

# Improving self-reported prescription medicine data quality with a commercial database lookup tool and claims matching

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The opinions and views expressed in this work are those of the authors. No official endorsement by the Department of Health and Human Services or the Centers for Medicare & Medicaid Services is intended or should be inferred.

# Background

- Regular prescription medicine use is a fact of life for the majority of older Americans (Mitchell et al., 2005)
  - Accurate measurement across the population is essential to inform healthcare policy
  - Common measurement methods have contrasting strengths and weaknesses:

Method / Data Source	Strengths	Weaknesses
Administrative claims data	High quality data	Coverage bias – excludes those without coverage Claims data are not timely
Representative surveys	Can cover wider portion of the population of interest	Can include several sources of error and may contain gaps in information (Mitchell et al., 2005, Zhang and Koru, 2020, Gnjidic et al., 2017)

- This study assesses how using a combination of these sources can improve the quality of reporting and reduce measurement error

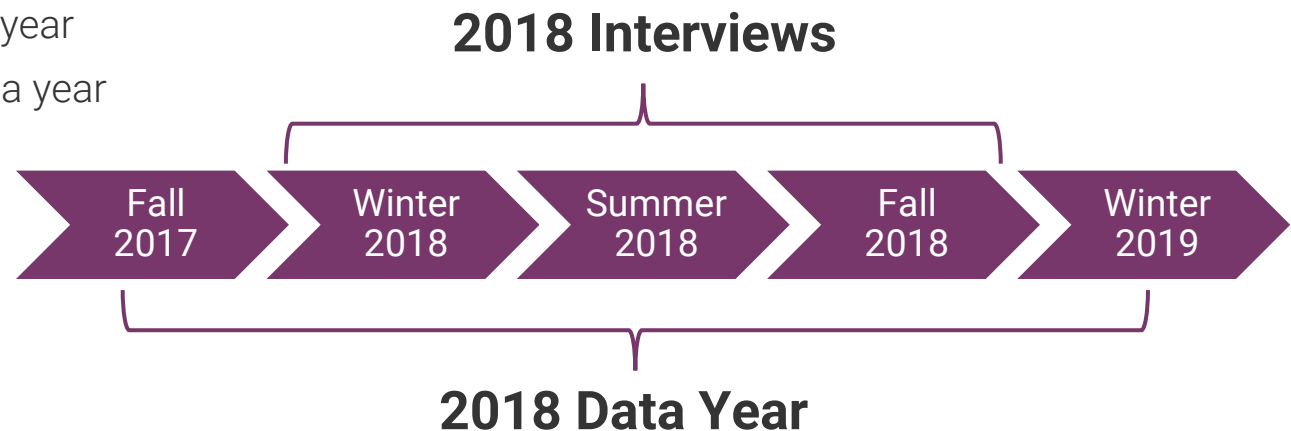
# Research Questions

1. Can a questionnaire lookup tool powered by a commercial database increase the quality of self-reported prescription medicine data?
2. How can Medicare Part D claims matching in post-processing improve survey reported data? What does this reveal about coverage gaps?
3. What do improvements from the lookup tool and claims matching reveal about differential measurement bias based on socio-demographics and health characteristics?
4. Is a survey approach equally effective for different types of medicines, such as widely prescribed vs. less common medicines?

# What is the MCBS?

## Medicare Current Beneficiary Survey

- The leading source of information on the Medicare program and its impact on beneficiaries, including health care utilization and costs
- Continuous, multipurpose, longitudinal survey that is conducted by the Centers for Medicare & Medicaid Services (CMS) through a contract with NORC at the University of Chicago
- Nationally representative sample of the Medicare population
- Round-based design
  - 3 interviews per year
  - 5 rounds per data year



# Prescription Medicine Data Collection and Processing



## The MCBS employs an enumeration-based approach to collecting prescription medicines

- Respondents report medicine details for any prescriptions filled in a certain time period with the aid of available documentation, such as prescription drug labels

## Prescription Medicine Lookup tool (PMLU)

- In 2017, NORC replaced the existing lookup tool with a dynamic, user-friendly tool incorporating a commercial database
- The PMLU is powered by the First Databank (FDB) MedKnowledge™ database (FDB, 2017) of prescribed medicines and is integrated into the Computer-Assisted Personal Interviewing (CAPI) software

