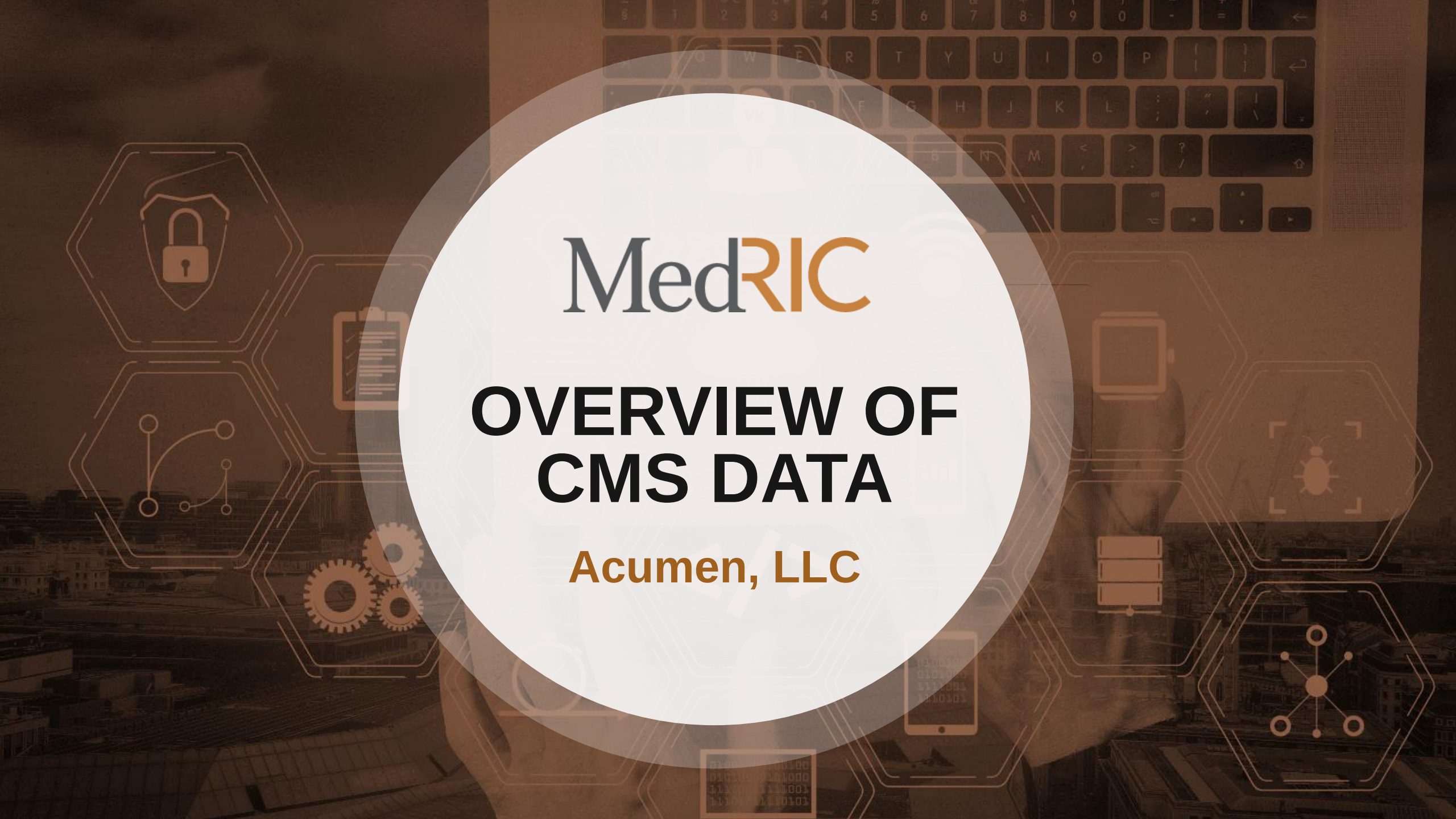


MedRIC

OVERVIEW OF CMS DATA

Acumen, LLC

Outline of Presentation

01 Objectives

02 Introduction to MedRIC

03 What CMS Data Are Available and Why Use Them?

04 What NIA-Funded Study Data Is Linked and How is Linked Data Useful?

05 What Does Linked CMS Data Looks Like?

06 How to Gain Access to Linked CMS Data?

07 Webinar Wrap Up and Q&A

01

Objectives

Objectives

01

Explain the MedRIC project at the National Institute on Aging (NIA)

