AGENCY FOR HEALTHCARE RESEARCH AND QUALITY

MEPS – HC

Sample Design

Sadeq Chowdhury, PhD

Features of MEPS Sample

- **MEPS sample is a sub-sample of the previous year's National Health Interview Survey (NHIS), covering civilian noninstitutionalized population**

- **Every year a new panel of sample (about 10,000 households) is selected from households responded to the previous year's NHIS**

- **Each Panel is followed for 2 years using 5 interview rounds (exception COVID years)**

- **MEPS full sample for a year is an overlap of 2 panels (exception COVID years)**

- **Subpopulations of interest are oversampled**

MEPS Sample Size

Annual File Includes Two Panels

	Old Panel Selected Last Year	New Panel Selected Current Year
Households Selected (from NHIS respondents)	10,000	10,000
Households Responds 1st Year	6,800	6,800
Households Responds 2nd Year	6,300	
Current Year Responding Households	6,300	6,800
Annual Total Responding Households	13,100	
Annual Total Responding Persons	27,000	

MEPS-HC Sample Sizes

Year	Number of families	Number of persons
2021	13,238	27,332
2020	12,290	26,847
2019	11,924	27,648
2018	12,475	29,415
2017	12,756	30,716
2016	13,587	33,259
2015	13,800	33,893
2014	13,421	33,162
2013	13,936	35,068
2012	14,763	37,182
2011	13,449	33,622
2010	12,445	31,228
2009	13,875	34,920
2008	12,316	31,262
2007	11,615	29,370
2006	12,811	32,577
2005	12,810	32,320
2004	13,018	32,737
2003	12,860	32,681
2002	14,828	37,418
2001	12,852	32,122
2000	9,515	23,839
1999	9,345	23,565
1998	9,023	22,953
1997	13,087	32,636
1996	8,655	21,571

