Aphasia and the risk of potentially inappropriate psychotropic prescribing after stroke

Robert Cavanaugh PhD CCC-SLP[1,2], Michelle L. Stransky, PhD[3,4], Evangeline Kim MS[2], Liam O'Connor MS[2], Chelsea N Wong, MD[5]

[1]MGB University of Health Professions, [2]The Roux Institute at Northeastern University, [3]Boston Medical Center, [4]Boston University Chobanian & Avedisian School of Medicine, [5]University of Hawaii John A Burns School of Medicine

Introduction

- Potentially inappropriate medications (PIMs) are common and harmful in stroke: linked to more hospitalizations, adverse events, and reduced home discharge[1–6]
- Appropriateness relies on objective data and patient-provider communication[2,3]
- Psychotropic prescribing specifically depends largely on self-report and clinical interview[7,8]
- Mental health conditions like depression are common in stroke [9,10] and especially aphasia[11,12] but aphasia disrupts test validity and patient-provider communication needed for diagnosis and treatment
- Standard screening tools assume intact language[12,13]; aphasia-specific tools exist but are under-validated and underused[8,14]
- Clinicians limit communication and assume reduced decision-making capacity in aphasia[15,16]; patients describe care as "one-way"[17]
- Communication disorders previously linked to altered prescribing patterns[18,19] and more adverse drug errors[20]

Objectives

1. Evaluate the prevalence of *psychotropic* potentially inappropriate medications (PIMs) in stroke survivors with and without aphasia

2. Examine clinical factors associated with of *psychotropic* PIM prescribing among stroke survivors with aphasia.

Methods

- Retrospective cohort, 180-day post-stroke window; IQVIA PharMetrics+ commercial claims (2017-2022)[21,22] in OMOP 5.4
- Stroke via OMOP phenotype[23], ≥2 codes/180 days; aphasia = ≥1 dx code post-index
- Excluded: prior CVA, age <18, dementia w/ behavioral disturbance
- PIM approximated as a new psychotropic rx in ATC class (antidepressant/anxiolytic/antipsychotic/hypnotic-sedative) lacking indicating diagnosis in window (Figure 1)
- Parallel models for both aims within each ATC class
- Covariates: age, LOS, discharge disposition, CCI[24], polypharmacy
- Aim 1: GLM: PIM ~ aphasia status, adjusted for severity proxies
- Aim 2: aphasia-only GLM, PIM ~ age, sex, LOS, discharge disposition, CCI, polypharmacy

Results

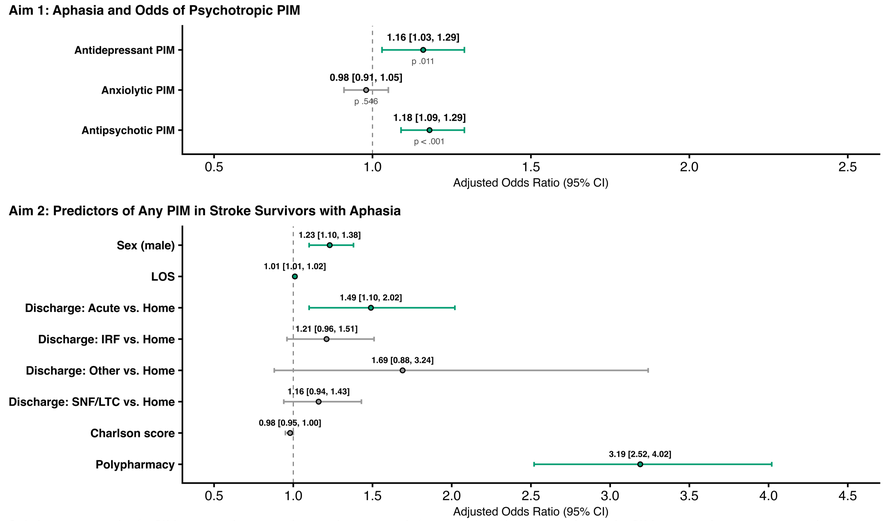

Figure 2. Adjusted odds ratios for PIM presence in stroke with vs. without aphasia (top panel) and factors associated with PIM presence in stroke and aphasia (bottom panel).

