
MCBS Advanced Tutorial on the COVID-19 Supplement Data

Version Control Log

Date	Version	Revisions
3/02/21	1.0	Initial version released.

Section 1: Introduction





Learning Objectives

- After completing this Medicare Current Beneficiary Survey (MCBS) advanced tutorial, a data user will be able to answer the following questions:
 - What are the MCBS “coronavirus disease 2019” (COVID-19) Community Supplements and how are they distinct from the main MCBS?
 - How can data users access the MCBS COVID-19 Community Supplement data?
 - What should data users know in order to correctly use the MCBS COVID-19 Community Supplement data for their own analyses?



Advanced Tutorial Outline

- Section 1: Introduction
- Section 2: Background and Development
- Section 3: COVID-19 Summer and Fall 2020 Community Supplement Content
- Section 4: Accessing COVID-19 Summer and Fall 2020 Community Supplement Data and Estimates
- Section 5: Using Data from the COVID-19 Summer and Fall 2020 Public Use Files (PUFs)
- Section 6: Analytic Examples

Introduction to the MCBS

- The MCBS is a continuous, multi-purpose longitudinal survey covering a representative national sample of the Medicare population. Interviews are usually conducted in-person using computer-assisted personal interviewing (CAPI); however, conducting interviews by telephone has also been permitted on a limited basis since the origin of the MCBS.
- The MCBS represents the population of Medicare beneficiaries aged 65 and over and beneficiaries aged 64 and under with certain disabling conditions living in the United States (U.S.).
- The MCBS is sponsored by the Office of Enterprise Data and Analytics (OEDA) of the Centers for Medicare & Medicaid Services (CMS) and is conducted through a contract with NORC at the University of Chicago (NORC).
- The MCBS is designed to aid CMS in administering, monitoring, and evaluating the Medicare program. The MCBS is the most comprehensive and complete survey available on the Medicare population and is essential in providing important information on beneficiaries that is not otherwise collected through operational or administrative data from the Medicare program.

Introduction to the MCBS (continued)

- The MCBS uses a rotating panel sample design and is designed to be representative of the population of all Medicare beneficiaries for the survey year. Each MCBS panel, an annual statistical sample of all Medicare enrollees, is interviewed up to three times per year over four consecutive years.
 - There are three distinct rounds of data collection each year; winter (January through April); summer (May through August); and fall (September through December).
 - One panel is retired at the conclusion of each winter round, and a new panel is selected to replace it each fall round.
- To obtain an accurate representation of all Medicare beneficiaries, the MCBS sample includes all beneficiaries regardless of residence status. The MCBS follows beneficiaries into and out of long-term care facilities to maintain a comprehensive profile of their health care utilization and expenditures.
 - Unlike beneficiaries living in the community, beneficiaries living in facilities or their proxies do not complete the interview. Instead, an interviewer conducts the interview with appropriate facility staff and abstracts some information from medical records to reduce burden on facility staff.

MCBS Documentation and Resources

- CMS provides a wide array of MCBS documentation that is publically available on the CMS MCBS website. This documentation contains more in-depth descriptions of the topics covered in this tutorial.
 - [Tutorials, including the *New User Tutorial* and topical Advanced Tutorials](#)
 - It is recommended that new MCBS data users refer to the *New User Tutorial* before consulting this or other Advanced Tutorials.
 - Additional data documentation including [Data User's Guides, Methodology Reports](#) and [codebooks](#)
 - Annual [Questionnaire User Documentation](#)
 - Annual [Chartbooks](#) and data tables
 - Annual [bibliographies](#)
 - Annual [Early Looks](#) and topical infographics

CMS Website:

<https://www.cms.gov/Research-Statistics-Data-and-Systems/Research/MCBS/index>

Medicare Current Beneficiary Survey (MCBS).

[Questionnaires](#)

[Data Documentation and Codebooks](#)

[Data Tables](#)

[Bibliography](#)

[Data Briefs and Tutorials](#)

Introduction to the COVID-19 Community Supplement Data Tutorial

- In response to the emergence of the novel (new) coronavirus in the U.S. in 2020, CMS administered a series of COVID-19 Supplements to quickly collect information on the pandemic's impacts on the Medicare population. CMS released topic-specific Public Use Files (MCBS COVID-19 Summer and Fall 2020 PUFs) to make this data publically available to data users.
- Note that CMS has also released a [*MCBS COVID-19 Data Snapshot*](#) to accompany the COVID-19 PUF releases. This data snapshot uses preliminary data from the MCBS COVID-19 Community Supplements to present information on Medicare beneficiaries' experiences with the COVID-19 pandemic via an infographic. The data snapshot is accompanied by data tables and a methodology document describing the construction of the analytic variables and weights used to create the preliminary estimates presented in the *MCBS COVID-19 Data Snapshot*.

Introduction to the COVID-19 Community Supplement Data Tutorial (continued)

- This tutorial is intended to be a starting point for data users who would like to use data from the MCBS COVID-19 Community Supplement data for their own analyses. It provides an overview of the background and development of the MCBS COVID-19 Community Supplements, information on where data users can find data from the COVID-19 Community Supplements, and guidance on how to appropriately use data from the COVID-19 Community Supplements.
- More detailed descriptions of the topics discussed in this tutorial can be found in the [*MCBS Data User's Guides*](#) that accompany the COVID-19 PUF releases, the [*MCBS Methodology Report*](#), and other survey documentation provided online, such as the *Questionnaire User Documentation*:
 - [*2020 Summer Supplemental COVID-19 Questionnaires*](#)
 - [*2020 Fall Supplemental COVID-19 Questionnaires*](#)

MCBS COVID-19 Community Supplements

- Two COVID-19 Community Supplements were fielded in 2020. An additional COVID-19 Community Supplement will be fielded in Winter 2021. This tutorial focuses on the COVID-19 Summer and Fall 2020 PUF releases.
- A COVID-19 Fall 2020 Facility Supplement was also administered to facility staff on behalf of beneficiaries living in a facility. Due to disclosure concerns, those data will not be released as a PUF but will be available in the 2020 LDS files.

COVID-19 Supplements	Date of Survey Administration	Planned LDS File Release	Release Date of LDS File	Planned Public Use File Release	Release Date of Public Use File
COVID-19 Summer 2020 Community Supplement	June- July 2020	2019 Survey File COVIDS Segment	Summer 2021	COVID-19 Summer 2020 PUF	Released 9/23/20
COVID-19 Fall 2020 Community Supplement	October- November 2020	2019 Survey File COVIDF Segment	Summer 2021	COVID-19 Fall 2020 PUF	Released 1/15/21
COVID-19 Winter 2021 Community Supplement	March- April 2021 (anticipated)	2020 Survey File COVIDW Segment	Summer 2022	COVID-19 Winter 2021 PUF	3 rd Quarter 2021

Section 2: Background and Development



Why were the COVID-19 Summer and Fall 2020 Community Supplements Developed?

