Summary of Goals

Oregon continues to experience or be at risk for natural disasters such as tsunamis, earthquakes, wildfires, flooding, extreme heat, drought, etc. and, like all states, is vulnerable to man-made disasters such as a terrorist attack. Despite years of campaigns at all levels of government in the aftermath of the September 11 attacks and the 2005 Gulf Coast hurricanes to increase disaster preparedness among U.S. households, only a small portion is prepared.¹ Latinos are often left out of mainstream messaging and are less prepared than non-Hispanic whites.¹ In addition, they are particularly vulnerable and disproportionately impacted by disasters due to language and literacy barriers, distrust of warning messages, lower perceived risk from emergencies² as well as lack of access to communications mechanisms.³ A population-based assessment of disaster preparedness among Latino households was an important first step to developing culturally competent disaster communication material tailored to this population.

The objectives of the study were to:

1) Determine the level of disaster preparedness (natural or man-made) among Latino households in Marion County, Oregon; and

2) Identify subgroups of Latinos who are ill-prepared for disasters (e.g. non-English speaking, elderly, chronically ill, etc.).

Summary of Scholarly Activities

We developed a 1-page survey to collect data needed to achieve the study’s objectives. The instrument was developed used questions directly from the Behavioral Risk Factor Surveillance System (BRFSS) questionnaire from 2010. BRFSS is a state-based, ongoing, telephone-based survey of the non-institutionalized U.S. civilian population 18 years or older which collected a wide variety of health information. Oregon State University’s Survey Research Center (SRC) secured a random sample of 1,500 Latino households in Marion County identified by Spanish surname. The one-page survey included questions in English and Spanish. A private translation service translated the document from English into Spanish. All recipients of the survey received a $2 bill for regardless of completion. The SRC coordinated the 4 mailings to potential participants and tracked all completed surveys and nonresponses. The SRC delivered all returned surveys to the PI, who coordinated with a Graduate Student Researcher to enter the data into a database for cleaning, coding, labeling, and analysis. The study received approval from OSU Institutional Review Board prior to data collection.

The study’s findings were presented back to key stakeholders at the Marion County Public Health Department in December 2013 as well as presented to a national audience at the 2013
American Public Health Association in November 2013. The results were also presented at the Oregon Epidemiologists (OR-EPI) meeting in June 2013. The presentation served as a basis for discussion during a breakout session at OR-EPI. Preparation of a manuscript for publication in a peer-review journal is currently underway with a targeted date of submission of February 2014.

See the Appendix for a poster and oral presentation given using the results of this work.

**Summary of Additional Scholarly Activities**

As a new faculty member to OSU, this project resulted in Dr. Bethel making key connections with people active in preparedness in Marion County as well as throughout Oregon. In addition, this project enabled Dr. Bethel to make connections among the Latino community in Marion County, which has one of the highest Latino populations in Oregon.

**Expenditure of Funds**

<table>
<thead>
<tr>
<th>Expense Category</th>
<th>Actual</th>
<th>Total Expense Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Services and Supplies</td>
<td>$9,300</td>
<td></td>
</tr>
<tr>
<td>Addresses (SRC contract)</td>
<td>$1,100</td>
<td></td>
</tr>
<tr>
<td>Survey administration (SRC contract)</td>
<td>$1,900</td>
<td></td>
</tr>
<tr>
<td>Printing and postage (SRC contract)</td>
<td>$4,800</td>
<td></td>
</tr>
<tr>
<td>Incentives</td>
<td>$1,500</td>
<td></td>
</tr>
<tr>
<td>Total expenses</td>
<td>$9,300</td>
<td></td>
</tr>
<tr>
<td>Total budgeted</td>
<td>$9,900</td>
<td></td>
</tr>
<tr>
<td>Unspent balance</td>
<td></td>
<td>$600</td>
</tr>
</tbody>
</table>

**External Funding Requests as a Result of Funding**

PI is currently preparing a proposal in response to the National Institutes of Health (NIH) program announcement entitled “Social and Behavioral Research on the Elderly in Disasters (R21), PAR-11-265”. The proposal will be submitted by February 16, 2014.
Appendix
COLLEGE OF PUBLIC HEALTH AND HUMAN SCIENCES

Disaster Preparedness among Latino Households in Marion County, Oregon

Jeffrey W. Bethel¹, PhD, Steven Ranzoni², MPH

¹Oregon State University, College of Public Health and Human Sciences; ²Oregon Health Authority

Objectives

• The objective of this study were to 1) determine level of disaster preparedness among Latino households in Marion County, Oregon; and 2) identify Latino subgroups who are ill-prepared for disasters.

