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Research Article

Employer Paid Sick Leave, Disability, and Workers' Compensation Trends for Employees With Cancer Conditions in the United States

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Abstract

Purpose: Employee benefits in U.S. firms often include medical and prescription insurance and short- and long-term disability (STD and LTD, respectively), workers' compensation (WC), and discretionary sick leave (SL). Employers are intensifying their efforts to understand and manage employee disability and its relationship to important health conditions. This research compares all-cause STD/LTD/WC/SL utilization and changes from baseline for eligible employees with cancer. **Methods:** Employees incurring cancer medical claims over a 20-year period (ending 12/31/2020) were identified in the Workpartners database. The annual prevalence, direct all-cause medical and prescription costs, absence benefit utilization, mean days of leave, and disability payments were analyzed retrospectively overall, and for specific cancer categories. Annual outcomes were calculated over the 20-year period. Trend line slopes were compared to detect differences from zero and across types of cancer. **Results**: At baseline (2001), 3.4% of employees had cancer, 58.7% of whom used SL, 16.7% filed STD claims, 0.8% filed LTD claims, and 0.9% filed WC claims. Baseline mean medical and drug costs for employees with cancer were $7,330 and $1,039, respectively. From 2001 to 2020, cancer prevalence rates increased significantly, by 0.75 per 1000 employees per year. While medical costs, drug costs, and sick days per employee increased significantly, the percent of employees using SL, LTD, and WC decreased. Some significant differences in trends among cancer types were seen. **Conclusions** While medical and drug costs for employees with cancer have increased over 2001-2020, utilization of most absence benefits and disability payments for those absences as a percent of salary have not.

Keywords: Cancer Conditions; Sick leave; Health Conditions; Employer disability.

Introduction

Costs for cancer care were estimated to be $208.9 billion in 2020 and include cancer-attributable costs for medical services and oral prescription drugs [1,2]. Medical and prescription costs varied by type of cancer, as did cost growth [1] Comprehensive information on both the direct and indirect cancer costs, such as those associated with absences, among working-age persons are lacking.

United States employers often provide health insurance to their employees, which pays a portion of the costs of employee and dependent medical and pharmacy services. Some US employers also provide sick leave (SL), which offers compensation (based on an employee's salary) during absences due to illness typically lasting less than two weeks, in addition to paid personal time off. Some employers provide additional short-term disability [3] (STD) and long-term disability [3] (LTD) coverage for longer illnesses and workers' compensation [4] (WC) for workplace illnesses and accidents. The absence benefits are summarized in (Table 1).

Absence Benefit	Typical Illness Duration	Percent of Salary Paid During Absence	Type of Illness	Employees in the Workpartners RRDb with coverage
Sick Leave	<2 weeks	100%	Non-work-related	710,000
Short-Term Disability[3]	2 weeks to 6 months	60%-100%	Non-work-related	1.2 million
Long-Term Disability[3]	>6 months	50%-70%	Non-work-related	1.1 million
Workers' Compensation[4]	any	66%-80%	Work-related	1.4 million

Table 1: United States Employers Absence Benefits and Coverage within the Workpartners RRDb.

According to the Centers for Disease Control and Prevention, an estimated 1.8 million people were diagnosed with cancer in the US in 2020 [5]. This has important implications for employers and workers alike. However, limited data on the work absence costs or lost time are available. Using a mix of claims data and proxies for cost (based on time absent and estimated average cost per day) within the most costly health and productivity conditions from 1997 to 1999, cancer of the female breast was ranked number 15, and cancer of the colon and rectum ranked number 20 [6]. A follow-up paper reported that "any cancer" was ranked in the top 10 conditions by estimated dollar impact, based on medical and productivity losses per employee [7].