02

Identify the various CMS data types available through NIA

03

Learn how CMS data can enhance health and aging research

04

Identify which NIA-funded study data is linked to CMS data and why it is useful

05

Get practical ideas for using linked CMS data in your research project(s)

06

Review the process for gaining access to CMS data for NIA-funded study cohorts

02

Introduction to MedRIC

Introduction to MedRIC

Key Stakeholders

National Institute on Aging (NIA)

NIA funds MedRIC and authorizes all requests for MedRIC's NIA study-linked CMS research files.

NIA-Sponsored Studies

NIA-sponsored studies collect data from various cohorts that MedRIC then generates CMS research files for them.

Researchers

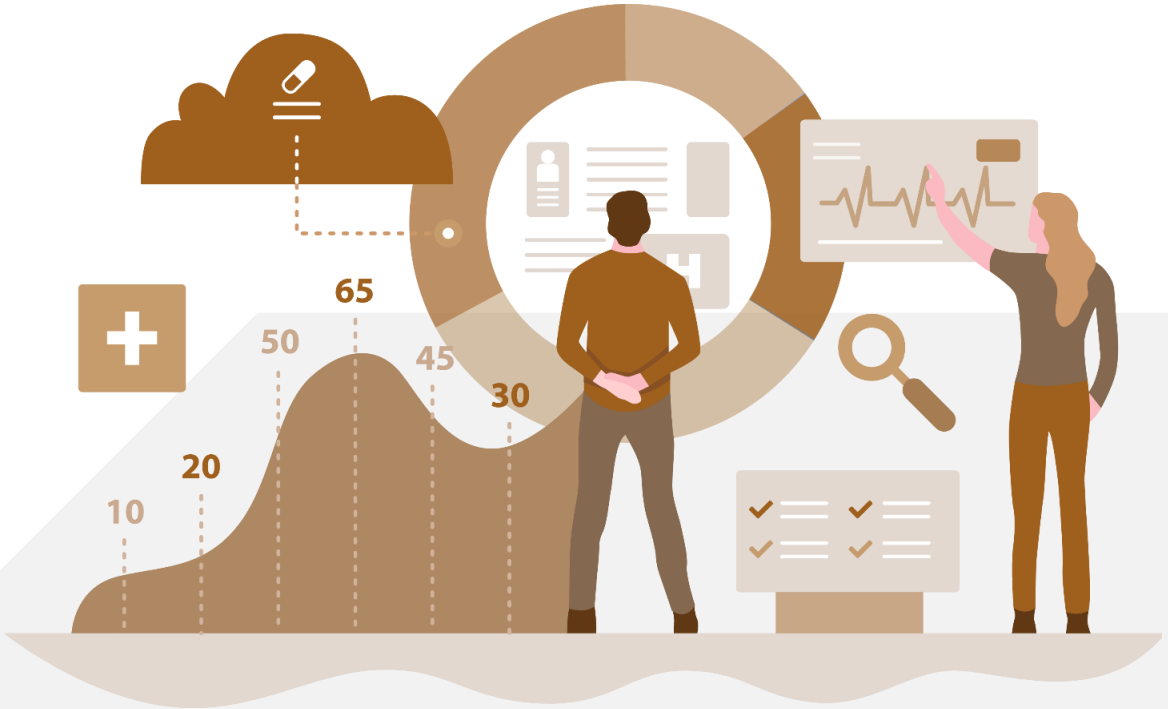
Authorized researchers use NIA-funded study and linked CMS data to produce high-impact research findings.

MedRIC

We provide Medicare and Medicaid data and tools to academic, non-profit, and government researchers.

