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Measuring Healthcare Organization Characteristics in Cancer Care Delivery Research

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None of the investigators have any affiliations or financial involvement that conflicts with the material presented in this report.

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Preface

The Agency for Healthcare Research and Quality (AHRQ), through its Evidence-based Practice Centers (EPCs), sponsors the development of evidence reports and technology assessments to assist public- and private-sector organizations in their efforts to improve the quality of healthcare in the United States.

The National Cancer Institute (NCI) requested this report from the EPC Program at AHRQ. AHRQ assigned this report to the following EPC: Johns Hopkins University Evidence-based Practice Center (Contract Number: 75Q80120D00003). The report was presented at the NCI public meeting – (Measuring Healthcare Organization Characteristics in Cancer Care Delivery Research) on June 21st, 2023.

The reports and assessments provide organizations with comprehensive, science-based information on common, costly medical conditions and new healthcare technologies and strategies. The EPCs systematically review the relevant scientific literature on topics assigned to them by AHRQ and conduct additional analyses when appropriate prior to developing their reports and assessments.

This EPC evidence report is a Technical Brief. A Technical Brief is a rapid report, typically on an emerging medical technology, strategy, or intervention. It provides an overview of key issues related to the intervention—for example, current indications, relevant patient populations and subgroups of interest, outcomes measured, and contextual factors that may affect decisions regarding the intervention. Although Technical Briefs generally focus on interventions for which there are limited published data and too few completed protocol-driven studies to support definitive conclusions, the decision to request a Technical Brief is not solely based on the availability of clinical studies. The goals of the Technical Brief are to provide an early objective description of the state of the science, a potential framework for assessing the applications and implications of the intervention, a summary of ongoing research, and information on future research needs. In particular, through the Technical Brief, AHRQ hopes to gain insight on the appropriate conceptual framework and critical issues that will inform future research.

AHRQ expects that the EPC evidence reports and technology assessments will inform individual health plans, providers, and purchasers as well as the healthcare system as a whole by providing important information to help improve healthcare quality. If you have comments on this Technical Brief, they may be sent by mail to the Task Order Officer named below at: Agency for Healthcare Research and Quality, 5600 Fishers Lane, Rockville, MD 20857, or by email to epc@ahrq.hhs.gov.

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Key Informants
In designing the study questions, the EPC consulted several Key Informants who represented the end-users of research. The EPC sought Key Informant input on the priority areas for research and synthesis. Key Informants are not involved in the analysis of the evidence or the writing of the report. Therefore, in the end, study questions, design, methodological approaches, and/or conclusions do not necessarily represent the views of individual Key Informants.
All Key Informants must disclose any financial conflicts of interest greater than $5,000 and any other relevant business or professional conflicts of interest. Because of their role as end-users, individuals with potential conflicts may be retained. The Task Order Officer (TOO) and the EPC work to balance, manage, or mitigate any conflicts of interest.

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Structured Abstract

Objectives. This Technical Brief aims to identify: 1) frameworks that describe organizational context and process characteristics relevant to cancer care delivery research, and compare these frameworks to the Integrated Framework recently developed by National Cancer Institute staff Weaver, Breslau, and colleagues; 2) approaches used to improve understanding of how organizational characteristics are described, measured, and analyzed in the context of cancer screening, diagnosis, or treatment; and 3) organizational context and process characteristics examined in studies assessing cancer care; and 4) evidence gaps and future research needs to advance the science of assessing the effects of organizational characteristics on cancer care.

Review methods. We integrated discussions with Key Informants and syntheses of evidence from searches of literature published from 2010 to 2023, using PubMed, CINAHL, SCOPUS, PsycINFO, and the Cochrane Central Register of Controlled Trials, as well as select grey literature.

Findings. We identified 17 frameworks that were developed or applied to examine the effects of organizational characteristics (including structures, context, and processes) on cancer care delivery. Our analysis of these frameworks supported the comprehensiveness of the Integrated Framework, though a few identified characteristics were not explicitly included in the Integrated Framework. We found 90 studies that take various approaches to describe, measure, and analyze organizational characteristics in the context of cancer care research. Of these, we identified 25 that tested associations between organization characteristics and screening, diagnosis, or treatment outcomes, and described measurement in detail. Cancer-related studies that include organizational measures have used a wide range of study designs and focused mostly on structural characteristics (e.g., type, size), total care models such as the patient-centered medical home, and processes of improvement project implementation and barrier assessment (such as guideline implementation). We identified specific organizational measures examined in the cancer care literature, noting little standardization of measures across studies and a need for multilevel inquiry. Our discussions with Key Informants and review of the literature indicated that many characteristics of healthcare organizations are relevant to cancer care delivery and useful to assess when precisely defined. Studies with stronger designs and more rigorous organizational measurement are needed to better determine the effects of organizational characteristics on the outcomes of cancer care.

Conclusion. Our findings suggest that the Integrated Framework generally covers relevant organizational context and process characteristics. The literature has a wide array of studies examining organizational characteristics, but few studies directly associate organizational factors with clinical outcomes. Research and collaboration are needed to improve measurement of organizational factors, to clarify our understanding of multilevel aspects of organizational context and process and how they affect care, and to standardize terminology and measures.
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Executive Summary

Main Points

- A critical part of understanding the quality of medical care across the cancer continuum is understanding the key characteristics of organizations that deliver care while taking into consideration the multilevel nature of health care delivery. Organizational characteristics can influence patient care-seeking behaviors, access to care, provider decision-making, patient and provider experience, quality of care, and disparities in care.¹ It is therefore critical to understand organizational characteristics when designing and disseminating multilevel interventions.¹

- To advance research investigating the relationship between organizational characteristics and cancer care delivery, Weaver, Breslau, and colleagues developed an Integrated Framework that incorporated organizational characteristics from prominently cited frameworks, systematic reviews, and feedback from collaborators.¹ Our systematic analysis of 17 relevant frameworks supports the comprehensiveness of the Integrated Framework in terms of key organizational context and process characteristics. A few characteristics (e.g., accessibility, readiness for change, past experience with change, absorptive capacity, and complexity) were found in more than one other framework but were not explicitly included in the Integrated Framework.

- Ninety studies employed different approaches (i.e., topics, data/analysis types, and study designs) for describing, measuring, and evaluating organizational characteristics within the context of cancer care delivery research, mostly focusing on screening or treatment, while using a wide variety of study designs and both qualitative and quantitative data.

- The most common study themes included: implementation of quality improvement projects and investigation of context and process barriers to implementation; evaluation of total care models such as patient-centered medical homes; or structural and resource-related characteristics such as size, type, affiliation, or characteristics of the patient population.

- Fewer studies considered important organizational concepts such as leadership, psychological states and traits among organization members (e.g., burnout) and groups (e.g., team cohesion), team composition, organizational design, or organizational readiness.

- Twenty-five studies directly tested associations of specific healthcare organizational context, process characteristics, and delivery of cancer care with association of measurement of organizational phenomena; studies mostly had prospective or retrospective cohort designs and assessed organization- or unit-level outcomes (e.g., percent compliance with guideline) rather than patient-level outcomes (e.g., screened/not).

- Screening-related studies mostly focused on total care models and were largely conducted in general medical settings (i.e., not cancer-specific).

- Treatment-related studies covered a variety of settings, themes, and cancer types.

- Few studies examined diagnostics or diagnostic outcomes, such as breast cancer diagnosis quality measures for use of needle/core biopsy.
• Studies that examined the relationship between organizational characteristics and cancer screening, diagnosis, and/or treatment tended to focus on less complex characteristics, such as size, participation in a specific type of health insurance payment program, or patient population demographics, with few studies examining more complicated characteristics such as organizational teamwork, provider attitudes and traits, or centralization (e.g., consolidation of authority or patient volume).
• Studies had little standardization of measures of organizational characteristics that might be considered high-quality (e.g., measured using validated scales).

Background and Purpose

As demonstrated by the well-known Donabedian, Andersen, and other frameworks, organizational characteristics can influence patient care-seeking behaviors, access to care, provider decision-making, patient and provider experience, quality of care, and disparities in healthcare organizations. A healthcare organization is a purposefully designed, structured social system developed for the delivery of health care services by specialized workforces to defined communities, populations, or markets. It is critical to understand organizational characteristics when designing and disseminating interventions, including interventions aiming to improve care delivery and outcomes across the cancer continuum. Inattention to organizational characteristics has historically limited clinical and delivery system interventions. Organizations are often unaware of the characteristics critical to the intervention’s effectiveness and whether the intervention needs to be adapted to the specific delivery system setting.

Challenges in understanding organizational characteristics include failure to use organizational theories to inform interventions and measurement approaches, the multilevel nature of organizational characteristics influencing health care delivery, and the multiple important perspectives on the process. Consistent and externally valid measurement of non-structural characteristics, such as change readiness can be challenging, and sometimes the design and methods of organizational studies are more limited in their ability to produce generalizable evidence.

To advance research investigating the relationship between organizational characteristics and cancer care delivery, Weaver, Breslau, and colleagues developed a framework known as the Integrated Framework that incorporated organizational characteristics from prominently cited frameworks, systematic reviews, and feedback from collaborators.

The purpose of this Technical Brief was to identify: 1) frameworks that have been developed or applied to examine the effects of organizational characteristics on the delivery of and outcomes associated with cancer screening, diagnosis, and treatment, and compare these frameworks to the Integrated Framework; 2) approaches used to improve understanding of how organizational context and process characteristics are described, measured, and analyzed in the context of cancer screening, diagnosis, and treatment; 3) healthcare organizational context and process characteristics that have been examined in studies assessing the delivery of cancer screening, diagnosis, and treatment; and 4) evidence gaps and future research needs.

Methods

We used methods consistent with those outlined in the Evidence-based Practice Center Program Methods Guidance (https://effectivehealthcare.ahrq.gov/products/collections/cer-methods-guide), including interviewing 10 Key Informants, representing governmental and non-
governmental perspectives in cancer care delivery research and organizational science as applied to cancer care. We searched PubMed, CINAHL, SCOPUS, PsycINFO, and the Cochrane Central Register of Controlled Trials from 2010 to 2023. We reviewed published articles and grey literature relevant to cancer care in the United States. We included studies that evaluated organizational measures in the context of cancer screening, diagnosis, or treatment. Details of our methodology can be found in the full report.

Results
We summarize the key findings below by Guiding Question.

Guiding Question 1: What frameworks have been developed or applied to examine the effects of organizational characteristics on the delivery of and outcomes associated with cancer screening, diagnosis, and treatment?

1a: How do these existing frameworks compare to the Integrated Framework developed by Weaver, Breslau and colleagues?

Findings: We identified 17 frameworks developed for or applied in cancer care delivery research that describe organizational context and process characteristics. They were developed for several purposes, including to describe how value can be defined and measured in care delivery, to advance the assessment of organizational characteristics in multilevel intervention research, to inform measurement in quality and safety initiatives, and to guide implementation efforts. Some of the models were developed in a very specific context (e.g., radiation oncology, nursing, or vaccination promotion); others focused on organizational characteristic measurement more generally (i.e., not specific to a particular context or application of care delivery). Our systematic analysis of these frameworks supports the comprehensiveness of the Integrated Framework for context characteristics (including organizational structure, organizational culture, financial structure, patient population, and capacity) and process characteristics (including organizational learning and quality improvement activities, care processes and infrastructure application (e.g., use of health information technology and decision support), and team processes). We found a few characteristics (e.g., accessibility, readiness for change, experience with change, absorptive capacity, and complexity) that were presented in more than one other framework but were not explicitly included in the Integrated Framework.

Guiding Question 2: What approaches have been used to improve understanding of how organizational context and process characteristics are described, measured, and analyzed in the context of cancer screening, diagnosis, and treatment?

