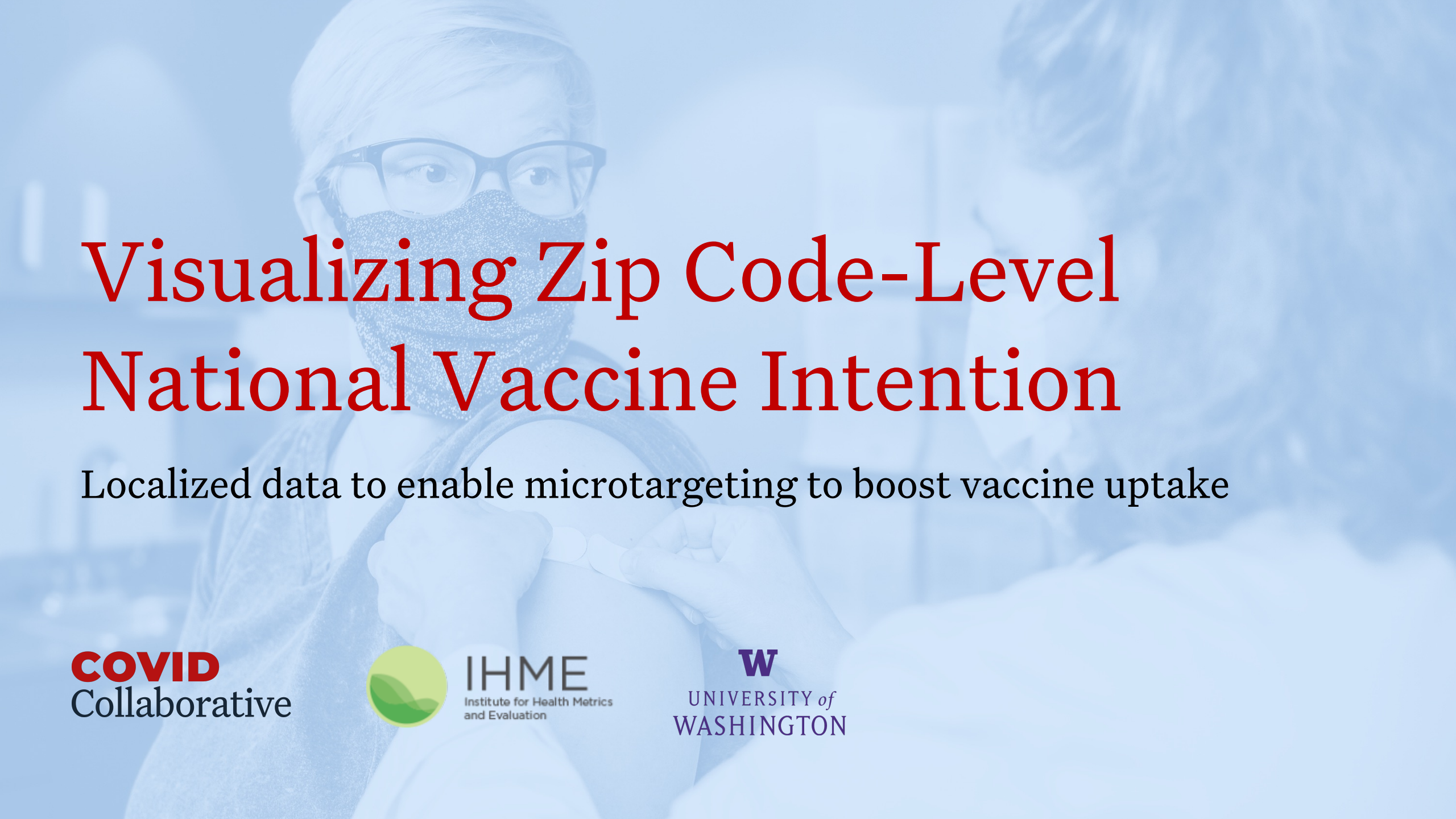


Visualizing Zip Code-Level National Vaccine Intention

Localized data to enable microtargeting to boost vaccine uptake

COVID Collaborative

IHME Institute for Health Metrics and Evaluation

UNIVERSITY of WASHINGTON

The Challenge

- The nation is falling short of vaccination levels needed for herd immunity
- Vaccination rates have slowed—requiring targeted intervention
- Efforts must focus on building confidence in communities with lower vaccination rates and higher vaccine hesitancy
- Currently, data visualizations are limited to the state and county level, not zip code (~3,000 counties, but ~30,000 zip codes)