Introduction to MedRIC

About MedRIC

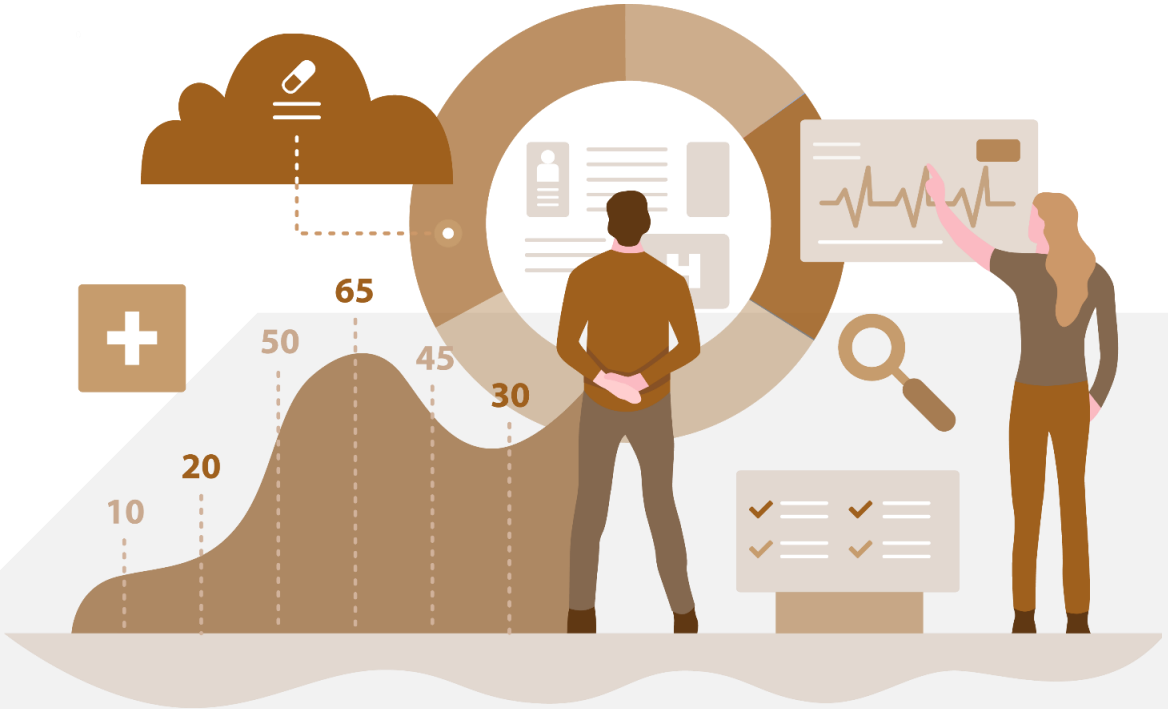


Data Drives Discovery

- Make access to CMS data **fast** and **equitable (no fees)**.
- Augment National Institute on Aging (NIA) research datasets with **powerful health care data**.
- Help researchers use CMS data **effectively**.

Introduction to MedRIC

About MedRIC, cont’d. (1 of 2)