Background

• Natural disasters (e.g. hurricanes, tornados, floods, fires, extreme heat, and disease pandemics) are priority public health issues due to their associated physical and mental impact.
• Populations with increased vulnerabilities to disasters include those with physical and mental disabilities, elderly, pregnant women, children, prisoners, economically disadvantaged minorities, undocumented workers, and those with language barriers.
• Racial and ethnic minorities are more vulnerable to natural disasters than non-Hispanic whites.
• Assessment of minority populations’ preparedness to sustain or minimize the impact of a natural disaster is important since different approaches may be needed to improve preparedness among these populations.

Methods

• 1,500 households in Marion County, OR identified by Spanish surname.
• Oregon State University Survey Research Center coordinated 4 mailings of 20-item self-administered survey which included $2 incentive.
• No personal identifying information collected.
• Three main dependent variables were examined: Household presence of 4 preparedness items (4 v. <4) including 3-day supply of food and water and flashlight and radio with batteries.

Results

• 465 completed surveys (30.9% response rate).
• 382 (83.6%) Latino/a.

Table 1. Characteristics of Survey Respondents (N=382)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Overall</th>
<th>English Survey Respondents</th>
<th>Spanish Survey Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age 18-64</td>
<td>91.1</td>
<td>90.6</td>
<td>91.6</td>
</tr>
<tr>
<td>≥65</td>
<td>8.9</td>
<td>9.4</td>
<td>8.4</td>
</tr>
<tr>
<td>Male sex*</td>
<td>60.2</td>
<td>54.5</td>
<td>65.3</td>
</tr>
<tr>
<td>Married/Living as married*</td>
<td>82.2</td>
<td>75.6</td>
<td>88.1</td>
</tr>
<tr>
<td>Education &lt; High School</td>
<td>46.3</td>
<td>29.2</td>
<td>61.1</td>
</tr>
<tr>
<td>High School</td>
<td>26.0</td>
<td>23.4</td>
<td>28.3</td>
</tr>
<tr>
<td>Some college</td>
<td>19.5</td>
<td>33.9</td>
<td>7.1</td>
</tr>
<tr>
<td>College graduate</td>
<td>8.2</td>
<td>13.5</td>
<td>3.5</td>
</tr>
<tr>
<td># living in household*</td>
<td>1-2</td>
<td>18.8</td>
<td>29.9</td>
</tr>
<tr>
<td>3-4</td>
<td>36.6</td>
<td>40.1</td>
<td>33.5</td>
</tr>
<tr>
<td>&gt;4</td>
<td>44.6</td>
<td>29.9</td>
<td>57.5</td>
</tr>
</tbody>
</table>

* includes 3-day supply of food, 3-day supply of water, radio with batteries, and flashlight with batteries.

Results (cont.)

Table 2. Multivariate logistic regression results for general preparedness among survey respondents

<table>
<thead>
<tr>
<th></th>
<th>4 Preparedness Items¹</th>
<th>Emergency Evacuation Plan</th>
<th>3-Day Supply of Medication²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Characteristic</td>
<td>OR (95% CI)</td>
<td>OR (95% CI)</td>
<td>OR (95% CI)</td>
</tr>
<tr>
<td>Spanish Survey Language</td>
<td>1.94 (0.75, 3.17)</td>
<td>2.04 (0.97, 4.31)</td>
<td>0.36 (0.20, 0.65)</td>
</tr>
<tr>
<td>Age ≥65</td>
<td>0.88 (0.20, 3.23)</td>
<td>1.09 (0.32, 3.77)</td>
<td>1.01 (0.36, 2.87)</td>
</tr>
<tr>
<td>Married/Living as married*</td>
<td>1.22 (0.50, 2.95)</td>
<td>0.83 (0.32, 2.15)</td>
<td>3.26 (1.54, 6.89)</td>
</tr>
<tr>
<td># living in household</td>
<td>1-2</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>3-4</td>
<td>0.61 (0.25, 1.48)</td>
<td>0.55 (0.20, 1.54)</td>
<td>0.50 (0.21, 1.22)</td>
</tr>
<tr>
<td>&gt;4</td>
<td>0.28 (0.10, 0.75)</td>
<td>0.43 (0.15, 1.20)</td>
<td>0.43 (0.18, 1.03)</td>
</tr>
<tr>
<td>Education &lt; High School</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>High School</td>
<td>1.15 (0.51, 2.56)</td>
<td>0.85 (0.40, 1.78)</td>
<td>1.34 (0.72, 2.49)</td>
</tr>
<tr>
<td>Some college</td>
<td>1.16 (0.48, 2.83)</td>
<td>0.20 (0.05, 0.75)</td>
<td>2.24 (0.99, 5.07)</td>
</tr>
<tr>
<td>College graduate</td>
<td>0.50 (0.13, 1.96)</td>
<td>0.13 (0.02, 1.05)</td>
<td>2.19 (0.72, 6.70)</td>
</tr>
</tbody>
</table>

¹Includes 3-day supply of food, 3-day supply of water, radio with batteries, and flashlight with batteries.
²Restricted to respondents living in household with members requiring medication.