Our Solution

- **A data visualization map at the zip code and county level for the US**
  - **See Appendix for examples**
- It allows local, county, and state organizations and policymakers to pinpoint areas of focus and boost vaccine uptake locally
- It will be based on pioneering public health/COVID database from CMU/Facebook COVID-19 Symptom Survey
  - See Appendix for methodology, survey questions
- We will launch a beta-testing version of visualization on Thursday June 24 to gain feedback from users
- Map will live on the IHME website and be accessible from covidcollaborative.us

Visualization Roadmap

Beta Features

- Visualization of hesitancy at the county and zip code level, by week

- Data can be filtered using two toggles:
  - "Somewhat Hesitant" only, including Yes - Probably and No - Probably Not responses
  - "All Hesitant" including Yes - Probably, No - Probably Not, No - Definitely Not

Potential Future Features

- Additional data filters that allow for further analysis based on variables such as:
  - Race/Ethnicity
  - Gender
  - Political Affiliation
  - Religious Affiliation
  - Urban/Suburban/Rural

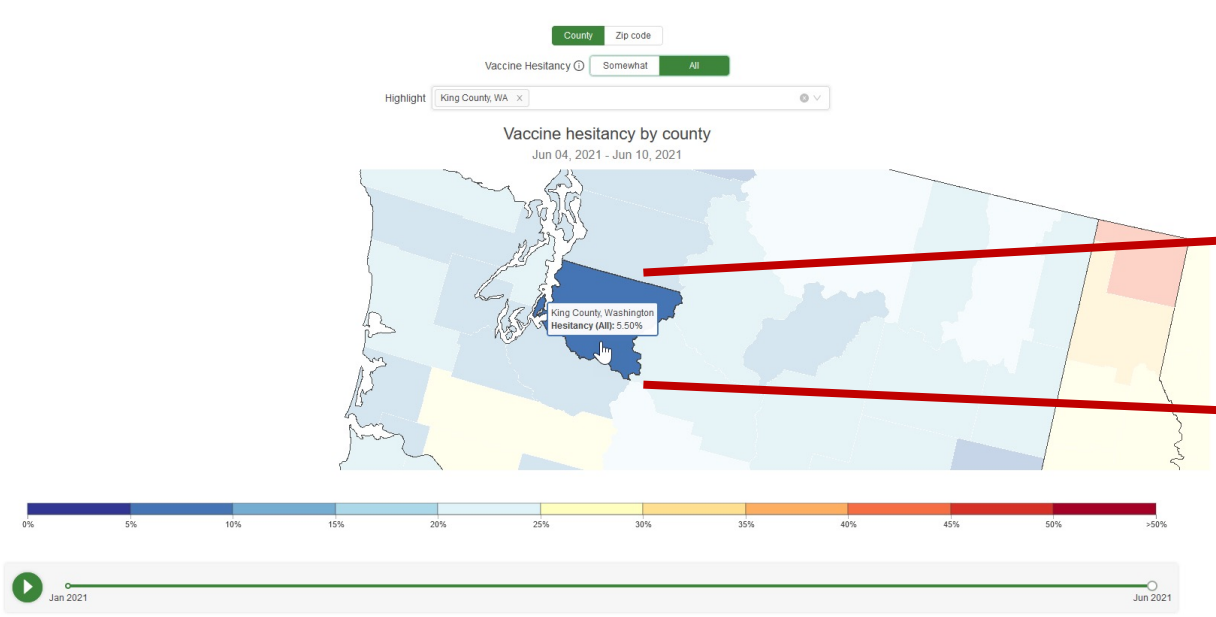
Comparison with Other Pulse Surveys

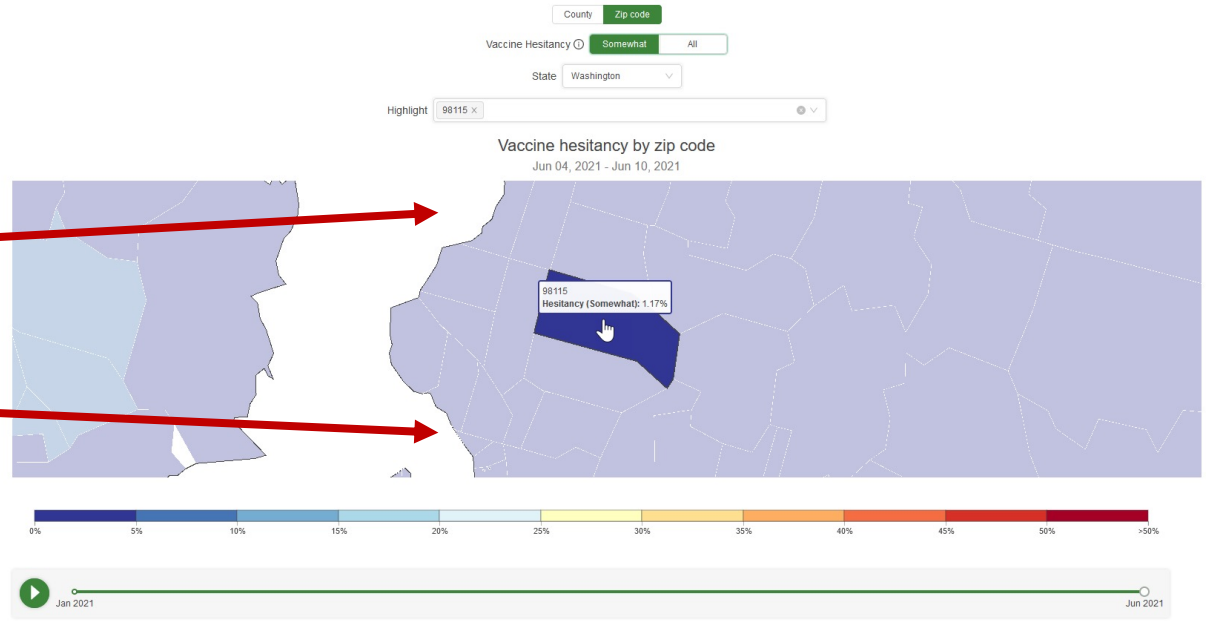
Publisher	IHME / COVID Collaborative	HHS / CDC	KFF Vaccine Dashboard
Database Generator	Facebook / Carnegie-Mellon	U.S. Census Bureau Household Pulse Survey (HPS)	Kaiser Family Foundation
