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Persistent Shortfall and Racial/Class Disparities
2020 Census Self-Response Rate

Paul Ong and Jonathan Ong[1]
UCLA Luskin School of Public Affairs and UCLA Center for Neighborhood Knowledge
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Abstract: Because of COVID-19 and other factors, the United States faces the unprecedented challenge of completing the 2020 census enumeration, the once in a decade effort to count every American for critically important political, economic and social reasons. The Census Bureau is winding down the self-response phase of the census, and this brief assesses what progress has been made. The analysis is primarily based on examining the 2010 and 2020 response rates for census tracts, which is a proxy for neighborhoods. There are two key outcomes: the temporal (across time) change in the overall average response rates and the temporal change in the range (high to low) of response rates. The change in overall response rates, or the total shortfall, is the difference in census response rates between the two decades. The second outcome measures the change from 2010 to 2020 in the spread between tracts with high response rates and tracts with low response rates. On June 1, the nation was approximately six percentage points behind where the nation was in 2010, which is better than the over 12 percentage point shortfall during late April. Despite the progress, it is unlikely that the overall gap could be closed completely. Every state is experiencing an increased response gap relative to 2010. Equally troubling is a larger spread in the response rates among some neighborhoods. This increase is evident within most states, although there are large variations. More troubling is that poor and minority communities are systematically and disproportionately affected by the problems with the self-response rates. These neighborhoods experienced lower response rates in 2010 than more advantaged neighborhoods, and the gap widened in 2020. The problems with the 2020 Census create enormous challenges to having a complete and unbiased enumeration. In turn, this threatens and undermines the goal of having fair political representation and just resource allocation. Among the many adjustments that are required to complete the census is adopting a new rapid response monitoring and assessment paradigm, similar to what has emerged to study the spread of COVID-19.

[1] Paul Ong is a Research Professor at UCLA School of Public Affairs. Jonathan Ong and Elena Ong are researchers at Ong and Associates, a public-interest consulting firm. Affiliations are for identification purpose only, and authors are solely responsible for the content.

Persistent Shortfall and Racial/Class Disparities

2020 Census Self-Response Rates

Introduction:

The 2020 Census enumeration is crucial for political, economic and social reasons. Constitutionally, the decennial census is required so that congressional seats can be reapportioned to account for geographic shifts in the population. The official count is also used for redrawing (a.k.a. redistricting) electoral district boundaries for congressional representatives, state legislators, and local officials. Equally important, the numbers are used for allocating public funds, enforcing laws (particularly voting rights), and for understanding demographic trends to plan for business, community, housing and economic development.

There are two major phases in the enumeration: self-response and non-response follow-up (NRFU). The first phase relies on self-response, where individuals and households are invited to complete the questionnaire online, or by telephone, or by mail. The Bureau introduced using the internet for 2020 as an innovative, cost-saving, innovative and effective use of technology. A higher self-response rate would mean fewer homes to visit during the NRFU. What could not have been foreseen is the COVID-19 pandemic, which has significantly disrupted people's lives, the economy and social behavior. The 2020 census has also fallen victim to the pandemic.

On April 18, the *New York Times* reported that the COVID-19 crisis had seriously hampered self-reporting, causing the Census Bureau to adjust their timeline and prolong the collection process to counter any shortfalls.[2] Our previous technical brief documented an eleven percentage point gap between the response rates for late April 2010 and late April 2020 at the national level.[3] Translating that into absolute numbers, the 2020 count was behind at least 6.5 million

[2] Michael Wines, "After Virus Delays, Census Must Scramble to Avoid Undercount," New York Times, April 18, 2020.

[3] Paul Ong, Jonathan Ong and Elena Ong, "2020 Census Response Rate Falling Behind Over 11 Percentage Points Lower than 2010," UCLA Luskin School of Public Affairs and UCLA Center for Neighborhood Knowledge, April 29, 2020, https://knowledge.luskin.ucla.edu/wp-content/uploads/2020/04/Census-2020-Response-Rate-Falling-Behind-4.29.20.pdf.

households.[4] That is a sizable deficit, and one that will likely tax the Census Bureau's remaining budget.[5]

The Census Bureau acknowledged this problem as early as March 21, when the Bureau announced that they were rescheduling census operations to be completed beyond the original deadline.[6] Since then, the continuing public-health crisis has forced the agency to further revise their schedule.[7]

Data and Indicators:

The slowdown of responses to the 2020 census materialized during the second half of March. The shortfall is observed when comparing today's response rates with the response rates from a decade earlier.[8] The 2010 census mail response rate (CMRR) is the number of returned forms divided by the total number of addresses from the master address file.[9] The 2020 response rate for all modes (CRRALL) is roughly equivalent. It is the number of completed forms (any of the

[4] The enumeration could have been behind 15 million after adjusting for the greater total number of households today The Census Bureau had received 84.0 million responses by April 23, 2010, and 77.5 million by April 23, 2010. There were 116.7 million households in 2010, and an estimated 128.6 million households in 2019. Other key reference points for the 2010 enumeration include the following: 54.0% response rate on April 3rd, 70.3 million households; 59.5% response rate on April 10th, 77.3 million households; and 64.6% response rate on April 23rd, 84.0 million households. These figures show that the 2020 enumeration is consistently behind when comparing different dates with similar percentages, different dates with similar absolute counts, and equivalent dates with different response rates and household counts.

[5] This could be a major problem. See Diana Elliott and Charmaine Runes, "The 2020 Census is underfunded compared with previous enumerations. An Underfunded 2020 Census Puts an Accurate Count at Risk," March 18, 2019, Urban Institute, https://www.urban.org/urban-wire/underfunded-2020-census-puts-accurate-count-risk.

[6] U.S. Census Bureau, "2020 Census Operational Adjustments Due to COVID-19," March 21, 2020.

[7] U.S. Census Bureau, "2020 Census Operational Adjustments Due to COVID-19," May 7, 2020.

[8] The main data sources include the following from the U.S. Census Bureau: "Planning Database," https://www.census.gov/topics/research/guidance/planning-databases.html; "Response Rates," https://2020census.gov/en/response-rates.html; "2010 Census Mail Response/Return Rates Assessment Report," June 6, 2012; 2014-18 American Community Survey. The U.S. Census Bureau's 2019 Census Planning Database has duplicate records (tracts), which are not included in the analysis. This exclusion does not affect the overall general pattern of disparities in tract-level response rates and socioeconomic differences. The 2020 response rates are allocated to 2010 tracts using weights provided by the Census Bureau, and tract-level analyses use observations with both 2010 and 2020 response rates.

