


Addressing Transportation Insecurity Among Patients With Cancer

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Abstract

Health-care-related transportation insecurity is common in the United States. Patients with cancer are especially vulnerable because cancer care is episodic in nature, occurs over a prolonged period, is marked by frequent clinical encounters, requires intense treatments, and results in substantial financial hardship. As a result of transportation insecurity, patients with cancer may forego, miss, delay, alter, and/or prematurely terminate necessary care. Limited data suggest that these alterations in care have the potential to increase the rates of cancer recurrence and mortality and exacerbate disparities in cancer incidence, severity, and outcomes. Transportation insecurity also negatively impacts at the informal caregiver, provider, health system, and societal levels. Recognizing that transportation is a critical determinant of outcomes for patients with cancer, there are ongoing efforts to develop evidence-based protocols to identify at-risk patients and address transportation insecurity at federal policy, health system, not-for-profit, and industry levels. In 2021, the National Cancer Policy Forum of the National Academies of Science, Engineering, and Medicine sponsored a series of webinars addressing key social determinants of health including food, housing, and transportation among patients with cancer. This commentary summarizes the formal presentations and discussions related to transportation insecurity and will 1) discuss the heterogeneous nature of transportation insecurity among patients with cancer; 2) characterize its prevalence along the cancer continuum; 3) examine its multilevel consequences; 4) discuss measurement and screening tools; 5) highlight ongoing efforts to address transportation insecurity; 6) suggest policy levers; and 7) outline a research agenda to address critical knowledge gaps.

Dorothy Baily (name changed to protect her privacy) is a 71-year-old woman with emphysema and lung cancer requiring continuous oxygen. She would need to walk 5 blocks to take a bus to her oncologist's office. Although this may seem like a short distance for a person in good health, 5 blocks is too far for Dorothy to feel comfortable walking because of her poor performance status and her need to carry her supplemental oxygen equipment. She relies on her grandson, the only person in the family with a car, to drive her for chemotherapy infusions. The grandson is a single parent working 2 part-time jobs; he is not eligible for unpaid leave benefits to care for his grandmother. Although he rescheduled his work to take his grandmother for chemotherapy, Ms Baily would occasionally miss her infusions

when her grandson was too tired to drive to and from the infusion center. However, she was too embarrassed to tell her oncologist about her transportation insecurity.

Health-care-related transportation insecurity is a condition in which one is unable to regularly move from place to place in a safe and timely manner because of the lack of material, economic, or social resources necessary for transportation to maintain health (1,2). In the United States, transportation insecurity was estimated to affect 5.8 million people in 2017 (3) and disproportionately burdens racial and ethnic minority, low-income, elderly, and rural populations (1,4,5). Transportation insecurity is a particularly important problem for patients with cancer for a number of reasons. First, patients with cancer are particularly

susceptible to transportation as a barrier to medical care, with higher rates of transportation insecurity relative to similar patients without a history of cancer (6,7). Second, transportation insecurity among patients with cancer is common. Although the precise prevalence of transportation insecurity among patients with cancer is unknown (6,8,9), according to the National Breast and Cervical Cancer Early Detection Program, up to 90% of women receiving assistance self-report lack of transportation as a barrier to screening (10). Third, the consequences of transportation insecurity among patients with cancer are substantial. Transportation insecurity may result in patients with cancer foregoing, missing, delaying, and/or altering necessary clinical care (4). Limited data suggest that transportation insecurity may be associated with oncologic outcomes (7). However, extrapolating from other studies evaluating treatment delays and nonadherence among patients with cancer, it is recognized that transportation insecurity has the potential to increase the rates of cancer recurrence and mortality as well as exacerbate disparities in cancer incidence, severity, and outcomes (11,12).