MEPS Sample Design – Inherited from NHIS

- NHIS sample is based on complex stratified area sample design

- Hence MEPS is based on the same complex design

- Complexity of the sample design affects the accuracy of a survey estimate

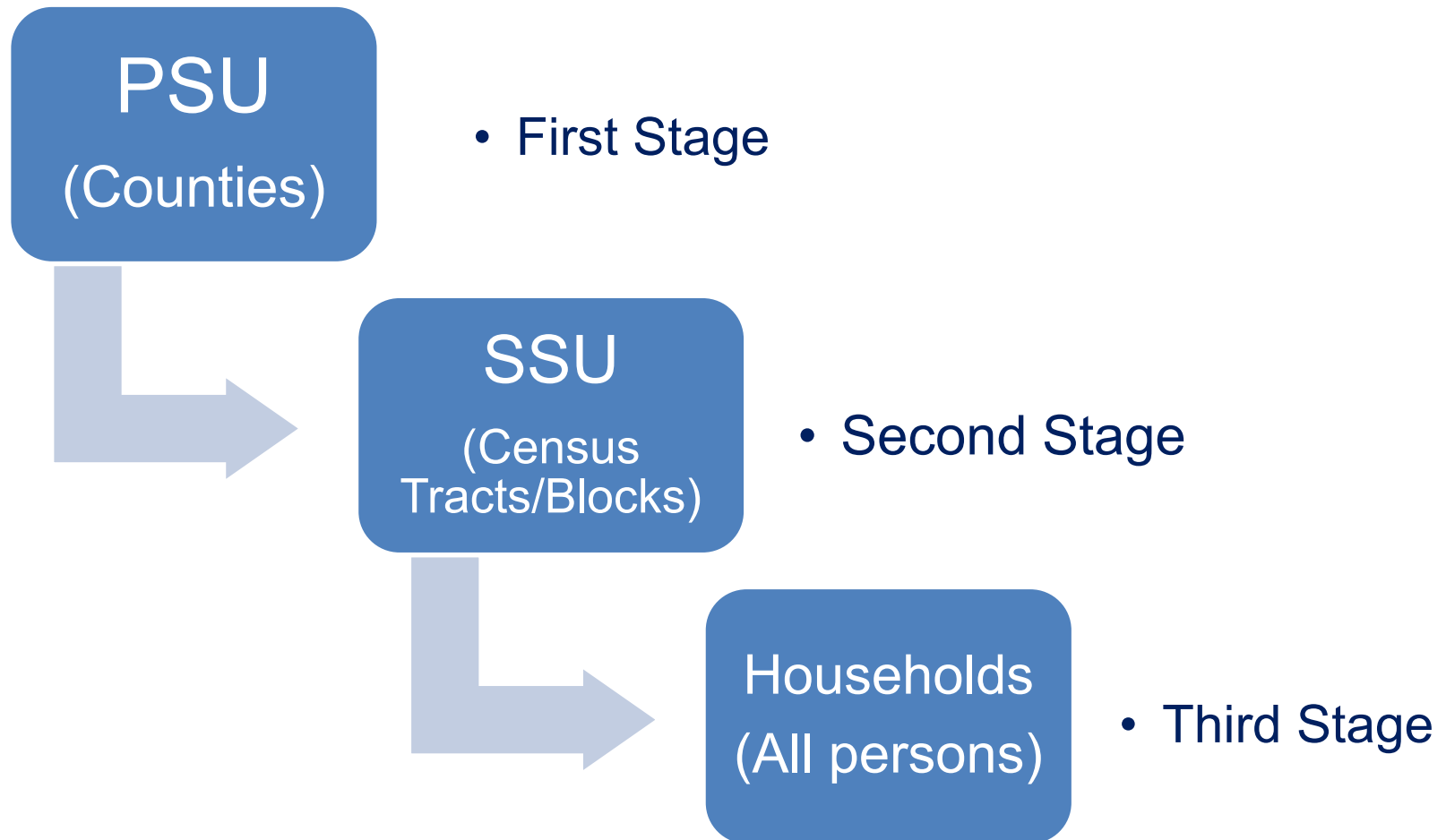- Complex multistage design is more cost-effective than single-stage or simple design

Simple Vs. Complex Design

- **Single Stage Simple Random Sampling**
  - **List of all sampling units available**
  - **One stage selection**
  - **Equal Probability**
  - **Sample from all areas**

