

S06

The Impact of Multiple Sclerosis on Absenteeism

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Introduction

- Multiple sclerosis (MS) is an acquired inflammatory and immune-mediated disorder of the central nervous system characterized by inflammation, demyelination, and degeneration of axonal neurons. MS affects more than 2 million people worldwide, and estimates range from 350,000 to 440,000 patients in the United States.^{1,2}
- MS usually affects young adults between the ages of 20–40 years, with a female-to-male risk ratio between 1.5 and 3.6.^{3,4}
- Several studies have reported that people with MS have difficulty maintaining employment due to the disease.⁵
- Disease-modifying therapies (DMTs, immunomodulators) for MS aim to reduce the frequency and severity of relapses, delay disability, and postpone the onset of the progressive phase of the disease. Available DMTs include the following:
 - Interferon (IFN)
 - Intramuscular (IM) IFNβ-1a (Avonex®)
 - IFNβ-1b (Betaseron®)
 - Subcutaneous (SC) IFNβ-1a (Rebif®)
 - Glatiramer acetate (Copaxone®)
 - Natalizumab (Tysabri®)
- While efficacy data on the DMTs exist, limited objective data are available on the differences in lost time (absence) among employed individuals with MS.

Objective

- The objective of this study was to assess the objective differences in lost time (absence) among employees treated with DMTs for MS in a real-world setting.

Methods

- A retrospective analysis was performed on data (1/1/2001–6/30/2007) from the Human Capital Management Services (HCMS) Research Reference Database, consisting of approximately 550,000 employees representative of the US employed civilian labor force (2004).
- Employer payroll and disability insurance records were analyzed for work absences (including sick leave, short-term and long-term disability [STD and LTD], and workers' compensation [WC]).
- Distribution of work absences among the different leave types was also calculated.
- Anonymity of person-level data was maintained according to Health Insurance Portability and Accountability Act guidelines.
- Healthcare was provided through managed care plans contracted by respective employers.
- International Classification of Diseases–9 (ICD-9) codes were used to identify patients with MS (ICD-9 code of 340.XX).
- Patients with available prescription claims were assigned to therapy cohorts and followed for 1 year after their initial prescription (index date).

Statistical Analysis

- Demographic characteristics of the cohorts were compared using *t* tests for continuous variables and Chi-square tests for discrete variables. Differences were considered significant at $P < 0.05$.
- Two-part regression analysis was used to model the absence differences between the cohorts using separate regression models for days from each type of absence (sick leave, STD, LTD, WC).
- Absence days and indirect costs were adjusted using regression modeling, controlling for age, gender, exempt/nonexempt status (exempt employees are not paid on an hourly basis and are not paid for overtime work), full-time/part-time status, salary, and Charlson Comorbidity Index score.⁶
- Only employees eligible for each specific benefit were included in the regression models for that benefit.
- Lost days include all days from claims begun at some point during the year following the index date.

Results

- Records of 785 patients with MS (ICD-9 code of 340.XX) were extracted with 1 year of data beyond the employee's index date. Of these patients, 311 received a DMT:
 - Avonex (n=156; 50%)
 - Betaseron (n=55; 18%)
 - Copaxone (n=87; 28%)
 - Rebif (n=13; 4%)
- No eligible natalizumab patients were found in the data based on the study timeframe and 1-year follow-up inclusion criteria.
- Aside from small geographic differences, patients in the 4 treatment cohorts were similar demographically (Table 1), and all cohorts were mostly female (more than 60%).
- From the 311 patients with MS, a subset of those with absenteeism data was used to compare the annual absences (lost time) for the patients (Table 2).
 - Patients receiving Copaxone had more days of sick leave (7.18 vs 2.98 days, $P = 0.0101$) and STD (6.79 vs 1.84 days, $P = 0.0695$) than those receiving Avonex.
 - Patients receiving Avonex reported the least annual lost time due to sick leave and STD among the 4 DMTs (4.83 total days). Patients receiving Rebif had the highest sick leave and STD lost time (20.67 days), followed by those receiving Copaxone (13.97 days) and Betaseron (7.33 days).
 - Annual LTD absences were not significantly fewer for patients receiving Copaxone compared with those receiving Avonex (4.62 vs 6.51 days). The zero days of LTD for patients receiving Betaseron and Rebif were also not significantly different than those of patients receiving Avonex.
 - All other absence comparisons between the cohorts were not significant.

