Census Data and Chicago Community Areas

CS 579 Online Social Network Analysis

Dr. Cindy Hood
9/16/25

Homework Assignments

- HW #2 assigned Due by midnight Friday 9/19
- HW #3 assigned later this week
  - You may work in groups up to 4 students (no exceptions) on this hw
- Please contact TAs with questions on hw grading

Exams and Final Project Poster Presentation

- Exam 1 – Oct 9 in class
- Exam 2 – Dec 2 in class

- Final Project Poster Session – Dec 4 in class

- Online students (sections 2 and 3) will have remote options

Teaching Assistants

- Siva Krishna Golla
  - sgolla2@hawk.illinoistech.edu
  - Mondays 2-3pm on zoom
- Khush Dhiren Patel
  - kpatel210@hawk.illinoistech.edu
  - Wednesdays 11-12 online
- Aswith Sama
  - asama@hawk.illinoistech.edu
  - Thursdays 3-4pm on zoom

- **Not yet officially working, waiting for authorization (US govt)**

HW #2 due by midnight 9/19

- In this assignment you will create networks/graph models from 2 different datasets. You may use any tool/platform/language that you like. I have attached a few pages from the Elements of Network Science Book that illustrate basic use of Stata, R and Python. Section 2.3 ElementsofNetworkScience.pdf Download Section 2.3 ElementsofNetworkScience.pdf
- (1) The first dataset is Chicago Community Areas https://en.wikipedia.org/wiki/Community_areas_in_Chicago
- Links to an external site.
- Nodes = Community areas
- Edges = Shared physical boundary (i.e. adjacency) with other community area. Note that you may have to make some assumptions here since you are determining boundaries from the image of the map on the page cited above. State your assumptions.
- You will then create a labelled visualization of this graph and plot the degree distribution of the nodes. You will submit
- (1a) Input file with graph representation,
- (1b) Labelled visualization of network created.
- (1c) Plot of degree distribution.

HW #2 con't

- (2) The second dataset is the CS 579 Class Participant Data Social Network Data collection.xlsx
- Links to an external site.
- Nodes = Class Participants, entities in common
- Edges = Shared entity
- You will create a bipartite graph. Some data cleaning will be necessary. State and justify any assumptions you make during the data cleaning. You will then create a unimodal graph that is a projection of the bipartite graph.
- You will create labelled visualizations of both the bipartite and unimodal graphs and plot the degree distribution of the unimodal graph. You will submit
- (2a) Input file for the bipartite graph.
- (2b) Labelled visualization of bipartite graph.
- (2c) Description of method for projecting bipartite graph to unimodal graph including code.
- (2d) Labelled visualization of unimodal graph.
- (2e) Plot of degree distribution of unimodal graph.

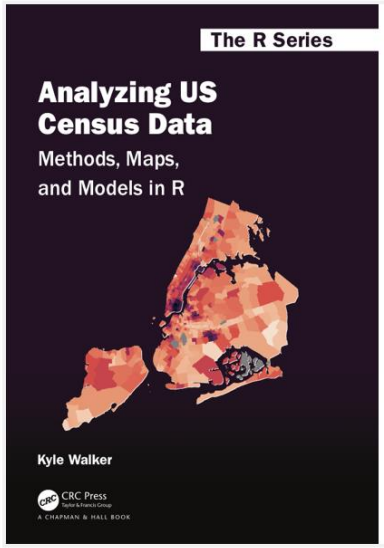
HW #2 – con't

- (3) Compare the degree distributions of the graphs from the two different datasets. What is similar? What is different? Is this what you expected? Why or why not?
- (4) Provide the details of how you did this assignment. What tools did you use to complete the assignment? Why did you choose the tool? Provide citations and links to references and code used. If AI (e.g. ChatGPT, etc.) was used, please include a transcript of the exchange.
- The above can be submitted in a zipped folder that includes
- input files labelled as Input_file1, Input_file2
- pdf report of everything else


Chicago
Central
Far North Side
Far Southeast Side
Far Southwest Side
North Side
Northwest Side
South Side
Southwest Side
West Side
A. Burnside
B. Oakland
C. Montclare
O'Hare
Edison Park
Norwood Park
Jefferson Park
Forest Glen
North Park
Rogers Park
West Ridge
Edge-water
Lincoln Square
Albany Park
Uptown
Portage Park
Irving Park
Dunning
North Center
Lakeview
Avondale
(C)
Belmont Cragin
Hermosa
Logan Square
Lincoln Park
Austin
Humboldt Park
West Town
Near North
West Garf. Park
East Garfield Park
Near West Side
Loop
North Lawndale
Near South
Lower West Side
South Lawndale
Bridge-Port
Armor Square
Douglas
McKinley Park
(B)
Archer Heights
Brigton Park
New City
Fuller Park
Grand Blvd
Ken-Wood
Garfield Ridge
West Elsdon
Gage Park
Wash-ington Park
Hyde Park
Clearing
West Lawn
Chicago Lawn
West Engle-Wood
Engle-Wood
Woodlawn
Greater Grand Crossing
South Shore
Ashburn
Auburn Gresham
Chatham
Avalon Park
South Chicago
(A)
Calumet Heights
Wash-ington Heights
Beverly
Roseland
Pullman
East Side
South Deering
Mount Greenwood
Morgan Park
West Pullman
Riverdale
Hegewisch

