

KEY POINTS

- The current study aims to bring the attention of the researchers for carefully selecting drug knowledge base sources for pharmacoepidemiology research.
- Compared to Food and Drug Administration (FDA) National drug code (NDC) crosswalk, Micromedex Redbook® can recognize almost all medication records in Medical Expenditure Panel Survey (MEPS) for the top 50 drugs used in the United States (US).

BACKGROUND

- Drug knowledge bases are critical to conducting pharmacoepidemiology research
- Micromedex Redbook is the most commonly used drug knowledge base for pharmacoepidemiology research
- FDA has its own drug knowledge base, which is publicly available and is also used frequently in research studies
- The accuracy of FDA drug knowledge in capturing medication records of interest is not known.
- The current analysis compared the accuracy of FDA NDC crosswalk to Redbook in capturing at least the top 50 medication records

Every year, there are more than 3 billion outpatient prescriptions filled in the United States

Top 50 drugs contribute for 60% of outpatient prescriptions filled

OBJECTIVES

To compare the FDA NDC Directory data and Micromedex Redbook® in identifying frequently prescribed medication records in nationally representative medication utilization data.

METHODS

Data Source:

- This is a cross-sectional retrospective study that analyzed data from Medical Expenditure Panel Survey (MEPS) from 2017 to 2018
- MEPS Household Component (MEPS-HC) prescribed medicine files from 2017-2018 were used to obtain estimates of the top 50 medications
- FDA NDC Directory and Micromedex Redbook® were used to identify of the top 50 medications based on the respective NDC

Study Population:

- Medication records for the top 50 most prescribed drugs based on the generic name

Outcome:

- The proportion of medication records identifiable using FDA NDC Crosswalk and Micromedex Redbook®, respectively

Statistical Analysis:

- Survey weighted frequency and percentage were reported for each of the top 50 drugs based on NDC to generic name mapping from Micromedex Redbook® and FDA NDC Directory drug knowledge bases respectively

RESULTS

- The study identified an unweighted sample of 349,641 medication records representing 3.56 billion medication records nationally
- Micromedex Redbook® based NDC to generic name mapping tables identified 99.87% of medication records overall
- FDA NDC directory-based mapping tables identified only 90.95% of the overall records
- The performance of FDA NDC directory-based mapping tables varied across different drugs and was lowest for human insulin (50.41%), followed by warfarin (57.03%), clonazepam (61.01%), norgestimate (64.34%), and levothyroxine (69.05%)

