Productivity Loss Among Patients with Diabetic Macular Edema in Two Eyes: A Retrospective Commercial Claims Analysis in the United States

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A thesis

submitted in partial fulfillment of the

requirements for the degree of

Master of Science

University of Washington

2023

Committee:

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Program Authorized to Offer Degree:

Department of Pharmacy

University of Washington

Abstract

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Background: Diabetic retinopathy (DR) is a leading cause of blindness in the US and its prevalence is increasing due to the rising incidence of diabetes. Diabetes macular edema (DME) is a common complication of DR that can cause central vision loss and impact workplace productivity. However, to the best of our knowledge no studies to date have assessed missed worktime following a diagnosis of DME in both eyes. With the implementation of the International Classification of Diseases, 10th revision (ICD-10) codes that differentiate laterality of the disease enable study of two-eye DME population specifically.

Objective: To quantify productivity loss due to absenteeism in the year following diagnosis among commercially insured non-elderly adults with newly diagnosed DME in two eyes in the US.

Methods: We conducted a retrospective cohort study using MarketScan health insurance claims data to identify DME diagnoses, linked with the Health and Productivity Management database to capture reported productivity loss. Incident two-eye DME patients were identified between January 1st, 2018 to December 31st, 2019 and followed for up to one year after diagnosis. One-year productivity loss after two-eye DME diagnosis was calculated as the sum of days missed due to nonrecreational absenteeism,

short-term, and long-term disability during the one-year follow-up period. The indirect cost attributable to workdays lost was calculated assuming an 8-hour workday and using the US average hourly wage (March 2023). A multivariable logistic regression was performed to describe the association between having any workdays lost and age, sex, region, health plan type, CCI score, receipt of anti-vascular endothelial growth factor (anti-VEGF) therapy, and frequency of anti-VEGF therapy.

Results: In the year following two-eye DME diagnosis, on average, patients with DME in both eyes lost 7.7 workdays (95% CI (5.13, 10.53)), corresponding to an indirect cost of $2,044 (95% CI ($1,362 - $2,795)). Region and the receipt of anti-VEGF therapy were associated with reporting any workdays lost among newly diagnosed two-eye DME patients, with almost 80% higher odds of having any workdays lost in patients who received anti-VEGF therapy, likely due to more severe disease, compared to those who didn't receive the therapy (OR=1.80, 95% CI: (1.05, 3.06)).

Discussion: We found that newly diagnosed two-eye DME patients have an average of 7.7 workdays lost, and the receipt of anti-VEGF therapy is the observed clinical characteristics from the claims data that is associated with workdays lost. However, the results may not be generalizable to the broader US population as this analysis primarily assessed full-time employees with employer-sponsored private health insurance and disability benefits.

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Acknowledgements

I would like to express my deepest gratitude to Dave, Aasthaa, and David who have played an instrumental role in shaping my journey and contributing to my personal and professional growth over the past year. I am truly honored to have had the opportunity to learn from great mentors who have inspired me to become a better version of myself both personally and professionally. I would also like to acknowledge the countless individuals who have supported and encouraged me throughout this journey including my friends and family. Your belief in my abilities has been a driving force behind my achievements, and I am deeply grateful for your unwavering support. Thank you all for being part of my journey and for your significant contributions to my growth and development.

1. Introduction

Vision impairment and blindness create a significant impact on patients' quality of life and activities of daily living.[6] Diabetic retinopathy (DR) is the main cause of new blindness cases in adults aged 20 to 74 years in the United States. Diabetic macular edema (DME), which can occur at any stage of DR, is diagnosed when retinal thickening involves or approaches the central macula. With the increasing prevalence of diabetes in the United States, the number of adults with diagnosed diabetes who reported vision impairment increased from 2.7 to 4.0 million from 1997 to 2011.[1]

Diabetes prevalence is also increasing in younger adults (aged 20-44 years) and diabetic macular edema may increasingly impact workplace productivity and/or employment status. Productivity loss is generally classified into absenteeism (time spent off work due to illness) and presenteeism (reduced work performance due to illness).[8] One study found that indirect costs due to absenteeism were higher in employees with DR compared with non-DR employees ($1640 vs $1218, difference = $422; $p < 0.0001$).[1] However, to the best of our knowledge, no studies to date have assessed missed worktime following a diagnosis of DME in two eyes. Such information may be useful in assessing the value of new treatment options especially for those patients who have two-eye DME.