Limitations

• Targeting households with Spanish surnames may have excluded Latinos in the county, thus limiting generalizability.
• While 30.9% response rate is typical for mailed surveys, it is lower than anticipated.
• Relative small sample size limited multivariate analyses.
• No comparison group.

Conclusions/Discussion

• Few Latino households had all 4 preparedness items (17.5%) and an emergency evacuation plan (15%); over half (57.6%) had medication supplies.
• Spanish survey respondents more likely to have all 4 preparedness items and evacuation plan but less likely to have medication supplies than English survey respondents.
• Larger households less likely to have all 4 preparedness items, evacuation plan, and medication supply than smaller households.
• Latinos in Marion County, OR should be targeted to increase preparedness to mitigate effects of natural disaster.
• Next steps include identifying reasons for lack of preparedness which can be used to develop effective strategies to improve preparedness among this population and to repeat assessment in other counties as well as across the state.
Disaster Preparedness among Latino Households in Marion County

Jeffrey Bethel, PhD
Assistant Professor
College of Public Health and Human Sciences
Oregon State University

Marion County Health Department Grand Rounds
December 18, 2013
• Impacts of natural disasters are a public health issue
  – Physical and mental health, including injuries, drowning, and depression
  – Socioeconomic impacts such as displacement and lack of food and clean water

• Hurricane Katrina
  – 275,000 homes destroyed or uninhabitable
  – 770,000 residents displaced
Natural Disasters and Vulnerability

- Those with physical and mental disabilities
- Elderly
- Pregnant women
- Children
- Prisoners
- Economically disadvantaged minorities
- Undocumented workers
- Those with language barriers
Background

- Racial and ethnic minorities are more vulnerable to natural disasters than non-Hispanic whites
- Socioeconomic differences
- Language barriers
- Minority preference for particular information sources (e.g. friends and family)
- Distrust of government authorities
Hurricane Katrina

• 971 Katrina-related deaths

• 53% men

• 51% Black, 42% NH White, 2% Hispanic

• Most deaths occurred in Orleans Parish (682)
  – Mortality rate among Blacks was 1.7-4 times higher than among Whites ≥ 18 years
  – Blacks were significantly more likely to die in storm than Whites in all age groups over 30

Objectives

• **Objective 1:** Determine the level of disaster preparedness among Latino households in Marion County

• **Objective 2:** Identify Latino subgroups ill-prepared for disasters
Methods

• 1,500 households in Marion County identified by Spanish surname

• OSU Survey Research Center coordinated 4 mailings

• 20-question survey in English and Spanish

• $2 incentive to complete

• No personal identifying information collected
Variables

• Dependent variables
  – All 4 preparedness items (water supply, food supply, radio, flashlight)
  – Disaster evacuation plan
  – 3-day supply of prescription medication
  – Self-reported level of preparedness

• Independent variables
  – Demographics: Age, sex, education, family income, marital status, number in household, race/ethnicity, language
  – Chronic disease: Index of diabetes, asthma, MI, stroke, heart disease
Statistical Analysis

• Chi-square test

• Multiple logistic regression
Results
Study Population

• 465 completed surveys returned (30.9% response rate)

• 382 (83.6%) Latino/a
  – 60% male
  – 53.3% in Spanish and 46.7% in English
  – 82% married/living as married
  – 44.4% of households >4 members
  – 3.6% of respondents had ≥2 chronic diseases
Preparedness Levels – Overall

- 4 Prep Items: 0%
- Emergency Plan: 20%
- 3-day Supply Meds: 80%
Self Reported Level of Preparedness

- Well
- Somewhat
- Not at all

p = 0.358
Preparedness Items

- 3 days supply of water: English (p = 0.001)
- 3 days supply of food: English (p = 0.085)
- Flashlight with batteries: Spanish (p = 0.063)
- Battery-operated radio: English (p = 0.934)
Medication Supplies

