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Catalyzing Healthcare's Future: How AI Powers the Quadruple Aim

BY CHRIS CASHWELL, CEO AND FOUNDER, AZRA AI

The healthcare sector is at the cusp of a major transformation. As the industry grapples with rising costs, uneven patient outcomes, and increasing demands on providers, the concept of the “Quadruple Aim” has emerged as a guiding principle. The Quadruple Aim focuses on improving patient experience, enhancing clinical outcomes, advancing operational efficiency, and producing positive financial impacts. To truly achieve these critical objectives, though, hospitals must harness the power of Artificial Intelligence (AI) and automation.

AI and automation have already proven to be game-changers in a variety of industries, and healthcare is no exception. These technologies offer numerous benefits that are critical to the success of hospitals in the 21st century. Here are specific ways AI and automation are already powering the Quadruple Aim:

1. ENHANCING PATIENT EXPERIENCE

Real-time Identification

With the advancement in AI, the capability to identify diseases like cancer at an early stage has surged. AI can analyze vast unstructured datasets in real-time, identifying patients with early-stage cancer and incidental findings that might otherwise go unnoticed. The result? Swift navigation towards effective treatments, potentially saving lives.

“We identify cancers in real-time now and we ensure the navigators can support our patients even prior to patients making treatment decisions,” said Jami DeNigris, a certified oncology nurse who is the director of oncology support services at Inspira Health in New Jersey. “This helps ensure we address barriers to care, it increases patient experience and satisfaction, and also increases our hospital retention rates. And being able to identify these patients, and connect them right away, and get them treated and diagnosed is key.”

Amplifying Nurse-Patient Interaction

Given the pervasive problem of clinical staff burnout, hospitals must look for ways to automate administrative tasks and workflows in order to increase productivity and capacity so that clinicians and care team members can spend less time in front of a computer or doing manual tasks, and more time providing care to their patients.

“I think the way [AI] technology is moving, it's bringing the clinicians back to the bedside, back to those patients,” said DeNigris. “When we went to the electronic medical record, you see these inpatient nurses, they're away from the patients because of technology, always charting, making sure they have all their i's dotted and all of that. But [AI] really is taking so much of the work away from all that manual, all that administrative stuff. Clinicians and nurses want to be with the patients and help them. They don't want to be behind a computer screen just searching through records and stuff. So the way that [AI] is heading is saving time and bringing us all back to the patients — where we belong.”

2. ELEVATING CLINICAL OUTCOMES

Swift Treatment Delivery

AI has shown great promise in improving patient outcomes by spotting complex diseases, such as cancer diagnoses, at an earlier stage. Early detection is crucial for the effective treatment of cancer, and AI-powered algorithms can analyze large amounts of patient data, such as pathology reports, diagnostic images and patient histories, to identify early signs of disease. This can help healthcare professionals to diagnose and treat patients earlier, leading to better outcomes and increased survival rates. By embracing AI-powered technologies, we can improve patient outcomes and save lives, making the future of healthcare more promising and patient-centric.

Promoting Health Equity

AI-driven solutions can help reduce health disparities by eliminating systemic biases, such as those related to socioeconomic backgrounds or race. By leveraging natural language processing, machine learning algorithms and patient data analysis, AI can create better, more equitable treatment models for patients of all backgrounds. Using AI to help guide patients into and through their healthcare experience is also a way to improve access to care and ameliorate disparities.

“We're working hard both globally and locally to make sure that your zip code doesn't determine more than your genetic code, that you are not receiving substandard care and screening prevention treatment because of your race or socioeconomic status or your neighborhood or your access or language barriers,” said Dr. Doug Flora, a treating medical oncologist at St. Elizabeth Healthcare.

3. BOOSTING OPERATIONAL EFFICIENCY

Eliminating Manual Case Finding

The old methods of manually sifting through cases are not only time-consuming but also prone to errors. Relying on human labor for case finding can inadvertently lead to missed diagnoses, delayed treatments, or incorrect prioritization of patients, affecting patient outcomes and hospital efficiency. By eliminating manual case finding and integrating AI-driven systems, hospitals can boost their operational efficiency significantly. AI can process vast amounts of data at incredible speeds, ensuring that every patient case is identified, analyzed, and prioritized based on its urgency and complexity. This not only reduces the workload of healthcare professionals but also minimizes the risk of human error, enabling hospitals to offer better care and achieve optimal resource allocation, thereby enhancing overall patient experience and operational performance.

Automating Repetitive Tasks, Streamlining Workflows

AI has the potential to revolutionize healthcare by automating routine tasks and freeing up nurses and clinical staff to focus on patient care. With AI-powered tools, healthcare professionals can streamline administrative tasks such as documentation, scheduling appointments, case finding, and managing patient records. By reducing the time spent on these tasks, nurses and clinical staff can devote more time to interacting with patients, providing personalized care, and improving patient outcomes.