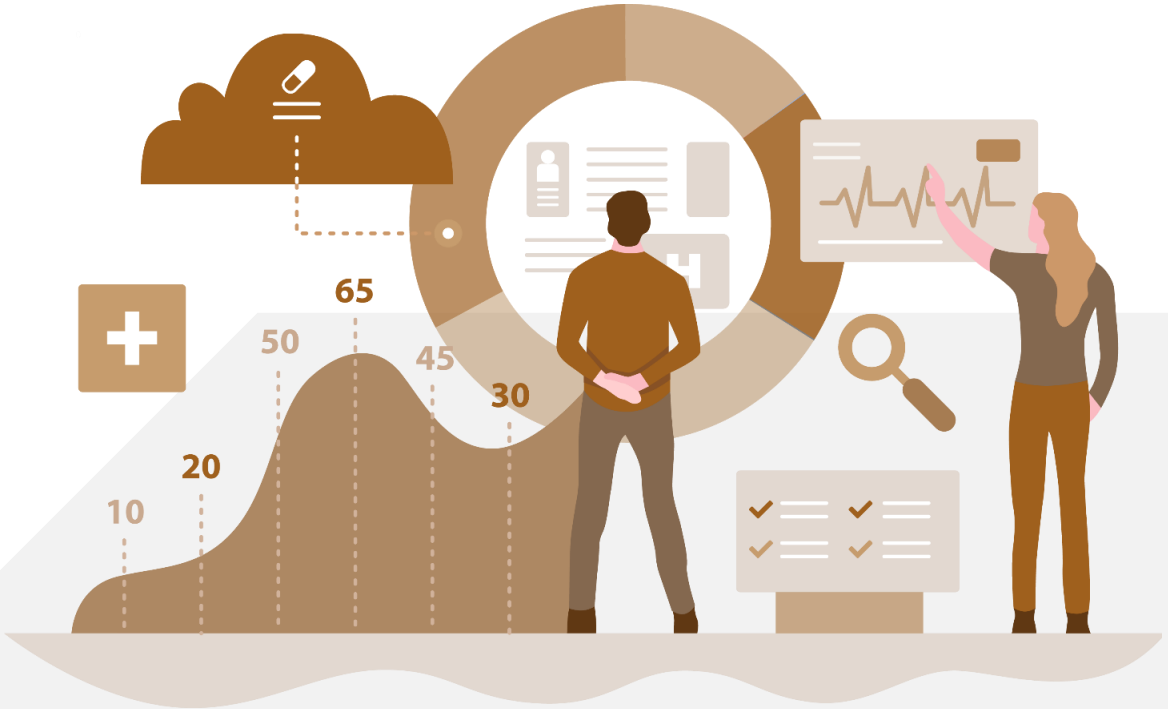


Partner with **NIA-sponsored studies** focused on improving the following circumstances of individuals:

- Health
- Social
- Behavioral
- Economic

Introduction to MedRIC

About MedRIC, cont’d (2 of 2)



Primary Services

- Link raw CMS data to NIA-sponsored study data.
- Provide linked raw and summary CMS data to authorized researchers through the Health and Aging Data (HaAD) Enclave.
- Support linked CMS data usage.

Two Types of Researchers

- Study Institutes: NIA funded longitudinal cohort study and willing to share their data
- Researchers: *policy*, *government*, *genomic* and *academic*

03

What CMS Data Are Available and Why Use Them?

What CMS Data Are Available? (1 of 3)

Name of File	File Contents	Data Years
Denominator (DN)	Demographic, enrollment and entitlement prior to 1999	*1991 - 1998*
Master Beneficiary Summary File (MBSF) Base Segment	Demographic, enrollment, and entitlement information for NIA study participants	*1999 - 2021*
Master Beneficiary Summary File (MBSF) – Chronic Conditions	Summary file containing indicators of whether NIA study participants have one or more of 27 conditions	*1999 - 2020*
Master Beneficiary Summary File (MBSF) – Cost & Utilization	Summary file containing calculated payments for – and aggregated services rendered to – NIA study participants	*1999 – 2020*
Master Beneficiary Summary File (MBSF) – Other Chronic Conditions or Potentially Disabling Conditions	Summary file containing indicators of whether NIA study participants have one or more of 35 other chronic conditions in the MBSF – Chronic Conditions dataset	*2000 – 2020*

What CMS Data Are Available? (2 of 3)