Previously, the laterality of the disease was not differentiated by International Classification of Diseases (ICD) diagnosis codes. However, in 2016 new ICD-10 codes were implemented to indicate the laterality of the affected eye(s).[7] This change in new ICD-10 codes presents an opportunity to study patients with DME specifically and identify the impact of the disease, especially in those patients who have DME in both eyes.

The primary objective of this study was to quantify absenteeism for non-elderly adults with newly diagnosed diabetic macular edema in two-eyes. A secondary objective was to identify observable factors associated with productivity loss in newly diagnosed two-eye DME patients.

2. Methods

2.1 Study Design and Data Source

This study was a retrospective cohort analysis using Truven Health Analytics MarketScan Commercial Claims and Encounters (CCAE) and Health and Productivity Management (HPM) databases to identify patients and capture absenteeism, respectively. The CCAE database contains a convenience sample of medical and pharmacy claims from US beneficiaries with employer-sponsored private health insurance. The HPM database contains workplace absence, short-term, and long-term disability information collected by employers for a subset of beneficiaries in the CCAE database with employer-sponsored disability benefits.[9]

The study period was from Jan 1st, 2017 (1 year after the US implementation of International Classification of Diseases 10th revision [ICD-10] coding that differentiates the laterality of DME) through December 31st, 2020 (the end of available data) (Figure 7.1). The index period was from January 1st, 2018, through December 31st, 2019, to allow for one year of follow-up. A 1-year washout period from Jan 1st, 2017, through December 31st, 2017, was implemented to remove prevalent cases of two-eye DME and ensure incident cases of two-eye DME during the index period.

At the time of the analysis, MarketScan data met Health Insurance Portability and Accountability Act of 1996 (HIPAA) requirements for fully de-identified data sets.[9] Institutional Review Board (IRB) approval at the University of Washington was not required, as the study met criteria for non-human subjects research as specified by the Human Subjects Division at the University of Washington.

2.2 Sample Selection

We used the CCAE database to identify patients with two-eye DME, defined as having ≥ 1 claim with a diagnosis of a two-eye DME in any billing position during the index period. The first claim with a diagnosis of two-eye DME in the index period was selected to serve as that patient's index date.

We required two-eye DME patients to meet the following inclusion criteria: (1) continuous insurance enrollment for ≥1 year before initial two-eye DME diagnosis to ensure incident two-eye DME and to calculate comorbidity index score, (2) ≥ 1 claim with a diagnosis of one-eye DME during washout period to capture the incidence cases of two-eye DME that progressed from one-eye DME, (3) age 18-64 at index to ensure working age, (5) full-time or part-time employment at index to ensure working status,

(6) primary beneficiary status to allow for linkage of absenteeism, short-term disability, and long-term disability (ABS+STD+LTD) data, and (7) ≥1 year follow-up after index with continuous insurance enrollment, and ABS+STD+LTD eligibility.

Patients with a two-eye DME diagnosis in any billing position during the washout period were excluded as prevalent cases.

2.3 Study Measures and Outcomes

Baseline characteristics including patient age, sex, region, year of index, insurance plan type, and employment status were assessed on index date. We calculated a Charlson Comorbidity Index (CCI), using ICD-10 diagnosis codes on medical claims collected during the 1-year pre-index period.[10]

The primary outcome of interest was total number of workdays lost in one year following a two-eye DME diagnosis, defined as the sum of days missed due to nonrecreational absenteeism, short-term disability (STD), and long-term disability (LTD). Non-recreational absenteeism (NR-ABS) included time off due to sickness, disability, leave, Family Medical Leave Act, or other, but excluded recreational time off.

A secondary outcome was the indirect cost attributable to workdays lost, which was calculated based on the one-year total workdays lost. To calculate indirect costs, we assumed 8-hour workdays and multiplied the number of days of workplace productivity loss during the follow-up period by the seasonally adjusted average hourly earnings of $33.18 for all employees on private nonfarm payrolls in March 2023, as reported by the US Bureau of Labor Statistics (BLS).[11]

2.4 Statistical Analysis

Baseline characteristics were summarized with mean and standard deviation (SD) for continuous variables, and count and percentage for categorical variables.

