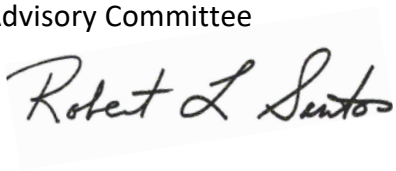
UNITED STATES DEPARTMENT OF COMMERCE
U.S. Census Bureau
Office of the Director
Washington, DC 20233-0001

May 26, 2023

To: Jay Breidt
Chair
Census Scientific Advisory Committee

From: Robert L. Santos
Director



Subject: Recommendations and Comments to the Census Bureau from the Census Scientific Advisory Committee Fall 2022 Meeting

The U.S. Census Bureau thanks the Census Scientific Advisory Committee for its recommendations. We are responding to the committee recommendations submitted during its 2022 Fall Virtual Meeting on September 29-30, 2022.

Your feedback is welcomed to ensure that the Census Bureau continues to provide relevant and timely statistics used by federal, state, and local governments, as well as business and industry, in an increasingly technologically oriented society.

Attachment

Recommendations and Comments to the Census Bureau
from the Census Scientific Advisory Committee
2022 Fall Virtual Meeting

To: Robert L. Santos
Director, U.S. Census Bureau

From: Jay Breidt
Census Scientific Advisory Committee (CSAC) Chair

Subject: Recommendations and Comments to the Census Bureau from the Census Scientific Advisory Committee 2022 Fall Virtual Meeting

September 29-30, 2022

The Census Scientific Advisory Committee (CSAC) thanks the US Census Bureau for all their work in preparing the Fall 2022 CSAC virtual meeting. CSAC thanks the presenters for their careful preparations and clear presentations, for providing CSAC with specific questions on each presentation, and for keeping to their allotted time and leaving room for discussion. CSAC appreciated the opening remarks by the Director and Associate Director and looks forward to hearing more at future meetings about some of the specific programs described, such as collaborative work with other agencies on improvements in the measurement of race and ethnicity. CSAC is also interested in the overall modernization of Census Bureau processes, especially the Bureau's vision of moving toward a data-centric enterprise organized around use cases and estimation targets and drawing on multiple sources of information.

I. Update on the 2020 Census Data Products

By way of general comments on the four presentations, CSAC finds that the Census Bureau's demonstration data products have been enormously valuable to users and, via the users' feedback, to the Census Bureau as well. We note, however, that the Census Bureau schedule allowed a relatively short time for feedback of recent demonstration data products (30 days). This may have contributed to the small number of responses received for the previous Demographic and Housing Characteristics (DHC) data release. The Census Bureau's use of varied forms of communication with users–in particular, workshops, webinars, cross-walk files, accuracy metrics, blogs and reports–to explain the changes in disclosure avoidance methods has been important in establishing at least an understanding of these changes and their implications. The change in methodology being implemented for the detailed DHC files will require a renewed communication effort, building on lessons learned from user responses to previous materials.

Demographic and Housing Characteristics (DHC) Update

The Differential Privacy (DP) Working Group report, presented below, addresses the application of DP to the DHC more broadly. The following findings and recommendations address the new material in the Census Bureau's presentation.

CSAC finds that the 95th percentile statistics are a useful addition to the accuracy metrics released with the demonstration products to date. From the first publication of accuracy metrics, users have expressed a strong interest in receiving more information on the tails of the distributions. Based on this information, the accuracy of tenure at the tract level looks good, but this is a single variable with only three, large categories, and tracts are fairly uniform in size. By contrast, couple household type has two very large categories (opposite-sex married and unmarried couples) and two very small categories (same-sex married and unmarried couples). Large mean absolute percentage errors (MAPEs) for these latter two categories at the county level (21% and 33%, respectively) raise concern, which the 95th percentiles (80% and 200%) underscore. For cross-tabulated variables, usability can be even more problematic. For example, tenure by age of householder looks reasonably good except for the youngest age group, but tenure by race of householder appears to be unusable for all but the White alone group, except perhaps in the largest counties. More generally, summary metrics for counties, incorporated places, and school districts show low accuracy for smaller areas.

1. **CSAC recommends that the Census Bureau give more attention to the accuracy of cross-tabulations, as these reflect how users are likely to use these data.**

   Census Bureau Response: The Census Bureau accepts this recommendation. Assessing the accuracy of various cross tabulations was included in the overall effort to improve the disclosure avoidance protections used for the DHC. Several cross tabulations were also accounted for in the Detailed Summary Metrics released with the 2010 demonstration data products. Efforts to improve the accuracy of key cross tabulations based on use cases successfully increased accuracy along these lines. Although the settings for the disclosure avoidance system that will protect the 2020 DHC have been finalized, we will continue to take this recommendation under advisement for future products and research efforts.

2. **CSAC recommends that for future data products, including household surveys and the 2030 Census, the Census Bureau determine how to improve the accuracy of smaller areas within each geography (e.g., counties, places, minor civil divisions, school districts and AIANNH areas).**

Census Bureau Response: The Census Bureau accepts this recommendation. Disclosure risk is often greater for individuals in less populous geographic areas, as there is a greater likelihood that individuals within these areas will have unique combinations of characteristics that would make it easier to re-identify them. That is why many disclosure avoidance approaches (including suppression, swapping, and formal privacy) tend to have a greater relative impact on statistics for these areas. That said, the Census Bureau recognizes the importance of data on small geographies and will research and evaluate options for improving the usability of statistics for small geographies, while also ensuring the confidentiality of these data, as part of future planning for the 2030 Census and other census data products.

3. **CSAC recommends that, in addressing the application of differential privacy to future surveys and censuses, the Census Bureau define data quality targets for a specified set of use cases and allocate the privacy loss budget to meet those targets. In doing so the Census Bureau should pay more attention to the tails of the distributions rather than focusing almost exclusively on means.**

   Census Bureau Response: The Census Bureau accepts this recommendation. Data quality and fitness-for-use cannot be assessed with any single metric. Measures of central tendency provide valuable information about overall accuracy, but as the Committee notes, they provide little information about the presence or magnitude of outliers. The Census Bureau has already incorporated metrics to assess the tails of distributions into our own assessments and into our published Detailed Summary Metrics, and we will continue to include measures of outliers in our disclosure avoidance research and planning for future censuses and surveys.

4. **CSAC also recommends that the Census Bureau publish extensive 2010 summary metrics based on the final parameter values in order to communicate to users the wide variation in accuracy that will characterize the published 2020 data.**

   Census Bureau Response: The Census Bureau accepts this recommendation. While the Census Bureau does not agree with the NAC's characterization of a wide variation in accuracy, the Bureau does accept the recommendation, to the extent as was done for the redistricting data product, to release detailed summary metrics for the DHC. These detailed summary metrics will be based on the production settings for the 2020 DHC and are scheduled for release on April 3.

Reconstruction and Re-identification of the DHC File

CSAC thanks the Census Bureau for this highly informative analysis–one that CSAC members have expressed an interest in seeing and that will be of considerable interest to a broader audience.

5. **CSAC recommends that the Census Bureau produce, publicly release, and submit for peer-review a detailed technical document describing the methods and results for their simulated reconstruction and reidentification attack on the Demographic and Housing Characteristics file and addressing critiques of this reconstruction attack.**

   Census Bureau Response: The Census Bureau accepts this recommendation. The results of the simulated database reconstruction attack on the 2010 Census were alarming and led to the decision to modernize disclosure avoidance methods for the 2020 Census. However, concerns about the impact that detailed information regarding this attack might have had on public participation in the 2020 Census prompted the Data Stewardship Executive Policy (DSEP) committee to limit public release of information about this simulated attack until after data collection operations had completed. During this period, however, the Census Bureau did engage with outside experts, including the JASON expert group, Mitre, and Galois, to review and validate the results and conclusions drawn from the simulated attack. A comprehensive technical paper on the simulated reconstruction-abetted re-identification attack on the 2010 Census is currently going through internal peer-review and will soon be submitted for publication.