Data Visualization Population Level	State, County, and Zip Code Map	State & County Map	Country-Level Barcharts Trend Analysis
Update Frequency	Every 2 weeks	Every 2 weeks	Once a month
Sample Size	~21 million plus 700,000/2 weeks	~100,000 per sampling interval	~2,100 per sampling interval
Sample Methodology	Random sample of FB users who respond to an advertisement; data anonymized, no personal identifiers	Multi-stage sampling begins with housing units, then email and sms messages, and then the online questionnaire	Random digit dialing cell-phone + landline sampling frame
Adjustments for Representativeness	FB calculates statistical demographic weighting to balance dataset by method “known to FB”	Various weightings for housing units, non-respondents, and person adjustments	Combined phone sample weight-balanced to 2019 Census Bureau Survey sampling error +/- 3%
Threats to Validity	How well adjustments result in “representativeness”	Ascertainment Bias	Ascertainment Bias
Hesitancy Terminology	Uses “Hesitancy”; most generally accepted terminology	-“Uses Hesitancy” -uses color-based 0-30% estimated hesitancy rate	-Uses “Enthusiasm” -does not use “Hesitancy”
Questionnaire Hesitancy Categories	-4-Response Scale -”somewhat hesitant” = PROB-Y + PROB-N -all hesitant=PROB-Y+PROB-N+ DEF-N	-5-Response Scale”; adds “unsure” -Strongly Hesitant= DEF-N -Hesitant = PROB-N + DEF-N	-4-Response Scale; ASAP/Wait & See/Only If Required/ DEF-N -no use of the term “hesitancy”

