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Cancer pain management disparities in the emergency department: a California state assessment

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Cancer pain management disparities in the emergency department: a California state assessment

Running Title: *"Cancer pain management disparities"*

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- Study concept and design: CJC
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Cancer pain management disparities in the emergency department: a California state assessment

ABSTRACT

Objectives

Pain is a common driving factor for why cancer patients present to the emergency department. Patients with cancer-related pain visit the emergency department (ED) more often than other patients with chronic, non-cancerous conditions and have very specific needs in relation to other ED users. Inadequate pain management and disparities in treatment contribute to high rates of ED recidivism among cancer patients. This paper aims to explore racial/ethnic and socioeconomic disparities in patients presenting to the ED with cancer and pain-related complaints using 7-day return visits as a quality-of-care metric.

Methods

Data was collected from the state of California using Department of Health Care Access and Information (HCAI) database from 2021. Ultimately, there were a total of 33,739 qualifying index visits and 26,696 patients responsible for at least one index visit. Of these, there were 4,199 patients with at least one 7-day ED return visit, resulting in 5,062 total 7-day return visits. Data was analyzed via descriptive statistics.

Results

In our analysis, 15.7% of patients presenting to the ED with cancer diagnoses and pain complaints had 7-day return visits. Non-Hispanic Black cancer patients contributed to the highest rate of pain-related return visits compared to other ethnic groups at an age, sex and population

adjusted rate of 21.0%. Significant discrepancies in return rates are seen based on race/ethnicity and socioeconomic status.

Conclusion

While differences in cancer type and disease burden contributed to revisit patterns, these clinical factors did not fully account for the disproportionately high rates of recidivism among Non-Hispanic Black and Hispanic/Latinx patients. Overall, the data reflect disparities in the management of pain-related complaints for cancer patients presenting to the ED. Targeted, equity-focused interventions are needed to address these gaps.

Introduction

Pain is the most common reason for an ED visit in cancer patients. Patients with cancer-related pain visit the emergency department more often than other patients with chronic, non-cancerous conditions and have very specific needs in relation to other ED users [1-10]. Considering the high pain burden throughout all cancer stages, it is estimated that somewhere between 56% to 82.3% of cancer patients do not experience adequate pain management [11]. In terminal cancers, ED visits are indicators of poor quality end-of-life care [12].

Disparities in general pain management are relatively well-documented. Racial and ethnic minorities are more likely to receive inadequate analgesia compared to their non-Hispanic white counterparts [13]. Successful pain management and analgesic usage can vary based on age, race/ethnicity, type of pain, and personal biases of treating providers, among other things [14-16]. However, the way these disparities manifest in the treatment of cancer-related pain in the ED is less well investigated.

Current treatment protocols for patients presenting to the ED with acute or acute-on-chronic moderate to severe pain exacerbations prioritize identifying true medical or surgical emergencies with the next priority being alleviating patients' pain. Addressing other factors like access to healthcare, medication compliance, and interactions with other chronic conditions are important as well to ensure that patients' pain is thoroughly addressed [17]. Several studies concluded that a lack of formal pain assessment and management protocols negatively impacted the ability to adequately treat pain [2]. Without cohesive systematic approaches, it is easier to under-treat pain and allows bias to influence patient outcomes.

Understanding how to sufficiently treat patients with cancer pain decreases medical costs [18], reduces preventable visits [4, 8, 19], decreases a growing burden on EDs, and improves the quality of life of these patients. This paper aims to explore racial/ethnic and socioeconomic disparities in patients presenting to the ED with cancer and pain-related complaints using 7-day return visits as a quality-of-care metric.

Methods

Data were collected from the state of California using Department of Health Care Access and Information (HCAI) database from 2021. HCAI requires all licensed hospitals in the state to submit utilization data in a standardized format. Our analysis focused on unique ED encounters reported in two non-public HCAI datasets: the Patient Discharge Data (PDD) and the Emergency Department and Ambulatory Surgery Data (EDAS). For this study, we combined same-hospital ED admissions from the PDD with ED encounters from the EDAS to create a comprehensive, non-duplicative database of ED utilization for analysis. Data were collected from 317 facilities reporting ED visits. The total number of visits included in the database was 12,868,925 which

were then narrowed down to exclude visits from patients younger than 18 years old, visits without valid patient identifiers, patients without at least one cancer-related visit, and maternity, rehab, psychiatric, and pediatric visits. Discharges with planned inpatient admissions or transfers to long term care hospitals, discharges against medical advice, discharges resulting from death, and invalid index dispositions were also excluded.

We used 7-day ED return visits as a quality-of-care metric, as early revisits can reflect gaps in initial management, inadequate symptom control, or insufficient discharge planning [20]. To identify eligible revisits within a 7-day period including index visits, direct and elective admissions were excluded along with visits with missing admission information. Emergency, urgent, and trauma admissions along with ED discharges were considered if they represented acute care or resulted in an ED discharge. Admissions from other hospitals, ambulatory surgery centers, hospice care, and scheduled admissions were excluded. Visits listing patient race/ethnicity as other/unknown were excluded. Any cancer diagnosis and any pain diagnosis were used to identify cancer pain-related visits. Ultimately, there were a total of 33,739 qualifying index visits and 26,696 patients responsible for at least one index visit (Figure 1). Of these, there were 4,199 patients with at least one 7-day ED return visit—only the first return visit within the 7-day window was included from patients with multiple return visits, resulting in 5,062 total 7-day return visits. Demographics, ED dispositions, return visit information, and estimated median household income by ZIP code were analyzed via descriptive statistics.

Results

The study included 33,739 eligible index visits across 26,696 adult patients with both a pain-related complaint and a cancer diagnosis. Of these, 5,062 (15.0%) were return visits that

occurred within 7 days of the index visit and 4,199 patients (15.7%) had at least one 7-day return visit *(Table 1)*. For all qualifying index visits, the overall population demographics were 53.1% Non-Hispanic White (NHW), 24.8% Hispanic/Latinx (HL), 11.5% Non-Hispanic Black (NHB), and 10.6% Non-Hispanic Asian (NHA) *(Table 1)*. The median age for all qualifying index visits was 66 years old (IQR 56-76). By ethnicity, Non-Hispanic White patients had the highest median age (69), then Non-Hispanic Asian (66), Non-Hispanic Black (64), and Hispanic/Latinx (61). Males and females comprised 43.3% and 56.7% of index visits respectively. The median household income for index visits was $96,555 (IQR $76,313-121,269) with the highest median income among Non-Hispanic Asians ($110,094), then Non-Hispanic Whites ($104,227), Non-Hispanic Black ($85,990), and Hispanic patients ($84,818) (*Table 1*). Medicare was the most frequent payer status across all index visits. Non-Hispanic White patients had the greatest proportion of visits paid for via Medicare (62.5%). Non-Hispanic Asian patients commonly paid through Medicare as well (49.4%), however they also had the largest proportion paying with private insurance (35.4%). Hispanic/Latinx patients had the largest proportion paying through Medi-Cal (27.2%) followed by Non-Hispanic Black patients (21.1%) compared to Medicare rates of 42.3% and 51.2% respectively (*Table 1)*.