- On January 31, 2020, the Health and Human Services (HHS) Secretary determined that a Public Health Emergency (PHE) existed for the U.S. to aid the nation's healthcare community in responding to the novel "severe acute respiratory syndrome coronavirus 2" ("SARS-CoV-2") virus and the disease it causes, COVID-19; this determination has been renewed regularly throughout the course of the pandemic. For information on the most recent PHE declaration, please consult the Department of Health and Human Services' [PHE Declarations Page](#).
- Older people and people of all ages with severe chronic medical conditions — like heart disease, lung disease, and diabetes, for example — seem to be at higher risk of developing serious COVID-19 illness.
- With the emergence of the COVID-19 pandemic in the U.S., CMS was uniquely positioned to collect timely and vital information on how the pandemic was impacting the Medicare population by utilizing the MCBS.

Why were the COVID-19 Summer and Fall 2020 Community Supplements Developed? (continued)

- CMS took advantage of the MCBS panel design to assess and understand the COVID-19 pandemic by planning a series of rapid response surveys as a supplement to the main MCBS.
- The first supplement was administered in Summer 2020 as a standalone questionnaire instrument during the regular MCBS production cycle of Summer 2020 (Round 87) to existing MCBS sampled beneficiaries who were living in the community.
- A second supplement was administered in Fall 2020 during the regular MCBS production cycle of Fall 2020 (Round 88). One questionnaire was administered to existing MCBS sampled beneficiaries who were living in the community and a separate questionnaire was administered for the first time to those living in a facility.
 - COVID-19 Fall 2020 Supplement data that were collected from beneficiaries living in a facility were collected as part of the MCBS Round 88 Facility questionnaire and will be included in the data released in the LDS Files, but is not included in the PUF releases due to disclosure concerns.
- A third supplement is planned for Winter 2021 during the regular MCBS production cycle of Winter 2021 (Round 89). It will include one questionnaire administered to existing MCBS sampled beneficiaries living in the community and a separate questionnaire administered to those living in a facility.

How were the COVID-19 Summer and Fall 2020 Supplement Data Collected in the Community?

- Data Collection Period for the COVID-19 Summer 2020 Supplement: 5 weeks in June to July 2020
- Data Collection Period for the COVID-19 Fall 2020 Supplement: 6 weeks in October to November 2020
- Mode: Telephone, standalone survey instrument administered by MCBS field interviewers to MCBS respondents
- Eligibility: A beneficiary must have been continuously enrolled in Medicare from the beginning of 2020 and still be alive, living in the **community**, and eligible and enrolled in Medicare at the time of their COVID-19 Summer or Fall 2020 Supplement interview.
- An advance letter was sent to all eligible sample members informing them of the addition of the COVID-19 Community Supplement. Consistent with MCBS protocols, beneficiaries were able to use the help of an assistant or proxy when needed. A Spanish version of the COVID-19 Community Supplement was available and bilingual interviewers were available to conduct the COVID-19 Community Supplement in Spanish. The average administration time for the COVID-19 Community Supplement was 15 minutes.



How were the COVID-19 Summer and Fall 2020 Supplement Data Collected in the Community? (continued)

- In addition to the questions administered as part of the COVID-19 Summer and Fall 2020 Supplements, the MCBS COVID-19 Summer and Fall 2020 PUFs include select socio-demographic, chronic condition, and use of inhaled tobacco products variables sourced from the 2019 Survey File LDS files.
 - These additional variables were collected during the Fall 2019 (Round 85) interview, if applicable.
 - A dual eligibility indicator variable from the Administrative Enrollment File was also included in the MCBS COVID-19 Summer and Fall 2020 PUFs.
 - The majority of beneficiaries included in the MCBS COVID-19 Summer and Fall 2020 PUFs completed a Fall 2019 (Round 85) interview; however, a small number did not complete a Fall 2019 (Round 85) interview and therefore do not have data for the Fall 2019 (Round 85) variables.

Section 3: COVID-19 Summer and Fall 2020 Community Supplement Content



What Content Areas are Included in the COVID-19 Summer and Fall 2020 Community Supplements?

Content Area	COVID-19 Summer 2020 PUF	COVID-19 Fall 2020 PUF
Availability of Telemedicine	X	X
Access to Computers and Internet	X	X
Forgone Health Care as a Result of the Pandemic	X	X
Autoimmune Disease Prevalence	X	X
Access to and Utilization of COVID-19 Testing	X	X
COVID-19 Care (including Symptoms and Suspected Diagnosis)	X	X
Preventive Measures	X	X
Sources of COVID-19 Information	X	X
Knowledge and Perceptions of COVID-19/Public Health Guidance	X	X
Ability to Access Basic Needs During the Pandemic	X	X
Impact to Financial and Mental Health	X	X
COVID-19 Vaccination (Presumptive Vaccine Uptake)		X

What are the Content Differences Between the COVID-19 Summer and Fall 2020 Community Supplements?

- Notable changes between the COVID-19 Summer and Fall 2020 Community Supplements include:
 - For the COVID-19 Fall 2020 Supplement, the COVID-19 testing section was divided into two series: one series on viral testing and one on antibody testing.
 - New items regarding COVID-19 testing, including how long it took to get results and how much beneficiaries paid out-of-pocket for testing, were added in the Fall.
 - In the COVID-19 Fall 2020 Supplement, items were added to further align with COVID-19 items on other federal surveys including:
 - Telemedicine utilization, severity of COVID-19 symptoms and long-term health effects of COVID-19, presumptive vaccine uptake, and perceptions of severity of COVID-19.

What are the Content Differences Between the COVID-19 Summer and Fall 2020 Community Supplements? (continued)

- Notable changes between the COVID-19 Summer and Fall 2020 Community Supplements include:
 - Removal of some items that were no longer applicable in Fall:
 - A series of items assessing the incidence of COVID-19 symptoms and items pertaining to lack of access to COVID-19 tests were removed for the COVID-19 Fall 2020 Supplement to reflect changes in the course of the pandemic since Summer 2020, such as the wider availability of COVID-19 testing.
 - The reference period throughout the survey was updated:
 - Reference period in the COVID-19 Summer 2020 Supplement: "Since the beginning of the Coronavirus outbreak..."
 - Reference period in the COVID-19 Fall 2020 Supplement: "Since July 1, 2020..."

