

# Rates of comorbidities in patients with and without multiple sclerosis: a US retrospective claims database analysis

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## INTRODUCTION

- Emerging evidence suggests that comorbidities in multiple sclerosis (MS) are associated with delays in the diagnosis of MS,<sup>1</sup> increased rates of disability progression,<sup>2</sup> and decreased health-related quality of life.<sup>3</sup>
- Some therapies for MS may be contraindicated when certain comorbidities are present, or may increase the risk of comorbidity, resulting in difficult treatment decisions for patients and physicians.<sup>4</sup>
- Despite the relevance of comorbidity to MS treatment and outcomes, large population-based studies that describe the prevalence of comorbidities in patients with MS in the US are lacking.<sup>5</sup>

## OBJECTIVE

- To compare the prevalence of comorbidities in patients with and without MS using data from a large US administrative claims database.

## METHODS

- This retrospective administrative claims database study used IMS Health Real World Data Adjudicated Claims – US data from between January 1, 2011 and September 30, 2015.
  - Approximately 150 million patients with a medical benefit, and a subset of 95 million patients with both medical and pharmacy benefits, are included in the database.
- Patients with MS, aged 18–65 years, were required to have ≥2 claims with a diagnosis of MS (International Classification of Diseases, Ninth Revision, Clinical Modification [ICD-9-CM] code: 340.xx) that were ≥30 days apart.
- Exact matching was used to match patients with MS 1:1 to the pool of patients without MS (zero claims of MS) by age group (5-year intervals), sex, geographic region, and index year quarter.
- The index date for patients with MS was the date of the second MS claim, and for patients without MS was the 366th day of continuous enrollment. One year of continuous eligibility was required for all patients.
- The prevalence of the 10 most common comorbidities in MS (based on a systematic review of the published literature by Marrie *et al.*)<sup>6</sup> and of the individual comorbidities included in the Charlson Comorbidity Index (CCI) were compared between patients with and without MS.
  - Statistical significance was assessed using pairwise chi-squared tests.

## RESULTS

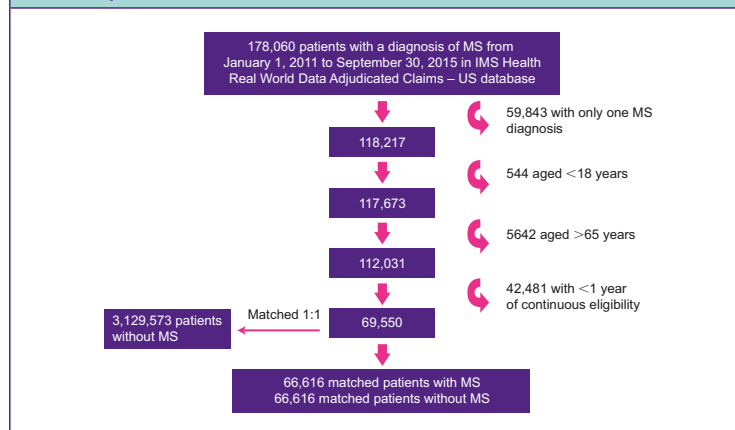
- A total of 69,550 eligible patients with MS were matched to the pool of 3,129,573 patients without MS, resulting in 66,616 matched patients in each cohort (Figure 1).
- In both matched cohorts, the mean age was approximately 46 years and approximately 76% of patients were female (Table 1).
- The majority of matched patients had commercial insurance (97.03% with MS and 95.43% without MS; Table 1).
  - Although healthcare coverage by Medicaid or Medicare was uncommon, matched patients with MS used Medicare nearly twice as often as matched patients without MS (0.89% vs 0.46%, respectively). Conversely, matched patients without MS used Medicaid nearly twice as often as matched patients with MS (4.11% vs 2.07%, respectively).
- Of the 10 most common MS comorbidities, eight occurred significantly more frequently (p<0.0001) in patients with MS than in patients without MS (Figure 2).
- Of the 17 comorbidities included in the CCI, more than two-thirds (n=15; 88%) were significantly more common (p<0.05) in patients with MS than in those without MS (Figure 3).
  - The mean (standard deviation [SD]) CCI score was statistically significantly higher in patients with MS (0.46 [1.02]) than in those without MS (0.31 [0.87]) (p<0.0001). The median was 0 for both cohorts.

Table 1. Baseline demographic characteristics of matched cohorts of patients with and without MS

	Patients with MS (n=66,616)	Patients without MS (n=66,616)
Age, years		
Mean (SD)	45.63 (10.43)	45.59 (10.50)
Median	47	47
Age group, years, n (%)		
18–22	1188 (1.78)	1188 (1.78)
23–27	2501 (3.75)	2501 (3.75)
28–32	4913 (7.38)	4913 (7.38)
33–37	6753 (10.14)	6753 (10.14)
38–42	9071 (13.62)	9071 (13.62)
43–47	10,532 (15.81)	10,532 (15.81)
48–52	11,644 (17.48)	11,644 (17.48)
53–57	10,967 (16.46)	10,967 (16.46)
58–62	8079 (12.13)	8079 (12.13)
63–65	968 (1.45)	968 (1.45)
Female, n (%)	50,790 (76.24)	50,790 (76.24)
US region, n (%)		
Midwest	21,771 (32.68)	21,771 (32.68)
Northeast	18,382 (27.59)	18,382 (27.59)
South	20,296 (30.47)	20,296 (30.47)
West	6167 (9.26)	6167 (9.26)
Healthcare payer, n (%) <sup>a</sup>		
Commercial	64,640 (97.03)	63,572 (95.43)
Medicaid	1381 (2.07)	2735 (4.11)
Medicare	595 (0.89)	309 (0.46)

MS, multiple sclerosis; SD, standard deviation.  
<sup>a</sup>Due to rounding, percentages do not equal 100%.