References

- https://walker-data.com/census-r/index.html



- https://mgimond.github.io/Spatial/index.html

Intro to GIS and Spatial Analysis

Manuel Gimond

Last edited on 2023-12-15

United States Government Basics

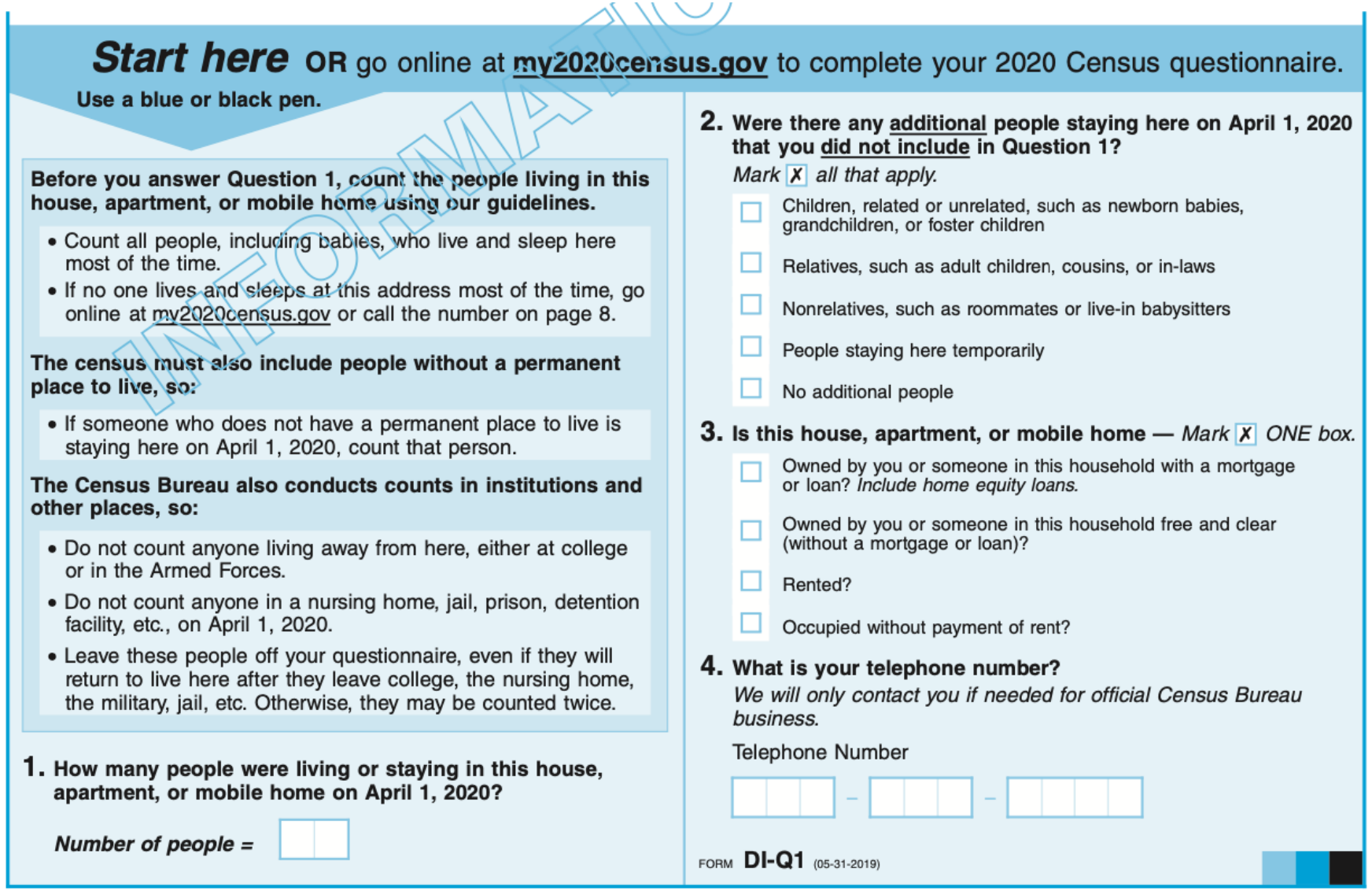
- The United States Constitution divides the federal government into 3 branches to ensure that no individual or group has too much power
  - Legislative branch
    - Congress
      - Senate
        - 100 Senators, 2 from each of the 50 states
      - House of Representatives
        - 465 Representatives , apportioned by population as measured by the census
  - Executive branch
    - President
    - Vice-President
  - Judicial branch
    - Supreme Court
    - Other federal courts

https://www.usa.gov/branches-of-government

Decennial Census

- The United States Constitution requires a census or enumeration of the population to be taken every 10 years
- The population measurement includes everyone
  - Independent of age, citizenship
- Census forms in English and Spanish
  - Other language assistance is available
- By law, all US citizens are required to take part in the census
- All personal information collected by the census is private for 72 years

Example of 2020 Census Questionaire



Start here OR go online at my2020census.gov to complete your 2020 Census questionnaire.

Use a blue or black pen.

Before you answer Question 1, count the people living in this house, apartment, or mobile home using our guidelines.

- Count all people, including babies, who live and sleep here most of the time.
- If no one lives and sleeps at this address most of the time, go online at my2020census.gov or call the number on page 8.

The census must also include people without a permanent place to live, so:

- If someone who does not have a permanent place to live is staying here on April 1, 2020, count that person.

The Census Bureau also conducts counts in institutions and other places, so:

- Do not count anyone living away from here, either at college or in the Armed Forces.
- Do not count anyone in a nursing home, jail, prison, detention facility, etc., on April 1, 2020.
- Leave these people off your questionnaire, even if they will return to live here after they leave college, the nursing home, the military, jail, etc. Otherwise, they may be counted twice.

1. How many people were living or staying in this house, apartment, or mobile home on April 1, 2020?

Number of people =

2. Were there any additional people staying here on April 1, 2020 that you did not include in Question 1?

Mark ☒ all that apply.

- ☐ Children, related or unrelated, such as newborn babies, grandchildren, or foster children
- ☐ Relatives, such as adult children, cousins, or in-laws
- ☐ Nonrelatives, such as roommates or live-in babysitters
- ☐ People staying here temporarily
- ☐ No additional people

3. Is this house, apartment, or mobile home — *Mark ☒ ONE box.*

- ☐ Owned by you or someone in this household with a mortgage or loan? *Include home equity loans.*
- ☐ Owned by you or someone in this household free and clear (without a mortgage or loan)?
- ☐ Rented?
- ☐ Occupied without payment of rent?

4. What is your telephone number?

We will only contact you if needed for official Census Bureau business.

Telephone Number

FORM **DI-Q1** (05-31-2019)

11800018

Person 1

5. Please provide information for each person living here. If there is someone living here who pays the rent or owns this residence, start by listing him or her as Person 1. If the owner or the person who pays the rent does not live here, start by listing any adult living here as Person 1.

What is Person 1's name? *Print name below.*

First Name MI

Last Name(s)

6. What is Person 1's sex? *Mark ✗ ONE box.*

☐ Male ☐ Female

7. What is Person 1's age and what is Person 1's date of birth? *For babies less than 1 year old, do not write the age in months. Write 0 as the age.*

Print numbers in boxes.

Age on April 1, 2020 — years

Month Day Year of birth

➜ **NOTE: Please answer BOTH Question 8 about Hispanic origin and Question 9 about race. For this census, Hispanic origins are not races.**

8. Is Person 1 of Hispanic, Latino, or Spanish origin?

☐ **No**, not of Hispanic, Latino, or Spanish origin

☐ Yes, Mexican, Mexican Am., Chicano

☐ Yes, Puerto Rican

☐ Yes, Cuban

☐ Yes, another Hispanic, Latino, or Spanish origin – *Print, for example, Salvadoran, Dominican, Colombian, Guatemalan, Spaniard, Ecuadorian, etc.*

9. What is Person 1's race?

*Mark ✗ one or more boxes **AND** print origins.*

☐ White – *Print, for example, German, Irish, English, Italian, Lebanese, Egyptian, etc.*

☐ Black or African Am. – *Print, for example, African American, Jamaican, Haitian, Nigerian, Ethiopian, Somali, etc.*

☐ American Indian or Alaska Native – *Print name of enrolled or principal tribe(s), for example, Navajo Nation, Blackfeet Tribe, Mayan, Aztec, Native Village of Barrow Inupiat Traditional Government, Nome Eskimo Community, etc.*

☐ Chinese
☐ Filipino
☐ Asian Indian
☐ Vietnamese
☐ Korean
☐ Japanese
☐ Other Asian – *Print, for example, Pakistani, Cambodian, Hmong, etc.*

☐ Native Hawaiian
☐ Samoan
☐ Chamorro
☐ Other Pacific Islander – *Print, for example, Tongan, Fijian, Marshallese, etc.*

☐ Some other race – *Print race or origin.*

➜ **If more people were counted in Question 1 on the front page, continue with Person 2 on the**

