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RURAL-URBAN DIFFERENCES IN PROVIDER TYPES DIAGNOSING AND PRESCRIBING FOR PATIENTS WITH ALZHEIMER'S DISEASE

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DISCLOSURES AND ACKNOWLEDGEMENTS

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- Jenny Park is a research fellow at Genentech Inc and University of Washington
- Helen Lin, and Christopher Wallick are full-time employees of Genentech Inc.
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OVERVIEW

- Background
- Objectives
- Methods
- Results
- Discussion

BACKGROUND

There is significant U.S. geographic variation in Alzheimer's Disease (AD) care and practicing provider types

Alzheimer's Disease

The estimated prevalence of AD varies more than threefold across U.S. counties[1]

Age-adjusted county level death rates from AD ranged from 4.3 to 123.7 per 100,000 persons[2]

Rural residents survived about 1.5 months less than their urban counterparts after adjusting for other risk factors[3]

Provider Type

While roughly 20% of the U.S. population live in rural areas, only 9% of U.S. physicians practice in rural communities[4]

The lack of access to specialists in rural locations has been identified as the primary reason for worse health outcomes amongst rural patients with chronic conditions[5,6]

BACKGROUND

The increasing AD caseload and the advent of DMTs may logistically challenge the U.S. healthcare system under current workforce limitations

Aging Population



- The number of patients with AD is expected to more than double to 13.5 million by 2050 with the aging U.S. population[7,8]
- The increasing AD caseload may present a logistical challenge to the U.S. healthcare system[5]
  - The growing number of patients with AD requires more diagnosing, prescribing, and monitoring for treatment and management

Disease Modifying Therapies (DMTs)



- AD DMTs require an increased need for
  - early detection and timely diagnosis
  - biomarker testing, including brain imaging or cerebrospinal fluid (CSF)
  - frequent monitoring for safety and efficacy

OBJECTIVES

- Identify provider types diagnosing and prescribing for patients with Alzheimer's Disease (AD) in the U.S.
- Compare diagnosing and prescribing patterns across U.S. geographic regions (rural vs. urban)

METHODS

Data Source	Timeline	Statistical Analyses
IBM MarketScan®	2016– 2019	R Studio and SAS

Diagnosing

Unit of Analysis: Patients with AD

Inclusion Criteria

- Patients newly diagnosed with AD
- 5-year lookback period

Exclusion Criteria

- Missing information
- Invalid provider type listed

Neurologists were classified as AD specialists for analyses.

Two-sample z-tests were used to compare the proportion of specialists and non-physician providers diagnosing and prescribing for patients with AD in rural and urban areas.

METHODS

Data Source	Timeline	Statistical Analyses
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Diagnosing
Unit of Analysis: Patients with AD

Inclusion Criteria
- Patients newly diagnosed with AD
- 5-year lookback period

Exclusion Criteria
- Missing information
- Invalid provider type listed

Prescribing
Unit of Analysis: AD Prescriptions

Inclusion Criteria
- FDA approved medications for AD* (symptomatic treatments)

Exclusion Criteria
- Refills
- Missing information
- Invalid provider type listed

Neurologists were classified as AD specialists for analyses.

Two-sample z-tests were used to compare the proportion of specialists and non-physician providers diagnosing and prescribing for patients with AD in rural and urban areas.

* At the time of this analysis, aducanumab was not FDA approved

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COHORT EXTRACTION

Diagnosing
(Patients with AD)



100,830

5 Year Continuous Enrollment and Lookback Period

20,514

Missing or Invalid Provider Type

16,803

Missing MSA

9,964

Prescribing
(AD Prescriptions)