A literature review revealed studies on absence and disability costs for patients with breast cancer,[8-11] multiple myeloma [12] bone metastases, [13] and non-Hodgkin lymphoma [14]. One early study using administrative claims compared multiple types of cancer with matched controls [15]. Some researchers also analyzed medication administration (oral vs injectable therapy) [12] and self- and physician-administered cancer treatment [16]. Several studies have reported patients reduce their work time due to their cancer, with many patients eventually returning to work within 5 years following diagnosis [17-18].

This present retrospective research compares all-cause payments for medical, prescription, (short- and long-term) disability, workers' compensation, and sick leave, and explores changes from baseline for eligible employees with cancer conditions. Different types of cancer were compared to understand whether trends were similar across cancer types.

Methods

To better understand the impact of cancer conditions on an employed population and on work absenteeism, claims from the Workpartners Research Reference Database (RRDb) were analyzed from January 1,2001-December 31, 2020. The RRDb is a national database that contains de-identified employee direct medical and prescription claims on 3.6 million US employees and 1.9 million dependents from multiple insurers in the manufacturing, retail, service, medical, transportation, technology, energy, financial, and utility industries. The RRDb also has data on employee job-related information (e.g., salary, exempt-/non-exempt status, full-/part-time status, etc.), vision and dental claims, plus payments and lost time for four absence benefits: sick leave, short-term disability, long-term disability, and workers' compensation. Employees in the RRDb with eligibility for the absence benefits are shown in Table 1.The RRDb has been used to analyze absence payments and lost productivity and trends for various conditions [19-29].

For the present study, patients were chronologically identified in the Workpartners RRDb,based on claims with ICD-9/-10 codes for the cancer categories defined by the US Agency for Healthcare Research and Quality [30] (AHRQ) (Table 2). The study claims data were analyzed over the fixed 20 calendar year periods ending 2020 for annual medical and prescription costs. Infused and injected agents paid for under the medical benefit are reported with the medical costs.

Category Name	Number of Unique Employees Years	Study Cohort	% of total
Cancer of breast	12,462	Breast	2.3%
Benign neoplasm of uterus	36,619	Female	6.7%
Cancer of cervix	21,732	Female	4.0%
Cancer of other female genital organs	1,349	Female	0.2%
Cancer of ovary	1,524	Female	0.3%
Cancer of uterus	1,732	Female	0.3%
Cancer of bladder	1,751	GI	0.3%
Cancer of colon	3,873	GI	0.7%
Cancer of esophagus	463	GI	0.1%
Cancer of liver and intrahepatic bile duct	1,017	GI	0.2%
Cancer of other GI organs; peritoneum	1,253	GI	0.2%
Cancer of rectum and anus	2,486	GI	0.5%
Cancer of stomach	675	GI	0.1%
Cancer of other male genital organs	227	Male	0.0%
Cancer of prostate	6,991	Male	1.3%
Cancer of testis	1,069	Male	0.2%
Melanomas of skin	5,656	Skin	1.0%
Multiple myeloma	827	Skin	0.2%
Other non-epithelial cancer of skin	31,960	Skin	5.8%
Cancer of bone and connective tissue	1,954	Other	0.4%
Cancer of brain and nervous system	1,564	Other	0.3%
Cancer of bronchus; lung	2,786	Other	0.5%
Cancer of head and neck	2,556	Other	0.5%
Cancer of kidney and renal pelvis	1,832	Other	0.3%
Cancer of other urinary organs	319	Other	0.1%
Cancer of pancreas	810	Other	0.1%
Cancer of thyroid	3,291	Other	0.6%
Cancer; other respiratory and intrathoracic	312	Other	0.1%
Hodgkin`s disease	1,072	Other	0.2%
Leukemias	1,964	Other	0.4%
Non–Hodgkin`s lymphoma	3,544	Other	0.6%
Secondary malignancies*	6,561	Other	1.2%

Category Name	Number of Unique Employees Years	Study Cohort	% of total
Cancer; other and unspecified primary*	6,515	Excluded	1.2%
Maintenance chemotherapy; radiotherapy*	9,690	Excluded	1.8%
Malignant neoplasm without specification of site*	2,573	Excluded	0.5%
Neoplasms of unspecified nature or uncertain behavior*	124,489	Excluded	22.8%
Other and unspecified benign neoplasm*	241,692	Excluded	44.2%
All categories	547,190		

Table 2: Unique Patients with US Agency for Healthcare Research and Quality Cancer Category Diagnoses[30];
*Eliminated per protocol due to the non-specific nature of the category.