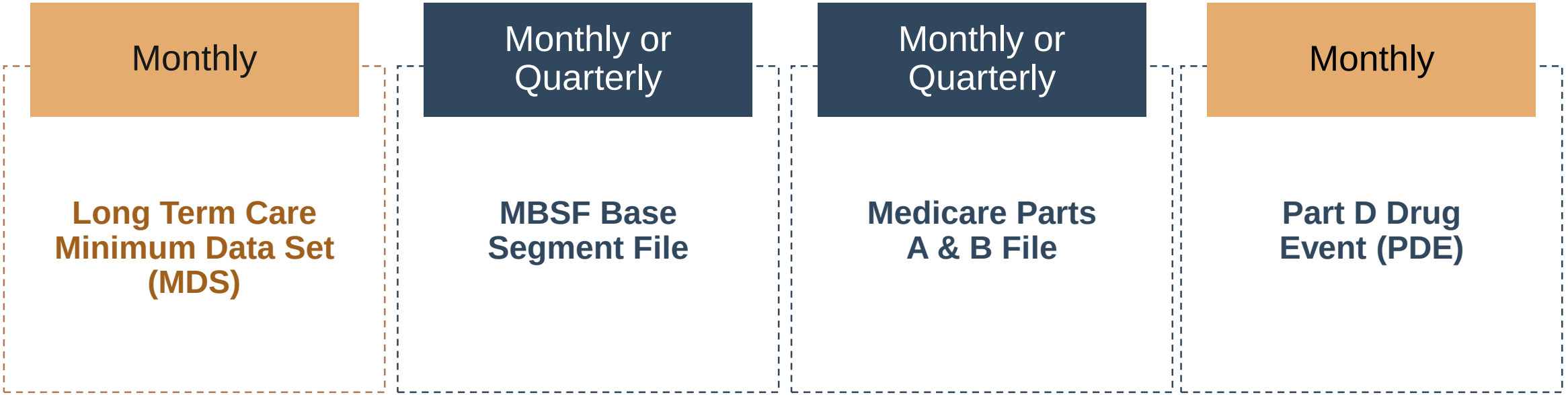
Name of File	File Contents	Data Years
Medicare Provider Analysis and Review (MedPAR)	Health service information for stays at two Medicare Part A settings – Inpatient and Skilled Nursing	*1991 – 2020*
Medicaid Analytic Extract (MAX)	Health services information – such as diagnoses, drugs, and procedures – for NIA study participants enrolled in a state Medicaid program	*1999 – 2015*
Transformed Medicaid Statistical Information System (T-MSIS)	Health services information – such as diagnoses, drugs, and procedures – for NIA study participants enrolled in a state Medicaid program	*2014 – 2019*
Parts A & B	Health services information – such as diagnoses, drugs, and procedures – for study or survey participants enrolled in a Medicare program	*1991 – 2021*
Part C (Medicare Advantage)	Health services information – such as diagnoses, drugs, and procedures – for study or survey participants enrolled in an MA (Part C) plan	*2015 – 2019*

What CMS Data Are Available? (3 of 3)

Name of File	File Contents	Data Years
Part D Drug Event (PDE)	Prescription drug information for study or survey participants enrolled in Medicare's Part D program	*2006 - 2021*
Part D Medication Therapy Management (MTM)	Medication therapy information for NIA study participants enrolled in the Part D MTM program	*2013 – 2019*
Home Health Outcomes and Assessment Information Set (OASIS)	Physical and cognitive assessments of NIA study participants who receive home health agency (HHA) care	*2000 – 2020*
Inpatient Rehab Facility (IRF) – Patient Assessment Instrument (PAI)	Physical and cognitive assessments of NIA study participants conducted at an IRF	*2002 – 2020*
Long-Term Care Minimum Data Set (MDS)	Physical and cognitive assessments of NIA study participants who receive long-term care services	*1999 - 2021*

What CMS Data is Available?

CMS Data Related to COVID-19



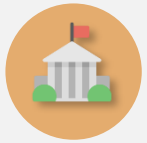
Why Use CMS Data?

Benefits Of Linked CMS Data Research Files (1 of 2)

Types of Research

- Genomics
- Dementia/Alzheimer's
- Frailty
- Hypertension
- Identification of older adults with serious illness
- Health economics
- Social Determinants of Health
- Depression
- Hip fractures

Outcomes



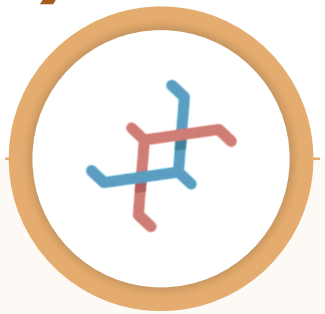
Policy changes

Standard of care improvements

Systems changes

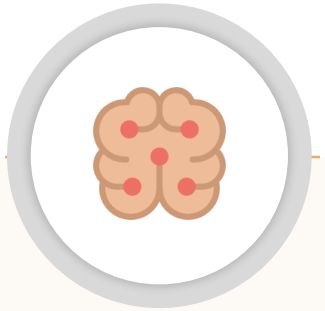
Why Use CMS Data?

Benefits Of Linked CMS Data Research Files (2 of 2)



Genome-Wide Analysis of Sex Disparities in the Genetic Architecture of Lung and Colorectal Cancers

Functional Trajectories at the End of Life for Individuals with Dementia: Final Report



Racial Disparities and Temporal Trends in Dementia Misdiagnosis Risk in the United States

Accuracy of Diagnosis and Health Service Codes in Identifying frailty in Medicare Data

***For the full set of published research, go to: https://www.medric.info/resources-pages/resources-bibliography**

Why Use CMS Data?