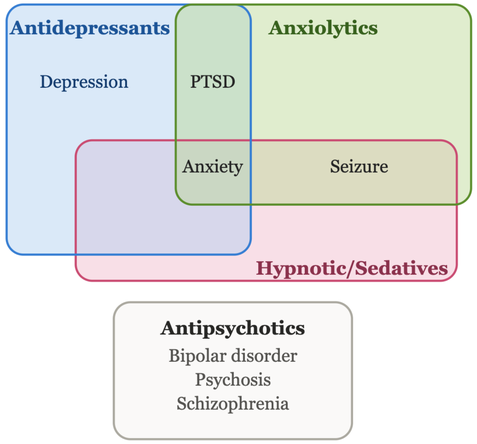

Figure 1. Medication – Indication adjustment rules for the four medical classes

	No Aphasia (N=50853)	Aphasia (N=10191)	Overall (N=61044)
Age at Stroke			
Mean (SD)	70.9 (12.6)	72.6 (11.1)	71.1 (12.4)
Median (Q1, Q3)	75.0 (64.0, 81.0)	76.0 (67.0, 81.0)	75.0 (65.0, 81.0)
Sex			
Female	25822 (50.8%)	5569 (54.6%)	31391 (51.4%)
Male	25031 (49.2%)	4622 (45.4%)	29653 (48.6%)
Insurance			
Commercial	13827 (27.2%)	2279 (22.4%)	16106 (26.4%)
Medicaid	640 (1.3%)	69 (0.7%)	709 (1.2%)
Medicare/Medicare Advantage	15737 (30.9%)	3281 (32.2%)	19018 (31.2%)
Medicare Supplement	20454 (40.2%)	4533 (44.5%)	24987 (40.9%)
Length of Stay (days)			
Mean (SD)	5.62 (13.8)	6.33 (13.7)	5.74 (13.8)
Median (Q1, Q3)	3.00 (1.0, 6.0)	4.00 (2.0, 7.0)	3.00 (1.0, 6.0)
Discharge Location			
Acute	1532 (3.0%)	407 (4.0%)	1939 (3.2%)
Home	35515 (69.8%)	5602 (55.0%)	41117 (67.4%)
IRF	6640 (13.1%)	2355 (23.1%)	8995 (14.7%)
SNF/LTC	6798 (13.4%)	1771 (17.4%)	8569 (14.0%)
Intracerebral Hemorrhage			
Present	13753 (27.0%)	2255 (22.1%)	16008 (26.2%)
Charlson Comorbidity Index			
Mean (SD)	3.13 (3.04)	3.11 (3.01)	3.12 (3.03)
Median (Q1, Q3)	2.00 (0.0, 5.0)	2.00 (1.0, 5.0)	2.00 (1.0, 5.0)
Polypharmacy			
Present	8976 (17.7%)	1896 (18.6%)	10872 (17.8%)

Table 1. Cohort characteristics by aphasia status and overall

Discussion

- Modestly elevated odds of PIM: antidepressant (+16%), antipsychotic (+18%), vs. those without aphasia
- Among aphasia patients, polypharmacy was strongest predictor of PIM, beyond comorbidity burden
- Effects modest but consistent w/ work linking communication disorders to altered prescribing[18,25] and adverse events[20]
- Average effect may mask subgroup risk: effects may be larger w/ more severe aphasia, low social support, or health literacy
- Aphasia prevalence in sample (~17%) lower than expected (~30%) — suggests under-coding of aphasia status, likely diluting true group differences (biasing toward null)

