

Census Accuracy

Key Concepts Explained

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KEY TAKEAWAYS

- Inaccuracies in the U.S. Decennial Census undermine fair political representation and the equitable distribution of over \$2 trillion in federal funds annually.
- In evaluations of census accuracy, net, gross, and differential coverage are key concepts.
- Stakeholders can use insights into census accuracy to advocate for research, census funding, and strategies to address undercounts and improve future census operations.

The U.S. Decennial Census is the statistical backbone of the nation's democratic system. Mandated by the Constitution, the census serves as an enumeration of the country's population and the basis for allocating political power. The census guides vital decisions and planning for community services, the enforcement of civil rights protections, and the distribution of more than \$2 trillion in federal funds to states and localities annually.¹

An accurate census helps ensure fairness in our core democratic institutions, but problems with accuracy persist despite the Census Bureau's best efforts. Shortcomings in census data can have significant consequences. They can distort political representation, skew federal funding, and lead to flawed policies and plans. Crucially, census errors often reflect broader societal inequities, disproportionately and persistently affecting groups such as Black and Hispanic populations, households with low incomes, recent immigrants, and people with disabilities—elevating the census as a civil rights issue.

This is the first brief in a three-part explainer series. Intended for policymakers, advocacy groups, funders, and researchers, the brief series provides a non-technical introduction to census accuracy. This brief introduces key concepts in census accuracy, such as net and gross coverage and differential undercounts.² The second brief in the series, "Census Accuracy: Key Methods Explained," examines the Census Bureau's two main evaluation methods—Demographic Analysis and the Post Enumeration Survey. The final brief, "Census Accuracy: Key Trends Explained," summarizes key results and trends from census evaluations.

Overall, this explainer series provides information intended to help stakeholders:

- Advocate for necessary research and reforms to ensure every community is accurately enumerated;
- Promote robust funding for the census by emphasizing the need for accurate data to help ensure fair political representation and equitable resource distribution; and
- Implement measures to mitigate the impact of census inaccuracies.

1. Defining “Accuracy” For the Decennial Census

What does “accuracy” mean for the decennial census? At its most basic level, accuracy is the extent to which published statistics align with reality.³ For example, one might evaluate how closely the published population count for a town matches the actual number of residents.

However, measures of accuracy can involve more than just matching population totals. The Census Bureau aims to “count everyone once, only once, and in the right place.”⁴ This means including everyone who should be counted, avoiding duplicate counts, excluding those who should not be counted, and recording everyone in the correct location.⁵ Examining these different components of the census count allows evaluators of census accuracy to understand the specific, underlying errors present in published statistics. For example, a state’s reported and actual population may match, but closer inspection might reveal errors in the enumeration process: the Census Bureau double-counted some residents while missing others. These errors may balance out in the aggregate for the state, giving the appearance of matching population totals and overall accuracy.

Demographers use terms like **net accuracy** and **gross accuracy** to capture these nuances in defining accuracy. Neither measure nor definition is the “correct” one; each offers different insights into the census and how accurately the Bureau enumerated the population.

BOX 1.

ACCURACY IS ONE COMPONENT OF CENSUS QUALITY

While this brief focuses on accuracy, accuracy is just one factor defining the overall quality of published statistics.⁶ “Data quality,” also referred to as “fitness-for-use,” should be judged by how well the data meets the needs of various user communities. The United Nations Statistical Division outlines key attributes for assessing data quality, including those summarized below:⁷

- **Accuracy:** Published statistics closely align with reality.
- **Clarity:** To the extent possible, non-expert users can understand the data.
- **Comparability:** Published statistics are comparable over time or between places.
- **Completeness:** Published statistics address the phenomenon they describe as fully as possible, taking into account resource restrictions and respondent burdens.
- **Interpretability:** Information is available to help users understand the sources, definitions, or methods used.
- **Punctuality:** The releasing agency follows preannounced release dates.
- **Timeliness:** The time elapsed between the data release and the event or phenomenon being described is relatively short to ensure that the information is still of value and can still be acted upon.
- **Trust:** The public trusts in the statistical authority of the agency and its products.