Patient Characteristics and Differences In Hospital Readmission Rates

Table 3. Impact of Patient Characteristics on Difference in Probability of Readmission Between Participants Admitted to Hospitals With Higher vs Lower Readmission Rates[a]

Model	Description	Probability of Readmission,[b] %		% (95% CI)	
		Admitting Hospital in Lowest HWRR Quintile	Admitting Hospital in Highest HWRR Quintile	Difference in Probability of Readmission[b]	Reduction in Difference From Previous Model[c]
1	Unadjusted[d]	14.53	20.39	5.86 (2.61 to 9.21)	
2	Variables used by CMS to adjust readmission rates[e]	15.04	19.45	4.41 (1.19 to 7.54)	−1.45 (−2.63 to 0.48)
3	Model 2 + additional claims data on eligibility categories and diagnoses[f]	15.74	19.24	3.50 (0.31 to 6.67)	−0.91 (−1.78 to −0.04)
4	Model 3 + additional clinical and social characteristics from the HRS [g]	16.06	18.36	2.29 (−0.77 to 5.31)	−1.21 (−2.07 to −0.21)

[a] Abbreviations: CMS, Center for Medicare and Medicaid Services; HRS, Health and Retirement Study; HWRR, Hospital Wide Readmission Rate measure.

[b] From logistic regression estimates, we simulated probabilities of readmission and differences in readmission probabilities (see eMethods in the Supplement for details). For each of the 4 models, we took 10 000 draws of model coefficients, assuming a multivariate normal distribution. For each draw of coefficients, we obtained the model prediction for each observation, alternately setting the highest and lowest HWRR quintile indicator to 1. Then for each draw, we calculated the mean predicted probability of readmission across observations under each of the 2 scenarios (HWRR quintile = highest vs lowest). We calculated the absolute difference between these mean predicted probabilities under the 2 scenarios for each draw and then took the mean of these probabilities and absolute differences across draws and report these means in this table, along with 95% CIs derived from the 2.5th and 97.5th percentiles of the distribution across draws.

[c] The average reduction and 95% CI are estimated comparing each model to the one in the row above using bootstrap methods.

[d] Model 1 adjusted for year fixed effects alone.

[e] Model 2 includes age, sex, discharge diagnosis, and 31 additional condition indicators included in the publicly reported HWRR measure.[14]

[f] Model 3 includes all variables in model 2 as well as indicators for Medicaid eligibility, disability as the original reason for Medicare enrollment, end-stage renal disease, Hierarchical Condition Category score, and 26 Chronic Condition Warehouse condition indicators.[18]

[g] Model 4 includes all variables in model 3 as well as 24 social and clinical characteristics from the HRS (variables listed in Table 1 and Table 2 that were not already present in model 3) and prespecified interaction terms (see eMethods inthe Supplement for details).

Source: *Barnett ML, Hsu J, McWilliams JM. Patient Characteristics and Differences in Hospital Readmission Rates. JAMA Intern Med. 2015 Nov;175(11):1803-12. doi: 10.1001/jamainternmed.2015.4660. PMID: 26368317; PMCID: PMC4991542..*

04

What NIA-Funded Study Data Is Linked and How is Linked Data Useful?

How is CMS Data Linked to NIA-Funded Study Data?

Study Data Linked to CMS Data

Some of our NIA-funded study partners include:

01 **Health and Retirement Study (HRS)** *est. 1992*

02 **Health, Aging, and Body Composition (Health ABC)** *est. 1997*

03 **LONG LIFE Family Study (LLFS)** *est. 2005*

04 **Midlife in the United States (MIDUS)** *est. 1995*

05 **National Health & Aging Trends Study (NHATS)** *est. 2011*

06 **National Long Term Care Survey (NLTCS)** *est. 1982*

07 **National Social Life, Health, and Aging Project (NSHAP)** *est. 2005*

08 **Panel Study of Income Dynamics (PSID)** *est. 1968*

09 **Predictors of Severity of Alzheimer's Disease (PSAD)** *est. 1989*

10 **Project Talent (PT)** *est. 1960*

How is CMS Data Linked to NIA-Funded Study Data?

