



# Using Census Bureau Data and Enigma's Smoke Signals to Save Lives

October 13, 2016

Join by Phone: 1-800-779-3216  
Passcode: 4156946

# Overview and Speakers

- Background between City of New Orleans and Enigma collaboration
  - Chief Tim McConnell and Oliver Wise, City of New Orleans
- Overview of the American Community Survey
  - Gretchen Gooding, U.S. Census Bureau
- Overview and demonstration of Enigma's Smoke Signals
  - Mike Flowers and Jeremy Krinsley, Enigma
- How NFPA creates free tools and uses free data to find solutions at local level
  - Matt Hinds-Aldrich, National Fire Protection Association

# City of New Orleans Smoke Alarm Program

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**Chief Tim McConnell**

*Superintendent, New Orleans Fire Department*

**Oliver Wise**

*Office of Performance and Accountability, City of New Orleans*

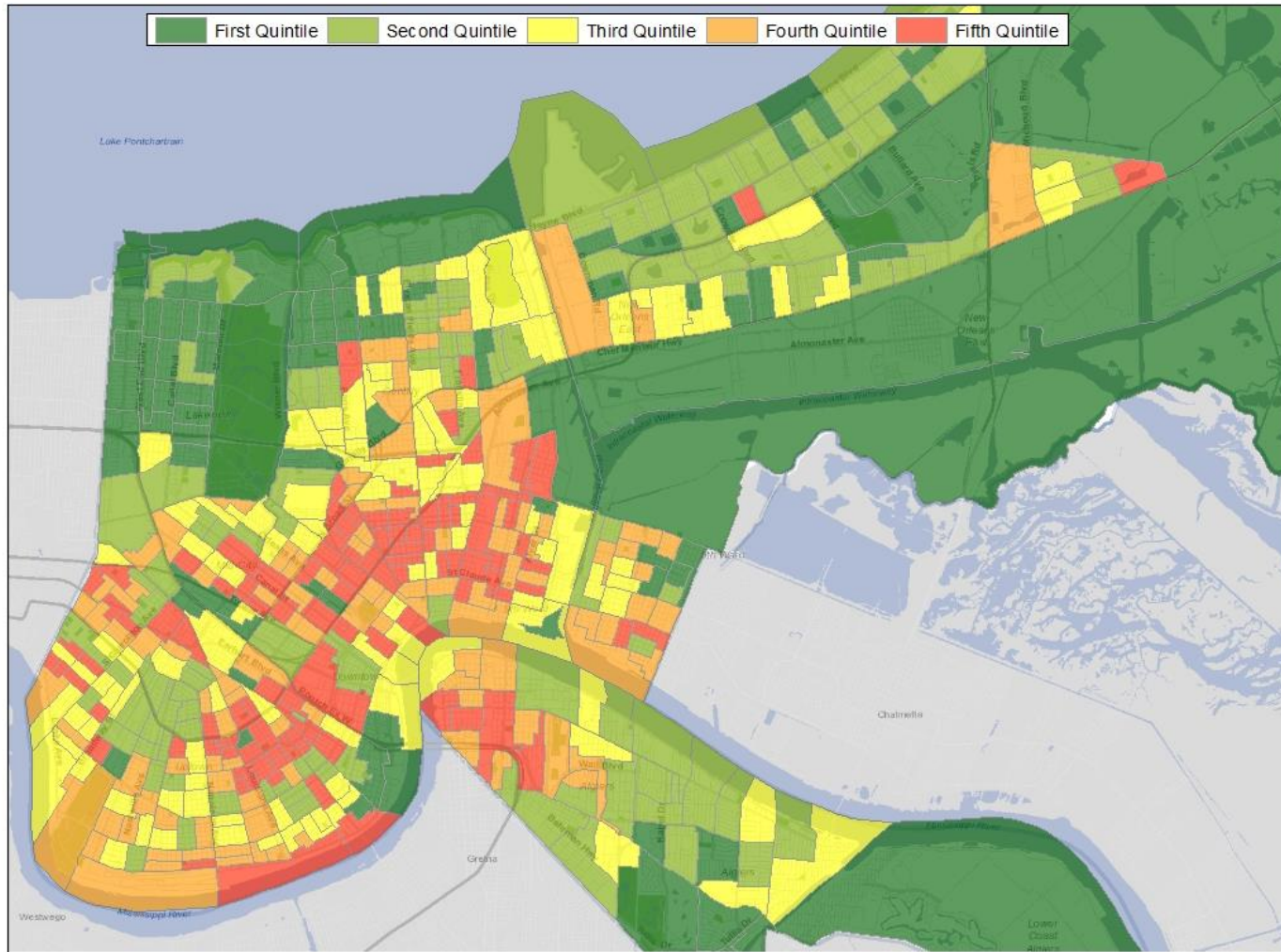


# Smoke Alarms Matter



CITY OF NEW ORLEANS

# Neighborhoods Most in Need



CITY OF NEW ORLEANS

# Approach

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- OPA creates a map for NOFD that identifies those areas of City that are:
  - Least likely to have a smoke alarm in their house
  - Most likely to suffer structure fire fatalities
- Analysis conducted by Dylan Knaggs (OPA)
- Technical assistance and peer review provided by Mike Flowers and Raluca Dragusanu (Enigma)





# Data Sources

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- American Housing Survey, 2011 (AHS)
  - Detailed survey regarding housing conditions
  - Data available at county/parish level
- American Community Survey, 2013 5-year estimate (ACS)
  - Data available at census block group level
- Census, 2010
- NOFD Administrative Data



# What homes are least likely to have smoke alarms?

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- American Housing Survey asks respondents whether or not they have a smoke alarm installed in their home
- Other variables asked in the survey correspond to questions in the ACS, which is available at more granular (census block group) level
- Approach: Use logistic regression where the presence of smoke alarm is the dependent variable and questions that are shared in the AHS and ACS are candidate independent variables





# Results of Regression Analysis

Variable	Significance level as sole variable in regression
Year structure was built	***
Year resident moved into house	**
Household income compared to poverty level	*
House has replacements/additions	*
Age of householder	*
Cost of replacements/additions	ns
Occupant rents house	ns

Significance codes: \*\*\* – 99% | \*\* – 95% | \* – 90% | ns – not significant at 90%

Notes: replacements/additions excluded due to data availability and directionality concerns. Age of householder excluded due to the variable already being accounted for by fatality risk.