1. Print name of **Person 2**

First Name | MI

Last Name(s)

2. Does this person usually live or stay somewhere else?
Mark ☒ all that apply.

- ☐ No
- ☐ Yes, for college
- ☐ Yes, for a military assignment
- ☐ Yes, for a job or business
- ☐ Yes, in a nursing home
- ☐ Yes, with a parent or other relative
- ☐ Yes, at a seasonal or second residence
- ☐ Yes, in a jail or prison
- ☐ Yes, for another reason

3. How is this person related to Person 1? *Mark ☒ ONE box.*

- ☐ Opposite-sex husband/wife/spouse
- ☐ Opposite-sex unmarried partner
- ☐ Same-sex husband/wife/spouse
- ☐ Same-sex unmarried partner
- ☐ Biological son or daughter
- ☐ Adopted son or daughter
- ☐ Stepson or stepdaughter
- ☐ Brother or sister
- ☐ Father or mother
- ☐ Grandchild
- ☐ Parent-in-law
- ☐ Son-in-law or daughter-in-law
- ☐ Other relative
- ☐ Roommate or housemate
- ☐ Foster child
- ☐ Other nonrelative

4. What is this person's sex? *Mark ☒ ONE box.*

☐ Male ☐ Female

5. What is this person's age and what is this person's date of birth? *For babies less than 1 year old, do not write the age in months. Write 0 as the age.*

Print numbers in boxes.

Age on April 1, 2020 | Month | Day | Year of birth

years

➜ **NOTE: Please answer BOTH Question 6 about Hispanic origin and Question 7 about race. For this census, Hispanic origins are not races.**

6. Is this person of Hispanic, Latino, or Spanish origin?

- ☐ **No**, not of Hispanic, Latino, or Spanish origin
- ☐ Yes, Mexican, Mexican Am., Chicano
- ☐ Yes, Puerto Rican
- ☐ Yes, Cuban
- ☐ Yes, another Hispanic, Latino, or Spanish origin – *Print, for example, Salvadoran, Dominican, Colombian, Guatemalan, Spaniard, Ecuadorian, etc.*

7. What is this person's race?
Mark ☒ one or more boxes ***AND*** *print origins.*

- ☐ White – *Print, for example, German, Irish, English, Italian, Lebanese, Egyptian, etc.*
- ☐ Black or African Am. – *Print, for example, African American, Jamaican, Haitian, Nigerian, Ethiopian, Somali, etc.*
- ☐ American Indian or Alaska Native – *Print name of enrolled or principal tribe(s), for example, Navajo Nation, Blackfeet Tribe, Mayan, Aztec, Native Village of Barrow Inupiat Traditional Government, Nome Eskimo Community, etc.*
- ☐ Chinese
- ☐ Filipino
- ☐ Asian Indian
- ☐ Other Asian – *Print, for example, Pakistani, Cambodian, Hmong, etc.*
- ☐ Vietnamese
- ☐ Korean
- ☐ Japanese
- ☐ Native Hawaiian
- ☐ Samoan
- ☐ Chamorro
- ☐ Other Pacific Islander – *Print, for example, Tongan, Fijian, Marshallese, etc.*
- ☐ Some other race – *Print race or origin.*

➜ **If more people were counted in Question 1 on the front page, continue with Person 3 on the next page.**

Why is data collected and how may it be used

- Determining representation
  - House of Representatives
  - Local and State governments
- Allocation of resources
  - Public schools
  - Public safety
  - Etc.
- Etc.

- Data is aggregated and made public based on data release rules

Apportionment

- https://www.census.gov/library/video/2021/what-is-apportionment.html

How is Census data used?

2020 Census Questionnaire

1. **How many people were living or staying in this house, apartment, or mobile home on April 1, 2020?**

   Why we ask this question: This helps us count the entire U.S. population and ensures that we count people where they live most of the time as of Census Day (April 1, 2020).

2. **Were there any additional people staying here on April 1, 2020, that you did not include in Question 1?**
   Mark all that apply.
   _ Children, related or unrelated, such as newborn babies, grandchildren, or foster children
   _ Relatives, such as adult children, cousins, or in-laws
   _ Nonrelatives, such as roommates or live-in babysitters
   _ People staying here temporarily
   _ No additional people.

   Why we ask this question: The goal of the 2020 Census is to count everyone just once and in the right place. We want to ensure that everyone in your home who should be counted *is* counted—including newborns, roommates, and those who may be staying with you temporarily.

3. **Is this house, apartment, or mobile home —** *Mark ONE box.*
   _ Owned by you or someone in this household with a mortgage or loan? Include home equity loans.
   _ Owned by you or someone in this household free and clear (without a mortgage or loan)?
   _ Rented?
   _ Occupied without payment of rent?

   Why we ask this question: This helps us produce statistics about homeownership and renting. The rates of homeownership serve as one indicator of the nation's economy. They also help with administering housing programs, planning, and decision-making.

4. What is your telephone number?
   We will only contact you if needed for official Census Bureau business.

   Why we ask this question: The Census Bureau asks for your phone number in case there are any questions about your census form. We will only contact you for official census business, if needed.

5. **Please provide information for each person living here. If there is someone living here who pays the rent or owns this residence, start by listing him or her as Person 1. If the owner or the person who pays the rent does not live here, start by listing any adult living here as Person 1.**

   What is Person 1's name?

   Why we ask this question: The Census Bureau asks a series of questions about each member of your household. This allows us to establish one central figure as a starting point.

6. **What is Person 1's sex?** *Mark ONE box.*

   _ Male
   _ Female

   Why we ask this question: This allows us to create statistics about males and females, which can be used in planning and funding government programs. This data can also be used to enforce laws, regulations, and policies against discrimination.

7. **What is Person 1's age and what is Person 1's date of birth?**
   For babies less than 1 year old, do not write the age in months. Write 0 as the age.

   Why we ask this question: The U.S. Census Bureau creates statistics to better understand the size and characteristics of different age groups. Agencies use this data to plan and fund government programs that support specific age groups, including children and older adults.

   NOTE: Please answer BOTH Question 8 about Hispanic origin and Question 9 about race. For this census, Hispanic origins are not races.

8. **Is Person 1 of Hispanic, Latino, or Spanish origin?**
   _ **No**, not of Hispanic, Latino, or Spanish origin
   _ Yes, Mexican, Mexican Am., Chicano
   _ Yes, Puerto Rican
   _ Yes, Cuban
   _ Yes, another Hispanic, Latino, or Spanish origin – *Print, for example, Salvadoran, Dominican, Colombian, Guatemalan, Spaniard, Ecuadorian, etc.* _____

   Why we ask this question: These responses help create statistics about this ethnic group. This helps federal agencies monitor compliance with anti-discrimination provisions, such as those in the Voting Rights Act and the Civil Rights Act.