During 2021, the National Cancer Policy Forum of the National Academies of Science Engineering and Medicine sponsored a series of webinars addressing key social determinants of health including food, housing, and transportation insecurity among patients with cancer. These webinars summarized research evidence for the association of social determinants of health and disparities in cancer care and patient outcomes and identified promising interventions and opportunities for practice and policy to improve health equity. This commentary summarizes the formal presentations and webinar discussion related to transportation insecurity (13) and will 1) discuss the heterogeneous nature of transportation insecurity among patients with cancer; 2) characterize its prevalence along the cancer care continuum; 3) examine its multilevel consequences; 4) discuss measurement and screening tools; 5) highlight ongoing efforts to address transportation insecurity; 6) suggest policy levers; and 7) outline a research agenda to address critical knowledge gaps.

Multifaceted Nature of Transportation Insecurity Among Patients With Cancer

Transportation insecurity among patients with cancer results from a diverse array of barriers. For example, transportation insecurity may arise from the inability to pay for gas, parking, public transit, or temporary lodging near specialty centers; insufficient public transportation infrastructure; lack of access to a vehicle; lack of an informal caregiver able to drive to and from clinical encounters; or the physical inability to travel long distances (4,14-16). Transportation insecurity is also a state, not a trait. Whereas some patients have long-term, consistent challenges accessing adequate transportation to and from cancer care facilities, others have unpredictable access to transportation because of unstable incomes, public transportation choices that are prone to disruptions, or personal vehicles that are unreliable (6). As the COVID-19 pandemic reinforced, transportation-related barriers may arise as the external environment changes. Patients with cancer who previously relied on public transportation were suddenly unable to use this method because of concerns about its safety, and others were left with new transportation barriers when previously established methods were temporarily suspended (eg, American Cancer Society Road to Recovery). This dynamic and time-dependent nature of

transportation insecurity is critical for patients with cancer who require available and affordable transportation for optimal prevention, screening, diagnosis, treatment initiation, completion of cancer-directed therapy, palliation, and survivorship care (2,7). Transportation insecurity is also context specific. Barriers to transportation among urban populations (eg, access to public transportation, neighborhood safety) may be quite different from barriers among rural populations (eg, travel distance) (4,17). Finally, transportation insecurity often doesn't exist in isolation but rather is intermixed with other social needs including inadequate social support, financial toxicity, food insecurity, and housing insecurity (9,18,19).

Prevalence of Transportation Insecurity Among Patients With Cancer

Patients with cancer are particularly susceptible to transportation as a barrier to medical care. As shown in Table 1, there are a number of factors that result in patients with cancer being an especially vulnerable population for transportation insecurity. These potential considerations have been validated empirically, as a number of studies have demonstrated higher rates of transportation insecurity among patients with cancer relative to those without a history of cancer (6,7). Although transportation insecurity among patients with cancer is thought to be common, prevalence estimates range widely across published studies. For example, nearly 90% of women in the National Breast and Cervical Cancer Early Detection Program and 75% of adults in the Colorectal Cancer Control Program self-reported lack of transportation as a barrier to screening (10). These programs assist low-income adults without adequate health insurance coverage in receiving screening. However, in a sample of veterans with colorectal cancer, 2 studies estimated that approximately 20% of patients self-reported transportation as a barrier to cancer care (8,9). Finally, a recent analysis of the nationally representative National Health Interview Survey found that only 3.1% of cancer survivors self-reported delaying care because of transportation barriers (6). These widely disparate prevalence estimates may reflect differences related to timing along the cancer care continuum (screening, treatment, survivorship), clinical population (breast cancer, colorectal cancer, all types of cancer), health insurance coverage and associated programs to address transportation insecurity (primarily Medicaid and underinsured, coverage through the Veterans Affairs Health System, inclusion of patients with Medicare or private insurance), or differences in sampling technique and study design (single institution study, national samples from household surveys).

