**Estimating Child Supplemental Security Income (SSI) Participation Rate from Public Data**

Andrew K. ElHabr, BS1; Turgay Ayer, PhD1; Christian Murray, MS2; Aziza Arifkhanova, PhD2; (others); Jennifer Kaminski, PhD2

1 Department of Industrial and Systems Engineering, Georgia Institute of Technology, Atlanta, GA

2 Centers for Disease Control and Prevention, Atlanta, GA

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Corresponding Author:

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**TARGET JOURNALS**

1. Public Health Reports
2. Disability and Health Journal
3. Journal of Disability Policy Studies
4. Journal of Public Health Management and Practice
5. Journal of Developmental & Behavioral Pediatrics

**ABSTRACT**

*Objectives*: To estimate the child participation rate in the Supplementary State Income (SSI) program among those who are eligible by state from 2016 through 2019, and to compute correlations with potentially relevant state characteristics and public policies.

*Methods*: We extracted data from the United States Census Bureau’s American Community Survey, and the National Survey of Children’s Health to estimate the disability prevalence of financially eligible children by SSI program standards. Then, we used aggregated data from the Social Security Administration’s Supplemental Security Record in combination with these estimated disability prevalences among financially eligible children to estimate child SSI participation rates.

*Results*: We estimate the US child SSI participation rate among those who are program eligible to be 38.6%. The top states are Arkansas (53.4%), New York (53.1%), and Louisiana (51.2%), and the bottom states are Wyoming (18.1%), Montana (19.9%), and Utah (20.8%). We found significant positive correlation (p < 0.05) between state-level child SSI participation rates and states with higher percentages of population in urbanized areas, higher percentages of financially eligible children with health insurance, and that award Medicaid automatically if SSI is awarded.

*Conclusions*: Child SSI participation rates are below 50% for all but four states. The lives of just over 120,000 program eligible children would be impacted if state-level participation rates could be brought up to the US estimate of 38.6%.

**3-QUESTION SUMMARY BOX**

*What is the current understanding of this subject?*

There is geographic variation in SSI participation rates among all children, and higher rates occur in areas with high prevalences of child disability.

*What does this report add to the literature?*

A baseline of child SSI participation rates estimates among those who are program eligible for all US states.

*What are the implications for public health practice?*

There is significant positive correlation between child SSI participation rates and states with higher percentages of population in urbanized areas, higher percentages of financially eligible children with insurance, and Medicaid awards directly tied to SSI awards. Our framework can be used for future analyses.

**INTRODUCTION**

The Supplemental Security Income (SSI) is a federal income supplement program administered by the Social Security Administration (SSA) intended to financially support aged (65 and up), blind, and disabled people who have limited income and resources.1 Specifically for children, disability eligibility is defined by having a medically determinable physical or mental impairment that can lead to severe functional limitations or death, and financial eligibility is generally characterized by living in a household earning less than about $5,000 per month.2 (This is almost impossible to define succinctly.) As of 2022, The maximum federal benefit rate is $841 per month for an individual.3 By 2018, 23 states opted to supplement these benefits with State Supplementary Payments (SSP), with a maximum benefit amount of about $60 for children.4,5 Just under 8 million people received SSI payment, 85.7% of which qualify through blind/disabled eligibility criteria, in 2020.6 Approximately 1.1 million children (nearly 2%) of all children in the United States (US) receive support from the SSI program, 67.7% of which were male and 68.3% of which came from single parent households, receiving an average federal payment of $669.6 The National Academies of Sciences, Engineering, and Medicine (NASEM) have estimated that child poverty would rise from 13.0 to 14.8% without the SSI program.7

Whether the SSI program has reached its full potential by assisting all children who are potentially eligible for its benefits remains an open question. Only a few specific SSI participation estimates have been published. Not considering financial eligibility, only 22.7% of those with disabilities in the working age population receive SSI.8 Because the disability eligibility criteria for the working age population includes the ability to perform substantial gainful activity in place of impairment that severely limits functional ability and many newly turned 18-year old were ineligible for SSI previously because their parental income was too high, it is difficult to assess how well this 22.7% translates to the child population.2,9 For financially eligible children with attention deficit hyperactivity disorder, the most common mental health diagnosis for SSI determinations and recipients, only 15.2% receive SSI.10 Because developmental disorders make up no more than 20% of diagnoses for child SSI recipients, this 15.2% estimate can only serve as a rough basis for the whole child population.6

In 2020, 63.8% of the 27.4 million uninsured in US who were eligible for Medicaid, the Children’s Health Insurance Program, or Affordable Care Act subsidies did not sign up, with lack of awareness of programs, uncertainty about eligibility, and administrative hurdles cited as reasons for not enrolling.11 Similar concerns exists for the SSI program.12 Since most SSI recipients are categorically eligible for Medicaid, the two programs are inevitably intertwined.13 The 16 and 17 states that opted to use more restrictive eligibility criteria for Medicaid than their SSI program and had not expanded Medicaid eligibility by 2019, respectively, may see this effect reflected in their child SSI participation rates.14,15 Beyond these potential policy impacts, evidence of general geographic variation in SSI participation has been shown to exist.8,10,16–18

The primary purpose of this study is to develop national and state estimates of child SSI participation rate among those who are program eligible. Estimates of child SSI participation could inform federal and state efforts to reach more eligible families, provide a basis on which to monitor effects of those efforts, and provide the foundation for estimating true potential population level impact of federal and state policies if SSI program reach were maximized. A secondary aim is to describe the distribution of uncertainty of our child SSI participation rate estimates to provide context for future research studies that may use our estimates.

