Missed opportunities for pharmacist intervention among Medicare Fee-for-Service beneficiaries with myasthenia gravis: A real-world claims analysis

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Introduction

- Myasthenia gravis (MG) is a rare, chronic, autoimmune neuromuscular disorder characterized by fluctuating skeletal muscle weakness, with rising prevalence in the United States (US), particularly among older adults[1–4]
- Management is complex, involving combinations of acetylcholinesterase inhibitors (AChEIs), corticosteroids, non-steroidal immunosuppressive therapy (NSISTs), and biologics[2,5]
- Care challenges include diagnostic delays, suboptimal treatment, and fragmented care across healthcare settings[5]
- Real-world evidence indicates that approximately one in three patients with MG remain suboptimally treated, highlighting opportunities for pharmacists to support evidence-based management[6]

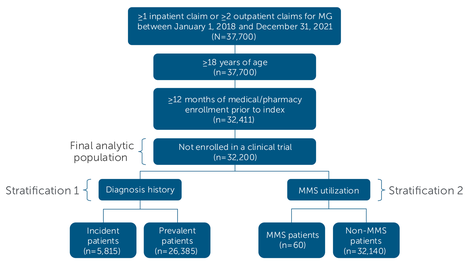
Objectives

- **Primary:** Describe pharmacist interactions among Medicare Fee-for-Service (FFS) beneficiaries with MG, using documented medication management services (MMS; medication therapy management [MTM] or evaluation and management [E/M] encounters) and prescription fills as proxies
- **Secondary:** Identify patient characteristics (demographics, clinical profiles, and prescription patterns) associated with pharmacist interactions
- **Exploratory:** Evaluate pharmacy-administered vaccinations (influenza or coronavirus disease 2019 [COVID-19]) during follow-up as an additional indicator of pharmacist engagement

Methods

- A retrospective observational cohort study was conducted using de-identified patient-level medical/pharmacy claims from 100% Medicare FFS data
- The **index date** was the first inpatient medical claim for MG (ICD-10-CM: G70.00, G70.01) during the identification period or first outpatient medical claim for MG (ICD-10-CM) during the identification period with a confirmatory second claim 90–180 days later
- **Study periods:** Overall (January 1, 2017 to December 31, 2022); identification (January 1, 2018 to December 31, 2021); baseline (12 months prior to index date); follow-up (index date until disenrollment, death, or December 31, 2022)
- **Statistical analyses:** Descriptive analyses were conducted to evaluate baseline characteristics and outcomes
- **Statistical model:** Multivariable zero-inflated negative binomial models were used to assess factors associated with total pharmacist interactions, adjusting for demographics and comorbidities

Figure 1 Patient selection and attrition



Cohorts were stratified by diagnosis history (incident MG: no MG-related diagnoses, procedures, or treatments during baseline; prevalent MG: evidence of MG-related diagnoses, procedures, or treatments during baseline) and MMS use (MMS: ≥1 pharmacist interaction via MTM [Current Procedural Terminology 99605–99607] or E/M codes [99213, 99214]; non-MMS: no pharmacist interactions identified via MTM or E/M codes during follow-up).

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Abbreviations: AChEI, acetylcholinesterase inhibitor; COVID-19, coronavirus disease 2019; ECI, Elixhauser Comorbidity Index; E/M, evaluation and management; ESRD, end-stage renal disease; FFS, Fee-for-Service; IQR, interquartile range; MG, myasthenia gravis; MMS, medication management service; MTM, medication therapy management; NSIST, non-steroidal immunosuppressive therapy; PPPY, per patient per year; SD, standard deviation; US, United States.

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References: 1. Narayanaswami P, et al. Neurology. 2021;96(3):114–122. 2. Alhaidar MK, et al. J Clin Med. 2022;11(6):1597. 3. Guo RJ, et al. Neurol Ther. 2022;11(1):73–86. 4 Dresser L, et al. J Clin Med. 2021;10(11):2235. 5. Mahic M, et al. Neurol Ther. 2022;11(4):1535–1551. 6. Thompson J, et al. Social determinants of health are associated with suboptimal treatment among individuals with myasthenia gravis [poster]. MGFA SS 2023. Poster 25.