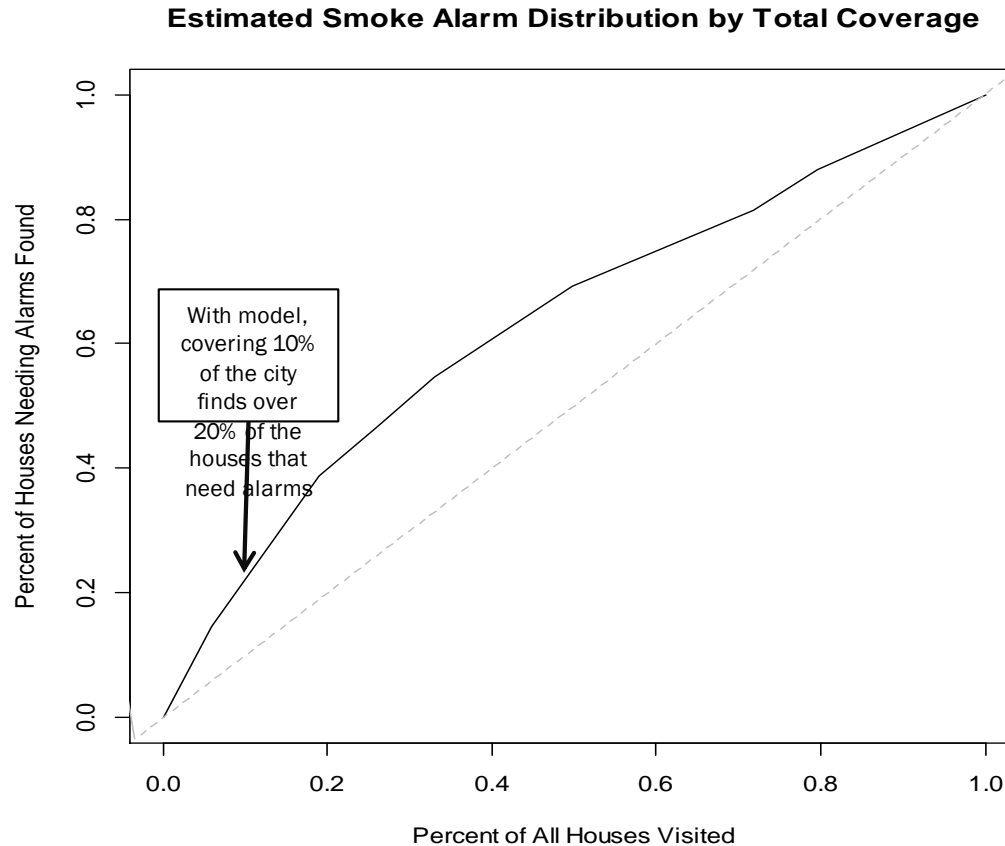
## Weights of Variables Chosen for Final Model

Weights chosen to correspond with regression coefficients

Structure Built Before 1950	Household Income <2x Poverty Level	Resident Moved Before 2000
1.00	.626	.546



