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Productivity Loss and Medical Costs Associated With Type 2 Diabetes Among Employees Aged 18–64 Years With Large Employer-Sponsored Insurance

Joohyun Park,
Elizabeth Bigman,
Ping Zhang
Division of Diabetes Translation, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, GA

Abstract

OBJECTIVE—To estimate productivity losses and costs and medical costs due to type 2 diabetes (T2D) among employees aged 18–64 years.

RESEARCH DESIGN AND METHODS—Using 2018–2019 MarketScan databases, we identified employees with T2D or no diabetes among those with records on workplace absences, short-term disability (STD), and long-term disability (LTD). We estimated per capita mean annual time loss attributable to T2D and its associated costs, calculated by multiplying time loss by average hourly wage. We estimated direct medical costs of T2D in total and by service type (inpatient, outpatient, and prescription drugs). We used two-part models (productivity losses and costs and inpatient and drug costs) and generalized linear models (total and outpatient costs) for overall and subgroup analyses by age and sex. All costs were in 2019 U.S. dollars.

RESULTS—Employees with T2D had 4.2 excess days lost (20.8 vs. 20.3 absences, 6.4 vs. 3.3 STD days, and 1.0 vs. 0.4 LTD days) than those without diabetes. Productivity costs were 13.3% ($680) higher and medical costs were double (total $11,354 vs. $5,101; outpatient $4,558 vs. $2,687, inpatient $3,085 vs. $1,349, prescription drugs $4,182 vs. $1,189) for employees with T2D. Employees aged 18–34 years had higher STD days and outpatient costs. Women had more absences and STD days and higher outpatient costs than men.

CONCLUSIONS—T2D contributes nearly $7,000 higher annual per capita costs, mostly due to excess medical costs. Our estimates may assist employers to assess potential financial gains from efforts to help workers prevent or better manage T2D.

Corresponding author: Joohyun Park, ppw6@cdc.gov.

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The findings and conclusions in this study are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Approximately 19.7 million U.S. adults aged 18–64 years were living with diabetes in 2018, accounting for ~10% of the working-age population (1,2). Type 2 diabetes (T2D) accounts for 90 to 95% of all diabetes cases (1). In the workplace, T2D contributes to productivity loss, as employees with diabetes are more likely to be absent, have reduced productivity, or be out of the labor force due to disability, compared with people without diabetes (3,4). In addition, employees with T2D have higher medical costs compared with their counterparts (5).

Employers bear much of the cost of productivity losses and medical expenditures of their employees (6). A majority of employees obtain health coverage through employer-sponsored insurance (7). Most employees also receive work benefits, such as paid sick leave and disability coverage, from their employers. Employers can also play an important role in reducing the health and economic burden of chronic diseases. For example, many employers have adopted workplace wellness programs, such as lifestyle change interventions, to help their employees improve health-related behaviors and reduce their risk of developing T2D (8). By helping employees prevent and better manage chronic disease, employers can have a healthier and more productive workforce as well as lower health care costs.

Accurate estimates of the cost of T2D borne by employers can help them assess the potential return on investment for activities designed to help employees prevent and manage T2D. However, the cost of T2D from the perspective of employers is not well characterized. A previous study used self-reported information from nationally representative surveys and survey-based health risk assessments of beneficiaries in claims data to estimate missed workdays due to diabetes and their associated productivity costs (4). Self-reported data are subject to recall and reporting bias, and more importantly, the portion of the productivity costs borne by employers was not estimated in that study. Another study estimated medical and productivity costs associated with diabetes among employees of large employers (9). However, that study was conducted more than a decade ago, and the number of days absent used for the estimation was based on assumptions (a 4 h time loss for an outpatient visit and an 8 h time loss for an inpatient hospital stay), which may be substantially different from the actual time lost.

The objective of this study was to estimate more comprehensively the economic costs of T2D from the perspective of employers. Using recent claims data from large employers, we estimated productivity losses and their associated costs as well as medical costs attributable to T2D among employees aged 18–64 years.

