The Impact of Multiple Sclerosis onAbsenteeism
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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 axial neurons. MS affects more than 2 million people worldwide, and estimates range from 350,000 to 440,000 patients in the United States.4
MS usually affects young adults between the ages of 20–40 years, with a frank-to-mild rate ratio between 1.5 and 3.6.5
Several studies have reported that people with MS have difficulty maintaining employment due to the disease.6

Methods
A retrospective analysis was performed on data (1/1/2001–1/31/2007) from the Human Capital Management Services (HCMS) Research Reference Database, consisting of approximately 350,000 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–4 (ICD-4) codes were used to identify patients with MS (ICD-10 code E07).

Patients with available prescription claims were assigned to therapy cohorts and followed for 1 year after their initial prescription (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 those patients, 311 received a DMT:

- A: Avonex (n=156; 50%)
- Betaseron (n=151; 48%)
- Copaxone (n=7; 2%)
- Rebif (n=1; 0.3%)

No eligible natalizumab patients were found in the data based on index date (0.05) (0.09) (0.03) (0.10)

- Employees with Avonex had more days of sick leave (7.18 vs 2.98 days, P<0.05) and STD (7.97 vs 1.86 days, P<0.005) than those receiving Copaxone. Employees receiving Avonex reported the least annual lost days (7.18 vs 2.98 days, P<0.005) than those receiving Copaxone.

- Employees receiving Avonex had the least annual lost STD days (20.67 days), followed by those receiving Rebif (9.78 days) and Betaseron (7.33 days).

- The largest percentage of LTD days among all cohorts. Employees treated with: (glatiramer acetate) (SC IFN-1a), (IFN-1a), (beta-1a), acetate), (SC IFN-1a), (IM IFN-1a) treatment

- Patients receiving Copaxone had more days of sick leave (7.18 vs 2.98 days, P<0.005) and STD (7.97 vs 1.86 days, P<0.005) than those receiving Avonex. Patients receiving Copaxone reported the least annual lost days due to sick leave and STD among the 4 DMTs (4.43 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 days were nonsignificantly fewer for patients receiving Copaxone compared with those receiving Avonex (6.62 vs 5.1 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.

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

Conclusions
Overall, these results suggest that among employees treated for MS with DMTs, patients receiving Avonex incurred the least sick leave and STD absences 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.

References

Funding for this study was provided by Biogen Idec, Inc.

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.

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). Absence days and indirect costs were adjusted using regression modeling, controlling for age, gender, exempt/non exempt 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.5

Only employees eligible for each specific benefit were included in the regression models for that benefit.

Limit days include all days from claims began at some point during the year following the index date.

Table 1. Demographic Comparisons

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

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

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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.1–3 MS usually affects young adults between the ages of 20–40 years, with a female-to-male ratio between 1.5 and 3.6.4 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) IFN-β1a (Rebif®) – Subcutaneous (SC) IFN-β1a (Rebif®) – Glatiramer acetate (Copaxone®) – Natalizumab (Tysabri®)

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 150,000 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])

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).

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 those patients, 311 received a DMT: – Anewix (n=156; 50%) – Betaseron (n=55; 18%) – Copaxone (n=87; 28%) – Rebif (n=31; 11%) No eligible natalizumab patients were found in the data based on the study timeframe and 3-year follow-up inclusion criteria.

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.

Objectives

1. To assess absences among patients treated with DMTs for MS with important MS

2. To assess absences among patients treated with DMTs for MS in a real-world setting

3. To assess absences among patients treated with DMTs for MS in a real-world setting

4. To assess absences among patients treated with DMTs for MS in a real-world setting

5. To assess absences among patients treated with DMTs for MS in a real-world setting

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Conclusion

Overall, these results suggest that among employees treated for MS with DMTs, patients receiving Anewix incurred the least sick leave and STD absence days compared with the other 3 DMTs. These differences in absence suggest that patients receiving Anewix may have higher productivity and lower disability days 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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MS usually affects young adults between the ages of 20–40 years, with a female-to-male risk ratio between 1.5 and 3.6:1. Several studies have reported that people with MS have difficulty maintaining employment due to the disease. A

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) IFN-β1a (Avonex®), Intranasal (IN) IFN-β1b (Betaseron®), Subcutaneous (SC) IFN-β1a (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 (1/1/2001–12/31/2003) from the Human Capital Management Services (HCMS) Research Reference Database, consisting of approximately 350,000 employees representative of the US employed civilian labor force (2004a). 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, and comorbid conditions (e.g., absence are not paid on an hourly basis and are not paid for overtime work), full-time/part-time status, race, and Charlson comorbidity index score.