   The table of agreement rates by block size shows a dramatic reduction in reconstruction accuracy at the smallest block sizes but a rather modest reduction for the largest block sizes. These results suggest that the current allocation of PLB provides comparatively less protection for larger than smaller blocks (and possibly larger versus smaller geographic areas of other types). Given that reconstruction accuracy increases with block size, which seems counter-intuitive, presumably one would prefer more improvement in privacy protection for larger versus smaller blocks, which would imply less noise infusion to smaller blocks than the current allocation provides. These results may be locked in from the redistricting data, but if not, a revised allocation may be able to improve the accuracy of DHC data for smaller areas.

6. **CSAC recommends that, if it is possible to do so, the Census Bureau should allocate more of the privacy loss budget (PLB) to smaller areas within varied geographies (e.g., counties, places, minor civil divisions, school districts, and AIANNH areas).**

   Census Bureau Response: The Census Bureau agrees to take this recommendation under advisement. The Census Bureau recognizes the importance of accurate data for smaller areas. However, disclosure risk is often greater for individuals in less populous geographic areas, as there is a greater likelihood that individuals within these areas will have unique combinations of characteristics that would make it easier to re-identify them. The settings for the disclosure avoidance system for the DHC already allocate more privacy-loss budget for smaller areas. Even with the allocation of additional privacy loss budget, data for small populations may still

have a lower relative level of accuracy. We will continue to take this recommendation under advisement for future products and in planning our research efforts.

The DP Working Group report presented below includes a recommendation regarding block designations for the 2030 Census. There may be additional ways to increase accuracy for small blocks.

7. **CSAC recommends that in developing the disclosure protection for the 2030 Census, the Bureau evaluate options to improve the accuracy of data for small domains by revising the allocation of PLB to smaller versus larger domains or limiting the impact of the DAS by binning variable categories or suppressing tables based on population size.**

   Census Bureau Response: The Census Bureau is unable to accept this recommendation as written. The Census Bureau is developing a disclosure avoidance research program for the 2030 Census. We will consider lessons learned from the 2020 Census process including the impact of DAS on small domains versus large domains as well as engage regularly with the data user community. Specific approaches and actions taken, including the potential of suppressing tables, will be determined as this program evolves. We will report back to CSAC on our plans.

Users will weigh the reduction in disclosure risk against the error introduced into the data. The Census Bureau reports that with commercial data as the source of names, the confirmed re-identifications declined from 24.8 percent with the 2010 swapping to 11.4 percent with the most recent application of DP (compared to 17.2 percent with the high swapping experiment). With the Census Edited File used as a proxy for higher quality commercial data, confirmed re-identifications declined from 75.5 percent with the 2010 swapping to 28.5 percent with the most recent application of DP (versus 46.6 percent with high swapping). The Census Bureau has commented in the past on the greater reduction in accuracy that a higher level of swapping would introduce in order to achieve a level of disclosure protection that is comparable in some sense to what is achieved with the application of DP. While the high swapping experiment does not match DP for protection, it would nevertheless be informative to see error metrics for this high swapping alternative.

8. **CSAC recommends that the Census Bureau express these findings in terms of a privacy/utility trade-off.**

   Census Bureau Response: The Census Bureau accepts this recommendation. The Census Bureau is developing materials to explain the privacy/utility trade-off of the selected privacy-

loss budget and Disclosure Avoidance System parameter settings. We will share those with the Committee once they are available.

9. **CSAC recommends that the Census Bureau produce error metrics for a selected set of DHC tables for the high swapping experiment; this will provide evidence bearing on the Census Bureau's past assertions regarding the choice of differential privacy over enhanced swapping.**

   Census Bureau Response: The Census Bureau accepts this recommendation. We intend to release a technical report and metrics demonstrating the privacy-accuracy tradeoff of swapping compared with the production settings of the 2020 Census Disclosure Avoidance System.

Update on 2020 Census Detailed DHC File A

The Census Bureau is taking an entirely different tack in the application of differential privacy to the detailed DHC versus the redistricting data and the forthcoming DHC file and has asked for suggestions for how to effectively engage with data users and others during the Proof of Concept feedback period. CSAC agrees that this is a challenge that will be important for the Census Bureau to meet.

10. **CSAC recommends that the Census Bureau utilize multiple modes of communication, as it has done with the new disclosure avoidance system and 2020 Census products to date, to provide a thorough explanation for the choice of methodology for the detailed DHC, why it differs from the approach employed for the census products to date, how it will affect key population statistics, and how to interpret the new metrics that will be provided.**

    Census Bureau Response: The Census Bureau accepts this recommendation. We are currently developing the Proof-of-Concept feedback strategy, which will include information about how the differentially private algorithm used to protect data in the Detailed DHC-A differs from that used to protect data in the Redistricting Data (P.L. 94-171) Summary File and the DHC. We are also working to develop a range of materials (e.g., webinars, newsletters, FAQs, etc.) to communicate this product and the selection and implementation of the methodology to a diverse group of data users.

11. **CSAC recommends that the Census Bureau release the materials in the previous recommendation prior to the release of the new demonstration products and address this information to non-technical users.**

Census Bureau Response: The Census Bureau accepts this recommendation. We are already in the process of developing a series of eight briefs, that provide key points and easy to read content, to help data users better understand the implementation of disclosure avoidance on the 2020 Census data products. Each brief will be reviewed by a set of external stakeholders and data users that represent a wide range of expertise. The Census Bureau plans to release these over the next 18 months.

12. **Given the change in methodology and, especially, the new form in which demonstration products will be presented, CSAC recommends that the Census Bureau devise a schedule that allows users a longer period of time–perhaps 60 days–to provide feedback than was permitted with the recent DHC products.**

Census Bureau Response: The Census Bureau is unable to accept this recommendation. The Census Bureau acknowledges that data user feedback has been critical to the development of the DAS including how the external review of demonstration data products complements our internal review of the data prior to full production releases.

However, the cycle of producing a demonstration data product, gathering feedback, analyzing, and incorporating that feedback, and producing an updated data product adds several months to the already finite 2020 Census life cycle. Therefore, we cannot accommodate an extension to the feedback period without jeopardizing the end of the 2020 Census cycle.

The Census Bureau will take this under advisement for 2030 Census planning.

13. **CSAC recommends that the Census Bureau conduct Tribal Consultations on the detailed DHC in each of the regions in order to meet with a diverse group of Tribal Nations. Tribal Consultations need to be conducted for non-technical audiences to fulfill the federal trust responsibility.**

Census Bureau Response: The Census Bureau believes it is doing the best it can to meet the spirit of this recommendation within our schedule restrictions. The Census Bureau has been and is committed to engaging with tribal leaders and conducting meaningful tribal consultations with Tribal Nations. In the fall of 2022, we conducted tribal consultations in Anchorage, Alaska in advance of the Alaska Federation of Natives Annual Meeting and in Sacramento, California at the National Congress of American Indians Annual Meeting. At both consultations, we were able to meet with and hear from tribal leaders representing Tribal Nations from across Alaska and the U.S. In February 2023, we conducted a virtual listening session and tribal consultation with tribal leaders across the U.S. to update them on the release of the Proof of Concept and hear their feedback. In advance of our in-person and virtual consultations, we published a Federal Register Notice and sent letters to tribal leaders inviting them to participate in the consultation. We will continue to engage and consult with tribal

leaders throughout the development of the Detailed DHC-A, Detailed DHC-B, and S-DHC.

