Treatment and Care Management, Clinical Outcomes and Mobility Impairment in People With or Without MS Aged ≥50 Years: Observational 6-Year Analysis

L. Freeman,[1] A. Lucas,[1] J. Zhou,[2] B. Hayward,[2] T. Livingston[2]

[1]Dell Medical School, The University of Texas at Austin, Austin, TX, US; [2]EMD Serono, Inc., Rockland, MA, USA (an affiliate of Merck KGaA, Darmstadt, Germany)

SUMMARY

Since an increasing proportion of people with MS are older, an important step in improving care in this population involves determining the differences in clinical profiles, care management, and healthcare utilization

The objective of this study was to characterize infections, mobility impairment, and healthcare service utilization in adults with MS ≥50 years of age compared with a cohort of adults without MS ≥50 years of age from the general population

Compared with people without MS ≥50 years of age, people with MS ≥50 years of age showed higher rates of infections and similar rates of malignancies

Those with MS showed a significantly shorter time to cane/walker and wheelchair use, and a significantly higher utilization of skilled nursing facilities and MRIs compared with older adults without MS

Reference: 1. Wallin MT, et al. Neurology. 2019;92(10):e1029-e1040

DISCLOSURES & ACKNOWLEDGMENTS

Abbreviations: CCI, Charlson Comorbidity Index; **CI,** confidence interval; **DMD,** disease-modifying drug; **HR,** hazard ratio; **ICD9, ICD10,** international classification of diseases 9th or 10th revision; **MRI,** magnetic resonance imaging; **MS,** multiple sclerosis; **OR,** odds ratio; **RR,** rate ratio; **SD,** standard deviation; **SNF,** skilled nursing facilities

Reference: 1. Wallin MT, et al. *Neurology*. 2019;92(10):e1029-e1040

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BACKGROUND

- Although MS is often described as a disease of young adults, a recent study conducted by the National Multiple Sclerosis Society showed that, in the US, people living with MS have a median age of 52 years[1]

- Younger and older people with MS are likely to have different disease treatment and care management patterns due to age-related comorbidities, longer disease duration, and accumulated disability. As an increasing proportion of people with MS are older, improving care specifically in this population will require further study, and thus far limited data are available. An important step in improving care involves determining the differences in clinical profiles, care management, and healthcare utilization between older people with MS and those without

Reference: 1. Wallin MT, et al. *Neurology*. 2019;92(10):e1029-e1040

OBJECTIVE

- To characterize infections, mobility impairment, and healthcare service utilization patterns in people with MS ≥50 years of age (MS≥50) compared with a cohort of people without MS ≥50 years of age (no-MS≥50) from the general population in order to explore differences between these two groups

METHODS

- Administrative US claims data from Truven Health MarketScan® Commercial and Medicare Databases 2011-2017 were analyzed

- Adults with MS included 3-MS diagnoses (ICD9/10 340/G35) OR 1 MS diagnosis + 1 DMD within 1-year of each other, AND 1st diagnosis or DMD in 2012 as index; continuous enrollment 1-year pre-index (baseline), and ≥3 years follow-up; aged ≥50. Adults without MS included those continuously enrolled from 2011 to minimum 2015, up to 2017, aged ≥50 and never diagnosed with MS, using July 1st 2012 as index for baseline characteristics

- A 1:1 matched cohort was created using propensity scores calculated from baseline covariates (age, sex, region, health plan and comorbidities)

- Multivariable models were used to compare infection and malignancy rates, treatment and care patterns including utilization of MRI, skilled nursing facilities (SNF), and mobility aids (use of cane/walker or wheelchair) between matched MS≥50 and no-MS≥50 groups

