Cancer Medicine Journal

Research Article | Vol 2 Issue 2

Emergency Department Visits made by Patients with Cancer; Analysis of Data from a Single Community Cancer Center

Barry Meisenberg*, Jane Rhule RN, Jessica Tan, Laura Arvin and Susanne Tameris

DeCesaris Cancer Institute, Anne Arundel Medical Center, Annapolis, Maryland, USA

***Corresponding author:** Barry R Meisenberg, DeCesaris Cancer Institute, Anne Arundel Medical Center, 2003 Medical Parkway, Annapolis, Maryland, USA, Tel: 01-443-481-5824; E-mail: bmeisenber@aahs.org

Abstract

Purpose: Cancer-related Emergency Department Visits (EDV) are costly and may indicate poor care. Most studies of cancer-related EDV identify patients using inclusive diagnostic codes but lack precision since they don't distinguish active cancer. We compared estimates of oncology-related EDV made by diagnostic code methods to a more specific method followed by chart review. We also studied characteristics of validated EDV.

Methods: EDV from cancer patients at a single acute care hospital were measured using any inclusive oncology codes and was compared to EDV made by patients who were active attendees at cancer clinics. We then reviewed the records of a 50% random sample of the 'active' patients to estimate how many were related to cancer or cancer treatment.

Results: Over 5 months, 790 oncology-EDV were identified by coding, but only 554 (70%) were made by 'active' patients. After review, 29% of active patient EDV was determined not to be related to an oncology problem or treatment. 48% of EDV occurred during daytime clinic hours. 79% were preceded by one or more contacts with the oncology care team within a week. There was variability in the number of EDV by patients of different oncologists.

Conclusion: The impact of cancer in overall EDV counts is over-estimated by coding because coding cannot distinguish between active and inactive cancer nor discriminate between symptoms likely due to unlikely due to cancer or cancer treatments. Cancer programs should study the experiences of their own patients to design effective programs to reduce potentially avoidable utilization

Keywords: ***Emergency department; Potentially avoidable utilization; Cancer costs***

Received Date: July 05, 2019; **Accepted Date:** July 24, 2019; **Published Date:** August 01, 2019

Citation: Barry Meisenberg, Emergency Department Visits made by Patients with Cancer; Analysis of Data from a Single Community Cancer Center. Cancer Med J 2(2): 26-35.

Introduction

The use of the Emergency Department (ED) by cancer patients is a common practice that is of increasing concern for care providers and planners due to the costs of both the ED visit (EDV) and the subsequent hospital admissions which follow more than half the time [1]. In the United States, new payment models create financial incentives and penalties for hospitals and physicians which encourage them to reduce EDV [2-4]. The renewed emphasis on population health and total expenditures has created a new urgency to understand and address the issues that lead to EDV. Beyond costs, EDV have been considered a marker of poor quality of care as they may result from overly aggressive care or care that is poorly matched to the patient's physiologic condition, support network, or ability to self-manage symptoms [5]. EDV may also represent insufficient access to, or communication with, oncology caregivers.

To better understand the phenomenon of cancer patient EDV in our local community and to determine if an EDV reduction initiative was addressing needs, we analyzed our community's experience with cancer-related EDV to ascertain patient and visit characteristics with regard to type of symptom, type of patient, timing of EDV and extent of care team involvement with patient prior to the EDV.

Methods

Setting

Anne Arundel Medical Center is a 385-bed acute care hospital in Annapolis MD. The cancer program is one of the largest in the state with over 2200 newly diagnosed cases annually. The ED sees approximately 100,000 visits annually. Relevant daily clinical volumes include 70 oncology infusions, 120 medical oncology physician visits and 90 radiation treatment visits. Nine medical oncologists, three radiation oncologists, three nurse practitioners, and four nurse navigators deliver and coordinate this clinical care.

During the time of this study, the cancer center already had support programs in place aimed at reducing unnecessary EDV such as maintaining a list of 'at risk' patients for nurse navigators and triage nurses to do prospective outreach, nurse-advised symptom management telephone triage line during clinic hours, 24 hour phone availability by oncologists, expanded same day infusion slots and same day visit times with physician or nurse practitioners. In addition, written patient education materials and chemotherapy teaching emphasized the importance of reporting symptoms early and calling prior to visiting the ED. There was no afterhours urgent care clinic. The electronic medical record (EMR) afforded a patient portal for communication but patients were advised not to use this channel for urgent medical problems.

