PREPTalks

New perspectives for emergency managers

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NATIONAL HOMELAND SECURITY CONSORTIUM™

CENTER FOR HOMELAND DEFENSE AND SECURITY
NAVAL POSTGRADUATE SCHOOL

Who's at Risk?
Rapid Mapping of Potential Hazard Exposure

Dr. Robert S. Chen

Agenda

Agenda
Introductions (5 minutes)
Watch the PrepTalks (20 minutes)
Discussion (30 minutes)

Introduction

- Dr. Chen is director of the Center for International Earth Science Information Network, a unit of the Earth Institute at Columbia University in New York.
- He manages the NASA Socioeconomic Data and Applications Center (SEDAC), part of NASA's network of Earth science data centers supporting both research and operational use of NASA remote sensing and related data.
- Chen received his Ph.D. in geography from the University of North Carolina at Chapel Hill and holds B.S. and M.S. degrees from the Massachusetts Institute of Technology.

Watch the PrepTalk

https://www.fema.gov/blog/preptalks-dr-robert-chen-who-risk-rapid-mapping-potential-hazard-exposure

Topics

- Using Census Data and Mapping Capabilities to Prepare for a Disaster
- How Mapping Capabilities Support Disaster Response
- Identify Ways that Mapping Can Improve Recovery

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

- Maps show where people are in a community **and** provide important context
- Geospatial analysis can identify and locate:
  - Vulnerable populations
  - At-risk infrastructure
  - 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

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

11 Population-Focused Indicators and Metric Used

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

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

9 Community-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

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

1. What types of population, infrastructure, and hazard risk details would enhance your community plans?
2. Use the Resilience Analysis and Planning Tool to examine the 20 commonly used community resilience indicators for your jurisdictions.
3. Add in the RAPT Infrastructure Layers and Hazard Layers to build a Resilience Profile for your community.

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

4. 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

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

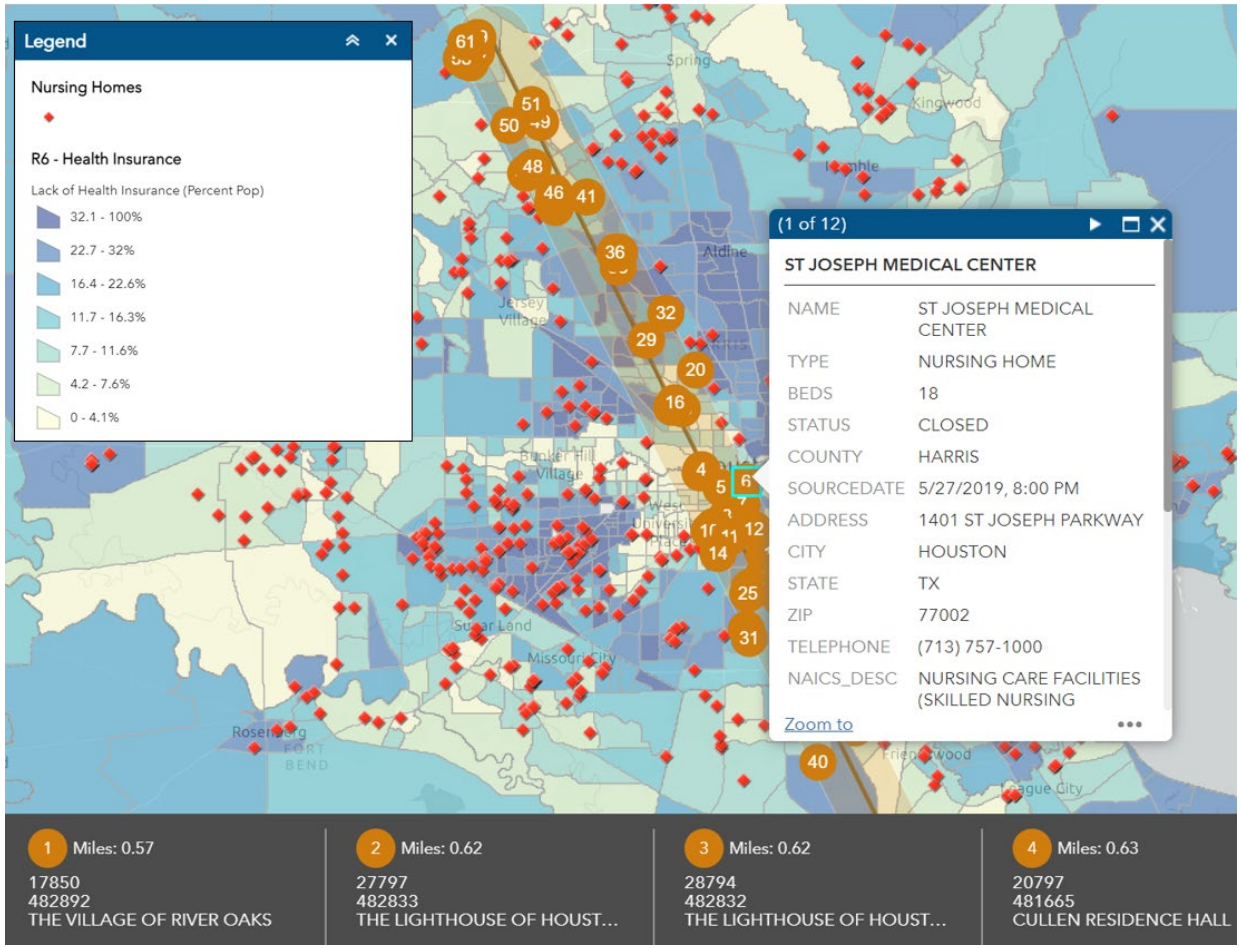
5. Share and explore different mapping resources that would be useful in the preparedness stage of planning. There is a growing number of federal agencies that provide geo-coded data.
6. How will you update plans to incorporate the latest mapping capabilities?
   - Use this data to help optimize the 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.

Topic 2: Consider How Mapping Capabilities Can Support Disaster Response

Maps Provide Critical Context for Planning

- Socio-demographic details about population (e.g. population over 65).
- Identification of areas of low elevation and coastal zones
- Type of housing stock in vulnerable areas.
- Major infrastructure points (e.g. dams, nuclear power plants).
- Major transportation routes.
- Potential secondary impacts (e.g. utilities).

Topic 2: Consider How Mapping Capabilities Can Support Disaster Response



Topic 2: Consider How Mapping Capabilities Can Support Disaster Response

1. 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?
2. How can you use maps to better convey hazard risk to the public? 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.
3. 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.

Topic 3: Identify Ways that Mapping Can Improve Recovery

- Nighttime lights show changes in the electrical grid
- Look to adjoining jurisdictions to deliver resources effectively

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

Discussion of Next Steps

- 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 NWS warning areas, would you like to know the population in [the impact area] polygon?

– Dr. Robert Chen

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