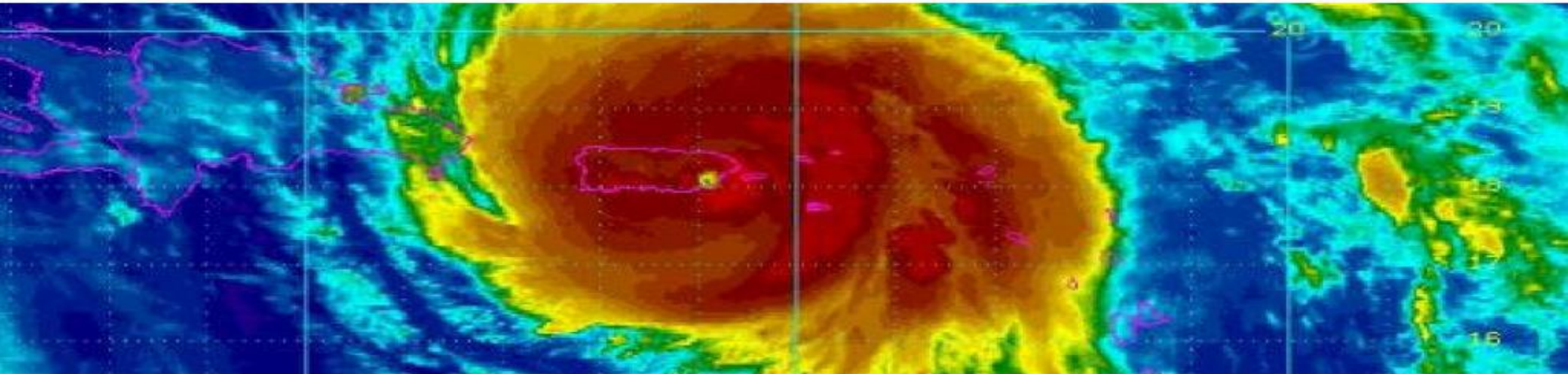


# HURRICANE MARIA CAPACITY BUILDING PROGRAM



FEMA



Obtaining and Presenting Data

Hector Segarra, JD, MAEE, CRA

# Overview: Obtaining and Presenting Data

- Working with Data: What and Why
  - Persuasion - Telling a story
  - Data Analysis
  - Quantitative and Qualitative Data
- Where to obtain data?
  - Census data
  - openFEMA
  - PR Institute of Statistics
  - Government documents
  - Questionnaires and Interviews
- Presenting your Data
  - Data visualization
  - Working with Excel to present your data

# Terminology

- What is **Data Analysis**?
  - “Data analysis is the process of systematically examining data with the purpose of spotlighting useful information.”
- Why is it important?
  - Supporting your claims
  - Informing the design of your program
  - Determining program impact
  - Measuring quality
  - Communicating results
- Your data analysis can use quantitative or qualitative data.

# Terminology

- What is **Quantitative Data**?
  - Measurable information.
  - Analysis involves statistical techniques.
  - Data collection performed via measuring instruments.
  - Most government reports and planning documents rely on it.
  - Lends itself to communication through charts and graphs.

# Terminology

- What is **Qualitative Data**?
  - Information that can be observed but can't be measured.
  - Described in natural language.
  - Analysis can be more time consuming, and involves organizing, coding, and establishing themes.
  - Data Collection performed via observation and interviews.
  - Lends itself to working with smaller populations.

# Data Validity

## Threats to Data Analysis Validity:

- Unreliable Data Elements
- Incorrect Analysis
- Incorrect Data Elements

## Internal Validity:

- Cause and Effect
- Observation Effects
- Maturation
- Group Selection
- Mortality / Persistence

# Data Collection

## Considerations:

- Anticipate how you will analyze your data.
- Ensure coherence between research questions, data collection methods, and data analysis.
- Consider the time and resources you have available.

## Secondary Data:

- Large-scale surveys such as censuses provide low-cost and high-quality datasets, democratizing research and access to valuable information that can make NGO and municipal proposals more persuasive.

# Obtaining Data

## Sources:

- The U.S. Census Bureau – ACS, PRCS
- OpenFEMA
- Sociedad Puertorriqueña de Planificación
- Estadísticas.PR
- Government Documents



# Census Data



- Census data is used to calculate funding levels and appropriations in Federal programs.
- Every 10 years, the U.S. Census Bureau conducts a census to determine the number of people living in the United States.
- The Decennial Census and the American Community Survey (ACS) are part of the Decennial Census Program of the U.S. Census Bureau.
- Since 2005, data that was collected once every 10 years is collected monthly (and released annually) through the ACS.

# American Community Survey

- Provides detailed population and housing information for the US and Puerto Rico through continuous measurement.
- It uses a series of monthly samples to produce annually updated estimates for the same small areas (census tracts and block groups) formerly surveyed via the decennial census long-form sample.
- New small-area statistics now are produced annually. The Census Bureau also will produce 3-year and 1-year data products for larger geographic areas.
- The ACS is conducted throughout the United States and in Puerto Rico, where it is called the Puerto Rico Community Survey (PRCS).

# ACS: Puerto Rico

- Puerto Rico data is updated annually. A portrait of our communities can be obtained through ACS 1-year and 5-year estimates.
- Municipalities with a population over 65,000 have 1-year estimates available.
- All 78 municipalities have 5-year estimates available, which are updated annually.
- When selecting your estimate, you might have to consider whether your priority is the sample currency or its size/reliability/precision.
- <https://censo.estadisticas.pr/EncuestaComunidad>

# State Data Center de Puerto Rico (SDC-PR)

## Perfiles municipales de la Encuesta sobre la Comunidad de Puerto Rico

Para cada Municipio y Puerto Rico encontrará las características seleccionadas de los siguientes tópicos: demográficos, sociales, económicos y de la vivienda.