**METHODS**

To understand child SSI participation at the state level, we gathered information on the number of children who received SSI in each state and the number of children who were potentially eligible via both financial and disability criteria. We assumed that families with incomes below 200% of the federal poverty level (FPL) are financially eligible for SSI, which is a proxy for financial eligibility that has been used in previous relevant literature.10,17,18 As of 2013, the family income of 77.9% of child SSI recipients was less than 200% of the FPL.19 Assuming no unearned family income, the income eligibility threshold for SSI has been estimated to be in the range of 177 to 235% of FPL. As for the SSI disability eligibility criteria, children must meet rigorous medical eligibility criteria based on a physician’s assessment to qualify, but it is not well established how well public survey questionnaires on disability align with the person-level questionnaire that SSI departments use.20,21 Given that about 80% of the 165,000 of medical denials for children applying for SSI every year are due to lack of severe enough functional limitations, the definition of disability prevalence is vital.6 The six-question sequence used by US Census Bureau’s American Community Survey (ACS) captures about 63% of the US working-age population that received SSI.22 Although the child and working populations are distinct, it is reasonable to assume that the ACS may provide a lower bound on the true disability prevalence of children who are financially eligible for SSI. A separate public source, the National Survey of Children’s Health (NSCH) includes multiple screener questions on the level of special health care needs for a child. These screener questions on special health care needs ask about functional limitations, similarly to the ACS, but also include questions about use of specialized services and prescription medications to manage chronic conditions.23 Thus, the prevalence of financially eligible children with special health care needs indicated by the NSCH can be used as an upper bound on the true prevalence of children with disability who are financially eligible for SSI.

*Child Disability Prevalence Estimation*

For the ACS disability prevalences, we extract the variables (B18131\_xxx) that correspond to the number of children with and without disability with ratios of less than 0.50, between 0.5 and 0.99, between 1.00 and 1.49, and between 1.50 and 1.99. from the “Age by Ratio of Income to Poverty Level in the Past 12 Months by Disability Status and Type” concept for each state in the 1-year ACS tables between 2016 and 2019.24 Disability prevalence is calculated as the ratio of number of children with disability to total number of children in each income to poverty level category. For the NSCH disability prevalences, we scraped the “More complex health care needs” percentage estimates to the answers of the aggregated survey question: “What is the level of complexity of special health care needs (CSHCN)?” for each state, year, and household income level categories of 0-100% FPL and 100-200% FPL.23 Due to the uncertainty in the true prevalence of disability among children who are financially eligible for SSI, we averaged the two public data sources of disability prevalences (ACS and NSCH). This same approach is recommended when estimating drug prices for cost-effectiveness analyses using public data.25 For proper combination with the NSCH data, the ACS data in income to poverty ratios of <0.5 and 0.5-1 are aggregated together and ratios of 1-1.5 and 1.5-2 are aggregated together. Because higher disability prevalences are correlated with lower family income, it is vital to properly account for subgroup disability prevalences in this manner to not underestimate the overall child SSI participation rates.10,26,27

*Child SSI Participation Estimation*

We collect the number of disability SSI recipients aged 18 or younger from the SSA’s Supplemental Security Record from 2016 through 2019.6 The total number of SSI recipients in this age group, who must have been both eligible by both financial and disability criteria, are then divided by the total number of financially and disability eligible children that are estimated from the aforementioned disability prevalence. When reporting summary statistics over the entire study period, we ensure that the numbers in each part of the participation rate fraction are summed across all years first to ensure that any underlying trends in population growth are properly accounted.

*State Attributes and Policy Information*

To explore the correlations between the estimated child SSI participation rates and various state-level attributes and policies of interest, we utilized a variety of public resources. To examine how estimates were associated with the percentage of urbanized areas in a state (areas with greater than 50,000 people), we extracted from the 2010 US Census Bureau’s urban-rural classification data (2020 data has not been released yet).28 We gathered information about Medicaid expansion states and the percentage of low-income children with health insurance from the Kaiser Family Foundation (KFF).15,29 For all years, Alaska, Rhode Island, and Vermont are excluded from the insurance correlation analysis due to missing data. For information about whether a state offered SSP for children with disabilities and automatically awarded Medicaid if SSI was awarded, we used the Policy Surveillance Program and SSA’s SSI annual report appendices, respectively.4,14

*Statistical Analysis*

In the secondary analysis in which we incorporate uncertainty in the public data estimates, we fit normal distributions to the mean and 5% and 95% quantiles provided in the ACS tables and beta distributions to the mean and 2.5% and 97.5% quantiles provided in the NSCH tables. After the distribution fitting, we sample 1,000 points from these distributions and carry out the aforementioned methodology to compute 1,000 child SSI participation rates for each state and year. No distribution fitting is applied to the SSA data because there is no uncertainty in these numbers. We used Pearson’s correlation coefficient to compute the association between numeric variables (child SSI participation rate, population percentage in urbanized areas, percent of financially eligible children with health insurance, etc.) and two sample t-tests for the association between a numeric variable and binary variable (whether a state grants automatic Medicaid when SSI is awarded, whether a state expanded Medicaid, etc.). We defined statistical significance as p < 0.05 for all testing. We used R version 4.1.1 (R Foundation for Statistical Computing) for all data collection and statistical analysis.

**RESULTS**

Between 2016 and 2019, 1.13 million children with disabilities received SSI on average, and we estimate that this is only 38.6% of children that meet SSI financial and disability criteria in the US (Table 1). Table 1 highlights that Wyoming (18.1%) and Arkansas (53.4%) are at the extreme ends of estimated child SSI participation rates, with Montana (19.9%) and Utah (20.8%) joining Wyoming in the bottom three states and New York (53.1%) and Louisiana (51.2%) in the top three states. Figure 1 shows a heatmap of the statewide variation over the entire study period. Table 1 also denotes the child SSI participation rate by state and year utilizing the disability prevalence implied from each of the two surveys.