All care in the ED and among the oncologists was documented in a single EMR that also included documentation of incoming and outgoing telephone contacts by members of the care team: physicians, advanced nurse practitioners, navigators, triage nurses, dieticians, and social workers.

Case finding

Consecutive EDV between March 1, 2017 through July 31, 2017 that listed a cancer diagnosis among the first 15 codes from the International Statistical Classification of Diseases and Related Health Problems (ICD-10) system were enumerated. To find patients that were 'active" in our center's clinics, we used a patient tracer methodology that cross matched all EDV made during

the study period with lists of patients who had more than one clinic or in-hospital visit with a medical or radiation oncologist in the 90 days prior to the EDV.

A 50% random sample of the 'active' oncology-related EDV underwent detailed record review to exclude, before analysis, patients with a non-malignant hematology diagnoses (myelodysplasia was included as a cancer diagnosis). EDV were characterized as "very unlikely," "unlikely" "uncertain, "likely" or "very likely" to be related to cancer or its treatment. We excluded from further analysis EDV that were "very unlikely" or "unlikely" due to cancer. For consistency, a single reviewer (BRM) made this determination prior to analysis of data. We also excluded from analysis a small number of patients who were primarily managed by nearby referral centers but who had been seen in our ED.

Electronic medical records were reviewed to determine demographics, cancer diagnoses, the cancer status, day and time of the EDV, the number of in-person medical record or telephone contacts between patients and members of the oncology care team in the seven days prior to the EDV and the identity of the primary oncologist. We did not include contacts with care providers other than medical or radiation oncologists and members of the associated care team. In order to gain an appreciation of the type of patient utilizing the ED, cancer status was classified into four categories based upon phase of treatment and cancer stage: 1) initial course of anti-mitotic therapy or adjuvant therapy being administered, 2) early stage or indolent disease with no current therapy, 3) advanced solid tumor or hematologic malignancy responsive to treatment, 4) advanced solid tumor or hematologic malignancy not responsive to the most recent or current therapy.

Statistics

To determine if certain diagnoses were overrepresented among patients making EDV, the frequencies of the top five underlying cancer diagnoses for men and women with validated EDV were compared to the frequency of those diagnoses in the population of newly diagnosed cancer patients in the same year the study took place. A significance level of 0.05 was used and the p value determined using a z test, a test for differences in proportions among different populations.

Ethical considerations

This study was deemed to be a quality improvement project and not research by the local Clinical Research Committee, which has institutional purview over such decisions.

Results

790 EDV were identified by coding method but only 522 (70%) of these were 'active' using the physician tracer methodology described above. This number represents 3.5 EDV per day over the five-month study period. All patients defined by the patient tracer methodology sample met the British National Institute for Health and Care Excellence (NICE) Guideline Development Group's definition of active cancer: receiving active antimitotic treatment; or diagnosed within the past 6 months; or recurrent or metastatic; or inoperable [6].

The active oncology EDV patients comprised 1.7% of all adult EDV in this general acute care hospital. 264 EDV were randomly chosen for detailed record review. No differences in the demographics between the analyzed and non-analyzed patients were noted. The 264 chart reviews excluded, according to the pre-analysis rules, 82 EDVs. Reasons for exclusions included: benign hematology diagnosis [1], inaccurate assignment to an oncology provider [1], patients managed predominately at other cancer centers [6]. Chart review determined that74/264 (28%) of EDV from oncology patients were "unlikely" or "very

unlikely" to be related to an oncology problem. This left 182 analyzable EDV made by 145 unique patients. Table 1 describes the characteristics of the oncology patients making validated oncology-related EDV.

Patient Characteristics, n=145					
Age	**Number**		**Percentage (%)**		
16-40	10		5.5		
41-50	16		8.8		
51-60	26		14.2		
61-70	51		28		
71-80	50		27.5		
81-90	27		14.8		
>90	2		1		
Median (mean)	**68 (67)**				
Gender	**Ratio**		**Ratio**		
M:F	36:64		01:01.8		
Race	**EDV (%)**		**New Patients (%)**		
Caucasian	74		80		
African American	23*		18		
Other	1		1		
Oncology Diagnosis					
Male			**Female**		
	EDV (%)	**% of all new patients**		**EDV (%)**	**% of all new patients**
Esophageal	15*	1.6	Breast	31*	48
Colorectal	14*	9.6	Gynecologic	21*	9.4
Metastatic	9*	3.6	Colorectal	9	6.1
Lung	9*	16.3	Lung	9	12
Myeloma	8*	3.2	Myeloma	9*	1.5
Patient's Cancer Status (see text for definitions)					
1			64 (47%)		
2			5 (3.4%)		
3			26 (18%)		
4			50 (34%)		

Table 1: Demographics of oncology patients and characteristics of validated emergency department visits.