The revisit rate for visits by Non-Hispanic Black patients was the highest (17.2%), followed by Hispanic/Latinx (16.1%), then Non-Hispanic White (15.5%) and Non-Hispanic Asian (14.4%) (*Figure 2)*. Concerning ED revisits only, the median age was 65 years (IQR 54-74), 47.7% of patients were male, and 52.3% were female, however, the median age and sex for patients with at least one revisit varies slightly based on ethnicity. Hispanic patients had the youngest median age (60) and the second highest proportion of female patients (53.0%). Non-Hispanic Black patients had the next youngest median age (62) and the highest proportion of

female patients (57.0%). Non-Hispanic Asian patients had a median age of 65 and the lowest proportion of female patients at 47.4%. Non-Hispanic White patients had the oldest median age of 68 and a proportion of female patients of 51.8% (*Table 1*). Adjusted for age and sex, the return visit rates for each race based on standard California populations were as follows, ordered from highest to lowest: Non-Hispanic Black (21.1%), Non-Hispanic Asians (18.3%). Non-Hispanic Whites (17.3%), Hispanic (17.1%). Median household income was the highest for Non-Hispanic Asians ($107,849), followed by Non-Hispanic Whites ($100,183), Non-Hispanic Black patients ($82,978), and Hispanic patients ($81,719) (*Table 1*). Among patients with 7-day return visits, the proportion of Medi-Cal users increased across all groups (*Figure 3)* with a concordant decrease in the proportions of Medicare and private insurance. The highest proportions of Medi-Cal payers were seen in Non-Hispanic Black patients (31.5%) and Hispanic patients (34.1%). Furthermore, the greatest increase in proportion of patients with 7-day return visits using Medi-Cal was seen in Non-Hispanic Black patients, followed by Hispanic patients, Non-Hispanic Whites, and Non-Hispanic Asians.

The top 5 primary pain diagnoses represented among all eligible index visits across all ethnicities were: abdominal pain (29.9%); chest pain (23.3%); and dorsalgia (19.5%); Pain, not elsewhere classified (19.4%); and headache or migraine (15.4%). The top 5 discharge diagnoses at index ED visits associated with 7-day return visits were: Abdominal and pelvic pain (7.4%); Other sepsis (6.3%); Pain in throat and chest (4.1%); Pain, not elsewhere classified (3.4%); and dorsalgia (3.0%). The top 5 pain-related revisit rates were due to: Abdominal pain (18.7%), followed by Pain, not elsewhere classified (NEC) (18.2%), Back pain (15.4%), Headache or migraine (14.6%), and lastly other miscellaneous pain (13.1%) *(Table 2)*. By race/ethnicity, Non-Hispanic Black patients had the highest revisit rate for Abdominal pain (20.8%); Pain, NEC

(19.2%); back pain (16.7%), and other miscellaneous pain (14.7%). The highest revisit rate for Headache or migraine (14.8%) was observed in Hispanic patients. Non-Hispanic Asians had the lowest pain-related revisit rates associated with each of the top 5 categories except for back pain, which was observed in Hispanic patients (14.1%) *(Table 3)*.

Breast cancer in females was the most common cancer diagnosis (13.3%) across all index visits, regardless of ethnicity. Prostate cancer (9.1%), myelodysplastic syndrome (8.2%), and lung cancer (7.5%) were among the next most common diagnoses followed by non-Hodgkin lymphoma (5.2%), colon cancer (4.7%), and multiple myeloma (4.2%). Non-Hispanic Asians had the highest metastatic disease burden at index ED visits (33.3%), followed by Non-Hispanic Black patients (28.5%), Non-Hispanic Whites (28.3%), and Hispanics/Latinx (27.5%). Non-Hispanic Black patients had the highest chronic disease burden based on Charlson Comorbidity Index (CCI) scores. Including cancer, 50.2% of all patients at index ED visits had a CCI higher than 3, however, 54.8% of Non-Hispanic Black patients had a CCI score higher than 3 with 14.8% having a score of 8 or greater (*Table 1*). In comparison, 51.5% of Non-Hispanic Whites had a CCI higher than 3 with 10.9% having a score of 8 or greater. Among Non-Hispanic Asians, 53% of patients had a CCI higher than 3 with 12% having a score of 8 or greater. Hispanics/Latinx had the lowest chronic disease burden with 44.2% having a CCI score higher than 3 with 7.4% of those being 8 or greater.

Quantitatively, breast cancer was the most common primary cancer among index visits (13.3%) and second most common among revisits (6.1%), yet when looking at cancer-specific return rates, several other cancers had higher proportions of patients returning to the ED within 7 days. Specifically, the highest return rates were seen in Other endocrine cancers (31.4 %)—not including thyroid cancer and neuroendocrine tumors; cervical cancer (25.3%); and small

intestinal cancer (22.5%), though these cancer diagnoses comprised a smaller proportion of total visits. The return rates among more commonly represented cancers like female breast cancer vary between race/ethnicity. For female breast cancer patients, Non-Hispanic Black patients returned at the highest rate (14.3%), followed by Non-Hispanic Whites (11.5%), Hispanics/Latinx (11.1%) and Non-Hispanic Asians (9.6%). Metastatic disease burden follows a different distribution across revisits when compared to index visits with the highest burden remaining among Non-Hispanic Asians (40.5%), followed by Hispanic patients (29.9%), Non-Hispanic Whites (28.7%), and Non-Hispanic Black patients (28.5%). Chronic disease burden follows a different pattern. In the sample of ED revisits, including cancer, 50.9% of all patients had a Charlson Comorbidity Index (CCI) higher than 3 at their index visit. Non-Hispanic Asian patients had the highest proportion of CCI scores greater than 3 (60.7%). This is followed by Non-Hispanic Black patients (56.6%), then Non-Hispanic White patients (50.4%), and Hispanic/Latinx patients (45.4%).

57.5% of 7-day revisits resulted in a repeat discharge, however, 37.1% of visits resulted in an admission to the same ED or admission/transfer to another hospital *(Table 4)*. Non-Hispanic Asian patients were admitted at the highest rate on return visits (37.3%), followed by Non-Hispanic White patients (34.8%), Hispanic patients (32.8%) and Non-Hispanic Black patients (27.2%) *(Table 4)*. The most common hospital dispositions for patients that were admitted after a 7-day repeat ED visit were Discharge (55.8%), followed by Home Health (24.0%), Hospice (10.2%), Expired (7.3%), and Transfer (2.7%). When comparing the index visit and the 7-day return visits, the primary discharge diagnosis commonly changed (79.9%), while most of the patient population presented to the same ED for the return visit (75.1%). Of the 7-day return visits, Non-Hispanic Black patients had the greatest proportion of change of care

facility (30.6%), followed by Hispanics/Latinx (25.1%), Non-Hispanic Whites (24.1%), and Non-Hispanic Asians (21.4%).