Having stated this, we actively seek to improve the quality of dialogue at these consultations acknowledging the range of tribal leaders' technical knowledge and familiarity with Census Bureau data products. We would appreciate any recommendation and feedback regarding the enhancement of the tribal consultations themselves to promote more meaningful dialogue and generate more relevant feedback.

CSAC finds the proposed use of margins of error to describe the accuracy of the detailed DHC data to be a welcome innovation. Margins of error are widely used to describe precision, and users will be familiar with their interpretation. However, users are likely to want to see accuracy described with at least some of the same statistics reported for the redistricting and DHC data.

14. CSAC recommends that the Census Bureau include some of the same metrics produced for the redistricting and DHC data so that users can more readily assess the detailed DHC data in comparison with earlier products.

Census Bureau Response: The Census Bureau accepts this recommendation. We recognize that a broad range of data users will be interested in the Proof of Concept for the Detailed DHC-A. As part of the Proof of Concept, we will provide the Margins of Error for each geographic level and different iteration levels. Additionally, we are planning to provide some metrics that are similar to those provided in the DHC Demonstration product where it's feasible to do so.

CSAC anticipates that the inconsistencies that are an apparent byproduct of the new approach will set off alarms among users accustomed to census counts adding up (and seeing such additivity in the redistricting data and, within units and persons, the DHC file).

15. CSAC recommends that the Census Bureau explicitly address the source and extent of these inconsistencies and why they are an acceptable byproduct of the new methodology.

Census Bureau Response: The Census Bureau accepts this recommendation. We recognize that data users will not be accustomed to or expecting the inconsistencies they may observe in the Detailed DHC-A and that we will need to provide guidance to users on this. As part of the Proof of Concept, we plan to provide descriptions and examples of the types of inconsistencies data users may observe in the 2020 Census Detailed DHC-A.

CSAC finds the adaptive design being employed with the detailed DHC files highly appealing and anticipates that other users will agree. In particular, the adaptive design addresses the problem that producing the same detail across all domains generates a lot of useless data for small domains and potentially limits the detail provided for areas large enough to support much greater detail.

16. **CSAC recommends that in describing the adaptive design, the Census Bureau include examples demonstrating the advantages of providing different levels of age detail for larger versus smaller domains in contrast to the disadvantages of providing the same level of age detail for all sizes of domains.**

Census Bureau Response: The Census Bureau partially accepts this recommendation. The Census Bureau appreciates the positive feedback from CSAC on the adaptive design of the Detailed DHC-A. We thank CSAC for this recommendation on ways to further illustrate the positive features of the adaptive design. However, we must first assess whether there are any disclosure risks with providing these types of examples in future materials, such as webinars, newsletters, and technical documentation.

17. **CSAC recommends that for 2030 the Census Bureau explore a broader application of the adaptive design to include tables of age by race/ethnicity by sex in the DHC.**

Census Bureau Response: The Census Bureau accepts this recommendation. The Census Bureau will explore this as part of the research and planning for the 2030 Census.

Disclosure Avoidance Briefs

At the Spring 2022 meeting, CSAC made several recommendations based on its review of "Disclosure Avoidance for the 2020 Census: An Introduction," released in November 2021. CSAC is pleased to see most of these recommendations acknowledged in the Census Bureau's presentation and reflected in the proposed briefs. One general recommendation was to better address the diverse skill/knowledge levels of varied audiences; CSAC finds that the proposed briefs represent one way in which the Census Bureau is striving to do just that.

18. **CSAC recommends that in view of the limited scope of a "brief," the Census Bureau should determine the target audience(s) for each brief and design the content and language accordingly (e.g., define all terms and acronyms in words that would be understood by the intended audiences). Target audiences range from local planners and their staff to users who are sophisticated methodologists.**

Achieving broad outreach is likely to require significantly more than 8 briefs.

Census Bureau Response: The Census Bureau accepts this recommendation.

19. **CSAC recommends that the Census Bureau consider producing more than just the proposed 8 briefs in order to achieve broad outreach. A possible model for additional audiences to**

consider are those used in the American Community Survey Handbooks for Data Users (i.e., American Indian and Alaska Natives, Federal Agencies, Rural Area Data Users, Business Community, State and Local Governments, Congress, Journalists, and All Data Users).

Another earlier CSAC recommendation was to utilize external reviewers, and CSAC is pleased to find that the Census Bureau is proposing to do so.

Census Bureau Response: The Census Bureau is unable to accept this recommendation. Given the remaining 2020 Census time constraints and resources, we are unable to produce more than the eight briefs previously identified.

The Census Bureau will take this under advisement for 2030 Census planning.

20. CSAC recommends that for briefs with a focus on methodology the Census Bureau should include links to technical details and/or documents and also pair a reviewer well-acquainted with the relevant methods and a more applied reviewer who can represent potential users.

Census Bureau Response: The Census Bureau accepts this recommendation. With the help of the Population Reference Bureau and our internal subject matter experts, we have reached out to data users and stakeholders with diverse backgrounds, asking for volunteers to review and provide feedback during the development of the briefs. Selection of the reviewers will be based on their interest and expertise related to the brief topic.

21. CSAC also recommends that for technical materials the Census Bureau should seek reviewers who are known to be skilled at communicating technical content to non-technical audiences.

CSAC finds that briefs 5, 7, and 8 will provide an in-depth description of the methodology employed in creating the three detailed DHC files but is not convinced that the methodologies will differ sufficiently to require a separate brief for each file. CSAC also notes the absence of a brief addressed to users of these files.

Census Bureau Response: The Census Bureau accepts this recommendation. We have already begun the identification and selection process for reviewers with the help of the Population Reference Bureau (PRB). The Census Bureau contracted with PRB because they specialize in communicating technical information to non-technical audiences.

22. CSAC recommends that the Census Bureau reassess the need for separate briefs describing the methodologies used to create the three detailed DHC files.

Census Bureau Response: The Census Bureau accepts this recommendation. We have determined the need for keeping these briefs separate because the timeline for development, test and production for each data product is different.

23. **CSAC recommends that in addition to briefs 5, 7, and 8, which will describe the methodologies employed in creating the three detailed DHC files, the Census Bureau should produce at least one additional brief that will address the uses of these files in the same way that brief 4 will discuss the uses of the DHC.**

CSAC found the guidance on fitness for use presented in the November 2021 publication to be especially helpful, albeit subject to overly broad interpretation. It is important that users understand that fitness for use varies across multiple dimensions, which the earlier guidance attempted to address. In addition, users can benefit from guidance on best practices for dealing with the impact of DP on use cases, including, for example, applications involving the aggregation of blocks.

Census Bureau Response: The Census Bureau accepts this recommendation. The methodology for the Detailed DHC-A, Detailed DHC-B, and S-DHC data products will have notable differences and will be discussed in the briefs along with use cases.

24. **CSAC recommends that discussion of the impact of disclosure avoidance on use cases provide guidance on fitness for use, as did the November 2021 publication, and best practices for addressing the impact of DP on use cases.**

Census Bureau Response: The Census Bureau accepts this recommendation. In addition to guidance that will be provided in the disclosure avoidance briefs discussed in our responses to recommendations 18-23, the Census Bureau will also be producing additional guidance and resources aimed at assisting data users in incorporating formally private data into their analyses.

