PREPTalks
New perspectives for emergency managers

Discussion Guide
Who is at Risk?
Rapid Mapping of Potential Hazard Exposure
Dr. Robert Chen

PrepTalks Discussion Guides provide a framework for community leaders to translate insights from the PrepTalk into community planning and outreach. Community leaders can use the PrepTalks materials at meetings, workshops, and conferences to address critical emergency management topics with whole community partners.

Who is at Risk? Rapid Mapping of Potential Hazard Exposure

Dr. Chen's PrepTalk outlines the different ways data mapping can be used to help emergency managers identify those at risk before, during, and after a disaster. Dr. Chen is Director of the Center for International Earth Science Information Network (CIESIN), a unit of Columbia University's Earth Institute. He manages the National Aeronautics and Space Administration (NASA) Socioeconomic Data and Applications Center (SEDAC); part of NASA's network of Earth Science Data Centers.

Partners for the Discussion

To apply the geospatial datasets, socioeconomic census data, and analytical techniques discussed in Dr. Chen's PrepTalk to your community, we encourage you to bring Geographic Information System (GIS) specialists together with emergency managers and others in involved in planning for response and recovery to various hazards, urban planners, the Warning Coordination Meteorologist from your local National Weather Service (NWS) Weather Forecast Office, data scientists at local universities, and preparedness outreach coordinators.

After watching Dr. Chen's presentation and the Q&A session, use this Discussion Guide and additional resources to discuss how to leverage available data and mapping services. Talk about how these resources can ensure your planning, exercises, training, and outreach appropriately reflects the community you serve.

Discussion Topics

Topic 1: Using Census Data and Mapping Capabilities to Prepare for a Disaster

In his PrepTalk, Dr. Chen outlines how maps not only show where people are in a community but provide important context. Geospatial analysis can clarify the identification and location of vulnerable populations, at-risk infrastructure, and other community characteristics that could help achieve preparedness, response and recovery objectives.

> *It's always good to [use maps to] explain where population centers are and who is vulnerable.*
>
> — Dr. Robert Chen

FEMA · IAEM International Association of Emergency Managers · NEMA National Emergency Management Association · National Homeland Security Consortium · Center for Homeland Defense and Security, Naval Postgraduate School

Questions for Discussion

Use Dr. Chen's PrepTalk, describing the types of community details that can inform plans, as a springboard for discussion.

- ❑ What types of population, infrastructure, and hazard risk details would enhance your community plans?
- ❑ Use the Resilience Analysis and Planning Tool to examine the 20 commonly used community resilience indicators for your jurisdictions. These 20 community resilience indicators are based on an analysis of published peer-reviewed research, FEMA's Community Resilience Indicator Analysis:

Educational Attainment: % population over 25 without high school diploma
Unemployment Rate: % of labor force unemployed
Disability: % of population with a disability
English Language Proficiency: % limited-English-speaking households
Mobility: % of occupied housing units with no vehicles available
Home Ownership: % owner-occupied housing units
Age: % of population 65 years and over
Household Income: median household income
Income Inequality: Gini Index
Health Insurance: % of population with no health insurance coverage (private or public)
Single-parent Households: % of single-parent households

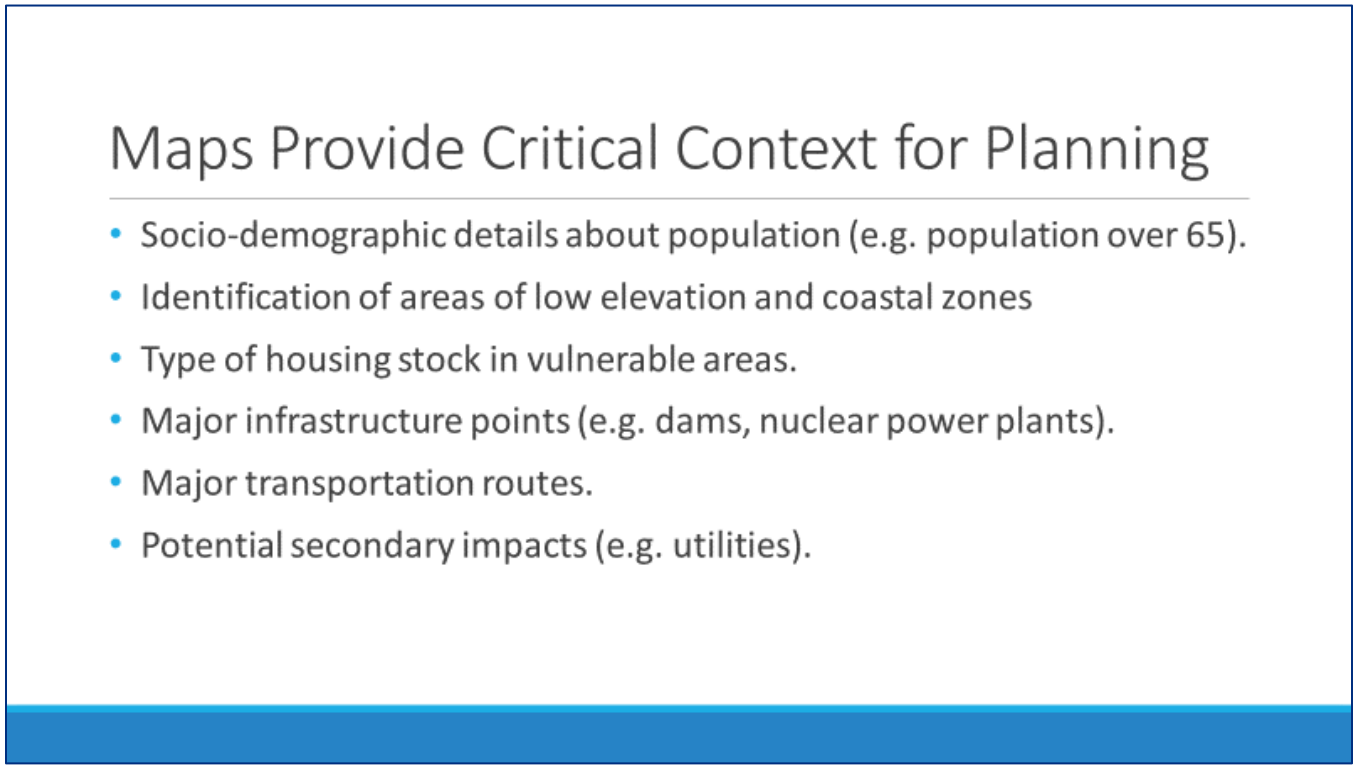
11 Population-Focused Indicators and Metric Used