Section 4: Accessing COVID-19 Summer and Fall 2020 Community Supplement Data and Estimates



COVID-19 Summer and Fall 2020 Public Use Files

- The COVID-19 Summer and Fall 2020 PUFs are available free for download.
- The full package available for download includes the following:

MCBS PUF Website:
<https://www.cms.gov/Research-Statistics-Data-and-Systems/Downloadable-Public-Use-Files/MCBS-Public-Use-File>

- Data File
- Codebook
- Documentation
- SAS code



Data File Year	Complete PUF Package	Data File	Codebook	Documentation	SAS® code
2020 Medicare Current Beneficiary Survey COVID-19 Summer Supplement PUF	MCBSCOVIDPUF 2020S (ZIP)	COVIDPUF_1_2020S_XPT (ZIP)	COVIDPUF_1_2020s.txt (PLAIN)	2020MCBSCOVIDPUF SummerDUG (PDF)	MCBSCOVID 2020S.txt (PLAIN)
2020 Medicare Current Beneficiary Survey COVID-19 Fall Supplement PUF	MCBSCOVIDPUF 2020F (ZIP)	COVIDPUF_2_2020F_XPT (ZIP)	COVIDPUF_2_2020f.txt (PLAIN)	2020MCBSCOVIDPUF DUGFall (PDF)	MCBSCOVID 2020F.txt (PLAIN)

MCBS COVID-19 Data Snapshot

- CMS has released a MCBS COVID-19 Data Snapshot that presents information on Medicare beneficiaries' experiences with the COVID-19 pandemic.
- The data snapshot is accompanied by a methodology document which describes the construction of the analytic variables presented in the infographic.

MCBS COVID-19 Data Snapshot

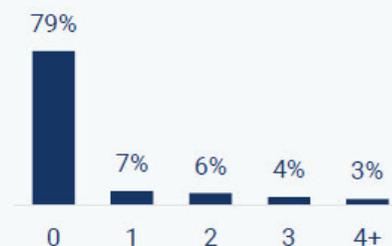
Website: <https://www.cms.gov/Research-Statistics-Data-and-Systems/Research/MCBS/Data-Briefs>

EXPERIENCES WITH FOREGONE CARE DURING COVID-19 PANDEMIC



21% of beneficiaries reported **needing health care** for something other than COVID-19, **but not getting it because of the pandemic**

Number of types of health care foregone¹
(% of beneficiaries)



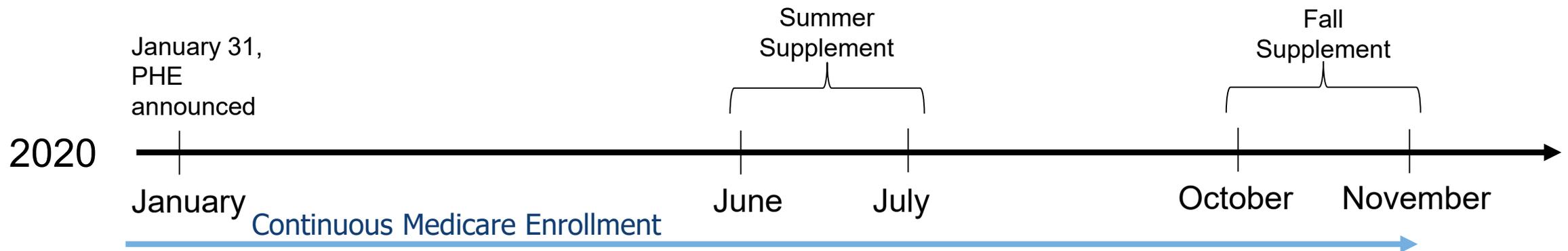
¹ Total does not sum to 100 percent because 1 percent of beneficiaries reported foregone health care but did not select a type

Section 5: Using Data from the COVID-19 Summer and Fall 2020 PUFs



Medicare Population Represented by the MCBS COVID-19 Summer and Fall 2020 PUFs

The MCBS COVID-19 Summer and Fall 2020 PUFs are representative of beneficiaries who were **continuously enrolled** in Medicare from the beginning of 2020 and still alive, living in the **community**, and eligible and enrolled in Medicare at the time of their COVID-19 Summer or Fall 2020 Supplement interview.



What Types of Questions Can Data Users Answer Using Data from the MCBS COVID-19 Summer and Fall 2020 PUFs?

Research Area	Example Research Question
Pandemic Impact on Daily Life	Are there differences in the self-reported impact of the COVID-19 pandemic on Medicare beneficiaries' daily lives (e.g., ability to pay housing costs, get food) across socio-demographic characteristics?
Availability of Telemedicine Services	Among Medicare beneficiaries, are there differences in availability of telemedicine services by income (below or above \$25,000) and metro area residence status?
Preventive Health Behaviors	Are there differences in self-reported preventive health behaviors (e.g., washing hands, wearing face masks) by age group?
Health Behaviors or Social Determinants of Health	Are there differences in the percentage of Medicare beneficiaries who were tested for COVID-19 by use of inhaled tobacco products?
Health Status and Functioning	Were Medicare beneficiaries with particular chronic disease conditions more likely than others to suspect they have or had COVID-19?
COVID-19 Vaccination	Are there differences in the likelihood of getting a COVID-19 vaccine (if one were available) by perceptions of COVID-19 severity (e.g., coronavirus is more deadly than the flu)?



Weighting

- The sample design of MCBS includes stratification, clustering, multiple stages of selection, and disproportionate sampling. Furthermore, the MCBS sampling weights reflect adjustments for survey nonresponse. These survey design and estimation complexities require special consideration when analyzing MCBS data (i.e., it is not appropriate to assume simple random sampling).
- To obtain accurate estimates from MCBS data, for either descriptive statistics or more sophisticated analyses based on multivariate models, the survey design complexities need to be taken into account by applying MCBS weights to produce estimates and using an appropriate technique to derive standard errors associated with the weighted estimates.

Weighting for the COVID-19 Summer and Fall 2020 PUFs

- The MCBS COVID-19 Summer and Fall 2020 PUFs include preliminary full-sample cross-sectional weights derived from nonresponse-adjusted weights among the beneficiaries sampled for the COVID-19 Community Supplements (CPWSWGT for the COVID-19 Summer 2020 PUF and CPFWWGT for the COVID-19 Fall 2020 PUF). These preliminary weights are intended for use in cross-sectional statistics.
- Each weight is greater than zero for all beneficiaries on the file. The weights should be used to make preliminary estimates of parameters for the Medicare population who were enrolled at any point in 2019 and still alive, enrolled, and living in the community in Summer or Fall 2020.
- Note these weights are considered preliminary because 2019 administrative data on beneficiary status and Medicare eligibility are not yet finalized. It is possible that these preliminary weights may include a small number of beneficiaries who will later be determined to have been ineligible. The final weights will be provided in the 2019 Survey File LDS and will reflect more complete entitlement and residency status for beneficiaries. Any differences between the preliminary and final weights are expected to be small.