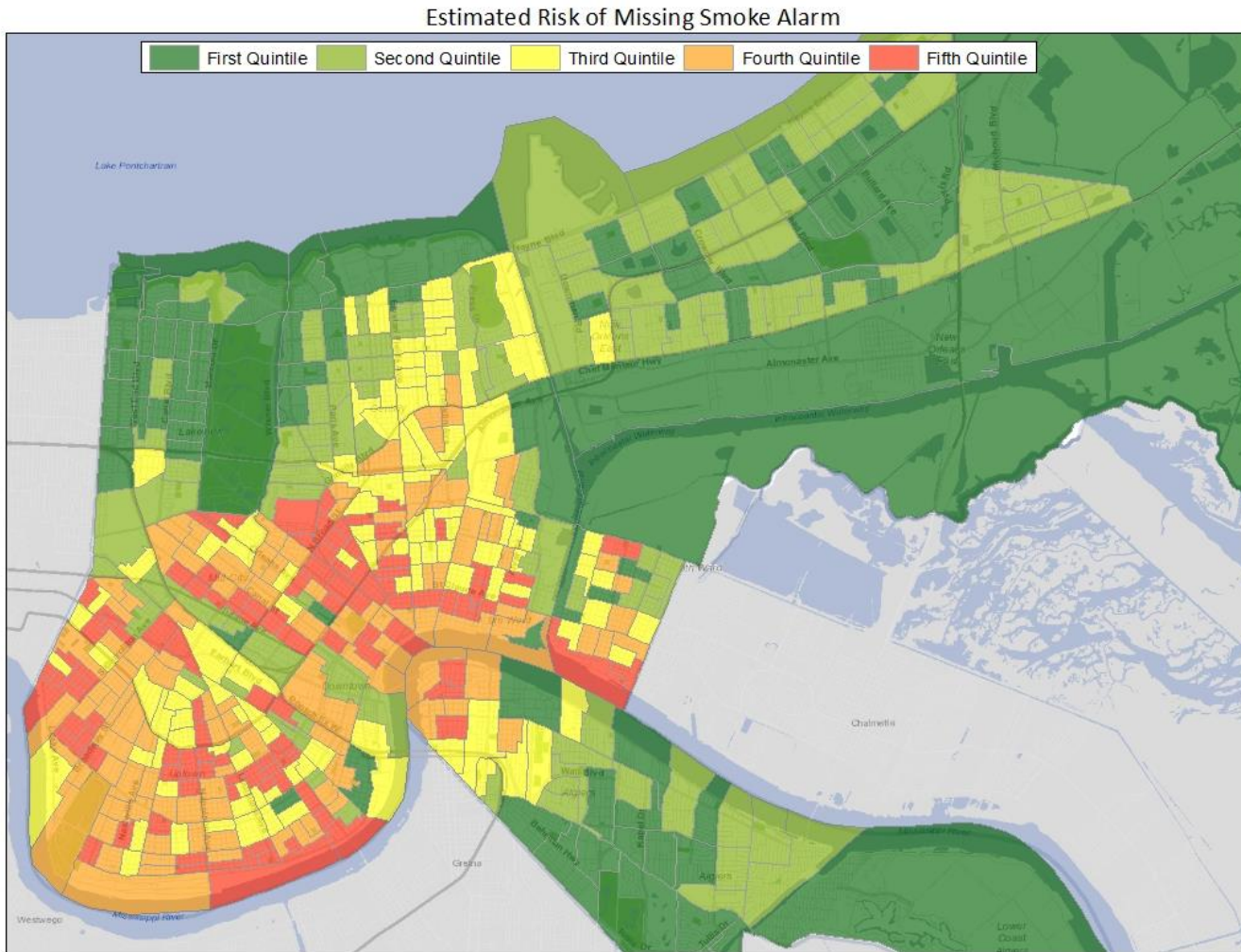
# Predictive Power of Model



Note: Estimates on pages 8 and 9 are derived assuming data is at the structure level. In practice, data was used at the block group level, which could lead to less precise estimation. The final model also has a factor accounting for fatality risk, not included in these estimates.



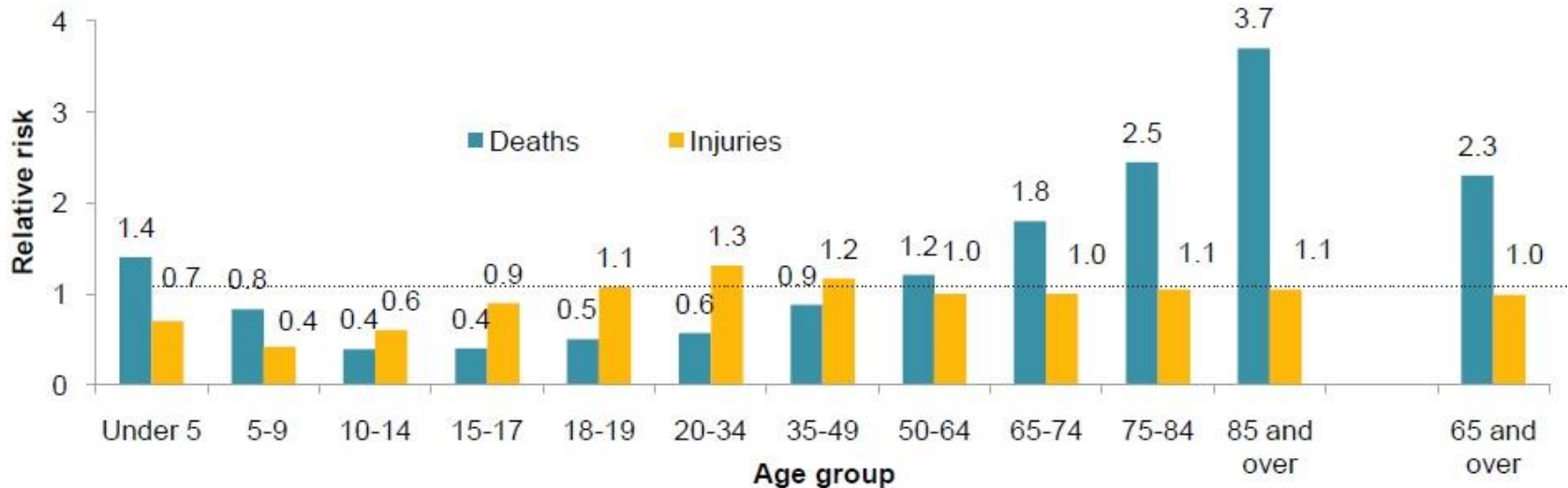
## Least Likely to Have Smoke Alarms



# What areas of the cities are most prone to fire fatalities?

- Research shows that the very young and very old are most susceptible to fire fatalities (National Fire Protection Association 2010)