RESEARCH DESIGN AND METHODS

Data Source

We used deidentified patient data from the IBM MarketScan Commercial Claims and Encounters (CCAE) and the associated Health and Productivity Management (HPM) databases from 2018 and 2019. The CCAE database contains enrollment and demographic data, service-level claims data from inpatient and outpatient medical services, and outpatient prescription drugs data for employees and their dependents insured by large employer-sponsored private health insurance in the U.S. (10). For a subset of employers in the CCAE database, they also provided productivity data in the HPM database, such as workplace absences due to sickness, disability, leave, or vacation, short-term disability (STD), and long-term disability (LTD) (10). As the workplace absence data were collected through employer payroll systems and lack details, we could not differentiate work absence by absence type (11). HPM data are fully linkable to the CCAE, facilitating the estimation of both productivity losses and medical costs at the patient level.

Study Population

The study sample consisted of full-time employees aged 18–64 years with T2D or without diabetes (Fig. 1). We restricted our sample to those who had coverage for both health services (inpatient and outpatient) and prescription drugs, were continuously enrolled in fee-for-services plans for 2018 or 2019 (or both), and were not pregnant during the enrollment year. Additionally, we only included individuals who had data on absences, STD, and/or LTD in the HPM database ($n = 3{,}217{,}817$), which were needed to estimate productivity losses. Some employers did not report all three components; to maximize sample sizes for productivity costs analysis, we conducted separate analyses using all available data for each component. Of the 3,217,817 employees, we included *1*) those with absence data for the absences analysis ($n = 393{,}444$), *2*) those with STD data for the STD analysis ($n = 2{,}785{,}537$), and *3*) those with LTD data for the LTD analysis ($n = 2{,}749{,}537$) (Fig. 1). For the medical cost analysis, a total of 3,217,817 employees were used.

We identified employees with T2D using a combination of ICD-10-Clinical Modification (CM) codes based on inpatient, outpatient, and outpatient prescription drug claims. First, we classified individuals as having T2D if they had two or more outpatient claims at least 30 days apart with T2D codes (ICD-10-CM code E11.XX), or had at least one inpatient admission with a primary or secondary T2D diagnosis and did not have any claims for type 1 diabetes (T1D; ICD-10-CM codes E10.XX) (5). Second, for overlapping T1D and T2D codes, we considered the patient to have T1D if >50% of their ICD-10-CM diabetes codes were T1D and if *1*) there was no dispensing for a noninsulin antidiabetes drug other than metformin or *2*) there was a prescription for glucagon (12,13). Noninsulin antidiabetes drugs other than metformin include sulfonylurea, meglitinide, α-glucosidase inhibitors, thiazolidinediones, dipeptidyl peptidase 4 inhibitors, sodium–glucose transport protein 2 inhibitors, and glucagon-like peptide 1, which were identified using national drug codes in the IBM RED BOOK and outpatient prescription drug claims.

Outcomes

Productivity Losses and Costs—We estimated (overall and by age-group and sex) the number and percentage of those with workplace absences, STD, and LTD, along with the missed days per person per year (i.e., productivity losses). If an employee had benefit eligibility in both 2018 and 2019, we divided the combined days absent by two to estimate the annual absent days. Productivity costs to employers were calculated by multiplying the number of hours absent (an 8 h workday [14]) by hourly wage, adjusting for type of absence (100% of wage for work absences, 70% for STD and 60% for LTD (15). An average hourly wage ($27.93) for all employees on private nonfarm payrolls was obtained from the 2018 and 2019 Bureau of Labor Statistics (16). For subgroup analyses by age-group and sex, productivity costs were calculated using age- and sex-specific average wages (17) (Supplementary Appendix 1).

Medical Costs—We estimated medical costs in total and by service type, including inpatient, outpatient, and outpatient prescription drugs, overall and by age-group and sex. We did not include patients' out-of-pocket costs, because employers do not bear these costs.