Variance Estimation

- To permit the calculation of random errors due to sampling, a series of replicate weights were computed for each MCBS COVID-19 Community Supplement data file. Unless the complex nature of the MCBS is taken into account, estimates of the variance of a survey statistic may be biased downward.
- When using the replicate weight approach to variance estimation, the variance estimation method of balanced repeated replication (BRR) using Fay's adjustment of 0.3 is recommended. Analysis of subgroups should utilize the domain functions within the statistical package of the data user's choice (e.g., the DOMAIN statement in SAS, or the OVER function in STATA); restricting the sample to the subgroup and then performing an analysis would lead to slightly biased estimates of variance.
- Most commercial software packages today include techniques to accommodate the complex design, through replicate weight approaches. Among these are STATA®, SUDAAN®, R®, and the complex survey procedures in SAS®.



Variance Estimation for the COVID-19 Summer and Fall 2020 PUFs

- The replicate weights included in the MCBS COVID-19 Summer and Fall 2020 PUFs can be used to calculate standard errors of the sample-based estimates.
 - In the COVID-19 Summer 2020 PUF, these replicate cross-sectional weights are labeled CPWS001 through CPWS100 corresponding to the ever enrolled weight CPWSWGT.
 - In the COVID-19 Fall 2020 PUF, these replicate cross-sectional weights are labeled CPWF001 through CPWF100 corresponding to the ever enrolled weight CPFWWGT.

Variance Estimation for the Difference of Estimates between the COVID-19 Summer and Fall 2020 PUFs

- When conducting a repeated cross-sectional analysis to compare estimates between two COVID-19 PUFs, the difference or net change in a population characteristic is often of interest. In this type of analysis, a point estimate of a difference is straightforward to calculate; simply take the difference between the two individual cross-sectional estimates. Each cross-sectional estimate included in the comparison can be calculated using the full-sample weight included in that PUF's data release.
- Calculating variance and standard error estimates of net change is more complicated because of correlation between the two data sets. Correlation is present because many beneficiaries are retained from the Summer sample to the Fall sample and the same set of Primary Sampling Units (PSUs) and Secondary Sampling Units (SSUs) are used for each supplement. We refer to these types of correlation as serial and intra-cluster correlation, respectively.
- To estimate the variance of net change estimates, the data user may rely on a statistical software package such as SAS or calculate estimates directly in their own custom program using a closed formula.
 - In SAS, point estimates of differences between two COVID-19 PUFs, in addition to corresponding estimates of standard errors, can be generated by concatenating the two COVID-19 PUFs and then using PROC SURVEYREG. This methodology is demonstrated in analytic example 3 of this tutorial.

Variance Estimation for the Difference of Estimates between the COVID-19 Summer and Fall 2020 PUFs (continued)

- The variance of a difference can also be calculated directly using the formula below, which a data user can incorporate into a custom program for producing a variety of estimates of net change. This process does not require concatenating two files together, although programmatically it may be useful to do so.
- Let X_0^t be the cross-sectional estimate of the mean of population characteristic Y from the COVID-19 Fall 2020 PUF (denoted as PUF t) using the full-sample weights from PUF t , and let $X_1^t, X_2^t, \dots, X_{100}^t$ be cross-sectional estimates of the same population mean from the COVID-19 Fall PUF t using each of the 100 corresponding replicate weights.
- Similarly, let $X_0^{t-1}, X_1^{t-1}, X_2^{t-1}, \dots, X_{100}^{t-1}$ be estimates of the same population characteristic Y from the COVID-19 Summer 2020 PUF (denoted as PUF $t-1$), using the weights from the PUF $t-1$. Next, define a set of difference variables as $D_0 = X_0^t - X_0^{t-1}, D_1 = X_1^t - X_1^{t-1}$, etc.
- Then, $Var(D_0) = \frac{2.04}{100} \sum_{i=1}^{100} (D_i - D_0)^2$ is an estimate of the variance of the estimate of net change from PUF $t-1$ to PUF t (i.e., the change between Summer 2020 and Fall 2020). The square root of this estimate is the estimated standard error.

Analytic Limitations for the COVID-19 Summer and Fall 2020 PUFs

- COVID-19 Summer and Fall 2020 PUF data are only representative of beneficiaries **living in the community**.
- The COVID-19 Summer and Fall 2020 PUFs are **standalone files** and cannot be merged together or with other MCBS PUFs, including other COVID-19 PUFs, or LDS files.
- The COVID-19 Summer and Fall 2020 PUFs contain **preliminary weights**; the final weights will only be available in the LDS.
- Some variables included in the COVID-19 Summer and Fall 2020 PUFs were not collected during the administration of the COVID-19 Summer and Fall 2020 Supplements. These variables were sourced from the 2019 Survey File LDS and were collected from MCBS respondents during prior interviews. Data users should use caution when conducting analyses with these COVID-19 Summer and Fall 2020 PUF variables as the data were not collected contemporaneously with the COVID-19 Summer and Fall 2020 Community Supplement data. Such variables include:
 - Socio-demographics
 - Chronic conditions
 - Use of inhaled tobacco products
 - Dual eligible status

Analytic Limitations for the COVID-19 Summer and Fall 2020 PUFs (continued)

- In general, the MCBS is designed to be representative of the **annual** population of enrollees. Due to the unique nature of the COVID-19 Community Supplements, COVID-19 Summer and Fall 2020 PUF data are **only intended for cross-sectional analysis and cannot be used for longitudinal analysis.**

Steps for Analyzing MCBS Data



Step 1: Define Research Question



- In order to analyze MCBS data, a data user must first define the:
 - Research question
 - Population of interest
 - Desired analysis
 - Data files needed

Steps 2: Create Analytic File



- To create an analytic file, a data user must:
 - Identify the data file(s) that the research question requires
 - Identify the variables and weights needed for analysis
 - Append data files (if needed)
 - Recode variables as necessary
 - Segment analytic file to population of interest (if needed)

Step 3: Conduct Analyses Using Appropriate Variance Estimation Methods



- For appropriate variance estimation, a data user must:
 - Determine the correct methodology for the intended analysis
 - For most analyses, the BRR method is recommended
 - Alternative methodology may be needed for a difference of estimates (as detailed in this section)
 - Identify replicate weights (if needed)
 - Utilize available resources
 - [*Data User's Guides*](#)
 - [*Advanced Tutorial on Weighting and Variance Estimation*](#)

Section 6: Analytic Examples



Example 1 Step 1: Define Research Question





Example 1 Step 1: Define Research Question

To what extent does access to telemedicine before and during the pandemic (as of Summer 2020) vary by metro area residence status for Medicare beneficiaries aged 65 and over living in the community?

