

NWIRP Research Study of Hurricane Maria (Puerto Rico)

Recovery of Social Functions Project

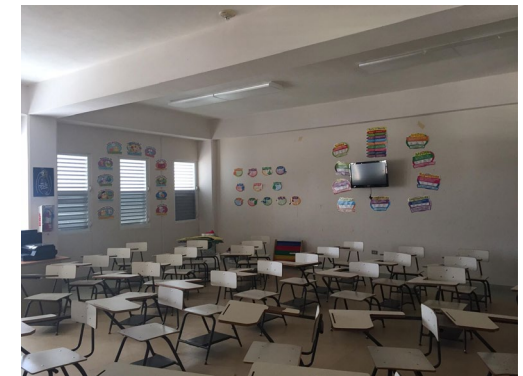
Project Leader: Maria Dillard

Background and Motivation

- The NIST Hurricane Maria Program includes a project focused on the recovery of education and healthcare services associated with critical buildings (schools and hospitals) in Puerto Rico.
- 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.
- This project will be used to advance an empirical understanding of long term recovery, including measurement, identification of predictors (e.g., resources, characteristics associated with resilience), and exploration of interdependencies across the community.
- Recovery is still in progress, nearly 5 years after Hurricane Maria; the Central Office for Recovery, Reconstruction, and Resiliency (COR3) reports that ~30% of large reconstruction projects (permanent work) are now in the construction phase with ~9% completed, as of Quarter 1 of Fiscal Year 2022*

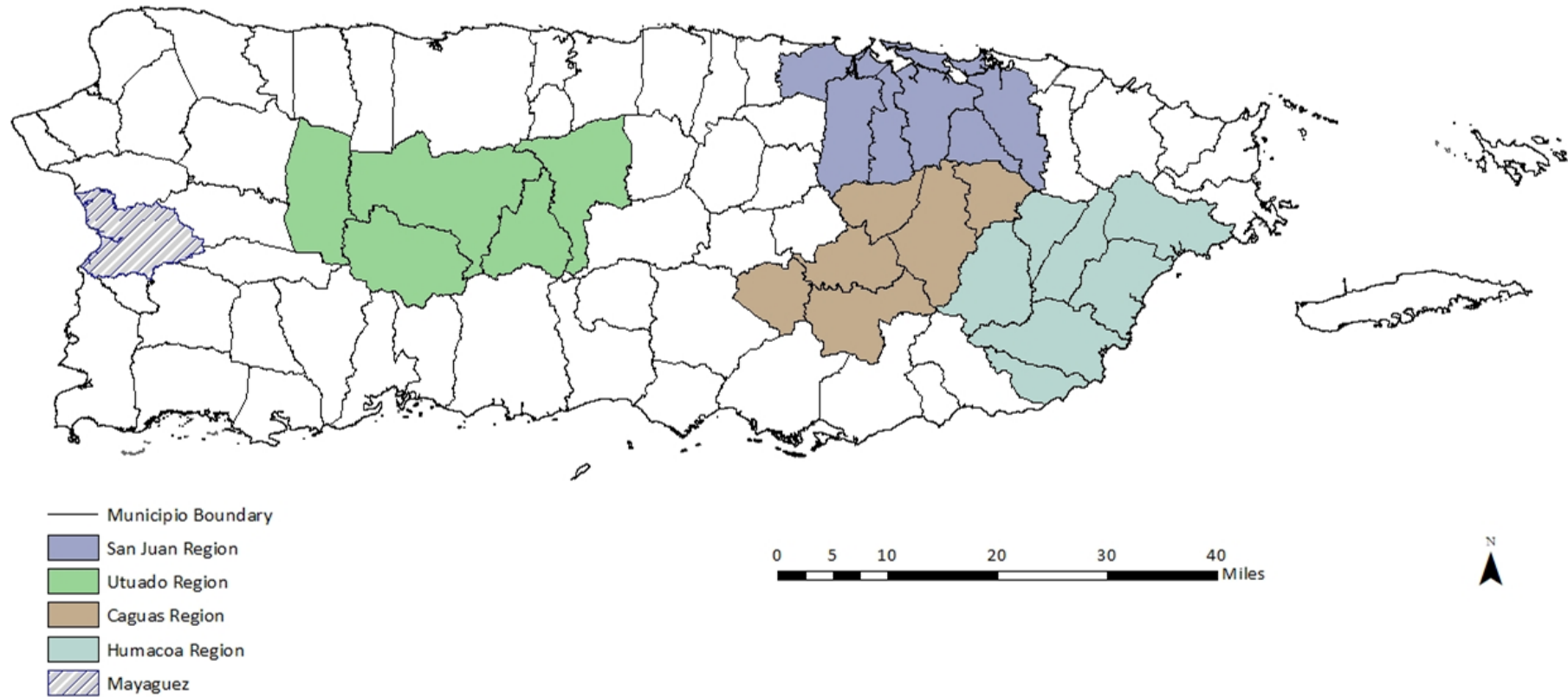
*COR3 Quarterly Progress Report. <https://recovery.pr/en/qpr/map>