Results

- The final analytic population included 32,200 patients (**Figure 1, Table 1**)
- Neurology and ophthalmology together accounted for nearly half of incident diagnoses (**Figure 2**)
- Prescription fills increased post-index for both incident and prevalent patients (**Figure 3**)
  - MG-related fills remained stable across both groups
- Frequent pharmacist intervention opportunities were observed post-index, reflected by prescription fill events (Part D; **Figure 4**)
  - Over the 24-month cumulative post-index period, prevalent patients averaged ~251 pharmacist encounters per patient (median 85; interquartile range [IQR] 533) vs ~135 among incident patients (median 128; IQR 244)
  - Over the 24-month cumulative post-index period, MG-related pharmacist encounters averaged ~108 per patient (median 107; IQR 190) for prevalent patients vs ~19 for incident patients (median 7; IQR 7)
  - These findings show wide variability, with averages in prevalent patients influenced by a subset of high utilizers
- Younger age (18–29 years) and older age (≥70 years), as well as higher comorbidity burden (Elixhauser Comorbidity Index [ECI] ≥11), disability-based Medicare eligibility, end-stage renal disease (ESRD), and Alzheimer's disease, were associated with higher total pharmacist interactions (**Figure 5**)
  - Eligibility for a Low-Income Subsidy was associated with substantially higher total pharmacist interaction, while dual eligibility (Medicare and Medicaid) was associated with lower total pharmacist interaction
  - Prescriptions from inpatient settings (vs neurology) were associated with higher total pharmacist interaction, whereas MMS was associated with lower total pharmacist interaction

Table 1 Patient characteristics

Age, n (%)	18–59 years	**2,207** (6.9)
	60–69 years	**5,607** (17.4)
	70–79 years	**14,520** (45.1)
	≥80 years	**9,866** (30.6)
Sex, n (%)	Male	**16,713** (51.9)
	Female	**15,487** (48.1)
Race/ethnicity, n (%)	Asian	**330** (1.0)
	Hispanic/Latino	**389** (1.2)
	White	**28,709** (89.2)
	Black	**1,744** (5.4)
	Other/unknown	**1,028** (3.2)
US geographic region, n (%)	Northeast	**6,513** (20.2)
	Midwest	**7,470** (23.2)
	South	**13,061** (40.6)
	West	**5,127** (15.9)
	US territory/unknown	**29** (0.1)
Original reason for Medicare benefits, n (%)	Age	**24,877** (77.3)
	Disability	**7,266** (22.6)
	ESRD	**27** (0.1)
	Unknown	**30** (0.1)
Dual eligibility for Medicare and Medicaid, n (%)	Full	**3,727** (11.6)
	Null	**27,061** (84.0)
	Partial	**1,412** (4.4)
Eligible for Part D Low-Income Subsidy, n (%)	Full	**5,298** (16.5)
	Null	**26,155** (81.2)
	Partial	**747** (2.3)
ECI score, mean (standard deviation [SD])		**6.5** (5.6)
Most common comorbidities, n (%)	Hypertension	**23,931** (74.3)
	Diabetes	**11,010** (34.2)
	Chronic pulmonary disease	**8,503** (26.4)

n=32,200. Demographics evaluated on index date. ECI and comorbidities evaluated during the baseline period.

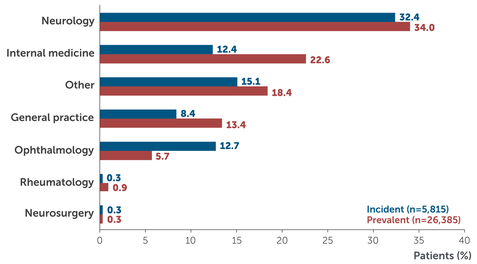
Unique MG therapy classes filled at baseline and post-index: Incident vs prevalent patients

- Corticosteroids and NSISTs remained the most frequently filled MG therapy classes
- In the post-index period, prevalent patients filled more MG therapy classes on average than incident patients (e.g., NSISTs: 1.8 vs 1.0 per patient per year [PPPY]; oral prednisone: 3.1 vs 2.1 PPPY; intravenous immunoglobulin: 1.7 vs 0.6 PPPY), illustrating more frequent pharmacy engagement and highlighting opportunities for MMS in MG

Vaccinations

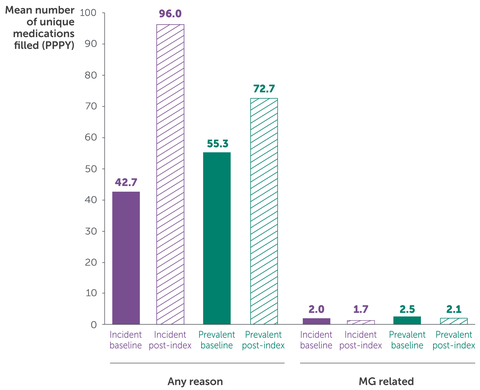
- Overall, 73.9% of patients received at least one influenza or COVID-19 vaccination post-index
- Higher vaccination rates were observed among incident patients (77.1%) than prevalent patients (73.2%), and patients with MMS use (76.7%) vs those without MMS use (73.9%)