The prevalence of cancer overall and the prevalence of the individual AHRQ-specific cancer conditions were calculated for each year. We eliminated categories of a non-specific nature from the analysis (e.g., maintenance chemotherapy or radiotherapy, unspecified neoplasms).To make the analysis manageable, the remaining categories were categorized into five groups: breast cancer (7%, including male and female), gastrointestinal ("GI") cancers (6%), "female" cancers (35%, including of the cervix, uterus, ovary, or other female genital organs but excluding breast cancer), "male" cancers (5%, including of the prostate, testes, and other male genital organs, excluding breast cancer), and "skin" (20%, e.g., dermatologic cancers, including melanomas, other non-epithelial cancer of skin). The remaining categories were grouped together as "other" cancer.

For each year's prevalent cancer populations, the annual medical and prescription costs and, as a measure of severity, the Charlson Comorbidity Index (CCI) scores [31] were calculated. For each absence benefit, the population was restricted to those employees with eligibility for the benefit, and the percent utilizing the benefit was calculated. Additionally, for short-term disability, long-term disability, and workers' compensation, the mean days of leave and the median payment as a percent of salary were calculated. Sick leave payments are equal to salary payments. Therefore, they are included in the average cost analyses but not in the median cost analyses. Outcomes from 2002 through 2020 were compared with baseline (2001).

All absences were aggregated based on the year the leave began. Long-term disability and workers' compensation payments included lump-sum distributions, and short-term disability, long-term disability, and workers' compensation leaves potentially extended beyond the year initiated. Workplace accidents were paid under the workers' compensation benefit. Workers' compensation claims without absence from work (medical-only claims) were excluded. Vacation time was not included in the analysis.

The cancer prevalence, comorbidity (CCI) and each benefit's cost, days (sick leave, short-term disability, long-term disability, and workers' compensation), and absence utilization (sick leave, short-term disability, long-term disability, workers' compensation) values were calculated. Trend lines were created for overall cancer and for each of the top cancer categories. The difference in the slopes of the trend lines were compared among the cancer categories and over time.

Results

The prevalence of all cancer conditions (Figure 1) averaged 3.4% over the study period, with the overall highest prevalence of 4.4% in 2018 and the lowest prevalence of 2.4% in 2004. Among the specific study cancer categories, the highest prevalence through most of the study was for Female cancers, with GI cancers the least prevalent. The annual prevalence slopes were positive (significantly greater than 0) for all cancers except Female cancers. The prevalence slope for All cancers was significantly greater than the slopes for Breast, GI, and Male cancers, and the slope for GI was significantly smaller than the "Other" prevalence slope.