All photos credited to NIST.



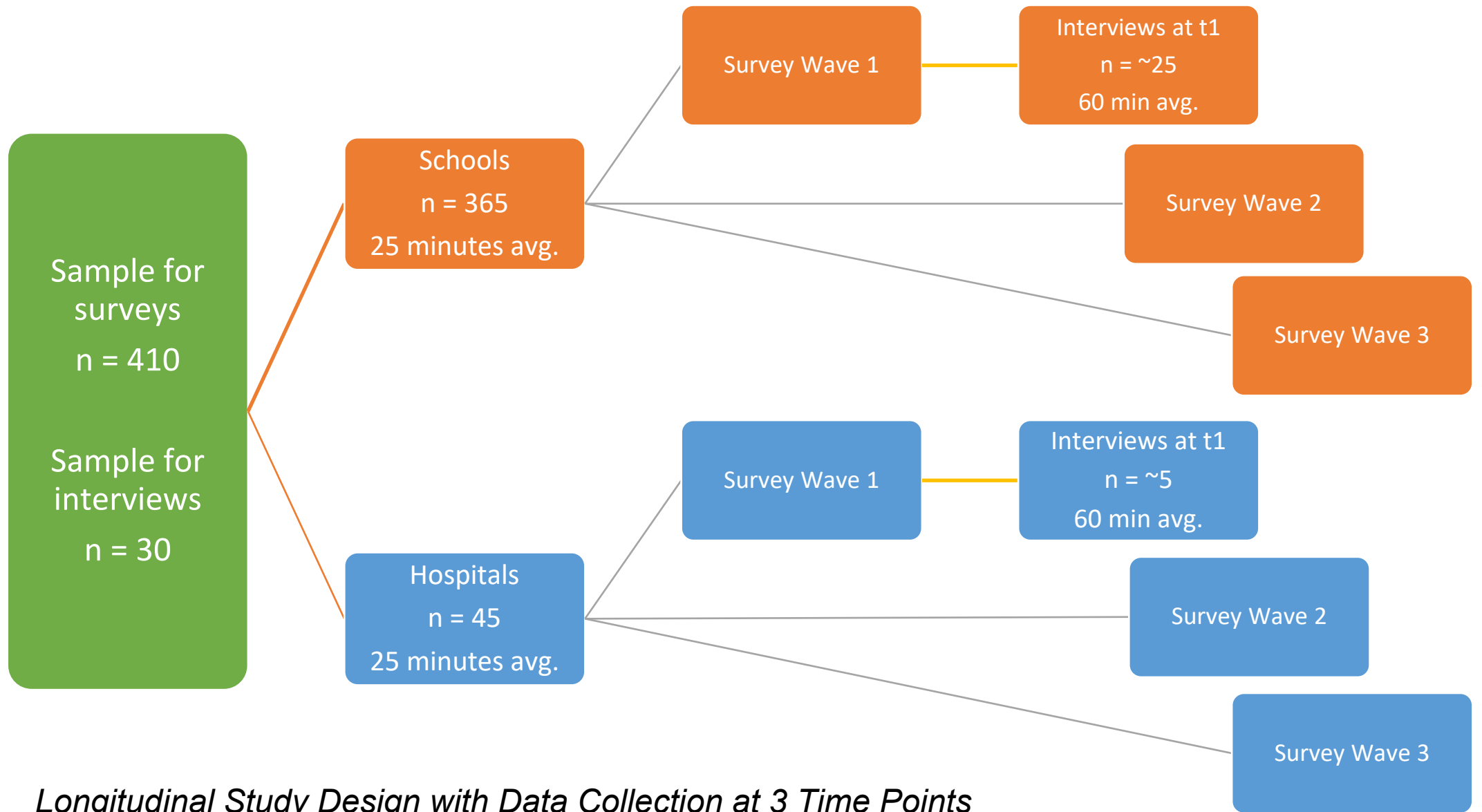
Background: Study Areas

- This project includes 4 regions common across all NIST Hurricane Maria Program projects plus the municipio of Mayagüez where Hospital Bella Vista is located