- Objective of this example:
 - Demonstrate how to use data from the COVID-19 Summer 2020 PUF
 - Demonstrate how to apply cross-sectional weights to produce nationally representative estimates

Example 1 Step 2: Create Analytic File





Example 1 Step 2: Create Analytic File

- Creating the analytic file requires three steps:
 - Identify the variables and weights needed for analysis
 - Recode variables
 - Segment population to population of interest

Example 1: Identifying Variables and Weights

Telemedicine access before and during the pandemic (as of Summer 2020) by metro area residence status for beneficiaries aged 65 and over

- This research question requires the following variables from the COVID-19 Summer 2020 PUF:

Measure	Variable
Age	DMV_AGECAT
Primary Care Provider (PCP) offered telemedicine before the COVID-19 pandemic	ACV_TELMEDBE
PCP offered telemedicine during the COVID-19 pandemic	ACV_TELMEDDU
Metro residence designated by core-based statistical area (CBSA)	DMV_CBSA
COVID PUF Summer Full Sample Weight	CPWSWGT
COVID PUF Summer Replicate Weights	CPWS001-CPWS100

Example 1: Identify Variables and Weights of Interest and Recode Variables

- The below code shows how raw variables can be converted into analytic variables. This example recodes telemedicine variables ACV_TELMEDBE and ACV_TELMEDBU to an analytic variable representing telemedicine access before and during the pandemic (as of Summer 2020). Respondents who are missing data, refused to answer, or answered “don’t know” for either or both telemedicine variables are dropped from the analytic data set.

```
data analysis1;  
  set summer.COVIDPUF_1_2020S (keep = DMV_AGECAT DMV_CBSA ACV_TELMEDBU ACV_TELMEDDU CPWSWGT CPWS001-CPWS100);  
run;
```

```
data analysis1_recode;  
  set analysis1;  
  if ACV_TELMEDBE=1 then TELEMED=1; /* Beneficiary was offered telemedicine prior to pandemic */  
  else if ACV_TELMEDBE=2 and ACV_TELMEDDU=1  
    then TELEMED=2; /* Beneficiary was offered telemedicine for the first time during the pandemic */  
  else if ACV_TELMEDBE=2 and ACV_TELMEDDU=2  
    then TELEMED=3; /* Beneficiary has not been offered telemedicine*/  
run;
```

Example 1: Recoded Variables

Measure	Original Variables	Recoded Variable
Telemedicine access before and during pandemic (as of Summer 2020)	ACV_TELMEDBE/ACV_TELMEDDU 1 Yes 2 No	TELEMED 1 Beneficiary offered telemedicine before pandemic 2 Beneficiary offered telemedicine for first time during pandemic 3 Beneficiary not offered telemedicine

Example 1: Segment the Population

- In order to restrict the file to beneficiaries age 65 and over, this example will segment the file on the variable DMV_AGECAAT.

```
data analysis1_final;  
  set analysis1_recode;  
  where DMV_AGECAAT > 1; /* Subset to beneficiaries age 65 and over */  
run;
```

Example 1 Step 3: Conduct Analyses Using Appropriate Variance Estimation Methods



Example 1 Step 3: Telemedicine Access Before and During the Pandemic (as of Summer 2020) by Metro Area Residence Status for Beneficiaries Aged 65 and Over Living in the Community

Balanced Repeated Replication (BRR) Method

The following code generates the frequency of the recoded telemedicine access variable for Medicare beneficiaries aged 65 and over by metro area residence status using the BRR method of variance estimation.

```
proc surveyfreq data=analysis1_final varmethod=brr (fay=.30);  
  table DMV_CBSA*TELEMED / row;  
  weight CPWSWGT;  
  repweights CPWS001-CPWS100;  
run;
```

Example 1 Results: Telemedicine Access Before and During the Pandemic (as of Summer 2020) by Metro Area Residence Status for Beneficiaries Aged 65 and Over Living in the Community

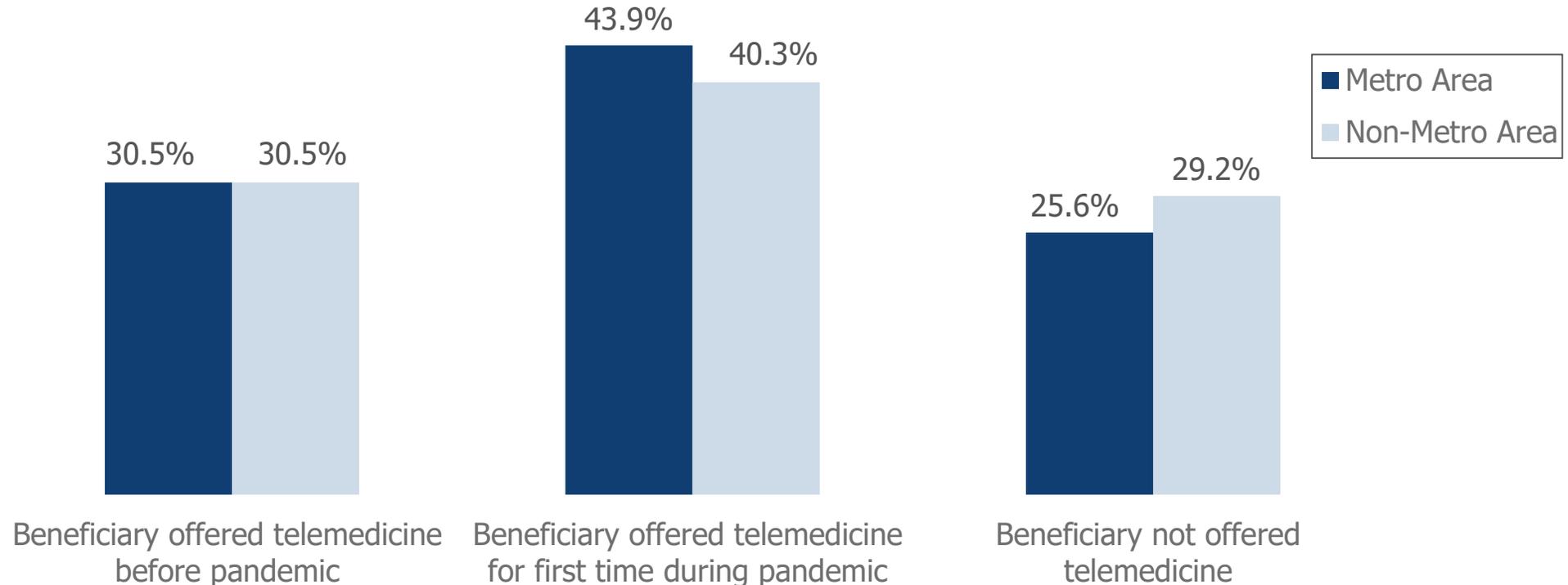
Telemedicine access before and during the pandemic (as of Summer 2020) by metro area residence status for beneficiaries aged 65 and over living in the community