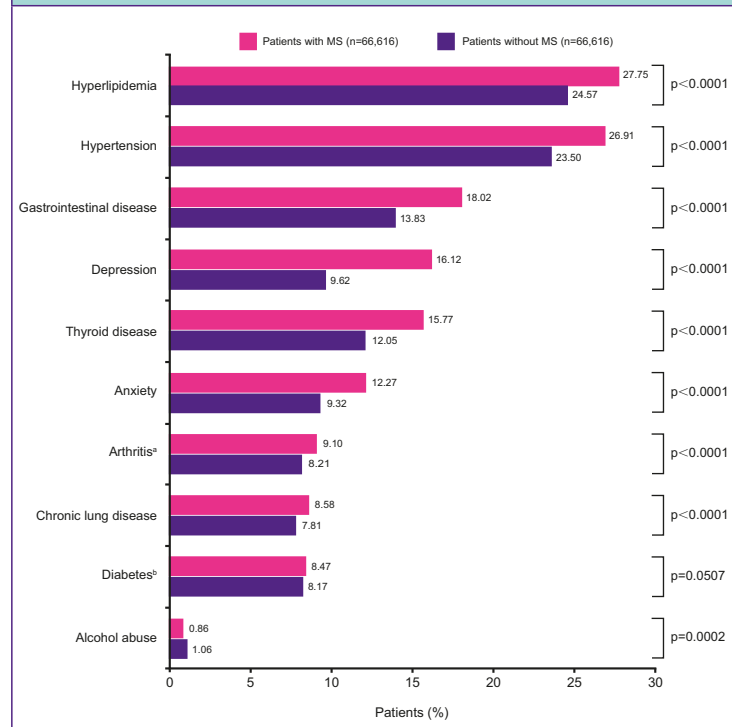
Figure 1. Matched cohort selection for the analysis of comorbidities in patients with and without MS



MS, multiple sclerosis.

- Patients with MS had a significantly lower prevalence of alcohol abuse (p<0.05; Figures 2), AIDS, mild liver disease, and moderate liver disease than patients without MS (p<0.05; Figure 3).
- No significant differences in prevalence between patients with and without MS were observed for type 1 and type 2 diabetes (Figure 2), diabetes without comorbidities and complications, and metastatic solid tumor (Figure 3).

Figure 2. Prevalence of the 10 most common comorbidities in MS in matched cohorts of patients with and without MS



MS, multiple sclerosis.  
 Statistical significance was assessed using pairwise chi-squared tests.  
<sup>a</sup>Rheumatoid arthritis or osteoarthritis.  
<sup>b</sup>Type 1 and type 2 diabetes.

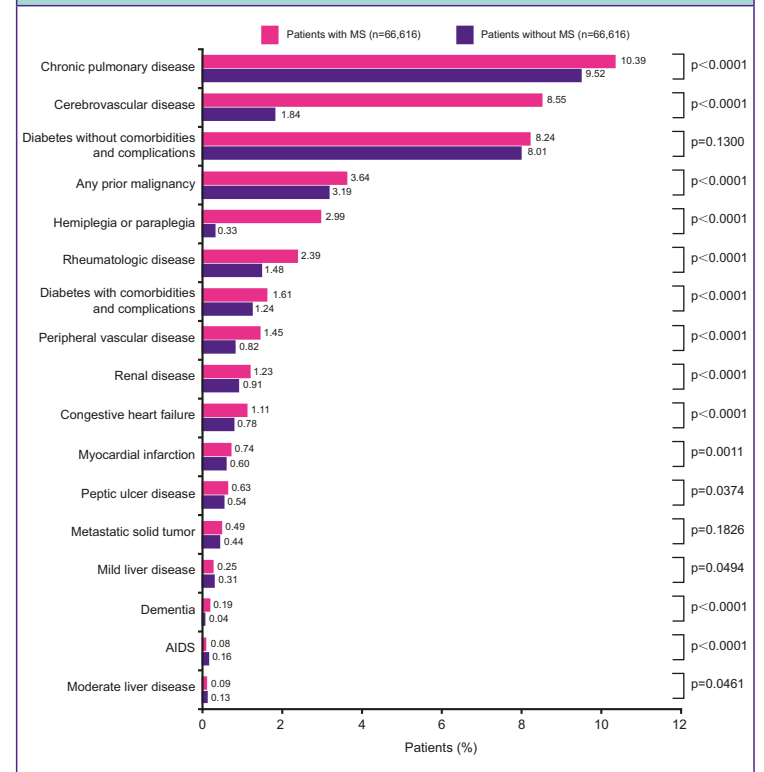
## LIMITATIONS

- Claims data are not specifically collected for research purposes and missing information may limit the inferences that can be made from the data.
- The ICD-9-CM code for MS does not differentiate between different types of MS (eg, primary progressive MS, relapsing–remitting MS, or secondary progressive MS).
- Administrative claims databases provide information on patients with health insurance administered by regional health plans in the US and results may not be generalizable to patients who self-pay or patients without employer-sponsored commercial health insurance.

## CONCLUSIONS

- In this study, several comorbidities, such as hyperlipidemia, hypertension, gastrointestinal disorders, and depression, were significantly more common among patients with MS compared with those without MS.
- These results may better inform physicians and patients about potential comorbidities in patients with MS and may also help guide treatment decisions.
- Administrative claims data can be a valuable resource for investigating a variety of health service research questions.

Figure 3. Prevalence of comorbidities included in the CCI in matched cohorts of patients with and without MS



Statistical significance was assessed using pairwise chi-squared tests.  
 AIDS, acquired immune deficiency syndrome; CCI, Charlson Comorbidity Index; MS, multiple sclerosis.

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## DISCLOSURES

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