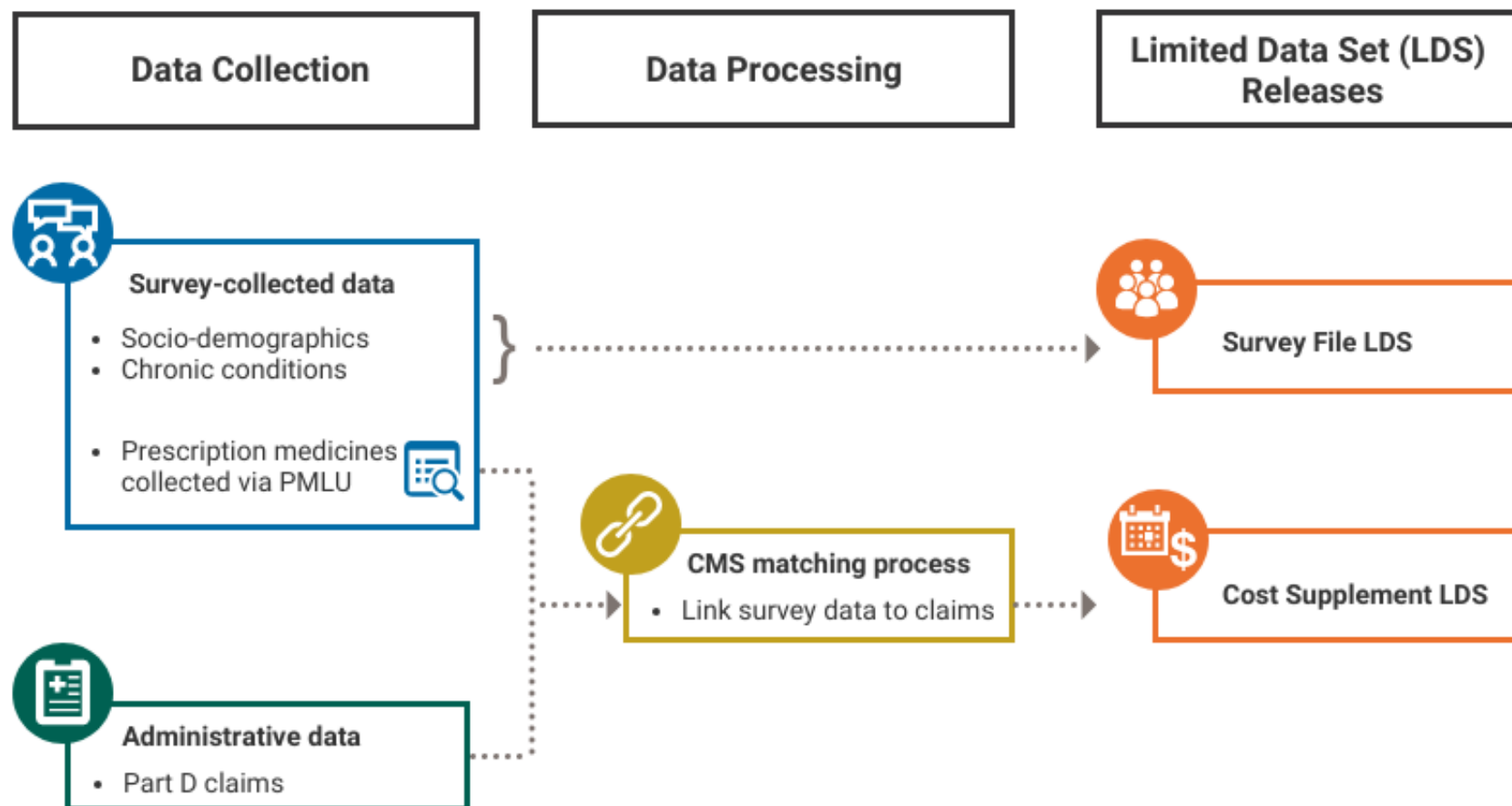
## Claims matching

- CMS matches survey-reported medicines to Medicare Part D claims to enhance self-reported data
- Claims are only available for beneficiaries enrolled in Part D

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# Methods

# MCBS Prescription Medicine Data Life Cycle



## Prescription Medicine Data Collection via PMLU Tool

**Since [last interview date], have you had any prescriptions filled?**  
**[If yes] What is the name of the medicine?**

The tool presents potential medicines as interviewers begin typing:

Prescribed Medicine Lookup **7 records found**

[Next](#)[Cancel](#)

**OMEPRAZOLE** (OMEPRAZOLE)

**OMEPRAZOLE-SODIUM BICARBONATE** (OMEPRAZOLE/SODIUM BICARBONATE)

**ZEGERID** (OMEPRAZOLE/SODIUM BICARBONATE)

**PRILOSEC** (OMEPRAZOLE)

**PRILOSEC** (OMEPRAZOLE MAGNESIUM)

**OMECLAMOX-PAK** (OMEPRAZOLE/CLARITH/AMOXICILLIN)

**LOSEC** (OMEPRAZOLE)

Searched for 'omep'