Findings: We identified 90 studies that used various approaches to describe, measure, and evaluate organizational characteristics within the context of cancer care delivery. Studies that evaluated organizational measures in a cancer context mainly focused on screening or treatment, with few studies considering diagnosis. Topical themes in the studies included: implementation of quality improvement projects and investigating context and process barriers to implementation; evaluation of total care models; or structural and resource-related characteristics such as size, type, affiliation, or characteristics of the patient population. Few studies considered important organizational concepts such as leadership, psychological states and traits among organization members (e.g., motivation) and of groups (e.g., team norms), team composition, or
organizational readiness. Approaches to assessing organizational influences on cancer care included qualitative and quantitative data collection and study designs that ran the gamut from randomized controlled trials to case studies.

**Guiding Question 3**: Which healthcare organizational context and process characteristics have been examined in studies assessing the delivery of cancer screening, diagnosis, and treatment?

3a: For each identified study, what were the following: i) Study design; ii) Setting; iii) Population; iv) Measures of organizational context and process characteristics (e.g., measurement instrument name and type, number of items, references, etc.); and v) Primary and secondary clinical outcomes studied?

**Findings**: We identified 25 studies that had strong relevance to this Guiding Question and featured sufficient description of the organizational concepts involved. The studies were mostly prospective or retrospective cohort designs, and typically measured organization- or unit-level outcomes such as, percentage compliance with guidelines rather than patient-level outcomes such as, whether a patient is screened or not. We noted some differences between studies in the broad categories of cancer screening, diagnosis, and treatment. For example, the largest portion of screening-related studies were categorized thematically as total care model studies and tended to be conducted in general medical settings (i.e., not cancer-specific). Treatment-related studies covered a greater variety of settings, themes, and cancer types. Few studies addressed cancer diagnosis. Across all studies, organizational characteristics that were measured tended to be less complex such as size, payment program participation, or demographics of the patient population. Few studied in-depth organizational concepts such as teamwork, provider attitudes and traits, or centralization (as in tightly controlled decision-making, for example). Fifteen studies among those meeting criteria for Guiding Question 3 directly examined the association between healthcare organization context and process characteristics and clinical outcomes of cancer screening, diagnosis, or treatment. Twelve examined the relationship between organizational characteristics and a clinical primary outcome and four included a clinical secondary outcome.

**Guiding Question 4**: What are the evidence gaps and future research needs?

4a: What are the evidence gaps in the current understanding of how organizational characteristics impact cancer care delivery and cancer-related outcomes?

4b: What methodologic approaches or measurement tools are needed to better understand the impact of organizational context and processes on the delivery of and outcomes associated with cancer screening, diagnosis, and treatment?

**Findings**: We found that studies generally lacked standardized definitions for organizational characteristics or standardized methods for measuring them. Few studies directly associated healthcare organization characteristics with clinical outcomes of cancer care. Further research is needed to develop high quality methods for measurement of organizational constructs and to incorporate more complex and in-depth organizational measurement in efforts to better understand organizational influences on cancer care.

**Limitations**

For Guiding Question 1, the determination of what constitutes a “framework” and whether characteristics in abstracted frameworks were included in the Integrated Framework were subject
to interpretation. For Guiding Questions 2 and 3, the search for empirical studies on the topic was limited to cancer-related studies conducted in the United States and published since 2010. For Guiding Question 4, the limited focus on organizational characteristics in study design and measurement in the literature as a whole makes specifying gaps and identifying the most pressing research needs challenging.

**Implications and Conclusions**

Our findings have important implications for cancer care delivery research. They suggest that the Integrated Framework comprehensively covers relevant organizational context and process characteristics. With some refinement, the Integrated Framework should provide investigators with useful guidance about organizational characteristics to potentially consider in future healthcare delivery research related to cancer screening, diagnosis, or treatment. This report highlights organizational characteristics that effectively measure phenomena in this complex and changing care area and have been used in cancer care research to date. A compendium of measures with suggested definitions and measurement approaches could be a welcome support to researchers who recognize the importance of organizational influences but are not sure how to meaningfully measure them. Such a compendium can be expected to encourage rigorous research without stifling creativity in developing new and better measurement approaches to a wide array of important organizational concepts.

**References**

1. Weaver SJ, Verhoeven D, Sanchez J, et al. Integrated framework: Organizational characteristics in cancer care delivery research. Unpublished work. Written permission of Dr. Sallie Weaver or the Chief of the National Cancer Institute, Health Systems and Interventions Research Branch is required to quote, cite, paraphrase, or publish any of the unpublished material; 2022.


Introduction

Importance of Measuring Organizational Characteristics in Healthcare Delivery

A critical part of understanding the quality of medical care is understanding the characteristics of organizations that deliver care while taking into consideration the multilevel nature of healthcare delivery. As suggested by such thinkers as Donabedian and Andersen,1,2 organizational characteristics can influence patient care-seeking behaviors, access to care, clinician decision-making, collaboration and coordination, patient and clinician experience, quality of care, and disparities in care.3 It is therefore critical to understand organizational characteristics when designing and disseminating interventions.3 Yano describes how inattention to organizational characteristics has limited clinical and delivery system interventions.4 Specifically, when interventions are tested in a single or a small number of institutions, organizational characteristics are less likely to vary, so they are either ignored or controlled (in effect). As a result, knowledge of the organizational characteristics that can influence the success or failure of the intervention is lacking. Thus, when trying to disseminate the intervention, organizations are unaware of the characteristics critical to the intervention’s effectiveness – or whether and how the intervention needs to be adapted to different organizational contexts. This limitation weakens the generalizability of the findings derived from one setting to other settings and to population-level interventions.

Historical Perspective on the Importance of Organizational Characteristics in Healthcare Delivery

A 1966 paper from Avedis Donabedian includes his classic structure-process-outcome framework for evaluating the quality of medical care.1 Later work tested the interaction among these features (reviewed in Hearld et al. 2008).5 Structural characteristics include the levels of care, types of care available, and organization size. Process characteristics include specific aspects of care delivery (e.g., whether cancer screening occurs according to guidelines). Outcome characteristics include the end results of care (e.g., survival or health-related quality of life). Over the past half century, efforts have sought to expand our understanding of how to measure and improve the quality of care. Organizational context as the fungible internal and external elements of setting has been added to the classic structure-process-outcomes triad. In 2009, a team of patient safety researchers laid out critical organizational aspects to measure in the production of safe care.6 A 2011 review noted the importance of organizational characteristics influencing patient safety practices.7 In 2014, Marsteller and colleagues extrapolated from existing frameworks to elucidate the range of organizational and other influences on implementation of efforts to change provider behavior.8 It is now widely recognized that group traits developed through interactions among members of an organization (such as shared mental models and psychological safety) are critical to the success of care delivery and yet are distinct from organizational “process” characteristics in the original framework.1,9,10

Similarly, Ronald Andersen’s Behavioral Model of Health Service Use developed in the late 1960s has evolved over time, as described in his 1995 article.2 The initial model focused on the person and family, including predisposing characteristics (demographic, social structure, health
beliefs), enabling resources at the personal/family and community levels, and perceived or evaluated needs, all culminating in health service use. The version of the model presented in 1995 added the critical role of the healthcare system and external environment at the front end and the outcomes that result from health service use on the back end. Thus, the 1995 version starts with the healthcare system and external environment and traces how they interact with population characteristics including enabling resources and needs to influence health behaviors and outcomes.

**Challenges in Measuring Healthcare Organization Characteristics**

A healthcare organization is a purposefully designed, structured social system developed for the delivery of health care services by specialized workforces to defined communities, populations, or markets. Despite the value of understanding the influence of organizational characteristics, it is challenging to determine their effects on care delivery and outcomes. Organizational theories such as, Diffusion of Innovation, Social Network Theory, or Resource Dependency Theory can help inform measurement approaches but are not used in many studies. According to organizational theory, organizational characteristics influencing the efficiency and quality of healthcare delivery involve multiple levels (e.g., clinic, system, and local community environment) and multiple perspectives (e.g., patient, provider, and administrative). Also, changes in care delivery are influenced by contextual characteristics within the organization, system, and community surrounding the organization. Measuring these non-structural characteristics using externally valid constructs is challenging. For example, while measuring the number of beds and patient volume may be straightforward, assessing organizational change (e.g., readiness to adopt a new healthcare delivery model) is a much more complex undertaking, generally requiring labor intensive methods, such as surveys or interviews. Where characteristics are social constructs produced organically in real time, then one might question how they can even be measured.

Assessing organizations that deliver cancer care involves even greater challenges. In their review of cancer care delivery research protocols from the National Cancer Institute (NCI) Community Oncology Research Program (NCORP), Weaver et al. found that assessment of organizational characteristics was common. The extent to which measurement approaches were based on organizational theories was more variable. Further, multiple types of organizations are involved in cancer care delivery, ranging from solo practices to large integrated systems. Investigators must consider how organizational characteristics, contextual elements, and care processes influence cancer care outcomes. Such research is critical to enhance our knowledge of the context and environment where the care is delivered, to improve the fidelity and impact of interventions disseminated in new settings, and to reduce waste in healthcare delivery. Ultimately, such knowledge will help to improve patient outcomes over the continuum of cancer care.

**Development of an Integrated Framework**

As part of their 2022 review of organizational characteristic measurement in NCORP protocols, Weaver and colleagues initially developed a framework, incorporating key characteristics from prominently cited frameworks and systematic reviews (see below). Their framework is an effort to list and organize the range of healthcare organization characteristics...
that may be relevant in multilevel cancer care delivery research. Its development responds to calls from the cancer care delivery research field to inform organization characteristic measurement. The framework is not intended to recommend what specific organizational characteristics are relevant in a given study but to offer a resource researchers can refer to when determining which organizational characteristics could be useful in their studies.

The initial framework was further refined based on additional frameworks and feedback from internal and external collaborators.¹³ The frameworks below informed the Integrated Framework’s development. They span over 50 years of work, much of which is non-cancer-focused, yet suggests their importance in identifying what has been learned and can be readily applied to cancer care research.

- Yano’s Organizational Research Framework⁴: describes the role of organizational research in advancing the implementation of evidence-based practice (EBP) into routine care settings;
- Piña’s Health Care Delivery Organizations and System’s Framework¹⁴: describes domains and elements that may be useful in characterizing various sizes and types of care delivery organizations that may influence key outcomes of interest;
- Damschroder and colleagues’ Consolidated Framework for Implementation Research: lists constructs thought to influence implementation¹⁵,¹⁶;
- Scholl’s review of organizational characteristics and shared decision making¹⁷: provides a comprehensive overview of organizational- and system-level characteristics that are likely to influence the implementation of shared decision making;
- Andersen’s healthcare utilization model review article: examines whether studies that have used the Andersen behavioral model included environmental and provider-related variables, as well as methods for analyzing those variables¹⁸;
- Donabedian’s model of care quality review article: reflects on evolution of the classic structure-process-outcome framework over the past 20 years¹⁹;
- Ferlie and Shortell’s Quality Improvement Framework: proposes a more comprehensive, multilevel approach to quality improvement²⁰;
- Wagner’s Chronic Care Model: describes a model for improving chronic illness care²¹;
- Garvin’s Framework for Building a Learning Organization: discusses the important qualities and main activities of learning organizations²²;
- Agency for Healthcare Research and Quality (AHRQ) Learning Health System Framework: defines learning health systems and describes their characteristics.²³

The resulting Integrated Framework from Weaver and Breslau (Table 1a-1c) includes the overarching domains of organizational context, processes, and outcomes, along with more specific subdomains. Specifically, organizational context includes subdomains for capacity, financial structure, organizational culture, organizational structure, and patient population. The organizational process domain includes subdomains for organizational learning and quality improvement activities, care processes and infrastructure application (e.g., use of health information technology and decision support), and team processes. The organizational outcome domain includes subdomains for organizational-level patient outcomes and other organizational outcomes. Altogether, 47 specific characteristics are included in the framework.