One-year productivity loss were described for the primary analysis, by calculating summary statistics for number of workdays lost and indirect costs attributable to workdays lost. After observing that a majority of individuals had zero workdays lost, we also summarized workdays days and indirect costs attributable to workdays lost separately among those who had *any* workdays lost. Balanced bootstrapping with 10,000 replicates was performed to generate 95% confidence intervals (CI) to estimate uncertainty in workdays lost and indirect costs attributable to workdays lost.[19]

As a secondary analysis, to identify observable factors associated with absenteeism, we fit a multivariable logistic regression model with the binary outcome of any workdays lost versus no workdays lost and explanatory variables age, sex, region, health plan type, CCI score, receipt of anti-vascular endothelial growth factor (anti-VEGF) therapy, and frequency of anti-VEGF therapy. However, due to the limited data available in the MarketScan claims database, explanatory variables that measure disease severity, such as visual acuity level, were not included in our analysis. Associations of the explanatory variables with workdays lost were assessed by using coefficients, 95% confidence intervals, and p-values. For categorical variables, we grouped together small categories in order to allow for estimation of odds ratios and standard errors in logistic regression. Specifically, for CCI score, we combined patients with a CCI score of 2 or 3 and grouped the remaining patients together who had a CCI score greater than 3. This is because the DME patients included in the study all had a minimum CCI score of 2 due to diabetes with chronic complications. Also, it is highly likely that diabetes patients have at least one other comorbidity, such as renal complications or peripheral vascular disease.[23] Additionally, for insurance plan types, we grouped together exclusive provider organization (EPO) and preferred provider organization (PPO) that share similar characteristics, while all the other health plan types (comprehensive, consumer-driven health plan (CDHP), high deductible health plan (HDHP), health maintenance organization (HMO), point of service (POS)) were categorized separately. Finally, instead of fitting a linear regression model with number of workdays lost as the outcome, we dichotomized the number of workdays lost and fit a logistic regression because almost 90% of the patients had zero workdays lost.

Cohort selection was performed using SAS version 9.4 (SAS Institute, Cary, NC). R version 4.1.1 (R Foundation for Statistical Computing, Vienna, Austria) was used for all statistical analyses.

3. Results

3.1 Baseline Characteristics

From the MarketScan CCAE inpatient and outpatient services tables, we identified 22,186 individuals with two-eye DME claims during the index period of January 1st, 2018 to December 31st, 2019. From this population, 1333 incident two-eye DME cases were identified, with 612 meeting eligibility criteria for the analysis (Figure 7.2). Mean age for the study population was 53.7 years (SD = 7.7) and the mean CCI score was 3.98 (SD = 1.63). Roughly 47% of the study population (n = 285) received anti-VEGF therapy (Table 6.1).

3.2 Primary Analysis

Overall, the mean workdays lost in a year following the diagnosis were 7.7 days (95% CI (5.13, 10.53) (range (0 days, 365 days), median (IQR): 0 days (0 days, 0 days))), with an indirect cost attributable to mean workdays lost corresponding to $2,044 (95% CI ($1,362, $2,795)) (Table 6.2). The distribution of workdays lost among the identified cohort is described by the histogram (Figure 7.3).

Almost 90% of the individuals did not report any workdays lost. Among those who did report any workdays lost, the mean workdays lost in a year following the diagnosis were 65.2 days (95% CI (47.3, 84.5) (range (1 days, 365 days), median (IQR): 30 days (12 days, 94 days))), with an indirect cost attributable to mean workdays lost corresponding to $17,307 (95% CI ($12,555, $22,430)) (Table 6.3). The distribution of workdays lost patients who had *any* workdays lost is described by the histogram (Figure 7.4).

3.3 Secondary Analysis

Workdays lost had a statistically significant relationship with the region and with receipt of anti-VEGF therapy (Table 6.4). Decreased odds of workdays lost were observed for patients living in the Northeast and South regions compared to the North Central region. Patients residing in the Northeast region had almost 90% lower odds of having workdays lost one year after DME diagnosis in both eyes compared to those patients living in the North Central region (OR 0.13 (95% CI (0.04, 0.43)), p-value 0.001). Also, patients residing in the South region had almost 50% lower odds of having workdays lost compared to those patients living in the North Central region (OR 0.49 (95% CI (0.28, 0.87)), p-value 0.02). Two-eye DME patients receiving anti-VEGF therapy had almost 80% higher odds of reporting workdays lost compared to those who did not receive the therapy (OR 1.80 (95% CI (1.05, 3.06)), p-value 0.03).