Briefs alone are insufficient to communicate the complexity of the material to be presented and to reach the diverse audiences that may use the census data.

25. **CSAC recommends that the Census Bureau make use of other forms of communication such as YouTube videos, Ted Talks, video vignettes, etc. on its website to reach a broader range of audiences, especially students.**

Census Bureau Response: The Census Bureau partially accepts this recommendation. We will take this under advisement. We agree that visual forms of communication are powerful tools

to help explain these complex concepts. We aspire to produce more visuals to help data users, including the college- and graduate-level students whom we understand have been using this work in their studies. Based on our experience to date, however, and after consultation with educational experts for our Statistics in Schools program, we have concluded that the broader topic of disclosure avoidance is not one that would engage K-12 students, their educators, or lay audiences. We have produced two general audience videos to date, available on our landing page, titled "Protecting Privacy with Math," a collaboration with MinutePhysics, and "Protecting Privacy in Census Bureau Statistics."

II. Improving Disclosure Protections on the Current Population Survey Public Use File

CSAC commends the U.S. Census Bureau for reevaluating the disclosure protections on the Current Population Survey monthly labor force data files in response to data user community feedback and prioritizing data user engagement. CSAC further commends the U.S. Census Bureau for taking the time to evaluate the various options and to continue to carefully work through analysis before implementation of new methods, so that any new method can be fully understood.

CSAC finds that there are few details on developing their disclosure protections methodology for the CPS. The lack of information includes how the Census Bureau evaluated the methodology against disclosure risk and utility risk metrics. Therefore,

26. CSAC recommends the U.S. Census Bureau employ additional partially synthetic data methods, such as decision tree models, and evaluate additional outcomes such as education, unemployment, and family structure, before finalizing their disclosure avoidance system. CSAC further recommends that the Bureau consider aggregation across contiguous geographies and the possibility of a hybrid model, one that combines swapping with a partially synthetic approach.

Census Bureau Response: The Census Bureau partially accepts the recommendation, as it is reviewing other synthetic data methods. We have developed decision tree synthesizer code and are actively exploring the use of this code to synthesize small geographies. This work is still in the research phase and not ready for use in production at this time, so we are continuing with plans to implement the regression approach and evaluate it thoroughly before release. Should research show that other techniques are superior to the regression approach we can work towards implementing them. We are reviewing many outcomes -- including impact on education, unemployment, and household structure -- as part of our review of the regression approach. The Census Bureau can review the possibility of a hybrid model at the same time.

Thank you for this and other recommendations regarding the Census Bureau's need to improve protections on the Current Population Survey Public Use File (CPS PUF). The Census Bureau appreciates the engagement from CSAC and its input as we strike the right balance between data protection and the value of the PUF for our user community.

27. CSAC recommends that the U.S. Census Bureau reports the uncertainty or error propagation when conducting the data quality evaluation given that the uncertainty could stem from multiple sources, such as data collection (unit nonresponse, item nonresponse, response error), modeling, and disclosure risk protection.

Census Bureau Response: The Census Bureau partially accepts this recommendation. This is an active area of research at the Census Bureau for all surveys including the CPS. We concur that the error from statistical disclosure limitation should always be considered within the context of total survey error. These findings will not be available in time for the release of the PUF with the new methods, but we will actively move toward reporting on it as possible.

CSAC commends the Bureau for engaging with the academic community on the question of designing formal privacy methods for this release. It may be worth exploring algorithms for synthetic data that give formal privacy guarantees for specific attributes. As an example, the model that is used to generate the synthetic attributes can be trained with differential privacy, which would imply formal protection for that specific attribute. Such an approach, while it may not satisfy formal privacy guarantees for the full release, may nevertheless make it feasible to avoid suppressing smaller population geographies as is currently done.

28. CSAC recommends that Census Bureau explore approaches to combine synthetic data generation processes with formal privacy protection.

Census Bureau Response: The Census Bureau accepts this recommendation. This is also an active area of research at the Census Bureau. We are monitoring the NIST Differential Privacy (DP) synthetic data challenges. We also have a Cooperative Agreement with prominent academics specializing in DP, who are collaborating with us on the research and development of various ways to implement DP into sample surveys and all of their corresponding data products, including public use microdata files. If new techniques are found to be an improvement, Census will replace the regression approach as necessary.

CSAC finds that the Census Bureau should continue engaging with the data user community.

29. CSAC recommends that the Census Bureau further clarify the implications for use-cases in geographies that fall below the 250,000 person cut-off, for example, for the use of these

data in rural areas (including areas with small towns), areas with American Indian populations, and sparsely populated areas. CSAC recommends that the Census Bureau also consider implementing partially synthetic data estimations, or use of aggregation methods, for geographies under both 250,000 and 100,000. This work of evaluating these additional methods to increase use for areas with small populations should be completed before the changes are implemented.

Census Bureau Response: The Census Bureau accepts this recommendation. We are in the process of examining the impacts of partially synthetic geographies along several dimensions, including comparing results of this approach to implementation of traditional suppression. We plan on releasing high-level findings from this evaluation with the technical paper upon release of the data. Census can investigate providing other types of estimates for data users as recommended; however, we do not believe we can delay release of the protections further given the need to address known vulnerabilities in the file.

30. **CSAC recommends the Census Bureau provide more dissemination materials (including but not limited to white papers, explanatory briefs, and journal articles) that detail the disclosure protection methodologies, utility metrics, and disclosure risk assessments and act as fitness-for-use guidelines. The broader communication outreach prior to release of public statistics will assist with stakeholder engagement. The materials should avoid the use of acronyms or define the acronyms in footnotes.**

Census Bureau Response: The Census Bureau accepts this recommendation.

31. **CSAC recommends involving an independent group of data users with Special Sworn Status to assess the impact of the CPS disclosure protection changes and giving the group sufficient time, data access, and resources to conduct the assessment.**

Census Bureau Response: In order to meet the timetable for ensuring that the new, modified protections are applied to the CPS PUF in time for 2023, the Census Bureau is unable to accept this recommendation. The Census Bureau has already taken a lengthy pause in implementing initial plans and believes it cannot further delay. However, the Census Bureau notes this is a valuable recommendation for future such efforts and improving its engagement with CPS data users more generally.

32. **CSAC recommends engaging with other stakeholder groups beyond those already engaged by the U.S. Census Bureau, such as members of the National Bureau of Economic Research, Inter-university Consortium for Political and Social Research, Pew Research, Tax Policy Center, the Population Association of America, the Rural Sociological Society, and Rural**

Population Research Network, National Congress of American Indians, and the US Indigenous Data Sovereignty Network.

Census Bureau Response: The Census Bureau accepts this recommendation. We are interested in meeting with these groups, getting a better understanding of their needs, and walking through advantages and impacts of the approaches so they understand impacts of the change as well.

III. Briefing on the Base Evaluation and Research Team

CSAC commends the Census Bureau for initiating the Base Evaluation Research Team and understanding the importance of improving and providing equitable statistics produced by the Population Estimates Program.

CSAC understands the importance of this project and the numerous challenges faced for the successful completion of a workable methodology and process that is both well communicated and meets the utility users expect. The impact on federal, state, and local resource distribution and decision-making need to be better understood by all parties. Benefits of researcher, and local government collaboration would further utility of, and trust in, the statistics produced especially when that information is provided prior to the application of changes. Therefore,

33. CSAC recommends that the Census Bureau initiate a CSAC working group on BERT, the Population Estimates Program, and the Population Estimates Challenge Program and provide frequent briefings.

