AskCHIS Neighborhood Edition (NE) ©: Using ACS Data to Construct and Visualize Small Area Estimates for The California Health Interview Survey

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California Health Interview Survey (CHIS)

Main Objectives

- California’s assessment tool to meet state and local needs for population-based health data
- Provide Health and Health-related Estimates
  1) at local-level for counties, cities with health departments, and statewide
  2) for adults, teens, and children
  3) for California’s major race/ethnic groups and (if possible) some smaller ethnic groups
  4) to wide audiences
CHIS Content

- Rich demographic data
- Health behaviors
- Health conditions
- Access to and use of health care services
- Health insurance coverage
- Social determinants of health
- ... and numerous other topics

See CHIS Questionnaire Topics
http://healthpolicy.ucla.edu/chis/design/Pages/survey-topics.aspx
How is CHIS conducted?

- Through 2018 used RDD sampling (landline and cell) and Computer-Assisted Telephone Interview (CATI), switching to an ABS, push-to-Web + CATI design starting in 2019

- CHIS collects detailed information for:

  One adult (age 18+) in the household,
  One adolescent (age 12-17) if present, and
  One child (age 0-11) if present (by parent proxy)
Sample Design of the CHIS

- Geographic stratification allows for direct estimates for 56 strata:
  - 8 Service Planning Areas in Los Angeles County
  - 6 Health Regions in San Diego County
  - 39 County strata (excluding LA and San Diego)
  - 3 County-group strata with the 17 smallest counties (by population)

- In total, ~20,000 adults per year are included in the sample

- Our challenge: *How do we generate health estimates for lower geographic levels—ideally down to the ZIP code level?*
CHIS Data Across Geographies

- State
- Counties
- Assembly
- Senate
- Congress
- Cities
- Zip Codes

AskCHIS

Direct Estimates

AskCHIS
Neighborhood Edition ©

Modeled Small Area Estimates

www.chis.ucla.edu
Approach for CHIS SAEs

Build models for CHIS data “borrowing strength” from other sources

**Survey Data: CHIS**
- CHIS outcome variable and covariates of interest

**Auxiliary Data: American Community Survey**
- ACS 5-year summary tables, especially sociodemographic variables at the neighborhood level. We initially included 236 variables, condensed through a 2-step principal component analysis (PCA), ending with two principal components.

**Population Data: Nielsen-Claritas**
- Nielsen-Claritas data, including same covariates of interest as in CHIS. We augmented this with modeled income-to-poverty ratios from CHIS, and adjusted to CHIS weighting dimensions through iterative proportional fitting.
Approach for CHIS SAEs

**Modeling Indicators**
- Begin with unit-level generalized linear mixed model
- Add a non-parametric function of census tract level auxiliary variables
- Apply model parameters to population dataset
- Aggregate predicted values into area level estimates

**Calibration and Validation**
- Include a random intercept from each stratum to account for sample design and soft-calibrate to direct estimates
- When predicted values fell outside limits, hard-calibrate by applying proportions of direct estimates to modeled estimates
- Validate by checking against larger areas and external information

**Stability and Pooling**
- Calculate coefficients of variation (CVs)
- Suppress point estimates with CV>=30%, or areas with a population universe < 1,000
- Geographic estimates may be combined to pass stability criteria (pooled estimates are population-weighted averages of originals)
Detailed Description of the Methodology

- “Generating Health Estimates by Zip Code: A Semiparametric Small Area Estimation Approach Using the California Health Interview Survey”

- “A design-based approach to small area estimation using a semiparametric generalized linear mixed model”
AskCHIS Neighborhood Edition©
Available at askchisne.ucla.edu

- Online platform for CHIS SAE dissemination and visualization
- Design informed by data user surveys and focus groups
- Developed thanks to grants from Kaiser Permanente and The California Wellness Foundation
Granular Health Estimates

AskCHIS Neighborhood Edition

UCLA Center for Health Policy Research

CHIS California Health Interview Survey

UCLA

AskCHIS Neighborhood Edition is an online data dissemination and visualization platform that provides health estimates at sub-county geographic regions. With AskCHIS NE, you can access and visualize authoritative health data at zip code, city, county, and legislative district levels.