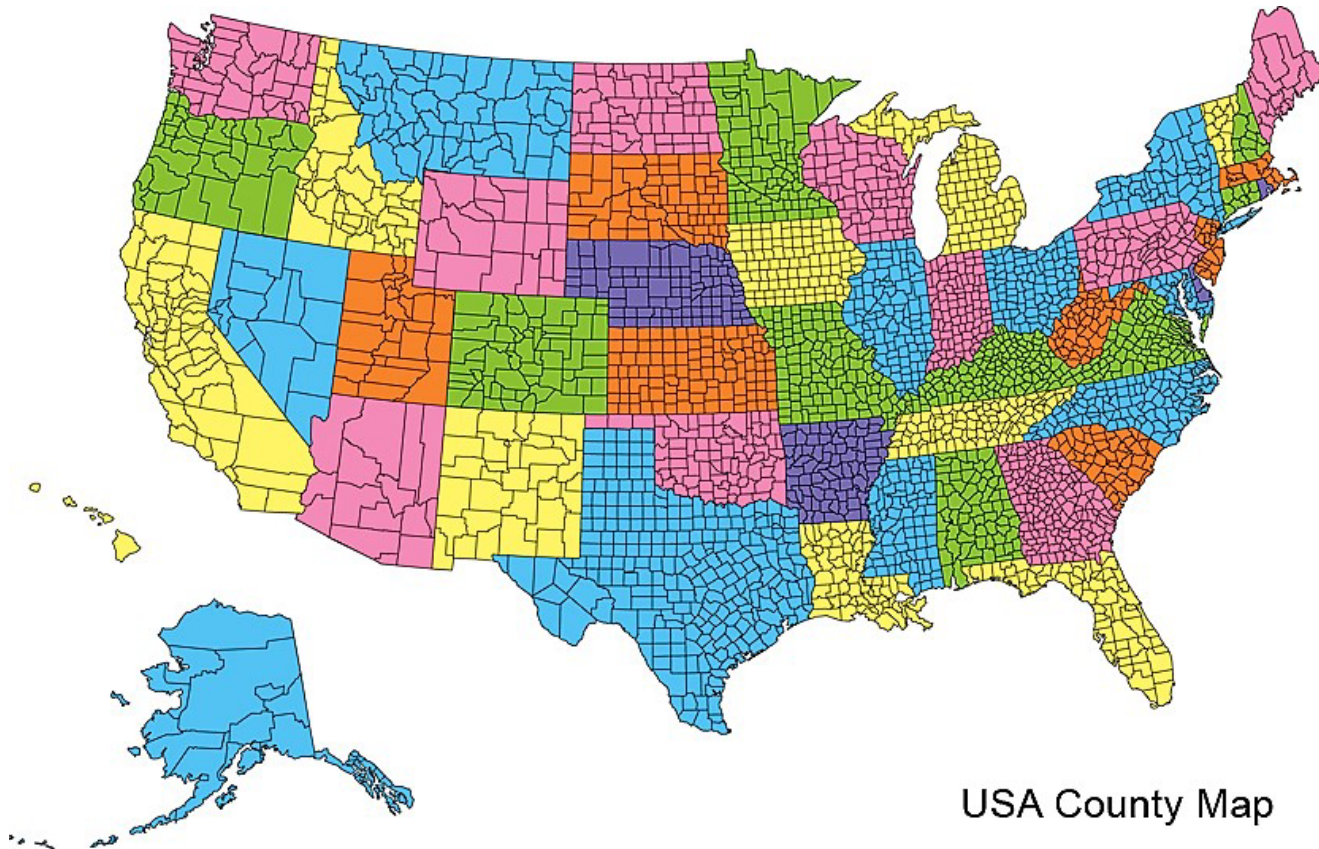Example: A sample of 10,000 persons selected directly from a list of all persons in the U.S.
  - **Efficient design i.e., estimates are more accurate**
  - **Expensive to create frame and collect data**

NHIS Stratified Multistage Area Sample Design up to 2015 (MEPS 2016)

PSU (Counties)
- First Stage

SSU (Census Tracts/Blocks)
- Second Stage

Households (All persons)
- Third Stage

PSUs Formed from Counties
(3,147 counties => 1900 PSUs)

USA County Map

This is a royalty free image that can be used for your personal, corporate or education projects. It can not be resold or freely distributed, if you need an editable PowerPoint or Adobe Illustrator version of this map please visit www.bjdesign.com or www.mapsfordesign.com. This text can be cropped off. © Copyright Bruce Jones Design 2009

NHIS Stratified Multistage Area Sample Design up to 2015 (MEPS up to 2016)

- ## First Stage or Primary Sampling Units (PSUs)
  - ► **Whole U.S. is partitioned into many PSUs**
  - ► **A PSU is a county or group of adjacent counties**
  - ► **3,147 counties collapsed into about 1,900 PSUs**
  - ► **A sample of almost 400 PSUs is selected**
  - ► **Roughly half (about 200) PSUs used in MEPS**

- ## Second Stage Units (SSUs)
  - ► **Each sampled PSU is divided into SSUs**
  - ► **An SSU is a cluster of housing units (Census blocks or tracts)**
  - ► **A sample of SSUs selected from each selected PSU**

NHIS Stratified Multistage Area Sample Design up to 2015 (MEPS up to 2016)

- **Final Stage Units**
  - ► **Sample of households from each selected SSUs**
  - ► **All families and persons within selected households were included**

- **Same PSUs and SSUs but different HHs**
  - ► **For each 10-year design, every year the sample was selected from the same PSUs and SSUs but different households (hence different families and persons)**
  - ► **In a redesign of NHIS (every 10 years), PSUs and SSUs are reselected but large PSUs (large MSAs) are always in the sample**