Example of a Crosswalk

Table 2.2 Example of Researcher Crosswalk File

The table below illustrates the researcher crosswalk file that we will produce for external researchers, so that those researchers can link authorized survey data sets to the CMS data sets that they receive from us. As stated above, this file will only contain survey participants that we were able to match to CMS enrollment data.

EXAMPLE SurveyLINK ID (ESID)	EXAMPLE BID (EBID)	YOB_Match	MOB_Match	DOB_Match	YOD_Match	MOD_Match	DOD_Match	SEX_Match	STATE_Match	ZIP5_Match	SSN_Match	LN_Match	FN_Match
001	1234567890	1	1	1	M	M	M	1	1	1	2	2	2
006	1234567895	1	1	1	1	1	1	1	1	1	2	2	2

Table 2.3 Matching Indicator Legend

The table below defines match indicators used in Tables 2.1 and 2.2.

Column D to L	Column M to O
M=Missing	M=Missing
0=Mismatch	0=Mismatch
1=Full Match	1=Partial Match
	2=Full Match

How is CMS Data Linked to NIA-Funded Study Data?

How Could You Use Linked HRS and CMS Data?

Health Outcomes

- The effect of examining ‘frailty’ in patients with hypertension, to LOS and hospital readmission.
- What kind of relationships exist at the intersection of retirement benefits, breast cancer, and survival rate?

Policy Outcomes

- Do changes in labor force participation effect the rate of hospitalization or LOS?
- Can OASIS assessments effectively predict the length of time services are needed?

Payment Reform

- Cost of medications in relation to income, gender, and race.
- What effect is the QPP having on the Medicare beneficiary population by income, race, and gender?

How useful is CMS Data Linked to NIA-Funded Study Data?

Why re-use a Data Partner's linked data?

- Get **holistic health, social, behavioral, and economic information** through partner and CMS linked data sets
- Develop **novel connections** between health, social, behavioral, and economic information
  - ❖ Change diagnosis code of heart failure to osteoarthritis in women or Parkinson's disease
- Access linked data at **no cost** and **fast**, regardless of **whether you're in your early, middle, or late career and your research funding**

05

What Does Linked CMS Data Looks Like?

What Does Linked CMS Data Looks Like?

Synthetic Data

01 **Screenshot of Public Use CMS Data File**

02 **Screenshot of CMS SAS Files in Enclave**

03 **HaAD Enclave Diagram for Linked Files**

01 Screenshot of Public Use CMS Data File

ata Viewer - car_2008_synpuf.sas7bdat

File RowLimit Help

Prev Next Meta/Data Filter Query

	DESYNPUF_ID	CLM_ID	CLM_FROM_DT	CLM_THRU_DT	ICD9_DGNS_CD_1	ICD9_DGNS_CD_2	ICD9_DGNS_CD_3	ICD9_DGNS_CD_4	ICD9_DGNS_CD_5	ICD9_DGNS_CD_6	ICD9_DGNS_CD_7
0	00000B48BCF4...	737133358637027	2008-02-16	2008-02-16	7061	70211					
1	00000B48BCF4...	737783362300937	2008-02-19	2008-02-19	9561	71945					
2	00000B48BCF4...	737513360019665	2008-02-20	2008-02-20	8241	27651					
3	00000B48BCF4...	737553359102154	2008-02-23	2008-02-23	V676	V5861					
4	00000B48BCF4...	737033360678635	2008-03-11	2008-03-11	5765	56969					
5	00000B48BCF4...	737093360154764	2008-03-07	2008-03-16	73320	7244	7392	7840			
6	00000B48BCF4...	737223359310755	2008-03-22	2008-03-22	24290	2720	4011	41400			
7	00000B48BCF4...	737603362601356	2008-04-01	2008-04-01	99691						
8	00000B48BCF4...	737603361186946	2008-04-07	2008-04-07	4279						
9	00000B48BCF4...	737483360372415	2008-04-14	2008-04-14	7235	73300					
10	00000B48BCF4...	737843361216659	2008-04-16	2008-04-16	5845	20300					
11	00000B48BCF4...	737933362269413	2008-04-17	2008-04-17	V568	58381	28529				
12	00000B48BCF4...	737033361820811	2008-04-24	2008-04-24	V1509						
13	00000B48BCF4...	737803361343358	2008-04-30	2008-04-30	70722						
14	00000B48BCF4...	737493361570453	2008-05-02	2008-05-02	6869						
15	00000B48BCF4...	737693361529565	2008-05-15	2008-05-15	29554						
16	00000B48BCF4...	737223358361806	2008-05-23	2008-05-23	4149	4019	7802				

What Does Linked CMS Data Looks Like?