## Prescription Medicine Data Collection via PMLU Tool

Once a medicine has been selected, the tool presents corresponding form and strength options:

Prescribed Medicine Lookup **7 records found**

PRILOSEC (OMEPRAZOLE) Next Cancel

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Brand Name:  
**PRILOSEC**

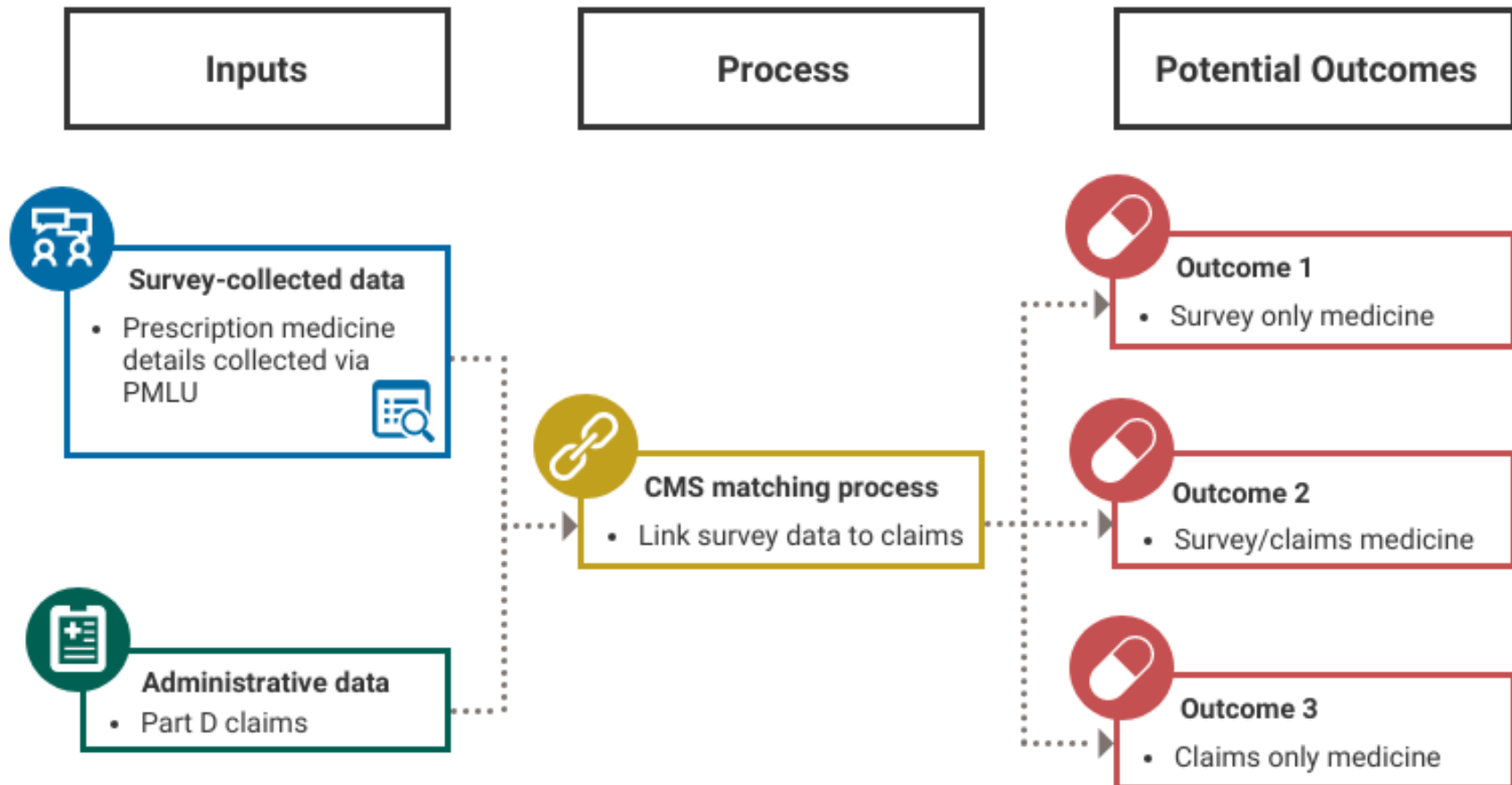
Generic Name:  
**OMEPRAZOLE**

Form	Strength
<input type="text" value="CAPSULE, DELAYED RELEASE (ENTERIC COATED)"/>	<input type="text" value=""/>
	10 MG
	20 MG
	40 MG
	Don't Know
	Refused
	Not Found