Connection to Civic and Social Organizations: # of organizations per 10,000 people
Hospital Capacity: # of hospitals per 10,000 people
Medical Professional Capacity: # of health diagnosing and treating practitioners per 1,000 people
Affiliation with a Religion: % of population that are religious adherents
Mobile Homes: % of mobile homes
Population Change: % change in residents who have lived in same county for more than 5 years
Public School Capacity: # of public schools per 5,000 population
Hotel/Motel Capacity: # of hotels/motels per 5,000 population
Rental Property Capacity: % vacant rental housing units

9 Community-Focused Indicators and Metric Used

- ❑ Add in the RAPT Infrastructure Layers and Hazard Layers to build a Resilience Profile for your community. All available data layers and sources included in RAPT is available at www.fema.gov/rapt.
- ❑ Researching the census data for your community can help you:
    - Identify population segments that may need a tailored approach to preparedness education;
    - Provide information to design more realistic community exercises;
    - Provide insights to enhance alerts and warning systems and make them more effective at any time of day;
    - Give planners a clearer understanding of the likely numbers of people needing group care or assistance with an evacuation during an incident; and
    - Strategize how to build social capital in the community (see Dr. Daniel Aldrich's PrepTalk).
- ❑ Share and explore different mapping resources that would be useful in the preparedness stage of planning. There is a growing number of federal agencies that provide geo-coded data. See the Resource List for this PrepTalk for a beginning list of potential resources. Please note that some resources are designed for non-technical users, while others may require greater knowledge and skill.
- ❑ How will you update plans to incorporate the latest mapping capabilities?
    - Use this data to help optimize the location and supply needs of emergency shelters.

- Create a plan to evacuate people accounting for those with special needs and those without vehicles.
- Identify areas where emergency information should be provided in multiple languages.



Source: Chen PrepTalk

Topic 2: Consider How Mapping Capabilities Can Support Disaster Response

Dr. Chen describes the importance of having access to quick estimates of population or other data during an event. This might provide the size of a population under a specific NWS warning, or whether a wildfire is threatening a heavily populated area, or even analyzing how a flood might disrupt a major transportation corridor.

> *For NWS warning areas, would you like to know the population in [the impact area] polygon?*
>
> — Dr. Robert Chen