Note: * The asterisks indicate that the frequency of the cancer among the emergency department visit population is statistically different at a p value of < 0.05 than the frequency of the cancer among newly diagnosed patients.

Demographics

Patients over 70 years compose 24% of newly diagnosed patients, but made 42.3% of all EDV. Women compose 60% of new cancer diagnoses at our institution, and made 64% of EDV. African Americans compose 18% of new patients but made 25% of EDV. The five most common cancer diagnoses among patients having EDV for men and women are shown in table 1. Esophageal cancer, head and neck cancer and myeloma in men and gynecologic, colorectal and myeloma in women are over-represented among the patients making EDV compared to the frequency distribution of new diagnoses. 20/182 (11%) EDV

represented a repeat visit to the ED within 30 days. 116/182 (64%) of oncology EDV resulted in a hospital admission with a median length of stay of 4 days (range 1-21 days). Two patients were in home hospice status at the time of their EDV.

Cancer status

Table 1 shows the status of cancer in the patients making EDV. Patients with early stage cancer under active treatment made up the plurality of validated oncology EDV (47%) followed by patients with advanced disease that was refractory to treatment (34%).

Time of arrival in the ED was tracked separately for weekdays and weekends (Figure 1). During weekdays, 48% of EDV occurred during the 8 hours generally considered clinic time: 8 AM to 4 PM. Very few EDV occurred at night.

Attribution to a single oncologist was possible for all 145 individual patients. There were differences in the number of times patients of particular oncologists used the ED (Figure 2).

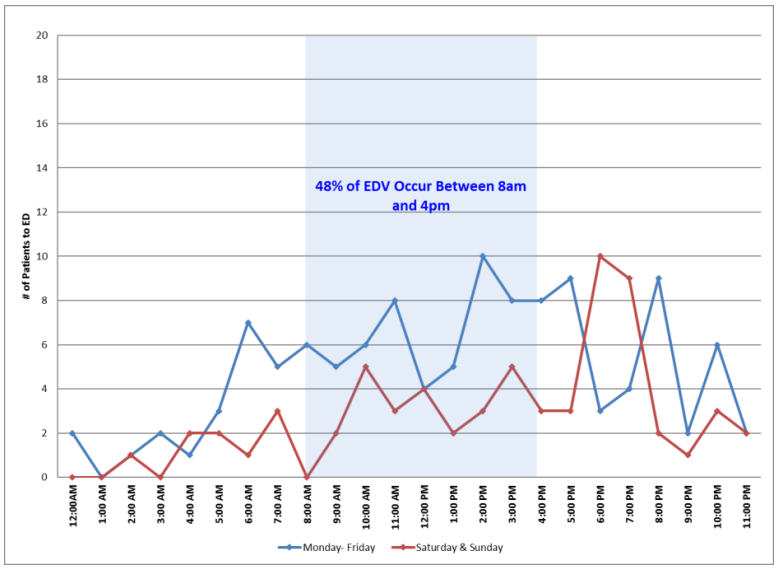

Figure 1: Number of cancer patient Emergency Department visits by time of day for both weekdays and weekends.

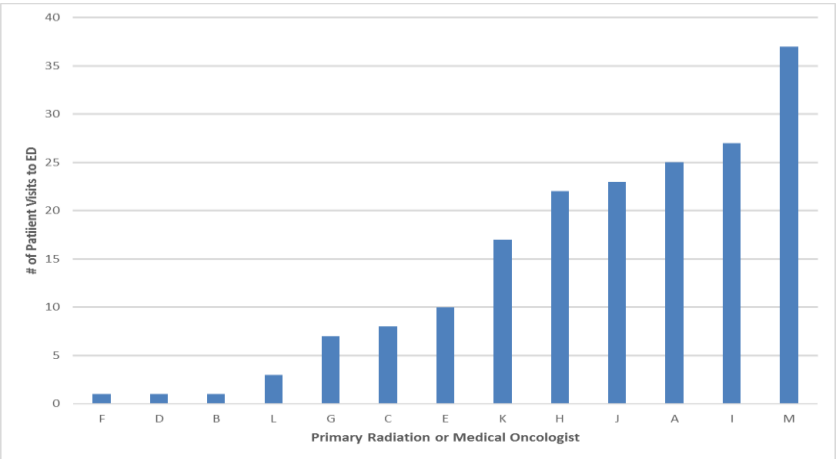

Figure 2: Number of Emergency Department Visits by Patients Assigned to Individual Medical or Radiation Oncologists. F, D, B represents Radiation Oncologists. L was a part time medical oncologist.