Consequences of Transportation Insecurity Among Patients With Cancer

The deleterious consequences of transportation insecurity occur at multiple levels (Table 2). Patients may forego, miss, delay, alter, or prematurely terminate necessary cancer care along the continuum (20,21) leading to missed or delayed administration of systemic therapies, radiation, and surgery (11), potentially impairing these efforts and resulting in higher rates of cancer recurrence and worse survival (7). In addition to the direct cost of travel, time spent traveling to and from care represents an opportunity cost—time that cannot be spent at work or in usual activities. Patient (22,23) and caregiver (24) time costs associated with cancer-directed therapy can be substantial, at the

Table 1. Patients with cancer are an especially vulnerable population to transportation insecurity

Predisposing factors	Examples
Cancer care is episodic in nature, occurs over a prolonged period, is marked by frequent clinical encounters, and requires intense treatments, resulting in many opportunities for transportation insecurity.	<ul style="list-style-type: none"> Need for inpatient and outpatient care resulting in diverse transportation requirements Need for (and/or lack of) coordinated multidisciplinary clinical appointments Need for imaging, lab draws, and other services in advance of appointments for treatment resulting in multiple clinical encounters Need for protracted, recurring, daily treatments (eg, radiation therapy, which is usually prescribed daily for 1-6 weeks)
The physical and psychological toxicity of cancer and its treatment precludes certain modes of transportation and creates additional logistical transportation challenges.	<ul style="list-style-type: none"> Physical difficulty utilizing certain transportation modalities Concerns about safety of public transportation in setting of weakened immune system Need for informal caregiver to physically travel with the patient results in challenges coordinating with caregiver's work and other responsibilities
Financial toxicity is increasingly prevalent among patients with cancer, amplifying transportation insecurity.	<ul style="list-style-type: none"> Stress and worry about life-threatening illness High patient out-of-pocket costs during treatment Lasting effects of new debt during treatment Changes in employment, income loss, and access to employer-sponsored health insurance coverage for patients and informal caregivers Prevalence of delaying care because of cost more common among cancer survivors than counterparts without a cancer history
Highly specialized care at regionalized centers of excellence necessitates a greater travel burden relative to other chronic conditions.	<ul style="list-style-type: none"> Increased travel distance or time results in increased transportation challenges Need for temporary lodging
The inability to deliver cancer-directed therapy virtually precludes some potential telemedicine-based interventions.	<ul style="list-style-type: none"> Greater time away from work for patients and informal caregivers Need for specialized equipment for radiation therapy Monitoring for reactions during infusion therapy

individual and national levels. A recent study estimated that for patients with advanced cancer, treatment-related time toxicity (ie, loss of time incurred receiving cancer treatment) may offset modest survival gains offered by some treatments (25). From the provider and health system perspective, when a patient cancels an appointment at the last minute or fails to arrive because of a transportation barrier, the complex cancer treatment process is interrupted. For health systems, transportation insecurity can result in lost revenue due to rescheduling patients and/or making alternative arrangements as well as underutilization and vacancies (eg, clinic, infusion suites, radiology). There is, thus, a strong financial incentive for health systems to minimize transportation-related barriers to cancer care.

Screening for Transportation Insecurity Among Patients With Cancer

Because of increasing evidence that interventions addressing social needs such as transportation may improve health outcomes and decrease the cost of care (26,27), there is growing consensus about the importance of screening for transportation insecurity (28). Among patients with cancer, transportation insecurity can be assessed using a variety of different approaches. One strategy measures insecurity by assessing travel difficulty via proxy measures such as time spent traveling to a provider, travel distance to available facilities, cost of transportation, and car ownership (1,4,20). Transportation insecurity can also be assessed by its consequences such as disruption of care or delays in care (3,7). Single items within broader point-of-service measures using this approach are available for screening in

clinical (eg, Accountable Health Communities Screening Tool, American Academy of Family Physicians Social Needs Screening Tool) and research (eg, National Health Interview Survey) domains. Transportation insecurity can also be assessed by direct patient report via structured assessments such as the Transportation Barriers Measure (17) or open-ended questions such as “do you have difficulty with transportation to get to or from treatment?” (9). Finally, the Gravity Project is a multistakeholder national public collaborative launched in May 2019 that seeks to develop consensus-based data standards of individual-level social determinants of health (including transportation) for integration into digital platforms using International Classification of Disease and Related Health Problems–10 or Systematized Nomenclature of Medicine - Clinical Terms (SNOMED-CT) codes (2).