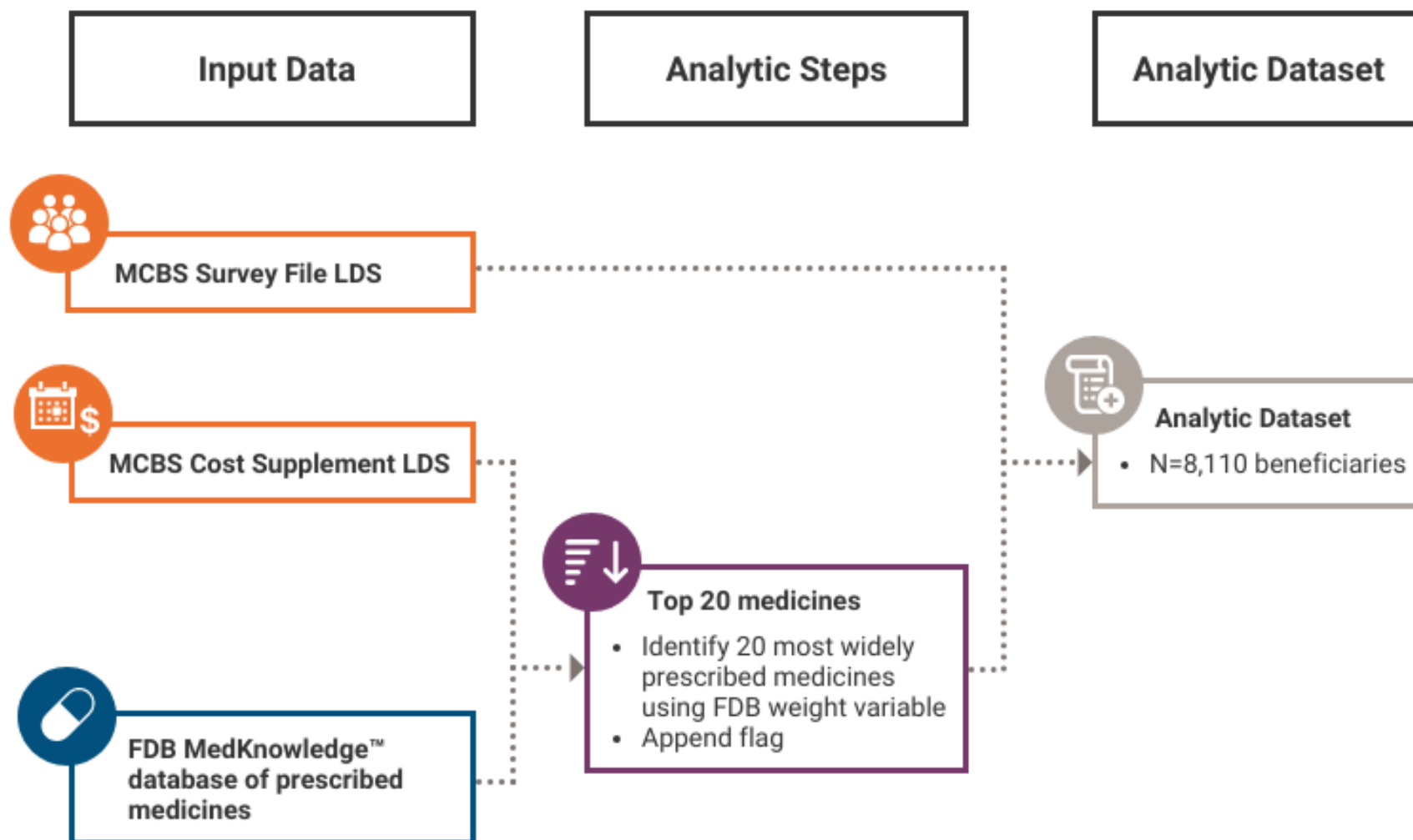
Submit

# Claims Matching Process and Outcomes

Final MCBS medicine data include an indicator of data source, with three potential outcomes from the claims matching process:



# Building an Analytic Dataset



# Analytic Metrics

## Impact of PMLU tool:

- Proportion of reported medicines for which interviewers locate a matching medicine within the tool
  - This is an indicator of high data quality, because complete details are needed to select a medicine within the tool.