Contacts with the care team

The EDV was preceded by at least one in-person or telephone contact with a member of the oncology care team in 144/182 (79%) of EDV. Half had more than one contact. 56% of EDV were preceded within 5 days by a visit with the oncologist. Table 2 shows the role of oncology team members who had the contacts and the number of contacts.

n=182 Emergency Department Visits		
Contact	**Type of Contact**	**Number**
Physician/Nurse Practitioner	In person visit	88
Infusion Nurse	In person visit	77
Symptom Management Nurse or Physician/Nurse Practitioner	Phone Call	87
Social Worker/Physical therapy	In person visit	6
Nurse Navigator	Phone Call	26
Registered Dietician	Phone Call	11

Table 2: Patient contacts with oncology care team members in the 7 days prior to emergency department visit.

Discussion

The concern about volume and costs of cancer-related EDV and associated admissions is world-wide. Studies from diverse countries, using various methods and ranging in size from the small but detailed (20 patients) to the massive but high level (tens of thousands of patients) [7-14], have provided distinct but always partial views of the phenomenon. Despite concerns that EDV are markers of poor care, it is also possible that EDV reflect an inevitable part of the disease process where symptom burden is high, home care less than comprehensive and hospice or comfort care strategies are reserved for the last days or weeks of life.

Numerous interventions to reduce EDV have been identified to reduce potentially avoidable EDV [15], but these strategies are not uniformly successful and it remains unclear if they effectively address the most significant motivators of EDV. Furthermore, local factors such as individual physician approach to patients with poor performance status, physician availability for urgent visits, and a shared culture of relying on the ED for patient assessment, may contribute to greater or lesser ED utilization. Thus, the reason to study local characteristics of cancer-related EDV is to help clinicians and administrators create and improve programs that can reduce potentially avoidable EDV and improve the quality of care during EDV that are not preventable.

The analyses of EDV at our institution were undertaken because, despite the creation of numerous services and programs recommended as best practices [15], the number of EDV was not declining. Several useful and unsuspected findings were found in this analysis, which may be of interest to similar cancer programs. Any analysis requires proper enumeration of oncology patient visits which is more complicated than at first thought due to different ways of identifying and counting cancer patients. The physician tracing methodology described identified a purer sample of current and active oncology patients compared to the coding which overstated the number of patient visits by 30%. Thus, the data by physician tracer was more actionable and measurable over time. Indeed, only one patient was mistakenly assigned to the cancer providers who did not have cancer, and only six were determined to be receiving their care predominantly at nearby referral centers.

Most large population studies of oncology EDV use clinical classification software mapped to International Statistical Classification of Diseases and Related Health Problems (ICD) system codes. The 30% difference between counts using a coding methodology and the more precise view of active cancer patients we used represents only an estimate of the potential for over-

counting using coding. Coding methods can also underestimate cancer as an underlying source of an EDV if abstractors only list active symptoms, e.g. fever or syndromes such as intestinal obstruction, and not the underlying cancer. But this is uncommon in published work and most studies include many different diagnostic codes to find all cancer cases. Indeed, up to 15 diagnosis codes were included in a large study of the epidemiology of U.S. EDV, which determined that 4.2% of all U.S. EDV were associated with cancer [16]. Regrettably, the authors did not re-calculate the data adjusting using different numbers of ICD codes. Moreover, in such large studies it is not feasible to do case review to assess the underlying reason for the EDV.

Beyond over inclusion due to coding flaws, over counting may also occur with the physician tracer methodology without chart review since we estimated that 28% of reviewed oncology EDV was determined to be “very unlikely” or “unlikely” related to the cancer diagnoses or its treatment. This estimate relied on experienced clinical judgement after individual chart review, a tool not feasible for larger health service research using claims or clinical databases. Admittedly, this is a subjective determination and subject to biases and thus should be regarded as an estimate. However, it is large enough discrepancy that it challenges the appropriateness of incentive models aimed at reducing oncology EDV unless the large number of non-cancer EDV can be accounted for.