These attributes are distinct yet interrelated, and the Census Bureau often must balance them. For example, during the 2020 Census, the Bureau prioritized accuracy over punctuality due to pandemic-related delays, which affected state redistricting timelines.⁸

ⁱ Alternatively, one might evaluate the internal census data underlying the published statistics. Due to confidentiality and privacy concerns, published statistics may contain additional errors that are not found in the internal census data. For further discussion, see “Disclosure Avoidance: Latest Frequently Asked Questions.” U.S. Census Bureau, last revised January 24, 2024. Available at <https://www.census.gov/programs-surveys/decennial-census/decade/2020/planning-management/process/disclosure-avoidance/2020-das-updates/2020-das-faqs.html>.

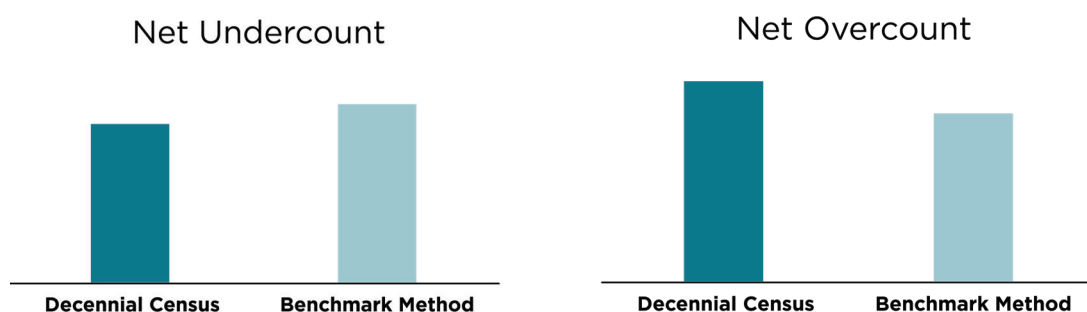
2. Measuring Overall Census Quality: Net & Gross Coverage

NET COVERAGE

As previously noted, one can define accuracy as “the extent to which published statistics align with reality.” This concept is reflected in “**net coverage**”—a widely used measure. Net coverage (or “net accuracy”)ⁱⁱ is the difference between the census count and an independent benchmark, such as one produced by the Census Bureau’s Demographic Analysis (DA) or the Post-Enumeration Survey (PES).

FIGURE 1. A Net Undercount or Net Overcount Occurs When Census Totals Do Not Match Benchmark Expectations:

Two Scenarios Where Census & Benchmark Population Estimates Diverge



Note: The two scenarios depicted in the bar charts above are hypothetical and not based on historical data. The figure is intended for illustrative purposes. The “Benchmark Method” typically refers to the Post-Enumeration Survey or Demographic Analysis.

A benchmark population serves as an independent reference point, representing the best estimate of the actual population. When the census count is smaller than the benchmark population, the result is a net undercount. When the census count is greater, it is a net overcount. One can express net coverage as an absolute number of people or a rate (i.e., a percentage).

$$\text{Net Coverage Rate} = 100 * \frac{(\text{Census Count} - \text{Benchmark Population})}{\text{Benchmark Population}}$$

Both the DA and PES provide estimates of net accuracy, though the estimates may differ due to methodological differences. The Census Bureau typically calculates and publishes net coverage rates for the total United States population and various geographic areas, demographic groups, and housing tenure (i.e., owner or renter).

GROSS COVERAGE

As a part of the agency’s census evaluations, the Bureau produces a detailed categorization of the count. These categories include correct enumerations, erroneous enumerations, whole-person imputations, and omissions—collectively referred to as “**components of coverage**.”

- **Correct Enumerations:** Individuals properly enumerated through Bureau operations such as self-response and Nonresponse Follow-Up (NRFU).
- **Erroneous enumerations:** Individuals who were incorrectly enumerated. This category includes duplicates (people counted more than once), fictitious people (nonexistent individuals), and people who should have been excluded (such as foreign tourists or individuals who died before the census date).⁹

ⁱⁱ In this brief, “coverage” and “accuracy” are used interchangeably. Both terms address the effectiveness of the census (or a survey) in representing the actual population.