- For this project, all sampling conducted using ZIP code to allow for linkages across NWIRP study



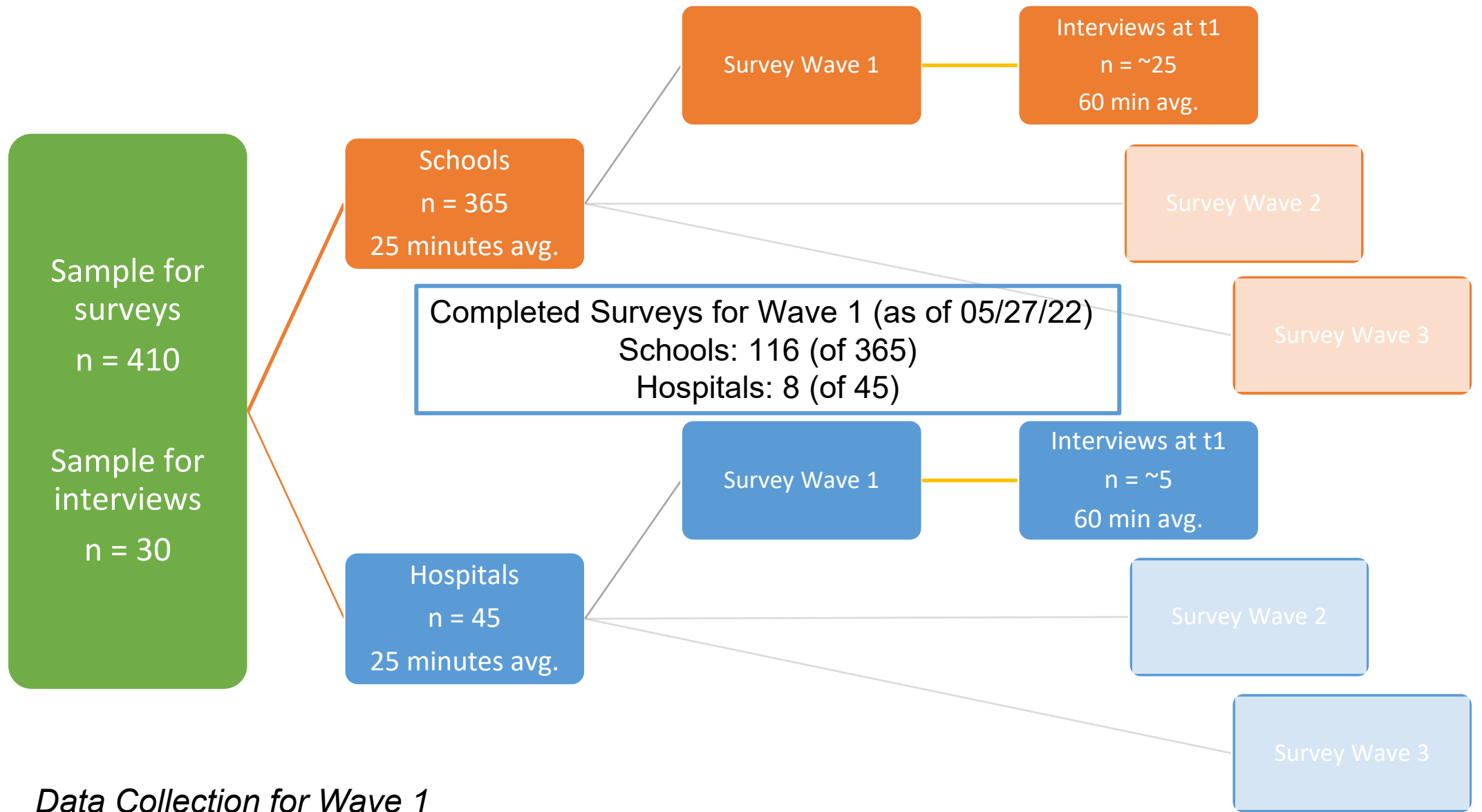
Data Source: US Census Bureau TIGER/Line 2016, FEMA 2017
Developed: NIST 2020; using ESRI software
Coordinate System: GCS NAD 1983
Datum: NAD 1983
Scale: 1:700,000