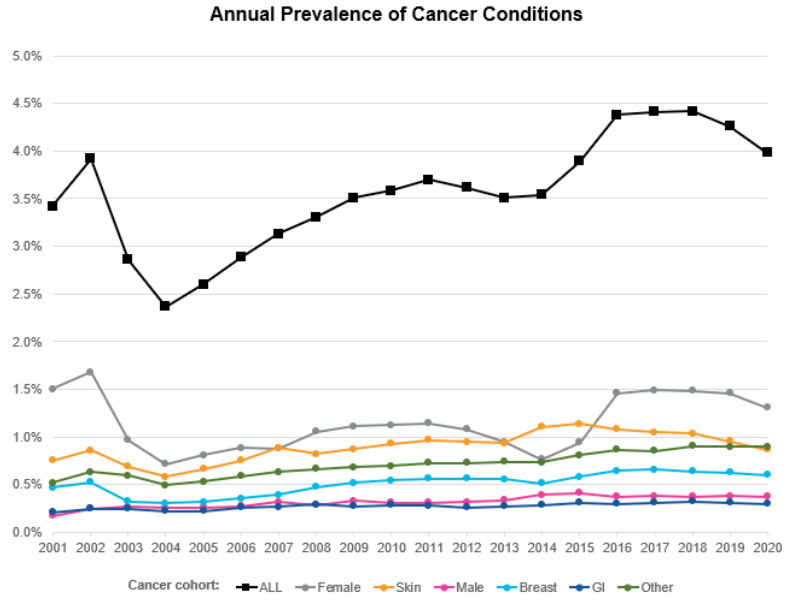

Figure 1: Annual Prevalence of Cancer Conditions.

Overall severity of comorbidities as measured by the annual CCI scores are presented in Figure 2, averaging just under 1.8. Consistently, employees with Female cancers had the lowest CCIs while employees with Other cancers had the highest CCIs until being overtaken by GI cancers in 2018. Analysis of the CCI score trend lines found the slopes for Breast, Male and Other did not increase, while the slopes for the remaining cancers (All, Female, GI, and Skin) were all significantly increasing. The CCI slope for GI was significantly greater than that of Breast, Female, Male, and Skin cancers.

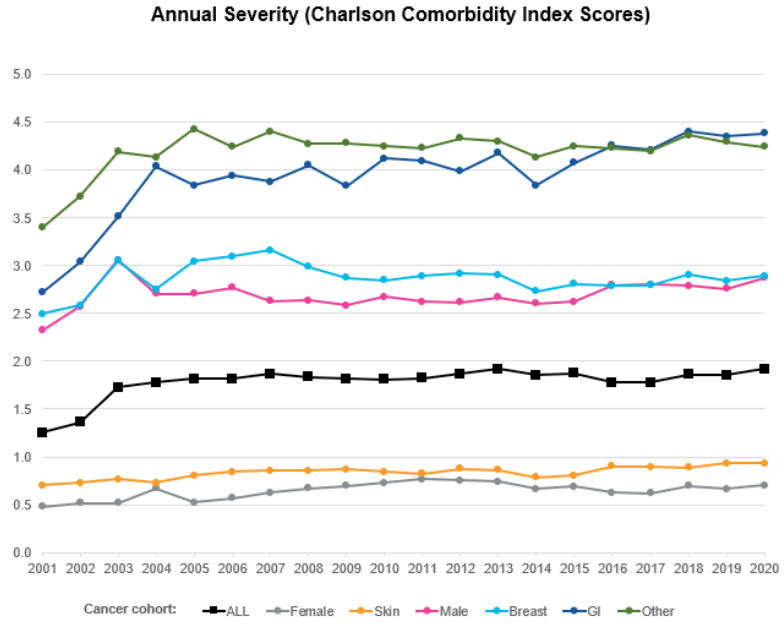

Figure 2: Annual Severity (Charlson Comorbidity Index Scores) for persons with Cancer Conditions.