[9] According to personal correspondences with the Census Bureau, the 2010 census mail response rate is compatible to the 2020 response rate. Personal correspondence, April 28, 2020. The authors appreciate the Bureau's staff willingness to engage in a series of email exchanges to clarify and detail the technical details of the 2010 and 2020 response rates. The 2020 response rate is only available publicly starting March 19, 2020.

three modes: online, telephone and mail) divided by the total number of addresses receiving an invitation to participate.[10]

There have been objections to comparing the CRRALL and CMRR because of significant differences in the ways individuals can respond (with an internet option in 2020 and without an internet option in 2010) and in the context (with and without a pandemic). It must be studied because of the potential differences and ramifications. We acknowledge that any difference between the two series is compounded by changes in the way information is collected, and the direct and indirect impacts of COVID-19, including the disruption to the planned operation to have census workers drop off notices to about 5% of households in remote and hard-to-reach areas. While we are unable at this time to statistically estimate the independent contribution of these and other factors, the comparison of 2010 CMRR and 2020 CRRALL is nonetheless useful and insightful. Regardless of the cause or causes, the results from comparing the two decades can reveal the magnitude of the challenges to ultimately having a complete and full count.

There analyses focus on two key outcomes: the temporal (across time) change in the overall average response rates and the temporal change in the range (high to low) of response rates. The first is the overall gap in the rates between the two decades, which measures the total shortfall. For any geography (e.g., the nation, a state, or a tract), the change (or gap) in the overall response rates is defined as:

$$RR\_10\_20\_Gap = CMRR(t=2010) - CRRALL(t=2020)$$

CRRALL is the rate for responses collected through all modalities (online, telephone and mail). The vast majority of the responses have come in via the internet (over 80% by early June).

Because much of the analyses in this brief uses census tracts, we use the median value of the RR_10_20_Gap for a given set of tracts. The median value divides the sample so half of the tracts have a higher response rate and the other half have a lower response rate. It represents the value for what is considered the typical tract. For example, we report the median for all tracts within each state, which is used in a later section in the brief.

The second measures a change or difference in the internal variations for two set of census tracts.[11] There are several ways to calculate variance, including standard deviation and coefficient variation. For this brief, we use an 80-20 metric which has a more intuitive meaning and directly applicable to policy. This metric reports the range between the 80th percentile

[10] According to personal correspondences with the Census Bureau, the denominator consists of records on the master address file that are in the Self Response (TEA=1) and Update Leave (TEA=6) enumeration areas. This universe is constant and does not change.

[11] An intuitive illustration of this measure is comparing the heights of Americans in the nineteenth century and the twenty-first century. There is an overall difference in the average height due to temporal changes in the genetic pool, nutrient and other factors. This is equivalent to our first measure, the RR_10_20_Gap. But each population also has taller and shorter individuals within the group, which is associated with how the distribution of genetic difference and resources. Changes in the spread reveals changes in the distribution (variance) within each century.

response rate and the 20th percentile. The 80th percentile means that 80% of the tracts have lower response rates and 20% have higher rates, and conversely, the 20th percentile means that 20% of the tracts have lower rates and 80% have higher rates. In other words, the range between the two percentiles measures the spread between the subset of tracts with high census response rates and the subset with low census response rates. For any given geography

2020 80-20 range =

(80th percentile 2020 response rate) – (20th percentile 2020 response rate)

2010 80-20 range =

(80th percentile 2010 response rate) – (20th percentile 2010 response rate)

We utilize the median value for the 80-20 range when the analysis is based on a set of tracts.

We are particularly interested in determining if the 80-20 range has increased over time:

Spread_10_20_Gap = (80-20 range for 2020) – (80-20 range for 2010).

An increase would indicate potentially more difficulties in achieving an unbiased count among neighborhoods.

It should be noted that the two temporal (across time) gap measures can be independent of each other, that is, it is possible to have a high RR_10_20_Gap and a low Spread_10_20_Gap, and vice versa. They can also be positively related. Each, however, has different policy and practical implications, and are discussed at the end of this brief.

National Response Shortfalls:

We start with the overall national response rates, which are shown in Figure 1. The graph shows that prior to March 24,[12] the 2020 national CRRALL rates (blue line) are higher than the national CMRR 2010 rates (gold line). However, by the last week of March, the 2020 rate fell increasingly further behind the 2010 rate.[13] The gap grew, topping out in late April at over 12 percentage points. Since that time, the overall gap slowly and partially closed.[14] The appearance and growth of the national response rate gap coincides with the COVID-19 crisis

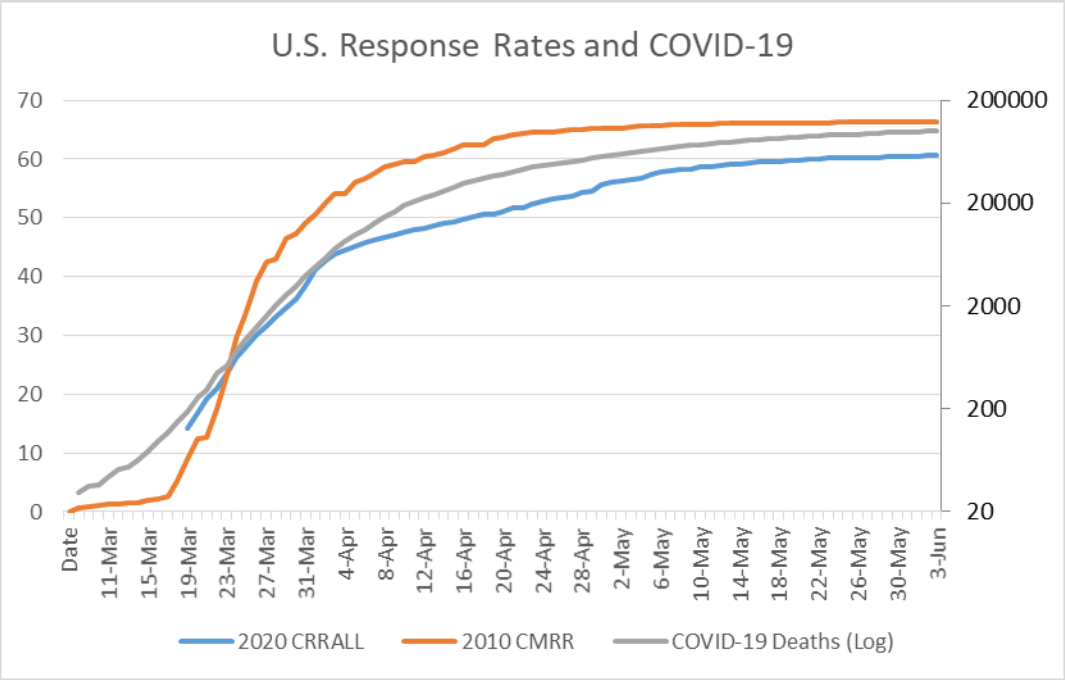
[12] Unfortunately, we do not have 2020 rates prior to March 19, which the Census Bureau stated is not available to this project.