## Impact of claims matching:

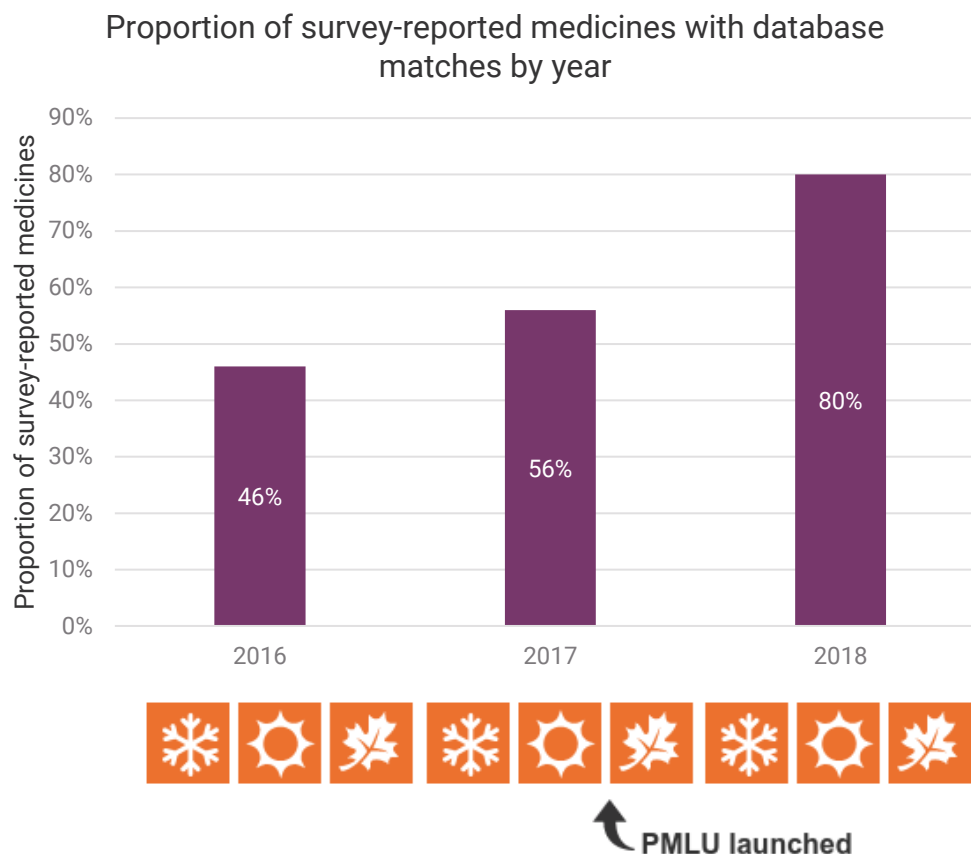
- Proportion of survey-reported medicines that were successfully matched to Part D claims
  - This is an indicator of high data quality and accurate recall.
- Proportion of medicines in the final data that were not reported in the survey and were discovered in claims data
  - This helps us understand differential underreporting.

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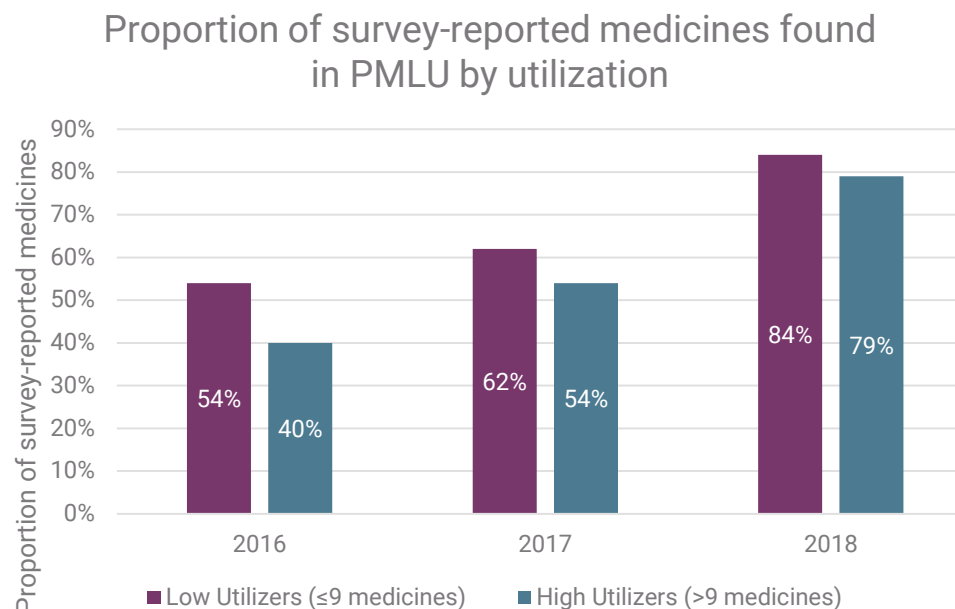
# Results

# How has the addition of the PMLU impacted the quality of medicine data collected in the MCBS?

The proportion of prescription medicines with database matches increased from 2016 to 2018.