9. **What is Person 1's race?**
   *Mark one or more boxes **AND** print origins.*
   _ White – *Print, for example, German, Irish, English, Italian, Lebanese, Egyptian, etc.* _____

   _ Black or African American – *Print, for example, African American, Jamaican, Haitian, Nigerian, Ethiopian, Somali, etc.* _____
   _ American Indian or Alaska Native – *Print name of enrolled or principal tribe(s), for example Navajo Nation, Blackfeet Tribe, Mayan, Aztec, Native Village of Barrow Inupiat Traditional Government, Nome Eskimo Community, etc.* _____
   _ Chinese
   _ Filipino
   _ Asian Indian
   _ Vietnamese
   _ Korean
   _ Japanese
   _ Other Asian – *Print, for example, Pakistani, Cambodian, Hmong, etc.* _____
   _ Native Hawaiian
   _ Samoan
   _ Chamorro
   _ Other Pacific Islander – *Print, for example, Tongan, Fijian, Marshallese, etc.* _____
   _ Some other race – *Print race or origin.* _____

   Why we ask this question: This allows us to create statistics about race and to analyze other statistics within racial groups. This data helps federal agencies monitor compliance with anti-discrimination provisions, such as those in the Voting Rights Act and the Civil Rights Act.

The following information is collected for each additional person identified in Question 1 on the front page until information is collected for ALL persons in the household.

1. **Print name of Person 2**

   Why we ask this question: The 2020 Census asks information about each member of your household. This question identifies the next person to refer to in the ensuing questions. This process repeats for each person in your household..

2. **Does this person usually live or stay somewhere else?**
   Mark all that apply.
   _ No
   _ Yes, for college
   _ Yes, for a military assignment
   _ Yes, for a job or business
   _ Yes, in a nursing home
   _ Yes, with a parent or other relative
   _ Yes, at a seasonal or second residence
   _ Yes, in a jail or prison
   _ Yes, for another reason

   Why we ask this question: This question helps ensure that the Census Bureau is counting everyone once, only once, and in the right place.

3. **How is this person related to Person 1?**
   Mark ONE box.
   _ Opposite-sex husband/wife/spouse
   _ Opposite-sex unmarried partner
   _ Same-sex husband/wife/spouse
   _ Same-sex unmarried partner
   _ Biological son or daughter
   _ Adopted son or daughter
   _ Stepson or stepdaughter
   _ Brother or sister
   _ Father or mother
   _ Grandchild
   _ Parent-in-law
   _ Son-in-law or daughter-in-law
   _ Other relative
   _ Roommate or housemate
   _ Foster child
   _ Other nonrelative

   Why we ask this question: This allows the Census Bureau to develop data about families, households, and other groups. Relationship data is used in planning and funding government programs that support families, including people raising children alone.

Participation in Census Data Collection

- Why might someone be reluctant to participate in the Census?

How is the Decennial Census organized?

- Enumeration units
  - Geographies at which Census data are tabulated
    - Legal entities
      - States
      - Counties
    - Statistical entities
      - Not official jurisdictions but used to standardize data tabulation

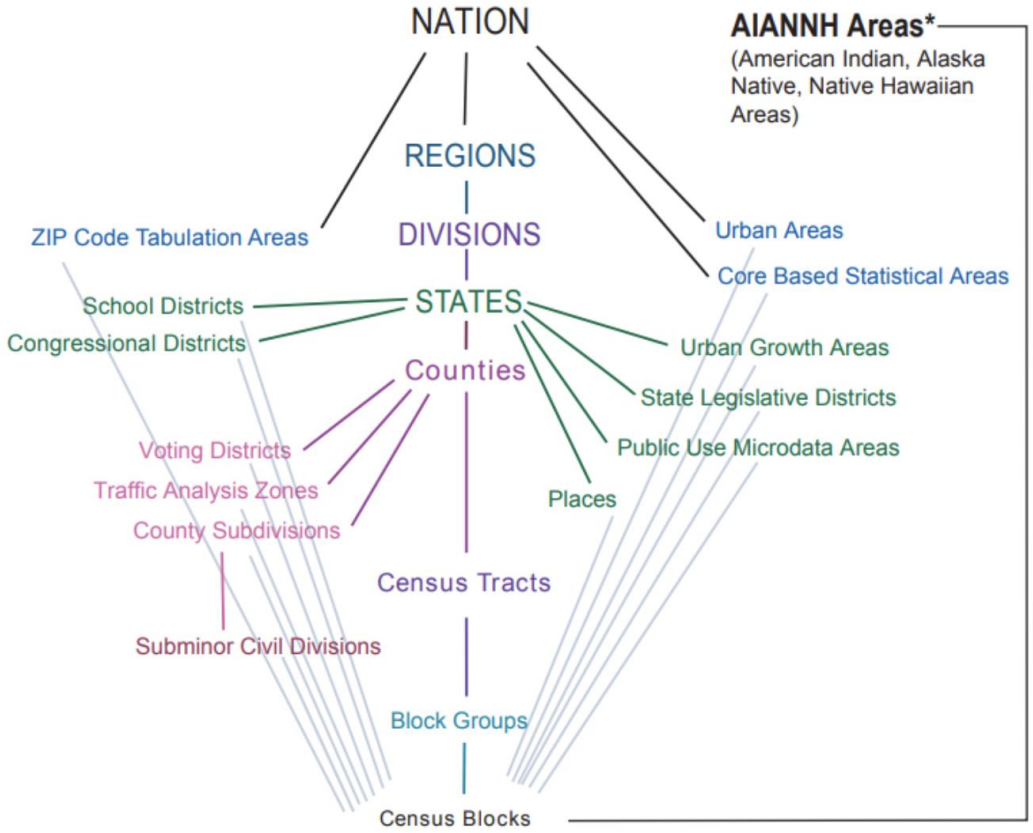


Figure 1.1: Census hierarchy of enumeration units

https://walker-data.com/census-r/the-united-states-census-and-the-r-programming-language.html