NHIS Sample Redesign 2016-2025 (MEPS 2017-2026)

- **A new NHIS design was introduced in 2016**

- **Stratification by State for State-level estimation**

- **PSUs formed and selected as before**

- **But households selected directly from USPS list of addresses within PSUs**
  - ► **USPS list available for most of the country**
  - ► **No need for listing of households**

- **Roughly 100 addresses (equal 1 cluster) selected from each PSU**

NHIS Sample Redesign 2016-2025 (MEPS 2017-2026)

- **Multiple clusters were selected from large PSUs**

- **A cluster includes many sub-clusters of 4 addresses**

- **Sub-clusters selected systematically from the PSU-wide list of addresses**

- **Traditional multistage design not needed anymore**

- **MEPS Panel 2017 and later are based on the new design**

- **Same PSUs used for 10 years but different clusters every year**

- **Almost 400 PSUs are selected for NHIS and half of those included in MEPS from NHIS Panels 1 & 3**

NHIS Sample Redesign 2016-2025 (MEPS 2017-2026)

PSU (Counties)

- First Stage

25 Subclusters (4 HHs each). A cluster of 100 HHs/PSU)

- Second Stage

All persons within selected HHs
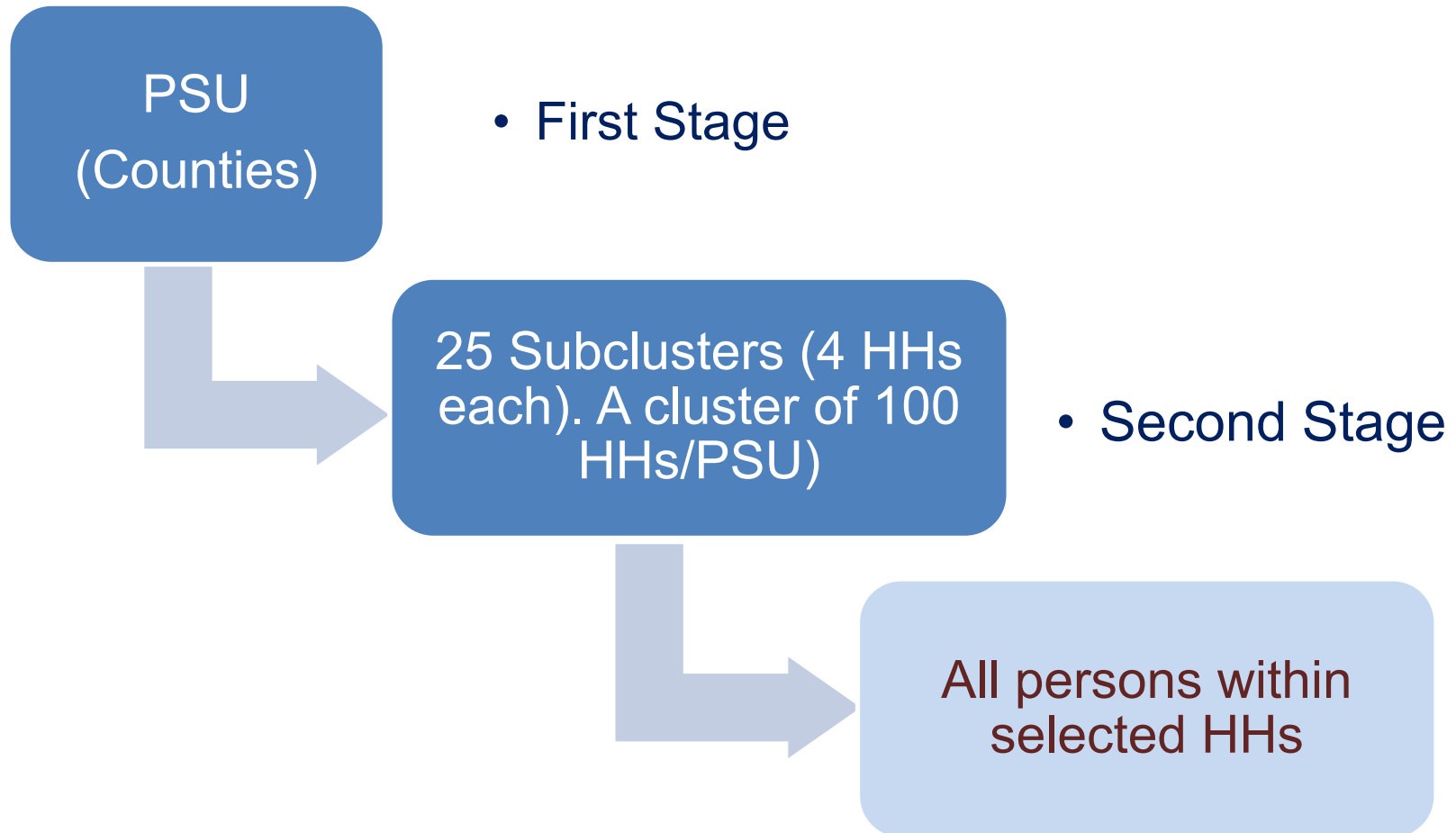
Illustration of Hypothetical 100 PSU Sample