Efforts to Address Transportation Insecurity for Patients With Cancer

Table 3 highlights ongoing efforts to address transportation insecurity at the policy, health system, not-for-profit, and industry levels. Transportation insecurity is optimally addressed using an upstream approach; as such, federal and state policy is critical (19). Nonemergency medical transportation (NEMT), which provides rides to medical appointments for eligible Medicaid beneficiaries, is the largest program addressing health-care-related transportation. In fiscal year 2018, state and federal spending on fee-for-service NEMT was \$2.6 billion (29). However, when Medicaid-managed care organizations costs are included, NEMT expenditures were estimated at nearly \$5.5

Table 2. Multilevel consequences of transportation insecurity for patients with cancer

Stakeholder	Consequences
Patient	Delays in screening, seeking medical attention, and along the cancer care continuum; stage migration Treatment nonadherence (ie, forego, miss, delay, alter, or prematurely terminate necessary cancer care) Direct cost of travel; opportunity cost of missed work and other activities Inability to participate in clinical trials Increased distress, decreased quality of life Higher rates of cancer recurrence; worse survival
Informal caregiver	Increased distress, decreased quality of life Delays in own care Direct cost of travel; opportunity cost of missed work
Physician	Inefficiencies of missed appointments Stress of rescheduling Need to restructure treatment pathways and protocols
Health system	Outpatient: lost revenue through increased work to reschedule patients or make alternative arrangements, underutilization, and vacancies (clinic, infusion suites, radiology) Inpatient: inefficiencies in discharge times and hospital or health-care facility throughput Lower patient satisfaction (outpatient and inpatient settings)
Society	Inefficient use of health-care resources Loss of productivity Disparities in cancer outcomes Potentially avoidable mortality

billion (30). Although there are relatively robust federal programs for health-care-related transportation for Medicaid beneficiaries and veterans, there is a large gap in federal policy for Medicare beneficiaries, those with private insurance, and those with no health insurance coverage. One program specifically targeting Medicare beneficiaries is the Repetitive Scheduled Non-Emergency Ambulance Transport. This small and specialized program involves ambulance transportation for those needing at least 1 round trip per week for at least 3 weeks. Medicare Advantage enrollees also have access to transportation benefits if their plan adopts transportation as a supplemental benefit. To date, there has been almost no adoption of transportation benefits within private employer-based programs or individual exchange markets.

At a more downstream level, health systems have developed programs to address transportation insecurity among patients with cancer. One example is the University of Illinois Health's PROgram for Non-emergency TranspOrtation (PRONTO) program (31). PRONTO is a partnership between the University of Illinois Health and Kaizen Health (a local health-access startup) that provides free rides to patients being transitioned home from inpatient and ambulatory clinics (eg, the cancer center), addressing transportation insecurity for patients with cancer like Dorothy Baily—the patient featured at the start of this commentary. PRONTO offers free rides to approximately 100 to 120 patients per month of whom 80% travel to areas that score high on the Centers for Disease Control and Prevention Social Vulnerability Index (32). One study evaluating the efficacy of a rideshare-based intervention found that it did not decrease missed appointments (33). However, 2 recent studies among cancer patients with transportation barriers undergoing radiation therapy showed that rideshare programs are acceptable (34) and that transportation logistics hubs utilizing rideshare-based transportation may decrease no-show rates and result in cost-savings to the health system (35). In addition, other studies have suggested that transportation vouchers are an acceptable method of addressing transportation insecurity among patients with cancer, with 1 study reporting that transportation vouchers were the preferred method (35).

Not-for-profit organizations such as the American Cancer Society have developed programs to address transportation insecurity among patients with cancer. American Cancer Society's Road to Recovery Program uses volunteer drivers who donate their time and personal automobiles to assist patients with cancer who need a ride to or from a clinical encounter. This program operates in all 50 states and has provided more than 9 million rides to more than 400 000 patients with cancer since 1981. Since 2016, the American Cancer Society has also awarded more than \$3 million to 225 hospitals through its transportation grants program, providing 7500 patients with cancer in rural or unsafe urban areas with 100 000 rides. Finally, for patients with cancer who face extended periods of daily treatment and require specialized centers of excellence, the solution to transportation insecurity may be provision of housing. Through its Hope Lodge program, the American Cancer Society offers cancer patients and their caregivers a free place to stay when their best hope for effective treatment is in another city. Despite the long-standing history and high utilization of programs such as those provided by the American Cancer Society, further research is needed to evaluate the impact of these programs on patient-centered outcomes.