Synthetic Data

02

Your NIA Datasets

_2008_synpuf.sas7bdat	1/17/2020 4:23 PM	SAS Data Set	5,503,616 KB
car_2009_synpuf.sas7bdat	1/17/2020 4:23 PM	SAS Data Set	6,044,544 KB
car_2010_synpuf.sas7bdat	1/17/2020 4:23 PM	SAS Data Set	3,783,680 KB
ip_2008_synpuf.sas7bdat	1/17/2020 2:48 PM	SAS Data Set	85,696 KB
ip_2009_synpuf.sas7bdat	1/17/2020 2:48 PM	SAS Data Set	80,256 KB
ip_2010_synpuf.sas7bdat	1/17/2020 2:48 PM	SAS Data Set	44,736 KB
op_2008_synpuf.sas7bdat	1/17/2020 2:50 PM	SAS Data Set	759,040 KB
op_2009_synpuf.sas7bdat	1/17/2020 2:50 PM	SAS Data Set	879,616 KB
op_2010_synpuf.sas7bdat	1/17/2020 2:50 PM	SAS Data Set	480,512 KB

03

Your New Research Data Output

rev Next Meta/Data Filter Query

	DESYNPUF_ID	CLM_ID	SEGMENT	CLM_FROM_DT
0	00013D2EFD8E4...	1966611769884...	1.0	2010-03-12
1	00016F7458628...	1962011770003...	1.0	2009-04-12
2	00016F7458628...	1966611770156...	1.0	2009-08-31
3	00016F7458628...	1960911769810...	1.0	2009-09-17
4	00016F7458628...	1962611769832...	1.0	2010-06-26
5	00052705243EA...	1969911769717...	1.0	2008-09-12
6	0007F12A492FD...	1966611769637...	1.0	2008-09-19

Your Enclave Desktop

Analytics:
R, SAS, Stata

MedRIC Support
Tools/Staff

Your Study Data

Name	Size	Type
H18A_H.da	1,217 KB	DA File
H18A_R.da	1,272 KB	DA File
H18B_R.da	4,939 KB	DA File
H18C_R.da	8,623 KB	DA File
H18D_R.da	8,355 KB	DA File
H18E_FC.da	74 KB	DA File
H18E_H.da	4,979 KB	DA File
H18E_MC.da	3,752 KB	DA File
H18E_TC.da	391 KB	DA File
H18F_R.da	8,790 KB	DA File
H18F_SB.da	1,118 KB	DA File
H18G_HP.da	313 KB	DA File
H18G_R.da	5,860 KB	DA File
H18H_H.da	9,265 KB	DA File
H18I_R.da	6,496 KB	DA File
H18IO_H.da	1,436 KB	DA File
H18IO_R.da	2,377 KB	DA File
H18I2_P.da	6,320 KB	DA File

06

How to Gain Access to Linked CMS Data?

How to Gain Access to Linked CMS Data?

Process Overview

Data

1. Review MedRIC datasets
2. Obtain approval for both partner and CMS data requests

DUAs

3. Complete NIA DUA request, submit to MedRIC
4. Finalize NIA DUA request materials
5. Receive NIA DUA

HaAD Enclave

6. Track MedRIC dataset creation
7. Configure HaAD enclave account
8. Access and verify enclave workspace

07

Wrap Up and Q & A

Wrap Up and Q & A

01 Discussed MedRIC as a unique and powerful opportunity to the healthcare research community

02 Described the data types and years available

03 Covered the benefits of linked CMS data research files

04 Provided an overview of the linkage process of study and CMS data

05 Described what the linked CMS data looks like

06 Learned how to gain access to the linked data

Q & A

Any Questions?

MedRIC

THANK YOU

Acumen, LLC