Further evaluation of the Integrated Framework is needed to compare its content with other frameworks that have been developed or applied in cancer care delivery research. Comparing the content of the Integrated Framework to other frameworks will provide insights regarding the extent to which other frameworks include content not currently reflected in the Integrated Framework.
<table>
<thead>
<tr>
<th>Subdomain</th>
<th>Characteristics</th>
<th>Example variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity (physical and human assets or resources)</td>
<td>Health information technology infrastructure</td>
<td>EMR availability/vendor(s), specific EMR functionality, time since EMR adopted, patient portal availability/vendor, specifics about patient portal functionality</td>
</tr>
<tr>
<td>Organization type</td>
<td>Facility type/level (e.g., clinic, service line, hospital, health system); Organizational designations that relate to population served, size, etc. (e.g., safety net); Practice type (e.g., solo, single specialty, group specialty practice)</td>
<td></td>
</tr>
<tr>
<td>Organizational assets</td>
<td>Capital assets; Drug assets; Equipment assets; Supply assets</td>
<td></td>
</tr>
<tr>
<td>Service comprehensiveness</td>
<td>Type, scope, and/or differentiation in scope of services offered or specialty teams/services offered</td>
<td></td>
</tr>
<tr>
<td>Size and volume</td>
<td>Number of beds; Number of facilities/locations/clinics; Number of patients served</td>
<td></td>
</tr>
<tr>
<td>Staffing and skill-mix</td>
<td>Aggregated organizational level indices of number of providers and/or staff, experience, training or training requirements; Types of clinicians/specialties/staff (e.g., number of interpreters); Aggregate indices of clinician demographics (e.g., proportion of clinicians of certain race/ethnicities)</td>
<td></td>
</tr>
<tr>
<td>Financial Structure</td>
<td>Financial solvency</td>
<td>Organizational debts and/or expenses</td>
</tr>
<tr>
<td>Ownership</td>
<td>Government, for-profit, or nonprofit entity</td>
<td></td>
</tr>
<tr>
<td>Payment model and payment program participation</td>
<td>Proportion of payments received for patient care that are fee for service, bundled payments, fully capitated, or partially capitated; Payer mix (e.g., percentage of patients with private insurance); Types of insurance or payments accepted (e.g., private, public); Participation in payment models (e.g., Accountable Care Organization, Oncology Care Model); Proportion of provider pay that comes from salary or base pay, productivity or relative value units, quality performance measures, patient satisfaction</td>
<td></td>
</tr>
<tr>
<td>Organizational Culture</td>
<td>Community orientation</td>
<td>Number and/or type of community engagements or activities; Organization level indices of concern for local community/social conscientiousness</td>
</tr>
<tr>
<td>Competition–collaboration continuum</td>
<td>Number, type, or other features of collaborative activities the organization engages in with the community and/or competitors; Where organization falls on scale from competitive to collaborative in relation to other organizations in community and competitors (e.g., survey measures of alliance orientation or interorganizational collaboration)</td>
<td></td>
</tr>
<tr>
<td>Cultural competence</td>
<td>Existence of or specific aspects of policies related to respect for and service of diverse populations (e.g., required cultural competency training); Types and/or availability of services designed to meet the social, cultural, and linguistic needs of diverse patient pop. (e.g., proportion of patients matched with translation services)</td>
<td></td>
</tr>
<tr>
<td>Knowledge, attitudes, beliefs of managers, providers, staff about organizational characteristics, policies, or processes</td>
<td>Aggregated organization/group level indices of staff perceptions of organizational characteristics, policies, or resources (e.g., organization level measures of staff knowledge or beliefs about teamwork); Aggregated organization/group level indices of implicit bias, organizational justice, and related constructs; Aggregated indices of senior leadership knowledge, attitudes, and beliefs (e.g., aggregate measures of communication, vision/strategic thinking)</td>
<td></td>
</tr>
<tr>
<td>Organizational climate</td>
<td>Aggregated organizational level indices of employee/staff perceptions of psychological safety/ability to speak up, patient safety culture or patient safety climate, general organizational culture</td>
<td></td>
</tr>
<tr>
<td>Organizational goals</td>
<td>Indices capturing the existence of or specific facets of organizational goals, priorities, and strategic plans of organizational leadership</td>
<td></td>
</tr>
<tr>
<td>Subdomain</td>
<td>Characteristics</td>
<td>Example variables</td>
</tr>
<tr>
<td>---------------------------</td>
<td>------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Resource allocation</td>
<td>Policies or methods of resource allocation (i.e., dollars, staff time/personnel, equipment, space, etc.); Organization level indices of staff perceptions of organizational justice or equity in organization resource allocation</td>
<td></td>
</tr>
<tr>
<td>Organizational Structure</td>
<td>Academic arrangements</td>
<td>Affiliation with medical/nursing/allied health school; Types and/or number of health professions trainees, policies related to trainee scope of practice or training activities</td>
</tr>
<tr>
<td></td>
<td>Affiliations</td>
<td>Affiliation with or located in/near a hospital campus, health system, or other provider network and/or type (e.g., ownership affiliation, referral network)</td>
</tr>
<tr>
<td>Configuration</td>
<td>Organization configuration (e.g., classification of organization structure based on organization chart (e.g., entrepreneurial/flat, divisional); Organization of clinical services (e.g., service lines, multidisciplinary clinic); Workflow policies or standard operating procedures (e.g., information about the sequencing, timing, location, responsibility, or other aspects of clinical or non-clinical facility tasks)</td>
<td></td>
</tr>
<tr>
<td>Location</td>
<td>Geographic location of organization including address, state, rural/urban, or other geospatial information</td>
<td></td>
</tr>
<tr>
<td>Leadership structure</td>
<td>Leadership and governance structure for organizational policy making or decision-making (e.g., number of levels of approval for policy development); Organization level indices of practice autonomy</td>
<td></td>
</tr>
<tr>
<td>Research and innovation</td>
<td>Degree to which organizational mission emphasizes research/innovation; Organizational clinical trial and research participation (e.g., extent to which organization participates in or originates research activities); Organizational clinical trial and research policies or rules (e.g., existence of policies or rules)</td>
<td></td>
</tr>
<tr>
<td>Patient Population</td>
<td>Geographic characteristics</td>
<td>Organizational-level indices of patient geographic characteristics (e.g., percentage of patients residing in rural areas)</td>
</tr>
<tr>
<td></td>
<td>Patient clinical trial/research participation</td>
<td>Percentage of patients enrolled in clinical trials, organizational-level (aggregated) measures of patient-perceived barriers to clinical trial participation that have to do with the clinic or facility (e.g., facility parking fees for clinical trial visits)</td>
</tr>
<tr>
<td></td>
<td>Patient demographics</td>
<td>Organizational-level indices of patient demographics (e.g., percentage of patients with different clinical or socioeconomic characteristics)</td>
</tr>
<tr>
<td></td>
<td>Patient financial status</td>
<td>Aggregated organizational-level indices of patient ability to pay for care, financial burden, or distress</td>
</tr>
</tbody>
</table>

EMR = electronic medical record
Table 1b. Integrated Framework - Organizational Processes

<table>
<thead>
<tr>
<th>Subdomain</th>
<th>Characteristics</th>
<th>Example variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organizational Learning and Quality Improvement Activities</td>
<td>Use of audit/feedback/dashboards</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>Use of quality improvement or other improvement methods (e.g., Lean Six Sigma)</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>Participation in state or national quality improvement collaboratives</td>
<td>NA</td>
</tr>
<tr>
<td>Care Processes and Infrastructure Application</td>
<td>Care management processes</td>
<td>General care management/patient workflow, management of specific care process/task (e.g., workflow or protocols used in practice, not interpersonal variables)</td>
</tr>
<tr>
<td></td>
<td>Clinical decision support</td>
<td>Use of clinical guideline reminders/decision aids</td>
</tr>
<tr>
<td></td>
<td>Screening processes</td>
<td>Processes for screening patients for medical (e.g., cancer screening) and non-medical (e.g., presence of caregiver) factors</td>
</tr>
<tr>
<td></td>
<td>Standardization</td>
<td>Use of organizational protocols; Emphasis on clinical practice guidelines or standard organizational care pathways; Clinician knowledge of guidelines</td>
</tr>
<tr>
<td></td>
<td>Use of health information technology system</td>
<td>Use of EMR by clinicians, staff, patients, and caregivers</td>
</tr>
<tr>
<td>Team Processes</td>
<td>Care coordination</td>
<td>Organizational processes and procedures that support deliberate organization of patient care activities with more than 2 providers (e.g., functioning and frequency of tumor boards); Processes and teamwork behaviors used to align, time, and connect patient care activities both over time and across disciplines or specialties</td>
</tr>
<tr>
<td></td>
<td>Communication</td>
<td>Processes and procedures used to communicate; Quality of communication</td>
</tr>
<tr>
<td></td>
<td>Patient centeredness</td>
<td>Organizational processes/procedures to support patient engagement in shared decision making; Efforts to engage patients in care (e.g., degree to which feedback from patient advisory boards is integrated into strategic goals)</td>
</tr>
<tr>
<td></td>
<td>Referral processes</td>
<td>Internal and external referral processes; Handoffs</td>
</tr>
<tr>
<td></td>
<td>Relationships</td>
<td>Nature of roles and responsibilities; Interpersonal styles; Care team familiarity/tenure</td>
</tr>
</tbody>
</table>

EMR = electronic medical record; NA = not applicable
Table 1c. Integrated Framework - Organizational Outcomes*

<table>
<thead>
<tr>
<th>Subdomain</th>
<th>Characteristics</th>
<th>Example variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>*Organizational Level Patient Outcomes</td>
<td>Disease-related outcomes</td>
<td>Complication rates, disease-specific morbidity and mortality</td>
</tr>
<tr>
<td></td>
<td>Intermediate outcomes/</td>
<td>Clinical guideline adherence, comorbidity management, quality measures</td>
</tr>
<tr>
<td></td>
<td>Process quality measures</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Patient care experience</td>
<td>Organizational level measures of patient experience (e.g., surveys)</td>
</tr>
<tr>
<td></td>
<td>Costs</td>
<td>Organizational level care costs</td>
</tr>
<tr>
<td>*Other Organizational Outcomes</td>
<td>Efficiency</td>
<td>Organizational level measures of average patient wait times, clinician workload</td>
</tr>
<tr>
<td></td>
<td>Recognition and rewards</td>
<td>Organizational accreditations; Receipt of organizational awards; Pay-for-performance</td>
</tr>
<tr>
<td></td>
<td>Utilization</td>
<td>Hospital readmission rates, emergency department visit rates, intensive care unit admissions, etc.</td>
</tr>
<tr>
<td></td>
<td>Workforce</td>
<td>Organizational indices of employee retention, turnover, burnout</td>
</tr>
</tbody>
</table>

*The Integrated Framework focuses on Contexts and Processes but includes the above information to provide a sense of the Outcomes other projects are focusing on. To align with the Integrated Framework’s focus, this Technical Brief addresses Contexts and Processes but not Outcomes.

Improving Measurement of Healthcare Organization Characteristics in Cancer Care Delivery

Several important points emerge from the above background. There is a need for better conceptual and definitional clarity of organizational characteristics. While measuring some characteristics is straightforward, other characteristics present measurement challenges. Thus, there is a need to explore how organizational science can inform conceptualization of healthcare organization characteristics, clarify the definitions of these characteristics in the context of cancer care, identify existing standardized measures for assessing these characteristics, and elaborate on gaps and areas for further research. For example, Diffusion of Innovation theory could specify influential measures of intervention uptake (e.g., simplicity, compatibility with values, trialability) and provide insights for how outcomes are produced. Use of organizational science will improve our understanding of how organizational characteristics influence cancer care delivery at the patient, provider, and system levels. This information, in turn, will inform our ability to improve access, quality, and outcomes, and reduce disparities in care. The decisional dilemma is “how can we define and measure organizational characteristics to improve research on cancer care delivery and enhance cancer care and outcomes?”