Figure 1. Relative Risk of Home Fire Death and Injury by Age: 2003-2007



# Overall Fire Fatality Risk

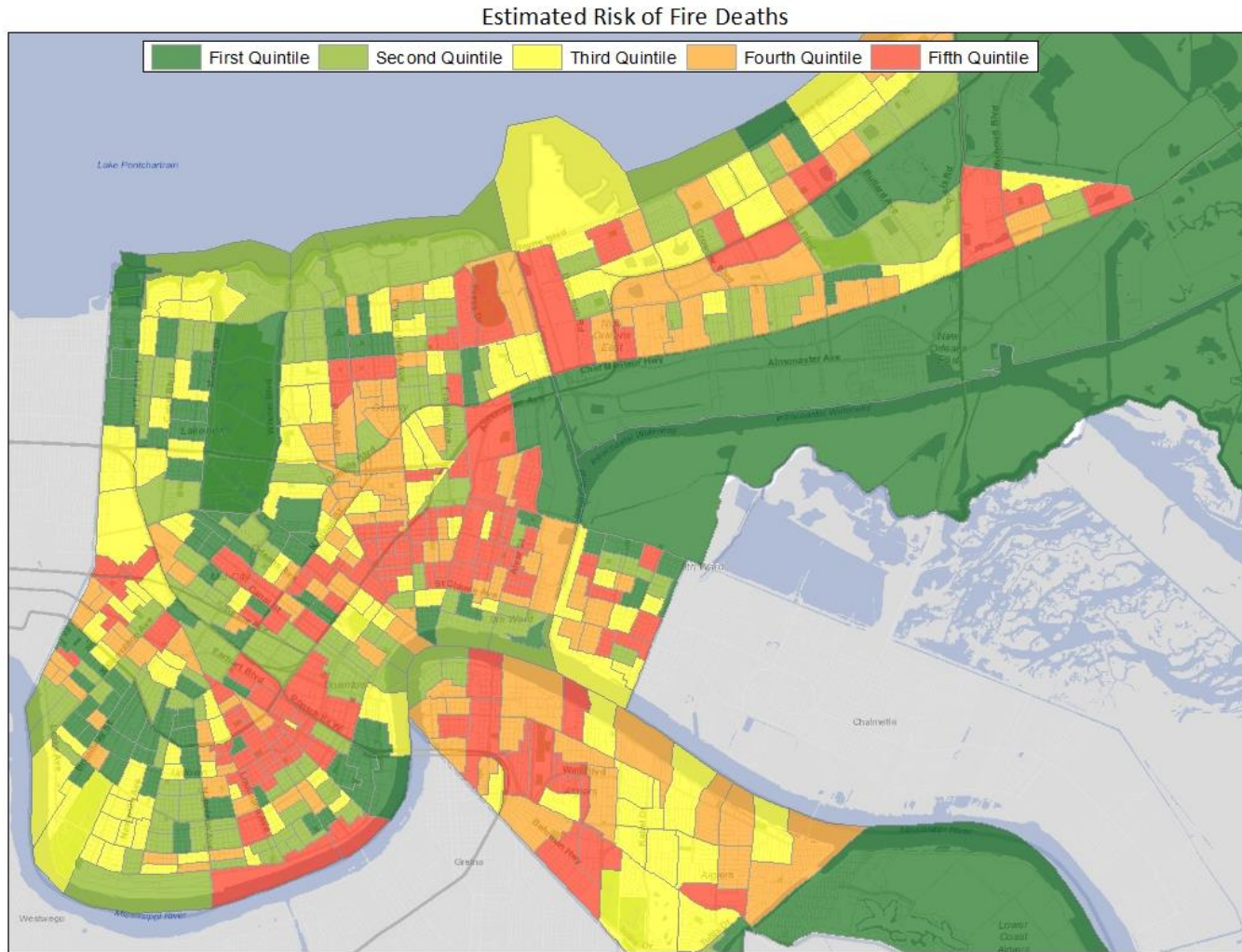
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- Create model that estimates the risk of fire fatalities by block group. The model accounts for the number of fires over the past 5 years, as well as the percent of population within age extremes.
  - Fire Fatality Risk =  $2 \times (\text{Fires/Housing Unit}) + \text{Age Adjustment}$
  - Age Adjustment =
  - $(\% \text{ Population Over } 65) + ((1.5/2.3)^{\dagger\dagger} \times \% \text{ Population Under } 5)$
- <sup>†</sup> Fires were weighted twice as strongly as the age adjustment
  - <sup>††</sup> Relative risk of fatalities for population over 65 vs. fatalities for population under 5





# Most at Risk of Fire Fatalities



# NOFD saves lives by targeted smoke alarm outreach

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**New Orleans Fire Department working hard to prevent fires: Chief Tim McConnell**

*[www.nola.com](http://www.nola.com)*

Just two weeks ago, a family of 11 members, including a 2-month-old baby, escaped a disastrous fire in their Central City home. They were alerted by a smoke alarm at 3 a.m., fleeing before the smoke was bad enough to impede their escape. New Orleans firefighters had installed that smoke alarm in the home as part of this year's campaign. The truth is that I have never





# Overview of the American Community Survey

Gretchen Gooding  
American Community Survey Office,  
U.S. Census Bureau

# Stats in Action Videos

## Stats in Action: New Orleans, LA: Smoke Alarm Outreach Program

September 06, 2016



American Community Survey data was key to the city developing a mapping model that determines neighborhoods most likely to suffer fire fatalities and least likely to have smoke alarms. See how the city's Office of Performance and Accountability and the New Orleans Fire Department are using Census Bureau data to save lives everyday.

[census.gov/programs-surveys/acs/library/videos.html](https://census.gov/programs-surveys/acs/library/videos.html)

# ACS Basics

- Ongoing monthly survey sent to 3.5 million addresses per year to produce detailed population and housing estimates each year
  - Visit 20,000 Group Quarter facilities and sample approximately 194,000 residents each year
- Designed to produce *critical information on small areas and small population groups* previously collected on the decennial long form
- Covers 35+ topics and supports over 300 known Federal Government uses
- Data released twice annually
  - 1-year estimates (12 months of data)
  - 5-year estimates (60 months of data)

The image displays three overlapping representations of the American Community Survey (ACS) forms. The topmost form is a paper questionnaire titled 'Housing' with various questions about housing characteristics. Below it is a computer screen showing the online survey interface, which includes a welcome message, a barcode, and a 'Please Log In' section with a 'User ID' field. The bottommost form is another paper questionnaire, similar to the top one, but with a large barcode on the left side.

# ACS Data Collection Process

**Online**



**Mail**



**Telephone**



**Personal Visit**





# ACS Content

## Social

Educational Attainment  
Marital Status  
Veteran  
Disability  
Ancestry  
Citizenship  
Fertility  
Grandparents  
Language Spoken at Home  
Migration  
Place of Birth  
School Enrollment  
Year of Entry