Tables

Table 1. *Demographic and Clinical Characteristics of Adult Cancer Patients Presenting to the Emergency Department.*

Characteristic	Hispanic	Non-Hispanic White	Non-Hispanic Black	Non-Hispanic Asian	Overall
Total 18+	6,627 (24.8) / 1,066 (16.1)	14,173 (53.1) / 2,196 (15.5)	3,075 (11.5) / 530 (17.2)	2,821 (10.6) / 407 (14.4)	26,696 (100.0) / 4,199 (15.7)
Age					
18–34	546 (8.2) / 85 (8.0)	371 (2.6) / 69 (3.1)	157 (5.1) / 37 (7.0)	115 (4.1) / 25 (6.1)	1,189 (4.5) / 216 (5.1)
35–44	596 (9.0) / 104 (9.8)	695 (4.9) / 129 (5.9)	199 (6.5) / 51 (9.6)	209 (7.4) / 27 (6.6)	1,699 (6.4) / 311 (7.4)
45–54	1,107 (16.7) / 188 (17.6)	1,318 (9.3) / 234 (10.7)	358 (11.6) / 70 (13.2)	413 (14.6) / 58 (14.3)	3,196 (12.0) / 550 (13.1)
55–64	1,673 (25.2) / 290 (27.2)	2,911 (20.5) / 488 (22.2)	834 (27.1) / 142 (26.8)	584 (20.7) / 93 (22.9)	6,002 (22.5) / 1,013 (24.1)
65–74	1,512 (22.8) / 226 (21.2)	3,958 (27.9) / 600 (27.3)	868 (28.2) / 129 (24.3)	791 (28.0) / 110 (27.0)	7,129 (26.7) / 1,065 (25.4)
75–84	855 (12.9) / 123 (11.5)	3,279 (23.1) / 453 (20.6)	478 (15.5) / 73 (13.8)	510 (18.1) / 69 (17.0)	5,122 (19.2) / 718 (17.1)
85+	338 (5.1) / 50 (4.7)	1,641 (11.6) / 223 (10.2)	181 (5.9) / 28 (5.3)	199 (7.1) / 25 (6.1)	2,359 (8.8) / 326 (7.8)
Sex					
Male	2,666 (40.2) / 501 (47.0)	6,429 (45.4) / 1,058 (48.2)	1,312 (42.7) / 228 (43.0)	1,155 (40.9) / 214 (52.6)	11,562 (43.3) / 2,001 (47.7)
Female	3,961 (59.8) / 565 (53.0)	7,744 (54.6) / 1,138 (51.8)	1,763 (57.3) / 302 (57.0)	1,666 (59.1) / 193 (47.4)	15,134 (56.7) / 2,198 (52.3)
Tumor Type					
Solid	5,531 (83.5) / 903 (84.7)	11,604 (81.9) / 1,848 (84.2)	2,571 (83.6) / 447 (84.3)	2,449 (86.8) / 352 (86.5)	22,155 (83.0) / 3,550 (84.5)
Liquid	1,050 (15.8) / 160 (15.0)	2,344 (16.5) / 315 (14.3)	460 (15.0) / 74 (14.0)	337 (11.9) / 47 (11.5)	4,191 (15.7) / 596 (14.2)
Both	46 (0.7) / 3 (0.3)	225 (1.6) / 33 (1.5)	44 (1.4) / 9 (1.7)	35 (1.2) / 8 (2.0)	350 (1.3) / 53 (1.3)
Charlson Comorbidity Index					
2–3	3,696 (55.8) / 582 (54.6)	6,875 (48.5) / 1,089 (49.6)	1,390 (45.2) / 230 (43.4)	1,327 (47.0) / 160 (39.3)	13,288 (49.8) / 2,061 (49.1)
4–5	679 (10.2) / 106 (9.9)	1,987 (14.0) / 270 (12.3)	435 (14.1) / 63 (11.9)	277 (9.8) / 50 (12.3)	3,378 (12.7) / 489 (11.6)

6–7	1,760 (26.6) / 305 (28.6)	3,762 (26.5) / 608 (27.7)	796 (25.9) / 155 (29.2)	878 (31.1) / 148 (36.4)	7,196 (27.0) / 1,216 (29.0)
≥8	492 (7.4) / 73 (6.8)	1,549 (10.9) / 229 (10.4)	454 (14.8) / 82 (15.5)	339 (12.0) / 49 (12.0)	2,834 (10.6) / 433 (10.3)
Primary Payer					
Private	1,882 (28.4) / 265 (24.9)	3,696 (26.1) / 515 (23.5)	782 (25.4) / 103 (19.4)	998 (35.4) / 132 (32.4)	7,358 (27.6) / 1,015 (24.2)
Medicare	2,804 (42.3) / 418 (39.2)	8,859 (62.5) / 1,307 (59.5)	1,574 (51.2) / 248 (46.8)	1,393 (49.4) / 196 (48.2)	14,630 (54.8) / 2,169 (51.7)
Medi-Cal	1,804 (27.2) / 364 (34.1)	1,471 (10.4) / 349 (15.9)	649 (21.1) / 167 (31.5)	399 (14.1) / 75 (18.4)	4,323 (16.2) / 955 (22.7)
Self-pay/Indigent	137 (2.1) / 19 (1.8)	147 (1.0) / 25 (1.1)	70 (2.3) / 12 (2.3)	31 (1.1) / 4 (1.0)	385 (1.4) / 60 (1.4)
Median Household Income ($), median (Q1–Q3)	84,818 (69,419–104,627) / 81,719 (67,259–100,668)	104,227 (81,262–127,464) / 100,183 (77,621–122,647)	85,990 (68,191–109,991) / 82,978 (66,957–107,943)	110,094 (84,924–135,612) / 107,849 (83,150–130,691)	96,555 (76,313–121,269) / 93,464 (73,611–116,773)

Note: Values are shown as Index n (%) / Revisit n (%). For the Total ≥18 years row, Index percentages represent the distribution of the Index cohort across race/ethnicity groups; Revisit percentages represent the proportion of patients within each race/ethnicity group who revisited. For all other characteristics, percentages are calculated within race/ethnicity groups. Overall column percentages are calculated relative to the total Index and total Revisit cohorts, respectively.

Table 2. *Overall top five pain-related ED revisit rates.*

Pain Diagnosis	Overall		
	Index (n)	Revisit (n)	Rate (%)
Abdominal pain	7985	1496	18.7
Headache or migraine	4117	601	14.6
Back pain	5211	804	15.4
Pain, NEC	5183	944	18.2
Other Pain	10887	1430	13.1

Abbreviations: NEC, not elsewhere classified.