Project Plans: Study Design



Longitudinal Study Design with Data Collection at 3 Time Points (Wave 1, Wave 2, Wave 3)

Project Plans: Study Design



Data Collection for Wave 1

Recent Progress 1/4

- Monthly and task specific meetings with survey and interview research services contractor since March 2020
- Completed pilot tests of Wave 1 survey (hospitals - Feb 2021 and schools - Aug 2021)
- Obtained approvals for revised Wave 1 survey instruments
 - NIST's Institutional Review Board (IRB) (Nov 2021); Office of Management and Budget (OMB) Paperwork Reduction Act (PRA) (Sept 2021); PR Department of Education annual renewal (Mar 2022)
- Wave 1 survey data collection began Dec 2021
- Obtained approvals for Wave 1 interview instruments
 - NIST's IRB (May 2022); OMB PRA (Mar 2022)
- Wave 1 interview data collection to begin Summer 2022
- Maintaining flexible data collection modes due to dynamic COVID-19 case rates

Recent Progress 1/4

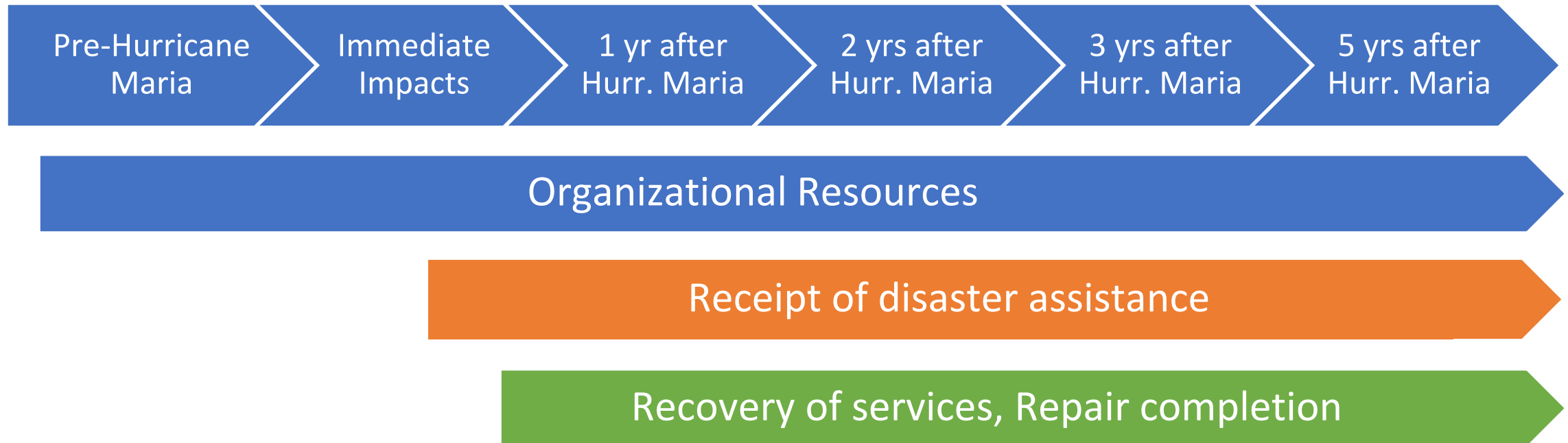
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Recent Progress 2/4