Limitations

- PIM operationalization is approximate: true PIM requires clinical reasoning not captured in claims; we identify only prescriptions lacking a documented indication
- Medications may be prescribed off-label for other reasons
- Under-coding of mental health conditions is a known issue in claims data[26,27]; if under-coding differs by aphasia status, aphasia-PIM association may be mis-estimated
- No direct stroke severity measure or formal aphasia diagnosis
- Diagnosis codes may reflect documentation practice (e.g., justifying existing prescriptions) rather than true clinical burden[12]

Future Directions

- Replication with more granular clinical data and a refined PIM approximation method is the necessary next step

References / Acknowledgments

This work was conducted using computational resources and services provided by the OHDSI Lab at Northeastern University. The content of this product does not necessarily represent the views of IQVIA or Northeastern University. We are additionally grateful to Jonah Bradenday and Phillip Bogden for facilitating the collaboration between the MS Data Science Program and the OHDSI Lab at the Roux Institute at Northeastern University.

Link to poster and references

REFERENCES

1. Matsumoto A, Yoshimura Y, Nagano F, et al. Polypharmacy and potentially inappropriate medications in stroke rehabilitation: prevalence and association with outcomes. *Int J Clin Pharm.* 2022;44(3):749-761. doi:10.1007/s11096-022-01416-5
2. American Geriatrics Society Beers Criteria® Update Expert Panel. American Geriatrics Society 2023 updated AGS Beers Criteria® for potentially inappropriate medication use in older adults. *J Am Geriatr Soc.* 2023;71(7):2052-2081. doi:10.1111/jgs.18372
3. O'Mahony D, Cherubini A, Guiteras AR, et al. STOPP/START criteria for potentially inappropriate prescribing in older people: version 3. *Eur Geriatr Med.* 2023;14(4):625-632. doi:10.1007/s41999-023-00777-y
4. Tian F, Chen Z, Zeng Y, Feng Q, Chen X. Prevalence of Use of Potentially Inappropriate Medications Among Older Adults Worldwide: A Systematic Review and Meta-Analysis. *JAMA Netw Open.* 2023;6(8):e2326910. doi:10.1001/jamanetworkopen.2023.26910
5. Xing XX, Zhu C, Liang HY, et al. Associations Between Potentially Inappropriate Medications and Adverse Health Outcomes in the Elderly: A Systematic Review and Meta-analysis. *Ann Pharmacother.* 2019;53(10):1005-1019. doi:10.1177/1060028019853069
6. Mekonnen AB, Redley B, De Courten B, Manias E. Potentially inappropriate prescribing and its associations with health-related and system-related outcomes in hospitalised older adults: A systematic review and meta-analysis. *Br J Clin Pharmacol.* 2021;87(11):4150-4172. doi:10.1111/bcp.14870
7. Merckelbach H, Dandachi-FitzGerald B. Symptom overreporting and its consequences for treatment. *Curr Opin Psychol.* 2025;65:102091. doi:10.1016/j.copsyc.2025.102091
8. Van Dijk MJ, De Man-van Ginkel JM, Hafsteinsdóttir TB, Schuurmans MJ. Identifying depression post-stroke in patients with aphasia: a systematic review of the reliability, validity and feasibility of available instruments. *Clin Rehabil.* 2016;30(8):795-810. doi:10.1177/0269215515599665
9. Liu L, Xu M, Marshall IJ, Wolfe CD, Wang Y, O'Connell MD. Prevalence and natural history of depression after stroke: A systematic review and meta-analysis of observational studies. *PLOS Med.* 2023;20(3):e1004200. doi:10.1371/journal.pmed.1004200
10. Hackett ML, Pickles K. Part I: Frequency of Depression after Stroke: An Updated Systematic Review and Meta-Analysis of Observational Studies. *Int J Stroke.* 2014;9(8):1017-1025. doi:10.1111/ijs.12357