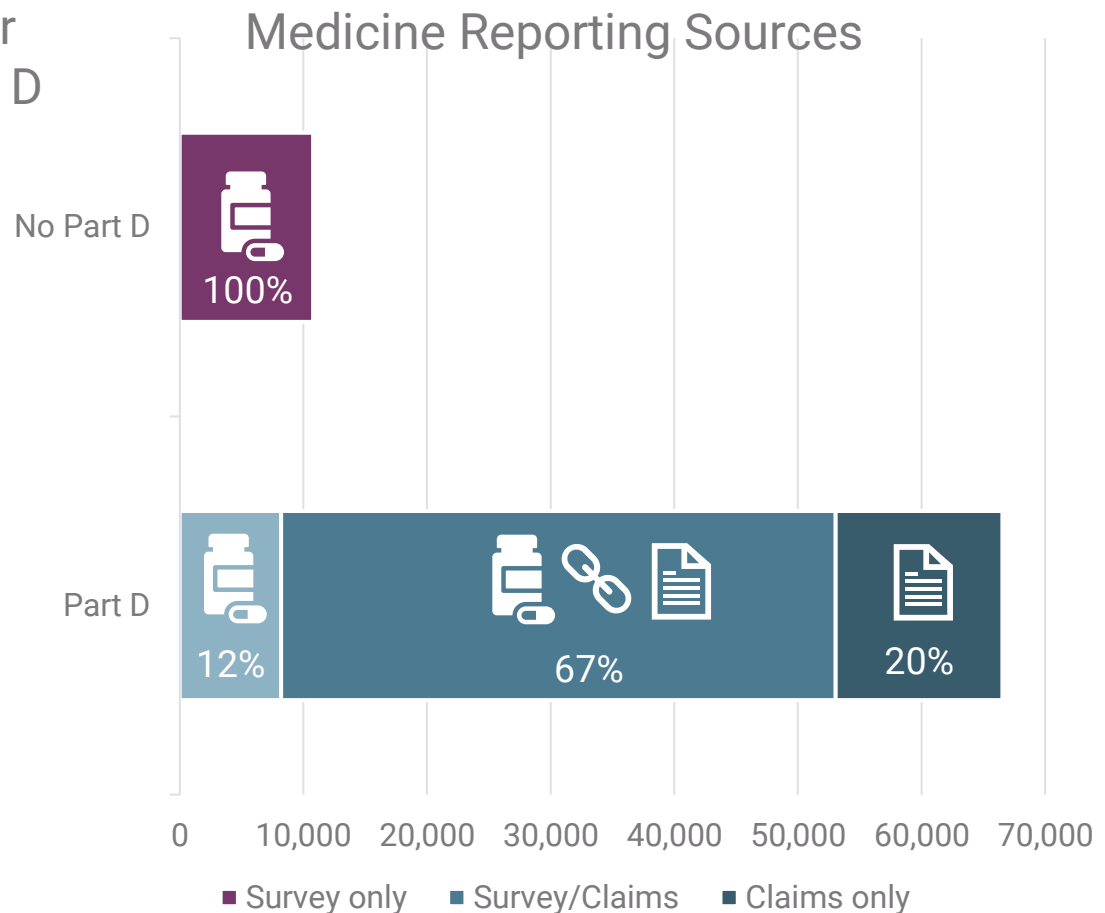
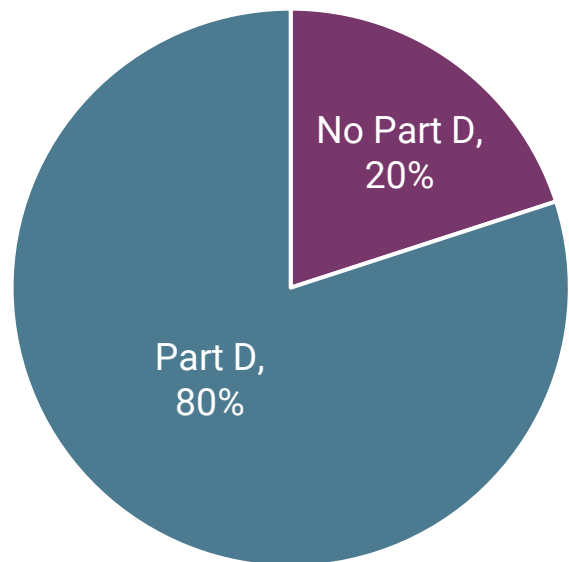
## How has the addition of the PMLU impacted the quality of medicine data collected in the MCBS?