Census Bureau Response: The Census Bureau is unable to accept this recommendation at this time due to resource constraints acknowledged in recommendation 34, below. If and when this situation changes, we will take the suggestion of forming a working group under advisement. As per our usual practice, we will ensure that informative updates to stakeholders on these critical programs are properly prioritized amongst efforts to meet project milestones.

CSAC finds that the Population Estimates Program and related research has in the past not been fully resourced and that it has not taken full advantage of its partnerships with Federal-State Cooperative for Population Estimates members and local governments. Furthermore, the impact of this program on stakeholders is not fully understood. Therefore,

34. CSAC recommends that the Census Bureau

a. Increase resources to support a continuing year-round estimates research program throughout the decade.

Census Bureau Response: The Census Bureau accepts this recommendation. Efforts are presently underway to pursue additional sources of funding and an expansion to the Population Estimates Program budget in future fiscal years.

b. **Develop or enhance the mechanism for effective partnership with the FSCPE so that the Bureau can benefit from local area knowledge, additional data sources, and methodological improvements for the estimates.**

Census Bureau Response: The Census Bureau accepts this recommendation. While acknowledging that fully, implementing it will likely require resources beyond what are presently available. However, we will engage with our FSCPE partners to explore creative and effective means to benefit from their knowledge and suggestions.

c. **Incentivize states with currently limited participation in the FSCPE program to fully participate in the partnership with the Bureau.**

Census Bureau Response: The Census Bureau partially accepts this recommendation. We believe that the efficacy of the partnership is enhanced by robust participation across the country. Although resources are not currently available to target states whose participation in the program is limited, we will continue to explore ways to enhance our outreach. For example, we will collaborate with more active states and seek input from less active states to identify options (some of which could be within our current means) to encourage additional participation. Then, at such a time as additional resources are available, we will expand the range of our efforts to enhance participation among the less active states. Additionally, should findings from the ongoing research by the Base Evaluation and Research Team result in a departure from a largely uniform estimates methodology across states, we could leverage this fact to strengthen the argument for participation.

d. **Enhance the estimates challenge program to solicit engagement with local governments by accepting a range of information and methodologies they could provide.**

Census Bureau Response: The Census Bureau partially accepts this recommendation. We are open to enhancing the Population Estimates Challenge Program where research indicates that such changes support the development of accurate and equitable estimates. Whereas previous research findings support the current format of the program, we expect to engage in further research to determine whether those findings still hold, and whether new information or methodologies could be implemented without introducing bias into the estimates.

e. **Collect information on and understand the utility and impact of annual population estimates on state and local government funding and other resources.**

Census Bureau Response: The Census Bureau is unable to accept this recommendation. Our agency mission is to serve as the leading source of quality data about the nation's people, and as such, we strive to create the most accurate and reliable estimates of population and housing units regardless of how they are used. To ensure we remain neutral and focused on this mission, we do not take specific funding use cases into account.

CSAC agrees with the Census Bureau, that innovative equitable methodologies are required to improve the statistics produced by the Population Estimates Program. Furthermore, developing or furthering practices that solicit information from stakeholders will be beneficial to the program. Therefore:

35. CSAC recommends that the Census Bureau

a. **Develop via improved partnerships and provision of additional resources the best data and methodology to be employed for each state without the constraint that the same process be applied nationwide.**

Census Bureau Response: The Census Bureau partially accepts this recommendation. Our ability to pursue this suggestion is contingent on the availability of additional resources, the successful enhancement of our partnerships, and the outcome of methodological research, all of which are priorities for us.

b. **Develop an adjusted base for housing data, vacancy, and persons per household information to support subcounty population estimates and local population estimate challenges.**

Census Bureau Response: The Census Bureau partially accepts this recommendation. Although vacancy and persons per household no longer factor into our calculation of subcounty population, as resources permit, we will pursue research which ensures the accuracy of the housing estimates base.

c. **Process successful subcounty population estimate challenges without a constraint that county population controls are invariant.**

Census Bureau Response: The Census Bureau partially accepts this recommendation. We will research the feasibility and logistics of implementing this change in order to ascertain if

it is methodologically sound, including soliciting input from our partners in the Federal-State Cooperative for Population Estimates.

d. **Link 2010 census records with 2020 records to better understand the impact of methodological changes on reported race and ethnicity and how these changes affect the quality of baseline age, race, sex, and ethnicity data used to develop current estimates.**

   Census Bureau Response: The Census Bureau accepts this recommendation. We expect to pursue this as part of the Base Evaluation and Research Teamwork.

e. **Use the MAF (particularly for subcounty areas), existing Administrative Records files, and the FRAMES program to improve accuracy of baseline data and ultimately the estimates.**

   Census Bureau Response: The Census Bureau partially accepts this recommendation in that we are exploring this line of research via the Base Evaluation and Research Teamwork.

f. **Collect group quarters lists by individual facility and include capacity and attendance information from Federal-State Cooperative for Population Estimates members for the estimates base and throughout the decade.**

   Census Bureau Response: The Census Bureau accepts this recommendation. We will coordinate with the Federal-State Cooperative for Population Estimates regarding the contents of the future Group Quarters Report data that they provide.

CSAC finds that users and stakeholders are not fully aware of the planned activities of the BERT team and the potential application and impact of privacy protections on the Population Estimates Program and the statistics it produces for dependent surveys. Therefore,

36. CSAC recommends that the Census Bureau make publicly available:

a. **A detailed research schedule for each BERT subject matter component.**
b. **A detailed representation of BERT's short-, medium- and long-term goals and key decision points.**
c. **Its evaluations of how specific decisions on population and housing base adjustments impact final statistics for states and sub-state areas.**
d. **Methodological reviews solicited by the Bureau from external researchers on BERT, the Population Estimates Program, and any potential application of privacy protection impacting the Population Estimates Program.**

e. **Comments and concerns solicited by the Bureau from federal and local government stakeholders on any potential application of privacy protection impacting the Population Estimates Program.**

Census Bureau Response: The Census Bureau partially accepts the five components of this recommendation. Our plans for disseminating information regarding BERT include regular briefings, the dedicated email address discussed above (see response to 34C) and launching a webpage on census.gov with relevant up-to-date materials, such as research goals and working papers on evaluations conducted by the team. Based on the specific subject matter and the manner in which the research is expected to evolve, it is not possible to provide a detailed research schedule by subject matter component. As resources permit, we will also consider other ways to enhance communication and engagement, including the specific ideas proposed here.

CSAC finds that the Census Bureau should further its communications and outreach to the user community and stakeholders to further its partnership in understanding and developing the important population and housing statistics produced on an annual basis. Additionally, furthering this partnership will benefit future survey and decennial census activities. Therefore:

37. **CSAC recommends the Census Bureau produce briefs, training presentations, and other outreach efforts on**
    a. **How the Population Estimates Program Impacts demographic surveys produced for other agencies including co-branding data products thereby enhancing its brand recognition.**

Census Bureau Response: The Census Bureau partially accepts this recommendation. The mission of the Population Estimates Program is to develop highly accurate and reliable estimates of population and housing units for the wide range of use cases that exist, rather than engaging directly in specific uses of the data which could be perceived as affecting our priority of neutrality. We already leverage presentations and publications to communicate the importance of the estimates data and would look to our stakeholders to detail more specifically how these data are being used in external products. As such, the program itself is unable to fulfill this recommendation. We will explore the feasibility and extent to which others at the Bureau are able to produce such materials.

    b. **The impact of Population Estimates Program's estimates on survey weights for demographic surveys.**

Census Bureau Response: The Census Bureau partially accepts this recommendation. It pertains to demographic surveys produced within our agency (otherwise, see response above to 37A). We will explore possible avenues for Census Bureau surveys to communicate the importance of the estimates as population and housing unit controls. For example, we are in the process of developing some publications which highlight the relationship between the population estimates and the American Community Survey.

c. The impact the Population Estimates Program has on government decision-making and resource distribution.