Table 1. Demographic Comparisons

Variable	Employees treated with:			
	Avonex (IM IFNβ-1a), mean (SE) or percent	Betaseron (IFNβ-1b), mean (SE) or percent	Copaxone (glatiramer acetate), mean (SE) or percent	Rebif (SC IFNβ-1a), mean (SE) or percent
n	156	55	87	13
Age, years at index date	41.48 (0.66)	41.42 (1.03)	39.63 (0.92)	36.90 (1.67)
Tenure, years at index date	9.79 (0.61)	8.80 (1.00)	7.01 ^a (0.71)	6.22 (1.63)
Annual salary, US dollars, at index date	61,796 (3385)	52,799 (3572)	58,039 (3366)	59,637 (10,921)
Female, %	62.2	61.8	63.2	69.2
Married, %	51.4	57.7	57.3	63.6
White, %	70.2	60.9	70.4	61.5
Black, %	14.0	15.2	5.6	0.0
Hispanic, %	5.3	10.9	7.0	15.4
Exempt, %	44.9	38.2	41.4	46.2
Full time, %	96.2	98.2	97.7	84.6 ^{b,c}
Charlson Index	0.224 (0.05)	0.200 (0.09)	0.115 (0.03)	0.154 (0.10)
Region, first digit of zip code, %				
0	17.9	9.1	13.8	0.0
1	14.7	7.3	9.2	0.0
2	15.4	20.0	9.2	15.4
3	14.1	12.7	11.5	0.0
4	5.1	3.6	2.3	0.0
5	0.0	1.8	4.6 ^a	7.7 ^a
6	6.4	9.1	2.3	7.7
7	14.7	14.5 ^b	27.6 ^a	46.2 ^{a,c}
8	3.8	9.1	9.2	7.7
9	7.7	12.7	10.3	15.4

^a $P < 0.05$ (vs Avonex [IM IFNβ-1a]); ^b $P < 0.05$ (vs Copaxone [glatiramer acetate]); ^c $P < 0.05$ (vs Betaseron [IFNβ-1b]). SE=standard error.

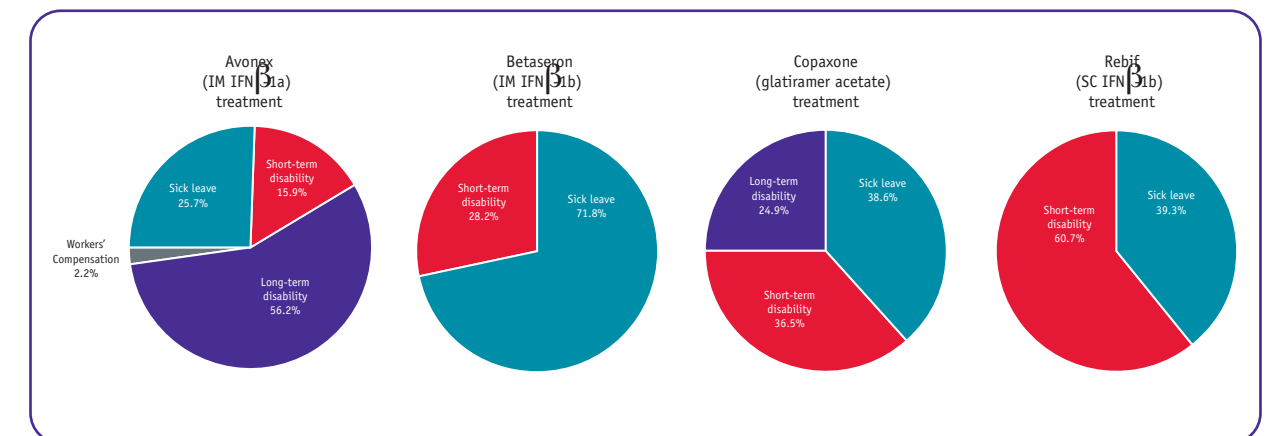
- On a percentage basis (Figure 1), the Avonex cohort had:
 - The smallest percentage of sick leave and STD days among all cohorts.
 - The largest percentage of LTD days among all cohorts.
 - The only WC absences.