Table 3. *Top five pain-related ED revisits by race/ethnicity.*

Pain Diagnosis	All Index Discharges, n				7-day Return Visits, n (%)			
	Hispanic	NH White	NH Black	NH Asian	Hispanic	NH White	NH Black	NH Asian
Abdominal pain	2371	3833	842	939	454 (19.1%)	702 (18.3%)	175 (20.8%)	165 (17.6%)
Headache or migraine	972	2280	453	412	144 (14.8%)	336 (14.7%)	63 (13.9%)	58 (14.1%)
Back pain	1172	2901	671	467	165 (14.1%)	453 (15.6%)	112 (16.7%)	74 (15.8%)

Pain, NEC	1081	3054	651	397	204 (18.9%)	545 (17.8%)	125 (19.2%)	70 (17.6%)
Other Pain	2603	5745	1346	1193	348 (13.4%)	752 (13.1%)	198 (14.7%)	132 (11.1%)

Abbreviations: NEC, not elsewhere classified.

Table 4. *Discharge Disposition associate with 7-day ED return visits by race/ethnicity.*

Discharge Disposition	Hispanic, n (%)	Non-Hispanic White, n (%)	Non-Hispanic Black, n (%)	Non-Hispanic Asian, n (%)	Overall, n (%)
Discharge	652 (61.2)	1,215 (55.3)	329 (62.1)	220 (54.1)	2,416 (57.5)
Discharge to Home Health Service	8 (0.8)	29 (1.3)	6 (1.1)	11 (2.7)	54 (1.3)
Admitted/Transferred to another hospital	22 (2.1)	88 (4.0)	28 (5.3)	11 (2.7)	149 (3.5)
Discharged/Transferred to SNF, ICF, IRF, or nursing facility	5 (0.5)	37 (1.7)	6 (1.1)	4 (1.0)	52 (1.2)
AMA	26 (2.4)	55 (2.5)	17 (3.2)	7 (1.7)	105 (2.5)
Expired	3 (0.3)	7 (0.3)	0 (0)	2 (0.5)	12 (0.3)
Other	0 (0)	1 (0)	0 (0)	0 (0)	1 (0)
Admitted to the same ED	350 (32.8)	764 (34.8)	144 (27.2)	152 (37.3)	1,410 (33.6)

Abbreviations: ED, emergency department; SNF, skilled nursing facility; ICF, intermediate care facility; IRF, inpatient rehabilitation facility; AMA, against medical advice.

Figures

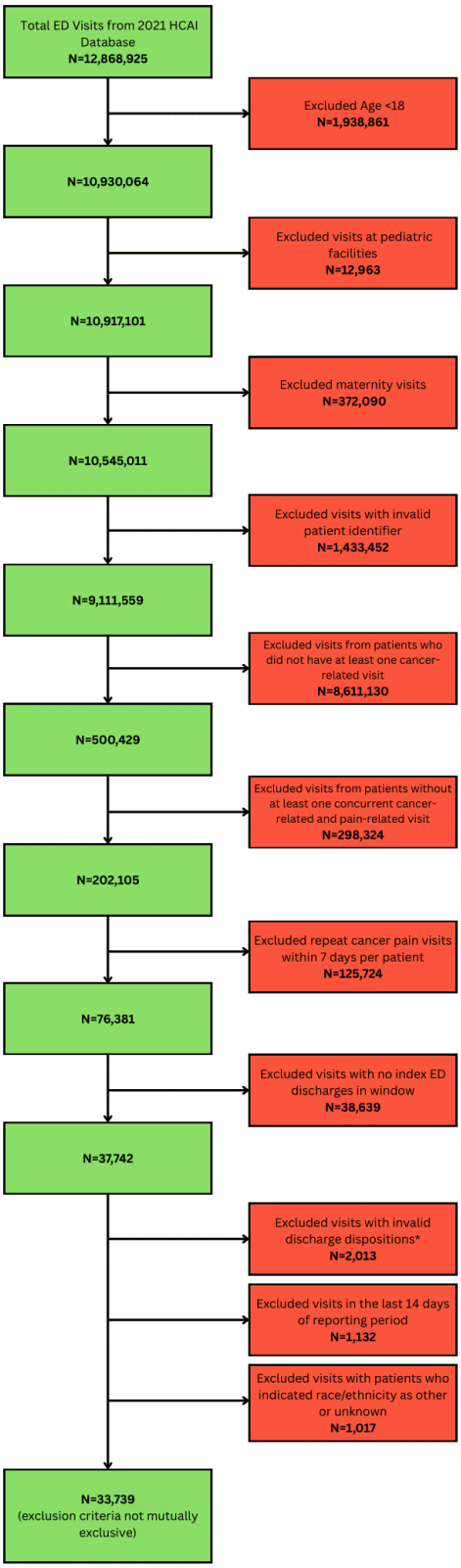

Figure 1. Selection of index visits. **Invalid discharge dispositions include Discharged/Transferred to a short term general care hospital for inpatient care, discharged/Transferred to a designated cancer center or children's hospital, Left*

against medical advice or discontinued care, Expired, Discharged/Transferred to a federal healthcare facility, Discharged/Transferred to a Medicare certified long term care hospital (LTCH), Discharged/Transferred to a psychiatric hospital or psychiatric distinct part unit of a hospital, Discharged/Transferred to a critical access hospital (CAH), Discharged/Transferred to a designated disaster alternative site, Discharged/Transferred to home or self care with Planned Acute Care Readmission, Discharged/Transferred to short term general care hospital with Planned Acute Care Readmission, Discharged/Transferred to Intermediate facility (ICF) with h Planned Acute Care Readmission, Discharged/Transferred home under care of organized home health service with Planned Acute Care Readmission, Invalid / Blank