Comparison with Vaccine Uptake Dashboards

- Provides valuable complement to vaccine uptake dashboards
- Provides Zip Code (~30,000 units) vs County (~3000 units) granularity
- Depicts graded scale of hesitancy (show “somewhat” and “all”)
  - Shows that hesitancy is not a mathematical inverse of uptake
- Provides bi-weekly instead of daily updates, but still a timely snapshot
- If beta-test proves out, can supplement with stratified demographics on sub-populations of interest (gender, race, political affiliation, urban/rural, etc)

Benefit: Enables Greater Local Targeting





Benefit: Highlights Disparities within Counties

- County level data does not show nuances in hesitancy at the hyper local level, which often shows more variable hesitancy levels

- Example: NE Washington State, county level hesitancy at 20%; Zip Code Level as high as 60%

- Example: Minnesota, two adjacent zip codes have hesitancy of 11% and over 70%

Next Steps

- Released Beta Version of Product on June 24
- Working with ASTHO, NACCHO, Big Cities Health Coalition to get resources into the hands of local implementers
- Collecting feedback and insights from local implementers about utility of resource to determine additional investment/features to build out

Appendix

Includes Methodology, Survey Questions, Sample Visualizations

Methodology

- Data are tabulated based on the provided survey weights, stratified by zip code tabulation area (ZCTA) and week
- Incorporate data into cascading spline Poisson models (using week as the independent variable) to borrow strength across local geography and capture change in hesitancy over time
- Fit to all available data in the state, then each county within that state separately, then each ZCTA that overlaps with a given county
- Each step reduces the model dataset to only be inclusive of a more granular geographic unit, while passing on statistical information from the "parent" model to inform the estimation through Bayesian priors
- Present results based on the ZCTA models, including county results based on population-weighted average of the constituent ZCTA estimates

CMU/Facebook COVID-19 Symptom Survey

- "Have you had a COVID-19 vaccine?"
  - Yes
  - No
  - I don't know
- For respondents who said they had not yet received the vaccine: "If a vaccine to prevent COVID-19 were offered to you today, would you choose to get vaccinated?"
  - Yes, definitely
  - Yes, probably
  - No, probably not
  - No, definitely not