- 3 day supply of meds†: p value < 0.001
- Evacuation plan: p value = 0.0

† Only for households in which a member was taking prescribed medication.
### Preparedness and Demographics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>4 Prep Items (%)</th>
<th>Disaster Evacuation Plan (%)</th>
<th>3-Day Supply of Meds (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; high school</td>
<td>18.00</td>
<td>20.75*</td>
<td>50.70*</td>
</tr>
<tr>
<td>completed high school</td>
<td>17.07</td>
<td>16.67</td>
<td>49.18</td>
</tr>
<tr>
<td>some college</td>
<td>18.18</td>
<td>4.29</td>
<td>77.78</td>
</tr>
<tr>
<td>college graduate</td>
<td>10.34</td>
<td>3.33</td>
<td>78.26</td>
</tr>
<tr>
<td><strong>Number in household</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-2</td>
<td>25.00*</td>
<td>18.46</td>
<td>79.66*</td>
</tr>
<tr>
<td>3-4</td>
<td>20.00</td>
<td>16.54</td>
<td>60.40</td>
</tr>
<tr>
<td>≥ 4</td>
<td>11.72</td>
<td>13.84</td>
<td>47.62</td>
</tr>
</tbody>
</table>

*p ≤ 0.05
## Preparedness and Chronic Disease

<table>
<thead>
<tr>
<th>Number of Chronic Diseases</th>
<th>4 Prep Items (%)</th>
<th>Disaster Evacuation Plan (%)</th>
<th>3-Day Supply of Meds (%)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>17.80</td>
<td>15.08</td>
<td>52.63</td>
</tr>
<tr>
<td>1</td>
<td>18.37</td>
<td>13.21</td>
<td>73.47</td>
</tr>
<tr>
<td>≥ 2</td>
<td>0.00</td>
<td>25.00</td>
<td>81.82</td>
</tr>
</tbody>
</table>

*p ≤ 0.05
# Multivariate Analyses

<table>
<thead>
<tr>
<th>Survey Language</th>
<th>4 Prep Items†</th>
<th>Evacuation Plan</th>
<th>3-Day Supply of Meds</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Spanish</td>
<td>1.69</td>
<td>2.79</td>
<td>0.29</td>
</tr>
</tbody>
</table>

†Includes 3 day supply of food, 3 day supply of water, radio with batteries, and flashlight with batteries

*Adjusted for age, education, marital status, and number in household
## Multivariate Analyses (BRFSS Data)

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>4 Prep Items†</th>
<th>Evacuation Plan</th>
<th>3-Day Supply of Meds</th>
</tr>
</thead>
<tbody>
<tr>
<td>NH White</td>
<td>1.00 / 1.00</td>
<td>1.00 / 1.00</td>
<td>1.00 / 1.00</td>
</tr>
<tr>
<td>NH Black</td>
<td>1.02 / 0.92, 1.14</td>
<td>1.13 / 1.01, 1.27</td>
<td>0.66 / 0.56, 0.79</td>
</tr>
<tr>
<td>ESH</td>
<td>1.07 / 0.85, 1.34</td>
<td>1.35 / 1.07, 1.69</td>
<td>0.48 / 0.34, 0.69</td>
</tr>
<tr>
<td>SSH</td>
<td>0.92 / 0.63, 1.35</td>
<td>0.67 / 0.47, 0.97</td>
<td>0.20 / 0.13, 0.29</td>
</tr>
</tbody>
</table>

*Adjusted for age, sex, education, marital status, household income, number in household, and health insurance.
†Includes 3 day supply of food, 3 day supply of water, radio with batteries, and flashlight with batteries.
Conclusions

• Few Latino households have all 4 preparedness items (17.5%) and an emergency evacuation plan (15%); over half (57.6%) have medication supplies

• Spanish survey respondents more likely to have all 4 preparedness items and evacuation plan but less likely to have medication supplies than English survey respondents
Conclusions

• Larger households less likely to have all 4 prep items, evacuation plan, and medication supply than smaller households
Discussion

• Latinos should be targeted to increase preparedness to mitigate effects of natural disaster

• Effective and culturally relevant health risk communication is critical

• Health status influences response to health risk information
Discussion

• Strengthen personal relevance by adapting communications to language, cultural values, and daily life conditions

• Use concrete imagery (no statistics)

• Build self-efficacy and trust by using members of community

• Be open and honest about potential negative effects
Next Steps

- Public health planning
  - Partner with local health departments and Red Cross
  - Medication distribution

- Research
  - Why not well prepared?
  - Identify effective strategies to improve preparedness
  - Local or state-wide projects
  - Continue systematic assessments
Acknowledgements

- Christina Charlesworth
Questions?
Preparedness Items

- 3 days supply of water: p = 0.004
- 3 days supply of food: p = 0.066
- Flashlight with batteries: p = 0.042
- Battery-operated radio: p = 0.373

Non-Latino
Latino - English
Latino - Spanish
Preparedness Levels

- 4 Prep Items
- Emergency Plan
- 3-day Supply Meds

Non-Latino
Latino - English
Latino - Spanish

- 0% 20% 40% 60% 80% 100%

- p = 0.691
- p = 0.024
- p = 0.000