AI-powered predictive analytics can forecast patient inflow, allowing hospitals to optimize their resources. It also aids in reducing registry backlog, ensuring a smoother operational flow.

4. POSITIVE FINANCIAL IMPACT

Augmenting Patient Retention and Revenue

In the highly competitive healthcare landscape, where patient trust is gold, retention rates are more than just numbers. They translate directly into increased revenue, ensuring the hospital's financial stability. This aspect is particularly critical in light of [recent research](#) revealing that the average hospital operates on a meager margin of just 1.1%. These slim margins underscore the need for operational efficiency and innovative strategies to optimize revenue.

In today's rapidly evolving technological era, leveraging AI isn't just a futuristic vision—it's a present-day necessity. For healthcare organizations, AI presents an opportunity to identify efficiencies, reduce overheads, and predict patient needs, all of which can substantially drive up Net Patient Revenue. Furthermore, by augmenting their operational capacities with AI, hospitals can go beyond mere financial stability. They can amplify their positive footprint in their communities, offering optimized care, pioneering treatments, and fostering a community

that is both healthy and well-informed. In essence, AI is not just a tool for profit; it's an instrument of profound community impact.

Leveraging Real-time Analytics for Strategic Planning

Strategic planning in healthcare isn't just about counting dollars and cents. It's about predicting future health trends, allocating resources, and ensuring the hospital can serve its community. With real-time analytics, hospitals can strategize more effectively, ensuring both their financial health and that of their patients.

Utilizing predictive analytics, AI-enabled healthcare facilities aim to reduce costs and maximize revenue by anticipating future patient needs and recommendations for optimal service delivery and care. With insights easily gathered from this technology, healthcare workers can also use AI to gain a better understanding of their patients' preferences in order to provide more personalized services. In addition, AI-inspired solutions can help streamline the administrative process by automating mundane tasks such as billing, claims processing, and data entry. Ultimately, effective utilization of AI in this realm has the potential to significantly improve patient satisfaction while increasing operational efficiency and enhancing the financial performance of a healthcare institution in meaningful ways well into the future.

CONCLUSION

The Quadruple Aim isn't just a theoretical concept; it's an achievable goal. But to realize it, hospitals must move beyond traditional methods and embrace the future: a future driven by AI and automation. As we've seen, the advantages are manifold, from enhanced patient experience to streamlined operations and financial growth. The call to action for hospitals is clear – leverage AI and automation to truly achieve the Quadruple Aim.

WELCOME &

Welcome to our new members & renewal members since August 2023. We are thrilled to have you be a part of the ACE!

Sudha Bommi
Kristofer Karwisch
Nikhilesh Korgaonkar
Stacy Kostenbauer
Josh Lahav
Kelsey Mattson
Shardee Ogonor

Nike Onifade
Anthony Paravati
Lori Ann Roy
Kimberly Smith
Melissa Threlkeld
Karen Wonders
Chere Wood

Newsroom:

ECG Management Consultants, a leading healthcare consulting firm, announced a key addition to its Center for Advanced Oncology with the hiring of **Elizabeth Liebow**, who left Boston's Dana-Farber Cancer Institute after nearly 20 years.

CEACAM5: A Clue to Cancer Cells Hiding in Plain Sight

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Despite therapeutic advances, most patients with advanced non-small cell lung cancer (NSCLC) progress while on immunotherapy, with or without chemotherapy.^{1,2} When their disease progresses, these patients may have a poor prognosis with current therapies.¹ Survival rates are low for these patients; the median progression-free survival for patients who progress after first-line immunotherapy (IO) or IO plus chemotherapy in advanced NSCLC is 2.4-5.5 months, while the median overall survival is 4.6-10.7 months.¹ Investigating novel targets and biomarkers could potentially help address the challenges patients and physicians face in later-line treatment selection and represents an important area of clinical investigation in NSCLC.³

CEACAM5: A POTENTIAL BIOMARKER

Carcinoembryonic antigen-related cell adhesion molecule 5, or CEACAM5, is currently being explored as a potential biomarker in advanced NSCLC.⁴ Notably, CEACAM5 is highly expressed in a subset of NSCLC tumors, but it is virtually undetectable in normal lung tissue.^{4,5} In early investigational studies, ~25% of patients with advanced nonsquamous (NSq) NSCLC had high CEACAM5 expression.⁶ The majority of other actionable molecular biomarkers in NSCLC are seen less frequently, including EGFR (9%-13%)* and ALK (4%-5%).^{7,8} The differential expression of CEACAM5 in NSCLC tumors versus normal lung tissue