Match rate was consistently higher for low utilizers with fewer medicines overall than high utilizers from 2016 to 2018, but the difference in match rate has narrowed over the years.

## How can Part D claims matching in post-processing improve survey reported data?

Claims are only available for beneficiaries enrolled in Part D

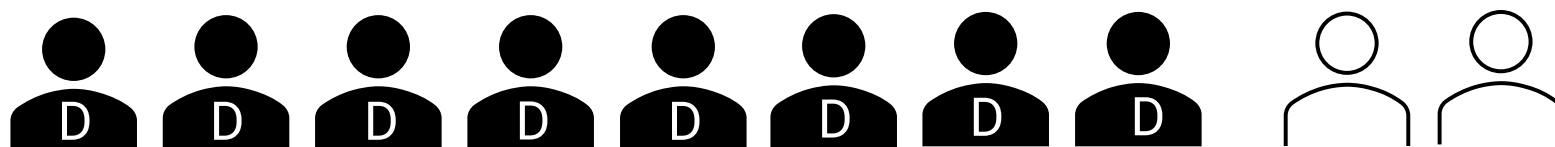


SOURCE: Centers for Medicare & Medicaid Services, Medicare Current Beneficiary Survey 2018



## Overall Increase in Medicines

- For every 10 Medicare beneficiaries in this analysis, eight have Part D coverage and two do not:



- The typical beneficiary in each group reported:

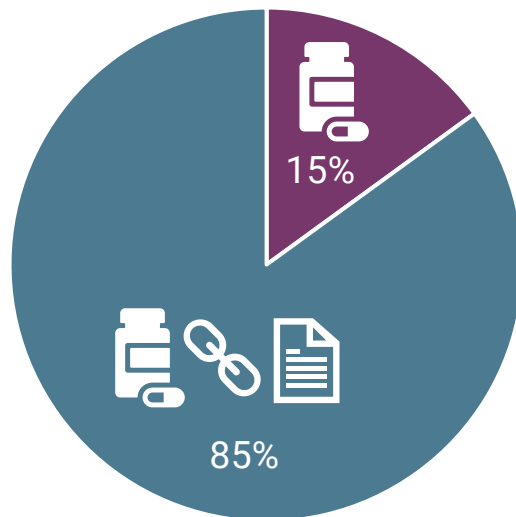


- ...and more medicines were identified in claims matching for those with Part D coverage:



## How can Part D claims matching in post-processing improve survey reported data?

- 85% of survey-reported medicines have claims matches, which can validate and enhance medicine details and cost information<sup>1</sup>



■ Not found in claims ■ Found in claims

For survey-reported medicines across data collection rounds<sup>1</sup>:

- 71% are consistently found in claims
- 13% are sometimes found in claims, but sometimes only reported in the survey in a particular round
- 16% are not found in claims

<sup>1</sup> Limited to beneficiaries with Part D coverage

## How can Part D claims matching in post-processing improve survey reported data?

- Overall, the number of medicines increased by 21% after matching.
  - Of all medicines in the final data, 17% were discovered through claims matching.
- To better understand differential likelihood of survey underreporting of medicine use, we ran a negative binomial model
- Factors associated with significantly more medicines discovered in claims matching:
  - Having a higher count of reported medicines
  - Race/ethnicity
  - Dual eligibility
  - Having 4 or more chronic conditions
  - Having an income <200% of the poverty line