The average disability prevalences for financially eligible children according to ACS and NSCH over the study period are 5.7% and 15.4%, respectively, yielding an overall US average of 10.6%. A detailed breakdown of the disability prevalences by year, state, and survey is shown in Supplementary Table S1. There is approximately a constant difference between the two survey estimates, which can be observed in Supplementary Figure S1. Clearly, using one disability prevalence estimate over the other can lead to drastically different child SSI participation rates, with average differences ranging from 19.7% (Wyoming; ACS: 32.3%, NSCH: 12.6%) to 62.0% (Arkansas; ACS: 98.6%, NSCH: 36.6%). The large discrepancies in individual survey participation rates are rooted in the differences between the survey-level child disability prevalences (Supplementary Table S1). For example, across all study years the difference in child disability prevalence for those who were financially eligible in Wyoming was 9.8% (NSCH: 16.1%, ACS: 6.3%) and in Arkansas was 12.5% (NSCH: 19.9%, ACS: 7.4%). Across all states and years, the difference between the two survey estimates was 10.2%, but was approximately constant across all ranges of child disability estimates (Supplementary Figure S1).

For all years, the base state-level child SSI participation rate estimates were significantly positively correlated with the percentages of state population located in urbanized areas and the percentages of financially eligible children with health insurance for all years (except 2018; p = 0.15), respectfully. Examples of these relationships are shown for 2019 in Figure 2. Notably, the percentages of the state population located in urbanized areas and the percentages of financially eligible children with health insurance for all years are not significantly correlated with each other. Also, we found the base state-level estimates were not significantly associated with indicators of whether the states expanded Medicaid nor offered additional supplementary payments, but they were associated with automatically awarding Medicaid when SSI was awarded for all individual years (Supplementary Figure S2).

After randomly drawing 1,000 times from appropriately fitted distributions to the uncertain estimates of the number financially eligible children with and without disability from the ACS data and the percentages of financially eligible children needing more special health care needs from the NSCH data, we generated 90% confidence intervals for each state (Figure 3). Through this process, states with relatively larger margins of error in their public data estimates, like Rhode Island (1st largest error bar margin: 62.5%) and North Dakota (12th: 42.8%), or states with relatively larger numbers of financially eligible children, like New York (3rd: 58.0%) and California (4th: 56.9%), for which smaller changes to their estimates can have higher impacts on outputs tended to have the widest ranges of participation estimates. Overall, the smallest range of participation rates belonged to Wyoming, with a 19.2% difference between its 95th and 5th quantiles. The distribution of rates from this process are shown for a selection of states in Supplementary Figure S3 for which the uncertainty in true estimates can be explicitly observed.

We also used this bootstrapping process to repeat the base case state attribute/policy analysis. We found that in 99.1%, 96.8%, and 99.6% of our 4,000 random draws (1,000 samples for each of the four years), the positive correlations existed between child SSI participation rates and the percentages of the state population located in urbanized areas, the percentages of financially eligible children with health insurance, and whether Medicaid was automatically awarded if SSI was awarded, respectively (Table 2). Although our base correlation estimates between participation rates and indicators of whether a state expanded Medicaid were not shown to be significant, we found them to be positively correlated in 75.6% instances of the bootstrapped data.

**DISCUSSION**

We used several public data sources to generate national and state-level estimates of child SSI participation rate, a previously unidentified metric that informs the level of participation in one of several federal US programs that aim to reduce child poverty. Then, we assessed the association between this metric and a handful of relevant state-level attributes and policies to gain high-level insight about states with below-average participation rates. The child SSI participation rate metric can also be used to assess the success of other relevant policies and outreach programs.

Several studies have found that the absolute SSI participation rate among all children in the US is a little under 2% and can vary greatly by county, state, and region.6,10,16–18,20 Although this finding is useful for general purposes, it lacks the important context of which children are potentially eligible to receive SSI in the first place. Most pertinent studies resort to estimating a relevant proxy to our metric to study a policy of interest. For example, one study estimated that the US average SSI participation rate among the working-age persons was 2.8% overall and 22.7% for those with disabilities.8 They found that differences in their participation rates can be primarily explained by the geographical variation in disability prevalence as opposed to inconsistencies in SSI program administration.8 Because our metric explicitly accounts for varying disability prevalence, it is difficult for us to make direct comparisons with their study or validate their conclusions in the child subpopulation. Another recent study found that overall child SSI participation rates were highly correlated with economic deprivation.30 Once again, it is difficult to make direct comparisons to their study because our metric already explicitly accounts for varying disability prevalence and family income levels. However, we do observe similar findings to theirs that metropolitan areas (as compared to rural areas) and the West region of the US are associated with higher-than-expected levels of SSI participation among all children (Figures 1-2A).30 In a comprehensive report on mental disorders and disabilities in low-income children, data between 2004 and 2013 was used to estimate that participation rates among financially eligible children with mental disorders ranged drastically, from 3% in those with mood disorders to 56% in those with intellectual disabilities, using a similar methodology to ours.10 Although this report looked at more granular subgroups than us, we can validly compare our estimated rates to theirs since they considered financial and disability criteria in their metric, and we found that all of our state-level estimates fell within this 3% to 56% range.