- Codebook for Wave 1 Survey developed and applied
- Data analysis plan developed, including statistical and geospatial analyses
- Analyses of pilot data conducted
- Final report sections drafted (literature review, background, methods)



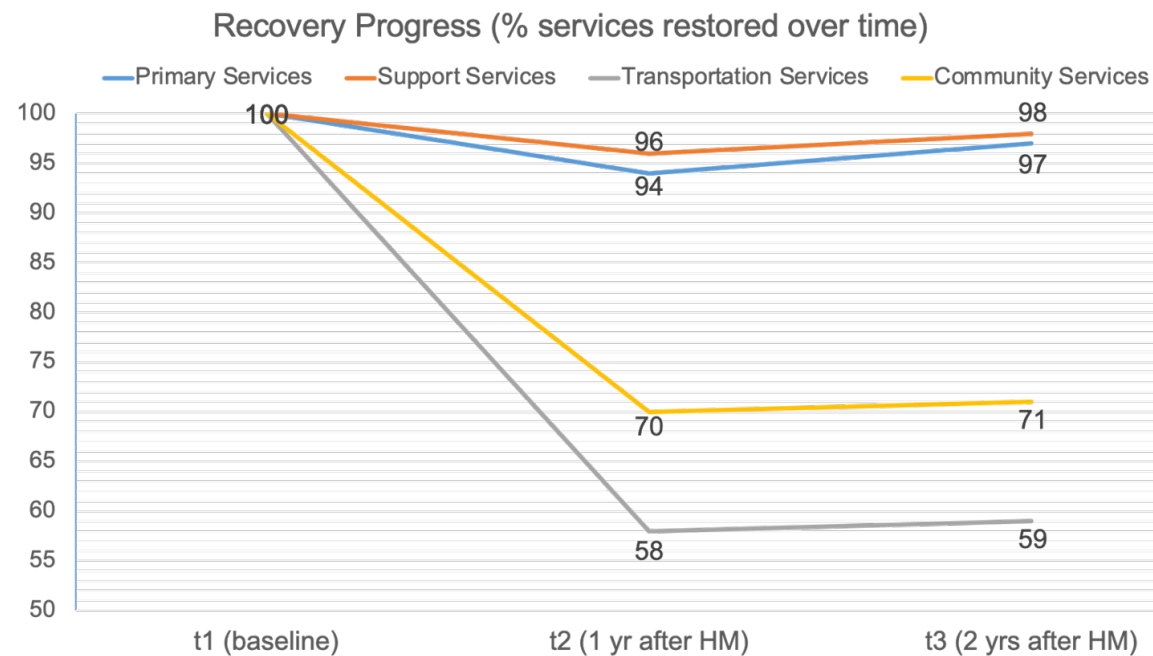
Recent Progress 3/4

Example of pilot test results for schools and hospitals

Recovery Progress	+ One year after Hurricane Maria	+ Two years after Hurricane Maria
Percentage of primary services restored (n=11)	94% (SD 18%)	97% (SD 6%)
Percentage of support services restored (n=10)	96% (SD 10%)	98% (SD 4%)
Percentage of transportation services restored (n=10)	58% (SD 50%)	59% (SD 51%)
Percentage of community services restored (n=10)	70% (SD 40%)	71% (SD 40%)

Notes: Results of pilot test only; n = 11 organizations

Preliminary analyses of pilot data only



- When looking at organizational types together, the slowest progress in restored services occurred with transportation.
- This highlights an interdependency that we can explore through the interviews as well as through the data collected in the Infrastructure Systems Project.