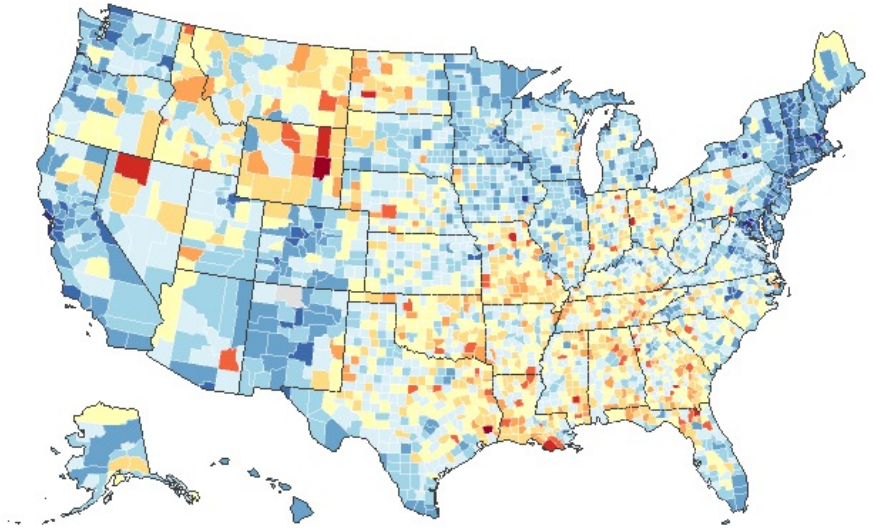
County | Zip code

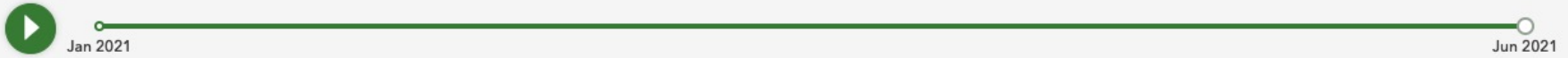
Vaccine Hesitancy ⓘ Somewhat All

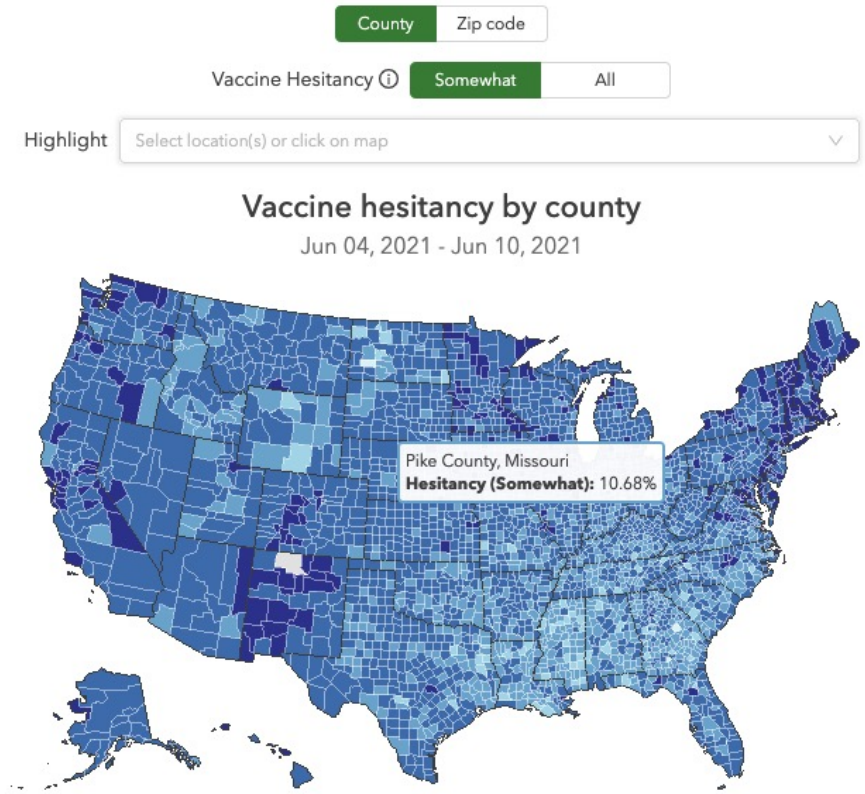
Highlight Select location(s) or click on map