The distribution of cancer status phase of treatment among the validated EDV was noteworthy and not predicted by us. A high number of EDV were for early stage disease (table 1), though all were on active anti-mitotic therapy. We had focused our pre-study preventive efforts on patients with more advanced and refractory disease, which composed the second most common patient group making EDV. These findings suggest that we should also include a formal assessment of self-management ability in selecting patients for extended outreach even in early stage patients.

Certain diagnoses were over-represented among patients making EDV. Based upon this data, these patients are now a focus for more outreach and efforts to expand patent-reported symptoms monitoring.

The analysis of time of arrival for EDV shows that 48% of weekdays EDV were during clinic hours, though we cannot say if the clinic venue would have been appropriate as a substitute. Time of arrival in the ED has been studied in at least one very large study that used coded diagnoses to identify cancer patients [8]. This study found that most patients were seen in the ED between 9 AM and 9 PM similar to our own findings. These data have implications for the business planning around an oncology-specific, urgent care clinic. Indeed, it was noted that the average volume of patients arriving in the ED from 4 PM to 9 PM, the hours of a typical after-hours clinic, was less than one per weekday, and some of these likely would likely have needed the ED anyway due to acuity.

Contrary to the idea that EDV result from poor accessibility to the oncology team, we found that patients making EDV were in frequent contact with their care teams prior to the EDV, often multiple times in the seven days prior to the EDV. Half had been seen by their doctor in the seven days prior to the EDV. This finding implies that despite abundant access, some EDV will continue to be viewed as necessary by the patient, their caregivers or even the oncology care team. Others have reported that more expansive support services, a bundle termed the ‘oncology medical home’ can reduce EDV [3]. While many services were in place in our system at the time the EDV were made, we cannot comment on the effectiveness of these services. Few of the patients making an EDV had a palliative care consult from a palliative care specialist but it is unclear if this alone is an adequate solution. In one systematic analysis of oncology related EDV [17], it was found that palliative care can reduce EDV

though this has not been a universal finding since there is much variation in the structure and effectiveness of palliative care programs.

Attributing EDV by patients to specific oncologists was feasible via chart review. But, while it is tempting to make judgments about the quality of care rendered by those oncologists with high patient EDV, such conclusions are hazardous without a larger sample size and multivariate analysis of known risk factors for EDV including age, diagnosis, race, distance from the treatment center etc. However, the data has provoked further analysis.

Limitations

Since our data was based upon our own ED visit database, we were not able to acquire data about EDV made by oncology patients at other emergency departments. These volumes tend to be small however for geographical reasons, but it is possible that our data may undercount a small number of external EDV. It is possible also that we erred in determining whether an EDV was “unlikely or “very unlikely” related to an oncology diagnosis. We tried to reduce variability in the assessment by limiting this determination to a single reviewer, but we there is an inherent subjectivity and risk of bias in the assessment.

Nothing in our retrospective analysis comments definitively on the appropriateness or preventability of the EDV or any subsequent admission. We noted a high admission rate of 64% similar to other studies of EDV, but the decision to admit a patient to the hospital during the EDV is also subjective and not standardized. Such decisions are influenced by preferences of the individual ED physician, oncologist and by the patient and family and further influenced by local factors including whether next day follow up is available, location of the patient’s domicile or availability of a caregiver/supporter at home.

Some published studies have concluded that a significant number of EDV or admissions are potentially preventable [18-22]. These analyses however are all retrospective, with the assessment of preventability made by oncology professionals after the evaluation has been performed, results of physical exam and lab tests are known. Moreover, reviewers do not share the patient perspective. In one small study at a cancer center in the UK, patients with unplanned admissions through the ED were interviewed about the reasons for the admission. The patients stated that there was good access to expert advice, and had tried self-management at home before visiting the ED [7]. This finding, similar to our own, suggests, that the burden of symptoms may be too high to be managed with telephone support only for some patients and families.

The phenomenon of EDV among oncology patients remains important to address. Studies of EDV characteristics are useful but ultimately they will need to be joined with studies incorporating the patient perspective to understand more fully the motivations behind EDV. Attempts have been made to do this among patients in several countries with other diseases [23], but studies of cancer patients are sparser [6,10]. This knowledge gap should be regarded as a call to action.

References

1. Vandyk AD, Harrison MB, Macartney G, et al. (2012) Emergency department visits for symptoms experienced by oncology patients: a systematic review. Supportive Care in Cancer 20(8): 1589-1599.
2. Rajkumar R, Patel A, Murphy K, et al. (2014) Maryland's all-payer approach to delivery-system reform. New England Journal of Medicine 370(6): 493-495.
3. Kuntz G, Tozer JM, Snegosky J, et al. (2014) Michigan oncology medical home demonstration project: first-year results. Journal of oncology Practice 10(5): 294-297.