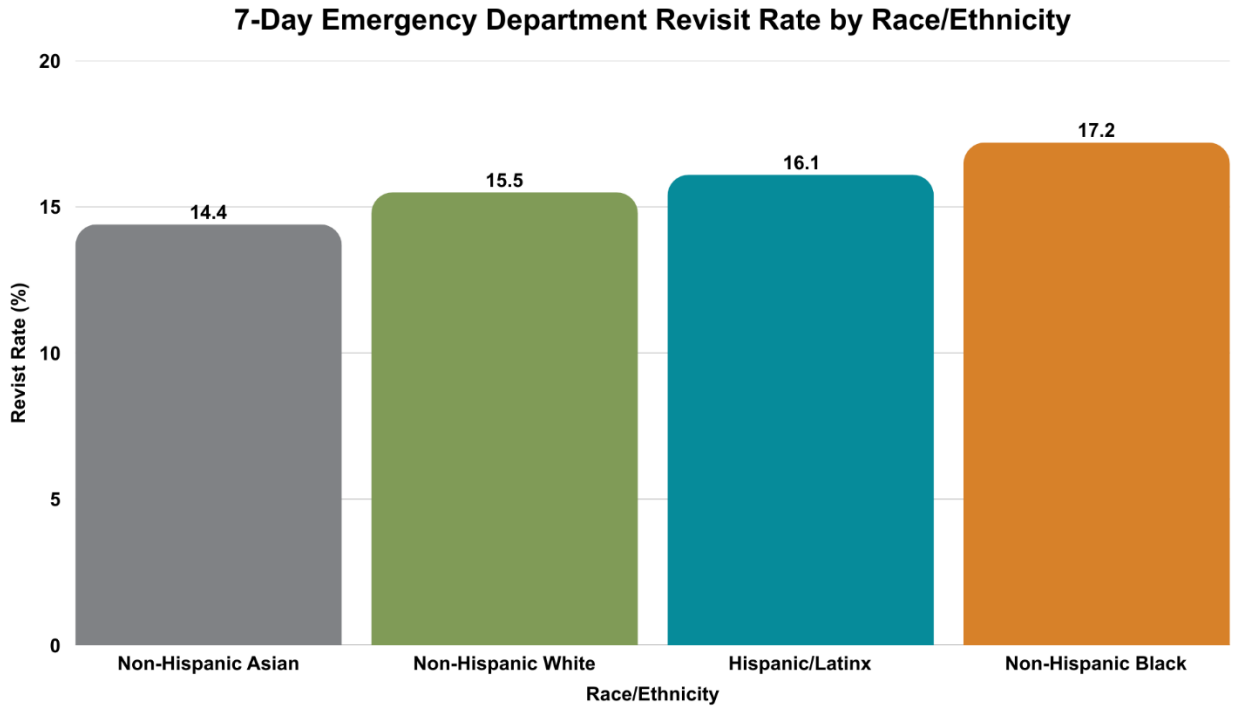

Figure 2. Bar graph of 7-day ED Return Visit Rate by Race/Ethnicity

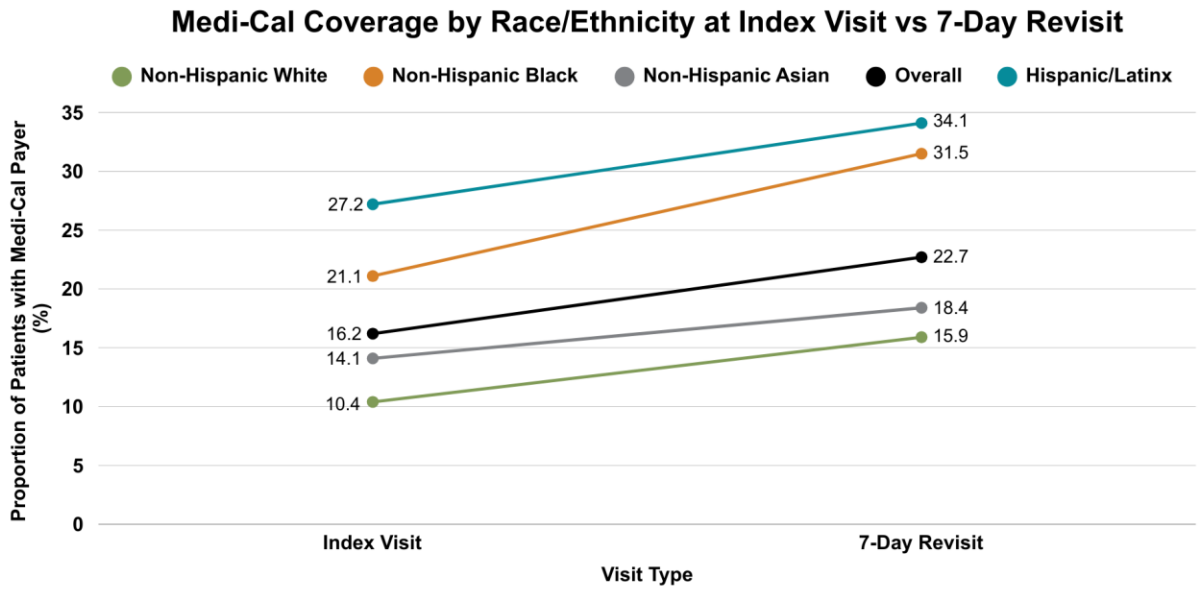

Figure 3. Slopegraph of the proportion of ED visits by race/ethnicity with Medi-Cal as the primary payer.

Discussion

During the early stages of the COVID-19 pandemic, ED visits declined sharply, including among patients with cancer. By 2021, however, ED utilization among oncology patients had returned to levels comparable to those seen before the pandemic. In contrast, ED visits for the general population also increased but did not fully recover, indicating that the rebound in healthcare utilization was particularly notable for oncology patients [21].

The data collected demonstrates disparities in cancer pain-related care based on the accepted notion that recidivism rates are indicative of quality of care. Pain is a reason for 52-78% of all ED visits and 10-41% of visits made by cancer patients [8, 10, 22-25]. In a 2013 retrospective analysis of adult ED visits in Florida and New York for all complaints, 8.2% of patients had return visits within 7 days of an initial discharge [26]. In our analysis, 15.7% of patients presenting to the ED with cancer diagnoses and pain complaints had 7-day return visits.

Overall, high return visit rates may reflect inadequate care or pain relief on initial visits or missed opportunities to coordinate outpatient follow-up or provide patient education. Prior studies have also described substantial potentially avoidable ED use among cancer patients, including during active treatment and near the end of life [8, 19, 27-30]. While we could not distinguish these clinical circumstances in our data, these could be contributing factors to the high revisit rates observed and indicate smaller subgroups that may need targeted interventions.

In addition, we found differences in return visit rates between racial/ethnic groups and in relation to socioeconomic status. This corresponds with a wealth of evidence surrounding general disparities in pain management in medicine [14-16]. Non-Hispanic Black cancer patients contributed to the highest rate of pain-related return visits compared to other ethnic groups at an age, sex and population adjusted rate of 21.0%. Non-Hispanic Black patients were overrepresented in these ED visits at nearly four times their California population proportion [31]. Non-Hispanic Black patients were the only racial/ethnic group that was overrepresented in this way based on California populations, although it should be noted that American Indian/Alaska Natives and Native Hawaiian/Pacific Islanders were not included in this analysis due to lack of data. Non-Hispanic Asian patients had the next highest return visit rates adjusted for age, sex, and population (18.3%), followed by Non-Hispanic Whites (17.3%) and Hispanics/Latinx (17.1%).