Covariates

Covariates included demographic characteristics (age, sex, state of residence, and industry type of the individuals' employer) (4,18) and a Charlson Comorbidity Index (CCI) score (19), which encompasses 15 chronic conditions (modified to exclude diabetes). The same covariates were used for estimating medical costs and productivity losses (overall and by component). To examine the effect of other clinical conditions other than T2D on productivity and medical costs, we conducted two sensitivity analyses: *1*) adding chronic conditions (depression, arthritis, and epilepsy) that are neither T2D complications nor the CCI conditions but are expensive to manage and *2*) excluding those with cancer.

Statistical Analysis

Our primary analyses aimed to estimate the mean differences in productivity losses and their associated costs and medical costs between individuals with T2D and those without diabetes. First, we estimated unadjusted means for the two groups and used *t* tests for statistical tests of significance for differences. We then conducted adjusted analyses to control for the above covariates.

For total and outpatient medical costs, we used a one-part generalized linear model with log link and γ-distribution. For productivity losses and costs, and inpatient and prescription drug medical costs, we used a two-part model to account for the large proportion of individuals with no productivity loss or no expenditures and the positive skew of expenditures among those who used services. In the first part of the two-part model, we used logistic regression to estimate the probability that an employee would have productivity losses and medical expenditures. For the second part, we used a generalized linear model with log-link to estimate the productivity losses and costs and medical expenditures among those with nonzero productivity losses and medical expenditures. The variance function was determined using the modified Park test (20,21); the γ-distribution was used for inpatient and prescription drug medical costs and LTD analysis, the Gaussian distribution was used for workplace absences analysis, and the Poisson distribution was used for STD analysis. For subgroup analyses by age-group and sex, we ran all regression models separately; significance of differences was determined conservatively based on overlap of 95% CIs.

All costs were adjusted to 2019 U.S. dollars (USD) using the Consumer Price Index for all urban consumers (22). All statistical analyses were conducted using Stata MP 16.1 software (StataCorp, College Station, TX).

RESULTS

Characteristics of the Study Population

Compared with employees without diabetes (n = 3,012,694), those with T2D (n = 202,123) were more likely to be older (mean 52 vs. 43 years, P < 0.001) and male (66% vs. 62%, P < 0.001), to reside in the South region (46% vs. 40%, P < 0.001), and to work in the manufacturing (39% vs. 36%) or transportation, communications, and utilities (20% vs. 18%) industries (P < 0.001) (Table 1). The CCI was five times as high as among people with T2D than among those without diabetes (0.11 vs. 0.02, P < 0.001). Similar patterns were observed among the subpopulations used for absences, STD, and LTD analyses, except that the absences subpopulation did not include any employees from the finance, insurance, or real estate industries (Supplementary Appendix 2).

Productivity Losses and Related Costs of T2D

Main Analysis—Table 2 reports adjusted estimates of productivity losses and costs associated with workplace absences and disabilities (STD and LTD) among employees with T2D and those without diabetes. Overall, employees with T2D were away from the workplace 4.2 days more than those without diabetes (28.2 vs. 24.0 days), resulting in 13.3% excess productivity loss cost ($5,784 vs. $5,104). For workplace absences, there was no significant difference in the proportion of people with any absences between those with T2D and those without diabetes (67% for both, P = 0.87) (Supplementary Appendix 3). However, people with T2D had 0.5 more absence days and slightly higher costs than those without diabetes (adjusted mean 20.8 days vs. 20.3 days and $4,655 vs. $4,536, both P < 0.001) (Table 2). Employees with T2D were twice as likely to have an STD claim as those without diabetes (15% vs. 7%, P < 0.001). Missed days and associated costs due to STD were also approximately double those of employees without diabetes (adjusted mean 6.4 days vs. 3.3 days and $996 vs. $514, P < 0.001). The proportion of those with LTD claims was also significantly higher for employees with T2D than those without diabetes (0.8% vs. 0.3%, P < 0.001). People with T2D had more average LTD days and higher productivity costs (adjusted mean 1.0 days vs. 0.4 days and $132 vs. $54, P < 0.001). Unadjusted estimates of absences, STD, and LTD show similar patterns, with larger differences between the groups (Supplementary Appendices 3 and 4). In sensitivity analyses, results show no significant differences from the main analyses; details are summarized in Supplementary Appendix 5.