4. Butcher L (2017) Some Builders' Remorse: The Rise and Fall of the Oncology Medical Home. Managed care (Langhorne, Pa.) 26(5): 18-22.
5. Earle CC, Landrum MB, Souza JM, et al. (2008) Aggressiveness of cancer care near the end of life: is it a quality-of-care issue?. Journal of Clinical Oncology 26(23): 3860-3866.
6. NICE guideline Development Group (2013) Venous thromboembolism in adults: diagnosis and management: Quality statement 7: Treatment of people with active cancer.
7. Chen H, Johnson M, Boland E, et al. (2019) Emergency admissions and subsequent inpatient care through an emergency oncology service at a tertiary cancer centre: service users' experiences and views. Supportive Care in Cancer 27(2): 451-460.
8. Scholer AJ, Mahmoud OM, Ghosh D, et al. (2017) Improving cancer patient emergency room utilization: A New Jersey state assessment. Cancer Epidemiology 51: 15-22.
9. Kraft Rovere R, Dagnoni C, Gomes Corrêa CE, et al. (2012) Profile of Cancer Patients Treated at the Emergency Room of a Tertiary Cancer Care Centre in Southern Brazil. Klinická Onkologie 25(6): 452-456.
10. Rosenwax LK, McNamara BA, Murray K, et al. (2011) Hospital and emergency department use in the last year of life: a baseline for future modifications to end-of-life care. Medical Journal of Australia 194(11): 570-573.
11. Barbera L, Taylor C, Dudgeon D (2010) Why do patients with cancer visit the emergency department near the end of life?. Canadian Medical Association Journal 182(6): 563-568.
12. Yildirim B, Tanriverdi O (2014) Evaluation of cancer patients admitted to the emergency department within one month before death in Turkey: what are the problems needing attention?. Asian Pacific Journal of Cancer Prevention 15(1): 349-353.
13. Duflos C, Antoun S, Loirat P, et al. (2017) Identification of appropriate and potentially avoidable emergency department referrals in a tertiary cancer care center. Supportive Care in Cancer 25(8): 2377-2385.
14. Wallace EM, Cooney MC, Walsh J, et al. (2013) Why do palliative care patients present to the emergency department? Avoidable or unavoidable?. American Journal of Hospice and Palliative Medicine® 30(3): 253-256.
15. Handley NR, Schuchter LM, Bekelman JE (2018) Best practices for reducing unplanned acute care for patients with cancer. Journal of Oncology Practice 14(5): 306-313.
16. Rivera DR, Gallicchio L, Brown J, et al. (2017) Trends in adult cancer–related emergency department utilization: an analysis of data from the Nationwide Emergency Department Sample. JAMA Oncology 3(10): e172450.
17. Henson LA, Gao W, Higginson IJ, et al. (2014) Emergency department attendance by patients with cancer in their last month of life: a systematic review and meta-analysis. Journal of Clinical Oncology 33(4): 370-376.
18. Delgado-Guay MO, Kim YJ, Shin SH, et al. (2015) Avoidable and unavoidable visits to the emergency department among patients with advanced cancer receiving outpatient palliative care. Journal of Pain and Symptom Management 49(3): 497-504.
19. Brooks GA, Jacobson JO, Schrag D (2015) Clinician perspectives on potentially avoidable hospitalizations in patients with cancer. JAMA Oncology 1(1): 109-110.
20. Brooks GA, Abrams TA, Meyerhardt JA, et al. (2014) Identification of potentially avoidable hospitalizations in patients with GI cancer. Journal of Clinical Oncology 32(6): 496-503.

21. Meisenberg BR, Hahn E, Binner M, et al. (2016) ReCAP: insights into the potential preventability of oncology

readmissions. Journal of Oncology Practice 12(2): 153-154.

22. Oh TK, Jo YH, Choi JW (2018) Associated factors and costs of avoidable visits to the emergency department among cancer patients: 1-year experience in a tertiary care hospital in South Korea. Supportive Care in Cancer 26(11): 3671-3679.
23. Kraaijvanger N, van Leeuwen H, Rijpsma D, et al. (2016) Motives for self-referral to the emergency department: a systematic review of the literature. BMC Health Services Research 16(1): 685-704.