Corporations are also developing innovative platforms to address transportation insecurity among patients with cancer. Rideshare companies have developed business-to-business platforms for sending and scheduling rides that can be used by case managers and nurses. These platforms, which do not require the passenger to have the company's app or a cell phone, have the potential to address the unmet need for on-demand cost-effective NEMT solutions (30) for inpatient and outpatient discharges and on-demand ride to screening and clinical appointments (11). In addition to brokers that have historically provided NEMT such as ModivCare (formerly LogistiCare), MTM, and Southeastrans, there are newer, technology-forward NEMT brokers and coordination platforms such as Kaizen Health, SafeRide Health, Ride Health, and Roundtrip that partner with health-care organizations, health plans, and transportation providers to schedule on-demand patient transportation. Recognizing the critical role of transportation to oncology

Table 3. Ongoing efforts to address transportation insecurity for patients with cancer

Level	Initiatives
Policy	Medicaid nonemergency medical transportation. Veterans Transportation Program: beneficiary travel, veterans transportation service, highly rural transportation grants Medicare Advantage Supplemental benefits (Medicare Part C)
Health system	Provision of ride services to patients in need, through philanthropy, grants, or operational funds Link transportation services to a hospital's community health needs assessment and implementation plan
Not-for-profit organizations ^a	American Cancer Society Road to Recovery; transportation grants; Hope Lodges Patient advocate foundation CancerCare
Industry ^a	Rideshare platforms (Lyft, Uber) NEMT brokers: traditional (ModivCare, MTM, Southeastrans) and technology-forward (Kaizen Health, SafeRide Health, Ride Health, and Roundtrip) Clinical trial sponsor-based initiatives

^aSelected organizations.

clinical trial participation (36,37), trial sponsors have developed initiatives to address transportation insecurity via vendor-sponsored travel agreements for patients with transportation barriers who wish to participate in clinical trials.

Policy Agenda for Addressing Transportation Insecurity for Patients With Cancer

There are numerous potential state and federal policy levers to address transportation insecurity for patients with cancer. Regulators and payors put standards in place to assure both quality of care and cost management. Some of these are regulated at the federal level, some at the state level, and some by individual private payors. All parties recognize that high-quality care not only results in the best outcomes for patients but is potentially less costly than low-quality care. Federal and state policy makers (or payors) could consider a directive to require or incentivize screening for transportation insecurity and provision of interventions to overcome transportation barriers as part of other initiatives to enhance the delivery of high-quality care. A number of organizations that seek to catalyze improvements in the quality of health-care delivery such as the National Quality Forum and National Committee for Quality Assurance have advocated for similar proposals in recent years (38,39). It is likely that a modest investment to provide transportation to patients in need would have a positive return on investment, as has already been demonstrated for cancer screening (40). These efforts could be managed at the level of the oncology practice with a modest administrative burden. Ultimately, transportation assistance for patients in need could be viewed as another critical aspect of high-quality cancer care.

There are also a number of changes to existing federal and state policy that govern NEMT that could help address transportation insecurity among patients with cancer. First, NEMT could be a benefit for all Medicare enrollees instead of only as a supplemental benefit for those enrolled in eligible Medicare Advantage plans. Second, policy efforts could remove unnecessary restrictions that limit uptake of services. For example, Medicaid NEMT in some states require planning trips 72 hours in advance for prior authorization, which can limit use of Medicaid NEMT following hospital discharge. Third, changes to existing policy governing NEMT could enhance equitable participation in clinical trials (5). Starting in January 2022, the Center