Subgroup Analysis by Age—Significant excess productivity losses and costs were consistently observed among those with T2D compared with those without diabetes across age-groups (Fig. 2). The youngest group of employees (those aged 18–34 years) had fewer lost days due to STD than their older colleagues (55–64 years); however, the difference between those with T2D and without diabetes was significantly larger in the youngest group (4.6 days) than in any of the other age-groups (3.1–3.8 days) and decreased as age increased. As a result of the lower wages of the youngest group, the difference in productivity costs due to STD was lowest in this group ($434 vs. $555–$697). Similar patterns were seen for days lost due to absenteeism and associated costs, although the differences in the excess days and costs were not statistically significant. Days lost and associated costs due to LTD increased with age, and the differences between those with T2D and those without diabetes tended to increase with age. While the differences between age-groups in excess number of days lost due to LTD were not significant, older employees with T2D had significantly more excess costs due to LTD than younger ones ($138 vs. $38).

Subgroup Analysis by Sex—Although female employees with T2D had more absences, STD days, and LTD days than male employees, they had lower productivity costs due to a lower average wage (Fig. 2). The differences between those with T2D and without diabetes were higher for women than men for absence days (1.2 [95% CI 0.9–1.6] vs. 0.3 [0.1–0.5]), STD days (3.4 [3.3–3.6] vs. 2.8 [2.7–2.9]), and absence costs ($205 [$146–$265] vs. $85 [$36–$134]) but were lower for STD productivity costs ($403 [$387–$418] vs. $502 [$486–$518]). Excess LTD days and their associated costs were similar for men and women.

Medical Costs of T2D

Main Analysis—Employees with T2D had more than double the total medical costs compared with those without diabetes ($11,354 vs. $5,101, an excess of $6,253; $P < 0.001$) (Table 2). A similar relationship between the two groups was found in the costs for outpatient services, inpatient services, and outpatient prescription drugs, with excesses of $1,872 (70%), $1,736 (129%), and $2,993 (252%), respectively (all $P < 0.001$). Similar to the productivity costs, the sensitivity analyses for adding the three chronic conditions (depression, arthritis, and epilepsy) were similar to the main analyses; the results for excluding those with cancer showed larger differences in medical costs between the groups (Supplementary Appendix 5).

Subgroup Analysis by Age—Medical costs increased with age, regardless of T2D status and medical service type, and employees with T2D spent more than those without diabetes in all age-groups (Fig. 2). Excess costs of T2D increased with age for outpatient prescription drug costs, with statistical significance between the youngest (18–34 years) and the oldest (55–64 years) groups. Excess costs of T2D for outpatient medical services decreased with age and were significantly higher for those aged 18–34 years than for those 55–64 years. All age-groups had similar excess costs for inpatient medical services.

Subgroup Analysis by Sex—Total excess costs were similar for men and women, but women had a higher excess costs for outpatient services and lower excess costs for outpatient prescription drugs than men (Fig. 2).

Total Costs of T2D

The combined adjusted productivity and medical cost was 68% higher for employees with T2D than those without diabetes ($17,138 vs. $10,205) (Table 2), yielding a total cost per person per year attributable to T2D of $6,933. The vast majority of this cost (90%) was due to medical costs, followed by productivity costs associated with STD (7%), absences (2%), and LTD (1%).

CONCLUSIONS

Using a large database that contained the most recent data on productivity loss and medical cost of employees of large U.S. employers, we estimated the cost of T2D from the perspective of employers. Compared with employees without diabetes, those with T2D were more likely to experience workplace absences, STD, and LTD, and had somewhat higher associated productivity costs and substantially higher medical costs. We estimated the total economic costs of T2D to employers was nearly $7,000 per person per year, mostly attributable to excess medical costs. Our study adds to the literature by providing the most recent estimate of the economic burden of T2D on employers, using data from actual insurance claims and employer payroll systems instead of self-reported information.