Census hierarchy of enumeration units

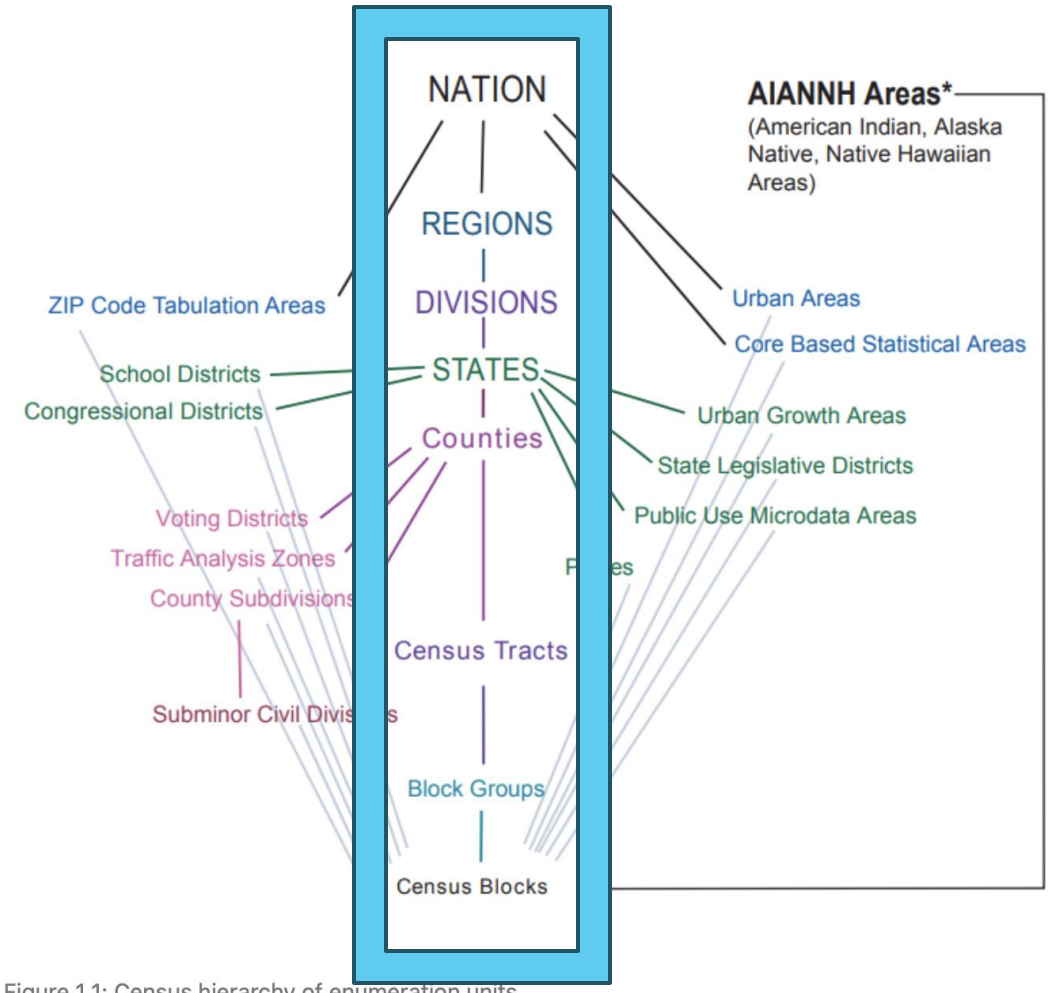


Figure 1.1: Census hierarchy of enumeration units

Each census enumeration unit geography nests within its parent unit

Not necessarily the case for enumeration units outside of box

American Community Survey (ACS)

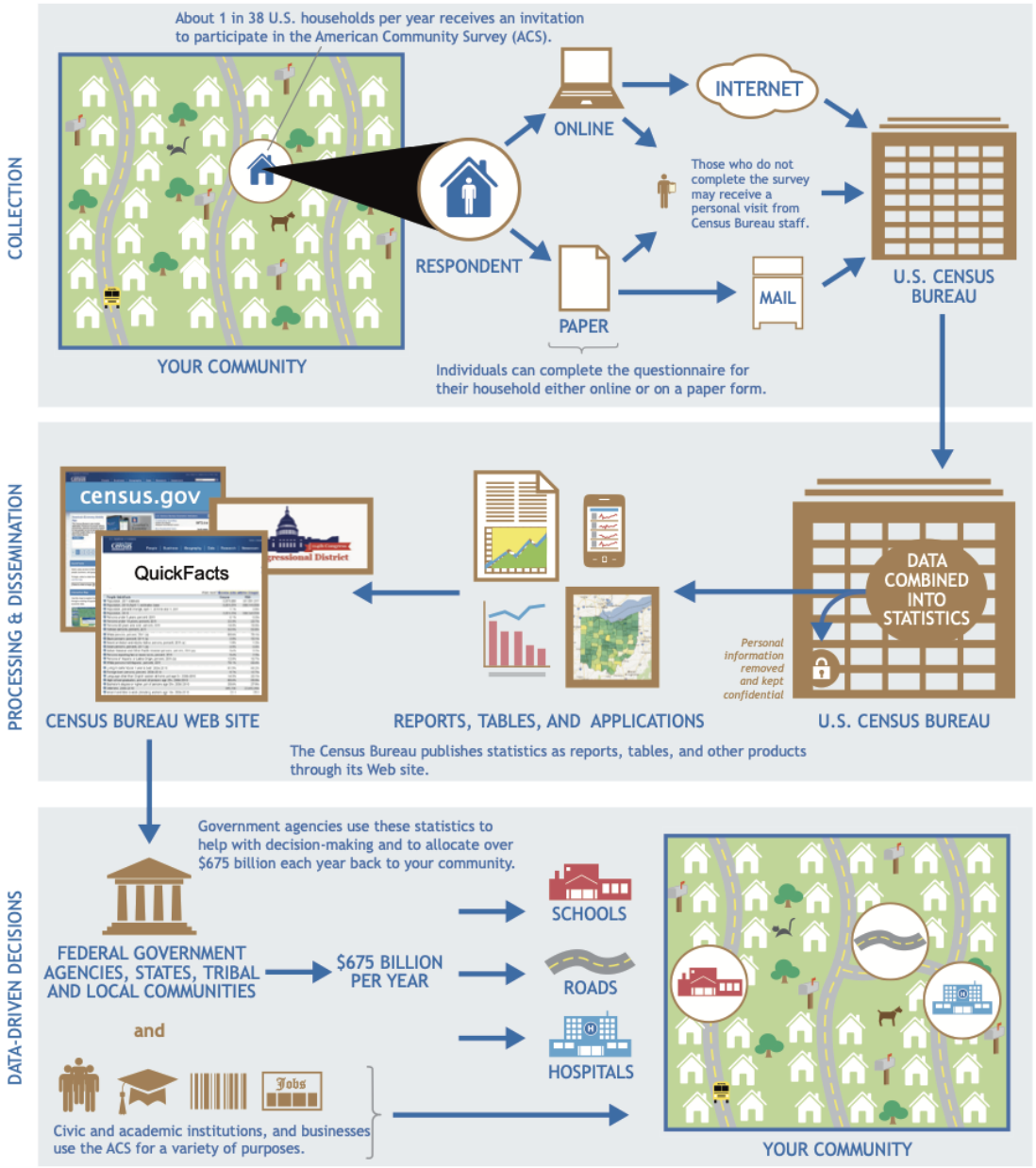
- Yearly survey
  - Sample of people throughout the United States
  - ~3.5 million vs. ~311 million for 2020 Decennial Census
- Much more detailed than Decennial Census
- Provide a statistical portrait of communities

About ACS

- Responses used to create and publish statistics for communities nationwide
  - Used by communities, local government, private sector
    - Establish priorities through needs assessment
    - Develop general plans
    - Research
    - Education
    - Advocacy work

- https://www.census.gov/content/dam/Census/programs-surveys/acs/about/ACS_Information_Guide.pdf

How the ACS Works for Your Community



Who Uses the ACS and Why?

Federal Agencies:
Throughout the federal government, agencies use ACS estimates to inform public policymakers, distribute funds, and assess programs. For example, the U.S. Department of Justice, the U.S. Department of Labor, and the U.S. Equal Employment Opportunity Commission use ACS estimates to enforce employment antidiscrimination laws. The U.S. Department of Veterans Affairs uses ACS estimates to evaluate the need for health care, education, and employment programs for those who have served in the military; and the U.S. Department of Education uses ACS estimates to develop adult education and literacy programs.

State and Local Agencies:
Information from the ACS is critical to state and local agencies. Planners and policymakers use the up-to-date estimates to evaluate the need for new roads, hospitals, schools, senior services, and other basic services. In addition, ACS data provide local communities with important information about their citizens, such as educational attainment, work commuting patterns, and languages spoken.