Metro area residence status	Telemedicine access	Unweighted N	Weighted N	Estimate - % (St. Error)
Metro Area	Beneficiary offered telemedicine before pandemic	904	5,070,178	30.5 (1.6)
	Beneficiary offered telemedicine for first time during pandemic	1,349	7,299,130	43.9 (1.3)
	Beneficiary not offered telemedicine	782	4,262,244	25.6 (0.9)
Non-Metro Area	Beneficiary offered telemedicine before pandemic	238	1,000,348	30.5 (2.2)
	Beneficiary offered telemedicine for first time during pandemic	283	1,321,696	40.3 (2.2)
	Beneficiary not offered telemedicine	195	955,668	29.2 (2.4)

SOURCE: Centers for Medicare & Medicaid Services, Medicare Current Beneficiary Survey COVID-19 Summer 2020 PUF.

NOTES: Percentages may not sum to 100 percent due to rounding. Estimates are representative of beneficiaries who were continuously enrolled in Medicare from the beginning of 2020 and still alive, living in the community, and eligible and enrolled in Medicare at the time of their COVID-19 Summer Supplement interview. Beneficiaries living in the community answered questions themselves or by proxy. Weights used for these estimates are preliminary weights and these estimates should therefore be interpreted with caution.

Example 1 Results: Telemedicine Access Before and During the Pandemic (as of Summer 2020) by Metro Area Residence Status for Beneficiaries Aged 65 and Over Living in the Community



SOURCE: Centers for Medicare & Medicaid Services, Medicare Current Beneficiary Survey COVID-19 Summer 2020 PUF.

NOTES: Percentages may not sum to 100 percent due to rounding. See detailed table for standard errors. Estimates are representative of beneficiaries who were continuously enrolled in Medicare from the beginning of 2020 and still alive, living in the community, and eligible and enrolled in Medicare at the time of their COVID-19 Summer Supplement interview. Beneficiaries living in the community answered questions themselves or by proxy. Weights used for these estimates are preliminary weights and these estimates should therefore be interpreted with caution.

Example 2 Step 1: Define Research Question





Example 2 Step 1: Define Research Question

To what extent does presumptive COVID-19 vaccine uptake (as of Fall 2020) vary by age group for Medicare beneficiaries living in the community?

- Objective of this example:
 - Demonstrate how to use data from the COVID-19 Fall 2020 PUF
 - Demonstrate how to apply cross-sectional weights to produce nationally representative estimates

Example 2 Step 2: Create Analytic File





Example 2 Step 2: Create Analytic File

- Creating the analytic file requires two steps:
 - Identify the variables and weights needed for analysis
 - Recode variables

Example 2: Identifying Variables and Weights

Presumptive COVID-19 vaccine uptake (as of Fall 2020) by age group for beneficiaries living in the community

- This research question requires the following variables from the COVID-19 Fall 2020 PUF:

Measure	Variable
Presumptive Vaccine Uptake	PKV_GETVAC
Age	DMV_AGECA
COVID PUF Fall Full Sample Weight	CPFWGT
COVID PUF Fall Replicate Weights	CPWF001-CPWF100

Example 2: Identify Variables and Weights of Interest and Recode Variables

- The below code shows how raw variables can be converted into analytic variables. This example recodes the presumptive vaccine uptake variable GETVAC from a five-point scale to a three-point scale and recodes the age variable R85_AGECA1 from four age categories to two. Respondents who are missing data, refused to answer, or answered “don’t know” to the vaccine uptake variable are dropped from the analytic data set.

```
data analysis2;  
  set fall.COVIDPUF_2_2020F (keep = DMV_AGECA1 PKV_GETVAC CPWF001-CPWF100);  
run;
```

```
data analysis2_final;  
  set analysis2;  
  
  if PKV_GETVAC in (1:2) then VACCINE=1; /* Likely to get vaccine */  
  else if PKV_GETVAC in (3:4) then VACCINE=2; /* Unlikely to get vaccine */  
  else if PKV_GETVAC=5 then VACCINE=3; /* Unsure */  
  
  if DMV_AGECA1 =1 then AGE=1; /* <65 Years */  
  else if DMV_AGECA1 in (2:3) then AGE=2; /* 65+ Years */  
  
run;
```

Example 2: Recoded Variables

Measure	Original Variables	Recoded Variable
Presumptive Vaccine Uptake (as of Fall 2020)*	PKV_GETVAC 1 Definitely 2 Probably 3 Probably Not 4 Definitely Not 5 Not Sure	VACCINE 1 Likely to get vaccine 2 Unlikely to get vaccine 3 Unsure
Age	DMV_AGECA 1 <65 Years 2 65-74 Years 3 75+ Years	AGE 1 <65 Years 2 65+ Years

* Important note regarding survey timing:

At the time the COVID-19 Fall 2020 Community Supplement was fielded, a vaccine was not yet widely available. Respondents were asked "If a vaccine that protected you from Coronavirus was available to everyone who wanted it, would you get it?"

Example 2 Step 3: Conduct Analyses Using Appropriate Variance Estimation Methods



Example 2 Step 3: Presumptive Vaccine Uptake (as of Fall 2020) by Age Group for Beneficiaries Living in the Community

Balanced Repeated Replication (BRR) Method

The following code generates the frequency of the recoded presumptive vaccine uptake variable by age category for Medicare beneficiaries living in the community using the BRR method of variance estimation.

```
proc surveyfreq data=analysis2_final varmethod=brr (fay=.30);  
  table AGE*VACCINE / row;  
  weight CPFWGT;  
  repweights CPWF001-CPWF100;  
run;
```

Example 2 Results: Presumptive COVID-19 Vaccine Uptake (as of Fall 2020) by Age Group for Beneficiaries Living in the Community