Lifestyle interventions are effective in reducing T2D among those at high risk (23,24), and the National Diabetes Prevention Program (National DPP) implements lifestyle change programs nationwide (25). In addition, diabetes self-management education and support (DSMES) services are effective in helping people who have been diagnosed with T2D maintain good control of their diabetes (26). Additionally, several interventions to prevent and manage T2D have been cost-effective for the underserved population, such as low-income individuals or ethnic minorities, in the U.S. (27). Employers could make it easier for employees with T2D or at high risk of T2D to participate in the National DPP lifestyle change program and DSMES services through flexible scheduling or by providing space for health professionals to offer those services on-site, especially for the underserved population. Employers could also help employees with T2D or at high risk of T2D overcome cost barriers by paying for lifestyle intervention programs for their staff (8). Other accommodations for day-to-day management of T2D in the workplace (e.g., breaks and locations for testing blood glucose or administering insulin) or flexible work schedules or a leave may help those with T2D accommodate medical appointments and perform their work responsibilities effectively and safely by encouraging better control of T2D (28). Our findings of higher costs in outpatient services and prescription drugs among those with T2D may be partly explained by these good diabetes management programs. This may be a good investment for employers, as maintaining good management and control of diabetes could reduce the likelihood of worse health outcomes that can lead to significant health care costs (e.g., hospitalization or emergency visit). Investment in T2D prevention and control in workplaces could lead not only to a more productive workforce but also to lower medical costs spent on employees. Thus, helping employees reduce the risk of developing T2D and helping those with T2D better manage diabetes may be a sound business case for employers.

Our estimates of productivity and medical costs are similar to or lower than those of the few previously published studies (4,9). Our estimated productivity costs of $680 attributable to T2D are within the wide range of prior estimates (adjusted to 2019 USD): $293 (4) and $687–$1,120 (9). The differences may be attributed to study populations or data sources; for example, using self-reported survey data (4) or targeting the 100 largest companies (9). For medical costs, our estimated excess cost of $6,253 was on the high end of Ramsey et al. (9) ($4,425–$6,490 adjusted to 2019 USD), possibly due to increased medical costs of diabetes over time, but lower than $10,014 from the American Diabetes Association (29), which included patients' out-of-pocket costs. Also, our study was limited to those who were employed for the entirety of a given year, thus excluding those who were not healthy enough to work.

Along with higher productivity costs, employees with T2D were twice as likely to report missed workdays due to disability as those without diabetes. We found that the total number of workdays lost (including absences, STD, and LTD) due to T2D was about 4 days per person per year, with STD accounting for the largest share. This estimate is within the range of 1.0–5.7 days reported in the literature (3,4,30).

Our subgroup analysis found that younger employees had more workdays lost due to STD attributable to T2D than their older colleagues and that the number of workdays lost decreased as age increased. Similar patterns were observed for excess medical costs of outpatient services. The higher excess cost in younger employees with diabetes was mainly due to the much lower workdays lost in employees without diabetes. Since younger workers are in the stage of learning the advanced skills needed to become more experienced workers, focusing on this age-group might be an investment for companies to ultimately increase productivity. Despite the greater time loss, productivity costs of T2D associated with STD were lowest among the youngest group, due to their lower average wages (17).

Female employees with T2D were more likely to have work losses due to absences or STD than male employees. Additionally, women with T2D have higher excess costs of outpatient services than men. Compared with men with T2D, women have greater increases in cardiovascular risk, myocardial infarction, and stroke mortality, as well as higher psychosocial stress (31). In this regard, sex may be a factor to consider when developing programs to mitigate disease burden for workers.

Our study is subject to several limitations. The study sample is limited to full-time employees from large-sized and self-insured employers who had employer-sponsored commercial health insurance and available data on work loss (i.e., absences, STD, and/or LTD). Therefore, the findings may not be generalizable to patients with T2D with parttime jobs, with other types of health insurance, without health insurance, without coverage for work loss, or from small employers. Also, since only full-time workers were included, our estimates may likely underestimate the productivity losses associated with T2D as those who were unable to work due to their severe T2D were not included.