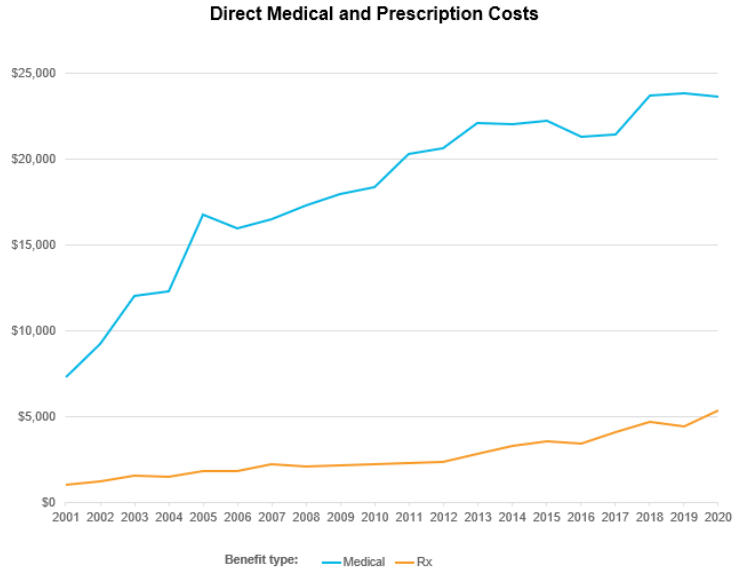

Figure 3: Direct Medical and Prescription Costs.

The overall average direct medical and prescription (Rx) costs for employees with cancer at baseline were $7330 and $1039, respectively. Both steadily increased from 2001 to 2020, with medical costs increasing at a rate almost four times higher than prescription costs (Figure 3). Within the cancer categories, the slopes for medical costs were largest for the Other and GI categories (significantly greater than for Female, Male, and Skin). Drug costs increased most rapidly for the Other category (significantly greater than most other categories).

	Sick Leave	Short-term Disability	Long-term Disability	Workers' Compensation
Utilization, % of Cohort	58.7	16.7	0.8	0.9
Days of leave, mean	7.8	42.8	132.2	66.6
Average Payment	$1279	$5640	$6732	$7649
Median Payment as Percent of Salary	NA	71.2%	17.5%	66.5%

Table 3: Baseline (2001) Values (All Cancers).

At baseline 2001, (Table 3), sick leave was the most utilized benefit by patients with cancer, followed by short-term disability, workers' compensation, then long-term disability. The annual percentages of employees utilizing each of the different absence benefits are shown in Figure 4 From 2001 through 2020, short-term disability utilization was 7.0%–21.8%, long-term disability utilization was 0.8%-2.6%, workers' compensation was 0.3%-1.0%, and sick leave was 34.5%–78.9%. The utilization slopes for cancer overall are similar to those of the individual cancers. For all cancers in this study, the slopes for sick leave and long-term disability all included zero in the confidence intervals and thus were not significantly different from zero. The short-term disability and workers' compensation slopes in all cancer categories demonstrated significant annual decreases, with the exceptions of Breast and Skin cancers.

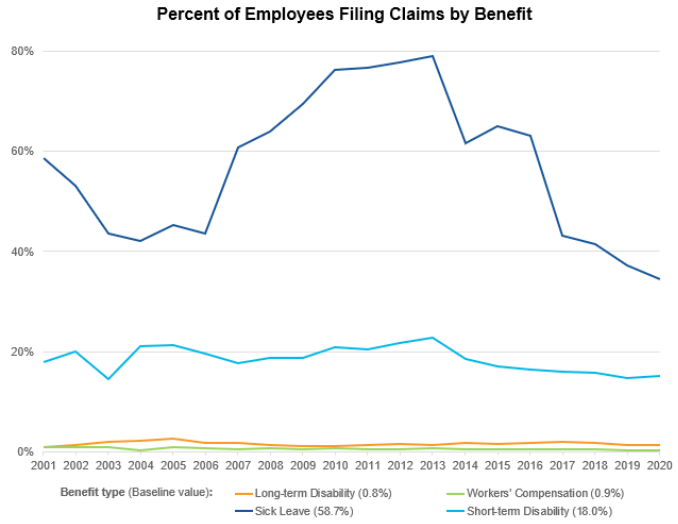

Figure 4: Percent of Employees Filing Claims by Benefit.

Annual days of leave relative to baseline by benefit for the All cancer cohort are presented in Figure 5. During the 20-year period (from 2001 through 2020) as a percent of baseline, relative mean days of sick leave were 65.2%-199.0%, short-term disability were 81.1%-116.1%, long-term disability leaves were 96.8%-330.5%, and workers' compensation leaves were 65.5%-293.1%. Sick leave days increased, with similar slopes for all individual cancer cohorts in the study. No significant annual changes were identified for the other three absence benefits.