Non-Hispanic Black Patients had the greatest proportion of change of care facility (30.6%), then Hispanic/Latinx patients (25.1%). This is notable compared to the overall proportion of patients who changed facilities (24.9%), suggesting potential disparities in continuity of care or access to preferred healthcare settings across racial/ethnic groups. Such systemic differences in triage and perceived acuity may contribute to patients seeking care at

alternative facilities, and while clinical decision support systems could help reduce these disparities, they must be carefully designed to avoid perpetuating bias [32].

The median household income for revisits was $93,464 (IQR $73,611-116,773) with the highest median income among Non-Hispanic Asians ($107,849), then Non-Hispanic Whites ($122,647), Non-Hispanic Black patients ($82,978), and Hispanic/Latinx patients ($81,719) (*Table 1*). While these findings point toward a potential interplay between race/ethnicity, socioeconomic status, and medical outcomes, the relationship does not appear to be linear. For example, Non-Hispanic Asian patients had the second-highest adjusted revisit rate despite having the highest median income. However, Non-Hispanic Black patients had the highest adjusted revisit rate with the second lowest median income. These patterns highlight that while socioeconomic status and race/ethnicity may influence cancer pain–related return visits, the relationship is multifactorial. Similarly, the proportion of Medi-Cal payers increased across all races/ethnicities when comparing revisits to index visits. This suggests that patients with a lower financial status are more likely to receive inadequate care and have more difficulty managing their pain.

Hispanic/Latinx patients in our cohort had the lowest Charlson Comorbidity Index (CCI) scores for both index visits and 7-day revisits, despite having the second-lowest median income. This pattern contrasts with what might be expected based on socioeconomic disparities but aligns with the concept of the “Hispanic Paradox,” wherein Hispanic/Latinx populations often exhibit better health outcomes than anticipated given their lower socioeconomic status. While lower comorbidity scores may reflect a genuine health advantage, it is also possible that underdiagnosis or differences in healthcare access play a role. Further investigation is needed to understand how these factors interact with ED utilization and pain management in this population [33].

The differences in median ages between these groups should also be noted. Overall, the median age for all revisits was 65 years old, however, for Hispanic/Latinx patients, the median age was 49 years old. Non-Hispanic Black patients were the next youngest group with a median age of 62, followed by Non-Hispanic Asian patients with a median age of 65 and Non-Hispanic White patients with the highest median age at 68. In other words, Hispanic/Latinx and Non-Hispanic Black patients are experiencing cancer pain–related revisit needs at younger ages compared to Non-Hispanic White and Asian patients. This could reflect differences in disease onset, access to timely care, socioeconomic or structural barriers, or other factors contributing to earlier return visits. Our analysis did not compare survival outcomes, however, prior literature has shown that cancer patients who do not rely on the ED for care tend to have longer median survival. The younger median ages seen in Hispanic/Latinx and Non-Hispanic Black patients presenting for pain-related revisits may reflect earlier or more frequent reliance on the ED for symptom management, which could partially align with this survival disparity described in the literature [7].

Interestingly, Non-Hispanic Black patients had the lowest metastatic disease burden, yet the highest proportion of revisits. Non-Hispanic Asians had the highest metastatic disease burden as well as the second highest amount of return visits. Metastatic disease is an indicator of cancer prognosis, but this finding may suggest that there are stronger influences that predict the quality of care for cancer pain in the ED. For Non-Hispanic Black patients, the high revisit rate despite a relatively low metastatic burden suggests that factors other than disease severity—such as disparities in pain management, systemic barriers, or inequities in outpatient care—may be key drivers of these returns. By contrast, for Non-Hispanic Asian patients, the elevated revisit rate

appears more closely tied to their higher metastatic burden, indicating that advanced disease status itself may be the primary driver.

A 2018 CDC report states that only 12.4% of all ED visits result in admission, yet over 50% of oncology patient visits result in admission [10, 17, 25, 34-36]. Non-Hispanic Black patients had the lowest rate of admission (27.2%) on return visits and Non-Hispanic Asians the highest (37.3%). Lower admission rates on a return visit might suggest less severe disease, but alternately, it could imply Non-Hispanic Black patients are returning to the ED because their needs were not adequately addressed on their initial visit. There are many outlying factors that could explain why Non-Hispanic Asians are ostensibly utilizing ED for their cancer pain more effectively than other groups, though, a point that contradicts this difference in effective ED utilization is that for all groups, around 79.9% of return visits resulted in a different diagnosis from the initial index visit discharge diagnosis suggesting that return visits addressed problems that were new, missed, or not fully covered on the first visit.

The majority of patients were female (56.7%) and the most likely explanation for this stems from female breast cancer being the most common diagnosis seen in this cohort and also the most frequent cancer observed in the U.S. [37] This corresponds with analyses of ED visits by cancer patients that found a very slight majority of visits were attributed to breast cancer and/or to females, but contradicts other studies that found cancer patients with ED visits were more likely to be male and to have lung or GI cancers [3, 7, 9, 10, 28, 30]. The revisit rate for female patients with breast cancer (11.5%) was lower than the overall revisit rate (15.7%) so while quantitatively, breast cancer was responsible for the most return visits, it is most likely explained by the high incidence in comparison to other cancers. Nonetheless, racial/ethnic disparities persist in return visit rates for breast cancer despite the lower overall breast cancer

revisit rate with 14.3% of visits by Non-Hispanic Black patients resulting in return visits compared to 11.5% of visits by Non-Hispanic Whites, 11.1% of visits by Hispanic/Latinx patients, and 9.6% of Non-Hispanic Asians.

Abdominal and pelvic pain were the most common pain-related diagnosis for both index visits and return visits, consistent with prior literature that also found pain and gastrointestinal complaints were significantly higher among patients diagnosed with cancer of the bladder, cervix, colon and rectum, kidney, liver, ovary, pancreas, or uterus [3, 8]. In a study of cancer patients presenting to the ED due to opioid overdose, head and neck cancer and multiple myeloma were cancers found to be at increased risk for opioid-related visits which may signify that these cancers cause difficult to manage pain [38]. Other literature supports this, noting that pain is increased earlier in disease for pancreatic and head and neck cancer [11]. Other endocrine cancers not including thyroid cancer and neuroendocrine tumors did have the highest return rate (31.4%) for all groups combined, but also had a smaller sample size. The next highest return rate was for cervical cancer (25.3%) which is in accordance with previous findings. Additionally, pancreatic cancers ranked among the top 10 cancers with the highest revisit rates (20.7%). Head and neck cancers did have high overall return rates (e.g. lip, oral cavity, pharynx – 18.4%; larynx-14.3%). While pathologic differences between cancers may explain divergent return rates between cancer types, there are no obvious differences in racial/ethnic proportions of patients visiting the ED for these more troublesome cancers that would explain differences in return rates by race/ethnicity.

Overall, the data reflect intersectional disparities in the management of pain-related complaints for cancer patients presenting to the ED. Importantly, management of cancer pain

should be achievable in an estimated 90% of cancer patients, and thus high levels of ED usage and recidivism are reflections of inadequacies of care that are necessary to address [27].