- **Whole-person imputations:** Individuals who were not directly enumerated but were added to the census count based on statistical methods. For instance, if a housing unit appears occupied but does not return a census form, the Census Bureau may use statistical methods to estimate the number of residents and their characteristics.¹⁰
- **Omissions:** Individuals who should have been enumerated but were missed.¹¹

The “**gross coverage**” (or “gross accuracy”) is defined as the total number of omissions and erroneous enumerations.ⁱⁱⁱ Omissions are “negative” errors that cause an underestimation of the population. In contrast, erroneous enumerations are “positive” errors that cause an overestimation. (Whole-person imputations can also cause an overestimation of the population but are not typically considered a type of error.) In calculating gross accuracy, the Bureau provides estimates for each type of error.

$$\text{Gross Coverage} = \text{Omissions} + \text{Erroneous Enumerations}$$

The PES (but not DA) provides estimates for components of coverage. Due to its methodology, DA does not provide estimates of correct enumerations, omissions, erroneous enumerations, and whole-person imputations.

FIGURE 2. Gross Coverage Provides Insight into Underlying Errors in a Decennial Census

Components of Coverage for the 2020 Census From the Post-Enumeration Survey

Omissions	18,800,000
Erroneous Enumerations	7,167,000
Gross Coverage Estimate	25,967,000

Note: The Census Bureau rounded estimates for purposes of disclosure avoidance. The authors calculated the total, which is not originally in the source.

Source: Khubba, Shadie, Krista Heim, and Jinhee Hong. “National Census Coverage Estimates for People in the United States by Demographic Characteristics.” U.S. Census Bureau, March 2022. Available at <https://www2.census.gov/programs-surveys/decennial/coverage-measurement/pes/national-census-coverage-estimates-by-demographic-characteristics.pdf>

COMPARING NET VS GROSS COVERAGE

Net coverage is a simple, easily understandable concept, useful for comparisons over time or between populations. However, it can provide a false impression of accuracy as it can obscure underlying errors. A net undercount of zero could mean no positive or negative errors or that those errors canceled each other out. Gross coverage provides a picture of all types of errors. It reveals a detailed accounting of errors, offering a more comprehensive insight into the census’s accuracy.

To illustrate the different insights net and gross accuracy provide, consider the following example. In the 2020 Census, the Census Bureau estimated a slight undercount: the DA estimated a net undercount of 0.35 percent^{iv} (1.1 million people), and the PES estimated an undercount of 0.24 percent^v (780,000 people).^{vi} However, a closer look showed 18.8 million negative errors (i.e., omissions) versus 7 million positive errors (erroneous enumerations) and 11 million whole-person imputations, resulting in a slight

iii “Glossary of Specialized and Technical Terms Used in the ESCAP Report and Supporting Documents.” U.S. Census Bureau, accessed July 2, 2024. Available at <https://www2.census.gov/programs-surveys/decennial/2000/program-management/5-review/escap/escap-glossary.pdf>

iv The 2020 Census estimated the U.S. population at roughly 331.449 million compared to the DA (middle series) estimate of 332.601 million, resulting in a disparity of around 1.2 million people. See Jensen, Eric, et al. “Methodology for the 2020 Demographic Analysis Estimates.” U.S. Census Bureau, 15 December 2020. Available at https://www2.census.gov/programs-surveys/popest/technical-documentation/methodology/2020da_methodology.pdf.

v The 2020 PES estimated a net undercount of 0.24 percent with a standard error of 0.25. In other words, the PES estimate was not statistically significant from zero. See Khubba, Shadie, Krista Heim, and Jinhee Hong. “National Census Coverage Estimates for People in the United States by Demographic Characteristics.” U.S. Census Bureau, March 2022. Available at <https://www2.census.gov/programs-surveys/decennial/coverage-measurement/pes/national-census-coverage-estimates-by-demographic-characteristics.pdf>

vi The Census Bureau calculates the coverage rates based on estimates for the 50 states and the District of Columbia. While 3.6 million people live in the U.S. territories, the Bureau excludes these populations from the agency’s calculation of net coverage rates. Post-Enumeration Survey results are only available for Puerto Rico, but are published separately. For further discussion of the U.S. territories and the Decennial Census, see Lee, Jae June, Cara Brumfield, Neil Weare. “Advancing Data Equity for U.S. Territories.” Georgetown Center on Poverty and Inequality, 29 November 2022. Available at <https://www.georgetownpoverty.org/issues/advancing-data-equity-for-us-territories/>

undercount. While the net undercount was near zero—or perfect accuracy—25.8 million gross coverage errors is a sizeable number, representing roughly 8 percent of the U.S. population.