Figure 2 Provider specialty at MG index date for incident and prevalent cases



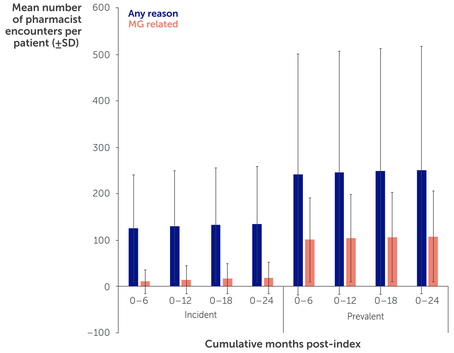
Provider specialty assessed at index date using taxonomy codes. 'Internal medicine' reflects adult-focused internists; 'general practice' reflects broad-scope primary care; 'other' includes hospitalists and multispecialty groups. Percentages may not sum to 100% due to rounding or missing data.

Figure 3 Unique medication fill encounters among incident and prevalent patients with MG



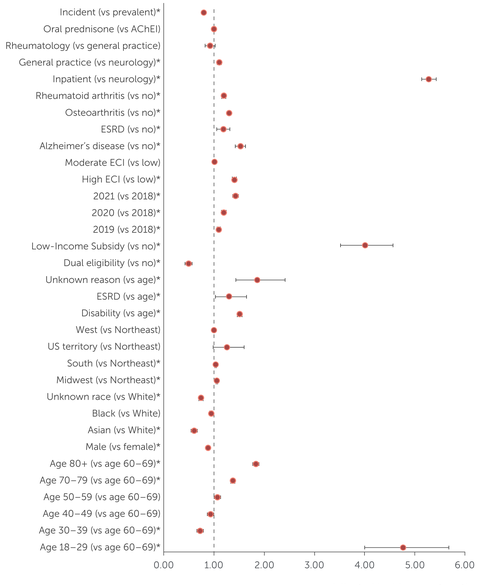
Incident (n=5,815) and prevalent (n=26,385) patients; based on Medicare Part D claims – does not include physician-administered drugs (Part B); unique medication fill encounters were defined as fills counted once per date, regardless of the number of medications dispensed – each date could include more than one medication.

Figure 4 Pharmacist intervention opportunities



Incident (n=5,815) and prevalent (n=26,385) patients; based on Medicare Part D claims. Pharmacist encounters were defined as unique prescription fill dates per patient; multiple medications filled on the same day were counted as a single encounter.

Figure 5 Factors associated with total pharmacist interactions in MG



Total utilization is defined as the sum of: (1) pharmacy fills (unique fill dates), (2) MMS (MTM or E/M encounters), and (3) pharmacy-administered flu or COVID-19 vaccinations. Components are not mutually exclusive; utilization assessed through end of follow-up. *p<0.05.

Summary and conclusions

- Among Medicare beneficiaries with MG, cumulative prescription fills indicated frequent pharmacy interactions, highlighting multiple opportunities for pharmacist intervention and MMS
- Pharmacy-administered MMS were infrequently captured in claims, suggesting coding limitations rather than absence of pharmacist involvement, and indicating missed opportunities for optimized therapy and care coordination
- Pharmacy-administered vaccination patterns revealed high utilization of pharmacist services for preventive care immunizations, underscoring the potential for pharmacists to meet complement inhibitor meningococcal vaccination requirements
- Populations with higher pharmacist interaction frequencies, often those with polypharmacy and greater clinical complexity, may reflect greater disease burden and need for pharmacist support in medication optimization and safety monitoring
- Pharmacists can play a key role in MG management and preventive care, providing immunizations, medication reviews, adherence counseling, and patient education. Their accessibility and integration into care teams can support medication optimization, enhance adherence, and improve outcomes in patients with complex, multidrug regimens
- Overall, these findings point to opportunities to expand the role of pharmacist involvement in this medically complex population in supporting care coordination, required vaccination administration, medication adherence, and safety in MG

Limitations

- Claims data are generated for billing, not research, and may underreport diagnoses or services not linked to reimbursement
- Part B administered drugs (e.g., infusions) are not captured in Part D, leading to possible underestimation of treatment
- Results are limited to Medicare FFS, which primarily covers older adults and those with disabilities, limiting generalizability
- MMS was included as a covariate in multivariable models to adjust for potential confounding; however, very few patients had MMS identified in claims, and results may reflect under-capture rather than true differences

These data were previously presented at the American Society of Health-System Pharmacists (ASHP) Midyear Clinical Meeting 2025, Las Vegas, NV, USA; December 7–10, 2025.