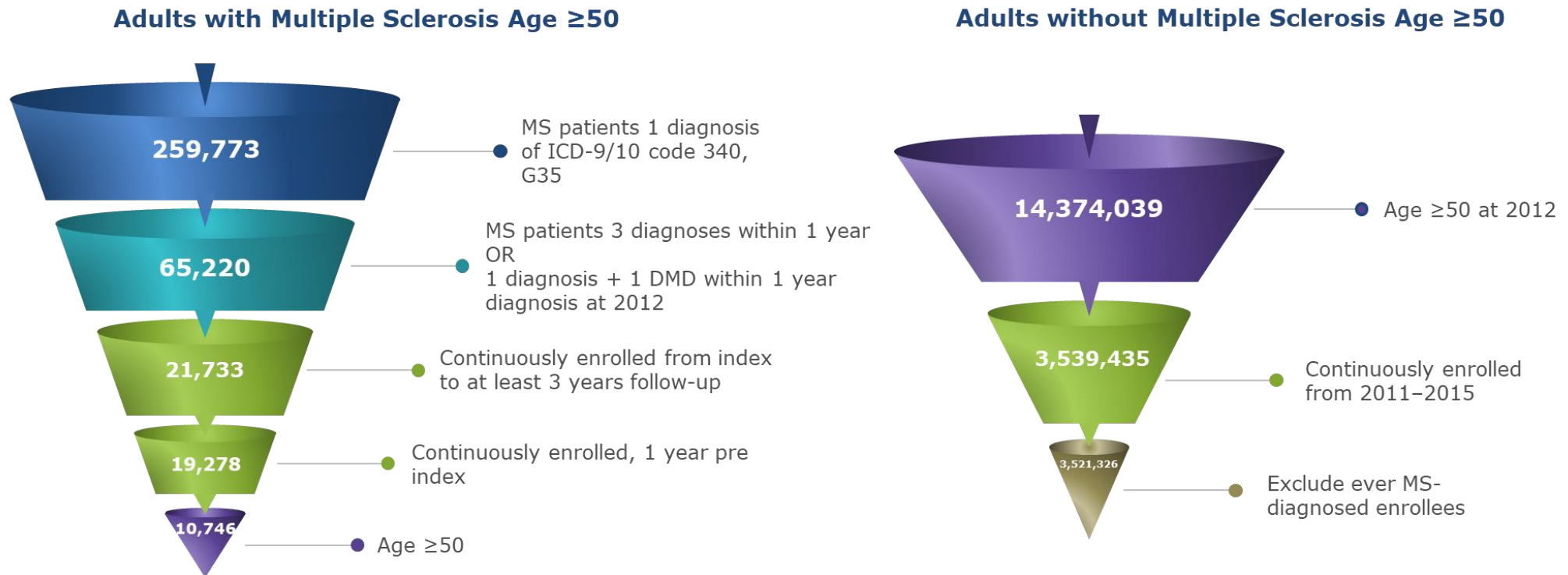**Reference: 1.** Wallin MT, et al. *Neurology*. 2019;92(10):e1029-e1040

Patients

- Inclusion criteria were met by 10,746 MS≥50 and 3,521,326 no-MS≥50 (10,746 matched to MS≥50) (**Figure 1**) and the mean duration of follow-up was 5 years

Figure 1. Population selection*

Adults with Multiple Sclerosis Age ≥50

Adults without Multiple Sclerosis Age ≥50

Adults with Multiple Sclerosis Age ≥50:
- 259,773 — MS patients 1 diagnosis of ICD-9/10 code 340, G35
- 65,220 — MS patients 3 diagnoses within 1 year OR 1 diagnosis + 1 DMD within 1 year diagnosis at 2012
- 21,733 — Continuously enrolled from index to at least 3 years follow-up
- 19,278 — Continuously enrolled, 1 year pre index
- 10,746 — Age ≥50

Adults without Multiple Sclerosis Age ≥50:
- 14,374,039 — Age ≥50 at 2012
- 3,539,435 — Continuously enrolled from 2011–2015
- 3,521,326 — Exclude ever MS-diagnosed enrollees

*Enrolled 2011-2017, Commercial and Medicare

Patients

- 10,746 matched pairs were analyzed. After matching, both patient cohorts had similar baseline characteristics (**Table 1**)