NASEM claims that raising the maximum child SSI payment amount by two-thirds would only reduce child poverty by 0.2%.7 This finding relies on the assumption that current child SSI child participation rate is 66%, a number based on only ACS data (similar to our US estimate of 71.8 % [Table 1]) without contemplating whether the ACS child disability questions truly align with the SSI disability criteria. They further assume that the policy would increase uptake among program-eligible up to 10% in their simulation modeling. Because our base estimate of child SSI participation rate is much lower than theirs, we believe that a higher assumed increase in uptake may be appropriate with the proposed policy of raising maximum payment amounts. This would indicate that their estimate of the overall impact on child poverty may be understated. Either way, we estimate that raising the child SSI participation rates of states below the US average up to the US average would affect the lives of 121,744 children (Supplementary Table S2), which is approximately 10% of the number of children that currently receive SSI payments, with highest impact in the states of Arizona, California, and Indiana. (This paragraph needs some work and may be too bold.)

Our findings that significant state-level correlation exist between the estimated child SSI participation rates and urbanized areas, the insurance status of financially eligible children, and whether Medicaid awards were directly tied to SSI awards provide high-level guidance for program administrators as to where to potentially target outreach efforts (Figure 2, Table 2, Supplementary Figure S2). Areas that are less populated, less likely to have children with health insurance, and require extra criteria for Medicaid to awarded beyond SSI payment receipt are more likely to have a lower-than-average number of program-eligible families even applying for SSI. These observations could be evidence of an aggregated word-of-mouth effect in which program awareness is highest in states with more concentrated populations and that the higher transaction cost of applying for Medicaid separately from SSI can be damaging for program participation. Although we did not find statistically significant associations between state-level policies like Medicaid expansion and offering SSP for children, our bootstrap analysis at least hints that Medicaid expansion may have impacted the number of SSI-eligible families that participated (Table 2).

The output of our work can be also used as input for a variety of subsequent analyses on public policies. In specific, the base state-level estimates can be used as the outcome or treatment variable of interest in a difference-in-difference econometric analysis, similar to what one study on the interaction between public health insurance expansion and SSI applications has done.13 In addition, the output of our distributional analysis can be used as parameter input for cost-effectiveness analyses or policy-simulation analysis, similar to the hypothetical policy simulations performed by NASEM.7

*Limitations*

There are several limitations with our study. First, because the data is not linked to person-level SSA data, we are only able to carry out the analysis at the state level and do not model the process for determining financial and disability eligibility, as has been done before.31,32 However, our framework can still be used to study other population subgroups by race, social capital, etc. The lack of person-level data prevents us from gaining insight into application rejections and the reasoning behind continuing disability reviews that ends benefits, both of which may be informative for developing an accurate participation estimate. Hypothetically, the Census Bureau’s ACS Public Use Microdata Sample or Survey of Income and Program Participation and NSCH screener and topical surveys that contain further geographical, demographic, and health information could be combined to develop a different methodology for generating a participation estimate, but it is not clear how this would be done.

The incorporation of the uncertainty in public data estimates into our analysis clearly reflects the general difficulty in quantifying this participation metric before, but also prevents us from making many strong statements without further investigation (Figure 3). In the bootstrap analysis, we randomly weighted the two disability prevalences used prior to the participation rate computation to further incorporate uncertainty about which prevalence is closer to ground truth. Propagating the uncertainty of our disability prevalent estimates in this way yields the possibility for very high child SSI participation rates, specifically in the states for which our base results indicate had above-average participation (Supplementary Figure S3). If specific beliefs by a researcher are held about which disability prevalence definition aligns more appropriately with the SSI disability criteria, this could be incorporated in a modified methodology and more precise estimates would be generated. In the end, this process is necessary because it would be inappropriate for outreach efforts in Wyoming to assume that they can operate just like those in Mississippi, a state with a similar percentage of people in urbanized areas but with a much different child SSI participation rate (Figure 3). The incorporation of uncertainty also prevents us from making more than a couple of statistical claims. For example, we cannot claim with 90% confidence that the top state in SSI participation, Arkansas, performs above the US average of 38.6% (Figure 3). More precise information about child disability prevalence or more complete information about which of the two survey aligns more properly with the SSI disability criteria would eventually allow for bolder statistical statements.

**CONCLUSION**

The child SSI participation rates generated by our methodology serve as a starting point for further research. We have developed baseline and distributional rate estimates for each state and found significant positive correlations with the percentage of population in urbanized areas and the health insurance coverage of low-income children. Our framework and findings can be extended for further studies on different types of subgroups, similar populations, and the impact of various public health policies.

