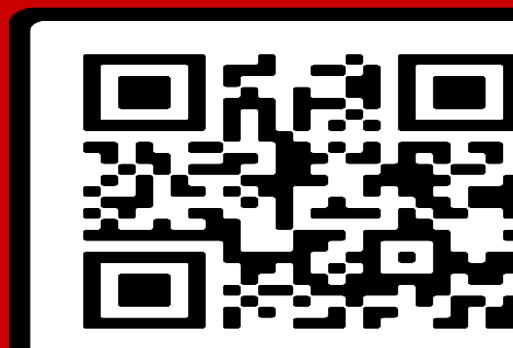




# Cumulative Anticholinergic Burden and Its Predictors among Older Adults with Alzheimer's Disease Initiating Cholinesterase Inhibitors

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## BACKGROUND

- Cumulative anticholinergic burden refers to the cumulative effect of multiple medications with anticholinergic properties.
- Also, concomitant use of cholinesterase inhibitors (ChEIs) and anticholinergic burden can nullify the benefit of ChEIs and worsen Alzheimer's disease (AD)
- Till date no study has accounted for patient-specific dosing and duration while accounting for the cumulative burden of anticholinergic medications in AD

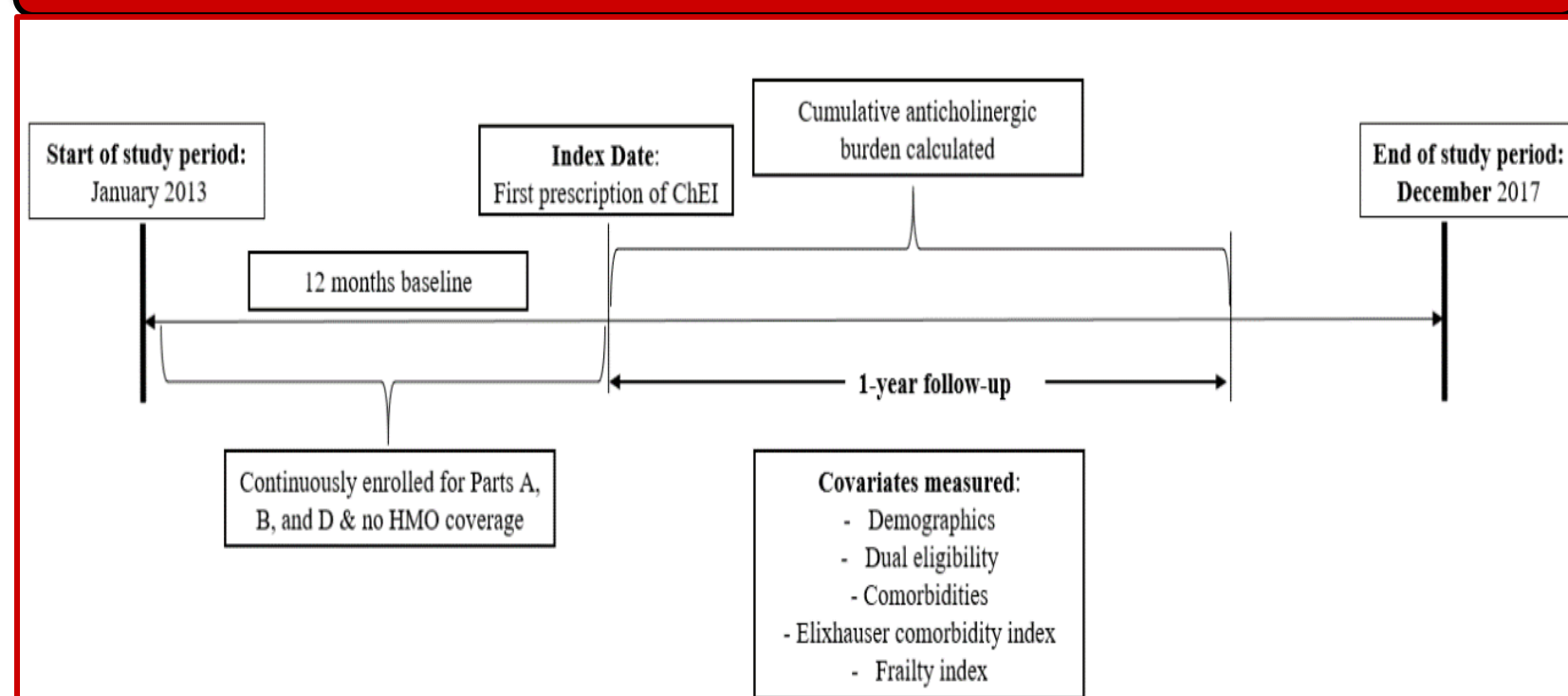
## OBJECTIVE

Examine the prevalence and predictors of cumulative anticholinergic burden among older adults with AD initiating with CHEIs