Table 1. Baseline characteristics

Baseline	All no-MS≥50	Matched no-MS≥50*	MS≥50*
N	3,521,326	10,746	10,746
Age, mean (SD, 95% CI)	61.8 (10.1, 61.8-61.8)	58.6 (6.6, 58.5-58.7)	58.4 (6.6, 58.3-58.5)
Sex, female, n (%)	1,912,689 (54.3%)	8,229 (76.6%)	8,229 (76.6%)
CCI score, mean (SD, 95% CI)	0.16 (0.44, 0.16-0.16)	0.19 (0.50, 0.18-0.20)	0.18 (0.46, 0.17-0.19)
CCI group, n (%)			
0	3,039,564 (86.3%)	9,062 (84.3%)	9,106 (84.7%)
1	407,509 (11.6%)	1,391 (12.9%)	1,391, (12.9%)
2	62,211 (1.8%)	208 (1.9%)	208 (1.9%)
3+	12,042 (0.3%)	85 (0.8%)	41 (0.4%)
Region, n (%)			
Northeast region	746,832 (21.2%)	3,002 (27.9%)	2,890 (26.9%)
North Central region	925,829 (26.3%)	3,159 (29.4%)	3,161 (29.4%)
South region	1,399,137 (39.7%)	3,266 (30.4%)	3,329 (31.0%)
West region	445,493 (12.7%)	1,314 (12.2%)	1,359 (12.6%)
Unknown region	4,035 (0.1%)	5 (<0.1%)	7 (0.1%)

*Improvement in balance after matching was confirmed with standardized mean differences of <0.1 for each covariate

Infections and malignancy

- A higher proportion of those in the MS≥50 group had infections compared with no-MS≥50 (61.5% vs. 45.2%, respectively, P<0.0001), however having MS showed no significant association with the odds of developing a malignancy (**Figure 2a**)
- The mean yearly infection rate during the covered period (0.74 vs. 0.25 per person per year, respectively, P<0.0001) was significantly greater in the MS≥50 group (**Figure 2b**)
- The incidence of the 3 top reported infections in the MS≥50 group compared with the no-MS≥50 group were: urinary tract infection 39.8% vs. 18.8%, acute upper respiratory infection 24.6% vs. 24.4% and herpes zoster 7.0% vs. 4.1%, respectively

2a. Proportion of infections and malignancies
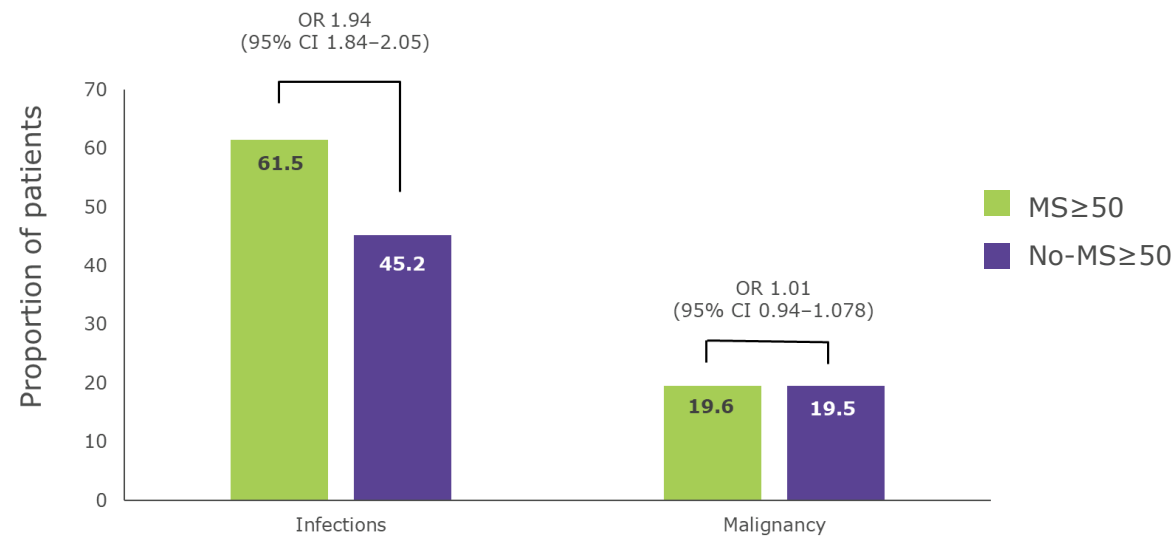
2b. Infection rate
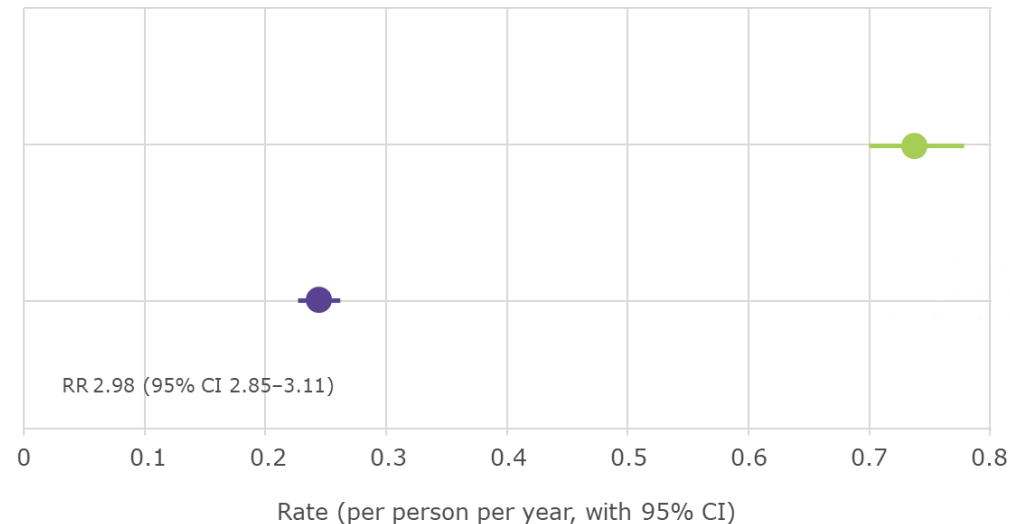
Clinical outcomes