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**TABLES**

Table 1. Estimated Supplemented Security Income child participation rates by state, year, and survey.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **State** | **National Survey of Children’s Health** | | | | | **American Community Survey** | | | | | **Overall**  **Estimate** |
| *2016* | *2017* | *2018* | *2019* | *Average* | *2016* | *2017* | *2018* | *2019* | *Average* |
| **United States** | **26.3** | **26.1** | **25.7** | **27.6** | **26.4** | **72.0** | **72.1** | **71.1** | **72.2** | **71.8** | **38.6** |
| Alabama | 30.2 | 20.2 | 27.4 | 20.6 | 23.9 | 70.6 | 79.8 | 70.7 | 97.4 | 77.9 | 36.6 |
| Alaska | 16.2 | 12.1 | 13.6 | 14.5 | 13.9 | 44.0 | 65.1 | 58.7 | 40.1 | 50.0 | 21.8 |
| Arizona | 15.6 | 23.0 | 18.3 | 11.4 | 16.1 | 48.7 | 53.2 | 45.8 | 46.6 | 48.5 | 24.1 |
| Arkansas | 41.4 | 30.2 | 34.6 | 43.1 | 36.6 | 100.0 | 94.9 | 91.3 | 97.5 | 98.6 | 53.4 |
| California | 21.9 | 25.5 | 22.3 | 47.7 | 26.4 | 66.6 | 74.5 | 71.5 | 75.0 | 71.7 | 38.6 |
| Colorado | 13.6 | 22.3 | 11.3 | 21.0 | 15.7 | 55.8 | 45.5 | 45.8 | 41.8 | 46.8 | 23.5 |
| Connecticut | 23.8 | 18.2 | 23.1 | 23.5 | 21.9 | 72.6 | 61.6 | 61.6 | 57.7 | 62.9 | 32.5 |
| Delaware | 28.7 | 21.8 | 25.1 | 24.3 | 24.8 | 79.9 | 100.0 | 71.8 | 79.6 | 82.8 | 38.1 |
| Florida | 30.3 | 28.0 | 38.9 | 40.3 | 33.5 | 98.5 | 89.8 | 96.2 | 96.7 | 95.2 | 49.5 |
| Georgia | 24.6 | 19.3 | 31.0 | 26.8 | 24.7 | 65.9 | 79.0 | 74.3 | 79.6 | 74.2 | 37.0 |
| Hawaii | 18.3 | 16.6 | 21.5 | 10.7 | 15.9 | 58.0 | 63.7 | 38.1 | 27.1 | 42.5 | 23.1 |
| Idaho | 18.8 | 16.5 | 19.8 | 20.1 | 18.7 | 48.5 | 42.6 | 52.2 | 49.7 | 48.0 | 26.9 |
| Illinois | 26.0 | 27.7 | 20.5 | 25.8 | 24.7 | 77.1 | 79.2 | 68.7 | 70.8 | 73.8 | 37.0 |
| Indiana | 19.1 | 18.2 | 23.6 | 19.6 | 19.9 | 58.9 | 51.4 | 56.4 | 59.4 | 56.3 | 29.4 |
| Iowa | 21.9 | 14.6 | 17.7 | 34.7 | 20.1 | 51.4 | 56.7 | 65.3 | 65.3 | 59.2 | 30.1 |
| Kansas | 18.1 | 18.2 | 18.2 | 17.4 | 18.0 | 57.2 | 62.9 | 49.5 | 49.8 | 54.4 | 27.0 |
| Kentucky | 27.7 | 33.9 | 26.9 | 33.1 | 30.1 | 72.5 | 73.2 | 60.9 | 69.1 | 68.6 | 41.8 |
| Louisiana | 35.9 | 51.3 | 32.0 | 30.2 | 35.9 | 86.4 | 90.2 | 89.3 | 91.3 | 89.2 | 51.2 |
| Maine | 20.3 | 35.1 | 23.1 | 27.2 | 25.3 | 43.3 | 53.4 | 55.3 | 53.0 | 50.7 | 33.8 |
| Maryland | 27.5 | 52.8 | 33.2 | 43.0 | 36.8 | 81.2 | 87.5 | 77.6 | 88.8 | 83.5 | 51.1 |
| Massachusetts | 31.4 | 26.5 | 27.1 | 38.4 | 30.2 | 74.7 | 87.2 | 76.8 | 80.4 | 79.5 | 43.7 |
| Michigan | 28.6 | 24.2 | 20.1 | 25.6 | 24.3 | 60.2 | 64.3 | 62.7 | 64.1 | 62.7 | 35.0 |
| Minnesota | 19.5 | 17.4 | 16.3 | 31.2 | 19.7 | 55.9 | 50.6 | 62.9 | 61.6 | 57.3 | 29.4 |
| Mississippi | 25.8 | 25.8 | 30.9 | 32.4 | 28.3 | 82.7 | 92.7 | 82.1 | 80.7 | 84.4 | 42.4 |
| Missouri | 20.0 | 25.3 | 17.8 | 19.8 | 20.1 | 57.8 | 54.6 | 54.1 | 59.8 | 56.6 | 29.6 |
| Montana | 13.5 | 11.9 | 12.5 | 12.2 | 12.5 | 54.7 | 56.1 | 36.4 | 53.8 | 48.9 | 19.9 |
| Nebraska | 14.2 | 11.8 | 13.6 | 15.6 | 13.7 | 54.7 | 45.8 | 50.0 | 49.9 | 49.9 | 21.5 |
| Nevada | 29.6 | 21.8 | 25.1 | 27.7 | 25.8 | 66.2 | 86.6 | 60.7 | 69.8 | 69.6 | 37.6 |
| New Hampshire | 22.4 | 19.9 | 17.4 | 17.5 | 19.2 | 46.2 | 33.1 | 45.6 | 45.8 | 41.7 | 26.3 |
| New Jersey | 27.4 | 30.0 | 33.3 | 29.8 | 30.0 | 91.6 | 76.0 | 95.5 | 72.1 | 82.7 | 44.0 |
| New Mexico | 20.3 | 24.9 | 20.1 | 18.6 | 20.8 | 68.8 | 61.0 | 50.5 | 50.1 | 56.9 | 30.4 |
| New York | 37.5 | 36.8 | 30.3 | 44.4 | 36.6 | 98.0 | 88.6 | 100.0 | 99.7 | 97.2 | 53.1 |
| North Carolina | 30.2 | 22.2 | 19.9 | 26.4 | 24.2 | 71.7 | 73.9 | 65.2 | 64.2 | 68.7 | 35.8 |
| North Dakota | 13.7 | 29.1 | 18.7 | 11.3 | 16.0 | 41.5 | 60.4 | 56.4 | 53.2 | 52.0 | 24.4 |
| Ohio | 24.8 | 32.9 | 22.4 | 19.2 | 23.9 | 60.0 | 58.2 | 59.0 | 59.7 | 59.2 | 34.1 |
| Oklahoma | 19.6 | 23.1 | 22.5 | 16.3 | 20.0 | 59.5 | 51.9 | 59.8 | 60.8 | 57.7 | 29.7 |
| Oregon | 16.7 | 20.0 | 22.5 | 18.3 | 19.1 | 50.4 | 60.9 | 54.4 | 44.2 | 51.8 | 27.9 |
| Pennsylvania | 40.5 | 36.4 | 32.6 | 24.9 | 32.7 | 82.9 | 83.4 | 77.1 | 77.6 | 80.2 | 46.5 |
| Rhode Island | 26.5 | 51.0 | 35.0 | 31.8 | 34.0 | 59.7 | 71.5 | 87.8 | 73.8 | 71.5 | 46.1 |
| South Carolina | 20.0 | 26.8 | 21.8 | 19.6 | 21.7 | 61.3 | 55.3 | 65.0 | 69.3 | 62.2 | 32.2 |
| South Dakota | 28.9 | 22.4 | 21.0 | 16.7 | 21.6 | 62.1 | 80.3 | 70.4 | 76.8 | 71.6 | 33.2 |
| Tennessee | 17.7 | 28.4 | 17.1 | 22.2 | 20.5 | 60.1 | 46.9 | 51.8 | 52.7 | 52.5 | 29.5 |
| Texas | 33.1 | 24.0 | 35.4 | 26.9 | 29.2 | 79.1 | 82.2 | 76.9 | 77.5 | 78.9 | 42.6 |
| Utah | 11.7 | 26.9 | 12.4 | 12.1 | 14.0 | 37.9 | 33.7 | 50.4 | 43.7 | 40.5 | 20.8 |
| Vermont | 17.6 | 17.3 | 26.2 | 19.6 | 19.6 | 54.0 | 53.8 | 35.3 | 40.7 | 44.6 | 27.2 |
| Virginia | 28.6 | 23.4 | 21.7 | 49.2 | 27.8 | 63.9 | 69.5 | 61.4 | 64.4 | 64.7 | 38.8 |
| Washington | 20.0 | 21.5 | 16.3 | 30.4 | 20.9 | 60.9 | 53.5 | 60.0 | 55.0 | 57.2 | 30.7 |
| West Virginia | 25.7 | 32.8 | 18.5 | 24.2 | 24.4 | 55.7 | 60.5 | 59.2 | 54.2 | 57.3 | 34.2 |
| Wisconsin | 28.7 | 23.0 | 31.2 | 22.5 | 25.9 | 77.4 | 76.1 | 83.3 | 86.9 | 80.6 | 39.2 |
| Wyoming | 15.3 | 11.6 | 12.0 | 12.0 | 12.6 | 26.2 | 29.2 | 44.5 | 34.4 | 32.3 | 18.1 |