Table 2. Annual Lost Time for Employees With Multiple Sclerosis by Treatment

Absence category	Employees with Avonex (IM IFNβ-1a) treatment		Employees with Betaseron (IFNβ-1b) treatment		Employees with Copaxone (glatiramer acetate) treatment		Employees with Rebif (SC IFNβ-1a) treatment	
	n	Adj mean days	n	Adj mean days	n	Adj mean days	n	Adj mean days
Sick leave	81	2.98	22	5.26	33	7.18 ^a	6	8.13
Short-term disability	84	1.84	32	2.07	48	6.79	11	12.54
Subtotal (SL+STD)		4.83		7.33		13.97		20.67
Long-term disability	110	6.51	44	0.00	70	4.62	10	0.00
Workers' compensation	139	0.25	49	0.00	74	0.00	11	0.00
Total		11.59		7.33		18.59		20.67

^a $P = 0.0101$ vs Avonex (IM IFNβ-1a).

Figure 1. Distribution of Lost Time Components by Disease-Modifying Therapy



Limitations

- While this study adds to the body of evidence about work absence levels among employees treated for MS, the study has the same limitations characteristic of database studies using administrative claims (ie, lack of severity classification, MS stage or type) and may not be representative of patients with MS who are not diagnosed, not treated, or not able to maintain employment.
- Furthermore, the small sample sizes in some of the cohorts suggest that results should be interpreted with caution.
- Despite such limitations, the study attempted to control for age, gender, employment status, and severity (using Charlson Comorbidity Index score) and thus represents an important addition to the literature.

References

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Conclusions

- Overall, these results suggest that among employees treated for MS with DMTs, patients receiving Avonex incurred the least sick leave and STD absence days compared with the other 3 DMTs.
- These differences in absence suggest that patients receiving Avonex may have higher productivity and lower disability than those treated with other interferons or glatiramer acetate for MS.
- Employees with MS who were treated with DMTs were able to maintain employment for more than a year, suggesting that appropriate management allows persons to consistently attend work and live a normal life.

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Multiple Sclerosis Cohort

N.L. Kleinman,² K. Rajagopalan,³ and A.K. ...
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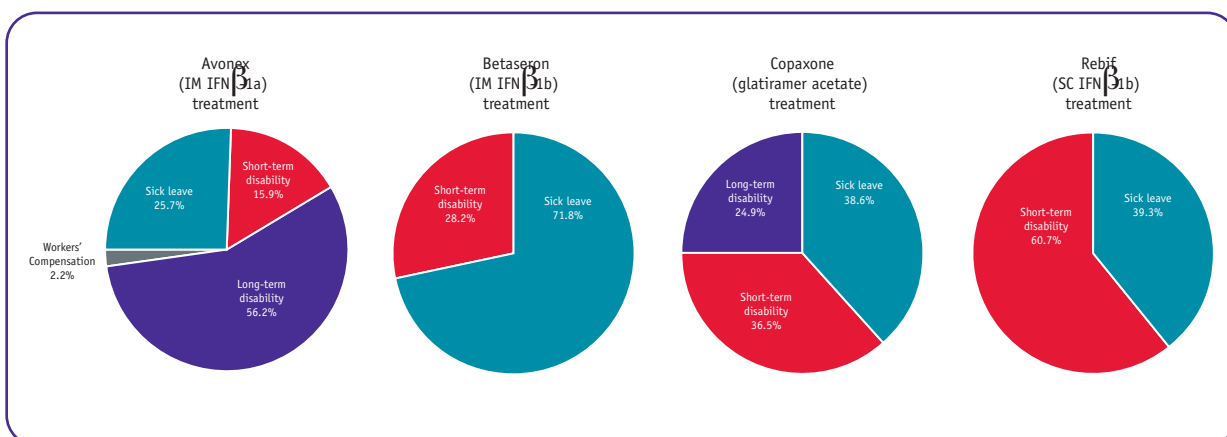
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