Second, it was not possible to distinguish the absences between sick time and personal time off due to limited data availability (e.g., not all employers provided a reason for the absence, or some employers did not make a distinction between sick time and personal time off). Thus, our estimates of workplace absences should be interpreted with caution, interpreting absences due to all possible reasons, including sickness, disability, vacation, or Family Medical Leave Act absence. This may partly explain why there were small differences in absences between those with T2D and without diabetes.

Third, disease duration and severity were not considered due to the crosssectional study design and lack of information available in the databases. Future studies with a longitudinal study design may provide a more accurate estimate of the potential costs that employers could save by assisting their employees in preventing the onset of T2D or managing their diabetes.

Lastly, due to lack of data, we were not able to control for all factors (e.g., race, ethnicity, education, income, or unobservable population characteristics) that could affect the productivity losses and medical costs in the regression models. Not including these covariates may introduce some bias in the cost estimates.

Using recent real-world claims data from large employers, we quantified productivity loss and associated costs, as well as medical costs, attributable to T2D from the perspective of employers. We found substantial differences between employees with T2D and without diabetes, with differences varying by age and sex. Our findings may be useful for employers seeking to estimate their likely expenditures—given the prevalence of T2D among their employees— and to assess the potential economic value of investments in strategies to help employees prevent or better manage T2D, such as lifestyle diabetes prevention programs and DSMES.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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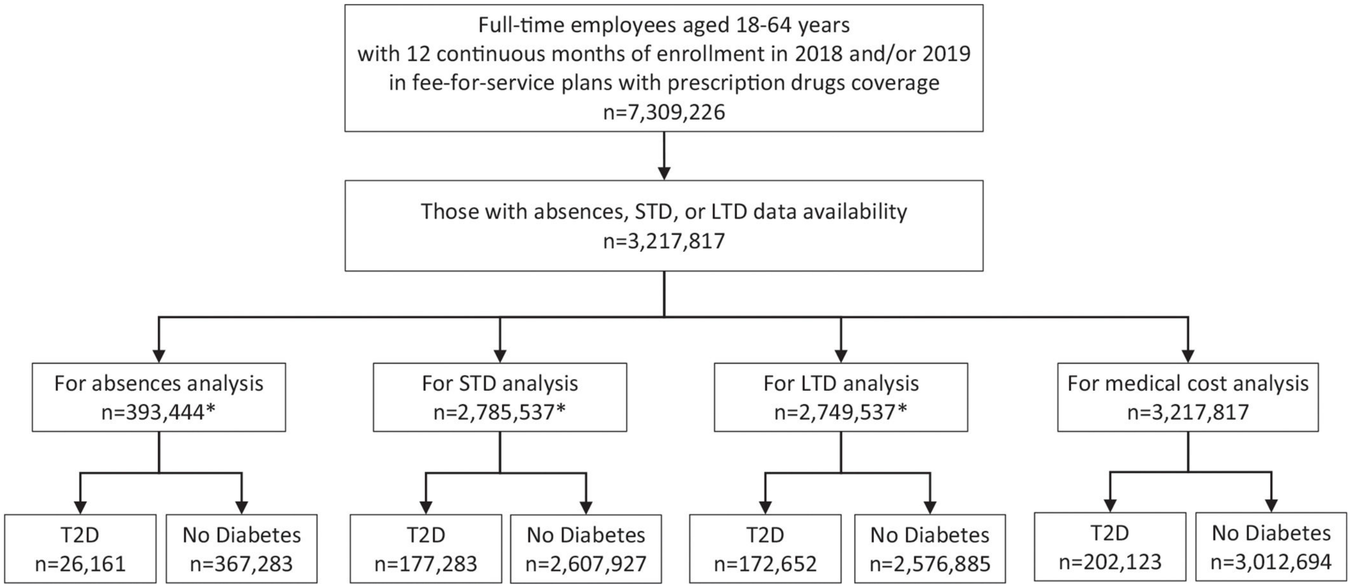

Figure 1—.

Selection of study sample for each analysis. *Some employers did not report on all three components. Absences includes workplace absences due to sickness, disability, leave, or recreational time off. STD, short-term disability; LTD, long-term disability; T2D, type 2 diabetes.