Table 2. Percentage of bootstrapped data sets for which the state-level attribute/policy of interest were positively correlated to estimated child Supplemented Security Income (SSI) participation rate.

|  |  |
| --- | --- |
| **State Attribute/Policy** | **Percent Positively Correlated with Child SSI Participation Rate** |
| Percentage of state population in urbanized areas | 99.1% |
| Percentage of financially eligible children with health insurance | 96.8% |
| Medicaid automatically award if SSI awarded | 99.6% |
| Medicaid expansion | 75.6% |
| State offers child-specific supplemental security payments | 22.3% |

**FIGURES**

Figure 1. Estimated child Supplemented Security Income (SSI) participation rates from 2016 through 2019.

**Map

Description automatically generated**

Figure 2. Relationship between the estimated child Supplemented Security Income (SSI) participation rates in 2019 and the percentage of state population in urbanized areas (A) and the percentage of financially eligible children with health insurance (B).

Chart, scatter chart

Description automatically generated

Figure 3. Mean and 90% confidence intervals of child Supplemented Security Income (SSI) participation rates using bootstraps from the distribution-fitting process of the public data.

Chart

Description automatically generated

**SUPPLEMENTAL MATERIALS**

Supplementary Table S1. Estimated child disability prevalence (%) for financially eligible children by state, year, and survey.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **State** | **National Survey of Children’s Health** | | | | | **American Community Survey** | | | | | **Overall**  **Estimate** |
| *2016* | *2017* | *2018* | *2019* | *Average* | *2016* | *2017* | *2018* | *2019* | *Average* |
| **United States** | **15.4** | **15.6** | **15.7** | **15.1** | **15.4** | **5.6** | **5.7** | **5.7** | **5.8** | **5.7** | **10.6** |
| Alabama | 15.8 | 22.1 | 15.9 | 20.8 | 18.7 | 6.7 | 5.6 | 6.2 | 4.4 | 5.7 | 12.2 |
| Alaska | 12.3 | 16.2 | 15.9 | 14.2 | 14.7 | 4.6 | 3.0 | 3.7 | 5.1 | 4.1 | 9.4 |
| Arizona | 15.2 | 10.5 | 12.9 | 21.1 | 14.9 | 4.9 | 4.5 | 5.1 | 5.2 | 4.9 | 9.9 |
| Arkansas | 17.9 | 24.5 | 20.5 | 16.7 | 19.9 | 6.6 | 7.8 | 7.8 | 7.4 | 7.4 | 13.6 |
| California | 12.8 | 11.4 | 13.0 | 6.4 | 11.1 | 4.2 | 3.9 | 4.1 | 4.1 | 4.1 | 7.6 |
| Colorado | 16.5 | 10.2 | 19.6 | 10.9 | 14.4 | 4.0 | 5.0 | 4.8 | 5.5 | 4.8 | 9.6 |
| Connecticut | 16.0 | 21.1 | 16.6 | 17.0 | 17.7 | 5.3 | 6.2 | 6.2 | 7.0 | 6.2 | 11.9 |
| Delaware | 16.6 | 20.0 | 17.1 | 19.8 | 18.4 | 6.0 | 4.1 | 6.0 | 6.0 | 5.5 | 11.9 |
| Florida | 17.6 | 18.8 | 13.6 | 13.5 | 15.9 | 5.4 | 5.9 | 5.5 | 5.6 | 5.6 | 10.8 |
| Georgia | 15.8 | 20.3 | 12.7 | 14.9 | 16.0 | 5.9 | 5.0 | 5.3 | 5.0 | 5.3 | 10.6 |
| Hawaii | 8.9 | 9.8 | 6.8 | 14.3 | 9.9 | 2.8 | 2.6 | 3.8 | 5.7 | 3.7 | 6.8 |
| Idaho | 14.5 | 16.9 | 13.7 | 13.8 | 14.7 | 5.6 | 6.5 | 5.2 | 5.6 | 5.7 | 10.2 |
| Illinois | 13.2 | 12.5 | 16.9 | 13.8 | 14.1 | 4.4 | 4.4 | 5.0 | 5.0 | 4.7 | 9.4 |
| Indiana | 18.3 | 19.9 | 14.9 | 18.9 | 18.0 | 5.9 | 7.0 | 6.3 | 6.2 | 6.4 | 12.2 |