Nongovernmental Organizations:
ACS estimates are available to the public and are routinely used by researchers, nonprofit organizations, and community groups. These groups produce reports, research papers, business plans, case studies, datasets, and software packages. Some of these activities are designed to inform the public, some are designed to further business ventures, and some are used to apply for funding in the form of grants and donations for community projects.

Emergency Planners:
Emergency planners use ACS estimates to find local statistics critical to emergency planning, preparedness, and recovery efforts. When severe weather threatens or a natural disaster has occurred, ACS estimates provide important characteristics about the displaced population such as size, age, disability status, and the characteristics of housing that may be damaged or destroyed.

American Indians and Alaska Natives:
ACS estimates are available for tribal planners and administrators, as well as national organizations serving American Indians and Alaska Natives, to use in planning for future economic development, housing needs, and access to health and educational services. In combination with information from tribal administrative records, ACS estimates complete the portrait of the community and provide an enhanced view of a community's current and future needs.

Businesses:
Businesses use ACS estimates to inform important strategic decision-making. ACS statistics can be used as a component of market research. They can provide information about concentrations of potential employees with a specific education or occupation, communities that could be good places to build offices or facilities, and information about people that might need their products or services. For example, someone scouting a new location for an assisted-living center might look for an area with a large proportion of seniors and a large proportion of people employed in nursing occupations.

Educators:
ACS estimates are available for educators to teach concepts and skills, such as statistical literacy, social studies, geography, and mathematics. Because the ACS is updated annually, it provides timely information for students every year.

Journalists:
Journalists use ACS estimates to highlight and investigate the issues that are important to each community. Articles frequently appear, across the country, on topics such as commuting and transportation, unemployment and earnings, education, and homeownership. Additionally, the wealth of ACS statistics allows journalists to paint a portrait of small communities as they respond to changes in population, employment, and housing needs.

Public:
People use ACS estimates to answer questions they have about their own community and other communities. If a person wants to see how they compare with their neighbors or find a new place to live, they can look to the ACS to provide a wealth of information. The ACS provides useful statistics about the median income of an area, the median age of the residents, the median house value, and monthly household expenses. The ACS is a good source of information on commute to work times and types of transportation used by the community. These statistics, and many more, are available to the public for communities across the United States.

ACS Subjects and Data Products

Population

- Age
- Ancestry
- Citizenship Status
- Commuting (Journey to Work) and Place of Work
- Disability Status
- Educational Attainment and School Enrollment
- Employment Status
- Fertility
- Grandparents as Caregivers
- Health Insurance Coverage
- Hispanic or Latino Origin
- Income and Earnings
- Industry, Occupation, and Class of Worker
- Language Spoken at Home
- Marital History, Marital Status
- Migration/Residence 1 Year Ago
- Period of Military Service
- Place of Birth
- Poverty Status
- Race
- Relationship to Householder
- Sex
- Undergraduate Field of Degree
- VA Service-Connected Disability Status
- Veteran Status
- Work Status Last Year
- Year of Entry

Housing

- Acreage and Agricultural Sales
- Bedrooms
- Computer and Internet Use
- Food Stamps/Supplemental Nutrition Assistance Program (SNAP)
- 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

Key ACS Data Products

Data Profiles
Provide broad social, economic, housing, and demographic profiles.

Comparison Profiles
Similar to Data Profiles but show data side-by-side from the five most recent years of the ACS.

Selected Population Profiles
Provide broad social, economic, housing, and demographic profiles for a large number of race, ethnic, ancestry, and country/region of birth groups.

Ranking Tables
Provide state rankings of estimates across 86 key variables.

Subject Tables
Similar to Data Profiles but include more detailed ACS data, classified by subject.

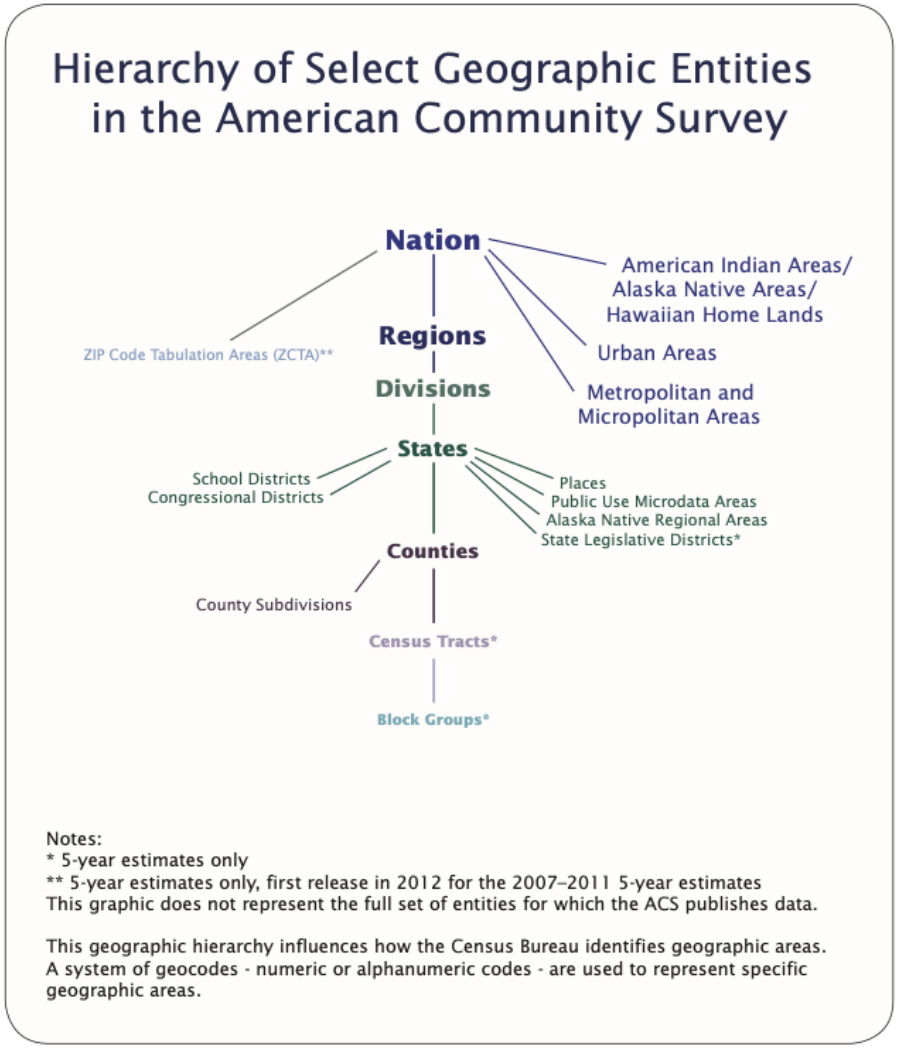
Detailed Tables
Provide access to the most detailed ACS data and cross tabulations of ACS variables.

Geographic Comparison Tables
Compare geographic areas other than states (e.g., counties or congressional districts) for key variables.

Summary Files
Provide access to the Detailed Tables through a series of comma-delimited text files.