Municipio	Documento
Puerto Rico	 Encuesta sobre la Comunidad 2012-2016  Encuesta sobre la Comunidad 2011-2015  Encuesta sobre la Comunidad 2010-2014
Adjuntas	 Encuesta sobre la Comunidad 2012-2016  Encuesta sobre la Comunidad 2011-2015  Encuesta sobre la Comunidad 2010-2014
Aguada	 Encuesta sobre la Comunidad 2012-2016  Encuesta sobre la Comunidad 2011-2015  Encuesta sobre la Comunidad 2010-2014
Aguadilla	 Encuesta sobre la Comunidad 2012-2016  Encuesta sobre la Comunidad 2011-2015  Encuesta sobre la Comunidad 2010-2014
Aguas Buenas	 Encuesta sobre la Comunidad 2012-2016  Encuesta sobre la Comunidad 2011-2015  Encuesta sobre la Comunidad 2010-2014

Subject	Aguadilla Municipio, Puerto Rico			
	Estimate	Margin of Error	Percent	Percent Margin of Error
<b>SEX AND AGE</b>				
Total population	56,893	*****	56,893	(X)
Male	27,711	*****	48.7%	*****
Female	29,182	*****	51.3%	*****
Under 5 years	2,813	*****	4.9%	*****
5 to 9 years	3,405	+/-310	6.0%	+/-0.5
10 to 14 years	3,587	+/-310	6.3%	+/-0.5
15 to 19 years	4,028	*****	7.1%	*****
20 to 24 years	3,803	*****	6.7%	*****
25 to 34 years	7,011	*****	12.3%	*****
35 to 44 years	7,254	*****	12.8%	*****
45 to 54 years	7,212	*****	12.7%	*****
55 to 59 years	3,302	+/-316	5.8%	+/-0.6
60 to 64 years	3,899	+/-316	6.9%	+/-0.6
65 to 74 years	6,354	*****	11.2%	*****
75 to 84 years	3,288	+/-174	5.8%	+/-0.3
85 years and over	937	+/-174	1.6%	+/-0.3
<p>▶ <b>CARACTERÍSTICAS DEMOGRÁFICAS</b>   CARACTERÍSTICAS SOCIALES   CARACTERÍSTICAS ECONÓMICA</p>				

# ACS Subjects: Social

- Ancestry
- Citizen Voting-Age Population
- Citizenship Status
- Disability Status
- Educational Attainment
- Fertility
- Grandparents as Caregivers
- Language Spoken at Home
- Marital History
- Marital Status
- Migration/Residence 1 Year Ago
- Place of Birth
- School Enrollment
- Undergraduate Field of Degree
- Veteran Status; Period of Military Service
- Year of Entry

# ACS Subjects: Housing

- Bedrooms
- Computer and Internet Use
- House Heating Fuel
- Kitchen Facilities
- Occupancy/Vacancy Status
- Occupants per Room
- Plumbing Facilities
- Rent
- Rooms
- Selected Monthly Owner Costs
- Telephone Service Available
- Tenure (Owner/Renter)
- Units in Structure
- Value of Home
- Vehicles Available
- Year Householder Moved Into Unit
- Year Structure Built

# ACS Subjects: Economic

- Class of Worker
- Commuting (Journey to Work) and Place of Work
- Employment Status
- Food Stamps/Supplemental Nutrition Assistance Program (SNAP)
- Health Insurance Coverage
- Income and Earnings
- Industry and Occupation
- Poverty Status
- Work Status Last Year



# ACS Subjects: Demographic

- Age
- Sex
- Group Quarters Population
- Hispanic or Latino Origin
- Race
- Relationship to Householder
- Total Population

# OpenFEMA

- “OpenFEMA is an authoritative source for FEMA's public data, which has been released as part of the Open Government Initiative. [Includes] information on public assistance funded projects, public assistance applicants, hazard mitigation grants, and disaster declarations.” – ProgrammableWeb.com

## Collections:

- FEMA Datasets
- FEMA Library

<https://www.fema.gov/openfema>



# FEMA

# OpenFEMA

OpenFEMA delivers mission data to the public in machine readable formats.

➤ [Expand All Sections](#)

---

➤ [Mission](#)

---

➤ [Goals](#)

---

▼ [Data](#)

---

OpenFEMA provides data in machine readable formats through API's and downloadable content that can be accessed from the following pages:

- [FEMA Datasets](#)
- [FEMA Library](#)

Developers:

FEMA offers some of its public data in machine readable format via an Application Programming Interface (API). [Click here to access FEMA's developer resources](#) and read the [API terms & conditions](#).

If you have ideas or suggestions email [openfema@fema.dhs.gov](mailto:openfema@fema.dhs.gov).

# OpenFEMA

## Housing Assistance Data


- <https://www.fema.gov/media-library/assets/documents/34758>

### Housing Assistance Data

This dataset lists aggregated, non-PII data of FEMA Housing Assistance Program primarily composed of data from Housing Assistance Program reporting authority from FEMA registration renters and owners within the state, county, zip where the registration is valid. The data is divided into data for renters and data for property owners. Additional core data elements include: number of applicants, county, zip code, severity of damage, owner or renter. Data is self-reported and as such is subject to human error. To learn more about disaster assistance please visit <http://www.fema.gov/what-disaster-assistance>.