Other associations were not found to be statistically significant. Female patients with two-eye DME had lower odds of reporting any workdays lost compared to male patients (OR 0.84 (95% CI (0.50, 1.42)), p-value 0.52). Patients enrolled in either an exclusive provider organization plan (EPO) or a preferred provider organization (PPO) had lower odds of workdays lost compared to those enrolled in other health plans including consumer-driven health plan (CDHP), high deductible health plan (HDHP), health maintenance organization (HMO), point of service (POS), and comprehensive (OR 1.23 (95% CI (0.74, 2.04)), p-value 0.52). Patients with CCI scores greater than 3 had almost 10% lower odds of reporting workdays lost than those with a CCI score of 2 or 3 (OR 0.91 (95% CI (0.55, 1.52)), p-value 0.73). Lastly,

patients receiving less than eight anti-VEGF injections per year had almost 10% higher odds of reporting workdays lost compared to those receiving eight or more injections per year (OR 0.92 (95% CI (0.37, 2.25)), p-value 0.85).

4. Discussion

We conducted a retrospective cohort study using MarketScan claims data to quantify the number of workdays lost associated with two-eye DME among commercially insured non-elderly patients in the US in the year following diagnosis. Overall, newly diagnosed two-eye DME patients reported an average of 7.7 workdays lost (95% CI (5.13, 10.53)), corresponding to an average indirect cost of $2,044 (95% CI ($1,362, $2,795)). Out of the identified patients, only 10% had any workdays lost; these patients reported an average of 65.2 workdays lost (95% CI (47.3, 84.5)), corresponding to an average indirect cost of $17,307 (95% CI ($12,555, $22,430)).

Among the observable clinical characteristics, the receipt of anti-VEGF therapy was associated with workdays lost in the year following a two-eye DME diagnosis. This association could be due to two reasons. First, since anti-VEGF therapy is indicated after evaluating the patient's visual acuity, the receipt of anti-VEGF therapy is likely an indication of the severity of the disease.[4] Thus, patients with worse visual acuity levels would be receiving anti-VEGF therapy and have a higher odd of reporting any workdays lost. Moreover, these patients who are receiving anti-VEGF therapy require a visit to the health care provider for an intravitreal injection. Therefore, patients who are receiving anti-VEGF therapy have a higher odd of having workdays lost in order to see a health care provider for an injection. Among other baseline characteristics, region was significantly associated with workdays lost. This could be due to the higher prevalence of cigarette smoking in the North Central region compared to any other regions in the US, as there are some studies reporting an association between cigarette smoking and diabetic retinopathy.[20-22]

Our results suggest that the disease progression of two-eye DME is slow enough that it would not greatly impact patient's productivity loss in the year following diagnosis. Further research is needed with a longer follow-up period and consideration of the visual acuity level to assess the productivity loss associated with the disease. However, our study highlights the economic burden of lost worktime associated with two-eye DME and may inform societal perspective economic models for assessing the value of novel therapies that result in less workplace disruption.

To our knowledge, this is the first study to analyze absenteeism among employed patients diagnosed with DME in both eyes. A previous study assessed absenteeism associated with DME and DR using the Human Capital Management Services Group Research Reference Database.[1] This study found that patients with DME had a total annual absence of 13.8 days and patients with DR had 12.7 days. Our study found fewer workdays lost among patients with two-eye DME. However, the difference between the studies results could be due to the difference in the database; the MarketScan database is a claims database collected from employer-sponsored health plans and covers over 300 million people across the United States, whereas Workpartners (formerly known as Human Capital Management Services Group Research) database is limited to the smaller employee population of the organizations that participate in the program. [9,15,16] Therefore, the difference in results may be due to the underlying differences in study population characteristics.

Our study has several limitations. First, we did not have any information regarding patient's visual acuity levels. DME is known to have a significant impact on patients' quality of life and activities of daily living due to decreased visual acuity.[6] Additionally, a previous study showed that people with impaired vision have high unemployment rates and productivity losses.[17] The MarketScan database allows us to identify patients with two-eye DME using the diagnosis code, but without information on visual acuity level, it is challenging to determine the severity of vision impairment and its association with productivity loss. It is plausible that with a new diagnosis of two-eye DME, patients may not have a severe visual impairment yet that would affect productivity loss. Thus, future studies could assess workdays lost while incorporating the visual acuity level of both eyes.