Non-Hispanic Black patients had the highest overall return rates compared to other groups and had the lowest socioeconomic status, followed by Hispanic/Latinx patients. Our results align with a 2017 analysis of cancer patients in New Jersey that found ED dispositions and readmissions were significantly affected by race, insurance payer, and income quartile [9]. An overview of EOL cancer patients in Louisiana found that Black patients receive increased amounts of burdensome care, but may also have a stronger preference for care measures that may seem burdensome, like ED visits. Contrasting this however, is that Black patients also typically had less access to this care and lower preferences for palliative care [39]. Differing preferences and expectations for cancer and pain management between ethnic groups can help explain increased ED usage in addition to known racial disparities in pain management. Black cancer patients also receive less information from providers about disease course and life expectancy which possibly influences increased ED usage as well [40]. Black patients were also shown to have the highest incidence of comorbidities, which may contribute to increased return visits and more difficulty managing pain. Targeted patient education on medication interactions and comorbidities may improve adherence, manage pain expectations, and bolster self-efficacy.

Initiating early palliative care referrals for cancer patients visiting the ED with pain complaints may significantly reduce unnecessary overutilization of the ED in this group [5, 28, 41]. Patient education that sets realistic expectations for pain symptoms and provides guidance on therapeutic self-management may also be influential, particularly for racial/ethnic minorities [3, 17]. Encouraging phone or web-based symptom consultations prior to ED utilization may

help patients avoid ED visits in favor of prompt outpatient follow-up with their primary physician [4, 6, 9, 25, 42].

Conclusion

In this statewide analysis of cancer pain–related ED utilization, we found clear and persistent disparities in 7-day return visits across racial/ethnic and socioeconomic groups. While differences in cancer type and disease burden contributed to revisit patterns, these clinical factors did not fully account for the disproportionately high rates of recidivism among Non-Hispanic Black and Hispanic/Latinx patients. Instead, the data reflect a complex intersection of systemic inequities, access limitations, and variations in pain management or care coordination that influence patients' reliance on the ED for symptom control. Importantly, given that cancer pain is manageable in most cases, elevated ED use for pain, particularly repeated visits, signals missed opportunities for more effective initial treatment, improved outpatient support, and earlier integration of palliative care.

Targeted, equity-focused interventions are needed to address these gaps. This includes implementing standardized pain assessment protocols, expanding rapid-access palliative care pathways, improving patient education around symptom management, and reducing barriers to timely outpatient follow-up. As cancer incidence grows and EDs continue to serve as critical safety-net access points, efforts to understand and eliminate disparities in cancer pain management remain essential to improving quality of care, reducing avoidable utilization, and advancing equitable outcomes for all patients.

References

1. Burnod A, Maindet C, George B, Minello C, Allano G, Lemaire A. A clinical approach to the management of cancer-related pain in emergency situations. Support Care Cancer Off J Multinatl Assoc Support Care Cancer. 2019;27(8):3147-3157. doi:10.1007/s00520-019-04830-0
2. Jain PN, Parab SY, Thota RS. A Prospective, Non-interventional Study of Assessment and Treatment Adequacy of Pain in the Emergency Department of a Tertiary Care Cancer Hospital. Indian J Palliat Care. 2013;19(3):152-157. doi:10.4103/0973-1075.121529
3. Gallaway MS, Idaikkadar N, Tai E, et al. Emergency department visits among people with cancer: Frequency, symptoms, and characteristics. J Am Coll Emerg Physicians Open. 2021;2(3):e12438. doi:10.1002/emp2.12438
4. Roy M, Halbert B, Devlin S, Chiu D, Graue R, Zerillo JA. From metrics to practice: identifying preventable emergency department visits for patients with cancer. Support Care Cancer. 2021;29(7):3571-3575. doi:10.1007/s00520-020-05874-3
5. Koh MYH, Lee JF, Montalban S, Foo CL, Hum AYM. ED-PALS: A Comprehensive Palliative Care Service for Oncology Patients in the Emergency Department. Am J Hosp Palliat Care. 2019;36(7):571-576. doi:10.1177/1049909119825847
6. Hong AS, Sadeghi N, Harvey V, Lee SC, Halm EA. Characteristics of Emergency Department Visits and Select Predictors of Hospitalization for Adults With Newly Diagnosed Cancer in a Safety-Net Health System. J Oncol Pract. 2019;15(6):e490-e500. doi:10.1200/JOP.18.00614
7. Barbera L, Atzema C, Sutradhar R, et al. Do patient-reported symptoms predict emergency department visits in cancer patients? A population-based analysis. Ann Emerg

Med. 2013;61(4):427-437.e5. doi:10.1016/j.annemergmed.2012.10.010

8. Tsai S-C, Liu L-N, Tang S-T, Chen J-C, Chen M-L. Cancer pain as the presenting problem in emergency departments: incidence and related factors. Support Care Cancer. 2009;18(1):57. doi:10.1007/s00520-009-0630-6
9. Scholer AJ, Mahmoud OM, Ghosh D, et al. Improving cancer patient emergency room utilization: A New Jersey state assessment. Cancer Epidemiol. 2017;51:15-22. doi:10.1016/j.canep.2017.09.006
10. Mayer DK, Travers D, Wyss A, Leak A, Waller A. Why do patients with cancer visit emergency departments? Results of a 2008 population study in North Carolina. J Clin Oncol Off J Am Soc Clin Oncol. 2011;29(19):2683-2688. doi:10.1200/JCO.2010.34.2816
11. Fallon M, Giusti R, Aielli F, et al. Management of cancer pain in adult patients: ESMO Clinical Practice Guidelines††FootnotesApproved by the ESMO Guidelines Committee: December 2004, last update April 2018. This publication supersedes the previously published version—Ann Oncol 2012; 23(Suppl 7): vii139–vii154. Ann Oncol. 2018;29:iv166-iv191. doi:10.1093/annonc/mdy152
12. Barbera L, Paszat L, Chartier C. Indicators of poor quality end-of-life cancer care in Ontario. J Palliat Care. 2006;22(1):12-17.
13. Mossey JM. Defining racial and ethnic disparities in pain management. Clin Orthop. 2011;469(7):1859-1870. doi:10.1007/s11999-011-1770-9
14. Hwang U, Belland LK, Handel DA, et al. Is all pain is treated equally? A multicenter evaluation of acute pain care by age. Pain. 2014;155(12):2568-2574. doi:10.1016/j.pain.2014.09.017
15. Hoffman KM, Trawalter S, Axt JR, Oliver MN. Racial bias in pain assessment and

treatment recommendations, and false beliefs about biological differences between blacks and whites. Proc Natl Acad Sci U S A. 2016;113(16):4296-4301. doi:10.1073/pnas.1516047113

