Predicting the future by studying the past for patients with cancer diagnosed in the emergency department

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Summary:

In the article that accompanies this editorial, Kapadia et al. developed a digital quality measure to identify emergency presentations of incident cancers, a measure they found to associated with both antecedent missed opportunities for diagnosis and subsequent 1-year all-cause mortality. Their work highlights the need for a cancer control continuum that includes, not only improved early detection, but also improved symptom recognition, expedited diagnostic work-up, and increased downstream support, including multilevel interventions focused on care continuity and symptom management for these patients with emergency presentations of cancer to improve cancer outcomes.

> Knowledge is telling the past. Wisdom is predicting the future.
>
> - Attributed to W. Timothy Garvey

In an ideal state, cancers are detected early through screening or rapid recognition of symptoms, enabling timely diagnosis, easier treatment, and optimal outcomes. In reality, many cancers are diagnosed emergently, often with upstream missed diagnostic opportunities related to patient, provider, and system factors. In the article that accompanies this editorial, Kapadia et al. introduce a digital quality measure (dQM) of emergency presentation for lung and colorectal cancer, focused on patients receiving primary care within two large integrated health systems, the United States (US) Department of Veterans Affairs (VA) and Geisinger, showing that emergency presentations of cancer are common and often follow missed opportunities for diagnosis (in press). A strength of their work is the robust death data in the VA database, uncommon in many electronic health record (EHR)-derived databases,[1, 2] which enabled reporting of 1-year mortality by emergency presentation status and estimation of its association in fully adjusted models.

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Compared to non-emergency presentations, emergency presentations were associated with significantly elevated 1-year mortality, even after accounting for patient age, cancer type, and comorbidities, with adjusted odds ratios (ORs) of 1.74 (95% CI: 1.63–1.86) and 1.83 (95% CI: 1.61–2.07) for lung and colorectal cancer, respectively. Their findings have clear implications for cancer outcomes research and care delivery improvement efforts.

The dQM presented by Kapadia et al. may be useful for health systems looking to improve timely cancer diagnosis within quality improvement frameworks. The Centers for Medicare & Medicaid Services (CMS) has set a goal of transitioning to digital quality measurement "to provide usable, timely data" for health systems to identify real-time quality gaps, drive innovations, and ultimately improve care. These efforts are germane to cancer care where patient outcomes are closely linked to care quality, not just disease severity, and where disparities in outcomes are tied to inequities in care delivery.[1] In oncology value-based payment models, such as the CMS Enhancing Oncology Model,[2] accountability for patient outcomes begins after cancer diagnosis and treatment initiation. However, in primary care, value-based payment models assume that primary care providers take on responsibility for patients across disease types and throughout care trajectories.[3] Thus, the Kapadia dQM, which measures pre-diagnosis cancer care, may be best suited for primary care-focused models rather than oncology models.

Nevertheless, the Kapadia measure has important implications for reducing cancer outcome disparities through improvements in pre- and post-diagnosis care delivery (Figure). Emergency presentations offer a landmark from which we can look both upstream, to precipitating factors, and downstream, to actions we can take after occurrence, in our search to improve cancer outcomes. At a foundational level, the oncology community should advocate for universal access to primary care, including cancer screening. The National Cancer Institute (NCI) recognizes that cancer prevention and screening are within the scope of the cancer research priorities, and cancer-focused advocacy and professional organizations, such as the American Cancer Society and the American Society of Clinical Oncology, focus significant effort on cancer prevention and control. NCI's newly-launched Cancer Screening Research Network, which will evaluate emerging cancer screening technologies, is a commendable effort to improve early detection of cancers.[4] Such improvements will be most impactful when joined with the long-standing efforts of NCI to also address the quality and equity of the multi-step processes underlying cancer screening including recruitment, testing, diagnosis, and referral for treatment.[5] However, not all cancers can be screen detected, and most patients with these cancers are diagnosed after symptomatic presentation to a healthcare provider,[6–8] many to the emergency department (ED).[9, 10] For this reason, as a complement to screening, efforts focused on "early diagnosis" should also prioritize early patient and provider recognition of cancer-related symptoms, and the need for timely investigations, biopsy confirmation (Figure, T_1), and oncology and other specialty consultation (Figure, T_2) once cancer is suspected.[11–14]

To improve cancer outcomes and reduce cancer disparities, we also need to better understand the upstream factors contributing to emergency presentations. Kapadia et al. demonstrated that Hispanic and Black patients were more likely to have emergency presentations; we have similarly reported increased emergency presentations among

Medicare beneficiaries who are Black, Hispanic, unmarried, have low income, or multiple comorbidities.[15, 16] Notable variation between racial and ethnic groups and the high number of missed opportunities for diagnosis identified by Kapadia et al. tells us that emergency presentations are not driven simply by unavoidable, aggressive cancer development but instead reflect preventable and actionable gaps in care access and delivery. These gaps, likely reflective of structural discrimination that influences entry to and movement through the healthcare system, ultimately translate to poor cancer outcomes and potentially compound health disparities.