Public Use Microdata Sample (PUMS) Files
Provide access to ACS microdata for data users with statistical software experience.

Geographic Areas: ACS vs. Census



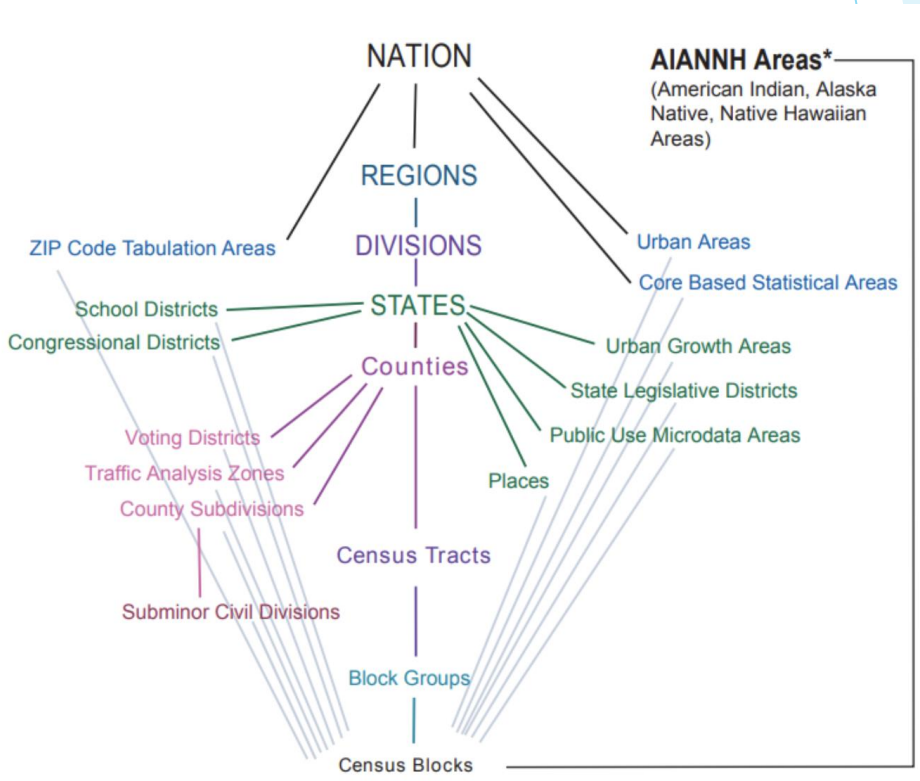


Figure 1.1: Census hierarchy of enumeration units

ACS Data Releases

ACS data are very timely because they are released in the year immediately following the year in which they are collected.

The ACS creates period estimates, which means they represent the characteristics of the population and housing over a specific data collection period. These are the 1-year and 5-year estimates.

1-Year Estimates

- 12 months of collected data
- Data for areas with populations of 65,000+
- 2005 ACS 1-year estimates first released in 2006

1-Year Supplemental Estimates

- 12 months of collected data
- Simplified versions of popular ACS tables
- Data for areas with populations of 20,000+
- 2014 ACS 1-year supplemental estimates first released in 2016

5-Year Estimates

- 60 months of collected data
- Data for all areas
- 2005–2009 ACS 5-year estimates first released in 2010

For more information about the release schedule, new and notable items related to each release, and changes to tables and geographies, please visit <census.gov/programs-surveys/acs/news/data-releases.html>.

Note: ACS 3-year estimates have been discontinued. Previous ACS 3-year estimates will remain available to data users, but no new 3-year estimates will be produced.

Which Estimate to Use?

1-Year Estimates

- Reflect most current data
- Larger margins of error than 5-year estimates
- Useful for geographic areas with rapidly-changing characteristics

5-Year Estimates

- Less current as larger samples include data collected in earlier years
- Smaller margins of error than 1-year estimates
- Increased statistical reliability for smaller geographic areas and small population groups

For more guidance on using ACS data, please visit <census.gov/programs-surveys/acs/guidance.html>

Data User Resources

Handbooks

You can use ACS estimates in different ways and for different reasons. Each one of our downloadable PDF handbooks helps a particular group with specific how-to instructions and case studies. There are ten different handbooks available with updated versions starting in 2017. Access the handbooks at <census.gov/programs-surveys/acs/guidance/handbooks.html>.

Available handbooks include:

- General Data Users
- American Indians and Alaska Natives
- Researchers
- Media
- Federal Agencies
- State and Local Government
- Business
- Rural Areas
- Congress
- Puerto Rico Community Survey

Special modules include:

- American FactFinder
- Application Programming Interface (API)
- Geographic Products/Applications
- Public Use Microdata Sample (PUMS)
- Summary Files

Presentations

Training presentations are available online for you to learn more about various aspects of the ACS. Each presentation consists of PowerPoint slides, accompanying speaker notes, and a Webinar transcript. The presentations cover a variety of content levels ranging from beginning to advanced ACS data topics. Access the full list of presentations at <census.gov/programs-surveys/acs/guidance/training-presentations.html>.

Data Tools

Find out more about your community using free data tools from the Census Bureau! Popular tools include QuickFacts, American FactFinder, and the Application Programming Interface (API). View the complete list at <census.gov/acs/www/data/data-tables-and-tools/>.

Geographic Information System (GIS)

- Most data has some association with a spatial dimension
  - A location on the earth's surface
  - Within an arbitrary coordinate system
    - Football field
    - Gridded petri dish
- A Geographic Information System (GIS)
  - Multi-component environment used to create, manage, visualize and analyze data and its spatial counterpart

Spatial Analysis

- Statistical analysis of patterns and underlying processes
  - “What could have been the genesis of the observed spatial pattern”
- Ex/

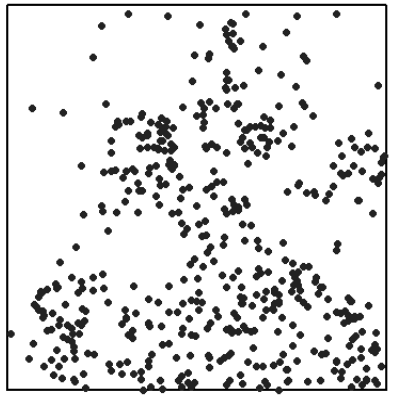


Figure 1.2: Distribution of Maple trees in a 1,000 x 1,000 ft study area.

  - Questions
    - Are the trees clustered or dispersed?
    - Is the tree density constant across the study area?
    - Could soil type or slope have led to the observed pattern?