16. Green CR, Anderson KO, Baker TA, et al. The unequal burden of pain: confronting racial and ethnic disparities in pain. Pain Med Malden Mass. 2003;4(3):277-294. doi:10.1046/j.1526-4637.2003.03034.x

17. Rivera DR, Gallicchio L, Brown J, Liu B, Kyriacou DN, Shelburne N. Trends in Adult Cancer-Related Emergency Department Utilization: An Analysis of Data From the Nationwide Emergency Department Sample. JAMA Oncol. 2017;3(10):e172450. doi:10.1001/jamaoncol.2017.2450

18. Fortner BV, Okon TA, Portenoy RK. A survey of pain-related hospitalizations, emergency department visits, and physician office visits reported by cancer patients with and without history of breakthrough pain. J Pain. 2002;3(1):38-44. doi:10.1054/jpai.2002.27136

19. Alsirafy SA, Raheem AA, Al-Zahrani AS, et al. Emergency Department Visits at the End of Life of Patients With Terminal Cancer: Pattern, Causes, and Avoidability. Am J Hosp Palliat Care. 2016;33(7):658-662. doi:10.1177/1049909115581819

20. Rahul NV, Brennan JJ, Castillo EM, Tran P, Hsia RY, Coyne CJ. Cancer-related emergency department visits: Comparing characteristics and outcomes. The Western Journal of Emergency Medicine. August 21, 2021. Accessed August 27, 2025. https://pubmed.ncbi.nlm.nih.gov/34546888/.

21. Valsecchi D, Porcu L, Khater A, et al. Emergency department visits among cancer patients during SARS-COV-2 pandemic. MDPI. February 15, 2023. Accessed August 27, 2025. https://www.mdpi.com/2072-6694/15/4/1240.

22. Patel PM, Goodman LF, Knepel SA, et al. Evaluation of Emergency Department Management of Opioid-Tolerant Cancer Patients With Acute Pain. J Pain Symptom Manage. 2017;54(4):501-507. doi:10.1016/j.jpainsymman.2017.07.013
23. Cordell WH, Keene KK, Giles BK, Jones JB, Jones JH, Brizendine EJ. The high prevalence of pain in emergency medical care. Am J Emerg Med. 2002;20(3):165-169. doi:10.1053/ajem.2002.32643
24. DeSandre PL, Quest TE. Management of Cancer-Related Pain. Emerg Med Clin North Am. 2009;27(2):179-194. doi:10.1016/j.emc.2009.01.002
25. Vandyk AD, Harrison MB, Macartney G, Ross-White A, Stacey D. Emergency department visits for symptoms experienced by oncology patients: a systematic review. Support Care Cancer. 2012;20(8):1589-1599. doi:10.1007/s00520-012-1459-y
26. Sabbatini AK, Kocher KE, Basu A, Hsia RY. In-Hospital Outcomes and Costs Among Patients Hospitalized During a Return Visit to the Emergency Department. JAMA. 2016;315(7):663-671. doi:10.1001/jama.2016.0649
27. Long DA, Koyfman A, Long B. Oncologic Emergencies: Palliative Care in the Emergency Department Setting. J Emerg Med. 2021;60(2):175-191. doi:10.1016/j.jemermed.2020.09.027
28. Verhoef M-J, de Nijs E, Horeweg N, et al. Palliative care needs of advanced cancer patients in the emergency department at the end of life: an observational cohort study. Support Care Cancer Off J Multinatl Assoc Support Care Cancer. 2020;28(3):1097-1107. doi:10.1007/s00520-019-04906-x
29. Barbera L, Taylor C, Dudgeon D. Why do patients with cancer visit the emergency department near the end of life? CMAJ Can Med Assoc J J Assoc Medicale Can.

2010;182(6):563-568. doi:10.1503/cmaj.091187

30. Díaz-Couselo FA, O'Connor JM, Nervo A, et al. Nonscheduled consultation in oncologic patients. How many of them are true emergencies? An observational prospective study. Support Care Cancer. 2004;12(4):274-277. doi:10.1007/s00520-003-0584-z

31. U.S. Census Bureau QuickFacts: California. Accessed September 15, 2021. https://www.census.gov/quickfacts/CA

32. Joseph JW, Kennedy M, Landry AM, et al. Race and ethnicity and primary language in emergency department triage. JAMA Network Open. 2023;6(10). doi:10.1001/jamanetworkopen.2023.37557

33. Ruiz JM, Steffen P, Smith TB. Hispanic mortality paradox: A systematic review and meta-analysis of the longitudinal literature. American Journal of Public Health. March 2013. Accessed August 27, 2025. https://pmc.ncbi.nlm.nih.gov/articles/PMC3673509/.

34. Sadik M, Ozlem K, Huseyin M, AliAyberk B, Ahmet S, Ozgur O. Attributes of cancer patients admitted to the emergency department in one year. World J Emerg Med. 2014;5(2):85-90. doi:10.5847/wjem.j.issn.1920-8642.2014.02.001

35. National Hospital Ambulatory Medical Care Survey: 2018 Emergency Department Summary Tables. Published online 2018:39.

36. Niska R, Bhuiya F, Xu J. National Hospital Ambulatory Medical Care Survey: 2007 emergency department summary. Natl Health Stat Rep. 2010;(26):1-31.

37. Siegel RL, Miller KD, Fuchs HE, Jemal A. Cancer statistics, 2021. CA: A Cancer Journal for Clinicians. 2021;71(1):7-33. doi:10.3322/caac.21654

38. Jairam V, Yang DX, Yu JB, Park HS. Emergency Department Visits for Opioid Overdoses Among Patients With Cancer. J Natl Cancer Inst. 2020;112(9):938-943.

doi:10.1093/jnci/djz233

39. Perry LM, Walsh LE, Horswell R, et al. Racial Disparities in End-of-Life Care Between Black and White Adults With Metastatic Cancer. J Pain Symptom Manage. 2021;61(2):342-349.e1. doi:10.1016/j.jpainsymman.2020.09.017

40. Trevino KM, Zhang B, Shen MJ, Prigerson HG. Accuracy of advanced cancer patients' life expectancy estimates: The role of race and source of life expectancy information. Cancer. 2016;122(12):1905-1912. doi:10.1002/cncr.30001

41. Hui D, Kim SH, Roquemore J, Dev R, Chisholm G, Bruera E. Impact of timing and setting of palliative care referral on quality of end-of-life care in cancer patients. Cancer. 2014;120(11):1743-1749. doi:10.1002/cncr.28628

42. Kotajima F, Kobayashi K, Sakaguchi H, Nemoto M. Lung cancer patients frequently visit the emergency room for cancer-related and -unrelated issues. Mol Clin Oncol. 2014;2(2):322-326. doi:10.3892/mco.201{Citation}4.241

Statements and Declarations

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