make it a potential biomarker of interest in advanced NSq NSCLC.^{4,5}

In early investigational studies



of patients with advanced NSq NSCLC had high CEACAM5 expression.⁶

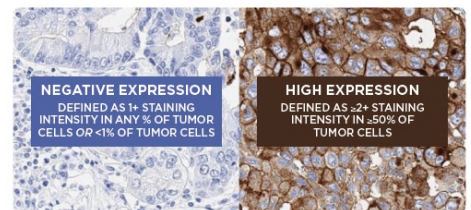
ROLE OF CEACAM5 IN TUMOR DEVELOPMENT

To understand the potential of CEACAM5 as a biomarker in NSCLC, it's important to examine the role of CEACAM5 in tumor development. CEACAM5 is a member of the CEACAM family of glycoproteins. It is a cell adhesion molecule that connects adjacent cell membranes in both normal and tumor tissues.¹⁰ When overexpressed, CEACAM5 may inhibit differentiation, apoptosis, and natural killer cytotoxicity.¹⁰⁻¹³ CEACAM5 may also disrupt cell polarization and tissue architecture and induce pro-inflammatory cytokines that increase binding of circulating tumor cells to the endothelium.^{10,13} Through these mechanisms, CEACAM5 may contribute to tumor development and metastasis.¹⁰

DETECTABLE VIA IHC TESTING

Immunohistochemistry (IHC) testing helps in identifying CEACAM5-expressing tumor cells. High CEACAM5 expression is defined as $\geq 2+$ staining intensity in $\geq 50%$ of tumor cells. It is important to note that

testing may be performed with new or archival biopsy tissue.⁶ Along with IHC testing protocol and scoring method, a validated CEACAM5 antibody clone is also important when determining CEACAM5 expression.¹⁴



For illustrative purposes only.

CONCLUSION

To discover more and stay up to date on CEACAM5 news, visit CEACAM5.com.

FOOTNOTES:

*North America and Western Europe.⁸

†Defined as expression at $\geq 2+$ intensity in $\geq 50%$ of tumor cells.⁹

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Pioneering a Cancer Program for the Future: Novel Approaches to Optimize the Patient Experience

BY JESSICA TURGON, PARTNER, ECG MANAGEMENT CONSULTANTS; MATT STURM, PARTNER, ECG MANAGEMENT CONSULTANTS; LILI HAY, MANAGER, ECG MANAGEMENT CONSULTANTS; MONICA DENAULT, MANAGER, ECG MANAGEMENT CONSULTANTS

INTRODUCTION

Achieving the Cancer Moonshot goal¹ of reducing the national cancer death rate by 50% over the next 25 years will require improved interventions and increased access to cancer care. Emerging research is fostering paradigm-altering improvements to cancer diagnosis and treatment, and innovative technologies are expanding access to cancer services to broader patient populations. At the same time, many programs face capacity and resource constraints—which will continue to rise as demand for cancer

services grows in the coming years. The aging US population is predicted to drive an increase in cancer incidence of almost 50% by 2050.²

Many cancer programs are facing significant challenges to maintaining access to care. By focusing on core operational imperatives, cancer programs can deliver advanced care and expand access to that care while maintaining a focus on the patient experience.

As cancer programs look to the next decade, administrative and clinical

leaders will need to implement novel approaches to increase patient access, improve operational efficiency, and ensure equity for all patients. Subspecialized physicians and excellent clinical outcomes remain fundamental to maintaining a competitive cancer program; this whitepaper does not address those topics, as it is assumed that programs have focused their development efforts in those areas over the past 10 to 20 years. Instead, the paper explores four pillars for creating a differentiated patient experience:



Optimization of performance to increase patient access



Incorporation of strong patient navigation services across the program



Integration of digital health tools to support the patient care experience



Dedicated focus on improving health equity

While each pillar must be understood on its own, cancer leaders who recognize how the pillars overlap can position their programs to reap the full rewards of investing in these initiatives—ensuring that their programs can continue bringing cutting-edge, patient-centric care to their communities and drive financial improvement for their organization.

PATIENT ACCESS

Problem

Along with expecting high-quality cancer care, patients are increasingly seeking rapid access to appropriate oncology specialists after diagnosis and the ability to initiate treatment quickly. Many highperforming programs strive to arrange new-patient appointments within five to seven calendar days, or even less (e.g., best-in-class breast cancer programs see new patients within 24 to 48 hours). These shifting patient experience expectations regarding access present increasing challenges for programs that

are already facing high patient volumes, staffing limitations, or physical footprint restrictions. For many patients, the ability to access care quickly and seamlessly is a key factor in determining where to seek care. Programs without well-designed patient access processes are at a competitive disadvantage.

In today's resource-constrained operating environment, providers need strategies to expand access and optimize capacity within existing clinics without adding space, chairs, or staff. Patient and provider priorities should also be considered when designing and implementing operational changes within a clinical program. Additionally, alternative care strategies need to be considered as methods of utilizing existing infrastructure in different ways.

Solution

To improve new-patient access to oncology services, programs need to prioritize capabilities that will support a seamless patient experience while

decreasing time to first appointment. The highestyield focus areas for improving patient access are:

- Refining referral intake processes while understanding the overall demand for newpatient appointments.
- Enhancing program capacity management to meet that demand.
- Optimizing provider work standards to free up capacity and enable operational efficiency.