Census Bureau Response: The Census Bureau partially accepts this recommendation. Our agency mission is to serve as the leading source of quality data about the nation's people, and as such, we strive to create the most accurate and reliable estimates of population and housing units regardless of how they are used. As such, we do not track government decision making insofar as Population Estimates are used. In the past, we have indirectly accounted for the use of Population Estimates in federal funding through reports we have generated on how decennial and other Census Bureau data are used in federal funding.

d. Methods used and constraints experienced in the production of estimates.

Census Bureau Response: The Census Bureau accepts this recommendation. Although we are already transparent regarding our methodologies and any limitations of the methods, we will work to identify and pursue additional means of making this information accessible to the widest range of stakeholders possible.

e. The relationship the Census Bureau has with state demographers and the Federal-State Cooperative for Population Estimates.

Census Bureau Response: The Census Bureau accepts this recommendation. Although we already highlight this information on the census.gov website and across numerous presentations, we will work to identify and pursue additional means of making this information accessible to the widest range of stakeholders possible.

f. The ability for local governments to improve statistics by partnering with the Census Bureau in the Estimates Challenge Program and Special Censuses.

Census Bureau Response: The Census Bureau accepts this recommendation. We are in the process of identifying additional ways of making information on the Population Estimates Challenge Program and Special Censuses accessible to local governments, such as the creation of new materials as resources allow. For example, we are exploring the development of a video which would walk local governments through the process of submitting a challenge, and which would be supplemental to the Population Estimates Challenge Program Guide which is already made available on the census.gov website.

38. CSAC recommends the Census Bureau enhance its outreach efforts and provide training on 2020 Post Census Group Quarters Review to engage governments representing smaller populations.

Census Bureau Response: The Census Bureau accepts this recommendation. The Census Bureau has developed training and other material to assist governmental units with submitting a PCGQR case. Some materials were developed with help from one of our external Stakeholders. In addition, PCGQR staff have presented information about the PCGQR to governmental units, as well as State Data Centers, Census Information Centers, the Federal-State Cooperative for Population Estimates, and others.

IV. New Price Adjusted Economic Indicator Data

CSAC commends the Census Bureau for leading the development of this experimental data product. It is a clear example of how greater inter-agency statistical coordination and cooperation can lead to quality enhancements of the federal statistical products on which users rely, on a topic that is no less important: near-term macroeconomic surveillance. CSAC urges the Bureau to continue working on developing this area of research. Significant amounts of work are still needed before this experimental data product can be put into production, including most notably benchmarking to the 2017 Economic Census and taking advantage of the standardized product-level data that became available in 2017 using the North American Product Classification System (NAPCS). This process will require the labor-intensive task of creating a new concordance between the Harmonized Tariff Schedule and the new NAPCS product categories (in replacement of the 2012 Economic Census product lines). In addition, these are some of the other areas of research that CSAC believes should be addressed going forward:

39. CSAC recommends the Census Bureau evaluate the seasonality of the Bureau of Labor Statistics (BLS) Producer Price Indexes and the Import Price Indexes used to construct price deflators, with the ultimate goal of seasonally adjusting them, when necessary.

Census Bureau Response: The Census Bureau accepts this recommendation. We will be working with our mathematical statisticians to see if we should use the seasonally adjusted price indexes from BLS.

40. CSAC recommends the Census Bureau evaluate the inclusion of BLS Export Price Indexes to deflate the exports that are registered as sales in some wholesale industries.

Census Bureau Response: The Census Bureau accepts this recommendation. The team has started looking into this and plans on adding this into the calculation of the real dollar estimates as soon as we are comfortable with our methods.

41. CSAC recommends the Census Bureau perform a robustness check in the way product weights are constructed, so that product categories for which there is not a clear price index (for example: Other Apparel and Footwear) would be assigned the deflator constructed from the remaining sectors in the industry (example: Deflator for all Apparels and Footwear), instead of simply dropping them from the sample.

Census Bureau Response: The Census Bureau accepts this recommendation. Evaluating different approaches to the product weights will be done as part of future research.

Without a formal concordance between the Harmonized Tariff Schedule and the NAPCS, it is very hard to analyze product-level data on domestic and foreign transactions at the same time. This complicates enormously the methodology used for this experimental data product, and it will likely continue as the Census Bureau expands this experiment to other sectors of the economy.

42. As a result, CSAC recommends the Bureau assess whether it is possible to construct a formal concordance between the Harmonized Tariff Schedule and the North American Product Classification System, with an eye towards eventually proposing a single product classification system that integrates both.

Census Bureau Response: The Census Bureau accepts this recommendation. Some concordance between NAPCS and the Harmonized Tariff Schedule already exists. We will follow-up with our International Trade Program to see whether what has been done previously aligns to this effort or if additional concordance work is needed.

More generally, without a formal concordance between the foreign trade product classification systems and domestic product classification systems, the Bureau may want to evaluate the overall methodological approach of this experimental data product. The current approach attempts to

perform the price deflation at a very detailed product level, which gives this approach precision and makes it comparable to Bureau of Economic Analysis (BEA) processes. But, it also makes it very complex and not very timely.

43. As a result, in lieu of a formal concordance, CSAC recommends the Census Bureau assess whether a simpler approach at the industry-level (not product level) would generate more quickly a data product that although less precise and less comparable, can produce on a more-timely basis simple indicators that enhance our understanding of near-term macroeconomic surveillance.

Census Bureau Response: The Census Bureau accepts this recommendation. The team has started looking at different ways to use a simpler approach to derive these estimates and will first compare to see if those estimates are close to what we are producing.

V. Differential Privacy Working Group Deliverable - Tasks 1-3

The CSAC Differential Privacy (DP) Working Group recognizes and appreciates the amount of time and information that Census Bureau Subject Matter Experts (SMEs) openly shared over the course of regular meetings between May and September 2022. These meetings facilitated open discussion and allowed members of the working group to learn and understand plans, processes, and challenges associated with producing differentially private Census 2020 data for the upcoming releases. CSAC commends the SMEs for working diligently to refine methods, make adjustments, and adapt to the complexities and vast number of user needs for Census 2020 data to provide data that both protects privacy and remains accurate. This is a difficult task and one where the work has been subject to considerable user scrutiny and critique. The SMEs have done an admirable job seeking solutions to balance various demands.

These challenges stem from the fact that well-tested processes for implementing differential privacy were not in place prior to Census 2020. Based on the collective information collected by the CSAC Differential Privacy Working Group, the information presented in this and prior CSAC meetings, and the response from data users, it is clear that the application of differential privacy for Census 2020 was not predetermined. Instead, specific methodologies and processes have been developed after data collection and as data are being released. This has meant that Census 2020 data products have been delayed, users have been confused and unprepared, and that the full impact of decisions made for each data release have not been fully understood or accounted for.

44. CSAC recommends that for Census 2030 and all other Census data products (including the American Community Survey), the Census Bureau should have a clear, well-tested, practical,

detailed and step-by-step plan for how the disclosure avoidance system (DAS) system will be applied for each data product and how such application at each level will impact other products/levels prior to collecting any data.