Also, there are some limits regarding the generalizability of the results since the study population only included people with employer-sponsored private health insurance and disability benefits. According to the US Bureau of Labor Statistics, over 60% of low-income workers do not have access to paid sick leave.[13] We hypothesize that low-income patients may be less likely to miss workdays but may face larger financial consequences from missed worktime. This is especially important considering several studies have reported an association between low socioeconomic status and the higher prevalence and the increased severity of DME.[14] Future studies should leverage datasets with productivity loss data for low-income patients and, if possible, analyze the financial impact of productivity loss in this population.

While the MarketScan HPM database contains employer-collected information for nonrecreational absenteeism, STD, and LTD, this may not be comprehensive of all missed worktime and therefore, our

results likely underestimate the full impact of two-eye DME on workplace productivity; for example, if a patient leaves work early for a provider visit, this may not be captured. Additionally, to be conservative in our definition of absenteeism associated with the disease, we did not include recreational absenteeism as part of our workdays lost. However, there might be instances where patients take recreational absences from work if they do not have enough paid sick leave. Finally, we did not have information on presenteeism which is an important facet of productivity loss that many patients may experience especially in a working-age population.[12]

5. Conclusion

Overall, in the year following diagnosis, two-eye DME patients had the mean workdays lost of 7.7 days with the attributable indirect costs of $2044. Out of the identified patients, only 10% had any workdays lost; these patients reported an average of 65.2 workdays lost, corresponding to an average indirect cost of $17,307. These findings highlight the economic burden of lost worktime associated with DME in both eyes and may inform societal perspective economic models for assessing the value of novel therapies that result in less workplace disruption. Future investigations are warranted to assess workdays lost associated with the visual acuity level of both eyes.

6. Tables

6.1 Baseline characteristics

	No workdays lost reported	Workdays lost reported	Overall
Characteristic	**(n = 540)**	**(n = 72)**	**(n = 612)**
Age (years) – mean (SD)	53.8 (7.8)	53.4 (6.6)	53.7 (7.7)
Age (years) – n (%)			
18 – 34	16 (3.0)	2 (2.8)	18 (2.9)
35 – 44	50 (9.3)	4 (5.6)	54 (8.8)
45 – 54	180 (33.3)	33 (45.8)	213 (34.8)
55 – 64	294 (54.4)	33 (45.8)	327 (53.4)
Insurance plan type – n (%)			
Comprehensive	11 (2.0)	2 (2.8)	13 (2.2)
EPO	10 (1.9)	1 (1.4)	11 (1.8)
HMO	42 (7.8)	10 (13.9)	52 (8.7)
POS	30 (5.6)	0 (0)	30 (5.0)
PPO	296 (54.8)	36 (50)	332 (55.5)
CDHP	75 (13.9)	15 (20.8)	90 (15.1)
HDHP	62 (11.5)	8 (11.1)	70 (11.7)
Unknown	14 (2.6)	0 (0)	14 (2.3)
Region – n (%)			
Northeast	108 (20.0)	3 (4.2)	111 (18.1)
North Central	124 (23.0)	28 (38.9)	152 (24.8)
South	247 (45.7)	28 (38.9)	275 (44.9)
West	61 (11.3)	13 (18.1)	74 (12.1)
Comorbidity index – mean (SD)	3.95 (1.61)	4.2 (1.75)	3.98 (1.63)
Comorbidity index – n (%)			
2-3	308 (57.0)	40 (55.6)	348 (56.9)
≥4	232 (43.0)	32 (44.4)	264 (43.1)
Anti-VEGF receipt – n (%)	243 (45.0)	42 (58.3)	285 (46.6)
Frequency of Anti-VEGF therapy – n (%)			
received greater than or equal to 8 injections/year	45 (8.3)	7 (9.7)	52 (18.2)
Year of index – n (%)			
2018	534 (98.9)	72 (100)	606 (99.0)

2019	6 (1.1)	0 (0)	6 (1.0)
Employment status – n (%)			
Full-Time	538 (99.6)	69 (95.8)	607 (99.2)
Part-Time	2 (0.4)	3 (4.2)	5 (0.8)

CDHP = consumer-driven health plan; EPO = exclusive provider organization; HDHP = high deductible health plan; HMO = health maintenance organization; PPO = preferred provider organization; POS = point of service

