

AGENCY FOR HEALTHCARE RESEARCH AND QUALITY

AHRQ

MEPS-HC: Using the Longitudinal Files, pooling multiple years of data, and other analytic topics

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Overview

- **Longitudinal analysis using panel files**
  - Structure of the Longitudinal (Panel) files
  - Available variables
  - Types of analyses supported
  - Survey design variables to use
  - Using with other MEPS data files
  - Extending the longitudinal period
- **Pooling multiple years of MEPS data**
  - Full-year consolidated files
  - Longitudinal (Panel) files
- **Use of price indices**

Longitudinal analysis using panel files

Panel structure

- **Full-Year (FY) Consolidated file refresher**
  - Person-level files
  - Comprised of two MEPS Panels
  - Used to generate annual estimates for a given year
  - Examine trends in those estimates over time
  - *Not useful for examining individual person-level changes over time*
- **Longitudinal (Panel) files**
  - Person-level files
  - Respondent data for two years in one file rather than split across two annualized FY files
  - *Useful for examining individual person-level changes over time*

Panel structure

Example:

Panel 23 (2018–2019)

Available variables

- **Insurance coverage**
  - Monthly indicators (24 measures per person)
  - Annual summary (2 measures per person)
- **Health status**
  - Each round (5 measures for perceived general/mental health)
  - Rounds 1 & 3 (2 measures activities of daily living)
  - Rounds 2 & 4 (2 measures hearing, vision, & disability)
- **Having a usual source of care**
  - Rounds 2 & 4 (2 measures per person)
- **Use and expenditures**
  - Annual (2 measures per person)

Available variables: case selection

Variable	Description
YEARIND	1=both years, 2=in Year 1 only, and 3=in Year 2 only
ALL5RDS	In-scope and data collected in all 5 rounds (0=no, 1=yes)
DIED	Died during the two-year survey period (0=no, 1=yes)
INST	Institutionalized for some time during the two-year survey period (0=no, 1=yes)
MILITARY	Active-duty military for some time during the two-year survey period (0=no, 1=yes)
ENTRSRVY	Entered survey after beginning of panel (mainly births; also includes persons who had no initial chance of selection who moved into a MEPS sample household) (0=no, 1=yes)
LEFTUS	Moved out of the country after beginning of panel (0=no, 1=yes)
OTHER	Not identified in any of the above analytic groups (0=no, 1=yes)

Types of analyses supported

- National estimates of person-level changes over 2-year period
- Examination of characteristics associated with changes over time

Examples later

Survey design variables to use

- **As with FY files need to use survey design variables to derive estimates**
  - Analytic weight - to yield national estimates
  - Stratum and PSU - to yield proper standard errors
- **Stratum (*VARSTR*) and PSU (*VARPSU*) are same as on FY**
- **Longitudinal files utilize a different analytic weight than the FY: *LONGWT***

Survey design variables to use

- **Why *LONGWT*?**
  - Longitudinal files have only about half the records of FY
  - Persons in the Panel who did not participate in the survey for the entire period they were in-scope are excluded; *LONGWT* adjusted for this nonresponse/attrition
- ***LONGWT* yields national estimates for persons in two consecutive years**
- **For Panel 23 (2018-2019) . . .**

LONGWT > 0	All 5 Rounds	Participated for entire period in-scope (not all 5 rounds)
14,067	13,044 (92.7%)	1,023 (7.3%)

Estimates from the longitudinal files

Examples using Panel 23 (2018-19):

- **Of those uninsured throughout 2018, an estimated 75.9% were also uninsured throughout 2019.**
- **An estimated 4.9% of the population had no insurance throughout 2018 / 2019.**
- **Of those with no expenses for health care in 2018, an estimated 42.2% had some expenses in 2019.**

Using with other MEPS data files

- **Medical Conditions files**
  - Can be used to identify persons with specific conditions of interest
  - Directly linkable to Longitudinal files via *DUPERSID*
- **Event-level files**
  - Payment amounts/sources already "rolled-up" on longitudinal files
  - Other event characteristics can be obtained (e.g., number of office-based visits involving labs, prescribed medicines, etc.)
  - Directly linkable to Longitudinal files via *DUPERSID*
- **More complex linking using CLNK and RXLK**
  - MEPS data page under **Appendix to MEPS Event files**