[13] A much better and more accurate way to measure and track the response gap is to compare the daily LAC response rate against the daily 2010 response rates for comparable dates. Unfortunately, we do not have that latter information. We do have the final 2010 mail return rate for the county as a whole and the final 2010 mail response rates by tracts.

[14] The LAC 2020 rates also lagged behind California's 2020 response rates, although the gap is smaller because California 2020 was also falling short of the national 2010 rates.

and the implementation of shelter-in-place advisories and mandates at the local and national levels. The cross-over of trend lines in Figure 1 and the subsequent widening gap coincides with the start and progressive deepening of novel coronavirus cases (gray line).

Figure 1. 2010 and 2020 Census Response Rates

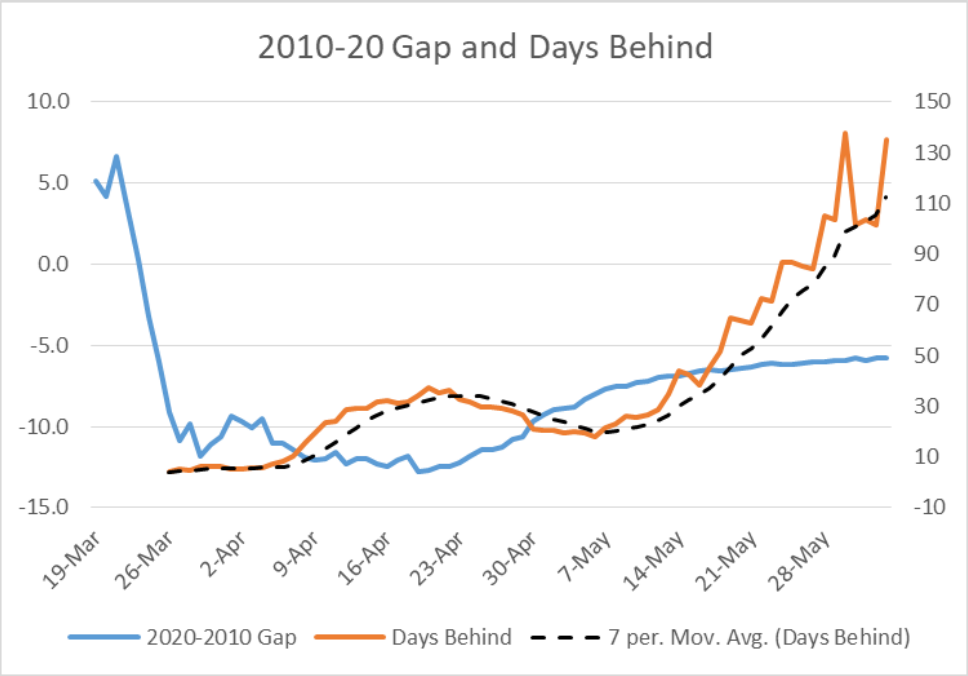


Source: Ong & Associates
Data assembled from U.S. Census Bureau data COVID Tracking Project

By late April, there has been some progress, albeit slow progress as the gap narrowed. This can be seen by the blue line in Figure 2. By mid-May, the overall gap was approximately seven percentage points behind where we were in 2010; however, even if the self-response rate in late May could have been maintained, it would have taken two or more months to catch up (see gold line).[15] By early June, the gap was about six percentage points behind, but the daily changes in the response rate was a mere fraction of one-tenth of a percentage point. In other words, the June 1st rate is most likely within one or two tenths of the final rate for October 2020.

[15] "Days Behind" is estimated by dividing the gap for any given date by the average daily increases over the last seven reporting days. The black dash line traces the seven-day moving average.

Figure 2. Inter-decennial Gap



Source: Ong & Associates, calculated from U.S. Census Bureau data.

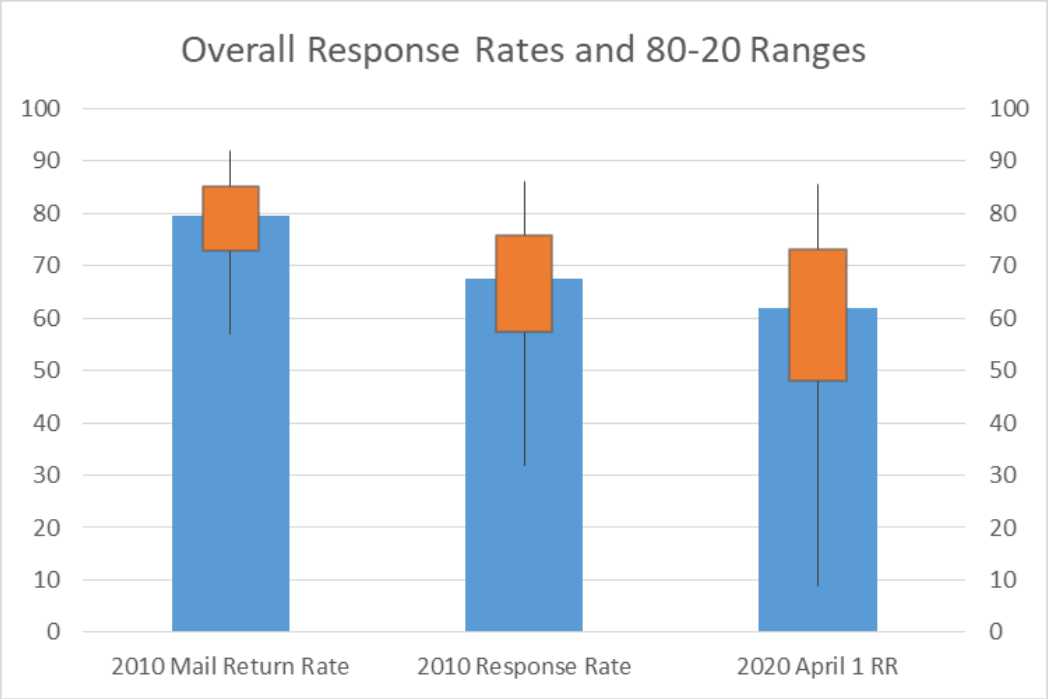
The problem with the 2020 enumeration, however, is not limited to overall falling behind relative to 2010 in overall response rates at the national level. There is also a problem with a growth in the spread in between tracts with high response rates and those with low response rates. (Here the relevant reporting unit is the nation, so the analysis utilizes all U.S. tracts.) The increase in the spread can be seen in Figure 3, which includes the median tract value for June 1, 2020 CRRALLs and the median tract value for the final 2010 CMRR, along with the corresponding statistics for the 2010 Census Mail Return Rate, which is different than the CMRR (Response Rate). The Return Rate calculates the rate after deducting invalid addresses from the denominator, whereas the CMRR uses all addresses in the original mailing.[16] The blue bars depict the unweighted median rate for all tracts within the U.S. Not surprisingly, the 2010 CMRR is lower than the 2010 Mail Return Rate, which is due to the difference in the denominators, as explained earlier. The difference in the median for the 2010 CMRR and 2020 CRRALL is approximately six percentage points, and in line the above analysis on national trends.