Census Bureau Response: The Census Bureau accepts this recommendation from the perspective of the 2030 Census planning. With respect to "all other data products," disclosure avoidance research and implementation plans will be carefully developed using the best science available and will involve extensive data user engagement.

The decennial census is a general use tool. There are thousands, potentially millions, of use cases. There are probably thousands of funding allocation decisions for federal, state, and local levels. The census is the only good source of demographic data for rural areas, and sometimes the only source of demographic data for American Indian and Alaska Native areas or groups. Data from the decennial census is particularly valuable because of its high accuracy for small geographies and rural areas. This is what distinguishes decennial census data from other sources.

The CSAC Working Group found that the use cases collected by the Census Bureau, while very useful and illustrative, only represent a small sample of the full number of use cases that exist, and that it would require an exorbitant amount of resources to identify all potential use cases. Census Bureau calls for use cases result in submissions that are limited to those with resources, expertise, time, awareness, and patience to contribute. Multiple releases of DP demonstration data have allowed users to test data accuracy for a variety of uses and have increased transparency. Still, the number of demonstration data releases over years of time lead to problems with burn-out. In addition, the complexity of the file layout (and changes to it), mistakes, and short deadlines limit responses, and consequently reduce participation by a diverse and inclusive group of users.

45. CSAC recommends that the Census Bureau develop fellowship programs, research calls, or other mechanisms that properly compensate data users, practitioners, researchers, and stakeholders to engage in detailed data product development and evaluation for use cases. Stakeholders representing diverse backgrounds and communities with a variety of interests should be included to provide perspectives from the broad user community.

Census Bureau Response: The Census Bureau is unable to accept this recommendation as written. We are unable to commit funds not allocated for the purpose of compensating stakeholders to engage in detailed data product development and evaluation for use cases.

The Working Group's review of use cases finds that block-level accuracy does matter for basic population counts and counts by race/ethnicity, as well as other factors. Blocks allow users to

create custom geographies to meet a variety of needs. For example, blocks are used for redistricting, transportation planning, emergency response planning, and for evaluating environmental justice. In addition, because people can ground-truth block data, there is potential for inaccurate block data to foster distrust among users.

46. CSAC recommends that in planning for Census 2030, the Census Bureau consider changing construction of census blocks so that all have a large enough population that accurate total population counts can be released.

Census Bureau Response: The Census Bureau is unable to accept this recommendation as written. The fundamental criteria for the creation of blocks prevents the imposition of population thresholds that can be applied to all blocks. However, the Census Bureau is open to exploring if it is possible to reduce the number of low population/housing unit blocks through modifications to the block creation algorithms. Blocks are created by the hierarchical intersection of physical, statistical, and legal geographies. In the instances where all bounding features of a prospective block are made up of geographies for which tabulations will be required, then the block must be created regardless of any pre-specified population or housing unit counts. Should one or more of those bounding geographies not represent a geography for which tabulations will be required, there is some flexibility to explore expanding the size of that block, within reason, towards a population or housing unit goal criteria.

A review of metrics from DP demonstration data and from users' responses indicates that the application of DP throughout Census 2020, and still in the most recent DHC demonstration data (8/25/22), significantly impacts the accuracy of data for small domains, including: rural areas, groups other than non-Hispanic whites, and a variety of small populations (e.g., small municipalities, same-sex couple households, etc.). For these domains, the most recent demonstration data indicate only limited accuracy for geographies below the state level, which does not leave room for geographic specificity.

47. CSAC recommends that the Census Bureau document and communicate the impact of DP application on these groups (rural; Black, Indigenous and People of Color; small populations), and use the results to improve Census 2030 and other data products.

Census Bureau Response: The Census Bureau accepts this recommendation. The Census Bureau plans to release Detailed Summary Metrics for a DHC production settings 2010 based demonstration product. These metrics will include those released with previous demonstration products plus additional metrics based on external feedback. Metrics will be developed to supplement those already included related to the groups included in this recommendation. We also plan to release a full set of 2010-based demonstration product summary files after the

release of the DHC that will allow the public to assess the impact the application of disclosure avoidance had on these groups. We will also take this recommendation under advisement when developing research plans for improving disclosure avoidance for the 2030 Census for other Census data products.

48. CSAC recommends that the Census Bureau develop a research program that seeks to (a) improve privacy protection methodologies based on the results from the impacts of DP applications and (b) link persons (including but not limited to children) to households.

Census Bureau Response: The Census Bureau partially accepts this recommendation. The Census Bureau is developing a disclosure avoidance research program for the 2030 Census. We will consider lessons learned from the 2020 Census process including the impacts of DAS and the points noted above. Specific approaches and actions taken, such as linking persons to households, will be determined as this program evolves. We will report back to CSAC on our research plans.

49. CSAC recommends that this research program include collaboration with user groups at the local and state levels to define the utility of DHC variables for safely accessing the data at various geographic levels early in the decennial census development cycle (e.g., adaptive methods that provide different detail for different geographies or population sizes, as illustrated in the Census Bureau's presentation on Detailed DHC File A, or different approaches to privacy protection for different variables, geographies, or groups).

Census Bureau Response: The Census Bureau accepts this recommendation. While the disclosure avoidance research program for the 2030 Census is being developed, it will include collaboration with user groups at the local and state level. As part of this collaboration, we will continue to gather information on the uses of the DHC variables and to examine options that account for providing different characteristic detail based on geographic level or population size (e.g., adaptive design methods). However, as noted above in #48, we cannot accept the recommendation about the specific disclosure avoidance research for the 2030 Census. We will report back to CSAC on our research plans.

When considering prioritizing use cases and adjustments that might still be made to the DHC data release, age is a particularly important variable. For counties, five-year age group accuracy is critical in order to (1) calculate age-specific health rates (Centers for Disease Control and Prevention and others seeking to understand mortality differentials, differential impact of Covid-19, etc.); (2) conduct basic planning for services that meet the needs of differently aged people such as childcare or long-term care facilities; and (3) for making accurate population estimates and projections, which are used for funding distribution and for planning. Places also have similar needs. Age-by-race/ethnicity is also important, and an adaptive approach for aggregating age

groups depending on population size of each broad race/ethnic grouping may be more appropriate than releasing inaccurate data for all groups and geographies.

50. CSAC recommends allocating greater accuracy (PLB) to county-by-age so that five-year age groups are accurate even for more rural counties in the DHC, and to place-by-age to improve accuracy for places.

Census Bureau Response: The Census Bureau accepts this recommendation. The Census Bureau recognizes the importance of accurate data by age. Through the allocation of additional privacy-loss budget and improvements to the disclosure avoidance algorithm, improvements to the accuracy of the DHC data by age for key geographic levels, including counties, places, and school districts should be realized. We will continue to take this recommendation under advisement for future products.

51. CSAC recommends considering collapsing older age groups (85-99, 100+) in order to reserve more of the privacy loss budget for making other age groups more accurate, including the 65-plus age group.

Census Bureau Response: The Census Bureau is unable to accept this recommendation. The age categories included in the DHC were set prior to this recommendation. However, we will take this recommendation under advisement for future products.

52. CSAC recommends that the Census Bureau release data for children 0-5 in more narrow age groups, e.g., 0-2 and 3-5, to inform childcare, tax policy, and educational planning, for counties and places and critical off-spine geographical units, such as AIANNH or school district geographies.

