NWIRP Study of Hurricane Maria Impacts and Recovery in Puerto Rico

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Goal 2: To characterize the impacts to and recovery of education and healthcare services

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Objective

- To identify the underlying characteristics and conditions associated with recovery of critical social functions from Hurricane Maria in Puerto Rico and to examine the recovery trajectories of sampled schools and hospitals.
- This project will also include investigation of the interdependencies of the broader community (e.g., households, businesses) and the social functions provided by schools and hospitals.

Background

Under the National Windstorm Impact Reduction Act Reauthorization of 2015 (Public Law 114-52), NIST is conducting a scientific study of Hurricane Maria's impacts on Puerto Rico and subsequent recovery processes to characterize:

1) *The impacts to and recovery of small and medium-sized manufacturers (SMMs), as well as businesses in retail and service industries;*
2) *The impacts to and recovery of education and healthcare services;*
3) *The impacts to and recovery of infrastructure systems in Puerto Rico, with a focus on infrastructure that supports the functioning of critical buildings (i.e., hospitals and schools) and emergency communications.*

Goals 1 and 2 align to NWIRP Strategic Plan Goal B: *Improve the Understanding of Windstorm Impacts on Communities*

- Objective 7: Improve understanding of economic and social factors influencing windstorm risk reduction measures
- Objective 8: Develop tools to improve post-storm impact data collection, analysis, and archival

Background

- The NIST investigation will include a project focused on the recovery of education and healthcare services associated with critical buildings (schools and hospitals) in Puerto Rico
- Both education and healthcare services are an important part of understanding the impacts of Hurricane Maria, as well as the long term recovery of Puerto Rico
- For example, the Department of Education in Puerto Rico will close over 283 schools*
- Puerto Rico will receive nearly $600 million in emergency federal assistance for school recovery and rebuilding*

A FEMA Disaster Recovery Center in Puerto Rico

*Source: ABC News, https://abcnews.go.com/US/puerto-rico-schools-receive-500-million-283-schools/story?id=54846053

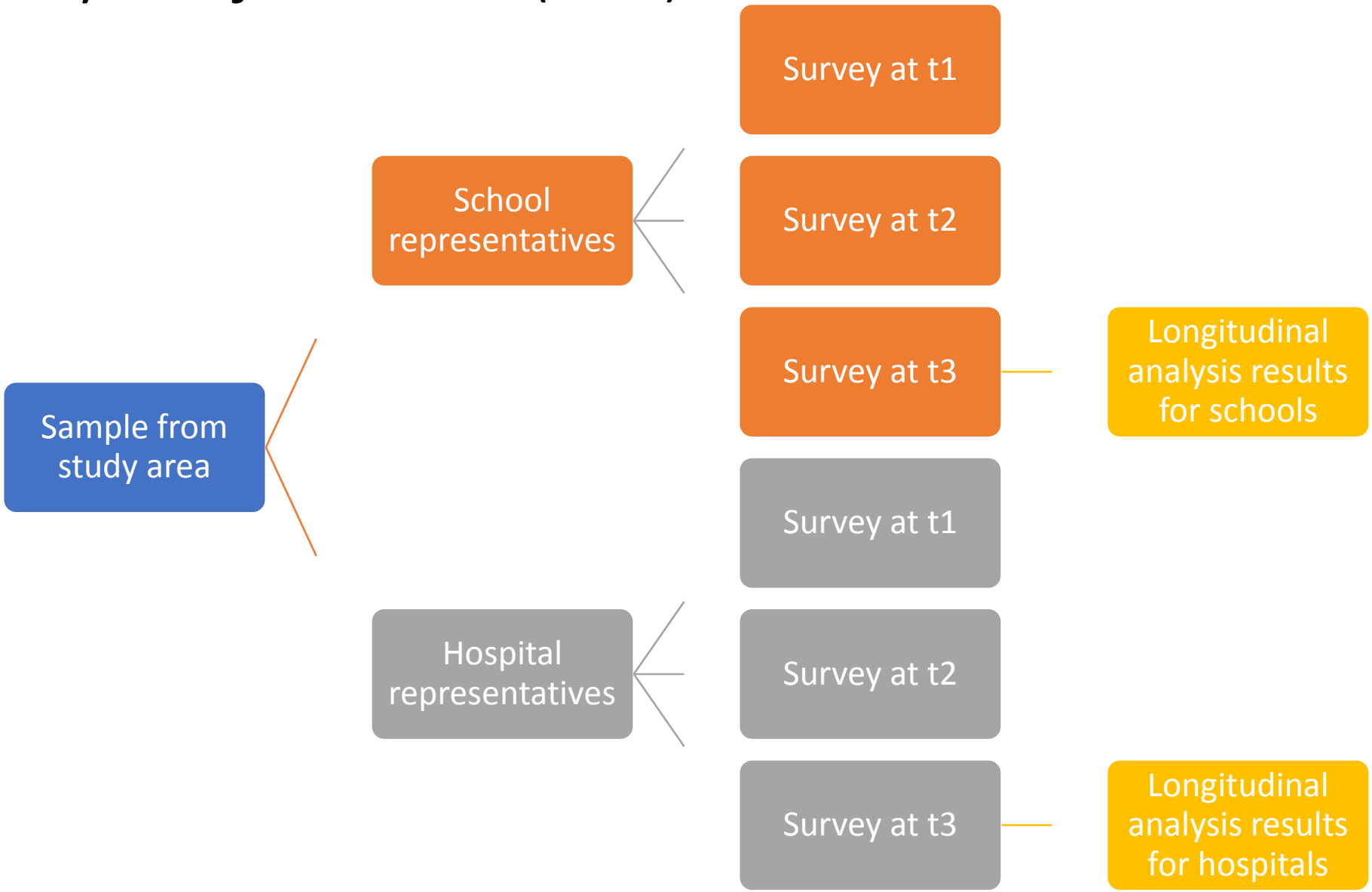
Preliminary Project Plan (1/3)