Graph 3 also includes two other elements. The top and bottom tips of the vertical lines reports the 99th and 1st percentile, providing a sense of the overall spread of tract-level response rates excluding extreme outliers. What is apparent from this graph is that the range for 2020 is

[16] According to available documents, there appears to be other but minor differences as they relate to replacement and subsequent mailings, but the major difference is as described.

considerably wider than that for 2010. The inner gold rectangle depicts the range between the 80th and 20th percentiles, so its height measures the spread. Comparing the two rectangles for CRRM and CRRALL captures the growing spread in response rates among neighborhoods over the two decades. The 80-20 spread was 18.5 percentage points for 2010, compared with 25.1 percentage points for 2020, an increase in the Spread_10_20_Gap by six to seven percentages point. In other words, there is a simultaneous and significant increase in overall gap (RR_10_20_Gap) and the Spread_10_20_Gap.

Figure 3: National Overall Response Rates and 80-20 Range in Response Rates



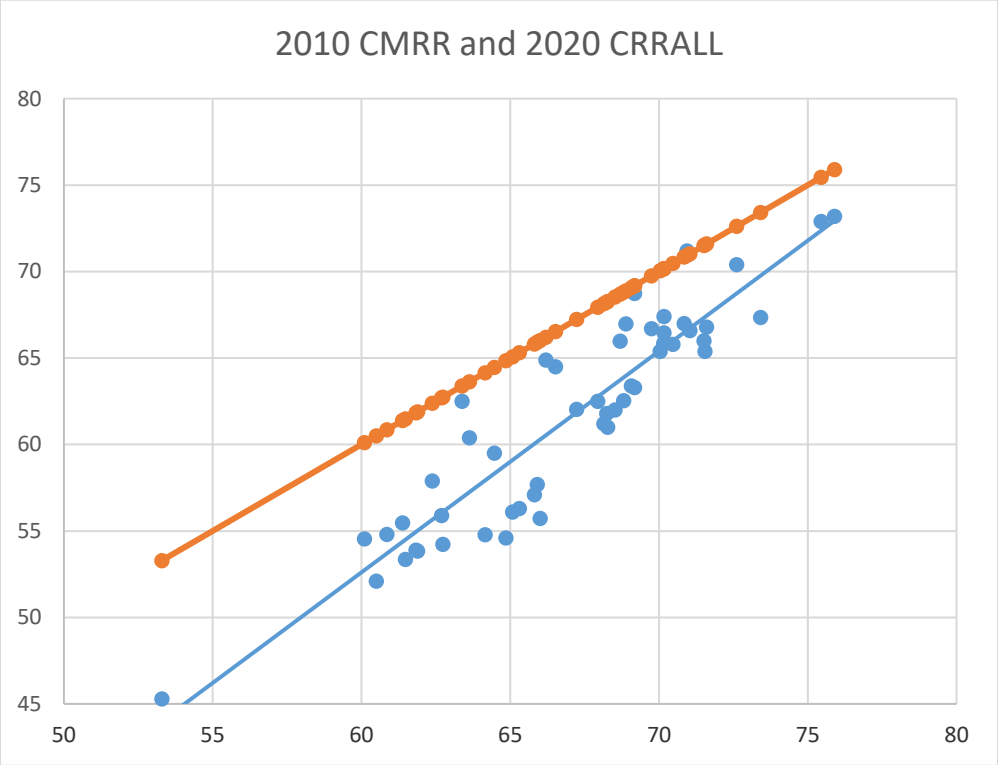
Source: Ong & Associates, calculated from U.S. Census Bureau data.

State Variation in the Census Response Rates

There is a shortfall in the 2020 self-response rate for nearly every state across America. Figure 4 provides a sense of the gap between in response rates for the two decades. (See Appendix A for individual state statistics.) The final 2010 CMRRs are arrayed along the horizontal axis, and June 1, 2020 CRRALL along the vertical axis. The X-Y values for each point are based on the medians for all tracts within a state (or the District of Columbia). If the two values were identical, then the points would fall along the gold line (the hypothetical gold dots). However, there is clearly a lack of parity between the two decades. The actual points (blue dots) fall below the gold line, indicating that the 2020 response is lower than the corresponding 2010 response. Greater vertical distance between a blue dot and the parity line indicates a greater RR_10_20_Gap. States with the largest RR_10_20_Gaps tend to be the ones where it is difficult

to send invitations by U.S. Postal Service, thus most adversely affected by the postponement in hand delivery by Census workers (e.g. Alaska, with a decrease of about 10 percentage points). Urban areas also seem to be affected (e.g., the overall gap is 9 percentage points for D.C.). It is also of interest to note that the RR_10_20_Gap is lowest in Michigan and Washington states, despite those states being heavily impacted by COVID-19. This would suggest that factors, other than COVID-19, have played a role in influencing the RR_10_20_Gap.[17]

Figure 4. Median Tract Response Rates by State



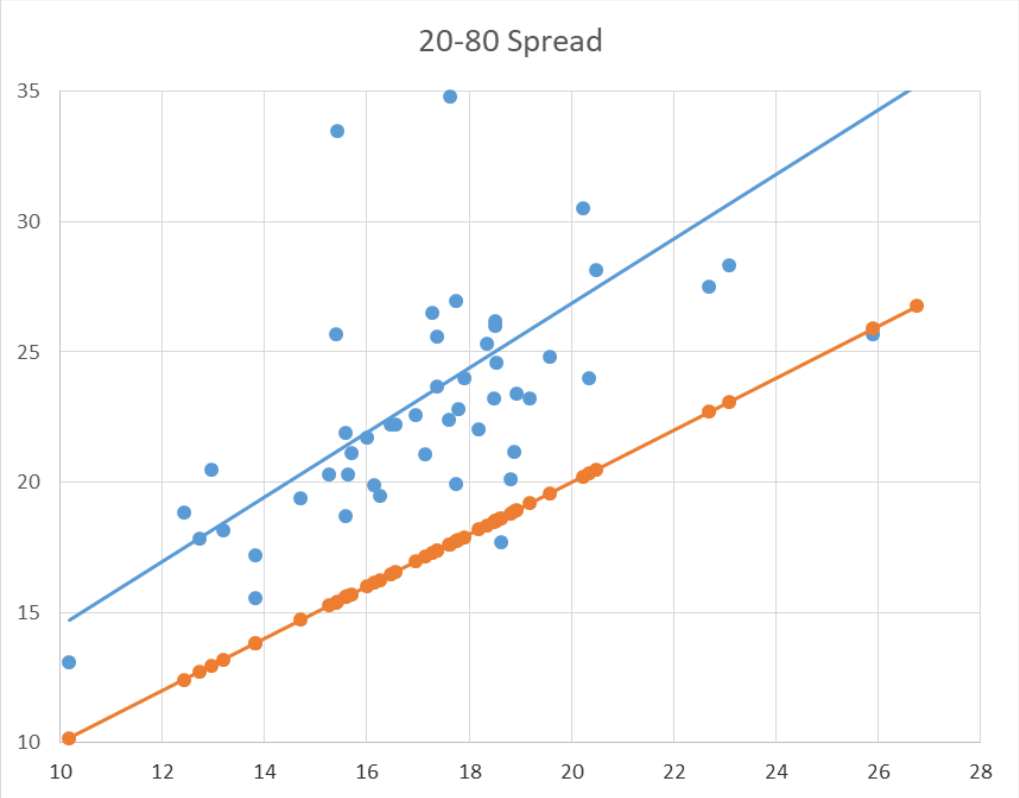
Source: Ong & Associates, calculated from U.S. Census Bureau data.