High-performing programs approach these three issues using standardized processes that allow all providers to work at the top of their licenses while reducing variation in workload across individual providers. Once providers' available time has been optimized, capacity management and clinical coordination efforts can be more effectively implemented. Several best practices, which must be approached in relation to one another, can help increase capacity without adding resources, which will in turn reduce wait times for new patients.



PATIENT ACQUISITION AND REFERRAL COORDINATION

TARGET: New patients seen within two to five business days

- Develop integrated upstream referral networks by strengthening relationships with primary care physicians and referring specialists.
- Establish screening programs in core disease areas.
- Implement a genetic counseling program to identify high-risk patients and support earlier diagnoses.
- Streamline the intake process for new patients.
- Provide navigation for all patients regardless of origin.
- Coordinate logistics for out-of-area patients.



CAPACITY MANAGEMENT

TARGET: 80% utilization of resources

- Measure and align supply/demand for new-patient appointments.
- Optimize infusion scheduling templates.
- Load-balance infusion services to unlock capacity without adding chairs or staff.
- Maximize clinic resources and room utilization.
- Evaluate the feasibility of separating certain programs (e.g., benign hematology with advanced practice provider [APP] support).
- Develop processes to ensure survivors receive follow-ups.



PROVIDER WORK STANDARDS AND OPTIMIZATION

TARGET: 32 patient contact hours per physician FTE

- Set clear standards for provider time to ensure an optimal mix of clinical and administrative time.
- Maximize the use of APPs to allow providers to work at the top of their licenses and support additional volume.
- Evaluate office hours and coverage expansion.
- Standardize provider scheduling templates, and optimize block scheduling.
- Confirm inpatient rounding commitments, and invest in hospitalist coverage, as appropriate.

Along with optimizing referral coordination, capacity management, and provider work standards, ensuring that patients utilize the right care setting will improve overall patient access.

Oncology urgent care centers and home infusion programs are two methods for utilizing existing program infrastructure in different ways.

Oncology Urgent Care Centers

Providing on-demand access to the right care setting for patients is key to both reducing healthcare costs and meeting patient experience expectations. Three of the most common frameworks for oncology urgent care centers are:

- Dedicated space in an existing medical office building/oncology clinic.
- A dedicated clinic within an emergency department (ED) that avoids general ED triage and provides oncology-specific emergency care.

- A stand-alone ambulatory clinic that patients can visit directly from home or after receiving care in the ED if their medical needs do not warrant an inpatient stay.

In addition to establishing the right clinical setting and structure for an oncology urgent care center, the center should offer patients:

- A way to communicate with a triage nurse who can direct them to the proper setting for their needs.
- Same-day/walk-in visits and extended hours of operation.
- Access to oncologists familiar with cancer treatment-related issues and side effects.
- Ability to treat common side effects (e.g., dehydration) on site.
- Alignment with value-based care strategies that reduce ED or inpatient admissions to create a supportive care environment.

ONCOLOGY URGENT CARE CENTERS

Address adverse effects of treatment and symptoms before they become significant issues.

Reduce unnecessary hospital admissions.

Avoid exposure to the general population for immunocompromised patients.

Provide a venue for unscheduled visits while reducing disruptions to the flow of outpatient clinics.



HOME INFUSION PROGRAMS

Improve patient access, particularly for patients who may have challenges related to comorbidities, cancer-related symptoms, or transportation.

Address clinic capacity issues by providing treatment in an alternative setting.



Home Infusion Programs

Although chemotherapy infusions have traditionally been delivered in a clinical setting, certain therapies can be provided to patients at home. This approach has been demonstrated to improve patient satisfaction and can create financial savings for both patients and health systems.^{3,4}

Patients who have demonstrated tolerance of a treatment in an infusion center are candidates for home infusion.⁵ Treatments can include intravenous and subcutaneous drugs, as well as biologics, which are administered either by a nurse or by the patient themselves.⁶ Nurses also

provide patients with education, apply dressings to the infusion site, and check for adverse reactions.

As a relatively new model for delivering cancer treatment, home infusion programs face several challenges that should be considered during design and implementation, including:

- Regulatory approval and/or state requirements for licensures.
- Insurance reimbursement.
- Availability of appropriately trained nurses.
- Logistical issues related to geography and patient/provider safety.
- The need for a high degree of coordination between patients, care teams, home infusion pharmacies, and home health agencies.⁷

Once these patient access initiatives are implemented, the ROI can be directly measured through increases in financial performance tied to incremental new-patient volumes.