Sample sufficient in all regions, but not in all states
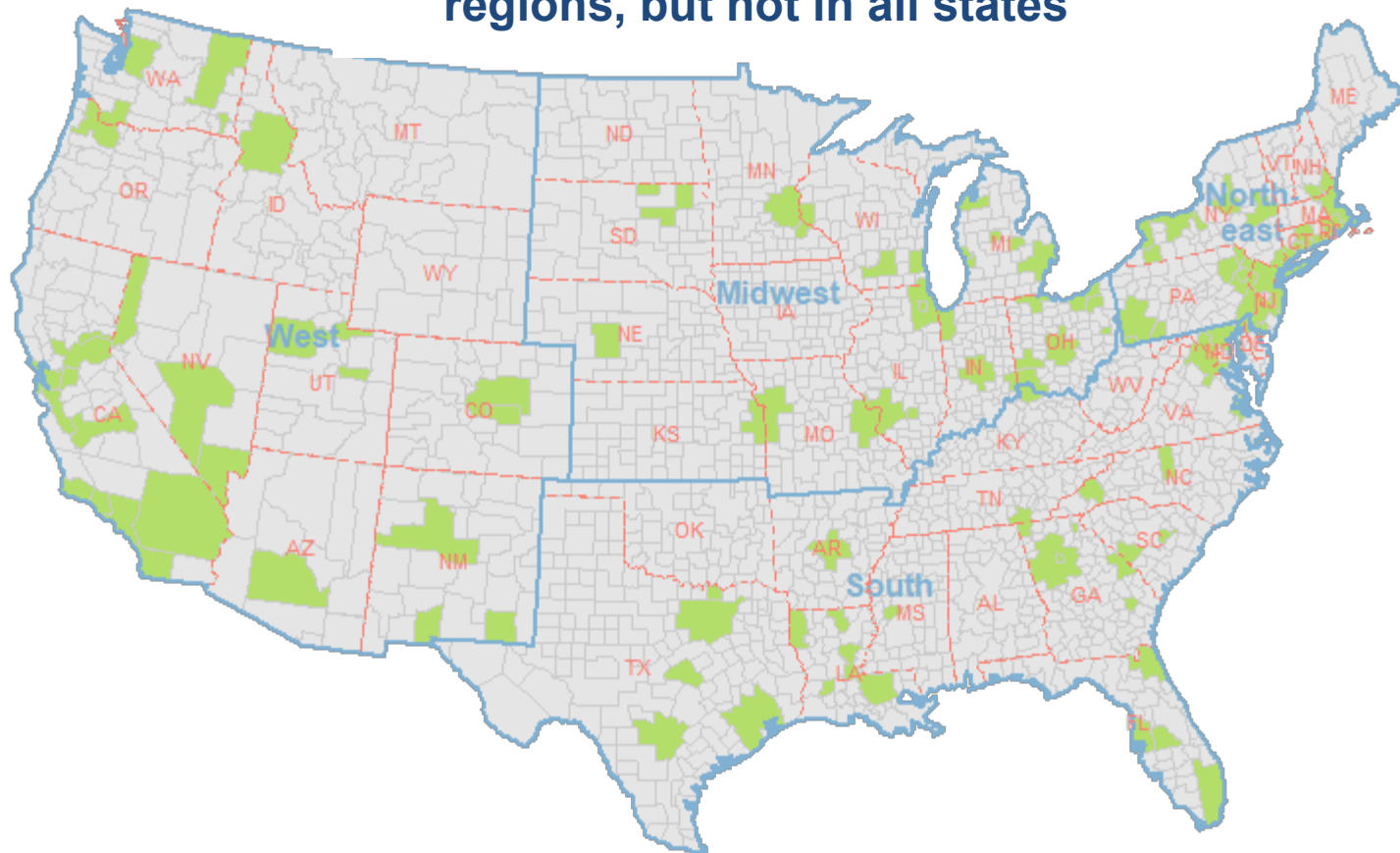
Oversampling in MEPS