By comparing net and gross coverage and the underlying components of coverage, stakeholders can better understand census accuracy and implications for fair political representation and equitable resource distribution. Net coverage is helpful for high-level comparisons, while gross coverage and components of coverage show a more detailed and comprehensive picture.

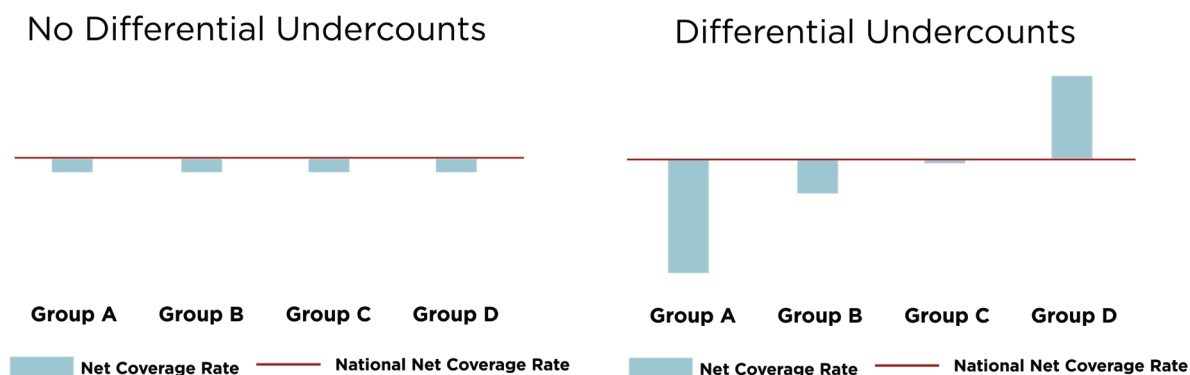
3. Evaluating Disparities in Census Accuracy: Differential Undercount

DIFFERENTIAL UNDERCOUNT

A fair and accurate census is crucial to helping ensure the equitable distribution of political representation and federal resources. While the presence of errors complicates the challenge of achieving an accurate count, the fairness of a census is shaped by how evenly those errors are distributed among population groups. Evaluations of census accuracy show that census errors do not affect all population groups equally. When a group experiences an undercount at disproportionately higher rates, this is often called a “**differential undercount.**”

FIGURE 3. Differential Undercounts Occur When Groups Are Undercounted at Greater Rates Than Others

Two Scenarios Showing Different Distributions of Net Coverage Rates Between Groups but With the Same National Rate



Note: The two scenarios above are hypothetical and not based on historical data. The figure is intended for illustrative purposes only.

Given persistent and uneven gaps in census accuracy, differential undercounts are among the most critical measures. One can measure the gaps in accuracy by comparing the net coverage rates between groups—or a group’s coverage rate to the national rate. One can measure differences in census accuracy among demographic groups, geographic areas, and housing types.¹²

In the 2020 Census, for example, the Census Bureau overcounted the non-Hispanic white Alone population (1.64 percent overcount) while undercounting the Hispanic population (4.99 percent undercount). The difference in coverage rates between the groups was 6.63 percentage points.¹³ As discussed below, differential undercounts have real-world impacts on the well-being of communities.

PERSISTENTLY UNDERCOUNTED GROUP

Differential undercounts in the census undermine fairness and equality in decision-making, resource distribution, and political representation.¹⁴ These inaccuracies often reflect broader societal inequities. Evaluations indicate that the Census Bureau has persistently undercounted particular groups at greater

rates because the agency struggles to—for example—accurately count people in complex households, track people who move frequently, and gain the trust of communities. Persistent undercounts can lead to wealthier, predominantly white communities obtaining disproportionate political representation and outsized federal resources, whereas poorer, non-white areas are shortchanged.