## Demographic

Sex  
Age  
Race  
Hispanic Origin  
Relationship

## Economic

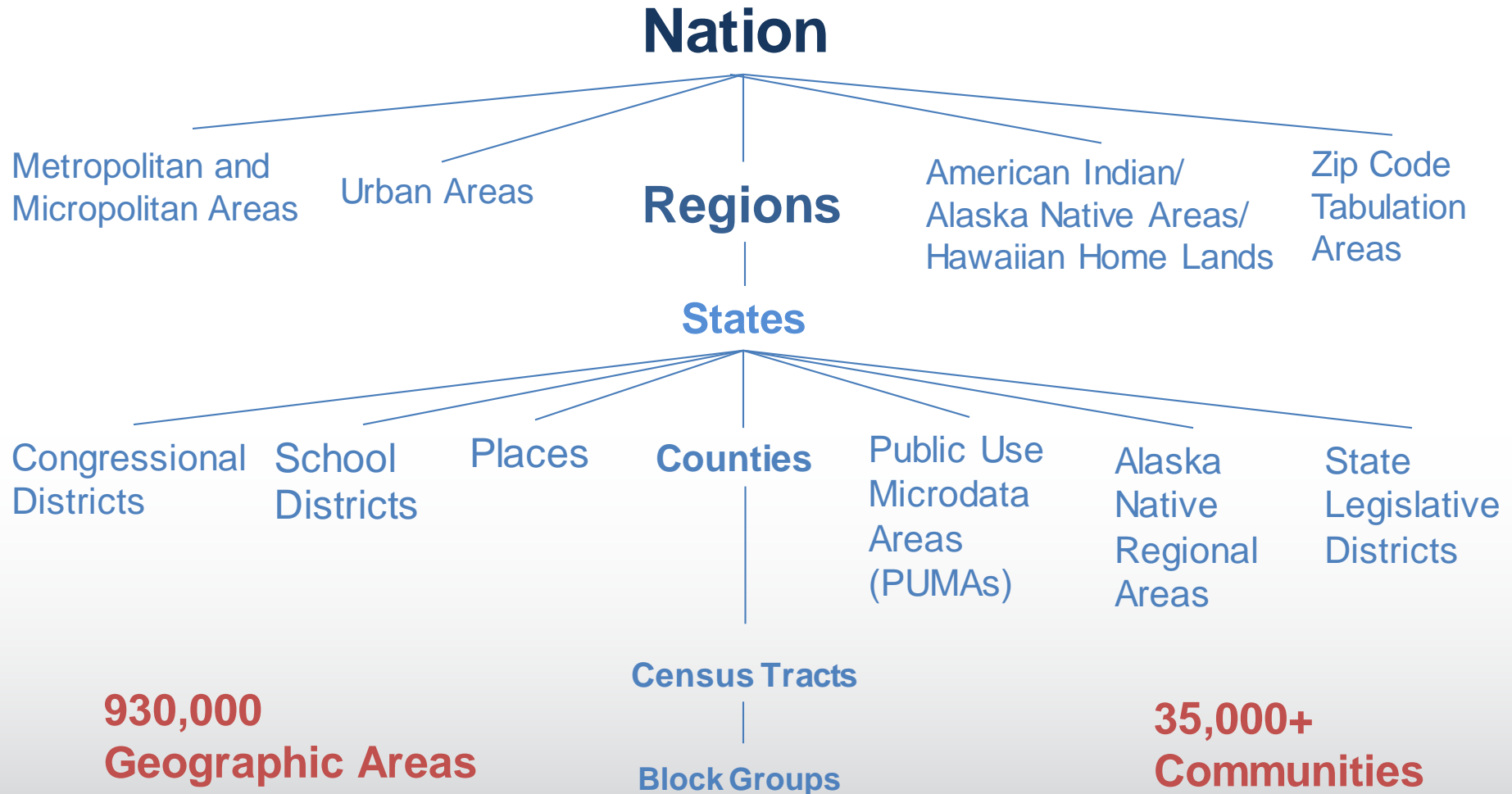
Employment Status  
Income  
Commuting  
Health Insurance  
Class of Worker  
Food Stamps (SNAP)  
Hours/Week, Weeks/Year  
Industry & Occupation

## Housing

Tenure (Own/Rent)  
Home Value  
Costs (Mortgage, Taxes, Insurance)  
Computer & Internet Use  
Heating Fuel  
Occupancy Status  
Plumbing/Kitchen Facilities  
Structure Type  
Utilities  
Vehicles  
Year Built/ Year Moved In

35+ Topics → 1000+ Tables → 11 Billion Estimates

# Selected Census Geographic Concepts



# Availability of ACS Data Products

Estimated Population of Geographic Area	1-Year Estimates	5-Year Estimates
65,000 or more	X	X
Less than 65,000		X
Release Date	September 15	December 8

[census.gov/programs-surveys/acs/news/data-releases.html](https://census.gov/programs-surveys/acs/news/data-releases.html)



# ACS Website



U.S. Department of Commerce | Blogs | Index A-Z | Glossary | FAQs

Topics  
Population, Economy

Geography  
Maps, Products

Library  
Infographics, Publications

Data  
Tools, Developers

Surveys/Programs  
Respond, Survey Data

Newsroom  
News, Blogs

About Us  
Our Research

Census.gov > Our Surveys & Programs > American Community Survey (ACS)

## American Community Survey (ACS)

About the Survey

Respond to the Survey

News & Updates

Data

Guidance for Data Users

Geography & ACS

Technical Documentation


Methodology

Library

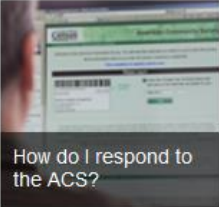
Operations and Administration

Contact Us

The American Community Survey helps local officials, community leaders and businesses understand the changes taking place in their communities. It is the premier source for detailed information about the American people and workforce.



What is the ACS?



How do I respond to the ACS?



Where can I get ACS data?



### Latest

Data

News

Events

Library



Respond to the ACS  
Learn how

#### 2015 Data Release

Learn more about upcoming ACS data releases, including the 1-year data release on September 15th for geographies with populations of 65,000 or more.