6.2 Absenteeism and attributable cost (all cohort)

	Cases (n = 612)
Workdays lost (PPPY)	
mean (95% CI)	7.67 ((5.13, 10.53))
range	(0, 365)
Median (interquartile range)	0 (0, 0)
Estimated attributable cost (USD PPPY)	
mean (95% CI)	$2,044 ($1,362 - $2,795)

CI = confidence interval; PPPY = per patient per year; USD = United States Dollars

6.3 Absenteeism and attributable cost (only with those who had *any* workdays lost)

	Cases (n = 72)
Workdays lost (PPPY)	
mean (95% CI)	65.2 ((47.3, 84.5))
range	(1, 365)
Median (interquartile range)	30 (12, 94)
Estimated attributable cost (USD PPPY)	
mean (95% CI)	$17,307 ($12,555 - $22,430)

CI = confidence interval; PPPY = per patient per year; USD = United States Dollars

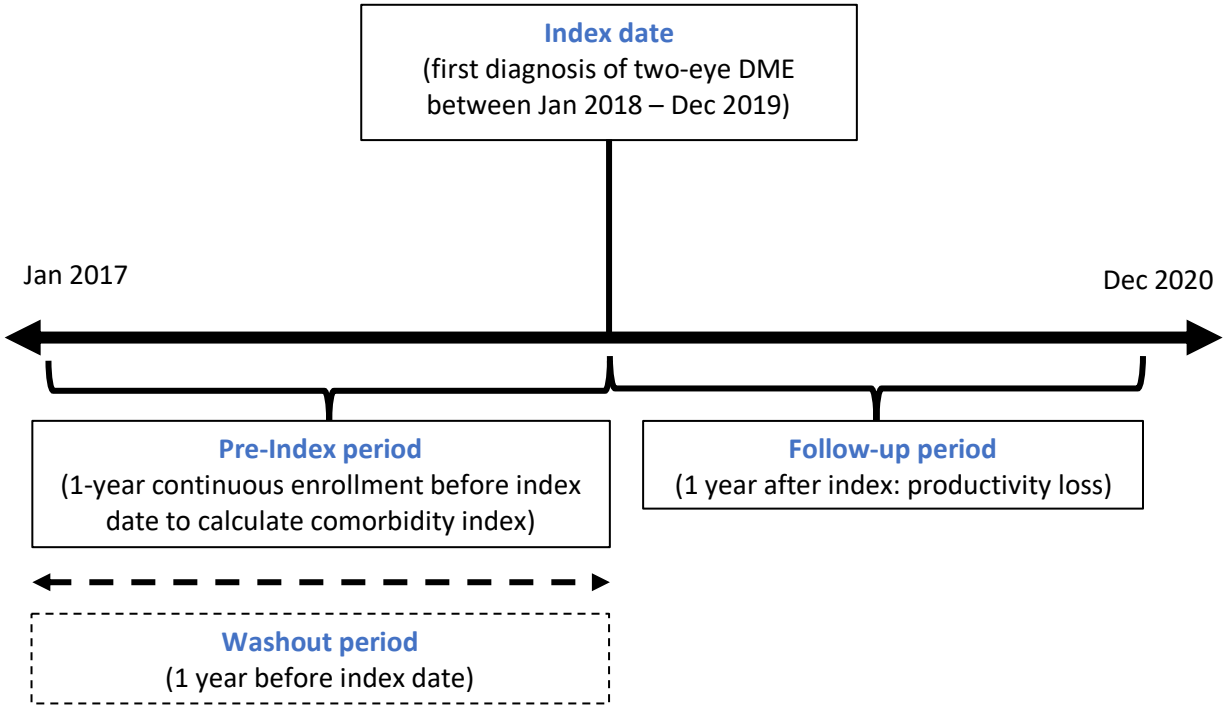
6.4 Adjusted Odds Ratios (95% CI) of workdays lost