FIGURE 4. Many Groups Are Persistently Undercounted in the Census

A List of Factors and Persistently Undercounted Populations from Three Sources

Government Accountability Office (GAO)	Census Bureau's National Advisory Committee (NAC)	U.S. Census Bureau, Planning Database
Persons who distrust the government	Persons who are angry at and/or distrust the government	Lack of cooperation/trust
Persons who do not speak English fluently (or have limited English proficiency)	Persons who do not speak English fluently	Communication/Language Isolation
Low-income persons	Lower-income persons	Socio-Economic Status*
Young, mobile persons	Young, mobile persons	Residential mobility
Persons experiencing homelessness	Homeless persons	
Racial and ethnic minorities	Racial and ethnic minorities	
Undocumented immigrants (or recent immigrants)	Undocumented immigrants	
Young children	Children	
Lesbian, gay, bisexual, transgender, queer/questioning persons	LGBT persons	
Renters		Renters
Complex households, including those with blended families, multi-generational, or non-relatives		Complex households
Persons who do not live in traditional housing		Irregular housing units
Persons residing in places difficult for enumerators to access, such as buildings with strict doorkeepers and basement apartments		
Displaced persons affected by a disaster		
Persons with mental and/or physical disabilities		
Persons without a high school diploma		
Persons residing in rural or geographically isolated areas		
Cultural and linguistic minorities		
Persons less likely to use the internet and others without internet access		
		Non-City style/ non-traditional addresses

Note: The labels for the different undercounted groups in the figure reflect the language used in the source. The list compiled above is not exhaustive. Undercount groups can exist across and within the categories above. * This factor includes variables such as “persons below poverty level” “receiving public assistance income” “unemployed,” and “Not High School Grad (no Diploma).”

Source: Georgetown Center on Poverty & Inequality, 2024. Dowling, Julie. “Hard to Count Working Group Report.” Presented in the U.S. Census Bureau's National Advisory Committee on Racial, Ethnic, and Other Population, 27 May 2016. Available at <https://www.census.gov/library/video/2016/2016-05-nac.html>; Bruce, Antonio, Gregory J. Robinson, Jason E. Devine. “A Planning Database to Identify Areas That Are Hard-to-Enumerate and Hard-To-Survey in the United States.” Population Division, U.S. Census Bureau, 2012. Available at http://www.asasrms.org/Proceedings/H2R2012/A_Planing_Database_to_Identify_Areas_That_Are_Hard-to-Enumerate_and_Hard-to-Survey_in_the_United_St.pdf; “2020 Census: Actions Needed to Address Challenges to Enumerating Hard-to-Count Groups.” U.S. General Accountability Office, GAO-18-599, July 2018. Available at <https://www.gao.gov/assets/gao-18-599.pdf>.

Conclusion

Understanding dimensions of census accuracy is crucial for those advocating for fair political representation, equitable resource distribution, and effective policymaking. Examining net and gross coverage reveals overall census errors and specific inaccuracies, while differential coverage highlights disparities among demographic groups and localities. Collectively, these measures provide a comprehensive picture of census accuracy, helping stakeholders develop strategies to address undercounts and improve future census operations.

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Any errors of fact or interpretation remain the authors'.