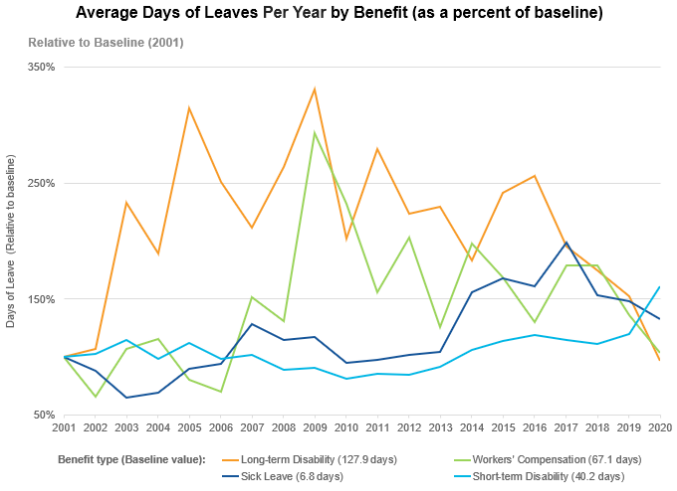

Figure 5: Average Days of Leaves Per Year by Benefit (as a percent of baseline).

The ranges of average absence payments as a percent of baseline average absence payments are shown in Figure 6 for each benefit. From 2001–2020 as a percent of baseline, the average payments were 91.9%-366.5% for sick leave, 96.0%-175.5% for short-term disability, 190.5%-810.3% for long-term disability, and were 60.4%-831.0% for workers' compensation. Analysis of the average payment trend lines slopes for the individual cancers revealed that all sick leave and all short-term disability average payments except Female and GI cancers were significantly increasing annually. Additionally, long-term disability payments for Other cancers were also increasing, whereas the average costs for each of the remaining benefit-cancer combinations did not significantly increase.

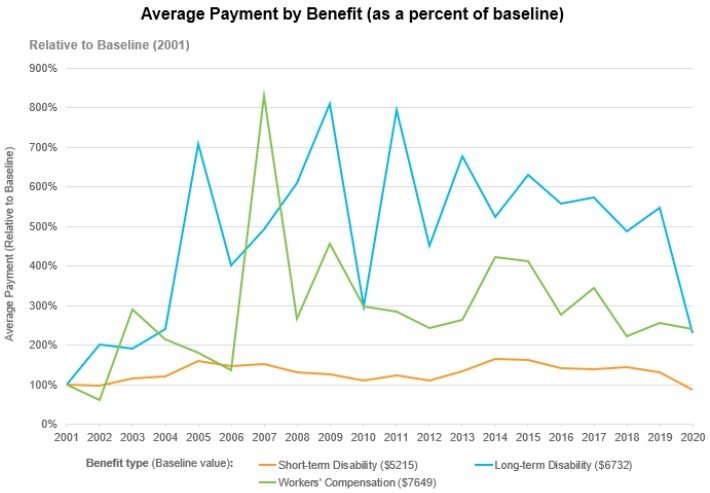

Figure 6: Average Payment by Benefit (as a percent of baseline).

At baseline, sick leave median payments were equal to salary, and for the other benefits, the median payments as a percent of salary were highest for short-term disability, followed by workers' compensation and long-term disability. Compared with baseline, the range of relative median payments as a percent of salary is shown in Figure 7**.** From 2001 to 2020, the median payments were 83.9%-130.7% of baseline for short-term disability, 136.5%-331.1% for long-term disability, and 75.9%-207.3% for workers' compensation. The slopes of the median payment lines for median long-term disability and workers' compensation annual payments were all similar to zero (no increase) overall and for the individual cancers. Within short-term disability a decrease in annual median payments was noted for the Breast and Skin cancer categories.