[census.gov/acs](https://census.gov/acs)

United States  
**Census**  
Bureau

U.S. Department of Commerce  
Economics and Statistics Administration  
U.S. CENSUS BUREAU  
[census.gov](https://census.gov)

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# Selected Ways to Access

- QuickFacts
- Census Explorer
- OnTheMap for Emergency Management
- Census Business Builder
- Narrative Profiles
- American FactFinder
- Application Programming Interface (API)

[census.gov/acs/www/data/data-tables-and-tools/](https://census.gov/acs/www/data/data-tables-and-tools/)

# QuickFacts

-- SELECT A FACT --

RESET

TABLE

MAP

CHART

DASHBOARD

DOWNLOAD

able

ALL TOPICS	Browse more datasets	DISTRICT OF COLUMBIA	SUITLAND CDP, MARYLAND	UNITED STATES	Enter state
PEOPLE					
Population					
Population estimates, July 1, 2014, (V2014)	658,893	X	318,857,056		
Population estimates base, April 1, 2010, (V2014)	601,767	X	308,758,105		
Population, percent change - April 1, 2010 (estimates base) to July 1, 2014, (V2014)	9.5%	X	3.3%		
Population, Census, April 1, 2010	601,723	25,825	308,745,538		
Age and Sex					
Persons under 5 years, percent, July 1, 2014, (V2014)	6.5%	X	6.2%		
Persons under 5 years, percent, April 1, 2010	5.4%	8.3%	6.5%		
Persons under 18 years, percent, July 1, 2014, (V2014)	17.5%	X	23.1%		
Persons under 18 years, percent, April 1, 2010	16.8%	27.6%	24.0%		
Persons 65 years and over, percent, July 1, 2014, (V2014)	11.3%	X	14.5%		
Persons 65 years and over, percent, April 1, 2010	11.4%	6.8%	13.0%		
Female persons, percent, July 1, 2014, (V2014)	52.6%	X	50.8%		
Female persons, percent, April 1, 2010	52.8%	55.3%	50.8%		

[census.gov/quickfacts](https://census.gov/quickfacts)

# American FactFinder



The screenshot shows the American FactFinder website. At the top left is the United States Census Bureau logo. The main header features the text "AMERICAN FactFinder" with a magnifying glass icon over a map of the United States. Navigation links include "MAIN", "COMMUNITY FACTS", "GUIDED SEARCH", "ADVANCED SEARCH", and "DOWNLOAD CENTER". On the right, there are links for "Feedback", "FAQs", "Glossary", and "Help", along with language options "English" and "Español". The "Community Facts" section is highlighted, showing a description: "Find popular facts (population, income, etc.) and frequently requested data about your community." Below this is a search input field with the placeholder text "Enter a state, county, city, town, or zip code:" and an example "e.g., Atlanta, GA", followed by a "GO" button. To the right of the search section is a large photograph of a smiling family (a man, a woman, and a child).

[factfinder.census.gov](http://factfinder.census.gov)

# Application Programming Interface (API)

## Developers

[API Forum](#)

[About this Section](#)

[App Gallery](#)

[Available APIs](#)

[Geography](#)

[News](#)

[Terms of Service](#)

[Updates](#)

The Census Bureau has begun rolling out our datasets via APIs. Check out our [Discovery Tool](#). Sign up for our [newsletter](#) to get the latest updates and newest dataset addition. We also invite you to make requests for features / data via our forum.

[Read More](#)

CITY S D K



NEW: JavaScript Toolkit!



Developers' Forum



Join the Mailing List



### Latest

[Available APIs](#)

[News](#)

[Updates](#)

### Annual Survey of Manufactures

August 18, 2015

Sample estimates of statistics for all manufacturing establishments with one or more paid employee.

[census.gov/developers](https://census.gov/developers)



# Continue the Conversation #ACsdata



Sign up for and manage alerts at  
<https://public.govdelivery.com/accounts/USCENSUS/subscriber/new>



More information on the  
American Community Survey:  
<http://www.census.gov/acs>



Census 1-800-923-8282



[facebook.com/uscensusbureau](https://facebook.com/uscensusbureau)



[twitter.com/uscensusbureau](https://twitter.com/uscensusbureau)



[youtube.com/user/uscensusbureau](https://youtube.com/user/uscensusbureau)



[instagram.com/uscensusbureau](https://instagram.com/uscensusbureau)



[pinterest.com/uscensusbureau](https://pinterest.com/uscensusbureau)



[linkedin.com/company/us-census-bureau](https://linkedin.com/company/us-census-bureau)



# AMERICAN COMMUNITY SURVEY DATA USERS GROUP

- Purpose of the ACS Data Users Group (DUG) is to improve understanding of the value and utility of ACS data and to promote information sharing among data users about key ACS data issues and applications
- Membership is free and open to all interested ACS data users
- Webinars and special sessions at professional meetings planned
- Next data users conference planned for May 11-12, 2017
- Users group website and online community

[acsdatausers.org](http://acsdatausers.org)



# Need Local Stats?

- Assistance Near You!

Our regional data staff can help you access local statistics from the ACS or offer training to help build your skills. Contact us at the following address:  
[clmso.ddb.questions@census.gov](mailto:clmso.ddb.questions@census.gov)



# Smoke Signals

Enigma's Open Source Prediction Engine Available for 200 American Cities

25,000 people are  
killed or injured  
each year in 1  
million fires across  
the United States.