IDs used to link MEPS files

- **Longitudinal files (*DUPERSID*)**
- **Medical Conditions files (*DUPERSID*, *CONDIDX*)**
- **Event files (*DUPERSID*, *EVNTIDX*)**
- **CLNK (*DUPERSID*, *CONDIDX*, *EVNTIDX*)**
- **RXLK (*DUPERSID*, *EVNTIDX*, *LINKIDX*)**

Example of generalized linking process

Examine healthcare utilization/expenditures for persons with asthma over a two-year period

- ID persons w/ asthma in Medical conditions files (2 years needed)
- If data on Longitudinal files is sufficient merge asthma indicators directly onto the file (*DUPERSID*)
- If need event-level info (e.g., expenditures for services related to asthma), merge CLNK (*CONDIDX*) then desired event-level data (*EVNTIDX*; 2 years)
- Prescribed medicine events are not directly linked to conditions; link PMED event file to RXLK file (*LINKIDX*) then linkable to conditions/other event files via CLNK (*EVNTIDX*/*CONDIDX*)

NOTES: With all file merges, be sure to only keep the Panel of interest. See CLNK/RXLK doc for SAS and STATA programing examples.

Extending the longitudinal period: MEPS-NHIS

- **MEPS-HC is a nationally representative subsample of responding households from the previous year's NHIS.**
  - Prior-year NHIS data available for many MEPS respondents
- **MEPS/NHIS link file**
  - Crosswalk to merge MEPS full-year public use data to NHIS person-level public use data
  - Crosswalk file not public use; available in AHRQ Data Center

Extending the longitudinal period: MEPS-NHIS

2017	2018	2019
	MEPS Panel 22 Year 2	
NHIS 2017 →	MEPS Panel 23 Year 1	MEPS Panel 23 Year 2
	NHIS 2018 →	MEPS Panel 24 Year 1

Linked files, weighting, and estimation

- **Linking the two surveys expands the analytic capabilities.**
- **Not all MEPS respondents link (birth, marriage, etc.).**
- **Weighting adjustment for non-linkage is recommended.**
- **Informational resources are available online:**

2012 American Statistical Association proceedings paper (Chowdhury, Machlin, and Wun)

https://meps.ahrq.gov/mepsweb/data_stats/Pub_ProdResults_Details.jsp?pt=Conference+Proceedings&opt=3&id=1241

2013 Federal Committee on Statistical Methodology proceedings paper (Mirel and Machlin)

https://s3.amazonaws.com/sitesusa/wp-content/uploads/sites/242/2014/05/H2_Mirel_2013FCSM.pdf

