.2-21.3)	25.8 (23.9-27.9)	<.0001
Leave if mandatory evacuation	95.2 (94.9-95.5)	92.3 (91.1-93.4)	<.0001	95.1 (94.8-95.5)	93.8 (92.9-94.5)	.0021	95.2 (94.8-95.5)	91.6 (89.7-93.2)	.0001
Preparedness Variables in Mental Health Domain	Mental Distress			Life Satisfaction			Social and Emotional Support		
	No FMD	FMD	P	Very Satisfied or Satisfied	Dissatisfied or Very Dissatisfied	P	Always or Usually	Sometimes, Rarely, or Never	P
3-day supply of food	83.6 (83.0-84.1)	77.7 (75.9-79.5)	<0.0001	83.6 (83.0-84.1)	72.7 (69.9-75.3)	<0.0001	84.4 (83.8-85.0)	77.0 (75.5-78.3)	<0.0001
3-day supply of water	54.1 (53.4-54.8)	49.2 (47.0-51.4)	<0.0001	54.1 (53.4-54.8)	44.7 (41.7-47.7)	<0.0001	53.6 (52.8-54.3)	53.1 (51.5-54.7)	0.5968
3-day supply of prescription medications	90.1 (89.5-90.6)	86.3 (84.6-87.8)	<0.0001	90.1 (89.6-90.6)	83.1 (80.3-85.5)	<0.0001	91.4 (90.9-91.9)	83.1 (81.6-84.4)	<0.0001
Working radio and batteries	78.5 (77.9-79.2)	71.4 (69.5-73.3)	<0.0001	78.5 (77.9-79.1)	64.8 (61.9-67.6)	<0.0001	80.0 (79.3-80.6)	69.2 (67.7-70.7)	<0.0001
Working flashlight and batteries	95.3 (94.9-95.6)	90.4 (89.2-91.6)	<0.0001	95.3 (95.0-95.6)	85.9 (83.7-87.9)	<0.0001	96.1 (95.8-96.4)	89.4 (88.3-90.3)	<0.0001
Evacuation plan	21.1 (20.6-21.7)	20.5 (18.9-22.1)	0.4567	21.2 (20.7-21.7)	20.1 (17.7-22.7)	0.3898	20.6 (20.1-21.2)	22.9 (21.7-24.3)	0.0015
Leave if mandatory evacuation	95.2 (94.8-95.5)	92.5 (91.2-93.6)	<0.0001	95.2 (94.9-95.5)	90.8 (88.7-92.5)	<0.0001	95.6 (95.3-95.9)	92.6 (91.6-93.5)	<0.0001

Abbreviations: FAL, frequent activity limitations; FMD, frequent mental distress; and FPD, frequent physical distress.