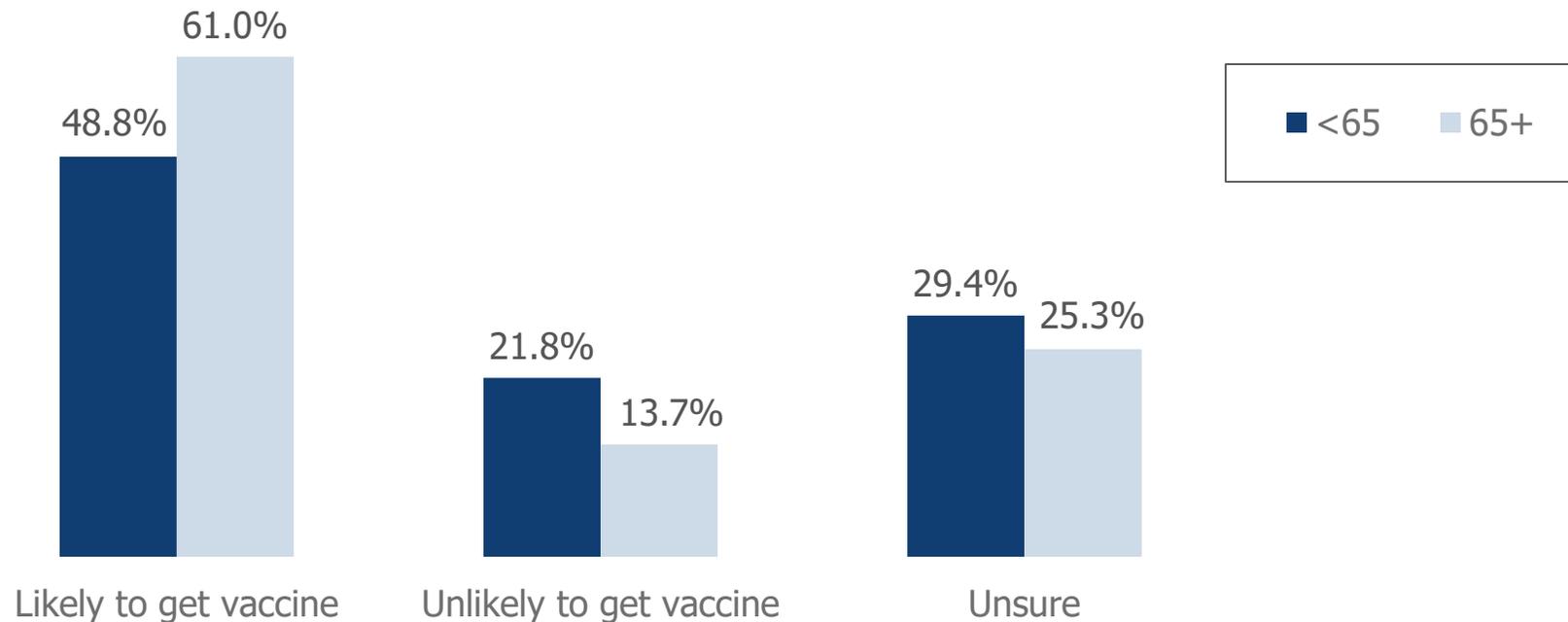
To what extent does presumptive COVID-19 vaccine uptake (as of Fall 2020) vary by age group for Medicare beneficiaries living in the community?

Age Category	Presumptive Vaccine Uptake	Unweighted N	Weighted N	Estimate - % (St. Error)
<65 Years	Likely to get vaccine	603	3,230,115	48.8 (1.9)
	Unlikely to get vaccine	306	1,540,610	21.8 (1.3)
	Unsure	327	2,029,514	29.4 (1.4)
65+ Years	Likely to get vaccine	4,336	25,683,771	61.0 (1.0)
	Unlikely to get vaccine	949	5,985,635	13.7 (0.7)
	Unsure	1,764	10,841,667	25.3 (0.8)

SOURCE: Centers for Medicare & Medicaid Services, Medicare Current Beneficiary Survey COVID-19 Fall 2020 PUF.

NOTES: Percentages may not sum to 100 percent due to rounding. Estimates are representative of beneficiaries who were continuously enrolled in Medicare from the beginning of 2020 and still alive, living in the community, and eligible and enrolled in Medicare at the time of their COVID-19 Fall Supplement interview. Beneficiaries living in the community answered questions themselves or by proxy. Note that at the time the COVID-19 Fall 2020 Community Supplement was fielded, a vaccine was not yet widely available. Respondents were asked "If a vaccine that protected you from Coronavirus was available to everyone who wanted it, would you get it?" Weights used for these estimates are preliminary weights and these estimates should therefore be interpreted with caution.

Example 2 Results: Presumptive COVID-19 Vaccine Uptake (as of Fall 2020) by Age Group for Beneficiaries Living in the Community



SOURCE: Centers for Medicare & Medicaid Services, Medicare Current Beneficiary Survey COVID-19 Fall 2020 PUF.

NOTES: Percentages may not sum to 100 percent due to rounding. See detailed table for standard errors. Estimates are representative of beneficiaries who were continuously enrolled in Medicare from the beginning of 2020 and still alive, living in the community, and eligible and enrolled in Medicare at the time of their COVID-19 Fall Supplement interview. Beneficiaries living in the community answered questions themselves or by proxy. Note that at the time the COVID-19 Fall 2020 Community Supplement was fielded, a vaccine was not yet widely available. Respondents were asked "If a vaccine that protected you from Coronavirus was available to everyone who wanted it, would you get it?" Weights used for these estimates are preliminary weights and these estimates should therefore be interpreted with caution.

Example 3 Step 1: Define Research Question



Example 3 Step 1: Define Research Question

To what extent did the proportion of Medicare beneficiaries living in the community who were unable to receive needed care due to the COVID-19 pandemic change between Summer and Fall 2020?

- Objective of this example:
 - Demonstrate how to combine data from the COVID-19 Summer and Fall 2020 PUFs to compare estimates between the Summer and Fall 2020 Community Supplements
 - Demonstrate how to apply cross-sectional weights to produce nationally representative estimates
 - Demonstrate how to appropriately conduct variance estimation for a difference of estimates between the COVID-19 Summer and Fall 2020 PUFs

Example 3 Step 2: Create Analytic File





Example 3 Step 2: Create Analytic File

- Creating the analytic file requires three steps:
 - Identify the variables and weights needed for analysis
 - Concatenate data files
 - Recode variables

Example 3: Identifying Variables and Weights

Forgone care among beneficiaries living in the community in Summer and Fall 2020

- This research question requires the following variables from the COVID-19 Summer and Fall 2020 PUFs:

File	Measure	Variable
COVID-19 Summer 2020 PUF	Unable to Get Care Due to COVID-19	ACV_COVIDCAR
COVID-19 Summer 2020 PUF	COVID-19 Supplement Round	CVROUND
COVID-19 Summer 2020 PUF	COVID PUF Summer Full Sample Weight	CPWSWGT
COVID-19 Summer 2020 PUF	COVID PUF Summer Replicate Weights	CPWS001-CPWS100
COVID-19 Fall 2020 PUF	Unable to Get Care Due to COVID-19	ACV_COVIDCAR
COVID-19 Fall 2020 PUF	COVID-19 Supplement Round	CVROUND
COVID-19 Fall 2020 PUF	COVID PUF Fall Full Sample Weight	CPFWWGT
COVID-19 Fall 2020 PUF	COVID PUF Fall Replicate Weights	CPWF001-CPWF100