One future direction for this research would be to evaluate predictors of missed opportunities for diagnosis. We know from US cancer screening literature that Asian or Black race, Hispanic ethnicity, rurality, low income, and lack of insurance are risk factors for low screening uptake or delayed time to biopsy after abnormal screening results (Figure, T_1).[17–20] Interventions such as reminders, navigation or scheduling assistance after abnormal screening, transportation support, expedited diagnostic procedures, and rapid access to oncology consultation are all evidence-based approaches that improve screening, timely diagnosis, and equitable outcomes.[21–29] Perhaps such interventions could also impact the diagnostic cascade in symptomatic presentations. Symptom awareness campaigns, which could reduce patient delays in seeking care, especially for minoritized and underserved communities,[30] have demonstrated effectiveness in other western countries,[11] but have not been undertaken extensively in the US. Identifying the multilevel drivers of missed opportunities for diagnosis, especially those at the provider- and system-level, could inform the design of pre-diagnosis interventions.

To optimize outcomes, we must also look downstream to post-diagnosis care where oncology care organizations can have the greatest impact. The same patient-, disease-, provider-, system-, and/or community-related factors in the pre-diagnosis period that contribute to emergency presentation will continue to accompany individuals downstream during oncologic care, compounding barriers to diagnosis with treatment gaps to produce even larger disparities in cancer outcomes. Emergency presentations are often markers for barriers to care, fragmented care delivery, high clinical acuity, and uncontrolled symptoms.[31, 32] Kapadia et al.'s findings suggest factors beyond advanced stage at presentation contribute to patient outcomes, including mortality. In our work, we demonstrated that patients with hospital-diagnosed advanced lung cancer have high downstream readmission rates, low receipt of cancer-directed therapies, and high mortality.[33, 34]

The complex cancer care continuum and the transitions between each step pose different challenges to individual patients, families, and physicians.[35] Use of the ED presentation dQM as a means to target downstream interventions could address these transitions and other challenges by enabling risk-stratified provision of support services to reduce unplanned hospital stays and ED visits, or otherwise enhance cancer care quality, and ultimately improve patient outcomes.[36] We know that patients with pre-diagnosis acute care events (ACEs) are at higher risk of post-diagnosis ACEs while receiving cancer treatment.[33, 37, 38] These events are not inevitable; patient navigation, early palliative care, and electronic patient-reported symptom monitoring have been shown to help reduce ACEs among cancer

patients.[39–41] As demonstrated by Kapadia et al., tracking emergency presentation is straightforward and could assist cancer centers, particularly those within integrated health systems, in both capacity planning for as well as targeting such support services.

One clear implication of identifying emergency presenters is the opportunity to accelerate cancer care processes. If, as demonstrated, emergency presentation is a marker of diagnostic delays, or high clinical acuity, acceleration of time to definitive diagnosis (T_1), oncologic consultation (T_2), and treatment initiation (T_3) is essential to decreasing overall time to treatment (T_T, Figure). EHR-derived tools that help identify these patients at presentation and leverage rapid access systems for timely biopsy confirmation (T_1) and oncologic consultation (T_2) could improve outcomes.[32] Digital quality measures, such as the emergency presentation dQM proposed by Kapadia et al., will be most impactful when they not only can be used to monitor cancer care quality or even to understand its multilevel drivers, but when, more importantly, they can be leveraged to improve care in real time.

An emergency presentation of cancer is an alarm bell. It signals potential missed opportunities upstream, which we must study to avoid endless repetitions of the same emergency, but it also highlights social determinants of cancer care for which we can leverage proven interventions to change the course of the downstream journey for the patient before us. Systematic, rapid, effective action at the point of emergency presentation can still impact the equitable receipt of high-quality cancer care and should be our communal responsibility.

Disclaimers:

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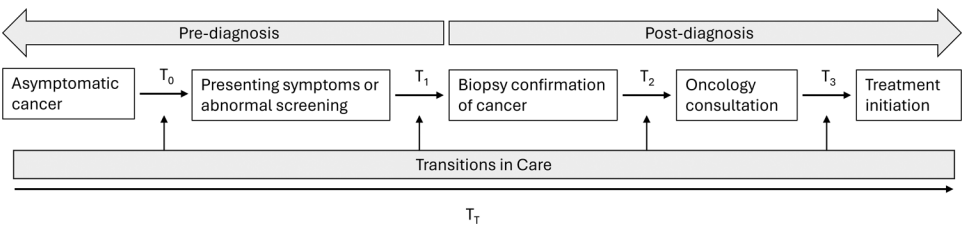
Figure.

Key components of the time to treatment for patients with newly-diagnosed cancer. Adapted from Taplin et al.[35]