- Compared with those in the no-MS≥50 group, the MS≥50 group showed a significantly shorter time to cane/walker use and wheelchair use (**Figure 3**)
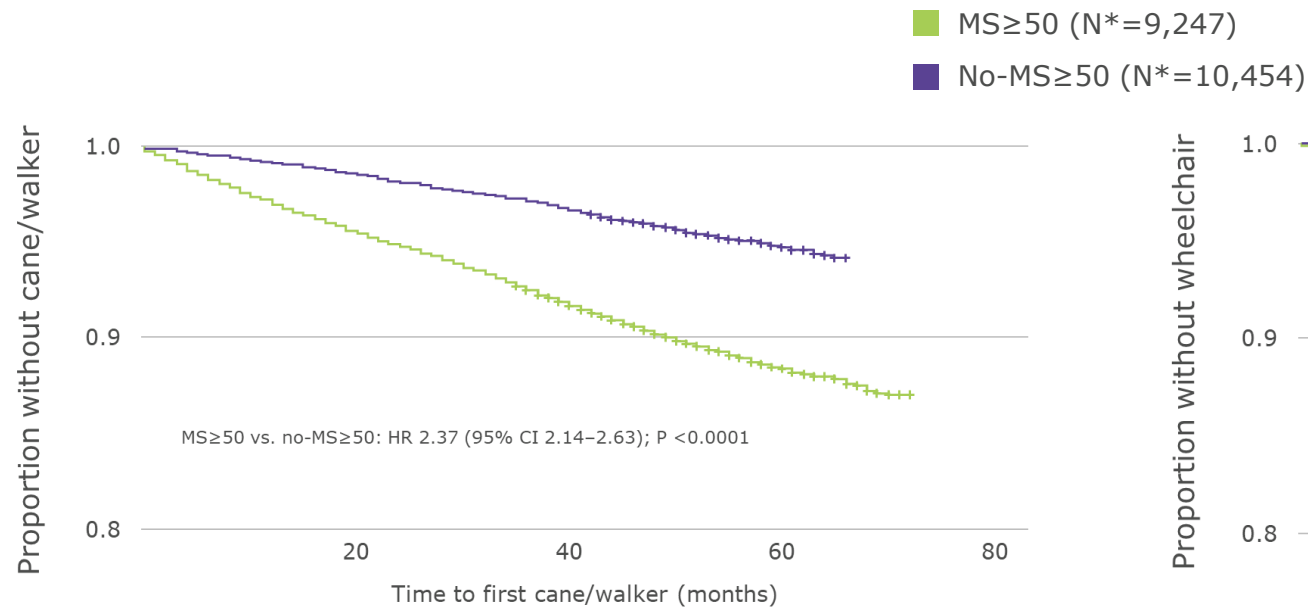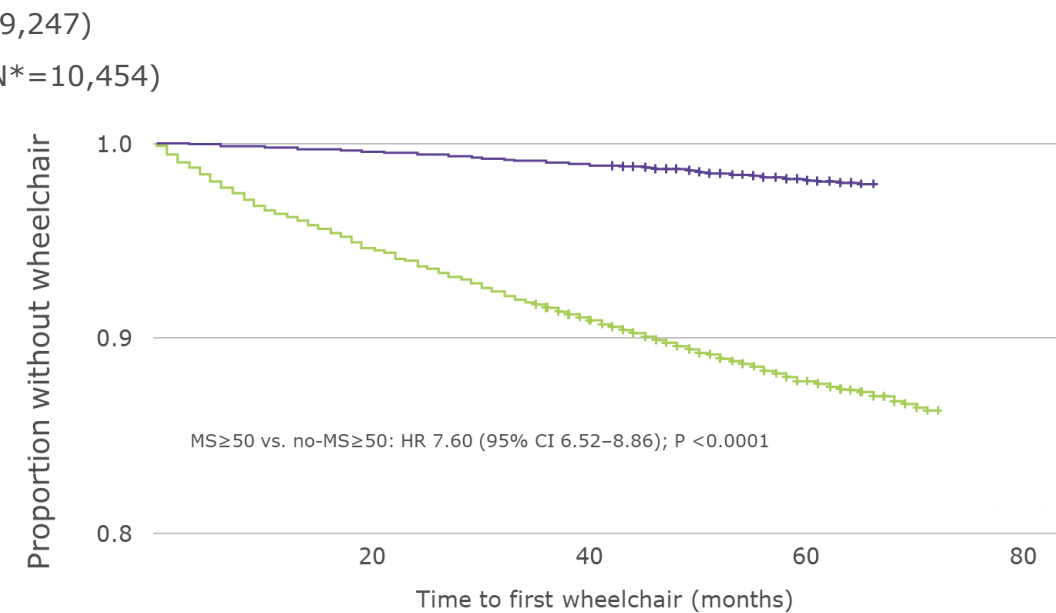
Figure 3a. Time to cane/walker use