Learn about our methodology
Estimates for Zip Codes, Cities, Counties, Legislative Districts

Ever diagnosed with diabetes (18+)
2014
- California: 8.8% (8.2% - 9.3%), 28,539,200
- Los Angeles County: 9.9% (8.9% - 10.9%), 7,577,300
- Congressional District 40: 10.3% (7.7% - 13.0%), 495,900
- Downey: 11.9% (8.2% - 15.6%), 84,400
- 90241: 11.1% (7.4% - 14.7%), 32,000

Obese (BMI ≥ 30) - Latino (18+)
2014
- California: 33.9% (31.5% - 36.9%), 9,811,500
- Los Angeles County: 32.9% (30.4% - 35.4%), 3,328,500
- Congressional District 40: 36.5% (31.7% - 41.4%), 423,500
- Downey: 38.8% (32.8% - 46.1%), 58,500
- 90241: 36.5% (30.1% - 43.0%), 22,000

Walked at least 150 minutes (18+)
2014
- California: 33.0% (31.9% - 34.0%), 28,539,200
- Los Angeles County: 34.1% (32.0% - 36.3%), 7,577,300
- Congressional District 40: 36.1% (31.0% - 41.1%), 495,900
- Downey: 34.6% (29.0% - 40.2%), 84,400
- 90241: 35.3% (29.6% - 41.1%), 32,000

Sugar drink consumption 1+ times per day (18+)
2014
- California: 17.4% (16.5% - 18.3%), 28,539,200
- Los Angeles County: 17.7% (16.1% - 19.4%), 7,577,300
- Congressional District 40: 27.2% (22.2% - 32.2%), 495,900
- Downey: 20.9% (16.2% - 25.6%), 84,400
- 90241: 20.6% (14.9% - 26.3%), 32,000

Demographics

Ever diagnosed with diabetes (18+)
Adult respondents ages 18+ who were ever diagnosed with diabetes by a doctor.
Powerful Visualization Tools

AskCHIS Neighborhood Edition

90241

Federal Poverty Level
- 0-138% FPL
- 139-249% FPL
- 250-399% FPL
- 400%+ FPL

Race/Ethnicity
- Non-Hispanic White only
- Hispanic or Latino
- Non-Hispanic Asian only
- Non-Hispanic Black only
- Non-Hispanic Other

Population
- Female
- Male

Number of zip codes

Ever diagnosed with diabetes (18+)

Base map data © OpenStreetMap and Natural Earth
Custom Visualizations Using Ranges Defined on Interactive Histogram
Supplemental Data Sources: CalEnviroScreen for Air Quality, Pollution

Particulate matter (PM2.5) (0+)
Annual mean PM 2.5 concentration, ug/m³
AskCHIS Neighborhood Edition

The AskCHIS Neighborhood Edition (AskCHIS NE) API provides access to all of the estimates available in the AskCHIS NE dashboard (http://askchisne.ucla.edu). The API can be used for both web development and research and makes it easy for users to build custom queries and extract estimates. Health indicators in AskCHIS NE are created using a sophisticated modeling technique called Small Area Estimation (SAE). For more information on data provenance, please visit the help section in AskCHIS NE.

Variable

Return data for a specific health indicator (e.g. variable) for specific geographic areas provided.

Note: The geoType or the geoids parameter is required. You can have both, or just one, but you cannot leave them both empty.

Free Tier Restriction: Only one geographic area can be queried at a time. If multiple geoids are provided, the first one will be used.

Try it

Request URL

http://askchisne.azure-api.net/api/variable/(name)?attributes=[&geoType][&geoids][&year]

Request parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Type</th>
<th>Description</th>
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<tbody>
<tr>
<td>name</td>
<td>string</td>
<td>Indicator name</td>
</tr>
<tr>
<td>attributes</td>
<td>string</td>
<td>Can be any of the following (case-sensitive): population, estimate, SE, CI_LB95, CI UB95, CV, MSE</td>
</tr>
<tr>
<td>geoType</td>
<td>string</td>
<td>can be one of the following: cities, assembly, congress, senate, zcta (zip codes), state, counties</td>
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AskCHIS On-Demand Learning Center
http://healthpolicy.ucla.edu/chis/Pages/CHISTraining.aspx

Introduction to AskCHIS NE
AskCHIS Neighborhood Edition allows you to access hyper-local California health data, including ZIP code, legislative district, city and more!

How to build a basic Community Profile
Learn how to select a health topic and up to five hyper-local geographical locations.

How to adjust and visualize your data
Learn how to adjust results, visualize your data, and more!

Fast, free tutorials on how to use AskCHIS and AskCHIS Neighborhood Edition©
Thank you!

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