[OpenFEMA](#) 

		Size	Publication Date
	<a href="#">FEMA Housing Assistance Program Data</a>	5.21M	

# OpenFEMA

## Individual Assistance Open Disaster Statistics


- <https://www.fema.gov/media-library/assets/documents/132213>

### Individual Assistance Open Disaster Statistics

Individual Assistance (IA) is provided by the Federal Emergency Management Agency (FEMA) to individuals and families who have sustained losses due to disasters. Homeowners, renters and business owners in designated counties who sustained damage to their homes, vehicles, personal property, businesses or inventory as a result of a federally declared disaster may apply for disaster assistance. Disaster assistance may include grants to help pay for temporary housing, emergency home repairs, uninsured and underinsured personal property losses, and medical, dental and funeral expenses caused by the disaster, along with other serious disaster-related expenses.

This data contains aggregate statistics on IA program registrants in a number of human categorization and program eligibility subjects areas. One way this data could be used is to analyze FEMA's IA program response attributes to help shape future assistance.

[OpenFEMA](#) 

		Size	Publication Date
	<a href="#">Individual Assistance Open Disaster Statistics</a>	0.88M	

# OpenFEMA

## OpenFEMA - Individual Assistance Data - Open Disaster Statistics

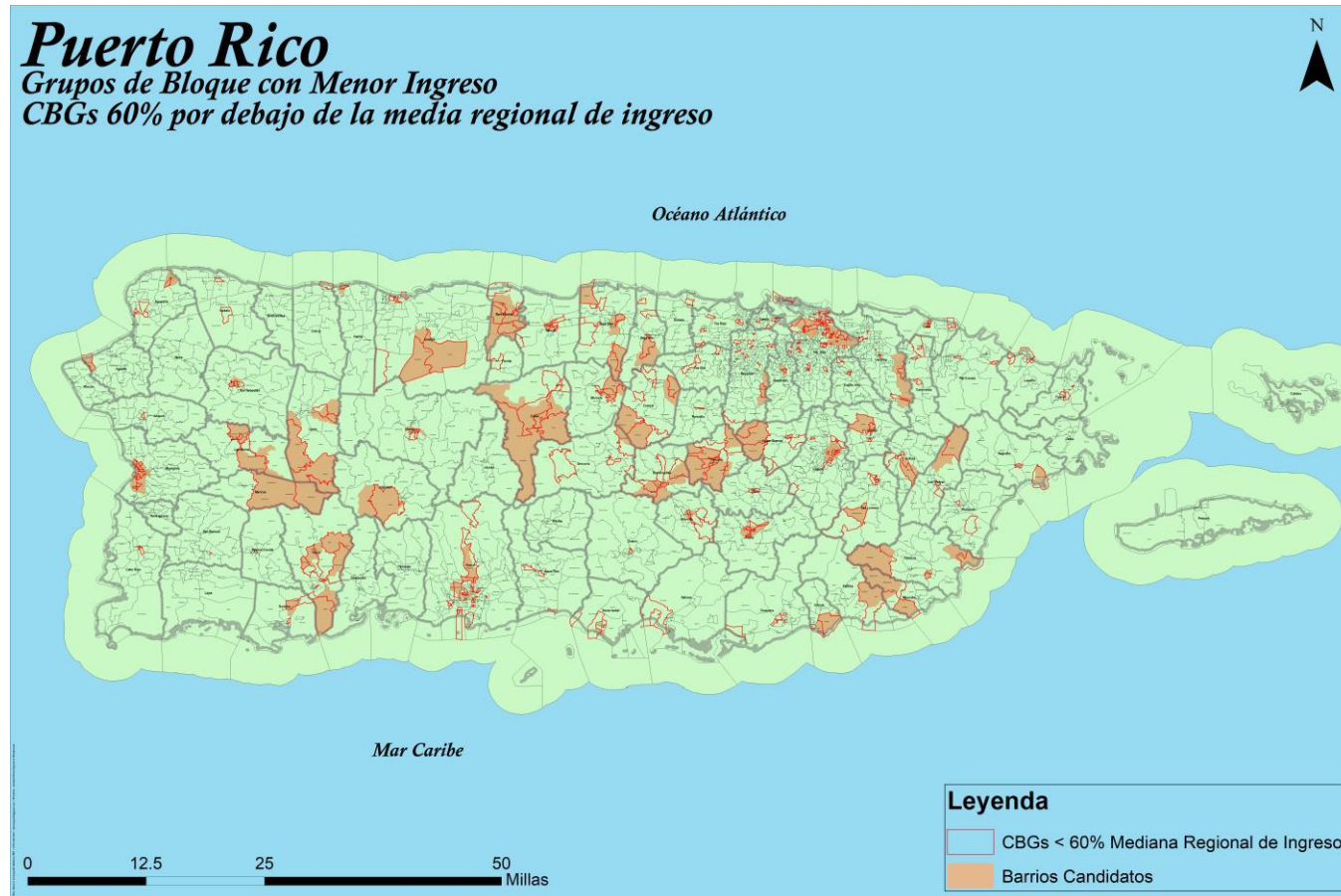
Data As Of: 10/1/18

Disaster Number	State	Declaration Date	County/Parish	Zip	Valid Regs	Occupants Under Two	Occupants Two to Five	Occupants 5 to 18	Occupants 19 to 64	Occupants 65 and Older	Home Damage	AFN	Utilities Out
4339	PR	9/20/2017	Adjuntas (Municipio)	00106	5	0	0	5	5	0	0	0	5
4339	PR	9/20/2017	Adjuntas (Municipio)	00601	5,661	237	396	2,160	7932	2,189	3,735	126	5,318
4339	PR	9/20/2017	Adjuntas (Municipio)	00603	5	0	0	0	5	5	5	0	5
4339	PR	9/20/2017	Adjuntas (Municipio)	00607	5	0	0	5	5	5	5	0	5
4339	PR	9/20/2017	Adjuntas (Municipio)	00610	5	0	0	0	0	5	5	0	5
4339	PR	9/20/2017	Adjuntas (Municipio)	00612	5	0	0	0	5	0	5	0	5
4339	PR	9/20/2017	Adjuntas (Municipio)	00624	5	0	0	0	5	0	0	0	5
4339	PR	9/20/2017	Adjuntas (Municipio)	00629	5	0	0	0	5	0	0	0	5
4339	PR	9/20/2017	Adjuntas (Municipio)	00631	35	5	6	16	59	12	25	5	33
4339	PR	9/20/2017	Adjuntas (Municipio)	00641	5	0	0	5	5	0	5	0	5
4339	PR	9/20/2017	Adjuntas (Municipio)	00656	5	0	0	0	5	5	0	0	5
4339	PR	9/20/2017	Adjuntas (Municipio)	00669	5	5	5	5	5	0	5	0	5
4339	PR	9/20/2017	Adjuntas (Municipio)	00701	5	0	0	0	5	0	5	0	0
4339	PR	9/20/2017	Adjuntas (Municipio)	00716	5	0	0	5	5	0	5	0	5

Hurricane María Disaster Number: 4339

# Sociedad Puertorriqueña de Planificación

<http://spp-pr.org/>