1,966,057

Duplicates

1,936,526

Missing Enrollee ID

1,935,255

Refills

741,242

Fill Date ≠ Service Date

184,639

Missing or invalid Provider Type

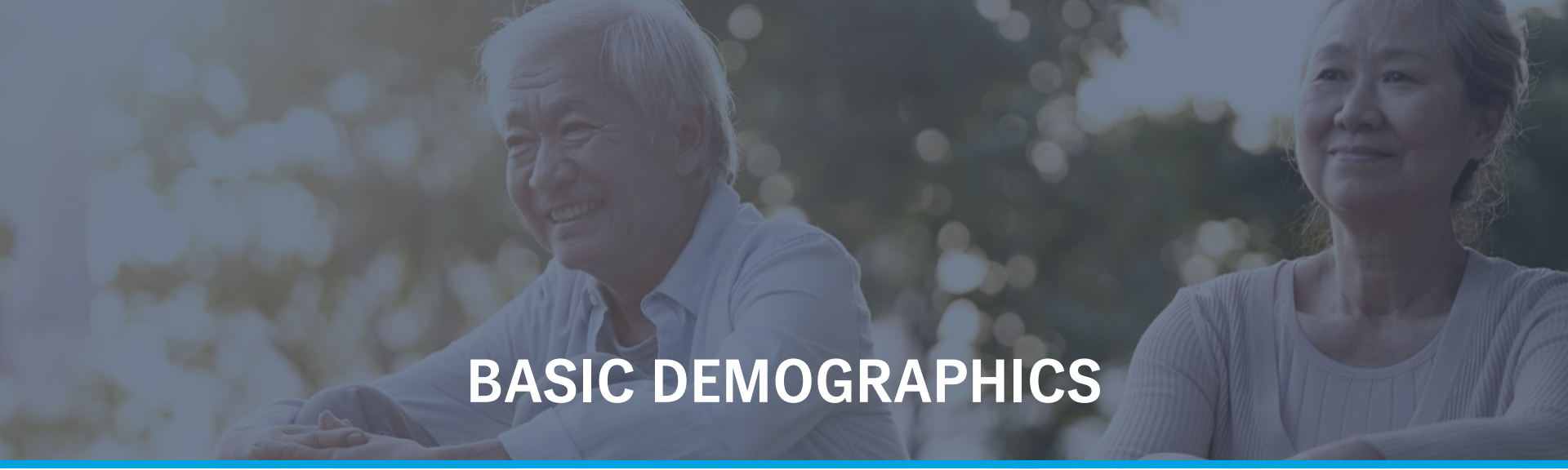
131,548

Missing MSA

103,067

AD: Alzheimer's Disease, MSA: Metropolitan Statistical Area, ID: Identification

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BASIC DEMOGRAPHICS

	Diagnosing	Prescribing
Age	80.75 (11.09)	75.22 (13.91)
Sex	60% Female 40% Male	58% Female 42% Male
Medicare	88%	84%
Commercial	12%	16%

The vast majority of newly diagnosed patients and AD prescriptions were from the Medicare Supplemental data in MarketScan

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Most patients are diagnosed with AD by non-specialist physicians

Of all newly diagnosed patients with AD, roughly **94%** were diagnosed by **physicians** and **6%** were diagnosed by **non-physician healthcare professionals** (HCPs).

Top five physician subtypes diagnosing patients with AD

Patients Diagnosed	
Total	**9,964 (100%)**
Physicians	**9,384 (94.18%)**
Family Practice	3,898 (39.12%)
Internal Medicine	1,914 (19.21%)
Neurology	1,493 (14.99%)
Multispecialty*	729 (7.32%)
Psychiatry	356 (3.57%)
Other**	994 (9.97%)
Other HCPs	**9,384 (94.18%)**
Family Practice	500 (5.02%)
Internal Medicine	80 (0.80%)

*Multispecialty: Physicians serving more than one medical specialty
**Other: Includes geriatric medicine, emergency medicine, endocrinology & metabolism and more

The top five physician subtypes diagnosing patients with AD were the same across rural and urban geographies

Patients Diagnosed	
Total	9,964 (100%)
Physicians	9,384 (94.18%)
Other HCPs	580 (5.82%)

Urban (Metropolitan)	
8,274 Diagnoses	
Physicians	**7,790 (94.15%)**
Family Practice	3081 (37.24%)
Internal Medicine	1629 (19.69%)
Neurology	1291 (15.60%)
Multispecialty**	649 (7.84%)
Psychiatry	306 (3.70%)
Other**	834 (10.08)
Other HCPs	**484 (5.85%)**
Nurse Practitioner	419 (5.06%)
Physician Assistant	65 (0.79%)

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The proportion of patients diagnosed by specialists in rural areas was significantly lower than that in urban areas

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Two- Sample Proportion -Tests

p-value	95% CI
<0.001	(-0.054,-0.019)

p-value	95% CI
0.831	(-0.014,0.011)

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Most AD prescriptions were written by non-specialist physicians

Of all AD prescriptions, roughly 95.5% were written by physicians and 4.5% were written by non-physician healthcare professionals (HCPs).

Top five physician subtypes diagnosing patients with AD

AD Prescriptions	
Total	**103,067 (100%)**
Physicians	**98,588 (95.65%)**
Family Practice	29,655 (28.77%)
Internal Medicine	23,924 (23.21%)
Neurology	16,254 (15.77%)
Multispecialty*	8,867 (8.60%)
Psychiatry	5,459 (5.30%)
Other**	14,429 (14.00%)
Other HCPs	**4,479 (4.35%)**
Family Practice	3,477 (3.37%)
Internal Medicine	1,002 (0.97%)

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The top five physician subtypes prescribing AD symptomatic treatments were the same across rural and urban geographies

Patients Diagnosed	
Total	103,067 (100%)
Physicians	98,588 (95.65%)
Other HCPs	4,479 (4.35%)

Rural (Non-Metropolitan)	
17,052 Prescriptions	
Physicians	**15,975 (93.68%)**
Family Practice	6,493 (38.08%)
Neurology	3,206 (18.80%)
Internal Medicine	2,491 (14.61%)
Multispecialty*	1,029 (6.03%)
Psychiatry	612 (3.59%)
Other**	2,144 (12.57%)
Other HCPs	**1,077 (6.32%)**
Nurse Practitioner	798 (4.68%)
Physician Assistant	279 (1.64%)