As specified in the below Guiding Questions, this Technical Brief aims to compare the content of the Integrated Framework with other frameworks of organizational characteristics to determine whether the relevant content is covered. By evaluating the Integrated Framework’s comprehensiveness, this Technical Brief evaluates its potential to be a useful resource to researchers who want to consider incorporating organization characteristics in their multilevel cancer care delivery research. This Technical Brief also reviews how organizational characteristics are currently assessed in existing cancer care delivery research and what measures are used, as well as identifying relevant knowledge gaps. The results of this Technical Brief can be used to inform future observational and interventional cancer care delivery research.
Guiding Questions

The purpose of this Technical Brief is to address the following Guiding Questions:

1: What frameworks have been developed or applied to examine the effects of organizational characteristics on the delivery of and outcomes associated with cancer screening, diagnosis, and treatment?
   
   1a: How do these existing frameworks compare to the Integrated Framework developed by Weaver, Breslau, and colleagues?

2: What approaches have been used to improve understanding of how organizational context and process characteristics are described, measured, and analyzed in the context cancer screening, diagnosis, and treatment?

3: Which healthcare organizational context and process characteristics have been examined in studies assessing the delivery of cancer screening, diagnosis, and treatment?
   
   3a: For each identified study, what were the following: i) Study design; ii) Setting; iii) Population; iv) Measures of organizational context and process characteristics (e.g., measurement instrument name and type, number of items, references, etc.); and v) Primary and secondary clinical outcomes studied?

4: What are the evidence gaps and future research needs?
   
   4a: What are the evidence gaps in the current understanding of how organizational characteristics impact cancer care delivery and cancer-related outcomes?
   
   4b: What methodologic approaches or measurement tools are needed to better understand the impact of organizational context and processes on the delivery of and outcomes associated with cancer screening, diagnosis, and treatment?

The results of this Technical Brief will inform a compendium that can serve as a resource to the cancer care delivery research community. This compendium will complement the existing AHRQ Compendium of United States Health Systems by providing information about important healthcare organizational characteristics that cannot be obtained from administrative or claims data.
Methods

The methods for this Technical Brief follow the Content and Procedures Guide for the Evidence-based Practice Center Program. The protocol was posted on the Effective Health Care website (https://effectivehealthcare.ahrq.gov/products/organization-cancer-care/protocol).

Throughout this report, we used the following definition of terms: Organizational characteristics encompass structural, context, and process constructs occurring within/around organizations that are studied in macro-, meso- or micro- organizational science. They are not limited to organization-level phenomena. Structural characteristics include generally unchangeable (in the short term) elements such as bed size, number of staff or profit status; process characteristics include specific aspects of care delivery (e.g., use of best practices) and team processes such as coordination and communication. Outcome characteristics include the end results of care at the patient, provider, team, or organizational levels (e.g., survival, screening rates). Although organizational context may be distinguished from structure as the fungible internal and external elements of setting such as leadership and culture, the Integrated Framework consolidates these notions under organizational context, and thus we use the term that way here. Further, we use the term “measures” to describe specific parameters that can be described numerically or qualitatively, and “constructs” to describe concepts that are not measurable as one variable such as infrastructure or coordination. As we note elsewhere in this report, however, variation in terminology and definitions exists in the organizational sciences literature, and opinions about the definitions used here may differ.

Discussions with Key Informants

We recruited 10 Key Informants (KIs) representing governmental and non-governmental perspectives in cancer care delivery research and organizational science as applied to cancer care, to give input on what important influences on cancer care can be attributed to organizational context or process. We gathered preliminary feedback from the KIs using a Web-based form, and then used that feedback as prompts for discussion in two meetings with the KIs (see Appendix C). KIs were invited to review the draft report and are acknowledged in the final report by name and affiliation with the disclaimer that all views expressed therein are strictly those of the report authors.

Grey Literature Search

We reviewed eight grey literature sources that were proposed by team members or internal senior advisors as potentially measuring relevant organizational characteristics: the Care Coordination Measures Atlas, the Veterans Affairs State of the Art (SOTA) scoping review and other articles on care coordination, the Agency for Healthcare Research and Quality (AHRQ) Comparative Health System Performance Initiative Bibliography, the Oncology Care Model, Implementation Science Compendia, the Cancer Prevention and Control Research Network, the Organization Theory for Implementation Science workgroup products, the American Hospital Association Survey of Hospitals, and Medicare Cost Report data. One team member (SYK) conducted the searches, tracked screening, and extracted the data using a form developed by the team in Microsoft® Excel. Extracted items included the organizational frameworks used and organizational constructs and measures listed. Sources were excluded if were not specifically set in the cancer care context. A principal investigator (JM) discussed and reviewed approaches and findings with the team member.
Based on recommendations from our KIs, we also searched a number of issue briefs and reports published by agencies and organizations, including the Brookings Institute, Centers for Medicare and Medicaid Services, Commonwealth Fund, Health Care Systems Research Network, National Academies of Science, Engineering, and Medicine, National Coalition for Cancer Survivorship, Robert Wood Johnson Foundation, and United States Department of Health and Human Services – Office of the Assistant Secretary for Planning and Evaluation. In addition, we reviewed the National Cancer Institute’s definition of designated cancer centers, issue briefs from the State of Cancer Care in America, the methodology for U.S. News and World Report – Cancer Center Rankings, and the full websites for the Alliance of Dedicated Cancer Centers and Consortium of Comprehensive Cancer Centers for Quality Improvement. One team member (LR) conducted the searches, tracked screening, and extracted the data using a form developed by the team in Microsoft® Excel. Extracted items included the organizational frameworks used and organizational constructs and measures listed. Sources excluded were not specifically set in the cancer care context. A principal investigator (JM) discussed and reviewed approaches and findings with the team member.

Published Literature search

We conducted a systematic search for published evidence using PubMed®, CINAHL, Scopus, PsycINFO®, and the Cochrane Central Register of Controlled Trials. We limited the search to the last 13 years because older studies have less relevance to modern cancer care delivery. A 13-year cut-off corresponds roughly to the implementation of the Affordable Care Act (ACA) (circa 2010). We included US-based studies only as the organization, financing, and delivery of health care in the US is unique.

We conducted separate searches by Guiding Questions: 1) to identify relevant frameworks of organizational characteristics, and 2) to identify approaches, designs, and measures for assessing organizational characteristics in cancer care delivery research (Guiding Questions 2 and 3). The literature from the Guiding Question 1-3 searches also informed our approach to Guiding Question 4 on evidence gaps and research needs. See Appendix A. Methods Table A-1 through A-8 for the search strategies.

Unique citations identified by the search strategies were independently assessed using the inclusion and exclusion criteria outlined in Table 2. For Guiding Question 1, a framework was defined as “a framework or organization of the characteristics used to evaluate healthcare organizations.” A framework had to address multiple domains or subdomains of the Integrated Framework to be included. If an article did not report on a framework directly but did refer to a potentially relevant framework of organizational characteristics, we excluded the article but noted the framework cited and searched for articles describing that framework.

We used the artificial intelligence (AI) feature of DistillerSR (AI Classifier Manager) as a semi-automated screening tool to conduct this review efficiently at the abstract screening stage. First, paired reviewers screened the abstracts of a randomly selected 10 percent sample of the unique citations identified by the search strategies. The remaining abstracts were screened by the AI Classifier Manager based on the results of our screening of the initial sample. Reviewers independently checked 10 percent of the articles screened by the AI Classifier Manager to confirm the accuracy and consistency of the AI review. In the review of a randomly selected 10% sample of citations, the discrepancy rate between AI system and the human reviewer was 2.0% for Guiding Question 1 citations and 8.6% for Guiding Questions 2-4 citations, which is similar to what we usually see when comparing two human reviewers.
Full-text articles were evaluated for inclusion by two independent reviewers using the eligibility criteria listed in Table 2. However, for Guiding Question 1, if an article published since 2010 referred to a framework published before 2010, the framework was included. In some cases, there were multiple articles on a framework as they can evolve over time. In general, we included the most recent version of the framework (for example, i-PARIHS rather than Promoting Action on Research Implementation in Health Services [PARIHS]) as the recent articles were more likely to have more complete coverage of organizational characteristics. We did not include frameworks that informed the development of the Integrated Framework as that would have created circular logic of comparing a framework included in the Integrated Framework to the Integrated Framework.

We updated the literature search during the public posting phase and incorporated any new information into the report.

Table 2. Inclusion and exclusion criteria for the Technical Brief

<table>
<thead>
<tr>
<th>Inclusion/Exclusion</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inclusions</strong></td>
<td><strong>All Guiding Questions</strong></td>
</tr>
<tr>
<td></td>
<td>• Address organizational characteristics in United States-based health systems/healthcare</td>
</tr>
<tr>
<td></td>
<td>• Published 2010 to present</td>
</tr>
<tr>
<td><strong>Guiding Question 1</strong></td>
<td>• Framework must be used in a cancer screening, diagnosis or treatment context</td>
</tr>
<tr>
<td></td>
<td>• Framework published before 2010 could be included if an article published since 2010 referred to the framework</td>
</tr>
<tr>
<td><strong>Guiding Question 2/3</strong></td>
<td>• Studies with primary empiric data related to the delivery of cancer screening, diagnosis, or treatment</td>
</tr>
<tr>
<td></td>
<td>• The focus or stated purpose of the paper is on testing the influence of organizational characteristics/traits</td>
</tr>
<tr>
<td></td>
<td>• Must include an interpretation or have a discussion of the effects of the organizational components tested</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Exclusions</th>
<th><strong>All Guiding Questions</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Addresses organizational characteristics outside United States-based health systems/healthcare</td>
</tr>
<tr>
<td><strong>Guiding Question 1</strong></td>
<td>• Framework is not used in a healthcare context</td>
</tr>
<tr>
<td><strong>Guiding Question 2/3</strong></td>
<td>• Literature reviews, commentaries, and opinion pieces</td>
</tr>
<tr>
<td></td>
<td>• Organizational characteristics/traits are included only as a covariate or control without presenting results that address these Guiding Questions.</td>
</tr>
</tbody>
</table>

**Data Organization and Presentation**

**Information Management**

For Guiding Question 1, detailed information was extracted from frameworks that had been applied to cancer care delivery. A principal investigator (CS) abstracted in a Microsoft® Word table information about the context and process characteristics of the frameworks for examining effects of organizational characteristics on cancer care delivery and outcomes. Articles were read in full, but abstraction primarily focused on relevant tables and figures to minimize the need to deduce framework components from the text. Where information in the figures and tables was too generic to be useful, specific examples from the text were abstracted. The abstracted categories and characteristics were taken directly from the papers. Only context and process characteristics at the organization level were abstracted from tables and figures. Outcomes were
not abstracted given the Integrated Framework’s focus on organizational context and process characteristics. Abstracted frameworks may have included other categories related to individual or external factors that were not abstracted as these factors are not covered in the Integrated Framework. For example, payment policy is an external factor that would not have been abstracted for Guiding Question 1, but an organization’s payer mix is a characteristic of the organization that would be considered for Guiding Question 1. The characteristics abstracted from the included frameworks were then compared to the content of the Integrated Framework and characteristics not included in the Integrated Framework were noted. While abstraction was conducted by a single principal investigator (CS), a second team member (LR) reviewed the comparison of the abstracted frameworks to the Integrated Framework.