PATIENT NAVIGATION

Problem

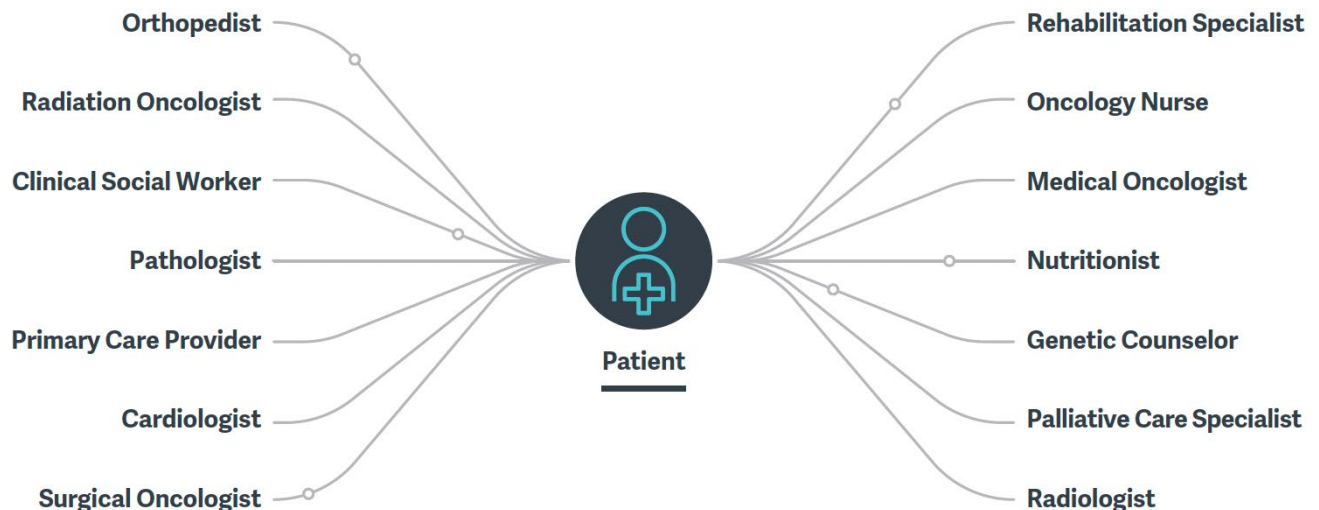
Cancer is a complex disease that requires multidisciplinary care. What makes it even more challenging is that the care pathway (both the unique care providers required and the sequence of events) varies by patient and is dependent on

their clinical diagnosis and treatment plan. This complicates most programs' efforts to implement a standardized set of care coordination protocols for their entire patient population; therefore, patients often struggle to coordinate care between specialists during their cancer journey.

Patient navigation programs are commonly utilized to bridge this gap and are designed to facilitate a patient-centered care experience by reducing barriers and ensuring access to timely cancer care. These services make the cancer care journey more manageable for patients and their loved ones.

While most cancer programs currently offer some fragmented patient navigation services, high-performing cancer programs facilitate a comprehensive patient navigation experience for all patients, regardless of disease site or geographic location, beginning at the point of intake and continuing throughout the patient's cancer journey. There are a variety of areas where enhanced navigation services can buttress existing clinical and operational practices and/or help minimize other patient-specific barriers to care (e.g., language, income, geography, education). These services are particularly important for programs to have in place as a way to efficiently manage patients' needs as the demand for cancer services increases.

COMPLEXITIES OF CANCER CARE COORDINATION



Solution

Given the complexities associated with cancer care, cancer centers should prioritize two key patient navigator roles: the new-patient coordinator and the clinical nurse navigator. These roles are crucial for effectively coordinating care for patients throughout the oncology care continuum. New-patient coordinators are the first point of contact for all oncology patients. They assist throughout the patient journey and are responsible for scheduling appointments and treatments, managing referrals, and assisting with financial matters. New-patient coordinators have the following duties:

1. New-Patient Coordinator

Prior to the patient's first visit:

- Ensure that the patient has the information they need about the location(s) of their appointment(s).
- Help the patient complete required documentation, including collecting records required to guide treatment (e.g., results of diagnostic testing, such as lab and radiology reports).
- Assist with transportation and parking.
- Locate lodging if the patient is traveling from out of town.
- Facilitate the transfer of clinical information to the treatment team.

- Help schedule appointments with financial counseling, social work, and other support services.

2. Clinical Nurse Navigator

During cancer treatment:

- Ensure that the patient remains connected to support services as needed, and assist with scheduling.
- Provide individual or family counseling and emotional support.
- Connect the patient to peer support (cancer support groups).

Once a patient has decided to pursue their oncologist's treatment plan, the new-patient coordinator will connect them to the clinical nurse navigator, who will begin to coordinate patient appointments with the patient's care team. The clinical nurse navigator has the following duties:

- Accompany the patient to initial appointments when possible.
- Coordinate diagnostics, procedures, and specialist appointments.
- Assess the patient's physical, emotional, psychosocial, spiritual, and financial needs.
- Initiate referrals to connect the patient with community resources.
- Provide patient education.
- Arrange treatment closer to home when available and appropriate.

In addition to having capable navigators overseeing patient volume (at a ratio of approximately 200 patients per 1.0 FTE navigator for either the new-patient coordinator or the clinical nurse navigator), successful patient navigation programs will have a number of components in place. There must be a strong vision and clearly articulated scope for the program, clarity on roles, robust EHR documentation tools, and a high level of physician and organizational commitment.