[junta@spp-pr.org](mailto:junta@spp-pr.org)

# Estadísticas.PR

<https://estadisticas.pr/>

## Inventario de Estadísticas



Ambientales



Ciencia y  
Tecnología



Demografía



Económicas



Educación



Otras sociales



Salud



Servicios  
Sociales



Trabajo



Viviendas



Datos del huracán María





# Estadísticas.PR

<https://estadisticas.pr/en/datos-del-huracan-maria>

## Datos del huracán María

El Instituto de Estadísticas de Puerto Rico creó esta sección sobre datos del Huracán María con el propósito de proveer una plataforma para la aglomeración de datos confiables para antes, durante y después del paso del huracán sobre Puerto Rico. De esta manera, desde un solo portal electrónico se pueda acceder la información que han estado produciendo las dependencias locales, estatales y federales, así también como diversas instituciones interesadas sobre el tema. Continuamente estaremos añadiendo información en esta sección.

- [Fuentes de Información](#)
- [Mapas Interactivos](#)

Tel. (787)-993-3336

E-mail: [preguntas@estadisticas.pr](mailto:preguntas@estadisticas.pr)

# Inventario de Estadísticas

Mostrando 1 - 6 de 6

## Tema

1 - Estadísticas sociales, demográficas y conexas

-1.1 - Servicios sociales

-1.2 - Estadísticas demográficas

--1.2.1 - Estadísticas de población

--1.2.2 - Estadísticas vitales

--1.2.3 - Estadísticas de migración

-1.3 - Estadísticas de viviendas

--1.3.3 - Número y características de los ocupantes de locales de habitación

--1.3.4 - Estimaciones nacionales de necesidades de vivienda para diversos períodos

## Entidad

- Any -

## Título

Pre-Acreditado

Items per page

# TRANSFORMATION AND INNOVATION IN THE WAKE OF DEVASTATION

AN ECONOMIC AND DISASTER RECOVERY PLAN  
FOR PUERTO RICO

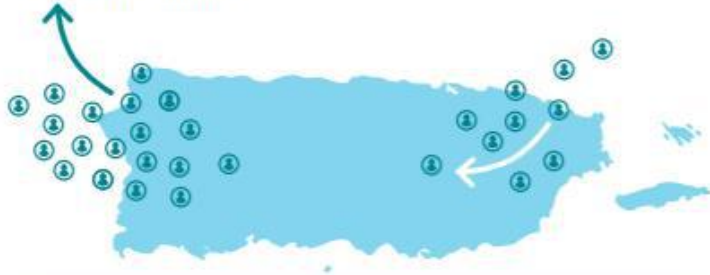


# A snapshot of Puerto Rico's demographics and income



## Demographics (2016)

In a 10-year period (2006–2016), people have moved to Puerto Rico but many more have left, for a net loss of **525,000 residents**

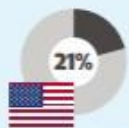


There is a shortage of **professional workers** in many sectors and fewer **school-aged children**

**1.2 births** per woman vs. 1.84 in the U.S. overall



Roughly **25 percent** of Puerto Rico's 3.4 million residents are **60 or older**



By comparison, roughly **21 percent** of the United States as a whole is **60 or older**

## Race and Ethnicity (2017)

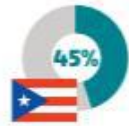
- 98%** self-identify as **Hispanic/Latino**
- Roughly **69%** self-identify as **white**
- 9%** self-identify as **black or African-American**
- 7%** self-identify as **2 or more races**