Longitudinal files

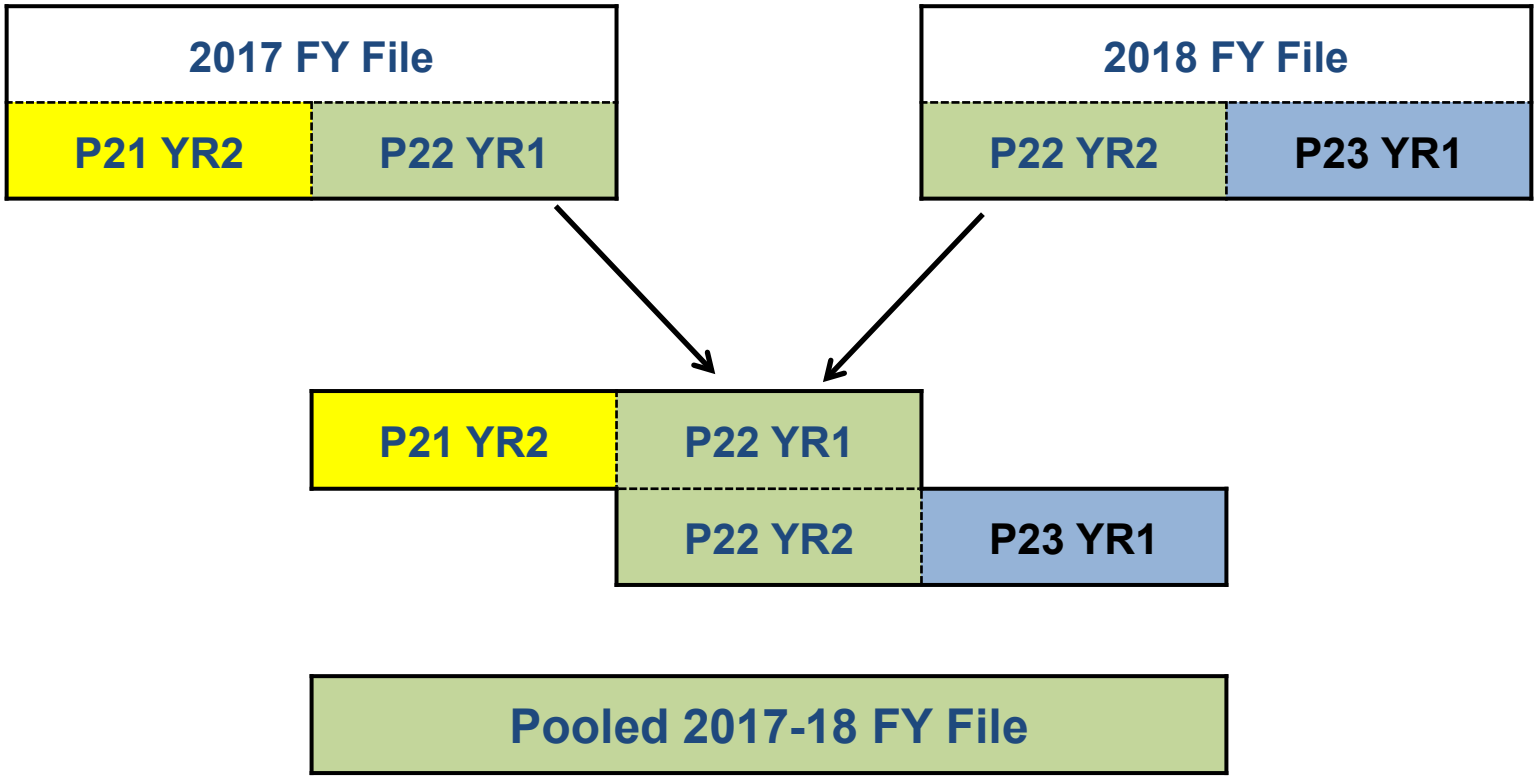
Panel Number	Years	File Number	Number of Persons
23	2018-19	HC-217	14,067
22	2017-18	HC-210	15,541
21	2016-17	HC-202	15,617
20	2015-16	HC-193	17,017
19	2014-15	HC-183	15,898
18	2013-14	HC-172	16,714
17	2012-13	HC-164	17,293
16	2011-12	HC-156	18,512
15	2010-11	HC-148	14,541
14	2009-10	HC-139	16,221
13	2008-09	HC-130	18,287

Pooling multiple years of MEPS data

Reasons for pooling

- Increase sample size
- Reduce standard errors of estimates
- Enhance ability to analyze small subgroups

Example of pooling FY files 2017 & 2018



Things to be mindful of when pooling

- Persons in the common panel are included twice
- Although correlated, data for the same person usually differ from year to year
- Each year represents nationally representative sample for that year
- Pooling produces average estimates across the pooled years
- Lack of independence diminishes the gain in precision from pooling

Accounting for lack of independence

- **MEPS panels are selected from the same sample PSUs and SSUs**
  - Correlation is not only at the person level, but persons within a PSU (segment/block) are also correlated
- **In multistage sampling, since PSU is the unit of sampling, specifying stratum (*VARSTR*) and PSU (*VARPSU*) in variance estimation is sufficient to account for all stages of correlation**

https://meps.ahrq.gov/survey_comp/hc_clustering_faq.pdf

Example of pooled sample sizes

Adults 18-64 years old w/ diabetes, by insurance status

	Sample Size		
Year	**Privately Insured**	**Publicly Insured**	**Uninsured (all year)**
2017	844	553	138
2018	812	520	117
2017-18 (Pooled)	1,656 person-years	1,073 person-years	255 person-years

Example of pooled RSEs of mean annual expenditures

Adults 18-64 years old w/ diabetes, by insurance status

	Relative Standard Error (RSE) (Standard error ÷ Point estimate)		
Year	Privately Insured	Publicly Insured	Uninsured (all year)
2017	7.3%	6.6%	48.1%
2018	8.2%	7.5%	39.5%
2017-18 (Pooled)	6.0%	5.1%	32.7%