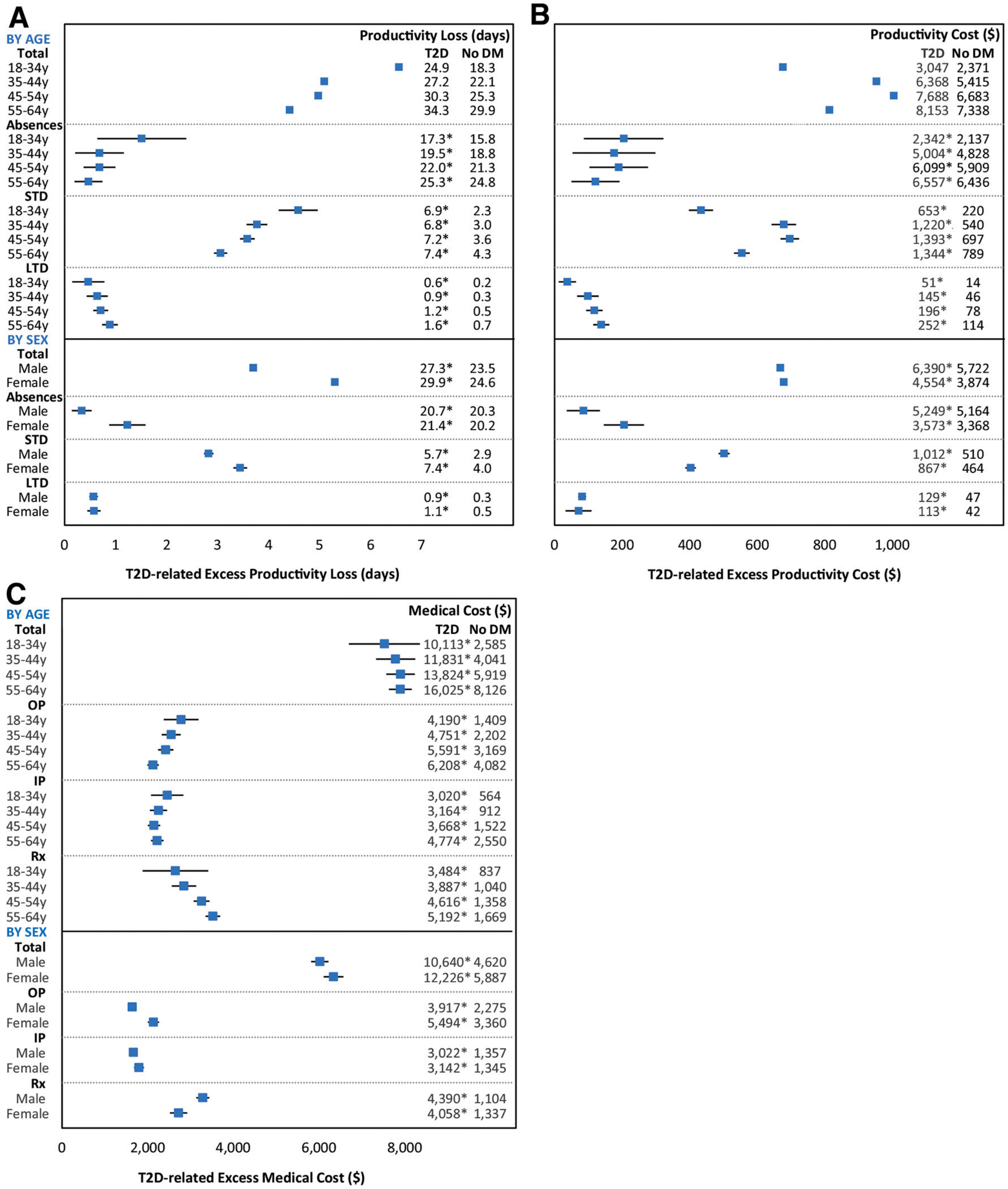

Figure 2—.