## Income (2016)

Median per capita income is **\$11,688**

**40%** participate in the **labor force**



**45%** of Puerto Ricans live below the **federal poverty level**



**21%** of Mississippi residents live below the **federal poverty level** (the poorest U.S. state)

**Poverty is worse** among minors (**57%**) and those older than 65 (about **40%**)



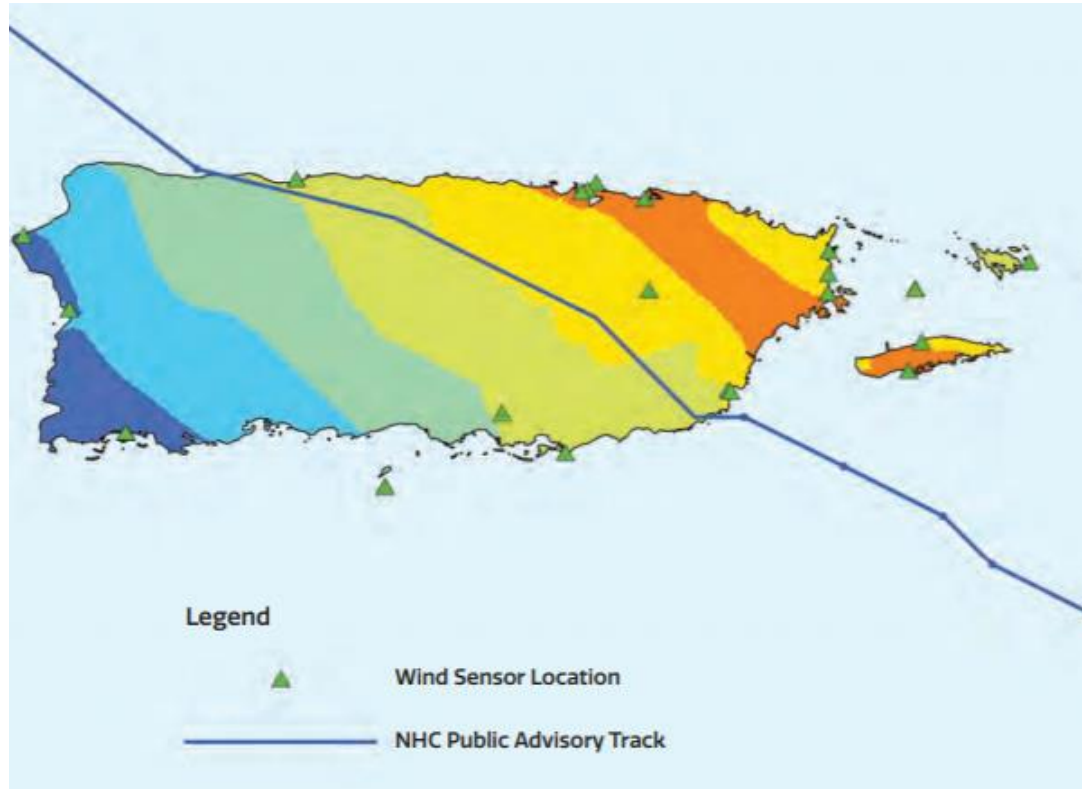
Nearly **25%** of Puerto Ricans **receive Social Security**



Less than **19%** of residents in the U.S. overall **receive Social Security**

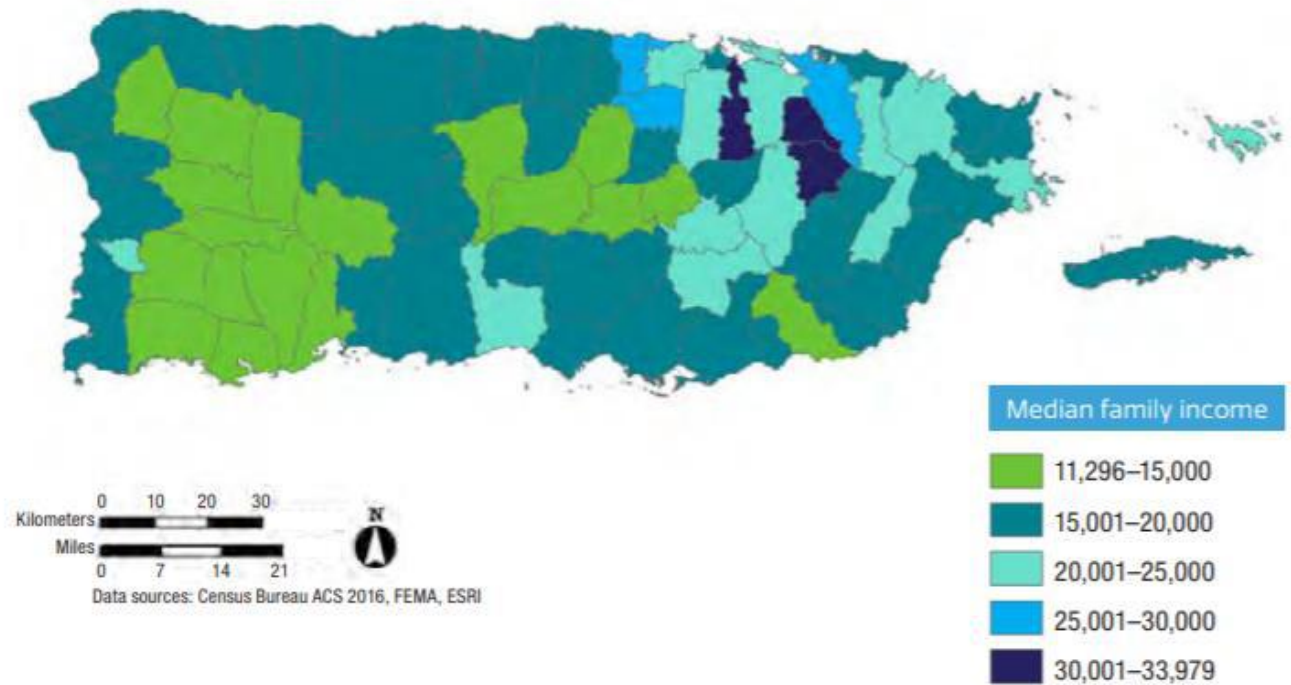
Report Page 20





## Report Pages 30 and 38

Median family income in Puerto Rico (2016 American Community Survey)



## Hurricane damage

### FATALITIES

According to initial reports, **64 lives** were lost. The official number is being reviewed as part of a study under way by George Washington University.