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Endnotes

- 1 In fiscal year 2021, federal agencies distributed more than \$2.8 trillion through 353 federal programs based on decennial census data (in part or in whole). For more details, see Ceci A. Villa Ross. “Uses of Decennial Census Programs Data in Federal Funds Distribution: Fiscal Year 2021.” U.S. Census Bureau, released June 2023. Available at <https://www2.census.gov/library/working-papers/2023/decennial/census-data-federal-funds-fy-2021.pdf>
- 2 Though not covered in this brief, “operational metrics”—such as self-response rates—provide insights into census data collection and processing operations. These metrics help understand data quality, though they are not themselves direct measures of census quality. For further discussion, see O’Hare, William P., and Jae June Lee, “Who Responded in the 2020 Census? Variation in Tract-Level Self-Response Rates in the 2020 U.S. Census.” Georgetown Center on Poverty and Inequality, 13 April 2021. Available at <https://www.georgetownpoverty.org/issues/who-responded-in-the-2020-census/>; and “Assessing the 2020 Census.” Teresa A. Sullivan and Daniel L. Cork, Editors. National Academies of Sciences, Engineering, and Medicine, 2023. Available at <https://nap.nationalacademies.org/catalog/27150/assessing-the-2020-census-final-report>.
- 3 “Principles and Recommendations for Population and Housing Censuses, Revision 3.” United Nations Statistics Division, 2017. Available at https://unstats.un.org/unsd/demographic-social/Standards-and-Methods/files/Principles_and_Recommendations/Population-and-Housing-Censuses/Series_M67rev3-E.pdf.
- 4 “Why We Conduct the Decennial Census of Population and Housing.” U.S. Census Bureau, last revised 23 November 2021. Available at <https://www.census.gov/programs-surveys/decennial-census/about/why.html>.
- 5 O’Hare, William P. “Who Is Missing? Undercounts and Omissions in the U.S. Census.” *Differential Undercounts in the U.S. Census*, 14 February 2019. Available at https://link.springer.com/chapter/10.1007/978-3-030-10973-8_1.
- 6 “Principles and Recommendations for Population and Housing Censuses, Revision 3.” United Nations Statistics Division, 2017. Available at https://unstats.un.org/unsd/demographic-social/Standards-and-Methods/files/Principles_and_Recommendations/Population-and-Housing-Censuses/Series_M67rev3-E.pdf.
- 7 “Principles and Recommendations for Population and Housing Censuses, Revision 3.” United Nations, 2017.
- 8 “2020 Census Operational Timeline and Adjustments Due to COVID-19.” U.S. Census Bureau, last revised 29 February 2024. Available at <https://www.census.gov/programs-surveys/decennial-census/decade/2020/planning-management/operational-adjustments.html>.
- 9 For further discussion, see O’Hare, William P., Cara Brumfield, and Jae June J. Lee. “Evaluating the Accuracy of the Decennial Census: A Primer on the Fundamentals of Census Accuracy and Coverage Evaluation.” Georgetown Center on Poverty and Inequality, last updated November 2020. Available at <http://www.georgetownpoverty.org/wp-content/uploads/2020/11/EvaluatingAccuracyDecennialCensus-Nov2020.pdf>.
- 10 For further discussion, see O’Hare, William P., Cara Brumfield, and Jae June J. Lee. “Evaluating the Accuracy of the Decennial Census: A Primer on the Fundamentals of Census Accuracy and Coverage Evaluation.” Georgetown Center on Poverty and Inequality, last updated November 2020. Available at <http://www.georgetownpoverty.org/wp-content/uploads/2020/11/EvaluatingAccuracyDecennialCensus-Nov2020.pdf>.
- 11 For further discussion, see O’Hare, William P., Cara Brumfield, and Jae June J. Lee. “Evaluating the Accuracy of the Decennial Census: A Primer on the Fundamentals of Census Accuracy and Coverage Evaluation.” Georgetown Center on Poverty and Inequality, last updated November 2020. Available at <http://www.georgetownpoverty.org/wp-content/uploads/2020/11/EvaluatingAccuracyDecennialCensus-Nov2020.pdf>.
- 12 For example, see “Investigating the 2010 Undercount of Young Children - A Comparison of Characteristics by Age.” U.S. Census Bureau Decennial Statistics Division, 18 January 2017. Available at https://www2.census.gov/programs-surveys/decennial/2020/program-management/final-analysis-reports/2020-2017_02-UndercountofYoungChildrenReport.pdf.
- 13 Khubba, Shadie, Krista Heim, and Jinhee Hong. “National Census Coverage Estimates for People in the United States by Demographic Characteristics.” U.S. Census Bureau, March 2022. Available at <https://www2.census.gov/programs-surveys/decennial/coverage-measurement/bes/national-census-coverage-estimates-by-demographic-characteristics.pdf>
- 14 For example, see: Dennie, Madiba. “Census Accuracy Requires Census Equity.” Brennan Center for Justice, 7 October 2022. Available at <https://www.brennancenter.org/our-work/analysis-opinion/census-accuracy-requires-census-equity>; and, “Census Accuracy and the Undercount: Why It Matters, How it’s measured.” Funders Census Initiative 2020, retrieved January 2024. Available at <https://funderscommittee.org/wp-content/uploads/2017/01/FCI2020-FactSheet-Census-Accuracy-Undercount-Fall2016.pdf>.