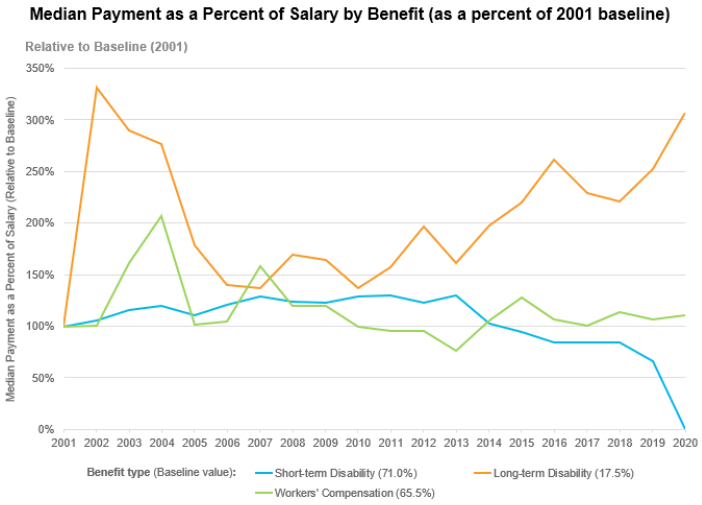

Figure 7: Median Payment as a Percent of Salary by Benefit (as a percent of 2001 baseline). Because sick leave payments are equal to salary, they are omitted from this chart.

Discussion

Although many studies report using real-world data to examine the impact of cancer on work absence, disability, and cost, few studies in the literature use real-world, person-specific absence cost and lost time data from comprehensive employee benefits and payroll systems [19-29].

Few studies cover multiple benefit types. The majority of studies focus only on disability data, [8-14] whereas some also include sick leave information [10,12,14]. Research by Goyal, [8] Wan,[10] Qian,[13] and Chang [15] focused on short-term disability and excluded long-term disability, whereas Merola [12] and Yu [14] examined long term disability. None of the studies identified included workers' compensation data. In these papers, the researchers multiplied lost time by a constant payment for absences across benefits,[12,13,15] which appears to be inaccurate, based on the present results. Other research focused on the out-of-pocket costs for cancers, but did not address absence costs [32].

A lot has changed in cancer management since Chang et al. [15] researched seven types of cancer, and while they used matched controls and report direct medical costs specific to each the cancers, similar to our research, their absence data were aggregated due to small sample sizes. Unlike the present research, Chang et al. [15] used US bureau of labor statistics (BLS) data to estimate absence costs for sick leave and short-term disability data, estimating monthly costs of $373 for sick leave (*vs*. controls $101) and $698 for short-term disability (*vs*. controls $25).

Chang et al. [15] reported that cancer patients had 5.2 mean monthly (62.4 annual) short-term disability days and 2.8 mean sick leave absence days per month (33.3 per year), translating to a monthly mean costs of $373 for sick leave and $698 for short-term disability ($8769 and $16,409 per year inflation adjusted to 2020 dollars, respectively). Our study found annual sick leave costs averaged $2483 (range: $1176-$4688) and short-term disability costs averaging $7579 (range: $5417-$9895), with annual sick leave days averaging 9.3 (range: 5.1-15.5) and short-term disability days averaging 43.0 (range: 34.7-49.7). The differences in days and costs between studies may be in part due to differences in overall benefit administration.

The estimates by Mariotto et al. [1] were largely based on cancer survivors aged 65 years and older, and excluded subjects who did not survive. Furthermore, these estimates project the Medicare data to those with cancer treated in the initial and end of life phases that are younger than 65 years old.1 Furthermore, this estimate [1,2] only presents cancer-attributable costs for medical services and oral prescription drugs [5] and ignores productivity losses, indirect health cost, and workers' compensation claims.