for Medicaid and Children's Health Insurance Program services outlined new Medicaid state plan requirements for assuring coverage of routine patient costs associated with participation in qualifying clinical trials for Medicaid beneficiaries (41). However, some states have limited the NEMT benefits as part of Medicaid expansion. To realize the full benefit of this coverage mandate in terms of trial participation, additional state and federal policy steps to provide Medicaid NEMT benefits for trial-associated appointments for those with transportation insecurity appear necessary (5). Fourth, policy makers could consider national paid leave. Such a policy would not only enable working patients the time to receive care but would also allow informal caregivers to accompany patients to and from their cancer care. Finally, recognizing that transportation insecurity often co-exists with other social needs such as financial toxicity, food insecurity, and housing insecurity (9,18,19), future policy changes could explore opportunities for synergy and coordination across public sector transportation and social service programs. For example, although there is substantial overlap between Supplemental Nutrition Assistance Program and Medicaid beneficiaries, most Medicaid programs don't allow for trips to the grocery store to use Supplemental Nutrition Assistance Program benefits. Leveraging transportation-based solutions to address food insecurity has the potential to improve outcomes along the continuum for patients with cancer.

Data Infrastructure Research Agenda to Address Transportation Insecurity for Patients With Cancer

Despite substantial progress characterizing, understanding, and addressing health-care-related transportation insecurity among patients with cancer, there is still a critical need for research and evidence across several fronts (Table 4). First, there is lack of precise data about the prevalence of, and risk factors for, transportation insecurity specifically among patients with cancer. To date, transportation insecurity research has focused primarily on general medical care, not specifically cancer care (4). Among the studies that have evaluated the prevalence of transportation insecurity related to cancer care, estimates have ranged widely, from 3.1% to 86.6% (6,10). Despite the wide variation in point estimates, it is clear that patients with cancer face special transportation-related challenges and are at high risk

Table 4. Transportation insecurity knowledge gaps and proposed research agenda for data infrastructure and research initiatives

Gap	Research initiative
Lack of cancer-specific data about the prevalence and risk factors for transportation insecurity	<p>Improved data infrastructure at National Cancer Institute–designated or Commission on Cancer–accredited cancer centers</p> <p>Integration of social needs screening information from electronic health records</p> <p>Data and other linkages with safety-net facilities</p> <p>Inclusion of social needs questions in large national surveys and cohort studies</p>
Lack of evidence-based guidelines for screening for transportation insecurity among patients with cancer	<p>Development of transportation insecurity risk models</p> <p>Development of validated tools for patients with cancer receiving treatment</p> <p>Evaluation of longitudinal data about trajectory of transportation insecurity</p> <p>Evaluation of relevant outcome measures of social needs screening, including appointment or treatment adherence, delays, and health outcomes</p> <p>Assessment of the frequency and type of co-occurring unmet social needs</p>
Lack of data about the association of transportation insecurity with outcomes among patients with cancer	<p>Patient: evaluation of treatment adherence; clinical, psychosocial, quality of life, and financial outcomes; clinical trial participation, survival</p> <p>Informal caregiver: evaluation of psychosocial, quality of life, and financial outcomes</p> <p>Provider: evaluation of the effect on missed appointments, guideline-adherent treatment</p> <p>Payor: economic consequences</p> <p>Health system: economic consequences</p> <p>Society: evaluation of disparities in cancer outcomes</p> <p>Estimation of economic costs of transportation insecurity from the perspective of patients, providers, health systems, and society more broadly</p>
Lack of data about the effectiveness and cost-effectiveness of policy, health system, not-for-profit, and corporate interventions to address transportation insecurity	<p>Assessment of the effectiveness of existing efforts in reducing treatment no-shows, adherence to treatment plans, enrollment in clinical trials, and downstream health outcomes</p> <p>Assessment of the cost and cost-effectiveness of ongoing initiatives</p> <p>Assessment of the role of managing social needs that co-occur with transportation insecurity</p>

for transportation insecurity relative to patients without cancer (6,7). Characterizing the scope of transportation insecurity among patients with cancer is thus a critical next step. In addition, there is likely heterogeneity within different oncology patient populations. Patients with cancer can experience specific impairments that affect mobility, cognition, and physical function; these impairments can vary substantially based on specific cancer diagnoses, locations, and treatment decisions. This variability may dictate the types of needed services (eg, gurney vans, bus pass, ridesharing) at different points along the course of treatment. Understanding which patients with cancer need what level of service at what point(s) in their cancer care journey is critically important to achieving more patient-centered and efficient service.