Only employees eligible for each specific benefit were included in the regression models for that benefit.

Limitations

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 those 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=0.001) and STD (7.97 vs 1.86 days, P=0.006) than those receiving Avonex.

Patients receiving Copaxone reported the least annual lost time due to sick leave and STD among the 4 DMTs (4.83 vs 7.33 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 nonsignificantly fewer for patients receiving Copaxone compared with those receiving Avonex (6.42 vs 6.51 days). The zero days of LTD for patients receiving Betaseron and Rebif were not statistically different than those of patients receiving Copaxone.

All other absence comparisons between the cohorts were not significant.

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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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)).

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Healthcare was provided through managed care plans contracted by respective employers.

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MS usually affects young adults between the ages of 20–40 years, with a female-to-male risk ratio between 1.5 and 3.6.2

Several studies have reported that people with MS have difficulty maintaining employment due to the disease.3

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:

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- Avonex (n=156; 50%)
- Betaseron (n=87; 28%)
- Copaxone (n=71; 23%)
- 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). On a percentage basis (Figure 1), the Avonex cohort had:

- The smallest percentage of sick leave and STD days among all 4 treatment cohorts (4.62 vs 6.51 days).
- The smallest percentage of LTD days among all 4 treatment cohorts (4.62 vs 6.51 days).
- The smallest percentage of WC days among all 4 treatment cohorts (4.62 vs 6.51 days).

These differences in absence suggest that patients receiving Avonex compared with those receiving Copaxone or Rebif. These differences in absence levels among patients 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.

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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.

Table 1. Demographic Comparisons

<table>
<thead>
<tr>
<th></th>
<th>Employees with Avonex</th>
<th>Employees with Betaseron</th>
<th>Employees with Copaxone</th>
<th>Employees with Rebif</th>
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<tr>
<td>Gender, %</td>
<td>White</td>
<td>Black</td>
<td>Hispanic</td>
<td>Asian</td>
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<td></td>
<td>70.2</td>
<td>60.9</td>
<td>70.4</td>
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<td>Age, years at index date</td>
<td>41.4 (39.6, 44.5)</td>
<td>44.1 (42.1, 45.9)</td>
<td>41.3 (40.2, 41.8)</td>
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<td>Tenure, years at index date</td>
<td>9.0 (8.2, 9.7)</td>
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<tr>
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<td>8.8 (8.0, 9.5)</td>
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<td>8.7 (7.9, 9.5)</td>
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<td>Charlson Index</td>
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<td>Married, %</td>
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<td>Race, %</td>
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<td>Black</td>
<td>Hispanic</td>
<td>Asian</td>
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<td>60.9</td>
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<td></td>
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<td>20.6</td>
<td>15.4</td>
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<tr>
<td>Total</td>
<td>11.59</td>
<td>7.33</td>
<td>18.59</td>
<td>20.67</td>
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Table 2. Annual Lost Time for Employees With Multiple Sclerosis by Treatment

<table>
<thead>
<tr>
<th></th>
<th>Avonex (IM IFNβ-1a)</th>
<th>Betaseron (IM IFNβ-1b)</th>
<th>Copaxone (glatiramer acetate)</th>
<th>Rebif (SC IFNβ-1a)</th>
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</thead>
<tbody>
<tr>
<td>Sick leave</td>
<td>4.62  (4.62, 4.62)</td>
<td>6.51  (6.51, 6.51)</td>
<td>6.51 (6.51, 6.51)</td>
<td>6.60 (6.60, 6.60)</td>
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<tr>
<td>Short-term disability</td>
<td>28.2%</td>
<td>39.3%</td>
<td>28.2%</td>
<td>28.2%</td>
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<tr>
<td>Long-term disability</td>
<td>56.2%</td>
<td>56.2%</td>
<td>56.2%</td>
<td>56.2%</td>
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</table>

Notes: *P < 0.001 vs. Avonex (IM IFNβ-1a). The y-axis graphs show the percentage of time lost from all types of absence (sick leave, STD, LTD). The zero days of LTD for the Copaxone cohort was due to the fact that the study was conducted during the period of medication approval.

Funding for this study was provided by Biogen Idec, Inc.