## STUDY DESIGN & METHODS

**Patient population:** 65 years of age or older patients with AD at index date, and are continuously enrolled

Figure 1. Study design



## METHODS

**Data source:** Medicare database involving parts A, B and D from January 2013 - December 2017

**Study design:** Retrospective cohort

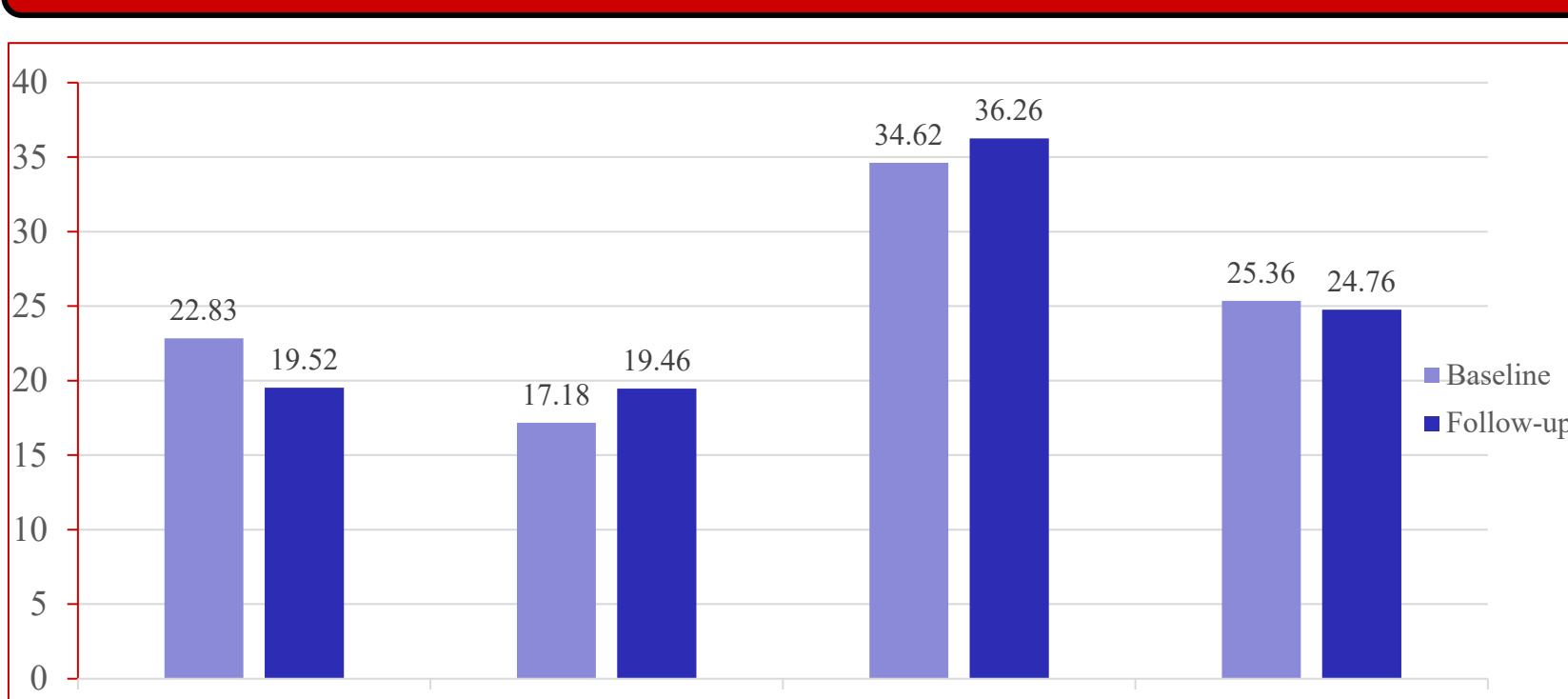
### Study Outcome Measures

- Patient specific cumulative Anticholinergic (ACH) burden measured over one year time period
- Burden based on total standardized daily dose (TSDD) categorized as No (TSDD=0), Low(1-89), Medium (90-499) and High (>=500)

**Statistical analysis:** Two multivariable logistic regression models adjusted for the factors identified using the conceptual framework of the Andersen Behavioral Model.