For individuals responsible for operating the navigation program, there are multiple ways to evaluate its success. Oncology leaders will need to determine the most appropriate performance indicators for their program. Performance can be evaluated utilizing metrics in both clinical and nonclinical categories (see chart on page 10).

While the direct ROI is difficult to measure, a strong patient navigation program drives an estimated 10% improvement in patient retention.⁸ Other factors to consider when evaluating the ROI for patient navigation include improved patient compliance with treatment plans and reductions in hospital admissions, readmissions, and ED visits.



		METRIC	DESCRIPTION
CATEGORY	DIAGNOSIS	Cancer screening follow-up to diagnostic workup	Number of navigated patients with an abnormal screening referred for a diagnostic workup
		Completion of diagnostic workup	Number of navigated patients with an abnormal screening who completed a diagnostic workup
	TREATMENT AND CARE TRANSITIONS	30-, 60-, and 90-day readmission rates	Number of navigated patients readmitted to the hospital at 30, 60, and 90 days
		Navigation caseload	Number of navigated patients per month
		Patient retention	Percentage of navigated patients retained for treatment services
		Emergency room utilization	Number of navigated patients who visit the ED per month
		Treatment compliance	Percentage of navigated patients who adhere to institutional treatment pathways
		Clinical trial education	Number of patients educated on clinical trials by the navigator per month
	Diagnosis to treatment	Number of business days from diagnosis (date of pathology result) to initial treatment (first date of treatment)	
	PATIENT EXPERIENCE	Patient satisfaction	Patient satisfaction survey results per month
Patient goals		Percentage of new cancer cases per month for which patient goals are identified and discussed with a navigator	
Caregiver support		Number of caregiver discussions about needs/preferences with a navigator per month	

DIGITAL HEALTH

Problem

Patients expect to find the same flexibility and ease of navigation in healthcare that they experience in other industries. Consumers want better products, higher-quality service, and a better overall experience, all enabled by technology. These expectations for seamless and quick access are driving providers to reevaluate their digital capabilities to be as patient-centric as possible.

To achieve this goal, organizations must thoughtfully evolve their use of digital

healthcare tools while understanding that digital transformation is not about simply adopting the latest technology. Cancer programs must carefully consider how they can best utilize digital health tools to drive improvements in patient access, patient experience, care coordination, and program differentiation. Considerations regarding the application of artificial intelligence (AI) should also be evaluated as AI-assisted technologies rapidly enter the healthcare space. These technologies are predicted to become a mainstream tool for providers within the next 10 years.

Solution

It is crucial to establish a foundation of digital health tools before venturing into more innovative technological capabilities. All cancer programs should have the following four patient-centric elements in place today:

- **Integrated Telehealth:** Synchronous video visits integrated into the EHR
- **Patient Portal Access:** Full patient access to the EHR, including the ability to upload and download information
- **Patient Communication:** Multiple access points, including phone and portal messaging;

coordinated and personalized survivorship communication

- **Triage Services:** On-demand digital nurse triage capabilities available through multiple access points

With these capabilities in place, cancer programs can explore more pioneering approaches to digital health that improve the patient experience while automating routine clinical tasks in a manner that allows providers and clinic staff to more efficiently attend to a larger patient population. One crucial digital health application that drives improved patient experiences and reduces the need for unnecessary clinic visits is remote monitoring of patient vitals and symptoms. The continuum ranges from basic electronic patient-reported outcomes (ePROs) to remote monitoring and, ultimately, AI-assisted monitoring solutions. These advanced digital tools enable the gathering and reporting of patient data to the care team and facilitate better symptom management, reduce travel burdens, minimize emergency visits, and improve cancer survival rates.⁹

Although implementing remote monitoring necessitates changes in staff skills, systems, and workflows, introducing ePROs in the short term will help patients adapt to remote monitoring, paving the way for the adoption of more innovative tools. Establishing a strong ePRO capability today will position cancer programs to transition to more advanced remote monitoring (including AI-assisted) solutions as technologies evolve and gain industry approval.

ePROs

ePROs utilize tools such as smartphones and web-based platforms to collect patient-reported data on vital signs, symptoms, and quality of life. Patients provide information about their health status by manually logging information into a system at preplanned intervals, allowing their providers receive timely data outside of routine clinic appointments. This approach empowers patients to actively participate in their care and has been shown to improve patient outcomes, satisfaction, and compliance with clinical therapies. Additionally, ePROs can enable

more timely interventions from clinic staff when serious issues arise.

Remote Monitoring

Remote monitoring involves the use of technology to automatically track a patient's health status. It typically involves the use of wearable devices, Bluetooth-enabled medical devices, or mobile applications that enable real-time collection and transmission of data such as heart rate, weight, blood pressure, or physical activity. In other cases, data can be collected and pushed to the clinic on a scheduled basis or downloaded when the patient visits the clinic.