### HOUSING

**527,000 households** that registered with FEMA indicated they had property damage.  
**197,000 renter households** indicated damage to personal property (e.g., cars, TVs, clothing).

Number of Individual Assistance registrants with damage to structures or personal property:



Most properties were **not insured**.

## After the hurricanes

The data reveal that there were **1,427** more deaths in the four months after the hurricanes than normal (based on the previous four years) that may or may not be attributable to the hurricanes.

Estimates from other studies range from about 800 to 8,500 deaths from delayed or interrupted health care.

Total damage to all dwellings: **\$33.9B**

Disbursements (as of 5/14/18)

FEMA: **\$517M** in structure repair for owner-occupied homes

FEMA: **\$402M** for personal property

SBA home loans: **\$1.2B**

Homeowners insurance: **\$358M**

A lack of accurate ownership records meant that many homeowners were not eligible for federal assistance.



### EDUCATION

**38-44 schools** were closed permanently by structural damage.



An estimated **1,075 of 1,112 K-12 schools** had reopened by December 2017.

### SOCIAL SERVICES

Households that applied for assistance: **90% of 1.23M**

### HEALTH

**5 of 16 outpatient clinics** administered by the Puerto Rico Department of Health were damaged.  
**20 of 92 federally qualified health centers** were damaged.

**11% of federally qualified health centers** have limited or no grid power.

- **3** health centers have intermittent power and use generators for backup.
- **5** lack power and rely solely on generators.
- **1** is now using solar power.

Business and employment losses are based on projections (using pre-storm data) of what conditions would have been like without the storm. Agricultural losses were estimated and reported by the Puerto Rico Department of Agriculture.

## BUSINESS

### LOSSES FROM THE HURRICANE

Agricultural production: **\$227 million**

Agricultural infrastructure: **\$1.8 billion**

Tourism: **\$547 million** in direct revenue

Trade: Large impacts on exports; imports reflect the response and recovery effort



Many sectors (e.g., tourism and trade) lag pre-hurricane levels despite an uptick in traveler counts and value of exports.

## EMPLOYMENT

Average private payroll employment in the 3 months after the hurricanes: **-4.35%**

Average manufacturing payroll employment in the 3 months after the hurricanes: **-1.27%**

The **overall workforce decreased** in both the number of people employed and the number of people in the labor force.

The hurricanes **accelerated the trend of residents moving away from the Island** to the U.S. mainland.

Employment (and wages) lag pre-hurricane levels.





	FEMA			HUD		DHHHS	DHS	DOC	DoD	Energy	DOI	DOL	DOT	Education	EPA	FCC	NOAA	NSF	SBA	Treasury	USDA	VA	Non-U.S. Govt.
	IA	PA	HMGP	FEMA (Other)	CDBG-DR																		
COMMUNICATIONS/I.T.																							
COMMUNITY/CAPACITY																							
ECONOMY																							
EDUCATION																							
ENERGY																							
HEALTH/SOCIAL SERVICES																							
HOUSING																							
MUNICIPALITIES																							
NATURAL/CULTURAL RESOURCES																							
PUBLIC BUILDINGS																							
TRANSPORTATION																							
WATER																							

# Potential Federal Funding Sources

## Report Page 170



# Questionnaires

## Uses:

- Exploration
- Description
- Feedback

## Questions:

- Open-ended
- Short response
- Likert scale
- Multiple choice

## Administration:

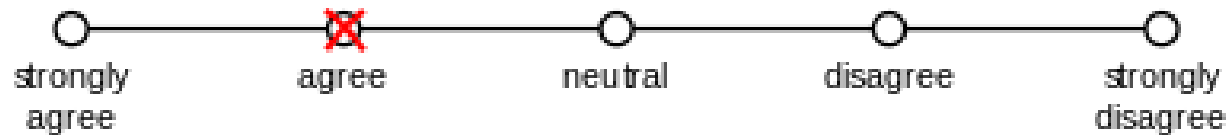
- Paper vs Computer
- Face-to-face or phone

# Questionnaires

- Exploratory – collect information, begin to define a problem
- Description – representative samples (Census)
- Feedback – for improvement

## Questions:

- Open-ended: “What did you like about \_\_\_\_\_?”
- Short answer: “How do you feel about \_\_\_\_\_?”
- Likert scale: 1. The website has a user friendly interface.



- Multiple choice

# Questionnaires

- Paper-based – simpler administration; more difficult data entry and analysis
- Computer-delivered – economic and easy to scale up; limited by need for respondent access to technology
- Face-to-face and phone administration – can mitigate technology access limitations; could be off-putting to respondents; can be expensive and/or time-intensive

# Presenting Data

## Data Visualization

- Edward Tufte
- Design Principles

## Working with Excel

- Applying Tufte's principles to Excel graphs

# Data Visualization



Edward Tufte presenting in Dallas, Texas, May 2015.