For Guiding Questions 2-4, paired reviewers (VD, JM, SYK, LR, RS, MV, AZ) independently assessed the quality of information about the organizational characteristic measures used in studies. That assessment focused on whether the measure is defined clearly (i.e., in a manner that can be readily replicated). We also classified studies according to whether they apply to cancer screening, diagnosis, and/or treatment to determine the extent to which findings apply to different aspects of cancer care. We used a Microsoft® Excel spreadsheet to extract information about the approaches used to measure and test organizational characteristics and processes related to cancer care delivery (Guiding Question 2), and organizational characteristics examined in studies assessing cancer care delivery. The extraction included information about the study design, setting, population, specific organizational measures, and outcomes used (Guiding Question 3), and evidence gaps or research needs identified in studies (Guiding Question 4).

We relied on an inductive qualitative approach using a process of thematic classification into topical categories with dual coding to classify 90 studies identified as relevant through the full-text screening process. Relevance was judged based on fit with the Guiding Questions and/or topics called out among the major categories of the Integrated Framework that guides this Technical Brief. One coder (JM) created initial categorizations and brief explanations based on a review of 40 per cent of the studies. The inductive approach was selected to be revelatory of consistency/inconsistency with the Integrated Framework. After the full team reviewed the initial coding structure, two additional coders (SYK, MV) applied these codes to the full set of studies and generated new codes as needed. Coders resolved conflicts through discussion with the Task Leader (EB) and the initial coder (JM).

In the next step, we split up the themes among the team members (VD, SYK, MV, AZ) and used a unique Guiding Question 2 form which focused on study approach to extract information on all studies. This permitted a uniform discussion of each category. For each study we abstracted study design; cancer care aspect (cancer screening, diagnosis, and/or treatment) involved; brief summary of findings; approach to measurement; and organizational characteristics measured. Team members then qualitatively summarized the group of studies assigned to each theme or category. In this step, we also identified studies well suited to addressing Guiding Question 3 based on one of two criteria, or both: 1) sufficient measurement and instrumentation to replicate or 2) tight fit with Guiding Question 3 as worded. Finally, we linked identified themes to the Integrated Framework elements and noted areas of divergence.

A set of 25 studies were selected to address Guiding Question 3. These were abstracted by two team members (VD, MV) using a unique form for Guiding Question 3, which included: study characteristics (study theme, first author and year of publication, aspects of cancer care (i.e. screening, diagnosis, or treatment) addressed in the study, study aim, design, setting,
population, organizational level, number of organizations in the study, and organization ownership); description of organizational characteristics measured (classification of the characteristic as a specific organizational context or process according to the Integrated Framework, study’s definition or description of the characteristic, approach to measurement, measurement instrument used, and number of items and type of scale of the instrument); primary and secondary outcomes (outcome name, type of the outcome as it relates to aspects of cancer care, whether the outcome is also an organizational characteristic, and whether the environmental influence on the outcome was measured); and study conclusions (main findings of the study and whether the study reports relevant research gaps). One principal investigator (JM) reviewed the abstractions and summarized findings for Guiding Questions 3 and 4.

**Data Presentation**

We used evidence tables to organize the detailed information extracted from studies. Then we created tables and figures with accompanying text to summarize the information on the Guiding Questions according to whether the studies focused on cancer screening, diagnosis, or treatment.

**Peer Review and Public Commentary**

Experts in cancer care delivery research and organizational science were invited to provide external peer review of this Technical Brief. The AHRQ Task Order Officers and an Associate Editor from AHRQ’s Evidence-based Practice Center Program also provided comments. We addressed all reviewer comments, revising the text as appropriate, and documented everything in a disposition of comments report that will be made available 3 months after AHRQ posts the final Technical Brief on the Effective Health Care website.
Findings

Results From Discussion with Key Informants

The 10 KIs were generally in agreement about the proposed methods for this Technical Brief. They helped to identify frameworks, models, or theories (other than the Integrated Framework) that describe how organizational characteristics may influence cancer care (screening, diagnosis, or treatment) or healthcare delivery in general. KIs called attention to relevant reports that might not be found in the traditional peer-reviewed literature. Some of the KIs suggested that we use additional terms in our search strategy and abstract additional details about organizations (e.g., level, ownership, and number of organizations in the participating study) and patient populations from relevant studies (see Appendix C).

The KIs highlighted major challenges in reviewing the literature. Publications investigating organizational characteristics in cancer care delivery are often more about what should have been done, that is, suggesting characteristics that should have been measured, and not about what has been done and tested. Recent developments related to the Coronavirus Disease (COVID-19) pandemic are only now beginning to appear in the literature. Terminology is not used consistently in the literature. It is important to determine and define the unit of analysis in relevant frameworks (e.g., institutions that are part of a larger corporate entity). In addition, the distinctions between academic and community settings are blurring, as more community hospitals take on some academic roles as part of networks. It is also important to consider temporal factors (such as changes to process that reset a system to a new state) as well as structural and temporal complexity (e.g., dynamic patterns that create changes at different structural levels with varying time lags) in the frameworks. Some frameworks are simpler and less detailed. More complex frameworks cover more ground but are harder to implement. There needs to be a balance between completeness of the framework and the degree of complexity.

Discussions with the KIs helped to define the most important considerations for interpreting and applying evidence on the topic of this report. The team reviewed the KIs’ input and integrated it as appropriate for the defined scope of the Technical Brief, while taking into consideration the evidence identified in the peer reviewed and grey literature.

Results of the Grey Literature Search

Multiple grey literature sources were searched, including sources received from our KIs. Among eight sources that were suggested by team members or internal senior advisors, five met inclusion criteria that specifically addressed cancer care, and included information pertaining to the frameworks in Guiding Question 1 or the organizational context and process characteristics that were focused on in Guiding Questions 2-4. The Agency for Healthcare Research and Quality (AHRQ) Care Coordination Measures Atlas was last updated in 2014. This resource is available online and provides a rich catalog of measures of care delivery and coordination that can potentially address Guiding Questions 1-3. Organizational measures that have been used in the cancer care delivery setting include: the Breast Cancer Patient and Practice Management Process Measures Surgeon Survey; the Care Transitions Measure (CTM-3); Head and Neck Cancer Integrated Care Indicators; Care Evaluation Scale for End-of-Life Care (CES); Oncology Patients’ Perceptions of the Quality of Nursing Care Scale (OPPQNC); Follow-Up Care Delivery scale; Adapted Picker Institute Cancer Survey; Primary Care Provider Ambulatory Care Experiences Survey (PCP ACES); and the Melanoma Continuity of Care—Recall System.
AHRQ launched the Comparative Health System Performance (CHSP) Initiative to study how healthcare systems promote EBP in delivering care. The CHSP Initiative led to the creation of the Compendium of U.S. Health Systems and a bibliography of publications on comparative health system performance. The working group defined a health system as including “at least one hospital and at least one group of physicians that provides comprehensive care (including primary and specialty care) who are connected with each other and with the hospital through common ownership or joint management.” The compendium provides health-system level aggregated data on structural features of provider organizations. Organizational characteristics of the health systems included in the compendium are derived from existing secondary data sources on hospitals and other healthcare provider organizations such as the American Hospital Association’s Annual Survey. These sources will be discussed later in this section. While the compendium’s focus is not on cancer care delivery, it provides useful information on organizational characteristics, mainly on environmental characteristics of the organization or structural features of the health system as a unit of organization and workforce capacity. The most common organizational characteristics reported in the research using the compendium were the size of the health system (the numbers of beds, physicians, and hospitals), teaching intensity of the system, patient population (pediatric or adults), percentage of low-income patients, ownership distribution, geographic coverage of the system (e.g., multistate system or single state), charity care provision, nursing home affiliation, and participation in alternative payment models.

The third source we identified is the Center for Medicare and Medicaid Innovation (CMMI). The CMMI has run 52 care delivery and payment innovation programs since its creation in 2010. Evaluation reports of these demonstration programs used a similar set of organizational characteristics, primarily structural features, to control for their confounding effects on the relationship between the outcomes of interest and demonstration programs. Among many, the Oncology Care Model directly targets cancer care-related payment and health outcomes and draws interest from cancer researchers. The evaluation reports refer to organizational characteristics that the federal agency used to assess the performance of the payment model demonstration. These reports used multilevel sociodemographic and market-supply characteristics (beneficiary, practice, and market-levels) as control variables in their analyses. Organizational characteristics mainly included structural and environmental features of healthcare organizations: academic medical center, health system affiliation, ownership, size and volume of events, and specialty type. Market-level factors included the size of the population, percentage of older adults, poverty level of patients, Medicare Advantage penetration, provider supply, and emergency department visits among Medicare fee-for-service patients. These organizational variables were primarily derived from the American Hospital Association’s Annual Survey and Health Resources and Services Administration (HRSA) Area Health Resource files.

Another source is the American Hospital Association’s Annual Survey. It is frequently cited by research articles and other grey literature as the main sources of organizational characteristics, primarily structural features. The American Hospital Association’s Annual Survey includes about 900 variables permitting the categorization of hospitals based on size, ownership, teaching status, and presence of many facilities and services. Commonly used organizational characteristics derived from these data include hospital beds, ownership, teaching status, critical access status, location (metropolitan/ rural/ urban), Medicare case mix index, and staffing. This data source covers nearly all hospitals that are members of the association and provides annual data. According to the American Hospital Association’s website, the response rate on the annual
survey has been over 75% each year. To ensure the validity of the survey, the Association employs a three-stage validation process: 1) addressing missingness in the data based on historical data or comparisons with similar organizations; 2) clarifying and validating unusual changes in responses over year; and 3) reexamining individual outliers from the aggregated responses or historical trends. In addition, a study by Everson, Lee, and Friedman evaluated internal consistency, construct validity, and criterion validity of the American Hospital Association’s longitudinal survey focusing on a subset of items - the Information Technology Supplement Survey. This study found that the instrument that the survey uses for the health information technology section is a reliable and valid measure.

Similarly, the Medicare Cost Report data are frequently cited by other research articles regarding financial metrics. Medicare-certified institutional providers are required to submit an annual cost report to Medicare, which contains information on facility characteristics, including the type of organization provider as reported in the hospital cost report (e.g., general short-term, cancer hospital, children’s hospital), utilization data, cost, and financial statement data such as margins, payment, and expenses on specific services and facilities.

Among the nearly 25 pieces of grey literature mentioned by KIs, only three included information pertaining to the frameworks and organizational context/process that we focused on in Guiding Questions 1-4. One of the items we identified was a table included in a chapter of the book titled, Delivering High-Quality Cancer Care: Charting a New Course for a System in Crisis. The book largely focuses on barriers to providing high-quality care for patients experiencing cancer across the United States. In chapter 7, which describes translating evidence into clinical practice, measuring care quality, and enhancing performance, a table describes nine quality measures commonly used in cancer care. The table refers to structure, process, outcome, cost, and efficiency as well as advantages and disadvantages of using these measures to assess quality of cancer care.

We also found relevant information in Transforming Cancer Care and the Role of Payment Reform: Lessons from the New Mexico Cancer Center, a report published by the Brookings Institute. The report describes innovations in care delivery and includes a list of structural, process, and outcome measures that the New Mexico Cancer Center uses to promote clinical actions that improve the quality of cancer care.

The American Society of Clinical Oncology – State of Cancer Care issue briefs identified potential barriers to providing oncology care in the United States. The major concerns of practices related to payer pressures, including prior authorizations and denials and appeals for coverage. Other environmental pressures reported by practices were competitive pressures, concerns around staffing shortages, electronic health record issues, and increasing costs (see Appendix C, Table C-1).