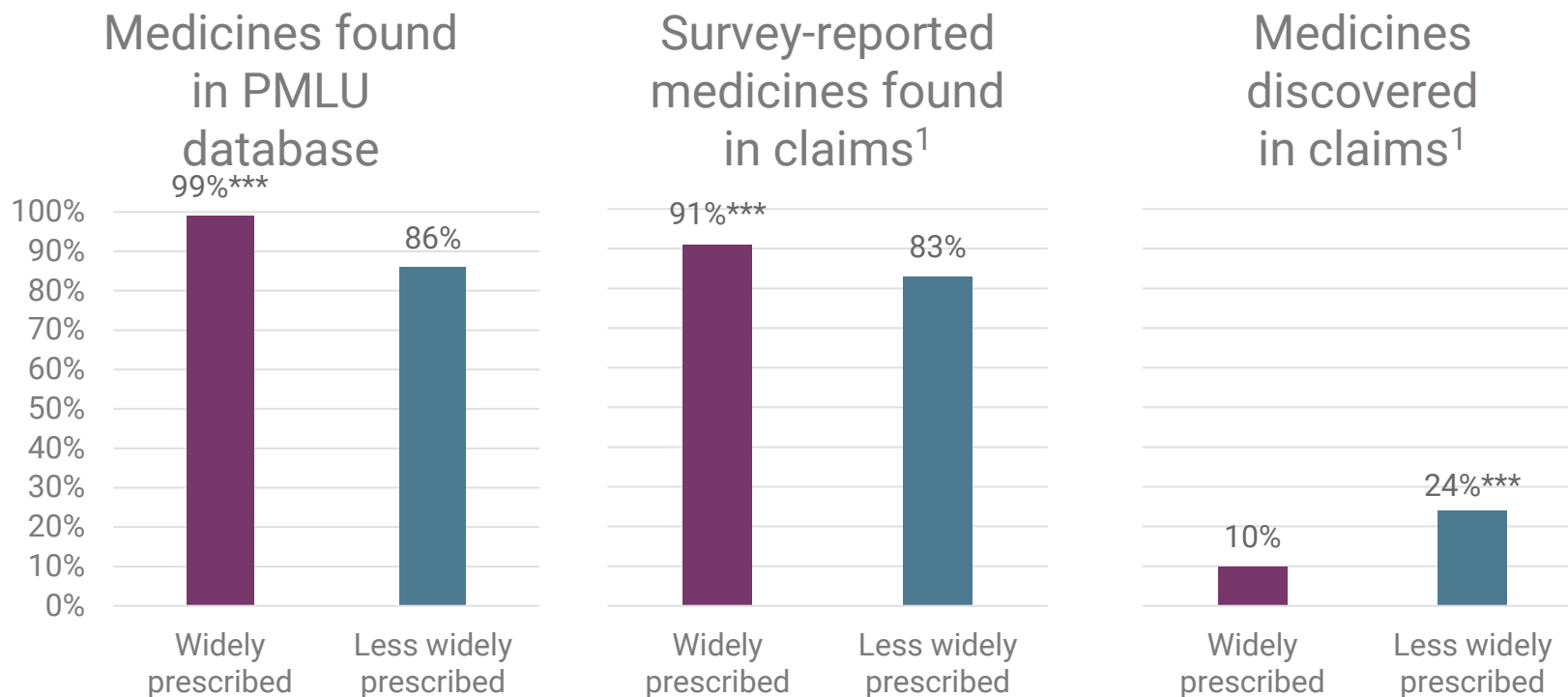
## Model Results: Medicines Discovered in Claims

	Number of Medicines Discovered in Claims Data	
	(N=7,622)	
Socio-demographic Variables	Estimate	Standard Error
Age: (reference: <65 years)		
65-74 years	-0.12+	0.07
75-84 years	-0.02	0.06
85+ years	-0.02	0.07
Sex: Female	0.08+	0.04
Race/ethnicity (reference: White)		
Hispanic	0.25**	0.07
Non-Hispanic Black	0.19*	0.07
Other race/ethnicity	-0.02	0.09
Educational attainment (reference: high school degree)		
Less than high school degree	0.07+	0.06
Some college/vocational school	-0.04+	0.05
Bachelor's degree or higher	-0.01	0.06
>=200% of the Federal Poverty Level	-0.14*	0.05
Dual eligibility	0.57***	0.06
Survey-reported medicine count	0.03***	0.01
Has >= 4 chronic conditions	0.34***	0.04

+ p<0.5 \* p<0.01 \*\* p<0.001 \*\*\* p<0.0001

## Is a survey approach equally effective for different types of medicines?

- Widely prescribed medicines are generally associated with higher data quality.



+ p<0.5 \* p<0.01 \*\* p<0.001 \*\*\* p<0.0001

<sup>1</sup> Limited to beneficiaries with Part D coverage

SOURCE: Centers for Medicare & Medicaid Services, Medicare Current Beneficiary Survey 2018

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# Discussion

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- Implementing the PMLU tool improved the quality of medicine reporting.
  - The tool supported respondent recall and limited potential sources of error.
  - The increase in accuracy among beneficiaries with many medicines is particularly important.
- Claims matching mitigates recall problems and increases medicine estimates.
  - This is particularly helpful to fill in gaps for beneficiaries with multiple chronic conditions and prescribed medicines.
  - Combining survey and claims data can provide a more comprehensive view of prescription medicine use within the MCBS population.
  - Coverage gaps still exist for beneficiaries who are not enrolled in Part D.
- Data quality can also vary based on medicine characteristics.
  - More widely prescribed medicines were more likely to be found in the PMLU, and claims matching helped fill in gaps for less widely prescribed medicines.

# Thank you.

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 **NORC** at the  
University of  
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