Author: Keegan Peterzell

## Edward Tufte

- Pioneer of data visualization.
- Wrote *The Visual Display of Quantitative Information*.
- Key concept: the “data-ink ratio.”
  - “A large share of ink on a graphic should present data-information, the ink changing as the data change.”
  - “Data-ink is the non-erasable core of a graphic, the non-redundant ink arranged in response to variation.”

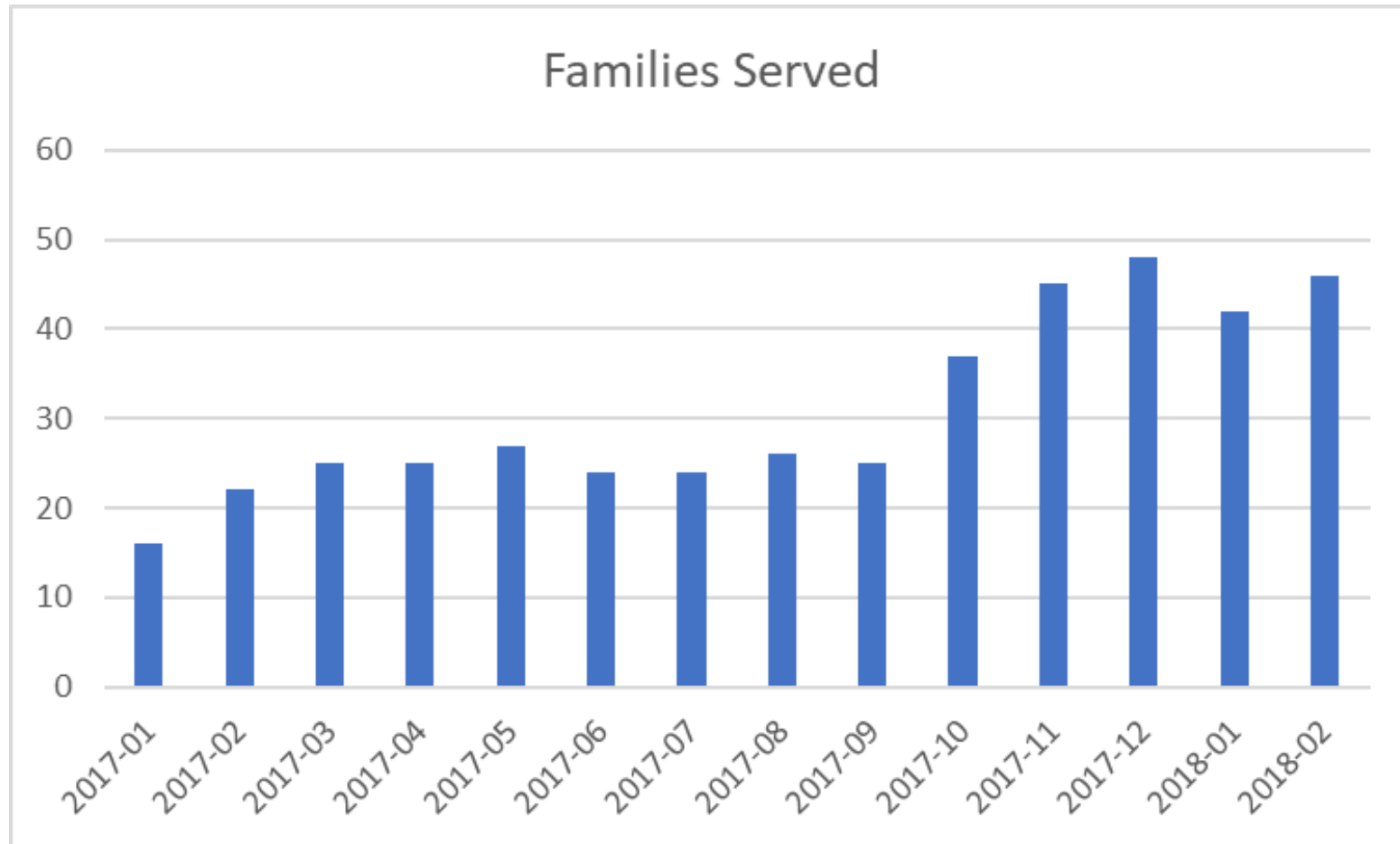
# Design Principles

- “Talk to my eye, not to my brain”
- “Less is more”
- “One chart = one takeaway”
- “Tell a story”

Good Ol' Excel Is The Ultimate Data Visualization Tool (In Most Cases)