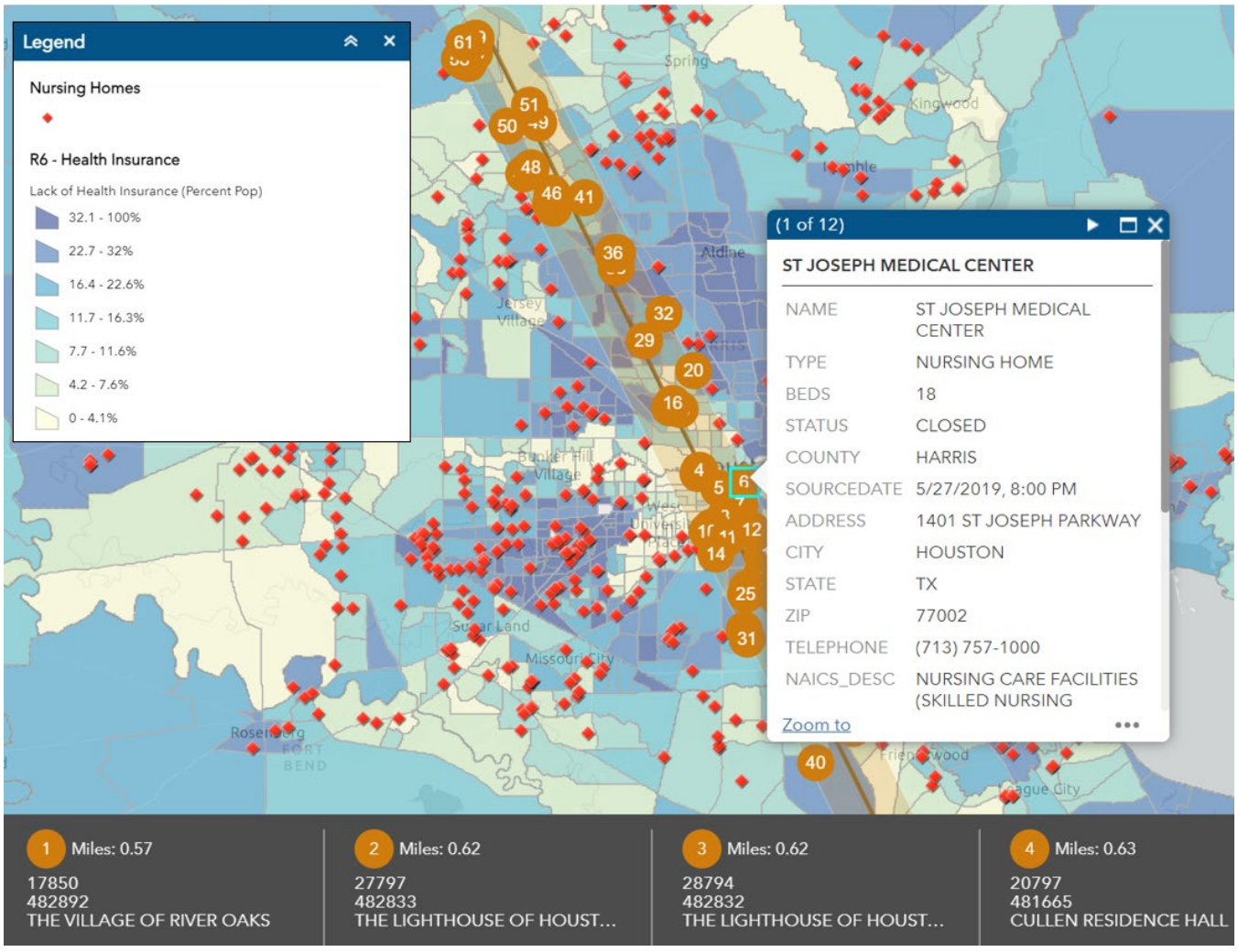
Questions for Discussion

Based on these examples:

- ❑ Identify and document the mapping resources that can provide quick estimates or real-time mapping for hazards that can affect your community. Who can provide and disseminate this information during an event?

- How can you use maps to better convey hazard risk to the public? Dr. Dennis Mileti's PrepTalk on Modernizing Public Warning Messaging noted the importance of helping people understand whether a risk was relevant to them. Identifying specific areas at risk, visualized with a map of the area, can be extremely helpful in quickly conveying who is at risk and reducing delays in people taking appropriate protective actions.

- Explore the analysis tools in RAPT, including the Incident Analysis Tool, the Selection Tool, and the Population by Census Tract Tool. These tools will allow you to identify infrastructure and population segments is a designated area, such as the path of a forecasted hurricane. This map shows nursing homes in the path of hurricane passing through Houston, TX.



Topic 3: Identify Ways that Mapping Can Improve Recovery

Dr. Chen notes that additional mapping capabilities can be useful in the recovery phase. For example, looking at nighttime lights to detect changes in the electrical grid, or for adjoining jurisdictions to figure out how to most effectively deliver resources to an impacted area.

Questions for Discussion

As a working group discuss:

- ❑ What real-time information would be helpful as you begin to implement your community's recovery plans?
- ❑ What data layers are available to include in GIS web map analysis?
- ❑ What communities are more vulnerable to disaster and may need additional support in their recovery process?

Discussion of Next Steps

What are the next steps your community can take to build resilience for power outages? Create a plan and timeline with your working group to:

- Conduct census data research on your community.
- Use RAPT to examine the interplay of population data, infrastructure locations, and hazards to create a Resilience Profile.
- Identify people with GIS and mapping capabilities within your community and make plans to augment needed skillsets.
- Update plans and processes as needed with mapping resources, including procedures for real-time analysis and distribution.
- Consider including a mapping function in your next tabletop exercise to assess how maps can be used in the response to an event.

For the companion Facilitator Slides and Resource List for this PrepTalk, visit:
https://www.fema.gov/blog/preptalks-dr-robert-chen-who-risk-rapid-mapping-potential-hazard-exposure