Figure 1: Prescription Selection

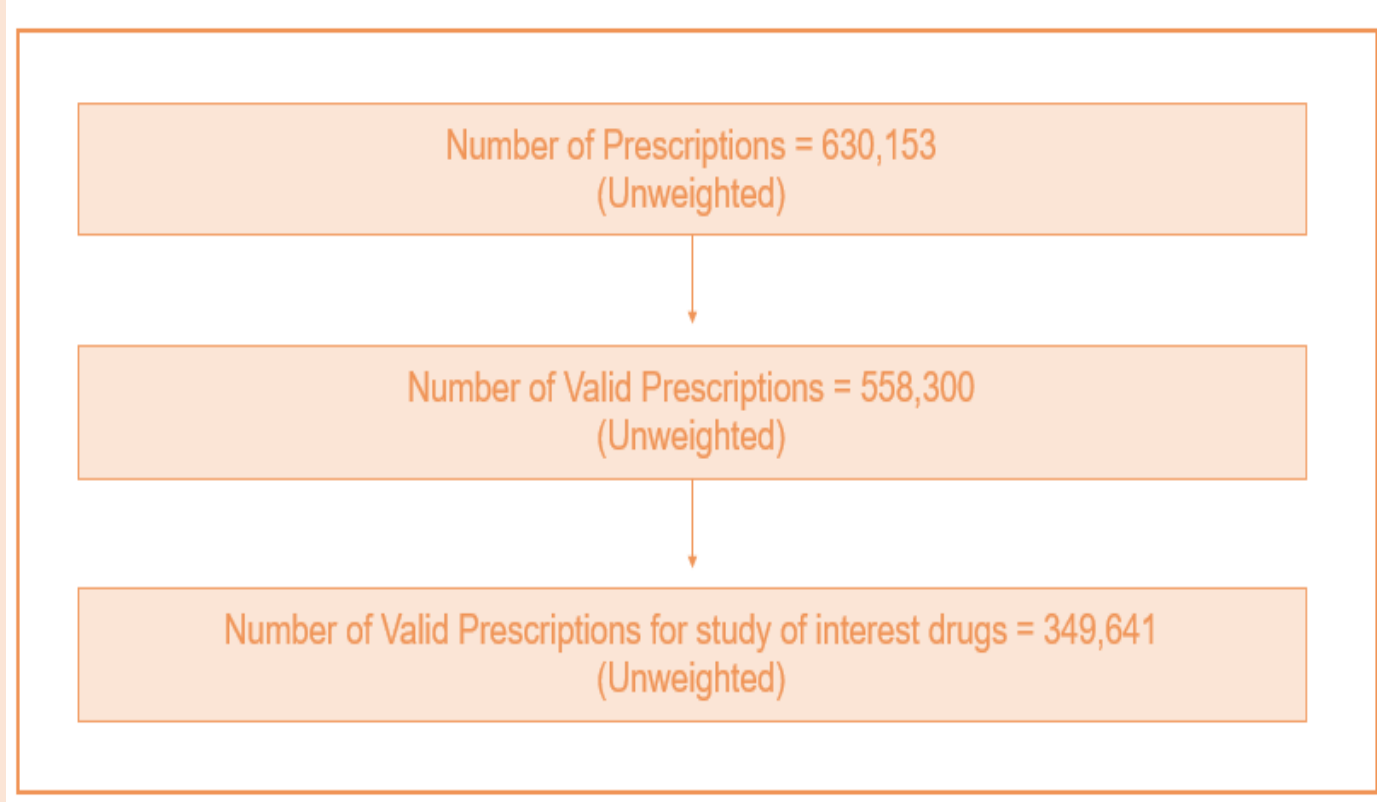


Figure 2: Mapping of Different Drugs with Lowest Performance in FDA NDC Directory



LIMITATIONS

- MEPS is a survey data, which comes with inherent biases such as under-reporting, missing data, and recall bias
- The study only compared the drug knowledge bank for the top 50 most prescribed drugs

CONCLUSIONS

- The coverage by the publicly available FDA NDC directory-based mapping table for the 50 most frequently prescribed medications was variable and incomplete
- Micromedex Redbook®, in contrast, provides complete coverage of the 50 most frequently prescribed medications
- Researchers should carefully select drug knowledge base sources for pharmacoepidemiology research as it can significantly impact the study populations and associated outcomes

REFERENCES

- Fuentes, A. V., Pineda, M. D., & Nagulapalli Venkata, K. C. (2018). Comprehension of Top 200 Prescribed Drugs in the US as a Resource for Pharmacy Teaching, Training and Practice. *Pharmacy*, 6(43), 1-10.
- Medical Expenditure Panel Survey (MEPS). (2021, August). Rockville, MD: Agency for Healthcare Research and Quality. Retrieved from <https://www.ahrq.gov/data/meps.html>

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Table 1: Mapping of Different Drugs using FDA NDC Directory and Micromedex Redbook®

Drug Name	Medication records MEPS (Millions)	Medication records identified by Redbook (%)	Medication records identified by FDA (%)
Lisinopril	223.38	100.00	90.29
Levothyroxine	198.95	100.23	69.91
Atorvastatin	207.12	99.94	98.72
Metformin	179.11	99.88	94.72
Simvastatin	101.29	99.51	84.10
Omeprazole	126.71	99.33	89.90
Amlodipine Besylate	148.81	99.98	87.86
Metoprolol	126.06	99.79	91.24
Acetaminophen hydrocodone	73.70	99.99	72.68
Albuterol	115.40	100.00	95.35
Hydrochlorothiazide	156.39	99.88	94.92
Losartan	123.49	99.91	90.43
Gabapentin	86.69	99.78	95.75
Sertraline	73.32	100.00	98.09
Furosemide	56.51	99.99	95.12
Acetaminophen	119.39	99.76	75.46
Atenolol	37.60	100.00	97.90
Pravastatin	46.33	100.00	98.18
Amoxicillin	70.90	99.92	96.60
Fluoxetine	45.52	100.00	98.26
Citalopram	94.41	100.00	95.77
Trazodone	43.24	100.00	99.00
Alprazolam	45.49	100.00	98.50
Fluticasone	86.34	100.00	99.99
Bupropion	46.12	99.75	92.04
Carvedilol	42.58	99.82	97.15
Potassium Chloride	35.00	99.80	98.70
Tramadol	41.72	100.00	93.30
Pantoprazole	54.16	99.88	90.94
Montelukast	64.05	99.75	97.65
Escitalopram	50.25	100.00	95.28
Prednisone	50.56	100.00	99.68
Rosuvastatin	42.00	99.34	90.96
Ibuprofen	45.33	98.62	96.02
Meloxicam	40.52	99.87	99.91
Insulin Glargine	38.68	100.00	99.83
Hydrochlorothiazide and Lisinopril	31.48	100.00	98.64
Clonazepam	35.91	99.93	60.89
Aspirin	23.83	98.49	79.16
Clopidogrel	37.41	100.00	93.17
Glipizide	31.24	99.97	78.58
Warfarin	29.07	99.95	56.43
Cyclobenzaprine	32.53	99.91	88.12
Insulin Human	11.00	100.00	55.65
Tamsulosin	40.09	100.00	99.49
Zolpidem	27.41	100.00	92.00
Norgestimate	22.21	100.00	65.82
Duloxetine	36.71	100.00	87.52
Ranitidine	32.62	99.90	96.02
Venlafaxine	35.40	99.95	98.20