Results of the Published Literature Search

Figure 1 shows the search flow diagram for Guiding Question 1 (identifying relevant frameworks). Specifically, 4,875 records were identified for screening, of which 4,794 were excluded, leaving 81 for full text review. Of these, 10 were considered eligible for inclusion. One was later excluded because it was an application of a framework already included, and one was excluded because it informed the development of the Integrated Framework. In addition, 34 frameworks were identified from the KIs or articles that were excluded for not directly reporting on frameworks but that referred to frameworks for possible inclusion. In the latter case, we hand searched for articles describing the mentioned frameworks. Of these 34 frameworks, nine were included while six were excluded because they informed the development of the Integrated
Framework, and the other 19 did not meet eligibility criteria. Thus, a total of 17 frameworks were included (eight from the literature review and nine from citation in articles from the literature review). All frameworks that were identified had been applied to cancer care delivery.

Figure 2 shows the search flow diagram for Guiding Questions 2-4, identifying approaches, designs, and measures that have been considered specifically in the case of cancer care delivery.

A listing of excluded studies is included in Appendix B, List of Excluded Studies.

**Figure 1. Summary of results of the search for Guiding Question 1 [identifying relevant framework]**

- Citations identified through electronic database searching after duplicates removed (n=4,875)
  - Title-abstract screened for relevant framework (n=4,875)
    - Retrieved for full text review (n=81)
      - Excluded (n=73)
        - 8 frameworks identified (n=8 articles)
    - Excluded (n=4,794)
      - Additional sources (n=34 frameworks identified from hand search and from the Key Informants)
        - Excluded (n=25)
          - Did not meet eligibility criteria: 19
          - Incorporated in development of the Draft Integrated Framework: 6
  - 17 frameworks included in this report

A listing of excluded studies is included in Appendix B, List of Excluded Studies.
Figure 2. Summary of results of the published literature search for Guiding Questions 2-4

Citations identified through electronic database searching after duplicates removed (n=10,533)

- Records screened (n=10,533)
  - Records Excluded (n=10,009)

- Retrieved for full text review (n=524)
  - Article included (n=90)

Excluded at full text review (n=434)*
- Study not based in the United States: 34
- No original data (opinion, letters, editorial, commentary): 50
- Conference/meeting abstract/poster: 3
- Does not address delivery of cancer care (screening, diagnosis, or treatment): 70
- Does not include any clearly defined measure of organizational characteristics: 116
- Addresses ONLY clinical trial recruitment outcome: 3
- The stated objectives of the article do not include anything about examining how organizational characteristics are related to the delivery of cancer care: 310
- Other: 22

* Total exceeds the number of citations in the exclusion box, because citations could be excluded for more than one reason (i.e., reviewers did not need to agree on reason for exclusion.)
Guiding Question 1: What frameworks have been developed or applied to examine the effects of organizational characteristics on the delivery of and outcomes associated with cancer screening, diagnosis, and treatment?

The 17 frameworks reviewed and abstracted were published between 1998 and 2022 (Table 3). They were developed for a number of purposes, including to describe how value can be defined and measured in care delivery,35, 36 to advance the assessment of organizational characteristics in multilevel intervention research,37-39 to inform measurement in quality and safety initiatives,6, 7, 40-44 and to guide implementation efforts.45-49 Some of the frameworks were developed in a very specific context (e.g., radiation oncology,35, 40, 41 nursing,45 or vaccination promotion43); others focused on organizational characteristic measurement more generally (i.e., not specific to a particular context or application of care delivery). Interestingly, a number of the frameworks referred to structure, process, and/or outcome categories as described by Donabedian.35, 37, 40, 44 Some frameworks included detailed listings of organizational characteristics.37, 45 Others included fewer organizational characteristics, though the framework as a whole may have been more extensive.39, 41, 42 For example, from the Albert and Das framework for identifying and refining quality measures in oncology, only the hospital-level structure indicators were abstracted; the framework also includes process and outcome measures that were not related to organization characteristics.41 The content of the frameworks varied depending on the purpose and the application.

Main Findings on Guiding Question 1

Our systematic analysis of 17 relevant frameworks supports the comprehensiveness of the Integrated Framework. The comparison of the Integrated Framework to other organizational characteristic frameworks from the literature supports the Integrated Framework’s comprehensive coverage of key organizational context and process characteristics. Few characteristics were found in other frameworks that were not already reflected in the Integrated Framework.

Guiding Question 1a: How do these existing frameworks compare to the Integrated Framework developed by Weaver, Breslau, and colleagues?

The final column in Table 3 highlights the characteristics from the abstracted frameworks that are not currently reflected in the Integrated Framework. With the caveat that comparing the abstracted frameworks to the Integrated Framework was subject to interpretation, there were few characteristics in the abstracted frameworks that were not found in the Integrated Framework, either explicitly or implicitly through the subdomain categories. All the characteristics abstracted from six of the frameworks39-42, 44, 48 were already included in the Integrated Framework (i.e., no new characteristics were identified in these six frameworks). For many of the other frameworks, where a characteristic was listed in an abstracted framework but not found in the Integrated Framework, the characteristic was a specific example of a subdomain in the Integrated Framework.

Characteristics included in multiple abstracted frameworks but not explicitly included in the Integrated Framework include accessibility,35, 43 readiness for change,6, 46 past experience with innovation and change,37, 49 absorptive capacity,46, 49 and complexity.7, 37 Evidence-based care was included explicitly in two frameworks35, 36 but is not explicitly included in the Integrated
Framework. Arguably, the “standardization” domain, which includes guidelines and pathways, incorporates this element.

Notably, just because a characteristic is included in another framework but not the Integrated Framework does not mean that it should be added to the Integrated Framework. Some characteristics might be specific to the application of the abstracted framework. Rather, the developers of the Integrated Framework can evaluate whether the characteristics in column 4 of Table 3 are already implicitly included in the Integrated Framework, and if not, evaluate the characteristics’ relevance and importance to determine whether they should be added.

**Table 3. Comparison of abstracted frameworks of organizational characteristics to the Integrated Framework**

|-----------------------------|--------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------|
| Mitchell, 1998<sup>44</sup> Quality Health Outcomes Model. Image J Nurs Sch. 1998;30:43-6. | Quality Health Outcomes Model: Incorporates Donabedian framework into a dynamic model that incorporates feedback among clients, system/context, and interventions | **From System Characteristics and Interventions sections**  
**Structural Characteristics**  
- Size  
- Ownership  
- Skill mix  
- Client demographics  
- Technology  
**Interventions**  
- Work group interactions  
- Unit-level processes  
**Client Characteristics**  
- Health status  
- Demographics  
- Disease risk factors | NA |
| Wandersman, 2008<sup>48</sup> Bridging the Gap between Prevention Research and Practice: The Interactive Systems Framework for Dissemination and Implementation. Am J Community Psychol. 2008;41:171-181. | Interactive Systems Framework for Dissemination and Implementation: Examines the systems and processes involved in moving from innovation development and testing to widespread use, focused on prevention | **From Figure 2 “Prevention Support System”**  
- General capacity building  
- Innovation-specific capacity building  
**From Text Section “Organizational Factors that Influence Implementation” (excludes factors related to implementing specific innovations)**  
- Leadership  
- Program goals vision  
- Commitment  
- Size  
- Skills for planning, implementation, and evaluation  
- Climate  
- Structure  
- Organizational capacity for innovation  
- Resources  
- Decision-making structures | NA |
|-----------------------------|--------------------------|---------------------------------------------------------------------------------|--------------------------------------------------------|
- **Hospital**
  - Effective leadership for quality improvement
  - Spreading quality improvement to other units
- **Unit**
  - Perception of unit-level safety climate and teamwork
  - Sustainability of interventions
| *Spreading quality improvement to other units
*Sustainability of interventions
*Rewards and incentives
*Readiness for change |
| Aarons, 2011** Advancing a Conceptual Model of Evidence-Based Practice Implementation in Public Service Sectors. Adm Policy Ment Health. 2011;38:4-23. | Exploration, Adoption/Preparation, Implementation, Sustainment: Multilevel four-phase model of the implementation process | From Figure 2 Organizational Characteristics
- **Exploration**
  - Absorptive capacity (knowledge/skills, readiness for change, receptive context)
  - Culture
  - Climate
  - Leadership
- **Adoption Decision/Preparation**
  - Size
  - Role specification
  - Knowledge/skills expertise
  - Values
- **Active Implementation**
  - Structure
  - Priorities/goals
  - Readiness for change
  - Receptive context
  - Culture/climate
- **Sustainment**
  - Leadership
  - Embedded evidence-based practice culture
  - Critical mass of evidence-based practice provision
  - Social network support | *Absorptive capacity
*Readiness for change
*Receptive context |
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Taylor, 2011&lt;sup&gt;1&lt;/sup&gt; What Context Features Might Be Important Determinants of the Effectiveness of Patient Safety Practice Interventions? BMJ Qual Saf. 2011;20:611-617.</td>
<td>Contexts for assessing and/or describing effects on patient safety practice implementations</td>
<td><strong>From Table 1</strong>  &lt;br&gt; Safety Culture, Teamwork, Leadership  &lt;br&gt; - Safety Culture (organizational and unit level)  &lt;br&gt; - Teamwork (organizational and unit level)  &lt;br&gt; - Leadership (organizational and unit level)  &lt;br&gt; Structural Organizational Characteristics  &lt;br&gt; - Existing quality/safety infrastructure  &lt;br&gt; - Organizational complexity  &lt;br&gt; - Financial status  &lt;br&gt; - Size  &lt;br&gt; - Location  &lt;br&gt; - Date of study  &lt;br&gt; - Academic status  &lt;br&gt; - Volume of procedures  &lt;br&gt; - Space/physical environment  &lt;br&gt; - Past experience with information technology  &lt;br&gt; - Physician ownership  &lt;br&gt; - Command and control management structure</td>
<td>&lt;br&gt; Organizational complexity  &lt;br&gt; Date of study</td>
</tr>
<tr>
<td>Albert, 2012&lt;sup&gt;2&lt;/sup&gt; Quality Assessment in Oncology. Int J Radiation Oncol Biol Phys. 2012;83:773-781.</td>
<td>Framework for identifying and refining quality measures</td>
<td><strong>From Table 1</strong> Hospital Characteristics  &lt;br&gt; - Accreditation  &lt;br&gt; - Other recognition  &lt;br&gt; - Facilities  &lt;br&gt; - Patient volume  &lt;br&gt; - Training/experience of non-physician staff  &lt;br&gt; - Other support services</td>
<td>NA</td>
</tr>
</tbody>
</table>

<sup>1</sup> Indicates prepublication final version

<sup>2</sup> Indicates prepublication final version
Literature review that examines multilevel intervention cancer care literature to identify measures used, including group-, organizational-, and community-level measures.