Figure 3b. Time to wheelchair use

■ MS≥50 (N*=9,247)
■ No-MS≥50 (N*=10,454)

MS≥50 vs. no-MS≥50: HR 2.37 (95% CI 2.14–2.63); P <0.0001

Time to first cane/walker (months)

| No-MS≥50 | 10454 | 10313 | 10123 | 6165 | 0 |
| MS≥50 | 9247 | 8845 | 8291 | 5452 | 0 |

MS≥50 vs. no-MS≥50: HR 7.60 (95% CI 6.52–8.86); P <0.0001

Time to first wheelchair (months)

| No-MS≥50 | 10454 | 10413 | 10345 | 6384 | 0 |
| MS≥50 | 9247 | 8758 | 8229 | 5446 | 0 |

*Subjects with cane/walker or wheelchair use at baseline were excluded

## Healthcare service utilization

- Compared with the no-MS≥50 group, a higher proportion of the MS≥50 group experienced SNF use (12.1% vs. 3.5%) and MRI use (86.9% vs. 37.2%; **Figure 4a**)
- In the MS≥50 group the most frequent type of MRIs reported were 82.2% for brain MRIs and 61.8% for spine MRIs during the covered period

- Yearly rates of SNF use (0.66 vs. 0.10 per person per year, respectively) and MRI use (0.68 vs. 0.16 per person per year, respectively) were significantly greater for those in the MS≥50 group compared with the no-MS≥50 group (**Figure 4b,** both P<0.0001)