Characteristic	Odds Ratios	p-value
Age	1.00 (0.97 – 1.03)	0.99
Sex		
Male	1.00 (Ref)	
Female	0.84 (0.50 – 1.42)	0.52
Insurance plan type		
EPO/PPO	1.00 (Ref)	
Others[a]	1.23 (0.74 – 2.04)	0.43
Region – n (%)		
North Central	1.00 (Ref)	
Northeast	0.13 (0.04 – 0.43)	0.001*
South	0.49 (0.28 – 0.87)	0.02*
West	0.96 (0.46 – 2.01)	0.92
Charlson Comorbidity index		
2-3	1.00 (Ref)	
≥4	0.91 (0.55 – 1.52)	0.73
Receipt of Anti-VEGF therapy		
Not Received	1.00 (Ref)	
Received	1.80 (1.05 – 3.06)	0.03*
Number of Anti-VEGF therapy received		
< 8 injections/year	1.00 (Ref)	
≥ 8 injections/year	0.92 (0.37 – 2.25)	0.85

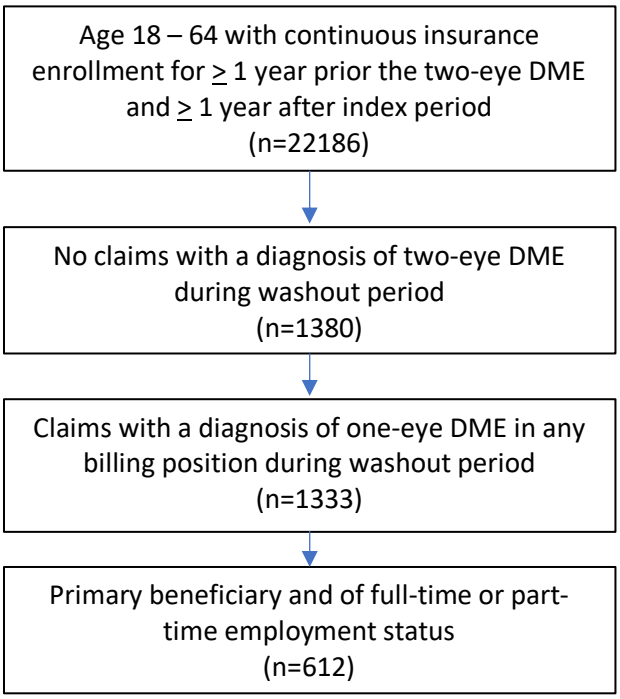
EPO = exclusive provider organization; PPO = preferred provider organization
[a] Others include CDHP = consumer-driven health plan; HDHP = high deductible health plan; HMO = health maintenance organization; POS = point of service; and Comprehensive
* p-value <0.05