Figure 5 shows the 80-20 (80th and 20th percentiles) spread for each state. (See Appendix B for individual state statistics.) For illustrative purposes, two states are not depicted because their 2020 values are greater than 35 percentage points. The 2010 spreads are arrayed along the horizontal axis, and the June 1, 2020 spreads are arrayed along the vertical axis. If the two

[17] Our previous report points to the following factors. One that affects the whole country is a shift to the internet as the primary mode of data collection. This shift, however, has played out differently across geographies, placing an extra burden in places with a disproportionate number of households without a computer or broadband connection. A second factor is comprised of spatial differences in vacant and seasonal housing. The presence of these unoccupied units translates into a lower calculated response rate because they have no permanent residents, thus do not add to the numerator in the population enumeration. Paul Ong, Jonathan Ong and Elena Ong, "Los Angeles County 2020 Census Response Rate Falling Behind 11 Percentage Points and a Third of a Million Lower than 2010," UCLA Luskin School of Public Affairs and UCLA Center for Neighborhood Knowledge, May 7, 2020, Revised May 12, 2020.

values were identical, the hypothetical gold dots would fall along the gold line. As with the RR_10_20_Gaps, there is clearly no perfect correlation between the two decades. The actual values (blue dots) are above the gold line, indicate that the 2020 80-20 spreads are higher than the corresponding 2010 values. The temporal difference between the 2010 and 2020 ranges is greater when there is a greater distance between a blue dot and the vertical distance to the gold parity line. Two states actually showed a marginal decrease (below the parity line). States with the smallest increase in the 80-20 range are located in different regions of the country: Louisiana, Hawaii, Delaware and Mississippi. States with the largest increases are those where it was difficult to send invitations by U.S. Postal Service, places like Alaska, Montana, and Wyoming.

Figure 5. Median Tract 80-20 Range by State



Source: Ong & Associates, calculated from U.S. Census Bureau data.

As pointed out earlier, the RR_10_20_Gap and the Spread_10_20_Gap need not be tightly associated. The correlation using state-level data produces a value of 0.33, indicating a mild relationship, and explaining only a ninth of the variation between the two indicators.

Self-Response Rate Gaps by Race and Class

The decline in the overall response rates and the widening of the 80-20 range may be a precursor to an eventual differential undercount when the 2020 Census self-response and NRFU enumeration efforts are proposed to end October 31. The Bureau defines the differential undercount as:

> "The difference between the net undercount rate for a particular demographic or geographic domain and the net undercount rate either for another domain or for the nation."[18]

In more concrete terms, minority and low-income groups and neighborhoods are among the most adversely affected.[19] Other adversely affected groups include families with young children, limited English speakers, and non-citizens. The self-response rate and the final count are directly linked. It more challenging to close out the enumeration for neighborhoods with significantly lower than average self-response rates. For this brief, we examine the inter-group differential response rates along two dimensions, race and economic class.

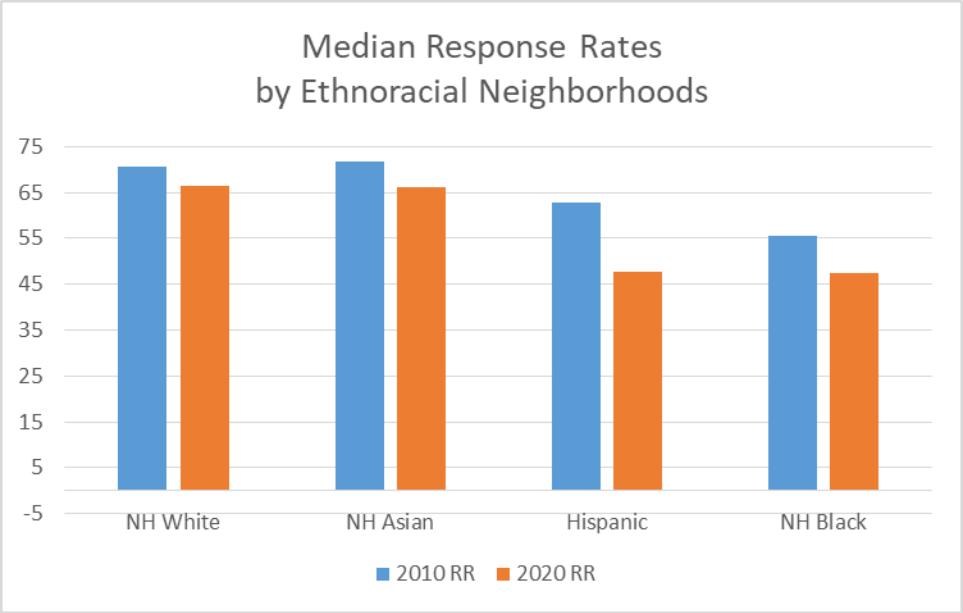
The first analysis compares predominantly non-Hispanic (NH) White neighborhoods, NH Black neighborhoods, NH Asian neighborhoods and Hispanic neighborhoods.[20] Figure 6 shows the median values for 2010 CMRR and June 1, 2020 CRRALL. Asian places were roughly on par with white places; however, other analyses show that there are large differences among Asian neighborhoods, with inner-city enclaves having noticeably lower rates than suburban enclaves. Both Black and Hispanic neighborhoods have significantly lower rates than NH white neighborhoods, and that difference increased over the two decades. By June of this year, the estimated response rates were 66.3% for NH White, 47.4 for Black, and 47.6% for Hispanic. What is particularly dramatic is the decline for Hispanic (Latin/x) neighborhoods (down 15.2% points), which may be attributable to the stigma and fear associated with the controversial attempt to include a citizenship question on the 2020 census form.