Caveat to computing standard errors from pooled files

- **Pooling annual data from 2002 onward**
  - Annual files already contain standardized stratum (VARSTR) and PSU (*VARPSU*) variables
- **Pooling annual data from any year before 2002**
  - Use standardized stratum and PSU identifiers from Pooled Estimation Linkage File (HC-036)
  - Stratum and PSU variables obtained from HC-036 for 1996-2018 (*STRA9618*, *PSU9618*)
- **Documentation for HC-036 provides instructions on how to properly create pooled analysis file**

Steps for creating FY pooled files

1) **Rename analytic and weight variables from different years to common names. For example,**
   - Expenditures: *TOTEXP17* & *TOTEXP18* = TOTEXP
   - Weights: *PERWT17F* & *PERWT18F* = POOLWT
2) **Concatenate annual files**
3) **Divide weight by number of years pooled to produce estimates for "an average year" during the period.**
   - Keep original weight if estimating total for the period
4) **Merge variance estimation variables from HC-036 onto file (only if any year prior to 2002)**
   - Strata variable: STRA9618
   - PSU variable: PSU9618

Estimation from Pooled Files

- **Produce estimates in analogous fashion as for individual years**
- **Estimates interpreted as "average annual" for pooled period**

Example using 2017 & 2018 pooled data:

The average annual per capita health care expenses in 2017-18 was $5,685

Note: Per capita expenses were $5,308 in 2017 and $6063 in 2018

Steps for creating Panel pooled files

- **The objective is the same**
  - Increase sample size
  - Improve precision of estimates (i.e., reduce standard errors)
  - Enable the analysis of smaller subgroups
- **Process**
  - Generally, no need to rename variables from different Panel years

    caveat: some variables may not be present all years
  - Append/concatenate/stack multiple panel files
  - If including Panels 1-6 must use HC-036 Pooled Estimation File
  - Standardize expenditure dollars to a reference year
  - Decide if need to divide estimates by the number of Panels pooled.

Estimates from pooled Panel files

- **When pooling multiple panels temporal comparisons can still be made (e.g., Y1 vs. Y2)**
- **Averages/proportions – direct results/output fine**
- **Totals – divide by number of panels pooled;**
  - average annual
- **All references should be relative to temporal constructs; not specific to particular year or range of years.**

Estimates from pooled Panel files

- **Hypothetical pooling of five most recent panel files**
  - P23 (2018-19), P22 (2017-18), P21 (2016-17), P20 (2015-16), P19 (2014-15)
- **Possible statements**
  - During 2014 to 2018, when considering two consecutive years, of those uninsured throughout the first year, an estimated x% were also uninsured the subsequent year.
  - During 2014 to 2018, when considering two consecutive years, there was an average annual increase/decrease in total healthcare expenditures of $x from year one to year two

Use of price indices

Inflating expenditures

- **Analyses involving multiple years**
  - Typically adjust expenditures to most current MEPS data year (i.e., inflate previous year expenditures)
- **CFACT guidelines on appropriate indices varies by:**
  - Purpose of the analysis
  - Type of expenditure
- **Resource page (updated bi-annually)**

  http://www.meps.ahrq.gov/mepsweb/about_meps/Price_Index.shtml

Guidance for choosing index

	Recommended Index			
Objective of analysis	**GDP or PCE**	**CPI**	**PHCE or PCE-Health Total**	**PHCE Component**
Trends in expenditures	x			
Trends in out-of-pocket expenditures only		x		
Pooling total expenditures			x	
Pooling expenditures by type of service (e.g., prescription meds)				x
Trends with income measures		x		

Notes: CPI = Consumer Price Index; GDP = Gross Domestic Product;
PCE = Personal Consumption Expenditures; PHCE = Personal Health Care Expenditures

Example of inflating expenditures

- **Nominal total expenditures for the U.S. civilian noninstitutionalized population**
  - 2009: $1,259 billion
  - 2019: $2,047 billion
- **Gross Domestic Product (GDP) to put in constant dollars**
  - Use yearly indices from resource page to determine inflation factor
  - 2019 index / 2009 index -> 113.623 / 94.999 = 1.1960442
- **Inflation adjusted total expenditures**
  - 2009: $1,506 billion
  - 2019: $2,047 billion *(reference year)*
  - about $541 billion more was spent on health care in 2019 than 2009, after accounting for inflation.

Thank you

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