By Cyrille Vincey for Qunb.com

# Design Principles



## Design Principles

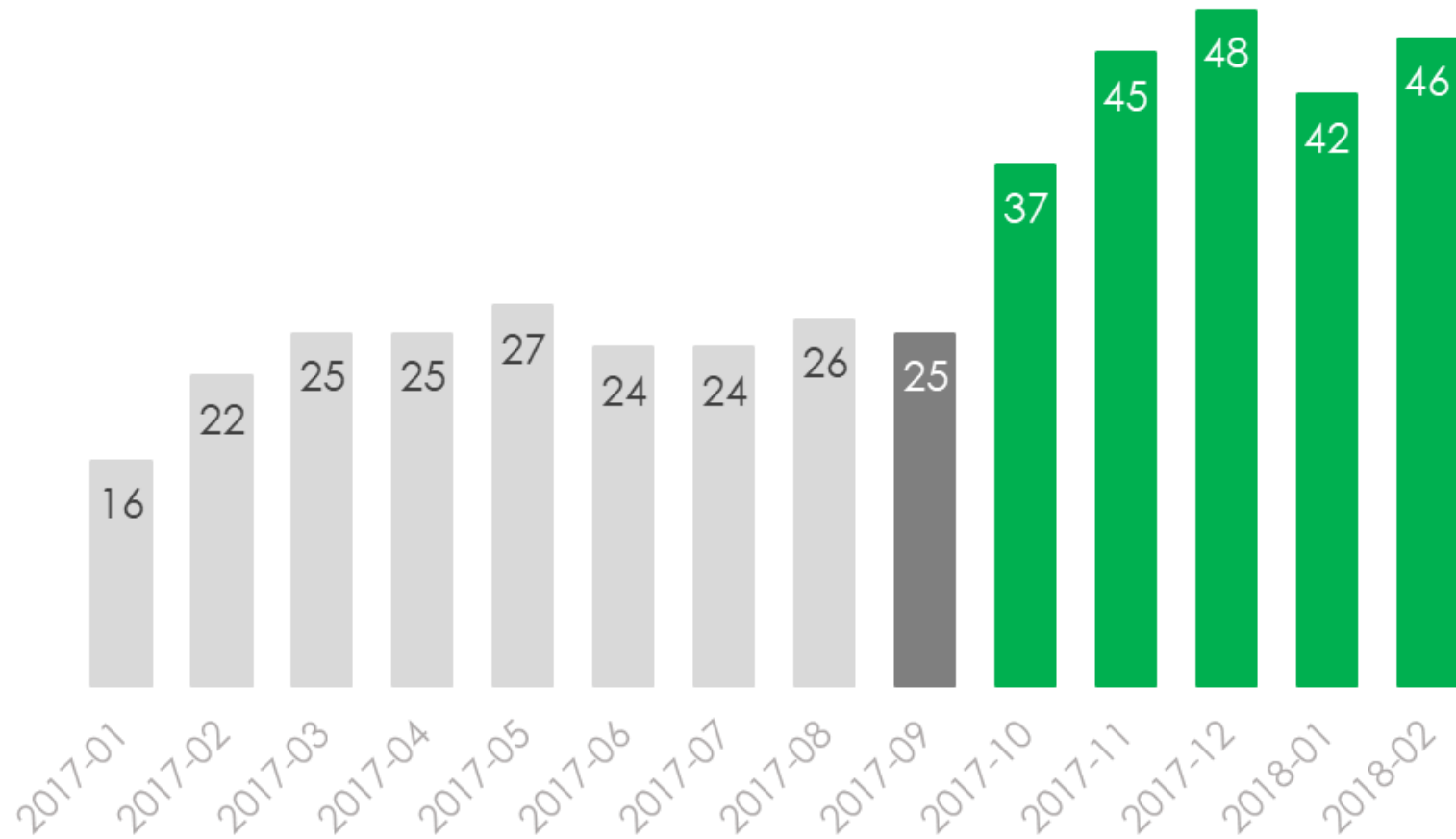


Figure 1. Drastic Increase of Families in Need of Assistance after Hurricane María's Landfall on 2017-09.



# Design Principles

1. “Delete all visual pollution” (includes the legend, the horizontal gridlines, and the Y axis.)
2. “Color set: one vivid color, and grays. No more.”
3. “Optimize the x axis”
4. “Add Data Labels”
5. “Delete useless labels”
6. “Add direct labelling to your chart”
7. “Add an explicit takeaway to your chart”
8. “Remove frames and borders”

Applied  
Principles

**Remove**  
to improve  
(the **data-ink** ratio)

Created by Darkhorse Analytics

[www.darkhorseanalytics.com](http://www.darkhorseanalytics.com)

Applied  
Principles

# Remove

to improve  
the **data tables** edition

Created by **Darkhorse Analytics**

[www.darkhorseanalytics.com](http://www.darkhorseanalytics.com)

# *Resources*

- <https://cyfar.org/qualitative-or-quantitative-data> - CYFAR.org
- Steiner, R. (2018) *Doing Good With Other People's Money: The Essential Guide To Winning Grants And Contracts For Nonprofits, Ngos, Educational Institutions, Municipalities, & Faith-based Organizations*. US: Hatherleigh Press
- Arthur, J., Waring, M., Coe, R., & Hedges, L. (Eds). (2012). *Research Methods & Methodologies in Education*. London: Sage Publications.

# *Resources*

- <http://www.p3.pr.gov/assets/pr-transformation-innovation-plan-congressional-submission-080818.pdf> - Puerto Rico Economic and Disaster Recovery Plan
- <http://spp-pr.org/> - Sociedad Puertorriqueña de Planificación
- <https://archive.li/P7D4Z> - “Good Ol’ Excel Is The Ultimate Data Visualization Tool (In Most Cases)”
- <https://estadisticas.pr/>
- <https://censo.estadisticas.pr/EncuestaComunidad>

# *Resources*

- <https://www.fema.gov/media-library/assets/documents/34758> – FEMA Housing Assistance Data
- <https://www.fema.gov/media-library/assets/documents/132213> – FEMA Individual Assistance Open Disaster Statistics
- [http://www.perceptualedge.com/articles/visual\\_business\\_intelligence/sometimes\\_we\\_must\\_raise\\_our\\_voices.pdf](http://www.perceptualedge.com/articles/visual_business_intelligence/sometimes_we_must_raise_our_voices.pdf)
- <https://community.mis.temple.edu/mis5208sp18/2017/04/22/edward-tufte-s-principles-of-graphical-integrity/>
- <https://www.darkhorseanalytics.com/blog/data-looks-better-naked>
- <https://www.darkhorseanalytics.com/blog/clear-off-the-table>

***For further questions and  
individual assistance:***

***cnde@uprm.edu***