4a. Proportion of SNF or MRI use
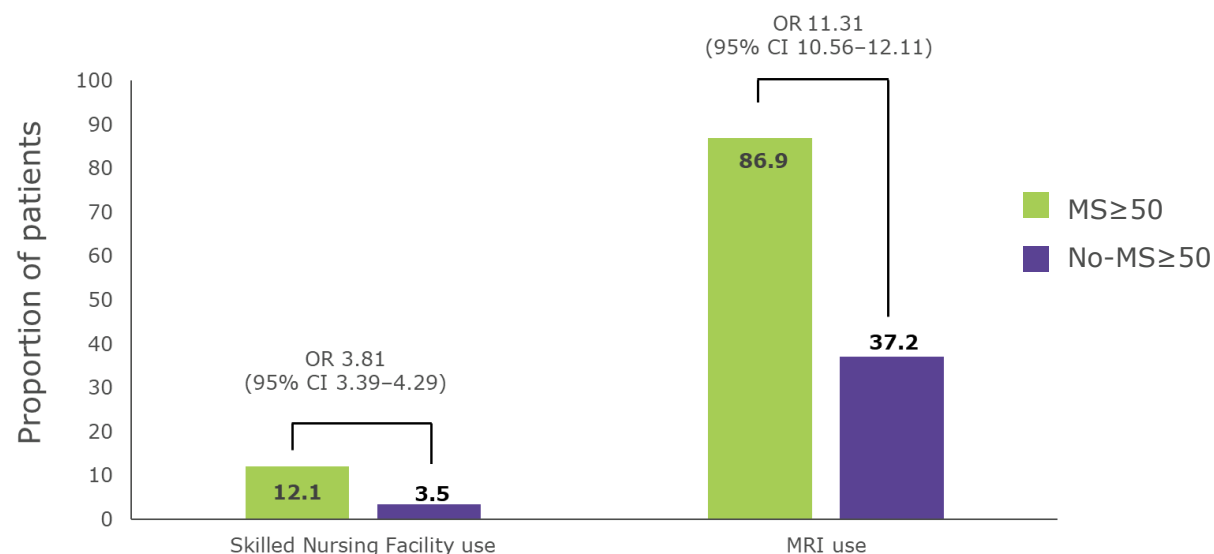
4b. Rate of SNF or MRI use
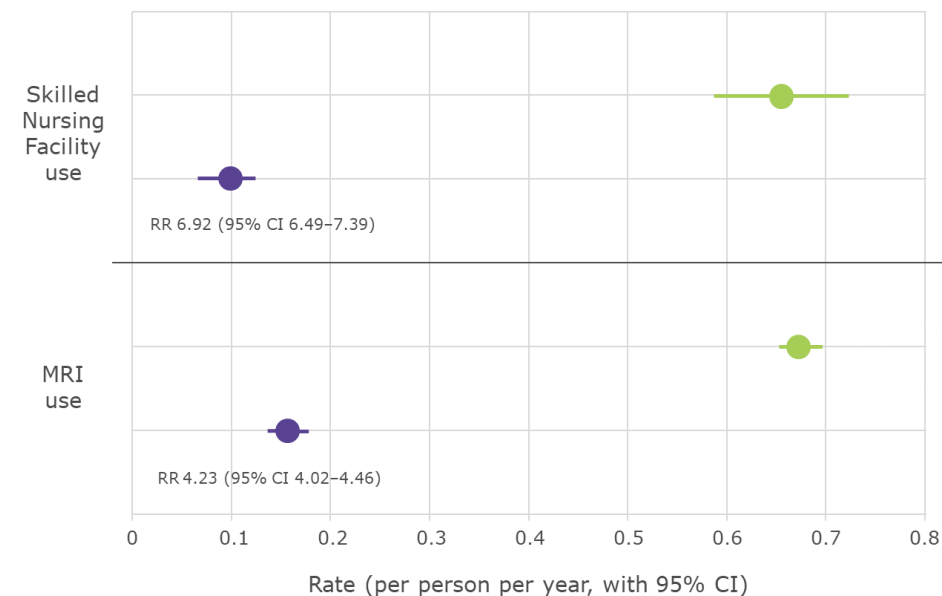
Reference: 1. Wallin MT, et al. *Neurology*. 2019;92(10):e1029-e1040

- Compared with people without MS ≥50 years of age, **people with MS ≥50 years of age showed higher rates of infections** (driven by increased urinary tract infections and herpes zoster infections; the rates of acute upper respiratory infections were similar) **and similar rates of malignancies**

- A **higher proportion of adults with MS ≥50 years of age had used skilled nursing facilities** compared with older adults without MS. Those with MS showed a **significantly shorter time to cane/walker and wheelchair use**, all of which are surrogates for disability progression

- A **higher proportion of adults with MS ≥50 years of age had MRIs performed** compared with older adults without MS, which is expected as MRIs are utilized to monitor disease progression and treatment response in patients with MS

- More complete characterization of healthcare service utilization and clinical outcomes of older adults with MS, in comparison with those without MS, can provide insight into optimizing care in this population