- Logistic regression:** Predictors of ACH burden levels dichotomized into moderate/high versus low/no burden
- Multinomial logistic regression:** Predictors of moderate and high versus low/no burden

Table 1. Change in Anticholinergic Burden after ChEI Use



## RESULTS

Table 1. Predictors of ACH burden: Logistic Regression

PATIENT CHARACTERISTICS	HIGH-MODERATE ODDS RATIO	p-value
<b>Age group</b>		
65-74 years	REFERENCE	
75-84 years	0.90 (0.87-0.93)	<0.001
85 years & above	0.79 (0.76-0.82)	<0.001
<b>Sex</b>		
Males	0.93 (0.91-0.95)	<0.001
<b>Race</b>		
White	REFERENCE	
Black/African American	0.89 (0.86-0.92)	<0.001
Others/Unknown	0.77 (0.70-0.84)	<0.001
Asian	0.62 (0.58-0.66)	<0.001
Hispanic	0.89 (0.83-0.95)	0.0003
<b>Dual eligibility</b>		
Yes	1.35 (1.32-1.39)	<0.001
<b>Baseline burden</b>		
Moderate-High	14.44 (14.13-14.75)	<0.0001
<b>Diagnoses clinically exacerbated with anticholinergic prescription (negatively related)</b>		
Syncope	0.90 (0.87-0.93)	<0.001
Chronic seizures/epilepsy	0.93 (0.89-0.97)	0.002
Delirium	0.97 (0.94-0.99)	0.04
Fractures	0.95 (0.92-0.99)	0.01
Pneumonia	0.93 (0.90-0.97)	<0.0001
Heart failure	1.32 (1.28-1.37)	<0.0001
Dyslipidemia	0.98 (0.95-0.99)	0.04
Narrow angle glaucoma	0.90 (0.87-0.92)	<0.0001
Dysrhythmia	1.27 (1.23-1.30)	<0.0001
<b>Diagnosis clinically needing anticholinergic prescription (positively related)</b>		
Behavioral and psychological symptoms (BPSD)	1.11 (1.07-1.14)	<0.0001
Mood disorders	1.21 (1.17-1.26)	<0.0001
Anxiety	1.09 (1.05-1.13)	<0.0001
Urinary incontinence	1.10 (1.06-1.14)	<0.0001
Muscle spasm/lower back pain	1.05 (1.02-1.08)	0.0002
Depression	1.04 (1.01-1.07)	0.03
Gastrointestinal reflux disease (GERD)	1.10 (1.07-1.13)	<0.0001
Insomnia	1.06 (1.02-1.11)	<0.0001
Irritable bowel disease	1.17 (1.08-1.26)	<0.0001
<b>Claims-based Frailty indicators</b>		
Robust	REFERENCE	
Prefrail	0.92 (0.89-0.95)	<0.001
Moderate to severe	0.87 (0.81-0.93)	<0.001

Table 2. Predictors of ACH burden: Multinomial Regression

- Predisposing factors**
  - Age 85 years & above had lower odds (4-41%) as compared to 65-74 years. Aged 75-84 years had lower odds (22%) only among the high burden
  - Males had lower odds of moderate(4%) & high (9%) burden
  - All racial groups except native Americans lower likelihood of having moderate (8-32%) & high (14-43%) burden
- Enabling factors**
  - Patients with dual eligibility had higher odds of moderate (28%) & high (42%) burden
- Need factors**
  - Patients with moderate burden in baseline had higher likelihood of moderate (9.00) and high burden (13.00)
  - Patients with high burden in baseline had higher likelihood of moderate(11.0) and high burden (153.00)
  - Depression (7%) had higher likelihood of high burden
  - Urinary incontinence had lower (5%) odds of moderate burden group while higher (20%) odds of high burden
  - Dyslipidemia (4%) and fracture(6%) lower odds high burden
  - Severely frail patients (7% & 22%) had lower odds of moderate and high burden
  - Prefrail (14%) and mildly frail (9%) patients had lower odds of high burden

## DISCUSSION & CONCLUSIONS

- Overall, this study found nearly one in four have high anticholinergic burden over one-year follow-up.
- Several predisposing, enabling, and need factors contribute to moderate and high anticholinergic burden.
- Key decision-makers should be well cautious of prescribing any medication with anticholinergic properties and always opt for alternatives to those medications.

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