[18] U.S. Census Bureau, "Coverage Measurement," https://www.census.gov/coverage_measurement/definitions/. Accessed June 6, 2020.

[19] U.S. Census Bureau, "Census Bureau Releases Estimates of Undercount and Overcount in the 2010 Census," May 22, 2012, https://www.census.gov/newsroom/releases/archives/2010_census/cb12-95.html.

[20] We use different cutoffs to classify the neighborhoods by predominant race because the populations are very unequal in size: 90% or higher for NH white tracts (n= 14,506), 70% or higher for NH black tracts (n= 3,554), 70% or higher for Hispanic tracts (n= 4,254), and 50% or higher for Asian tracts (n=664). Data on the ethnoracial composition and poverty come from the 2014-18 American Community Survey.

Figure 6. Race and Median Response Rates



Source: Ong & Associates, calculated from U.S. Census Bureau data.

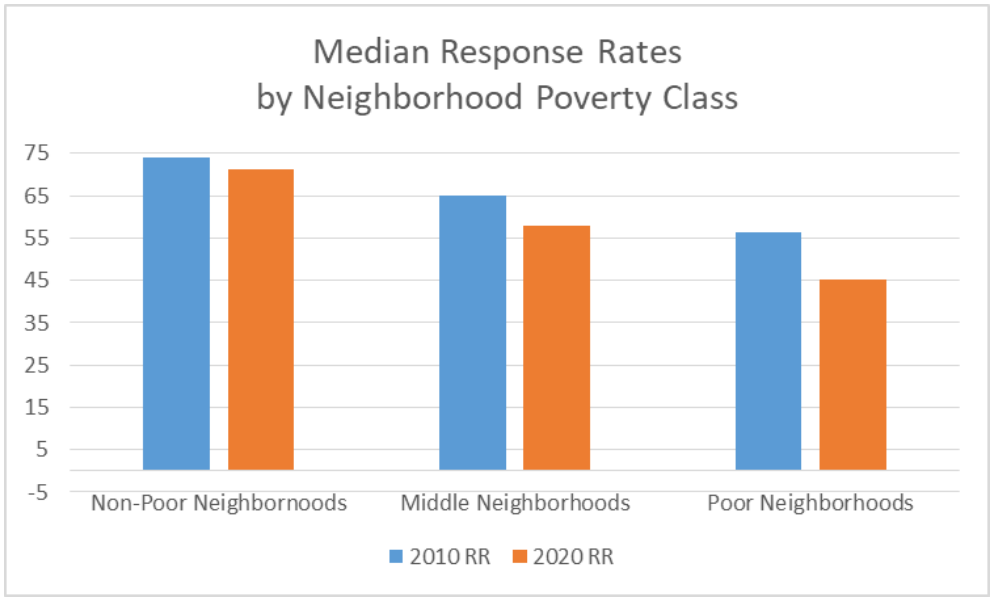
The second comparison involves neighborhoods (census tracts) classified by their poverty rate, which is the percent of the population below the federal poverty line (FPL). The FPL is adjusted for income and household size, but not for geographic differences in cost of living. In 2018, the cutoff was $25,100 for a family or household of four.[21] We create three categories of poverty: (1) neighborhoods where the poverty rate is over 30% (poor census tracts), (2) under 10% (non-poor or affluent tracts), and (3) those in between (middle tracts).[22]

Figure 7 shows the median values for 2010 CMRR and June 1, 2020 CRRALL for each of the groups. Our findings show that the poorer the community, the lower the census response rate. Our findings also reveal a widening divide over the past decade. For the poorest neighborhoods, the self-response rates dropped from 56.3% in 2010 to 45.3% by 2020.

[21] U.S. Department of Health and Human Services, "2018 Poverty Guidelines," https://aspe.hhs.gov/2018-poverty-guidelines, accessed June 6, 2020.

[22] For this analysis, there are 8,888 poor tracts, 29,935 non-poor tracts, and 33,771 in-between middle tracts.

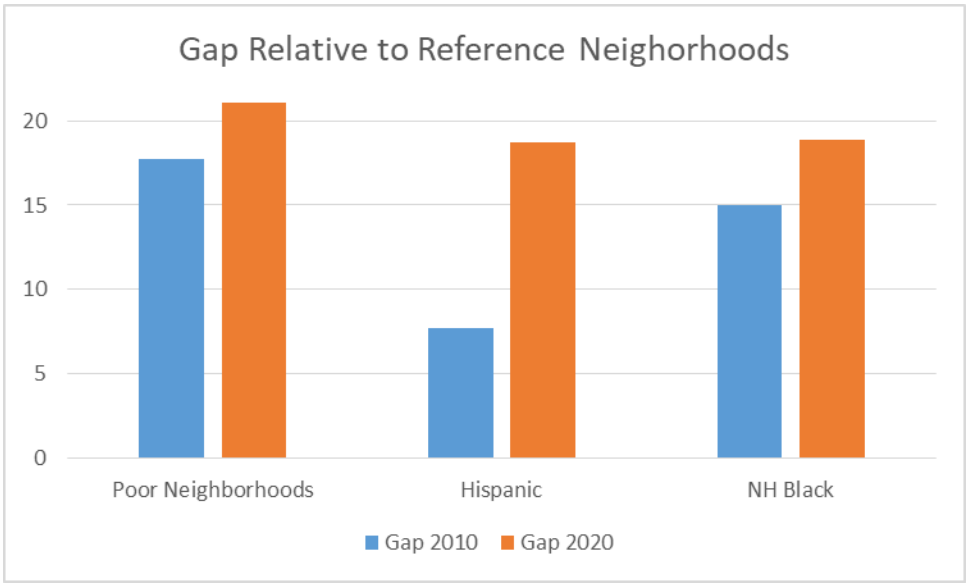
Figure 7. Median Response Rates and Poverty Class



Source: Ong & Associates, calculated from U.S. Census Bureau data.

The last figure, Figure 8, provides another visual interpretation of our analysis. It shows the differential gap relative to the neighborhoods with the highest response rates (NH white tracts and non-poor tracts). The patterns reveal that low-income and minority neighborhoods lag behind their counterparts, and that the gap widened between 2010 and 2020. While the poverty rate and the percent minority are correlated, a simple regression model finds that both make independent contributions to depressing the self-response rates.

Figure 8. Race and Class Differentials



Source: Ong & Associates, calculated from U.S. Census Bureau data.

Implications:

Completing the 2020 enumeration is much more difficult than a decade ago. Although the self-response phase is just one part of the effort, problems at this stage have downstream ripple effects. The lower self-response rate means disproportionately more homes must be visited during the labor-intensive NRFU phase. This would add a great strain on the Census Bureau's limited budget and resources. The rescheduling of operations means that the amount of time to for NRFU is very compressed, thus adding tremendous pressure on Census workers and other stakeholders. COVID-19 will create additional barriers because of the likely need to continue social distancing and other public-health precautions. The challenges will become even greater if there is another round of shelter-in-place due to a second coronavirus wave. Finally, the systematic low self-response rates in disadvantaged neighborhoods will compound the problems because these are the same neighborhoods most affected by COVID-19.