Vaccine hesitancy by county

Jun 04, 2021 - Jun 10, 2021

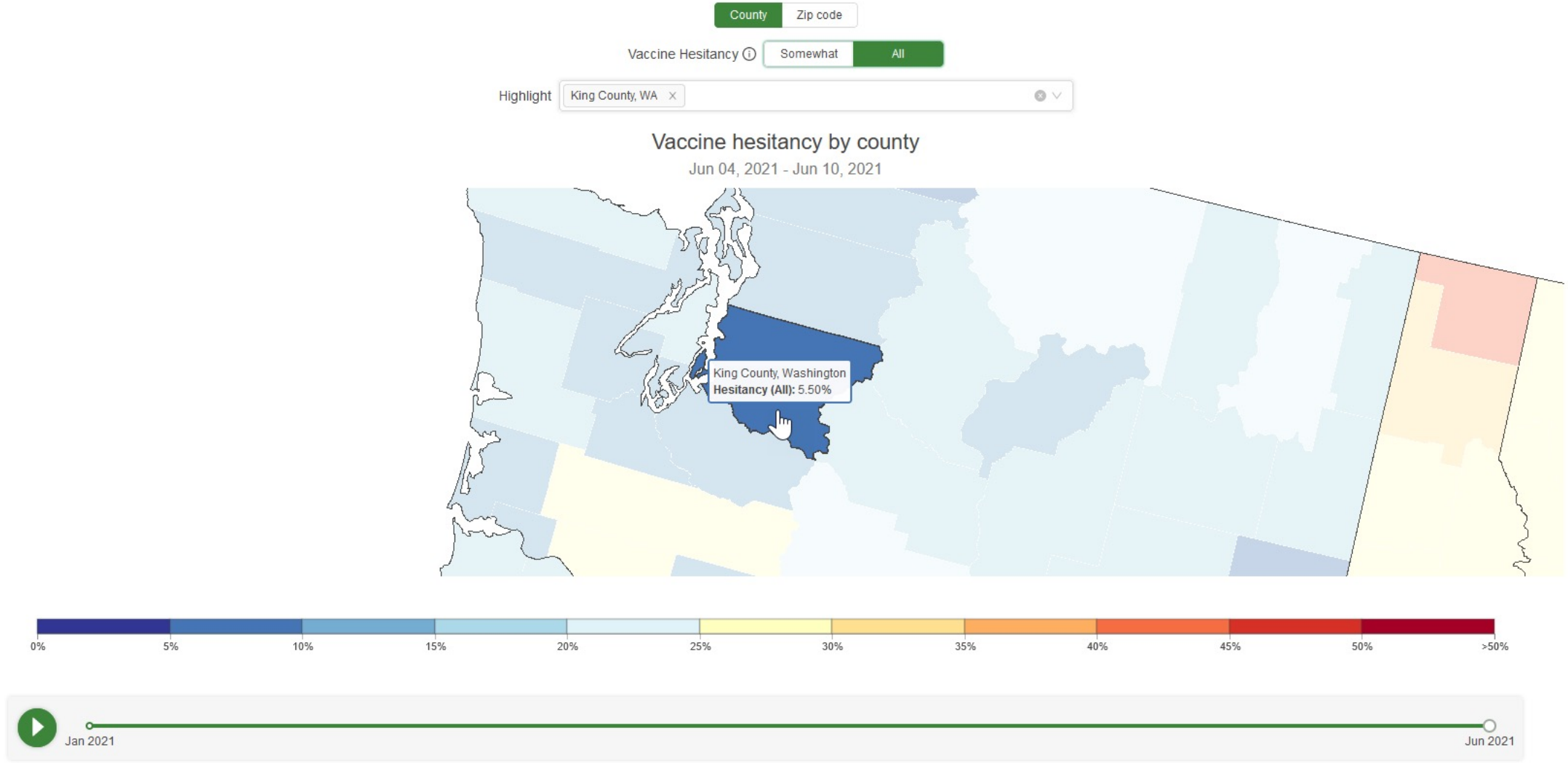





County
Zip code
Vaccine Hesitancy
Somewhat
All
Highlight
Select location(s) or click on map
Vaccine hesitancy by county
Jun 04, 2021 - Jun 10, 2021
Pike County, Missouri
Hesitancy (Somewhat): 10.68%


0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
50%
>50%


Jan 2021
Jun 2021


County
Zip code
Vaccine Hesitancy
Somewhat
All
Highlight
King County, WA
Vaccine hesitancy by county
Jun 04, 2021 - Jun 10, 2021
King County, Washington
Hesitancy (All): 5.50%
0%
5%
10%
15%
20%
25%
30%
35%
40%
45%
50%
>50%
Jan 2021
Jun 2021

County | Zip code

Vaccine Hesitancy ⓘ Somewhat | All

State Washington

Highlight 98115 ×

Vaccine hesitancy by zip code

Jun 04, 2021 - Jun 10, 2021