Adjusted estimates of per capita annual excess productivity losses and costs and medical costs by age-group and sex. *A*: Adjusted estimates of excess productivity losses of T2D and per capita mean annual productivity losses by T2D status. *B*: Adjusted estimates of excess productivity costs of T2D and per capita mean annual productivity costs by T2D status. *C*: Adjusted estimates of excess medical costs of T2D and per capita mean annual medical costs by T2D status.*Significantly different from no DM group at $P < 0.05$. Productivity losses and costs were estimated from two-part models, and medical costs were estimated from two-part or generalized linear models. All models were adjusted for age-group, sex, CCI, state of residence, and the industry type of the individuals' employer. All costs are in 2019 USD. Total productivity losses and costs were calculated by summing the mean annual estimates of each component by age-group and sex; therefore, 95% CIs and *P* values were not reported. DM, diabetes; IP, inpatient; OP, outpatient; Rx, prescription drugs.

Table 1—

Characteristics of overall study population

	T2D (*n* = 202,123)	No diabetes (*n* = 3,012,694)	*P*
Age, mean (SD), years	52 (8)	43 (11)	<0.001
Age-group			<0.001
18–34 years	6,907 (3.4)	811,754 (26.9)	
35–44 years	27,657 (13.7)	766,832 (25.5)	
45–54 years	71,774 (35.5)	800,395 (26.6)	
55–64 years	95,785 (47.4)	633,713 (21.0)	
Male sex	133,281 (65.9)	1,858,616 (61.7)	<0.001
Census region			<0.001
Northeast	27,842 (13.8)	493,605 (16.4)	
North Central	50,627 (25.1)	745,709 (24.8)	
South	93,440 (46.2)	1,195,336 (39.7)	
West	29,851 (14.8)	573,508 (19.0)	
Unknown	363 (0.2)	4,536 (0.2)	
Industry			<0.001
Manufacturing	77,719 (38.5)	1,091,592 (36.2)	
Transportation, communications, utilities	40,969 (20.3)	527,673 (17.5)	
Finance, insurance, real estate	27,684 (13.7)	495,294 (16.4)	
Services	36,555 (18.1)	594,050 (19.7)	
Others	14,742 (7.3)	225,089 (7.5)	
Missing	4,454 (2.2)	78,996 (2.6)	
CCI, mean (SD)	0.11 (0.5)	0.02 (0.2)	<0.001

Data are presented as *n* (%), unless indicated otherwise. *P* values are based on *t* tests for age and CCI and χ^2 tests for all else, comparing the mean or proportions between those with T2D and without diabetes.

Table 2—

Adjusted estimates of per capita mean annual productivity losses and costs and medical costs among individuals with T2D and without diabetes

	T2D		No diabetes			
	Mean	**SE**	**Mean**	**SE**	**Difference**	**SE**
Productivity loss (days)						
Total	28.2		24.0		4.2	
Absences	20.8	0.08	20.3	0.02	0.5*	0.1
STD	6.4	0.04	3.3	0.01	3.1*	0.0
LTD	1.0	0.05	0.4	0.01	0.6*	0.1
Productivity cost ($)						
Total	5,784		5,104		680	
Absences	4,655	18.7	4,536	5.1	119*	19.4
STD	996	5.9	514	1.2	482*	8.7
LTD	132	4.8	54	0.9	78*	8.2
Medical cost ($)						
Total	11,354	78.6	5,101	13.8	6,253*	81.7
Outpatient	4,558	40.0	2,687	7.4	1,872*	41.7
Inpatient	3,085	35.4	1,349	8.1	1,736*	36.4
Outpatient Rx drugs	4,182	65.1	1,189	14.2	2,993*	126.9
Total costs ($)†	17,138		10,205		6,933	

Productivity losses and costs were estimated from two-part models, and medical costs were estimated from two-part models or generalized linear models. All models were controlled for age-group, sex, CCI, state of residency, and industry type of the individuals' employer. All costs are expressed in 2019 USD. Rx, prescription.

*Statistically significant at an α level of 0.001.

†Total costs were estimated by summing the mean estimates of productivity costs associated with absences, STD, and LTD and total medical costs.