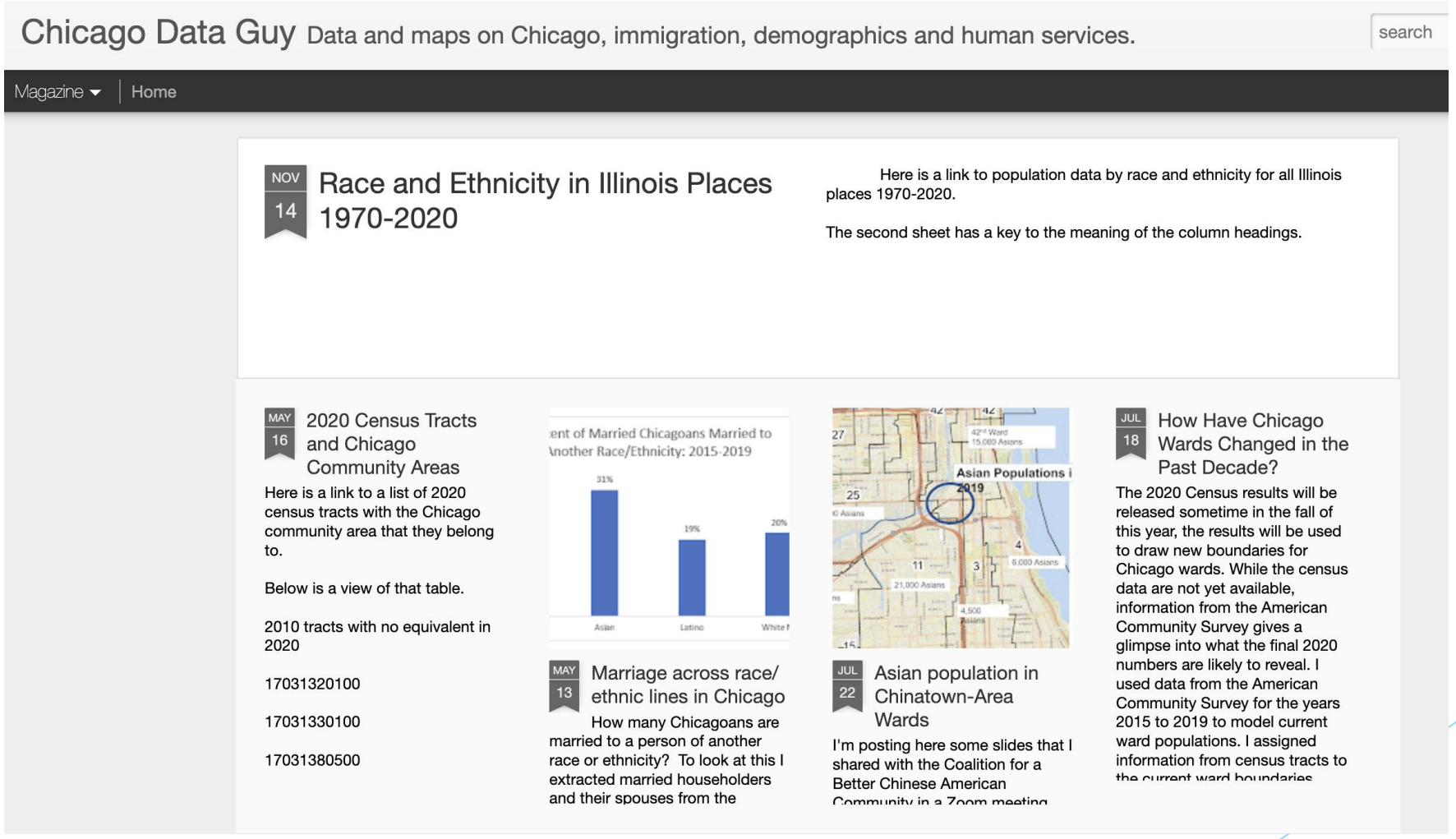
General idea of GIS maps

- Reference maps
  - Used to navigate landscapes or identify location of points-of-interest
- Presentation maps
  - Designed to convey a narrative
- Statistical maps
  - Purpose is to manipulate raw data to tease out patterns not discernable in original form
    - Usually requires multipe data manipulation operations and visualization
    - Sometimes can benefit from being explored outside of spatial context

In the next hw

- Considering to what extent the community areas are actual communities
- Developing alternative community area-based networks based on census data

Mapping Census Data to Chicago Community Areas



http://robparal.blogspot.com/

2020 Census Tracts to Chicago Community Area Equivalency File : Sheet1		
GEOID20	CA	COMMUNIT_1
17031010100	1	Rogers Park
17031010201	1	Rogers Park
17031010202	1	Rogers Park
17031010300	1	Rogers Park
17031010400	1	Rogers Park
17031010501	1	Rogers Park
17031010502	1	Rogers Park
17031010503	1	Rogers Park
17031010600	1	Rogers Park
17031010701	1	Rogers Park
17031010702	1	Rogers Park
17031020100	2	West Ridge
17031020200	2	West Ridge
17031020301	2	West Ridge
17031020302	2	West Ridge
17031020400	2	West Ridge
17031020500	2	West Ridge
17031020601	2	West Ridge
17031020602	2	West Ridge
17031020701	2	West Ridge
17031020702	2	West Ridge
17031020801	2	West Ridge
17031020802	2	West Ridge
17031020901	2	West Ridge
17031020902	2	West Ridge
17031030101	77	Edgewater

Understanding Geographic Identifiers (GEOIDs)

What are GEOIDs?

The Census Bureau and other state and federal agencies are responsible for assigning geographic identifiers, or GEOIDs, to geographic entities to facilitate the organization, presentation, and exchange of geographic and statistical data. GEOIDs are numeric codes that uniquely identify all administrative/legal and statistical geographic areas for which the Census Bureau tabulates data. From Alaska, the largest state, to the smallest census block in New York City, every geographic area has a unique GEOID. Some of the most common administrative/legal and statistical geographic entities with unique GEOIDs include states, counties, congressional districts, core based statistical areas (metropolitan and micropolitan areas), census tracts, block groups and census blocks.

Why Are GEOIDs Important?

GEOIDs are very important for understanding and interpreting geographic and demographic data and their relationship to one another. Data users rely on GEOIDs to join the appropriate demographic data from censuses and surveys, such as the American Community Survey (ACS), to various levels of geography for data analysis, interpretation and mapping. Without a common identifier among geographic and demographic datasets, data users would have a difficult time pairing the appropriate demographic data with the appropriate geographic data, thus considerably increasing data processing times and the likelihood of data inaccuracy.

https://www.census.gov/programs-surveys/geography/guidance/geo-identifiers.html

GEOID Structure for Geographic Areas

The Standard Hierarchy of Census Geographic Entities diagram illustrates the hierarchal relationship of different geographic areas to one another. This diagram is a great tool for understanding how GEOIDs are concatenated for geographic areas that nest within other geographic areas. The table below shows the GEOID structure in TIGER/Line Shapefiles for some of the most common legal and statistical geographies, as well as example GEOIDs for different geographic areas.

Hierarchy Diagrams

Diagrams showing how levels of geography relate to one another.

Area Type	GEOID Structure	Number of Digits	Example Geographic Area	Example GEOID
State	STATE	2	Texas	48
County	STATE+COUNTY	2+3=5	Harris County, TX	48201
County Subdivision	STATE+COUNTY+COUSUB	2+3+5=10	Pasadena CCD, Harris County, TX	4820192975
Places	STATE+PLACE	2+5=7	Houston, TX	4835000
Census Tract	STATE+COUNTY+TRACT	2+3+6=11	Census Tract 2231 in Harris County, TX	48201223100
Block Group	STATE+COUNTY+TRACT+BLOCKGROUP	2+3+6+1=12	Block Group 1 in Census Tract 2231 in Harris County, TX	482012231001