| Iowa | 14.5 | 22.3 | 18.7 | 9.6 | 16.2 | 6.2 | 5.7 | 5.1 | 5.1 | 5.5 | 10.8 |
| Kansas | 18.3 | 18.0 | 17.9 | 19.5 | 18.4 | 5.8 | 5.2 | 6.6 | 6.8 | 6.1 | 12.3 |
| Kentucky | 19.8 | 17.1 | 20.5 | 17.5 | 18.8 | 7.6 | 7.9 | 9.1 | 8.4 | 8.2 | 13.5 |
| Louisiana | 17.1 | 11.6 | 18.6 | 21.1 | 17.0 | 7.1 | 6.6 | 6.6 | 7.0 | 6.8 | 11.9 |
| Maine | 21.1 | 14.0 | 20.1 | 17.6 | 18.3 | 9.9 | 9.2 | 8.4 | 9.0 | 9.2 | 13.7 |
| Maryland | 18.1 | 9.2 | 15.1 | 11.9 | 13.6 | 6.1 | 5.6 | 6.5 | 5.8 | 6.0 | 9.8 |
| Massachusetts | 19.2 | 22.3 | 21.6 | 16.2 | 19.9 | 8.1 | 6.8 | 7.6 | 7.7 | 7.5 | 13.7 |
| Michigan | 14.7 | 17.5 | 20.5 | 16.6 | 17.3 | 7.0 | 6.6 | 6.6 | 6.6 | 6.7 | 12.0 |
| Minnesota | 17.1 | 19.6 | 20.7 | 11.1 | 17.2 | 6.0 | 6.7 | 5.4 | 5.6 | 5.9 | 11.6 |
| Mississippi | 21.4 | 21.1 | 17.2 | 16.0 | 19.0 | 6.7 | 5.9 | 6.5 | 6.4 | 6.4 | 12.7 |
| Missouri | 17.8 | 15.3 | 20.1 | 18.6 | 17.9 | 6.2 | 6.5 | 6.6 | 6.2 | 6.4 | 12.1 |
| Montana | 19.6 | 23.1 | 19.1 | 22.3 | 21.0 | 4.8 | 4.9 | 6.6 | 5.1 | 5.4 | 13.2 |
| Nebraska | 16.4 | 18.7 | 17.0 | 15.8 | 17.0 | 4.2 | 4.8 | 4.6 | 4.9 | 4.7 | 10.8 |
| Nevada | 11.5 | 15.9 | 13.2 | 12.3 | 13.2 | 5.2 | 4.0 | 5.5 | 4.9 | 4.9 | 9.0 |
| New Hampshire | 17.3 | 19.2 | 20.5 | 22.9 | 19.9 | 8.4 | 11.5 | 7.8 | 8.7 | 9.1 | 14.5 |
| New Jersey | 14.7 | 13.8 | 12.9 | 14.5 | 14.0 | 4.4 | 5.5 | 4.5 | 6.0 | 5.1 | 9.5 |
| New Mexico | 15.6 | 12.9 | 16.0 | 17.2 | 15.4 | 4.6 | 5.3 | 6.4 | 6.4 | 5.6 | 10.5 |
| New York | 14.1 | 14.3 | 17.6 | 12.6 | 14.7 | 5.4 | 5.9 | 5.1 | 5.6 | 5.5 | 10.1 |
| North Carolina | 13.0 | 17.5 | 18.4 | 14.0 | 15.7 | 5.5 | 5.3 | 5.6 | 5.8 | 5.5 | 10.6 |
| North Dakota | 14.5 | 7.4 | 12.1 | 20.4 | 13.6 | 4.8 | 3.6 | 4.0 | 4.3 | 4.2 | 8.9 |
| Ohio | 17.5 | 12.9 | 18.9 | 22.4 | 17.9 | 7.2 | 7.3 | 7.2 | 7.2 | 7.2 | 12.5 |
| Oklahoma | 18.4 | 15.5 | 15.9 | 22.0 | 17.9 | 6.1 | 6.9 | 6.0 | 5.9 | 6.2 | 12.0 |
| Oregon | 19.0 | 16.0 | 14.6 | 20.2 | 17.4 | 6.3 | 5.2 | 6.0 | 8.4 | 6.4 | 11.9 |
| Pennsylvania | 16.1 | 18.4 | 19.9 | 25.4 | 19.9 | 7.9 | 8.0 | 8.4 | 8.2 | 8.1 | 14.0 |
| Rhode Island | 20.3 | 11.8 | 15.6 | 18.6 | 16.7 | 9.0 | 8.4 | 6.2 | 8.0 | 7.9 | 12.3 |
| South Carolina | 19.1 | 13.4 | 16.3 | 18.7 | 16.8 | 6.2 | 6.5 | 5.5 | 5.3 | 5.9 | 11.4 |
| South Dakota | 10.6 | 14.6 | 13.7 | 17.8 | 14.1 | 4.9 | 4.1 | 4.1 | 3.9 | 4.2 | 9.2 |
| Tennessee | 18.8 | 11.9 | 18.7 | 15.8 | 16.4 | 5.5 | 7.2 | 6.2 | 6.6 | 6.4 | 11.4 |
| Texas | 12.3 | 17.0 | 11.2 | 15.2 | 13.9 | 5.1 | 5.0 | 5.2 | 5.3 | 5.1 | 9.5 |
| Utah | 14.4 | 6.5 | 14.2 | 15.5 | 12.6 | 4.4 | 5.2 | 3.5 | 4.3 | 4.4 | 8.5 |
| Vermont | 22.6 | 20.2 | 15.6 | 20.8 | 19.9 | 7.4 | 6.5 | 11.6 | 10.0 | 8.7 | 14.3 |
| Virginia | 13.5 | 16.6 | 17.7 | 8.0 | 14.0 | 6.0 | 5.6 | 6.3 | 6.1 | 6.0 | 10.0 |
| Washington | 15.7 | 14.5 | 19.7 | 110.8 | 15.2 | 5.1 | 5.8 | 5.3 | 6.0 | 5.6 | 10.4 |
| West Virginia | 16.7 | 13.7 | 23.2 | 18.4 | 18.0 | 7.7 | 7.4 | 7.2 | 8.2 | 7.6 | 12.8 |
| Wisconsin | 17.2 | 21.4 | 15.7 | 22.1 | 19.1 | 6.4 | 6.5 | 5.9 | 5.7 | 6.1 | 12.6 |
| Wyoming | 12.9 | 16.0 | 17.5 | 18.2 | 16.1 | 7.6 | 6.4 | 4.7 | 6.3 | 6.3 | 11.2 |