This data collection and transmission process allows healthcare providers to detect any potential issues or changes in the patient's condition and provide timely interventions or adjustments to their treatment plan to reduce adverse treatment-related events, ultimately lessening the need for frequent in-person visits (e.g., clinic visits, ED visits, hospital admissions) and improving patient outcomes.

AI-Assisted ePROs and Remote Monitoring

Further into the future, remote monitoring technologies will incorporate AI algorithms to assist providers in making timelier and more data-driven decisions. Unlike humans, AI algorithms can analyze longitudinal patient data in real time, potentially incorporating data from the patient's EHR. This enables the identification of trends to support taking preemptive (and remote) measures to avoid adverse events or making rapid adjustments to the patient's course of treatment.

Examples of where AI-assisted technologies are already being tested include:

CANKADO PRO-React: A digital system of patient-generated daily health documentation and symptom questionnaires that predicts impending adverse incidents at earlier stages and shares the patient-generated data with physicians in real time. It also provides recommendations to patients

regarding how urgently they should seek medical care.¹⁰

BioIntelliSense: A rechargeable sensor that adheres to the chest and passively measures more than 20 vital signs, recording 1,440 measurements daily. The AI software component manages, monitors, analyzes, and interprets the daily data points and alerts the healthcare team and patients when the vital signs fall outside personalized ranges.¹¹

Economic returns for digital health technology investments can be measured through direct and indirect ROI. Direct ROI includes cost reduction or avoidance (e.g., through reduced hospital readmissions). Indirect ROI can be measured through an increase in the customer lifetime value of a patient driven by three factors:

1. More total patients served (e.g., patients switch from competitors, patients are attracted from outside the current market, reduced time to treatment allows for more patients to be treated)
2. More revenue per patient (e.g., fewer appointment no-shows, new digitally enabled services such as genomics counseling, payment reminders to improve collection rates)
3. More time caring for patients (e.g., patient loyalty increases because of high-quality and convenient experience, survival rates improve through consistent care delivery and personalized medicine)

HEALTH EQUITY

Problem

Although the US has made tremendous progress in treating cancer in recent decades, advances in detection, diagnosis, and treatment have not benefited all populations equally. While cancer incidence rates and mortality are declining steadily across all population groups, disparities throughout the cancer care continuum remain a major public health challenge.

People of color and other medically underserved populations continue to bear a disproportionate burden for cancer when compared to White Americans.

AMERICAN CANCER DISPARITIES¹²



American Indian and Alaska Native populations have an

80% higher

incidence rate of kidney cancer.



Individuals living under persistent poverty have a

43.2% higher

mortality rate of stomach cancer.



Individuals living in rural areas have

17% higher

death rates from all cancers combined.



The Black population has

more than double

the mortality rate of multiple myeloma.



77%

of tumor samples in the Cancer Genome Atlas are from White populations.



The Native Hawaiian and Other Pacific Islanders population has nearly

three times

the mortality rate of stomach cancer.

At a general population level, approximately 40% of cancers are considered preventable, and 60% of patient outcomes are correlated directly with environmental factors and patient behavior¹³—statistics that are closely tied to social determinants of health (SDOH).

While SDOH function upstream from traditional healthcare interventions, they often have an equal or even greater impact on health outcomes for individual patients and communities compared to the provision of healthcare services alone. Accordingly, providers and programs