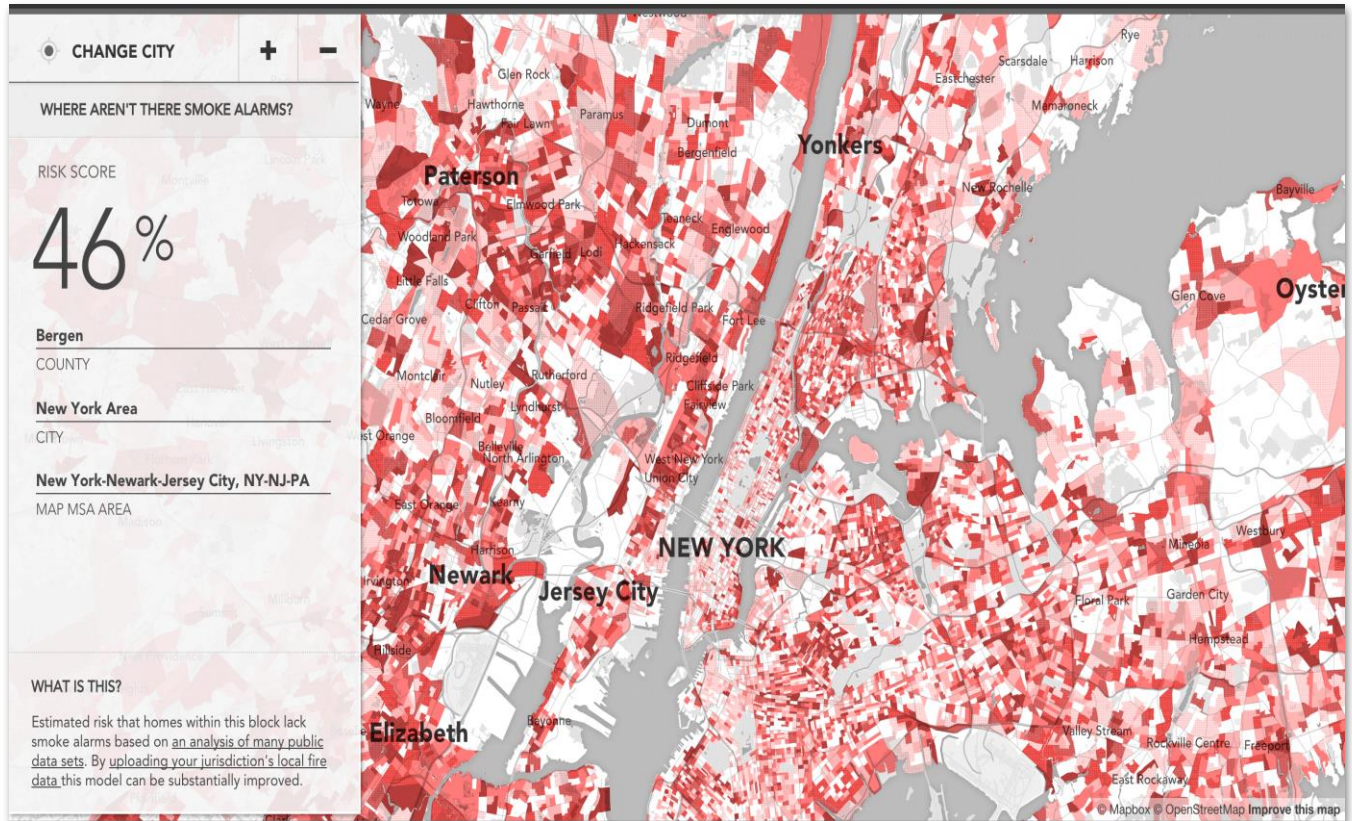
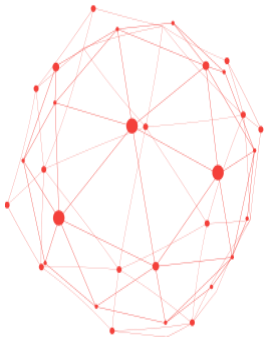
How Many Had a Smoke Alarm?

# Data is powerful when it drives action



**DataKind**

# Signals



# DEMO



## How we did it

This tool is an example of applied data analytics aimed at improving the lives of people in cities. Below is an overview of the components and data involved in making it work.



### US Census Data [↗](#)

The Census' American Housing Survey provides extremely detailed information about residential housing that is normalized at the level of entire

cities. The American Community Survey provides extensive demographic data about households within very granular census blocks. We linked the two together to provide the basis for our

model. This enabled us to understand which census blocks are least likely to have smoke alarms installed and most likely to have at-risk populations. Learn more and access the data [here](#).



### TIGER Geocoder [↗](#)

Knowing where in the world an address is located can be a difficult problem. The US Census has released a

database of all the streets in the country and how to geocode them. This was important for helping generate a list of addresses towards

which to focus outreach efforts. We also released a version of TIGER that makes it easy for anyone to spin up a geocoder. Read more about it [here](#).



### Analytics [↗](#)

The basis of this tool is US federal government data. However, it becomes

much more effective when local data on fire incidents is available. Analyzing where fires have historically occurred enables risk models to be tuned so

they can be more sensitive to where the risk actually lies. You can read about the analysis we did and contribute to it [here](#).



**NATIONAL FIRE PROTECTION ASSOCIATION**

The leading information and knowledge resource on fire, electrical and related hazards

# The Fire Data Revolution:

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## Coming to a Fire Department Near You!

October 13, 2016 | Matt Hinds-Aldrich, Ph.D: Big Data Program Manager



# Don't Wait



## CHECK

the date!



## REPLACE SMOKE ALARMS EVERY 10 YEARS

**FIRE PREVENTION WEEK OCT. 9–15, 2016**

[firepreventionweek.org](http://firepreventionweek.org)

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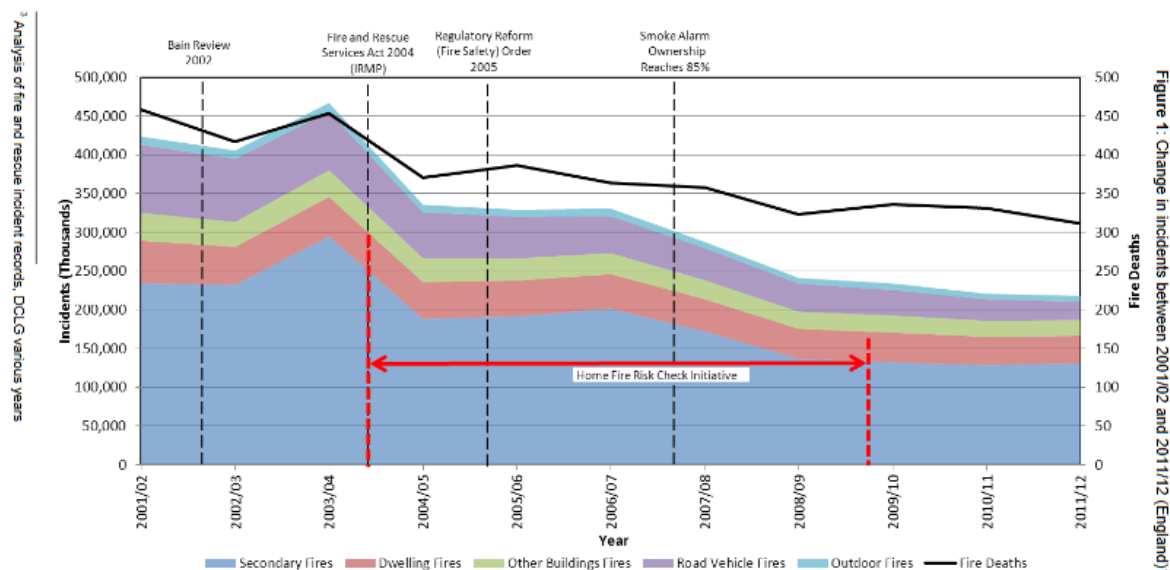
# WHY