Recent Progress 4/4

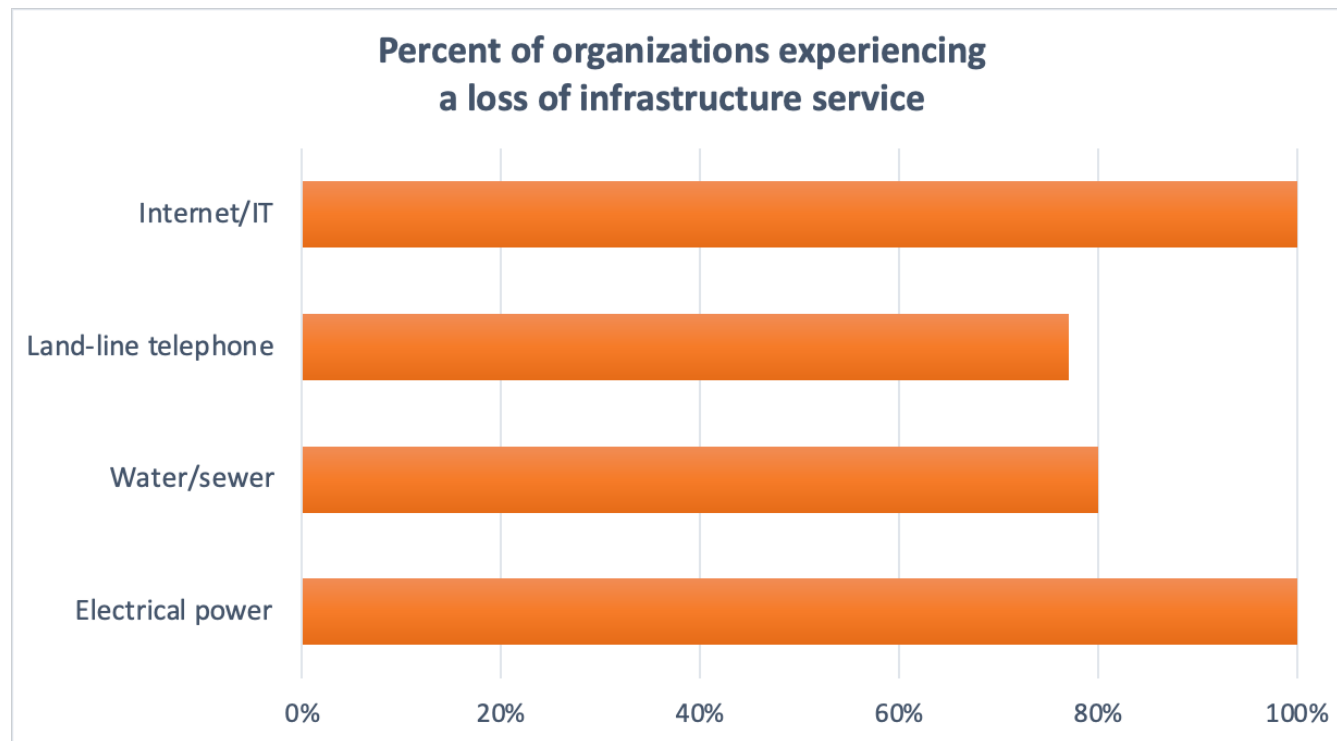
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Example of pilot test results for schools and hospitals

For any of the following, did your organization ...	experience loss?	have backup prior to Hurr. Maria?	use backup after Hurr. Maria?
Electrical power	100%	63%	54%
Water/sewer	80%	60%	80%
Land-line telephone	77%	25%	29%
Internet/IT	100%	0%	33%

Notes: Results of pilot test only; n = 11 organizations

- When looking at organizational types together, only slightly more than half had some form of backup for power and water and only a quarter had a form of backup for landline telephone.
- The full results will help identify how backup systems, when present and operational, supported recovery and what differences existed for those who had backups in place ahead of the event.



Next Steps

- Complete full survey and interview data collection for Wave 1
- Conduct preliminary analysis of Wave 1
- Obtain approvals needed for Wave 2 data collection
- Launch Wave 2 survey



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Recovery of Social Functions Project

Project Leader: Maria Dillard

Project Team: Jarrod Loerzel (NIST), Kelly Jean Anderson (PREP Research Associate, University of Maryland)



Questions?

**Please 'raise your hand' using the Blue Jeans
Participant window and unmute your audio and video**