Example 3: Identify Variables and Weights of Interest

- The below code identifies variables needed for the analysis and renames the weights in each data set to utilize common weight names (POOLWGT and POOL001-POOL100) across PUFs in preparation for concatenation.

```
data summerPUF;  
  set summer.COVIDPUF_1_2020S (keep = ACV_COVIDCAR CVROUND CPWSWGT CPWS001-CPWS100);  
  rename CPWSWGT = POOLWGT;  
  rename CPWS001-CPWS100 = POOL001-POOL100;  
run;
```

```
data fallPUF;  
  set fall.COVIDPUF_2_2020F (keep = ACV_COVIDCAR CVROUND CPFWWGT CPWF001-CPWF100);  
  rename CPFWWGT = POOLWGT;  
  rename CPWF001-CPWF100 = POOL001-POOL100;  
run;
```

Example 3: Concatenate Data Sets and Recode Variables

- The below code shows how to concatenate PUF data sets by stacking them vertically and recode an analytic variable. This example vertically stacks the two PUF data sets, including their corresponding sets of weights, and recodes the forgone care variable ACV_COVIDCAR.

```
data analysis3;  
  set summerPUF fallPUF;  
  if ACV_COVIDCAR = 1 then FORGOCARE = 1; /* Unable to receive care due to COVID */  
  if ACV_COVIDCAR = 2 then FORGOCARE = 0; /* Able to receive care */  
run;
```

Example 3: Recoded Variables

Measure	Original Variables	Recoded Variable
Unable to Get Care Due to COVID-19*	ACV_COVIDCAR 1 Yes 2 No	FORGOCARE 1 Unable to receive care due to COVID-19 0 Able to receive care

* Important note regarding variable reference periods:

In Summer, respondents were asked "At any time **since the beginning of the coronavirus outbreak**, did you need medical care for something other than coronavirus, but not get it because of the coronavirus outbreak?"

In Fall, respondents were asked "**Since July 1, 2020**, did you need medical care for something other than coronavirus, but not get it because of the coronavirus pandemic?"

Example 3 Step 3: Conduct Analyses Using Appropriate Variance Estimation Methods



Example 3 Step 3: Forgone Care Among Beneficiaries Living in the Community in Summer and Fall 2020

Balanced Repeated Replication (BRR) Method

The following code generates the proportion of Medicare beneficiaries living in the community who had to forgo care due to COVID-19 in Summer and Fall 2020 using the BRR method of variance estimation. This code also generates an estimate for the difference in these Summer and Fall 2020 estimates and the standard error for this net change. The variable CVROUND is used to indicate which PUF (Summer or Fall 2020) each of the two files represents.

```
proc surveyreg data=analysis3 varmethod=brr (fay=.30);  
  class CVROUND;  
  model FORGOCARE = CVROUND;  
  lsmeans CVROUND / diff;  
  weight POOLWGT;  
  repweight POOL001-POOL100;  
run;
```

Example 3 Results: Forgone Care Among Beneficiaries Living in the Community in Summer and Fall 2020

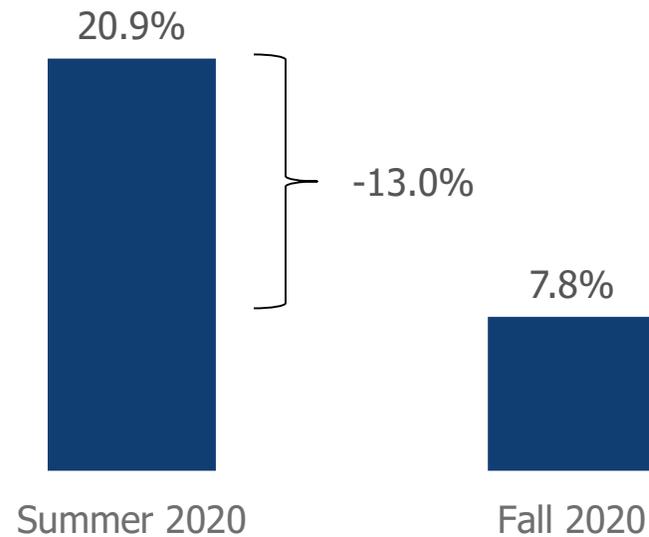
To what extent did the proportion of Medicare beneficiaries living in the community who were unable to receive needed care due to the COVID-19 pandemic change between Summer and Fall 2020?

COVID-19 Supplement Round	Estimate - % (St. Error)
Summer 2020	20.9 (0.8)
Fall 2020	7.8 (0.3)
Difference between Summer and Fall 2020	-13.0 (0.7)

SOURCE: Centers for Medicare & Medicaid Services, Medicare Current Beneficiary Survey COVID-19 Summer and Fall 2020 PUF.

NOTES: Estimates are representative of beneficiaries who were continuously enrolled in Medicare from the beginning of 2020 and still alive, living in the community, and eligible and enrolled in Medicare at the time of their COVID-19 Summer or Fall Supplement interview. Beneficiaries living in the community answered questions themselves or by proxy. In Summer, respondents were asked "At any time since the beginning of the coronavirus outbreak, did you need medical care for something other than coronavirus, but not get it because of the coronavirus outbreak?" In Fall, respondents were asked "Since July 1, 2020, did you need medical care for something other than coronavirus, but not get it because of the coronavirus pandemic?" Weights used for these estimates are preliminary weights and these estimates should therefore be interpreted with caution.

Example 3 Results: Forgone Care Among Beneficiaries Living in the Community in Summer and Fall 2020



SOURCE: Centers for Medicare & Medicaid Services, Medicare Current Beneficiary Survey COVID-19 Summer and Fall 2020 PUF.

NOTES: See detailed table for standard errors. Estimates are representative of beneficiaries who were continuously enrolled in Medicare from the beginning of 2020 and still alive, living in the community, and eligible and enrolled in Medicare at the time of their COVID-19 Summer or Fall Supplement interview. Beneficiaries living in the community answered questions themselves or by proxy. In Summer, respondents were asked "At any time since the beginning of the coronavirus outbreak, did you need medical care for something other than coronavirus, but not get it because of the coronavirus outbreak?" In Fall, respondents were asked "Since July 1, 2020, did you need medical care for something other than coronavirus, but not get it because of the coronavirus pandemic?" Weights used for these estimates are preliminary weights and these estimates should therefore be interpreted with caution.



For more information on how to use data from the COVID-19 Summer and Fall 2020 PUFs, please consult the Data User's Guides.

Thank you!

If you have any questions, please contact CMS at the following email address: MCBS@cms.hhs.gov.



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