## Community Risk Reduction Paradigm Shift

...“Programs, actions, and services used by a community, which prevent or mitigate the loss of life, property, and resources associated with life safety, fire, and other disasters within a community.” (NFPA 1035: 2015)

British fire service  
which saw historic  
reductions in fires.

Emphasis on  
targeted outreach  
and engagement



Findings of the review into efficiency and operations of fire and rescue authorities in England





# WHAT

## Designing Community Risk Reduction Campaigns



THE NFPA URBAN FIRE AND  
LIFE SAFETY TASK FORCE

JUNE  
2016

COMMUNITY  
RISK REDUCTION:  
DOING MORE  
WITH MORE



- **NFPA 1300:** Standard on Community Risk Assessment and Community Risk Reduction Plan Development
- **NFPA 1452:** Guide for Training Fire Service Personnel to Conduct Community Risk Reduction
- **NFPA 1730:** Standard on Organization and Deployment of Fire Prevention, Inspection and Code Enforcement, Plan Review, Investigation and Public Education Operations

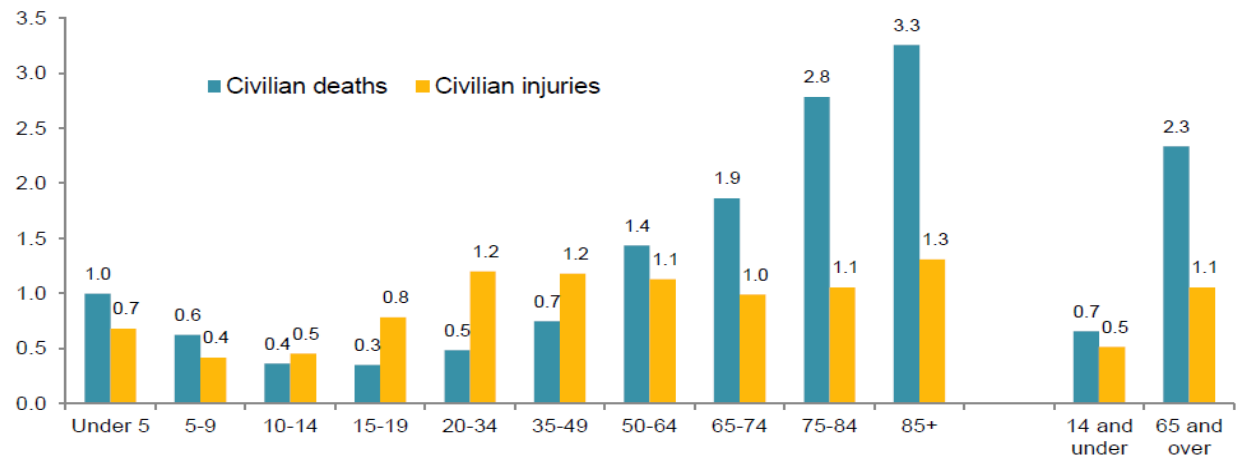


# WHO

## Identifying “At Risk” People

- People are the often overlooked part of the equation
- Proportionally seniors remain one of highest risk groups
- Identifying community partners and alternative data sources
  - Fire Incident data
  - EMS / Public Health data
  - Census data
  - School data

Figure 8. Relative Risk of Civilian Death and Injury from Home Structure Fires, by Age Group 2010-2014





# WHERE

## Identifying “At Risk” Communities & Houses

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- “Data is gut-instinct’s wingman” (NFPA Blog)
- Is the “bad part of town” really the highest fire risk?
- Are wealthy communities and new homes not at risk?
- The Recipe?
  - 2 parts local fire incident data
  - 2 parts available data sources
    - Census data
    - Property / Tax Assessors data
    - Certificate of Occupancy data
    - Land Use / Zoning data
  - 1 part Review Output with Local Subject Matter Experts

# WHEN

**Taking the Initiative**

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# NOW!



# HELP?

## How Can NFPA Help Us?

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**National Fire Data System**

**Research Reports**

**Analytical Tools**

**NFPA Technical Questions Service**

(\*free to members and AHJs/public sector officials)







ALL DATA ARE LOCAL!





**NATIONAL FIRE PROTECTION ASSOCIATION**

The leading information and knowledge resource on fire, electrical and related hazards

# Thank You

**Matt Hinds-Aldrich, Ph.D.**

Big Data Program Manager

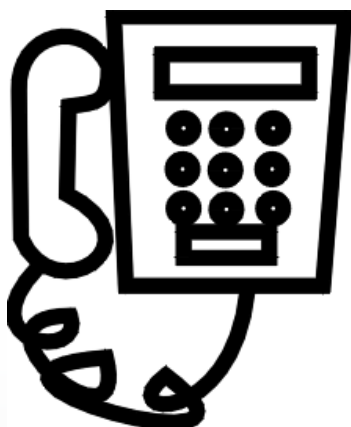
**National Fire Protection Association**

1 Batterymarch Park, Quincy, MA 02169 USA

(e) [mhinds-aldrich@nfpa.org](mailto:mhinds-aldrich@nfpa.org)

(p) 617-984-7344

# Questions?



Dial \*1 for the Operator

Today's presentation will be posted soon at  
<https://www.census.gov/programs-surveys/acs/guidance/training-presentations.html>



# Evaluation