Second, there is a lack of evidence-based guidelines for screening for transportation insecurity among patients with cancer. Screening for transportation insecurity and documenting how patients are connected to resources is beginning to occur in the primary care setting (42-45), however, it does not routinely occur in the context of cancer care. This practice gap reflects a lack of evidence related to who to screen (eg, everyone, risk adjusted), the screening instruments to use (eg, widely accepted, validated screening instruments with construct validity among patients with cancer), when to screen (eg, before

cancer treatment, during cancer treatment), how frequently to screen (eg, regularly, event based), where to screen (eg, in communities, in clinics), how to screen (eg, paper based, electronic health record, phone survey), who should be involved in the screening (eg, social workers, cancer clinicians), and whether patients find social needs screening questions acceptable while undergoing cancer treatment. Accurate identification of patients with transportation insecurity using evidence-based screening tools is key to appropriately allocating transportation-related resources.

Third, more data about consequences of transportation insecurity at the patient, caregiver, provider, health system, and society levels are necessary. Transportation insecurity also frequently co-occurs with other social needs such as food and housing insecurity; the independent and combined effects of these different social needs among patients with cancer need to be characterized to inform the development, implementation, and evaluation of interventions aimed at addressing transportation insecurity. On one hand, interventions to address transportation insecurity have the potential for efficiency and synergy if they can be leveraged to address concurrent social, housing, and food insecurity. On the other hand, if attempts to address transportation insecurity ignore other social needs, the impact of these programs may be limited. Providing a ride home from

the hospital but failing to address concurrent social, housing, or food needs may lessen the effectiveness and impact of transportation insecurity interventions. High-quality comprehensive longitudinal data are needed to help untangle these complex relationships and evaluate the consequences of ongoing and future interventions to decrease transportation insecurity among patients with cancer.

Fourth, more research is needed to evaluate the effectiveness and economic impact of transportation insecurity initiatives at the federal and state policy, health system, not-for-profit, and corporate levels, particularly among patients with cancer. To date, studies have assessed the effectiveness of medical transportation interventions using proximal outcomes such as health-care utilization and missed appointments (30). More robust data about patient health outcomes are needed. In addition, the economic impacts of transportation in cancer care may consider a more expansive perspective for payers and providers, including long-term savings from early cancer detection and fewer cancer treatment disruptions resulting in better treatment outcomes and a reduction in cancer disparities. Even more critical, transportation could be a stabilizing factor for patients undergoing cancer care who are more likely to experience medical financial hardship (46,47) and lean on informal caregivers who similarly benefit from the time and financial costs saved by stable and reliable transportation. Articulating the economic impacts of addressing transportation insecurity for payors, providers, and patients can inform policy and payment changes, evidence that is urgently needed to support and address social needs, risk factors, and determinants of health that have long afflicted patients along the cancer care continuum.

Health-care-related transportation insecurity is one of the most important barriers to care for patients with cancer (20) as disruptions in care can lead to poor outcomes and preventable death. Recognizing that transportation is a critical determinant of guideline-concordant care and related outcomes for patients with cancer, there has been substantial progress in our understanding of the multifaceted nature of this condition and its consequences for patients, caregivers, oncologists, health systems, and society. There are ongoing efforts to develop evidence-based protocols to identify patients at risk for transportation insecurity and address transportation insecurity at federal policy, health system, not-for-profit, and industry levels. However, critical knowledge gaps exist in each of these areas. A research agenda across several fronts is proposed to enhance our ability to understand and address health-care-related transportation insecurity among patients with cancer. Reducing transportation barriers to care should be a priority of our health-care system and has tremendous potential to impact outcomes for patients, caregivers, oncologists, and health systems.

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