These problems could result in an unacceptable census with a significant overall undercount and differential undercount that could disproportionately hurt the poor and people of color. One policy and allocation tradeoff is between closing the overall undercount and closing the differential undercount. It is likely that it is more cost effective to address the overall count by focusing resources and funds towards the low hanging fruit of "easy to count" areas, but this would lead to a large differential undercount. Doing so could distort reapportionment, redistricting and future spatial distribution of funds and services, mainly by disadvantaging low-income and minority neighborhoods. The other alternative is targeting "hard to reach" neighborhoods. Doing so would minimize the differential undercount at the expense of closing the overall count. If we believe in a fair count, it is more important to address racial and class disparities. If these systematic biases are eliminated, then we would have a fair, equal and proportionate count for every group. This would mean that there would no systematic and disproportionate impact on reapportionment, redistricting and the distribution of future governmental resources.

The results are consistent with the call to increase support for community and faith-based organizations, which have the trust relationships, language and cultural skills, and credibility to reach and persuade the "hard to count" to participate. Their efforts, as well as the Bureau's efforts, face a daunting challenge because of the geographic correlation between COVID-19 hotspots and places with the lowest census response rates. This association makes in-person interactions and follow-up interviews riskier and more costly than originally planned. Under these circumstances, priorities must be realigned so that scarce resources are laser focused on safe, and proven, evidence-based actions with hard-to-count populations. Strategic spatial targeting would ensure that the most marginalized and hard-to-count people and neighborhoods are reached, included and counted.

Recommendations:

As a part of a major revamping of census operations for the next few months, we recommend an equally profound restructuring of the empirical and analytical work to guide action. One of the most remarkable responses to the COVID-19 crisis has been the medical and epidemiological research conducted under a highly compressed timeframe laced with enormous uncertainty. The crisis has made it clear that scientific research cannot proceed at a painfully slow pace because the needs are urgently immediate. The rush to collect and analyze data certain has at times produced flawed, contradictory and even fraudulent findings. At the same time, the rapid response has quickly improved and generated incredibly useful insights and information. It has followed the principle of not letting the perfect be the enemy of the good.

Effective rapid respond rests on having data transparency, researchers inside and outside public agencies, an army of diverse and dedicated analysts, open communication and exchange between traditionally competing groups, quick learning by doing, and adequate funding and resources from myriad sources. This research paradigm should be adopted to tackle the brewing crisis with the 2020 enumeration.

To implement the new practice, we recommend the following concrete actions with respect to data, monitoring, analysis, outreach and outcomes:

1. We need to better link information on the direct and indirect impacts of COVID-19 in a more integrated, real-time, neighborhood database. This includes integrating health, economic and social information from traditional sources, administrative records, and crowd-sourced data.[23]

2. Move as near to real-time monitoring as possible. It is critically vital to quickly detect what is happening on the ground so adjustments can be made rapidly. This requires the Census Bureau and other public agencies to openly share more data and up-to-date information with as few institutional delays as possible.[24]

3. We must quickly reanalyze the data to better understand the current and evolving nature, geographic pattern and trajectory of census completion rates. For example, the

[23] Currently, many data sources are incompatible, using different geographic units and scale, definitions, and time periods. Reconciling them will be challenging, but feasible, within reasonable limits.

[24] There are real confidentiality issues that need to be addressed, but this should not be insurmountable.

modeling to identified problematic tracts should be updated with new information[25] so stakeholders can better strategize and prioritize.

Immediate actions could reduce the enumeration shortfalls, but it is not likely to totally eliminate the undercount and differential undercount. The looming incomplete and imperfect enumeration is an unfortunate likelihood, a byproduct of one of the nation's worst public-health crises. During the post-enumeration period, collecting the data described above will help us better understand the magnitude and characteristics of the limitations of the official and final 2020 count.[26] These insights can be utilized to make future adjustments to ensure fair political representation, just resource allocations, and social equity.[27]

[25] For example, the LRS (Low Response Score) model was developed prior to the enumeration and is outdated. Our assessment indicate that LRS is moderately predictive of the 2020 self-response rate, and other more recent data can enhance the prediction.

[26] The Census Bureau will conduct what is known as the Post-Enumeration Survey, which is designed to identify biases in coverage and the counts. https://www.federalregister.gov/documents/2019/06/05/2019-11705/proposed-information-collection-comment-request-2020-census-post-enumeration-survey-person-interview and https://www.census.gov/coverage_measurement/post-enumeration_surveys/.

[27] Any future efforts to adjust the official count for differential undercount will undoubted be challenged in the courts, which have not been supportive of such efforts. Nonetheless, adjustments can have other uses beyond reapportionment and redistricting.