Census Bureau Response: The Census Bureau accepts this recommendation. The DHC already includes block-level tables with single year of age up to age 19. Census Blocks can be aggregated to obtain single year of age data for all geographies.

53. CSAC recommends that the Census Bureau consider adaptive methods, similar those being implemented in the Detailed DHC-A, in order to provide more accurate race/ethnicity-by-age data for counties, places and tracts for broad race/ethnic groups represented in the DHC. This will allow users to access data with age groupings that appropriately balance accuracy and privacy, depending on population size.

Census Bureau Response: The Census Bureau accepts this recommendation and will take it under advisement in the context of 2030 Census planning.

54. CSAC recommends that in plans for Census 2030, the Census Bureau allocate more privacy loss budget to age (under/over 18) in the PL file (redistricting data).

Census Bureau Response: The Census Bureau partially accepts this recommendation by taking it under advisement for 2030 Census research and planning.

Another table in the DHC that deserves more attention is housing tenure by race/ethnicity and age. These data are important for implementation of the Fair Housing Act and for lenders to ensure equity. In the August 2022 DHC demonstration data release, errors for tenure by race, ethnicity, and age group for counties and places are unacceptably high (Tables 4.b/c, 3.b/c, 2.b/c), calling the ability to use these data into question.

55. CSAC recommends allocating greater accuracy (i.e., PLB) to housing tenure by race/ethnicity and age group for counties, places, and tracts.

Census Bureau Response: The Census Bureau accepts this recommendation. The Census Bureau recognizes the importance of accurate data on housing tenure by race/ethnicity. Through the allocation of additional privacy-loss budget and improvements to the disclosure avoidance algorithm, improvements to the accuracy of the DHC data for tenure and tenure tabulated by race and ethnicity should be realized.

The 2020 Census is a census of population and housing. The focus of disclosure avoidance has been on population and therefore less attention has been given to the accuracy of housing data and the interface between population and housing. The national housing crisis is playing out differently and more acutely in some local areas than others. For example, planners and stakeholders need to know why units are vacant at local levels. The different reasons for vacancy (e.g., for sale/rent, migrant worker, seasonal/recreational) have very different implications for judging the housing market and its needs for new construction, as well as for planning to meet emergency response, redevelopment, or for equity investments or for zoning and regulation of short-term rentals. The recent growth of the short-term rental market offers a good example of why this matters--housing units are vacant, but they might be high-value seasonal homes or they might be available for rent. Seasonality or migrant housing is also important for estimating seasonal vs. permanent population numbers and labor markets. Seasonal housing data is used at the block level for fire planning (e.g., US Forest Service) and by lake associations for planning, for school district funding planning, and for local government zoning/planning.

56. CSAC recommends allocating greater accuracy (i.e., PLB) within the DHC at local levels in order to better understand the reasons for housing vacancy.

Census Bureau Response: The Census Bureau is unable to accept this recommendation. The Census Bureau recognizes the importance of accurate data by detailed vacancy status. While privacy-loss budget was not added specifically to improve the accuracy of these data, improvements were made to the disclosure avoidance algorithm that resulted in improvements to the DHC data for detailed vacancy categories. At this point in the production schedule, it is unfortunately too late to alter our specifications. We will take this recommendation under advisement in the context of 2030 Census research and planning.

Accurate persons per household data are important for applied demographers (e.g., state and local demographers/governments) to make population estimates and projections using the housing unit method. Because the persons per household variable will not be included in the DHC, users may construct ad hoc measures based on separate household and population counts, creating impossible or improbable results. Accurate construction of this persons per household variable would require a person-household join, which is not directly possible in the current 2020 Census DAS.

57. CSAC recommends that Census Bureau direct users to the Detailed S-DHC for persons per household information from the 2020 Census.

Census Bureau Response: The Census Bureau partially accepts this recommendation. S-DHC research is ongoing, which includes comparing the relative accuracy for persons per household from S-DHC and DHC. Census Bureau will finalize guidance when research is complete.

58. CSAC recommends that the Census Bureau focus efforts to prioritize accuracy for persons per household on local geographies, including but not limited to incorporated places, minor civil divisions, and census tracts, for the Detailed S-DHC.

Census Bureau Response: The Census Bureau partially accepts this recommendation. We accept the recommendation to continue to prioritize accuracy for persons per household. Although we recognize the importance of persons per household data for local geographies, we are unable to accept prioritizing local geographies. At this time, the proposed S-DHC geographies are still under consideration. We are prioritizing accuracy for the final geographies while working within the limits of the privacy-loss budget. We will take your feedback under consideration as we finalize the S-DHC data product proposal.

59. CSAC recommends that the Census Bureau set a research agenda for how to better associate persons, households, and housing units to improve persons per household accuracy in planning for the 2030 Census.

Census Bureau Response: The Census Bureau partially accepts this recommendation. The Census Bureau thanks CSAC for the recommendation and will consider this relative to other topics in our 2030 Census research and planning.

In prioritizing allocation of the privacy loss budget, there are no clearly identified use cases for the variable "number of races reported," which is included in Tables 10a/b/c/d and 11a/b/c/d.

60. CSAC recommends that, without clearly defined use cases, some categories of the "number of races" variable could be removed from the DHC, so as to allocate privacy loss budget elsewhere. More detail on race could be included in the Detailed DHC instead.

Census Bureau Response: The Census Bureau is unable to accept this recommendation. The tables included in the DHC were set prior to this recommendation.

The Differential Privacy Working Group was also tasked to review metrics assessing the impact of DP. Releasing summarized metrics along with demonstration data is critical, as many users don't have capacity to review the raw data. Still, in considering the metrics released, it remains important to identify outliers where errors may be more extreme. It is important to recognize that the privacy loss budget is still not intuitive for data users (for example, many users still think that swapping techniques produce "truth"), and what it means for various data types and applications has been under-researched.

The CSAC DP Working Group has made several recommendations related to metrics in the past. We have a few remaining.

61. CSAC recommends that for cases where there are many units with an error of 5% or more, a column be added to also show the number of units with an error of 10% or more.

Census Bureau Response: The Census Bureau accepts this recommendation and will work to include this measure in the DHC production settings detailed summary metrics.

62. CSAC recommends that the Census Bureau calibrate the PLB against traditional measures of disclosure risk (e.g., identity, attribute, inferential) to help provide context of what a PLB means.

Census Bureau Response: The Census Bureau accepts this recommendation. Measures of absolute disclosure risk, such as those included in formal privacy frameworks, differ greatly from the relative risk assessments that have historically been used in disclosure risk

assessments (See "Disclosure Risk Assessment and Mitigation" in the Federal Committee on Statistical Methodology's Data Protection Toolkit). Consequently, the absolute risk measures common to formal privacy frameworks are less intuitive to audiences more accustomed to the more traditional relative risk frameworks. The Census Bureau is developing guidance to help explain these differences and to assist stakeholders in better understanding how to interpret the implications of differing levels of privacy-loss budgets on disclosure risk.

63. **CSAC recommends that the Census Bureau maintain an independent group of data users and privacy experts with Special Sworn Status who can access the census edited file (CEF) to evaluate the privacy-utility trade-offs and help communicate the on-going results to the public.**

Census Bureau Response: The Census Bureau accepts this recommendation. Approved researchers will be able to access the confidential Census Edited File through the Federal Statistical Research Data System network for use on approved projects, which may include projects investigating the privacy-utility tradeoff of the 2020 Census data products. As with all FSRDC projects, however, the statistical output of these projects will need to undergo disclosure avoidance review before they can be released publicly.