Supplementary Table S2. Number of financially eligible children affected by state by raising the child Supplemented Security Income participation rate up to the United States average of 38.6% and up to 50%, respectively.

|  |  |  |
| --- | --- | --- |
| **State** | **Up to 38.6%** | **Up to 50%** |
| **United States** | **121,744** | **374,178** |
| Alabama | 1,846 | 8,134 |
| Alaska | 914 | 1,533 |
| Arizona | 10,508 | 18,752 |
| Arkansas | 0 | 577 |
| California | 8,403 | 33,965 |
| Colorado | 5,691 | 9,968 |
| Connecticut | 1,613 | 4,593 |
| Delaware | 118 | 1,048 |
| Florida | 0 | 6,310 |
| Georgia | 3,506 | 15,089 |
| Hawaii | 883 | 1,530 |
| Idaho | 2,222 | 4,374 |
| Illinois | 2,192 | 12,752 |
| Indiana | 6,999 | 15,649 |
| Iowa | 2,561 | 5,261 |
| Kansas | 3,712 | 7,363 |
| Kentucky | 214 | 4,898 |
| Louisiana | 0 | 1,310 |
| Maine | 649 | 1,887 |
| Maryland | 0 | 1,386 |
| Massachusetts | 0 | 3,316 |
| Michigan | 3,770 | 15,547 |
| Minnesota | 4,182 | 8,860 |
| Mississippi | 0 | 3,515 |
| Missouri | 6,036 | 13,675 |
| Montana | 2,121 | 3,411 |
| Nebraska | 3,064 | 5,097 |
| Nevada | 478 | 3,259 |
| New Hampshire | 1,042 | 2,001 |
| New Jersey | 0 | 3,316 |
| New Mexico | 2,160 | 5,167 |
| New York | 0 | 1,313 |
| North Carolina | 3,920 | 14,950 |
| North Dakota | 636 | 1,138 |
| Ohio | 6,757 | 20,606 |
| Oklahoma | 4,716 | 10,766 |
| Oregon | 4,035 | 8,323 |
| Pennsylvania | 340 | 6,241 |
| Rhode Island | 54 | 493 |
| South Carolina | 3,659 | 10,139 |
| South Dakota | 404 | 1,205 |
| Tennessee | 6,942 | 15,575 |
| Texas | 1,297 | 23,141 |
| Utah | 4,344 | 7,118 |
| Vermont | 588 | 1,174 |
| Virginia | 1,692 | 6,980 |
| Washington | 4,392 | 10,537 |
| West Virginia | 1,154 | 3,490 |
| Wisconsin | 917 | 5,869 |
| Wyoming | 1,016 | 1,579 |

Supplementary Figure S1. Relationship between the disability prevalences for financially eligible children according to the American Community Survey (ACS) and the National Survey of Children’s Health (NSCH).

Timeline

Description automatically generated

Supplementary Figure S2. Relationship between estimated child Supplemented Security Income (SSI) rates and state-level policies (whether Medicaid was automatically rewarded if SSI was awarded, Medicaid was expanded, children are eligible to receive State Supplementary Payments [SSP]) by year. According to two-sample t-tests, all year-policy relationships are statistically significant for the first row and insignificant for the second and third rows.

Diagram, schematic

Description automatically generated

Supplementary Figure S3. Distribution of child Supplemented Security Income (SSI) participation rates using bootstraps generated from the distribution-fitting process of the public data tables colored by whether the state had greater than or equal to 60% of its population in urbanized areas for selected states.

Chart, surface chart

Description automatically generated