From Table 2 on Organization Measures

<table>
<thead>
<tr>
<th>Environment/Structure</th>
<th>Structure</th>
<th>Processes</th>
<th>Emergent States</th>
<th>Outcomes Reporting</th>
<th>Characteristics/Descriptors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complexity</td>
<td>Size</td>
<td>Communication</td>
<td>Culture</td>
<td>Complexity</td>
<td>Urban/rural location</td>
</tr>
<tr>
<td>Work characteristics</td>
<td>Structure/design</td>
<td>Coordination</td>
<td>Organizational climate (global)</td>
<td>Work characteristics (uncertainty, interdependence)</td>
<td></td>
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<tr>
<td>(uncertainty,</td>
<td>Centralization/decentralization</td>
<td>Conflict resolution</td>
<td>Specific climates (perceived climate for communication, perceived climate for change [readiness for change], perceived climate for learning)</td>
<td>Part of larger entity? (degree of autonomy, degree of independence)</td>
<td></td>
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<tr>
<td>interdependence)</td>
<td>Differentiation</td>
<td>Human resource management practices (compensation, reward, and recognition; training; performance feedback)</td>
<td>Empowerment of staff</td>
<td>History (experience with prior innovations, interventions)</td>
<td></td>
</tr>
<tr>
<td>Part of larger entity? (degree of autonomy, degree of independence)</td>
<td>Characteristics of workforce: diversity</td>
<td>Alignment of goal setting and evaluation with implementation of focal practice</td>
<td>Organizational health (staff satisfaction, staff stress, staff absenteeism, staff turnover)</td>
<td>Conflict resolution</td>
<td></td>
</tr>
<tr>
<td>Resources (financial, liquid asset availability, profitability, sufficiency of staffing, space, other resources, slack resources)</td>
<td>Formalization</td>
<td>Leadership</td>
<td>Degree of adoption/fidelity of an innovation or practice</td>
<td>Human resource management practices (compensation, reward, and recognition; training; performance feedback)</td>
<td>Unionization</td>
</tr>
<tr>
<td>History (experience with prior innovations, interventions)</td>
<td>Technology</td>
<td>Decision-making</td>
<td>Functional diversity</td>
<td>Feedback mechanisms</td>
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<tr>
<td>Environment/Structure</td>
<td>Structure</td>
<td>Communication</td>
<td>Conflict resolution</td>
<td>Adjusting/reflecting mechanisms</td>
<td></td>
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<tr>
<td>Complexity</td>
<td>Size</td>
<td>Coordination</td>
<td>Human resource management practices (compensation, reward, and recognition; training; performance feedback)</td>
<td>Empowerment of staff</td>
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<tr>
<td>Work characteristics</td>
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<td>Leadership</td>
<td>Functional diversity</td>
<td>Feedback mechanisms</td>
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<td>interdependence)</td>
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<tr>
<td>Part of larger entity? (degree of autonomy, degree of independence)</td>
<td>Characteristics of workforce: diversity</td>
<td>Conflict resolution</td>
<td>Empowerment of staff</td>
<td>Quality of service management and reporting</td>
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<tr>
<td>History (experience with prior innovations, interventions)</td>
<td>Formalization</td>
<td>Leadership</td>
<td>Degree of adoption/fidelity of an innovation or practice</td>
<td>Outcomes Reporting</td>
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<tr>
<td>Resources (financial, liquid asset availability, profitability, sufficiency of staffing, space, other resources, slack resources)</td>
<td>Technology</td>
<td>Decision-making</td>
<td>Functional diversity</td>
<td>Internal transparency of performance measures</td>
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<tr>
<td>History (experience with prior innovations, interventions)</td>
<td>Environment/Structure</td>
<td>Conflict resolution</td>
<td>Human resource management practices (compensation, reward, and recognition; training; performance feedback)</td>
<td>Degree of adoption/fidelity of an innovation or practice</td>
<td>Financial performance</td>
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<td>Environment/Structure</td>
<td>Structure</td>
<td>Communication</td>
<td>Conflict resolution</td>
<td>Outcomes Reporting</td>
<td>Financial performance</td>
</tr>
<tr>
<td>Complexity</td>
<td>Size</td>
<td>Coordination</td>
<td>Human resource management practices (compensation, reward, and recognition; training; performance feedback)</td>
<td>Characteristics/Descriptors</td>
<td>Characteristics/Descriptors</td>
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<tr>
<td>Work characteristics</td>
<td>Structure/design</td>
<td>Conflict resolution</td>
<td>Alignment of goal setting and evaluation with implementation of focal practice</td>
<td>Urban/rural location</td>
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• Not-for-profit/for-profit  
• Functional diversity  
• Region/location  
• Unionization  
• Ownership/practice model | NA |

From Table 1 (organization-level characteristics only)  
• Personnel  
• Financing and time allocation  
• Diversity of patients  
• Diversity/mix of providers
<table>
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<tr>
<td>Cullen, 2012&lt;sup&gt;1&lt;/sup&gt; Planning for Implementation of Evidence-Based Practice. &lt;br&gt; JONA, 2012;42:222-230.</td>
<td>Evidence-based practice implementation guide for clinicians and nursing leaders</td>
<td>From Figure 1 Building Organizational System Support &lt;br&gt; Create Awareness &amp; Interest &lt;br&gt; • Knowledge broker(s) &lt;br&gt; • Senior executives announcements &lt;br&gt; • Publicize new equipment &lt;br&gt; Build Knowledge &amp; Commitment &lt;br&gt; • Teamwork &lt;br&gt; • Troubleshoot use/application &lt;br&gt; • Benchmark data &lt;br&gt; • Inform organizational leaders &lt;br&gt; • Report within organizational infrastructure &lt;br&gt; • Action plan &lt;br&gt; • Report to senior leaders &lt;br&gt; Promotion &amp; Adoption &lt;br&gt; • Audit key indicators &lt;br&gt; • Actionable and timely feedback &lt;br&gt; • Non-punitive discussion of results &lt;br&gt; • Checklist &lt;br&gt; • Documentation &lt;br&gt; • Standing orders &lt;br&gt; • Patient reminders &lt;br&gt; • Patient decision aides &lt;br&gt; • Rounding by unit and organizational leadership &lt;br&gt; • Report into quality improvement program &lt;br&gt; • Report to senior leaders &lt;br&gt; • Action plan &lt;br&gt; • Link to patient/family needs &amp; organizational priorities &lt;br&gt; • Unit orientation &lt;br&gt; • Individual performance evaluation</td>
<td>Primarily provides specific examples of the general concepts already included in the Integrated Framework</td>
</tr>
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</tbody>
</table>
| Zapka, 2012 Multilevel Factors Affecting Quality: Examples from the Cancer Care Continuum. J Natl Cancer Inst Monogr. 2012;44:11-19. | Factors from multiple levels that affect the quality of care across the cancer continuum, illustrated using case scenarios | From Table 1 Organization/Practice Setting Column  
- Standard practice concerning patient contact  
- Outreach practices (e.g., reminders by organization/practice)  
- Opportunities for in-reach during routine visits  
- Systematic links between providers  
- Medical record system type and quality: Access to quality electronic health record  
- Patient education resources  
- Patient navigation to improve adherence  
- Extent of integrated care delivery  
- Incentives for care coordination  
- Availability of reminder systems  
- Standards for reporting, and surveillance plans | Patient education resources  
Patient navigation |
| Mazza, 2013 Refining a Taxonomy for Guideline Implementation: Results of an Exercise in Abstract Classification. Implement Sci. 2013;8:32. | Effective Practice and Organisation of Care Taxonomy: Classifies the nature and content of guideline implementation strategies | From Table 2 Organisational Strategies Implementer  
- Additional human resources  
- Reallocated roles  
- Creation of an implementation team  
- Communication between distant health professionals  
- Improved healthcare professional satisfaction  
- Other  
Patient  
- Consumer participation  
- Consumer feedback, suggestions, and complaints  
- Other  
Structure  
- Change in organizational structure  
- Change to the setting or site  
- Change in the physical structure, facilities, or equipment  
- Change in information & communication technology  
- Change in quality assurance, quality improvement and/or performance measurement systems  
- Change in the method  
- Change in the integration of services  
- Change in risk management provisions  
- Other | Disregarding the emphasis on changes over time  
- Risk management provisions |

*From Table 1 Organization/Practice Setting Column 

Disregarding the emphasis on changes over time

- Risk management provisions
|------------------------------|--------------------------|-----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| Teckie, 2014<sup>12</sup>  
Value: A Framework for Radiation Oncology. J Clin Oncol, 2014;32:2864-2870 | Value equation built on Porter (value = outcomes/cost) to add the Donabedian framework of structure, process, and outcomes so that value = quality [structure, process, outcome]/cost | From Figure 1  
**Structure**  
- Accredited  
- Integrated  
- Technology current  
- Safe  
**Process**  
- Patient-centered  
- Coordinated  
- Accessible  
- Evidence based  
**Costs**  
- Transparent  
- Measured through full cycle of care  
- Related to quality |  
- Accessible  
- Evidence based |
| Harvey, 2016<sup>19</sup>  
PARIHS revisited: from heuristic to integrated framework for the successful implementation of knowledge into practice. Implement Sci. 2016;11:33 | Integrated Promoting Action on Research Implementation in Health Services: integrated framework to explain and predict the success of implementing evidence into practice | From Table 3  
**Context-Local Level**  
- Formal and informal leadership support  
- Culture  
- Past experience of innovation and change  
- Mechanisms for embedding change  
- Evaluation and feedback processes  
- Learning environment  
**Context-Organisational Level**  
- Organisational priorities  
- Senior leadership and management support  
- Culture  
- Structure and systems  
- History of innovation and change  
- Absorptive capacity  
- Learning networks |  
- Absorptive capacity  
- Past experience of innovation and change |
|-------------------------------|--------------------------|----------------------------------------------------------------------------------------|--------------------------------------------------------------|
**Practice-level**  
- Use of standing orders  
- Vaccination promotion by all staff  
- Prevention/immunization champion  
- Vaccine supply  
**Provider-level**  
- Access to care  
- Availability of technology and personnel  
- Organizational priorities  
- Structure of office practice  
- Reimbursement  
- Coordination with community resources  
**Patient-level**  
- Access to care  
- Coordination of resources | Disregarding the vaccination-specific issues (e.g., vaccination promotion)  
- Access to care |
| Modica, 2020* The Value Transformation Framework: An Approach to Value-Based Care in Federally Qualified Health Centers. J Healthc Qual. 2020;42:106-112. | Value Transformation Framework: Guides health center systems change toward high-value care | From Figure 2 Infrastructure  
- Improvement strategy  
- Health information technology  
- Policy  
- Payment  
- Cost  
**Care Delivery**  
- Population health management  
- Patient-centered medical home  
- Evidence-based care  
- Care management  
- Social determinants of health  
**People**  
- Patients  
- Care teams  
- Leadership  
- Workforce  
- Partnerships |  
- Population health-management  
- Medical home *patient-centeredness included*  
- Evidence-based care |
|-----------------------------|-------------------------|---------------------------------------------------------------------------------|---------------------------------------------------------------|
| Wright, 2021<sup>40</sup> Safety First: Developing and Deploying a System to Promote Safety and Quality in Your Clinic. Pract Radiat Oncol. 2021;11:92-100. | Practical framework for improving or developing a Safety and Quality program in radiation oncology | *From Figure 1*  
- Culture of Safety  
- Accreditation  
- Organizational Structure, Leadership, Committee Oversight  
**Structure**  
- Staffing  
- Training  
- Professional Development  
**Process**  
- Policies and Procedures  
- Physics Quality Management  
- Peer Review | NA |
| Van Citters, 2022<sup>42</sup> Prioritizing Measures that Matter within a Person-Centered Oncology Learning Health System. JNCI Cancer Spectr. 2022;6:pkac037. | Measures to guide a person-centered oncology learning health system | *From abstract-contextual factors (also in Figure 1)*  
- Team Well-Being and Joy in Work  
- Learning Culture & Community  
- Scholarly Engagement and Productivity  
- Diversity, Equity, Inclusion, and Belonging | NA |

* Taken directly from the paper sections specified. Only internal organizational characteristic categories related to context and process were abstracted; outcomes were not abstracted given the Integrated Framework’s focus on context and process. Abstracted frameworks may have included other categories related to individual or external factors that were not abstracted as these factors are not covered in the Integrated Framework. For example, payment policy is an external factor that would not have been abstracted for Guiding Question 1, but an organization’s payer mix is a characteristic of the organization that would be considered for Guiding Question 1.

NA = not applicable

Guiding Question 2: What approaches have been used to improve understanding of how organizational context and process characteristics are described, measured, and analyzed in the context of cancer screening, diagnosis, and treatment?