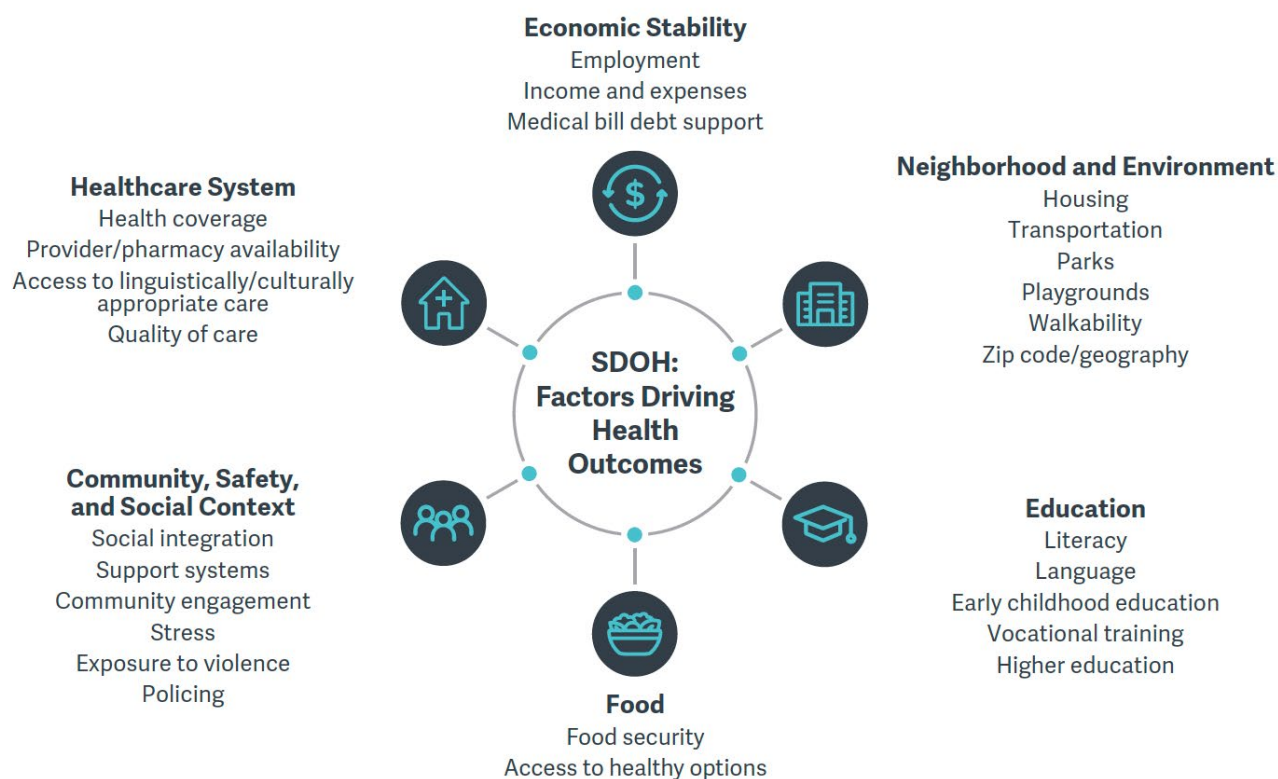
seeking to improve health equity must adopt a comprehensive view of patients and their communities, looking beyond efforts to merely improve access to care within the clinical setting.

HAVE SOME NEWS TO SHARE?

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KEY SOCIAL DETERMINANTS OF HEALTH¹⁴



Health outcomes: mortality, morbidity, life expectancy, healthcare expenditures, health status, and functional limitations.

Solution

Cancer centers can begin improving health equity by implementing four practical methods:

1. Proactively identify patient care gaps within the community to understand both clinical and nonclinical vulnerabilities across the SDOH spectrum.

2. Expand access to cancer screening within communities, increase outreach by bringing care closer to home, and improve health literacy in a socioculturally tailored manner.
3. Increase diversity in the workforce and in clinical trial participation.
4. Improve provider and staff education to facilitate the delivery of culturally

appropriate care, free of implicit bias and medical discrimination.

Specific examples of tactics within these groupings are provided below.^{15,16} When implemented thoughtfully, these methods can help cancer programs build connections and develop trust within their communities.

TACTICS TO IMPROVE HEALTH EQUITY

1

PROACTIVELY IDENTIFY PATIENT CARE GAPS

Use EHR data mining and clinically validated assessments.

Evaluate and understand community vulnerabilities.

Utilize patient navigation to support patients through their care journey.

2

EXPAND SCREENING ACCESS AND PATIENT OUTREACH

Provide education and outreach that are socioculturally and individually tailored.

Bring screenings to the community.

Use ACCC's online health literacy assessment.¹⁵

Promote awareness and facilitate access to trials across diverse communities.

Ensure racial diversity in clinical trial accruals.¹⁶

Where possible, hire providers and staff who reflect the local community.

Train providers to understand the impact of implicit bias and medical discrimination.

Train providers and staff to deliver culturally and linguistically appropriate care.

Patients and communities want to know that their healthcare providers understand their needs and are committed to empowering individuals to be engaged in both their general healthcare and their cancer care journeys. Over time, deploying the tactics above will enable cancer centers to improve access to care and build connections to the local community that drive increased patient volumes.

Moreover, by actively engaging with the community, organizations will eventually be able to treat diseases such as cancer at earlier stages, which often results in better treatment outcomes at lower total systemic costs. As healthcare trends toward population health and risk-based contracting models, this shift to reduced costs and improved outcomes will have a meaningful financial impact for provider organizations. In particular, cancer programs can indirectly realize ROI from health equity measures by fulfilling regulatory requirements for Certificate of Need applications and by meeting clinical research requirements to expand participating patient populations.

A FORWARD-LOOKING APPROACH

As the demand for high-quality, patient-centric cancer care continues to increase over the next decade, cancer programs that have prioritized the strategies described in this paper will be best positioned to continue meeting the needs of their diverse communities, maintain competitive success, and realize programmatic volume growth. This includes pursuing elements that some may consider more foundational (adoption of industry best practices for navigation services, overall program optimization,

continued evolution of digital health capabilities), proactively addressing more complex issues (health equity), and incorporating innovative approaches to better meet patient needs and expectations (alternative care models).

Just as successful clinicians take a holistic view of their patients' needs, administrators and leaders must adopt an expansive perspective of their roles as stewards of community cancer care.

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