7. Figures

7.1 Study timeline

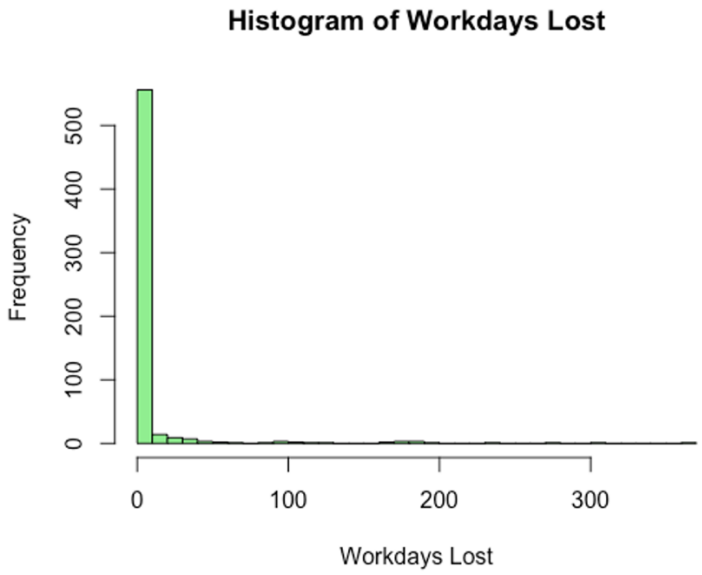


7.2 Cohort selection process

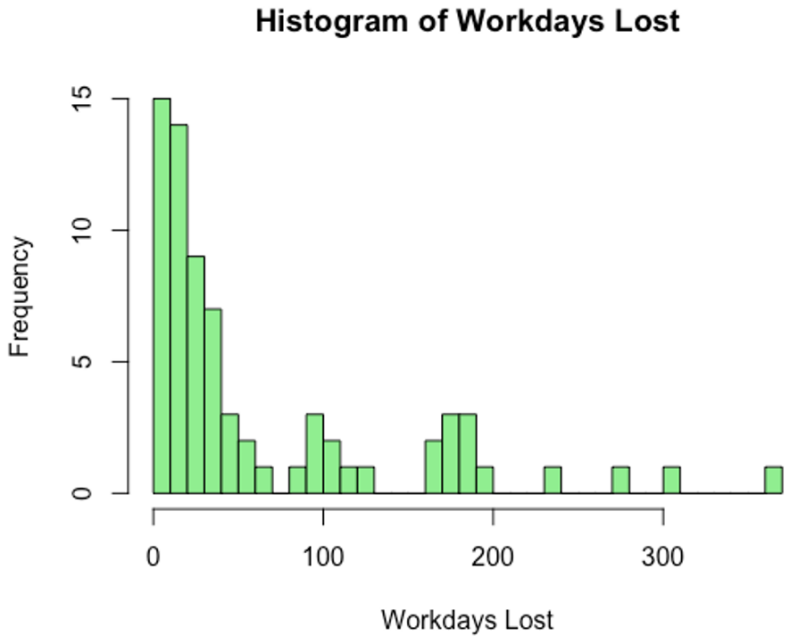


DME = diabetes macular edema

7.3 Histogram of Workdays Lost (all cohort)



7.4 Histogram of Workdays Lost (only with those who had *any* workdays lost)



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9. Appendices

9.1 Appendix A – ICD-10 diagnosis codes

	Types of Diabetic Macular Edema (DME)	ICD-10	Notes
One-eye DME	Mild Nonproliferative Diabetic Retinopathy with Macular Edema	E10.3211, E10.3212	type 1 diabetes mellitus
	Mild Nonproliferative Diabetic Retinopathy with Macular Edema	E11.3211, E11.3212	type 2 diabetes mellitus
	Moderate Nonproliferative Diabetic Retinopathy with Macular Edema	E10.3311, E10.3312	type 1 diabetes mellitus
	Moderate Nonproliferative Diabetic Retinopathy with Macular Edema	E11.3311, E11.3313	type 2 diabetes mellitus
	Severe Nonproliferative Diabetic Retinopathy with Macular Edema	E10.3411, E10.3412	type 1 diabetes mellitus
	Severe Nonproliferative Diabetic Retinopathy with Macular Edema	E11.3411, E11.3412	type 2 diabetes mellitus
	Proliferative Diabetic Retinopathy with Macular Edema	E10.3511, E10.3512	type 1 diabetes mellitus
	Proliferative Diabetic Retinopathy with Macular Edema	E11.3511, E11.3512	type 2 diabetes mellitus
Two-eye DME	Mild Nonproliferative Diabetic Retinopathy with Macular Edema	E10.3213	type 1 diabetes mellitus
	Mild Nonproliferative Diabetic Retinopathy with Macular Edema	E11.3213	type 2 diabetes mellitus
	Moderate Nonproliferative Diabetic Retinopathy with Macular Edema	E10.3313	type 1 diabetes mellitus
	Moderate Nonproliferative Diabetic Retinopathy with Macular Edema	E11.3313	type 2 diabetes mellitus
	Severe Nonproliferative Diabetic Retinopathy with Macular Edema	E10.3413	type 1 diabetes mellitus
	Severe Nonproliferative Diabetic Retinopathy with Macular Edema	E11.3413	type 2 diabetes mellitus
	Proliferative Diabetic Retinopathy with Macular Edema	E10.3513	type 1 diabetes mellitus
	Proliferative Diabetic Retinopathy with Macular Edema	E11.3513	type 2 diabetes mellitus

ICD-10 = The International Classification of Diseases, 10th Revision

9.2 Appendix B – CPT Codes for Anti-VEGF treatments

CPT/HCPC code	CPT/HCPC Code Description
67028	Vitreous Procedures on the Posterior Segment of the Eye
J0178	aflibercept
J2778	ranibizumab
J9035	bevacizumab
J3490	bevacizumab
J3590	bevacizumab
C9257	injection, bevacizumab, 0.25mg
Q5107	Injection, bevacizumab-awwb, biosimilar, 10 mg
J7999	compounded drugs
J3590	unclassified biologics used in medical care
J3490	unclassified drugs used in medical care
Q9977	compounded drug, not otherwise classified

CPT = Current Procedural Terminology codes; HCPC = Healthcare Common Procedure Coding