Project methods include structured surveys of representatives of hospitals and school institutions within study area and semi-structured interviews

- Survey data collection
  - Longitudinal design
    - Allows the same cases to be observed over time
    - 3 waves of data collection, approximately 6 months between each wave
  - Sampling unit: Organization
    - Schools (K-12, public and private)
    - Hospitals
  - Sample in order to assess differences in recovery
    - Geography
    - Population characteristics (e.g., hospital & school size, public/private ownership)
    - Degree of hazard exposure/impact
  - Data collected to include:
    - Impacts of hazard on buildings and services
    - Interdependencies
    - Response
    - Recovery of services

Schools in Puerto Rico

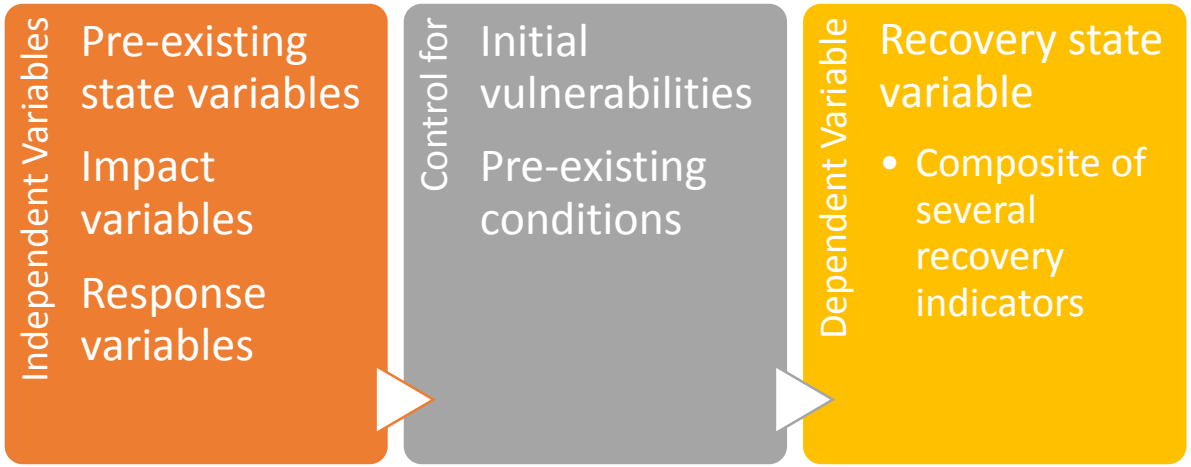
Preliminary Project Plan (2/3)



Preliminary Project Plan (3/3)

Modeling to consider the following variables:

- Pre-existing state
  - Resilience characteristics – e.g., flexible decision making structures, economic security of the institution
  - Initial vulnerability
- Impacts
  - Physical – e.g., building damage, infrastructure damage
  - Non-physical – e.g., population dislocation, impaired access, disruptions of school/work
  - Interdependencies (infrastructure, households, businesses)
- Response
  - Resources (monetary and non-monetary)
  - Plans in place
  - Policies
  - Decisions
  - Delays
- Recovery
  - Repairs
  - Function
  - Access
  - Service provision



FY18 Progress Updates

- Developing a better understanding of our potential study area:
  - Population characteristics
  - Distribution of schools and hospitals
  - Hazard impacts (building damage, deaths)
- Writing and submitting contract for survey and interview research services to NIST's Acquisitions Management Division
- Identifying linkages between projects (e.g., overlapping samples, methods, analysis)
- Collecting background data for schools and hospitals
  - Lists of all public and private K-12 schools
  - Lists of all hospitals
  - Preliminary data on closures
  - Damage assessments
  - Collection of data on institutional characteristics, e.g., size, staffing, services provided, operating budget
  - Media coverage of impacts and flow of recovery assistance

Next Steps

- Develop draft sampling strategy for survey research
- Develop draft survey and interview instruments
- Award contract for survey and interview data collection
- Prepare packages for data collection instrument approvals
  - NIST's Institutional Review Board
  - Office of Management and Budget's Paperwork Reduction Act

Hospitals in Puerto Rico