Urban (Metropolitan)	
86,015 Prescriptions	
Physicians	**82,613 (96.04%)**
Family Practice	23,162 (26.93%)
Neurology	20,718 (24.09%)
Internal Medicine	13,763 (16.00%)
Multispecialty	7,838 (9.11%)
Psychiatry	4,847 (5.64%)
Other**	12,285 (14.28%)
Other HCPs	**3,402 (3.96%)**
Nurse Practitioner	2,679 (3.11%)
Physician Assistant	723 (0.84%)

*Multispecialty: Physicians serving more than one medical specialty | **Other: Includes geriatric medicine, emergency medicine, endocrinology & metabolism and more

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The proportion of prescriptions written by specialists and other non-physician healthcare professionals significantly differed between rural and urban geographies

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Other HCPs	4,479 (4.35%)

Rural (Non-Metropolitan)	
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Two- Sample Proportion Z-Tests

p-value	95% CI
<0.001	(-0.059,-0.046)

p-value	95% CI
<0.001	(0.020,0.028)

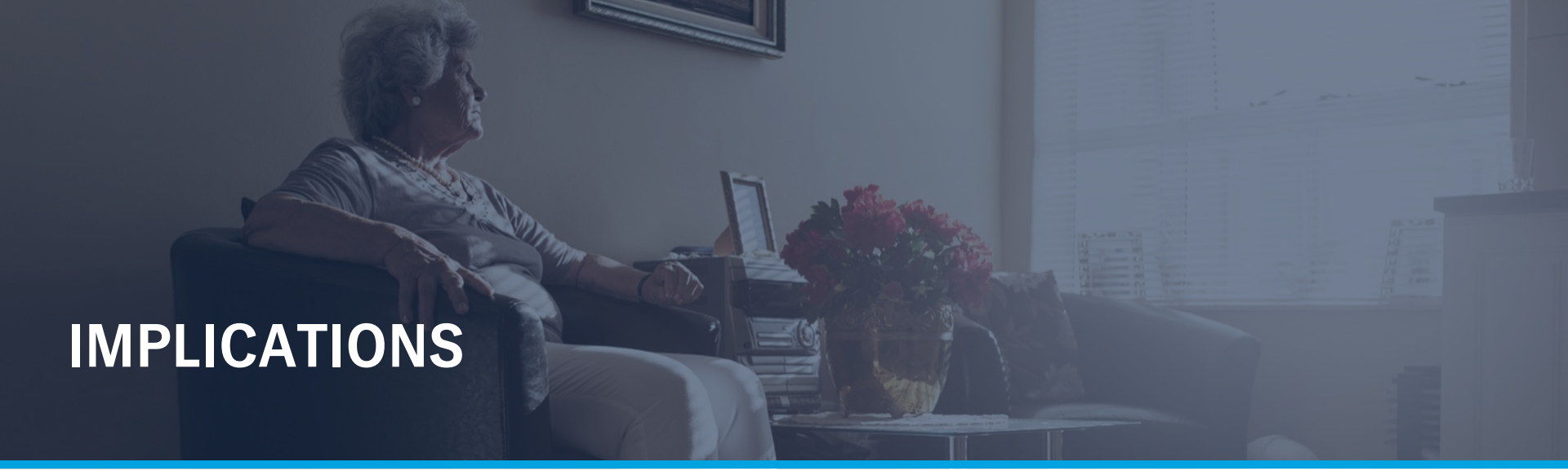
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LIMITATIONS

- Generalizability
  - Medicare Fee-For-Service (FFS) data not captured
  - Concerns for selection bias during cohort extraction
- Incident-to-billing
  - Some nurse practitioners (NP) and physician assistants (PA) may have billed their claims under a physician's NPI under certain circumstances for reimbursement purposes
- Race and Ethnicity
  - Race and ethnicity data unavailable in the dataset
  - Important to assess racial/ethnic disparities in access to specialized care
- Narrow definition of AD specialists

KEY TAKEAWAYS

	Diagnosing	Prescribing
RURAL	People with AD are significantly less likely to be diagnosed by a **specialist**	People with AD are significantly less likely to be prescribed for by a **specialist** People with AD are significantly more likely to be prescribed for by **NPs/PAs**
URBAN	People with AD are significantly more likely to be diagnosed by a **specialist**	People with AD are significantly more likely to be prescribed for by a **specialist** People with AD are significantly less likely to be prescribed for by **NPs/PAs**



IMPLICATIONS

Most diagnosing and prescribing for patients with AD are currently managed by non-specialist physicians

Patient journeys for those with AD may differ by their geographic location

A clear understanding of current practice can provide a helpful benchmark for future planning of AD care

Strategic and proactive efforts are necessary to ensure patients with AD in rural areas have equal access to timely high-quality care



FUTURE DIRECTION

Characterize health outcomes and costs by provider type and region

Comprehensive assessment of disparities in AD care including racial/ethnic demographics and social determinants of health



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