Absences from work can have significant implications on business performance. Absence costs in the literature are often estimated using a constant rather than the actual amount paid to the employee for time missed due to their absence, and studies often assume that the percent of salary received is the same, regardless of benefit [10,12,15]. These estimates often combine disability (short- and long-term) and in some cases do not differentiate between absence benefits used [12].

Reflecting the unique information contained in the database, the Workpartners RRDb has been leveraged to publish data from all four absence benefits using real-world data based on claims and payroll data [19-29] In the present study, annual cohort inclusion, prevalence, medical costs, and CCI were based on medical claims, drug costs were derived from prescription claims, with the remaining outcomes based on absence benefits.

Many of the identified studies focused on patients with cancer. The present research focused on employees with cancer, but the results have been compared with research on employees whose spouses have cancer [33]. In comparing the prevalence of these two recent cancer studies in this database, the spouses with cancer and employees with cancer were highly correlated (Pearson correlation coefficients [r] $\geq$ 0.9) for All cancer, Skin cancer and Other cancer. Female cancers had a small correlation (r = 0.07), and Male, Breast, and GI cancers had r of 0.67, 0.74, and 0.78, respectively.

The present study has several strengths. This study used real-world, objective data from employer disability, workers' compensation claims and payroll systems, and was conducted in a diverse, commercial workplace–centric database, which includes patients dispersed throughout the US. The database also includes

job-related information (salary, exempt status, and part-/full-time status) and self-reported racial information not contained in other databases. The employers in the database represent a wide range of industries.

This study has several limitations. These administrative claims data are derived from employees with commercial health insurance over the study period and may not be generalizable to patients who do not have employer-sponsored health insurance or who are unemployed. Although the study did examine subgroups of cancer and compared them with cancer overall, we did not examine all of the individual cancer conditions-and similar to the variance amongst the cancer categories in the study, there were likely differences within the individual cancer categories.

The study also did not assess the impact of treatment or ascertain disease control of the patients. In addition, comparisons with baseline allow for a level of control, but the study did not include specific control groups. The Workpartners RRDb provided a convenience-based sample, and the population expanded or contracted by employers joining or leaving the database. Even though the study was conducted over a 20-year period, each year/condition was an evolving and thus different cohort with potentially evolving absence benefit plan characteristics. Cost data associated with paid leaves are generally not normally distributed and may benefit from a regression-based approach. Finally, the RRDb cannot control for employer-based interventions to decrease sick leave and disability. This study includes 20 years of observation; therefore, it is likely that at least some of the trends were impacted by such interventions.

This study did not address *presenteeism*, which refers to the lost productivity that occurs when employees are not fully functioning in the workplace because of an illness, injury, or other condition. Perhaps 25% of cancer survivors feel less productive at work, with 25% having difficulty with physical tasks and 14% having difficulty with mental tasks required by their job [34].

Future research should consider comparing health issues and treatments for employees versus spouses with cancer, examining specific cancer conditions, using control cohorts (employees without the stated condition), adjusting inclusion/exclusion criteria to require multiple medical or prescription claims, and using two-part regression models controlling for employee job-related information (e.g., salary, full-/part-time status, etc.) to estimate absences and costs, which might allow the impact to be projected to the US employed population.

Conclusion

In this real-world study, the overall severity of illness in the patient population with cancer conditions, as measured by the Charlson Comorbidity Index, increased during the study period. Whereas medical and drug costs for employees with cancer increased from 2001 to 2020, utilization of absence benefits and payments for those absences as a percent of salary have not increased. Additionally, the percent of employees with cancer using disability, workers' compensation, or sick leave in a given year varied greatly. Additionally, the lengths of leave as well as payments for leave as a percent of salary over time were highly variable and associated with benefit type. Using a constant cost or salary replacement factor over time, or for all benefits, is not accurate or appropriate in health benefit absence research. Every effort should be made to use actual person-level or claim-level absence and payment data from employer disability, workers' compensation, and payroll data systems.

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