Appendix A: Statistics for Tract CMRRs and CRRALLs Within States

	A	B	C	D	E	F	G
State	FIPS	Number of Tracts	Median of Tract 2010 CMRRs	Median of Tract 2020 CRRALLs	Median of Tract RR_10_20_Gaps	Column C minus Column D	State Level 2020 CRRALL
Alabama	1	1170	62.4	57.9	3.7	4.5	58.5
Alaska	2	148	53.3	45.3	10.0	8.0	41.2
Arizona	4	1464	63.6	60.4	2.5	3.2	56.8
Arkansas	5	684	62.7	54.2	7.3	8.5	55.1
California	6	7936	69.1	63.4	4.8	5.7	61.6
Colorado	8	1231	70.2	67.4	2.1	2.8	63.1
Connecticut	9	825	70.9	67.0	4.5	3.8	64.1
Delaware	10	214	68.8	62.6	5.7	6.3	58.8
District of Columbia	11	176	65.1	56.1	9.2	9.0	56.7
Florida	12	4111	64.5	59.5	4.2	5.0	57.9
Georgia	13	1951	62.7	55.9	5.6	6.8	56.6
Hawaii	15	311	68.5	62.0	8.0	6.5	55.3
Idaho	16	294	68.9	67.0	2.6	1.9	62.7
Illinois	17	3113	71.5	66.0	4.6	5.5	65.5
Indiana	18	1503	70.1	65.4	4.3	4.6	65.2
Iowa	19	822	73.4	67.4	5.7	6.1	67.2
Kansas	20	759	69.2	63.3	5.4	5.9	64.5
Kentucky	21	1105	66.5	64.5	1.1	2.0	64.1
Louisiana	22	1124	60.9	54.8	6.4	6.1	54.7
Maine	23	348	60.1	54.6	6.6	5.6	50.6
Maryland	24	1386	71.6	66.8	4.3	4.8	64.7
Massachusetts	25	1441	70.2	65.9	3.5	4.3	62.6
Michigan	26	2735	71.0	71.2	0.1	-0.3	67.0
Minnesota	27	1324	75.9	73.2	2.1	2.7	70.2
Mississippi	28	657	61.4	55.5	5.6	5.9	55.7
Missouri	29	1388	68.3	61.8	6.3	6.5	60.7
Montana	30	253	65.8	57.1	9.2	8.7	51.5
Nebraska	31	526	71.0	66.6	4.2	4.4	66.7
Nevada	32	677	63.4	62.5	1.6	0.9	59.6
New Hampshire	33	288	66.2	64.9	1.1	1.3	59.3
New Jersey	34	1993	70.5	65.8	3.9	4.7	62.5
New Mexico	35	464	61.5	53.4	7.0	8.1	48.0
New York	36	4771	64.2	54.8	8.1	9.4	55.5
North Carolina	37	2154	65.9	57.7	7.6	8.2	56.8
North Dakota	38	199	68.3	61.0	7.6	7.3	59.5
Ohio	39	2937	69.8	66.7	3.1	3.1	65.5
Oklahoma	40	1045	61.8	53.9	7.6	7.9	54.0
Oregon	41	825	68.7	66.0	2.0	2.7	63.3
Pennsylvania	42	3189	71.6	65.4	5.8	6.1	63.5
Rhode Island	44	239	68.0	62.5	6.4	5.5	58.6
South Carolina	45	1082	66.0	55.7	9.9	10.3	55.3
South Dakota	46	208	67.2	62.1	4.4	5.2	60.0
Tennessee	47	1475	68.2	61.2	6.1	7.0	60.5
Texas	48	5188	64.9	54.6	9.1	10.3	55.1
Utah	49	578	72.6	70.4	1.4	2.2	64.0
Vermont	50	180	61.9	53.9	6.8	8.0	51.2
Virginia	51	1870	70.2	66.5	2.6	3.7	65.6
Washington	53	1433	69.2	68.7	0.1	0.4	65.8
West Virginia	54	484	60.5	52.1	7.9	8.4	47.9
Wisconsin	55	1310	75.5	72.9	2.6	2.6	67.7
Wyoming	56	125	65.3	56.3	8.6	9.0	50.5

Appendix B: Statistics for 80-20 Range

State	Median of 2010 Tract 20th Percentile	Median of 2010 Tract 80th Percentile	Median of 2010 Tract 80-20 Spread	Median of 2020 Tract 20th Percentile	Median of 2020 Tract 80th Percentile	Median of 2020 Tract 80-20 Spread	Gap Between 2010 and 2020 Median 80-20 Spread
Alabama	53.3	69.5	16.3	47.7	67.2	19.5	3.2
Alaska	41.8	68.5	26.8	13.1	60.3	47.2	20.5
Arizona	52.3	72.6	20.3	47.4	71.4	24.0	3.7
Arkansas	53.8	69.1	15.3	43.9	64.2	20.3	5.0
California	62.5	75.5	13.0	52.4	72.9	20.5	7.5
Colorado	60.9	78.3	17.4	54.3	78.0	23.7	6.3
Connecticut	59.7	78.6	18.9	52.1	75.5	23.4	4.5
Delaware	56.7	75.5	18.8	50.5	70.6	20.1	1.3
District of Columbia	59.3	73.1	13.8	48.0	65.2	17.2	3.4
Florida	54.7	72.5	17.8	48.9	68.8	19.9	2.2
Georgia	53.7	70.3	16.6	44.9	67.1	22.2	5.7
Hawaii	52.4	78.3	25.9	44.6	70.3	25.7	-0.2
Idaho	59.6	75.0	15.4	49.0	74.7	25.7	10.3
Illinois	60.5	79.0	18.5	51.9	76.5	24.6	6.1
Indiana	60.9	76.6	15.6	53.5	73.8	20.3	4.7
Iowa	67.7	77.9	10.2	60.4	73.5	13.1	2.9
Kansas	61.3	76.8	15.6	52.0	73.9	21.9	6.3
Kentucky	55.6	74.5	18.9	52.9	74.1	21.2	2.3
Louisiana	50.8	69.4	18.6	45.2	62.9	17.7	-0.9
Maine	48.6	69.1	20.5	36.5	64.7	28.2	7.7
Maryland	63.0	78.7	15.7	55.3	76.4	21.1	5.4
Massachusetts	60.3	77.6	17.4	50.8	76.4	25.6	8.2
Michigan	56.3	79.0	22.7	52.9	80.4	27.5	4.8
Minnesota	67.1	81.8	14.7	61.9	81.3	19.4	4.7
Mississippi	53.5	67.4	13.8	47.6	63.1	15.5	1.7
Missouri	59.3	76.6	17.3	47.3	73.8	26.5	9.2
Montana	54.4	73.0	18.6	27.5	68.7	41.2	22.6
Nebraska	62.7	79.1	16.5	54.6	76.8	22.2	5.7
Nevada	53.4	71.6	18.2	49.4	71.4	22.0	3.8
New Hampshire	56.9	73.8	17.0	51.5	74.0	22.6	5.6
New Jersey	59.4	77.9	18.5	49.7	75.9	26.2	7.7
New Mexico	50.5	70.7	20.2	37.3	67.8	30.5	10.3
New York	53.8	73.0	19.2	43.9	67.1	23.2	4.0
North Carolina	57.5	73.1	15.6	47.7	66.4	18.7	3.1
North Dakota	56.9	75.4	18.5	47.6	70.8	23.2	4.7
Ohio	59.5	77.4	17.9	52.1	76.1	24.0	6.1
Oklahoma	53.6	71.4	17.7	40.2	67.1	27.0	9.2
Oregon	61.8	74.3	12.4	55.4	74.2	18.8	6.4
Pennsylvania	61.2	79.6	18.4	50.7	76.0	25.3	7.0
Rhode Island	56.0	74.5	18.5	44.3	70.3	26.0	7.5
South Carolina	57.3	73.5	16.1	45.5	65.4	19.9	3.8
South Dakota	56.4	76.0	19.6	47.9	72.7	24.8	5.2
Tennessee	60.3	73.5	13.2	51.0	69.1	18.2	4.9
Texas	55.2	73.0	17.8	43.4	66.2	22.8	5.0
Utah	63.2	79.2	16.0	57.2	78.9	21.7	5.7
Vermont	48.0	71.1	23.1	38.5	66.9	28.3	5.2
Virginia	61.5	79.1	17.6	55.2	77.6	22.4	4.8
Washington	62.1	74.8	12.7	58.4	76.2	17.8	5.1
West Virginia	50.5	68.1	17.6	29.7	64.5	34.8	17.2
Wisconsin	64.5	81.6	17.1	58.8	79.9	21.1	3.9