11. Kauhanen ML, Korpelainen JT, Hiltunen P, et al. Aphasia, Depression, and Non-Verbal Cognitive Impairment in Ischaemic Stroke. *Cerebrovasc Dis.* 2000;10(6):455-461. doi:10.1159/000016107
12. Vogel-Eyny A, Jung YJ, Hyun J, et al. Prevalence of depression in post-stroke aphasia: systematic review and meta-analysis. *BMC Neurol.* 2025;26(1):43. doi:10.1186/s12883-025-04570-1
13. Townend E, Brady M, McLaughlan K. A systematic evaluation of the adaptation of depression diagnostic methods for stroke survivors who have aphasia. *Stroke.* 2007;38(11):3076-3083. doi:10.1161/STROKEAHA.107.484238
14. Tierney-Hendricks C, Schliep ME, Vallila-Rohter S. Using an Implementation Framework to Survey Outcome Measurement and Treatment Practices in Aphasia. *Am J Speech Lang Pathol.* 2022;31(3):1133-1162. doi:10.1044/2021_AJSLP-21-00101
15. Carragher M, Steel G, O'Halloran R, et al. Aphasia disrupts usual care: the stroke team's perceptions of delivering healthcare to patients with aphasia. *Disabil Rehabil.* 2021;43(21):3003-3014. doi:10.1080/09638288.2020.1722264
16. Hinckley J, Jayes M. Person-centered care for people with aphasia: tools for shared decision-making. *Front Rehabil Sci.* 2023;4:1236534. doi:10.3389/fresc.2023.1236534
17. Carragher M, Steel G, O'Halloran R, et al. Aphasia disrupts usual care: "I'm not mad, I'm not deaf" – the experiences of individuals with aphasia and family members in hospital. *Disabil Rehabil.* 2024;46(25):6122-6133. doi:10.1080/09638288.2024.2324115
18. Trollor JN, Salomon C, Franklin C. Prescribing psychotropic drugs to adults with an intellectual disability. *Aust Prescr.* 2016;39(4):126-130. doi:10.18773/austprescr.2016.048
19. Deutsch SI, Burket JA. Psychotropic medication use for adults and older adults with intellectual disability; selective review, recommendations and future directions. *Prog Neuropsychopharmacol Biol Psychiatry.* 2021;104:110017. doi:10.1016/j.pnpbp.2020.110017
20. Bartlett G, Blais R, Tamblyn R, Clermont RJ, MacGibbon B. Impact of patient communication problems on the risk of preventable adverse events in acute care settings. *Can Med Assoc J.* 2008;178(12):1555-1562. doi:10.1503/cmaj.070690
21. Voss EA, Makadia R, Matcho A, et al. Feasibility and utility of applications of the common data model to multiple, disparate observational health databases. *J Am Med Inform Assoc.* 2015;22(3):553-564. doi:10.1093/jamia/ocu023
22. Overhage JM, Ryan PB, Reich CG, Hartzema AG, Stang PE. Validation of a common data model for active safety surveillance research. *J Am Med Inform Assoc.* 2012;19(1):54-60. doi:10.1136/amiajnl-2011-000376
23. Rao G. PhenotypeLibrary: The OHDSI Phenotype Library. 2025. https://ohdsi.github.io/PhenotypeLibrary/
24. Charlson M, Szatrowski TP, Peterson J, Gold J. Validation of a combined comorbidity index. *J Clin Epidemiol.* 1994;47(11):1245-1251. doi:10.1016/0895-4356(94)90129-5
25. Harms SL, Eberly LE, Garrard JM, Hardie NA, Bland PC, Leppik IE. Prevalence of Appropriate and Problematic Antiepileptic Combination Therapy in Older People in the Nursing Home. *J Am Geriatr Soc.* 2005;53(6):1023-1028. doi:10.1111/j.1532-5415.2005.53323.x
26. Peng M, Southern DA, Williamson T, Quan H. Under-coding of secondary conditions in coded hospital health data: Impact of co-existing conditions, death status and number of codes in a record. *Health Informatics J.* 2017;23(4):260-267. doi:10.1177/1460458216647089
27. Doktorchik C, Patten S, Eastwood C, et al. Validation of a case definition for depression in administrative data against primary chart data as a reference standard. *BMC Psychiatry.* 2019;19(1):9. doi:10.1186/s12888-018-1990-6