- **To produce reliable estimates for subpopulations of interest**

- **Oversampled subpopulations**
  - ► **Asians**
  - ► **Blacks**
  - ► **Hispanics**
  - ► **Veterans (2018 panel)**

- **Increases variation in selection probabilities and sampling weights**

MEPS Overlapping Panel Design

2017	2018	2019

Panel 22 R1	R2	R3	R4	R5				
Panel 23		R1	R2	R3	R4	R5		

FY 2018 ⎰ Panel 22: R3, R4, R5
        ⎱ Panel 23: R1, R2, R3

MEPS Annual Files – Combination of Two Panels

Panel	Year		
	2017	**2018**	**2019**
21	**Yr2**		
22	**Yr1**	**Yr2**	
23		**Yr1**	**Yr2**
24			**Yr1**

MEPS Panel Design: Data Reference Periods

	2017				2018				2019			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Panel 21												
Round 3												
Round 4												
Round 5												
Panel 22												
Round 1												
Round 2												
Round 3												
Round 4												
Round 5												
Panel 23												
Round 1												
Round 2												
Round 3												
Round 4												
Round 5												
Panel 24												
Round 1												
Round 2												
Round 3												
Sample Size	N = 30,716				N = 29,415				N = 27,648			

N is equal to the number of people with a positive person weight on the file.

18

Overlapping Panels
Exception in COVID Years

- Due to COVID, response and completion of interviews were lower in 2020

- To compensate, the outgoing Panel 23 was extended initially for one year to 2020 and then for another year to 2021

- Panel 24 was also extended another year to 2022

- So there are 3 panels in 2020, 4 panels in 2021 and 3 panels in 2022.

MEPS Panel Design: Data Reference Periods

	2019				2020				2021				2022			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Panel 23																
Round 3																
Round 4																
Round 5																
Round 6																
Round 7																
Round 8																
Round 9																
Panel 24																
Round 1																
Round 2																
Round 3																
Round 4																
Round 5																
Round 6																
Round 7																
Round 8																
Round 9																
Panel 25																
Round 1																
Round 2																
Round 3																
Round 4																
Round 5																
Panel 26																
Round 1																
Round 2																
Round 3																
Round 4																
Round 5																
Panel 27																
Round 1																
Round 2																
Round 3																
Sample Size	N = 27,648				N = 26,847				N = 27,332				N = TBD			

N is equal to the number of people with a positive weight on the file.

MEPS Annual Files in COVID Years
Combination of Panels

Panel	Year		
	2020	**2021**	**2022**
23	Yr3	Yr4	-
24	Yr2	Yr3	Yr4
25	Yr1	Yr2	-
26		Yr1	Yr2
27			Yr1

Thank you!

Sadeq.Chowdhury@ahrq.hhs.gov