We defined “approaches” to mean: the organizational topics considered, whether process or context; the quantitative, qualitative or mixed data collection and analysis; and the study designs. To describe approaches taken in the literature since 2010 to understand organizational influences on cancer care, we analyzed 90 studies for themes and abstracted information most relevant to Guiding Question 2 (see Figure 3).

For Guiding Question 2, inductive thematic analysis yielded 12 categories (see Figure 4). Most commonly, 39 of 90 studies (43%) that mentioned or described organizational characteristics (including processes, structures, or context) were accounts of project implementation designed to improve quality of care or institute guidelines, electronic reminders, or other systems. Among the 90 studies, 35 (39%) were related to cancer screening, 7 (8%) to cancer diagnosis, 26 (30%) to cancer treatment, and 22 (24%) to other aspects of cancer care (e.g., financial integration between physicians and hospitals, innovation implementation, leadership skill building) or more than one aspect of cancer care. This categorization includes 25 studies that also were relevant to Guiding Question 3. Details can be found in Appendix D, Evidence Tables D-1 through D-4.
Main Findings on Guiding Question 2

Guiding Question 2 explains approaches that have been used to improve understanding of how organizational characteristics are described, measured, and analyzed in the context of cancer screening, diagnosis, and treatment. Studies that evaluated organizational measures in a cancer context mainly focused on screening or treatment, with few studies considering diagnosis. Topical themes in the studies included, among others: implementation of quality improvement projects and investigation of context and process barriers to implementation; evaluation of total care models; or structural and resource-related characteristics such as size, type, affiliation (e.g., with a network), or characteristics of the patient population. Few studies considered important organizational concepts such as leadership, psychological states and traits among organization members (e.g., risk aversion) and groups (e.g., hierarchy), team composition, or organizational readiness. Approaches to testing organizational influences on cancer care included qualitative and quantitative data collection (see Table 4) and study designs that ran the gamut from RCTs to case studies.

Figure 3. Cancer care delivery in studies relevant to Guiding Question 2
Figure 4. Thematic categorization of studies relevant to Guiding Question 2

<table>
<thead>
<tr>
<th>Theme</th>
<th>Cancer care context</th>
<th>Approaches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implementation of improvement projects and barriers to implementation</td>
<td>Screening</td>
<td>• Administered surveys</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• The Michigan Office of Health Information Technology provided summary data</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Community sites were randomized to either tailored navigation from trained navigators or control</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Utilized commercial insurance and Medicaid data for enrollees and the Johns Hopkins ACG system</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Utilized the PRISM and PNSAT model</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Consulted with leadership from the departments of radiology and information technology</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Collected field notes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Interviews with key informants</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Care providers received a continuing medical education–accredited academic detailing session</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Utilized Medicaid administrative claims data</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Obtained data from patient charts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Worked with clinic staff to select and implement policies and procedures from a tool kit</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Data from the National Survey of Primary Care Physicians’ Recommendations and Practices for Breast, Cervical, Colorectal, and Lung Cancer Screening</td>
</tr>
<tr>
<td></td>
<td>Diagnosis/Treatment</td>
<td>• Conducted semi-structured interviews with oncologists, nurses, social workers, medical assistants, and front-desk staff</td>
</tr>
</tbody>
</table>

Table 4. Summary of approaches to testing organizational influences on cancer care of studies relevant to Guiding Question 2

<table>
<thead>
<tr>
<th>Theme</th>
<th>Cancer care context</th>
<th>Approaches</th>
</tr>
</thead>
<tbody>
<tr>
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<td>• Data from the National Survey of Primary Care Physicians’ Recommendations and Practices for Breast, Cervical, Colorectal, and Lung Cancer Screening</td>
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<td></td>
<td>Diagnosis/Treatment</td>
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</tr>
<tr>
<td>Theme</td>
<td>Cancer care context</td>
<td>Approaches</td>
</tr>
<tr>
<td>-------</td>
<td>---------------------</td>
<td>------------</td>
</tr>
<tr>
<td><strong>Treatment</strong></td>
<td>Quality and safety team developed an event-reporting system program</td>
<td>• Quality and safety team developed an event-reporting system program &lt;br&gt; • Administered surveys &lt;br&gt; • Utilized an incident reporting system &lt;br&gt; • Interviews with key informants &lt;br&gt; • Merged data from the American Hospital Association’s Annual Survey and Medicare claims &lt;br&gt; • Tracked and extracted data from electronic health records</td>
</tr>
<tr>
<td><strong>Other cancer care context</strong></td>
<td>Used managed care penetration, hospital competition, and clinical trials competition</td>
<td>• Used managed care penetration, hospital competition, and clinical trials competition &lt;br&gt; • Comparisons of data pre and post work enhancement implementation &lt;br&gt; • Developed a semi-structured interview guide based on the CFIR model &lt;br&gt; • Teams participated in video conferencing training &lt;br&gt; • Administered surveys &lt;br&gt; • Utilized the MDC assessment tool &lt;br&gt; • Sourced data from the CCOP Annual Progress Reports &lt;br&gt; • Assessment of safety-net clinics &lt;br&gt; • Structured interviews &lt;br&gt; • Data collected by the Chicago Breast Cancer Quality Consortium &lt;br&gt; • Obtained medical record data and reviewed patient cases &lt;br&gt; • Compared practice self-report with external evaluation of implementation</td>
</tr>
<tr>
<td><strong>Participation in total care delivery models</strong></td>
<td>Data taken from quarterly reports submitted to hospitals</td>
<td>• Data taken from quarterly reports submitted to hospitals &lt;br&gt; • Facilitators engaged physicians and staff on-site in a series of activities &lt;br&gt; • Utilized surveys &lt;br&gt; • Obtained data physician utilization of federal incentives &lt;br&gt; • Utilized the NCQA recognition audit data &lt;br&gt; • Identified comparison practices in the same geographic region &lt;br&gt; • Utilized the Safety Net Medical Home Scale &lt;br&gt; • Measures derived from expert consensus, clinical trial results that test anticancer therapies, and published guidelines</td>
</tr>
<tr>
<td><strong>Structural and resource-related characteristics</strong></td>
<td>Merged patient level, organizational level, and area level data sources</td>
<td>• Merged patient level, organizational level, and area level data sources &lt;br&gt; • Utilization of surveys &lt;br&gt; • Information from administrative datasets &lt;br&gt; • Collected data from the VA National Data Systems</td>
</tr>
<tr>
<td><strong>Diagnosis/Treatment</strong></td>
<td>Measures were refined after structured discussion and panels. The resulting set of quality indicators were then grouped into domains</td>
<td>• Measures were refined after structured discussion and panels. The resulting set of quality indicators were then grouped into domains &lt;br&gt; • Interviews with key informants &lt;br&gt; • Utilization of surveys &lt;br&gt; • Review of patient medical records</td>
</tr>
<tr>
<td><strong>Workload, workflow, or work performance</strong></td>
<td>Collected publicly reported data about coordinated care organizations</td>
<td>• Collected publicly reported data about coordinated care organizations &lt;br&gt; • Utilized data from field notes, collaborative meetings, and medical record review</td>
</tr>
<tr>
<td><strong>Diagnosis/Treatment</strong></td>
<td>Pulled data from laboratory information system and chart review</td>
<td>• Pulled data from laboratory information system and chart review</td>
</tr>
<tr>
<td><strong>Treatment</strong></td>
<td>Prospective quantitative data were collected</td>
<td>• Prospective quantitative data were collected &lt;br&gt; • Interview-based surveys were conducted with experienced oncology pharmacists &lt;br&gt; • Assessments were performed in a simulation laboratory</td>
</tr>
<tr>
<td><strong>Other cancer care context</strong></td>
<td>Obtained data on community-based networks of hospitals and physician practices from the CCOP</td>
<td>• Obtained data on community-based networks of hospitals and physician practices from the CCOP &lt;br&gt; • Utilized electronic health records used in in-person observations</td>
</tr>
<tr>
<td><strong>Organizational reactions to</strong></td>
<td>Use of National Cancer Database data</td>
<td>• Use of National Cancer Database data</td>
</tr>
<tr>
<td><strong>Treatment</strong></td>
<td>Thematic analysis guided by Donabedian Quality of Care framework.</td>
<td>• Thematic analysis guided by Donabedian Quality of Care framework.</td>
</tr>
<tr>
<td>Theme</td>
<td>Cancer care context</td>
<td>Approaches</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>--------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| environmental forces                       | Other cancer care context                         | • Utilized the ASTRO workforce survey  
• Applied the Herfindahl-Hirschman Index for practices of medical oncologists that billed Medicare |
| Leadership                                 | Screening                                        | • Interview with key informants                                                                                                       |
|                                            | Diagnosis/Treatment                               | • Web-based survey on the practice of quality assurance peer review chart rounds                                                         |
|                                            | Other cancer care context                         | • Use of Evidence-based Practice Measurement Tools                                                                                      |
| Psychological states or traits of         | Diagnosis/Treatment                               | • Surveys covering job satisfaction, safety, communication, and burnout                                                              |
| providers and provider groups              | Treatment                                         | • Online survey                                                                                                                        |
|                                            | Other cancer care context                         | • Surveys covering job satisfaction, safety, communication, and burnout                                                              |
| Financial metrics                          | Treatment                                         | • Identification strategy using administrative data                                                                                     |
|                                            | Other cancer care context                         | • Utilized administrative data                                                                                                          |
| Impact of training, training types, and   | Screening                                        | • Interview with primary care practice team-members                                                                                     |
| workforce capacity assessments             | Treatment                                         | • Multi-payer claims based, shared patient network measures                                                                            |
|                                            | New roles or team composition                     | • Review of medical chart data                                                                                                          |
| Safety and safety culture                  | Treatment                                         | • Administered the ESAS questionnaire                                                                                                  |
| Organizational readiness                   | Treatment                                         | • Used surveys and document review processes or did not specify approach                                                                |
|                                            | Other cancer care context                         | • Emailed self-developed survey                                                                                                         |

ACG = Adjusted Clinical Group; CCOP = Community Clinical Oncology Program; CFIR = Consolidated Framework for Implementation Research; ESAS = Edmonton Symptom Assessment System; MDC = Multidisciplinary Care; NCQA = National Committee of Quality Assurance; PNSAT = Patient Navigation Sustainability Assessment Tool for Preventive Cancer Screening; PRISM = Practical, Robust Implementation and Sustainability Model; VA = Veterans Affairs

**Guiding Question 2: Implementation of Improvement Projects and Barriers to Implementation**

Among studies included for Guiding Question 2, thirty-nine addressed the implementation of a project and/or assessed barriers to and facilitators for implementing an intervention (an organizational process that becomes a contextual element after completion). The publication dates for these studies ranged from 2011 to 2023.

Despite the heterogeneity among studies, especially as related to the population, organizational characteristics, setting, and whether authors measured care delivery outcomes, most studies sought to measure the quality of cancer care delivery. In doing so, authors either defined quality metrics or relied on quality metrics determined by outside organizations. Though most studies examined other aspects or more than one aspect of cancer care, several studies reported data on cancer screening and cancer treatment.

Studies approached this topic using both qualitative (e.g., semi-structured interviews, surveys, assessments) and quantitative methods (e.g., retrospective analysis, prospective analysis, pre/post intervention analysis) to determine barriers and facilitators of interventions. For qualitative assessments, authors typically distributed surveys or conducted semi-structured interviews. Surveys allowed organizations to report on implementation standards, barriers, facilitators, approaches to sustainability and clinician/staff experiences of an intervention. Survey results were based on self-reports from leadership and staff within organizations. In addition, assessments were used to monitor implementation projects. For example, one study distributed the Patient Navigation Sustainability Assessment Tool for Preventive Cancer Screening (PNSAT) to determine potential barriers/facilitators of a Systems of Support patient navigation program.
Studies in this group also reported qualitative observations of and interviews with oncology providers, organizational leadership, and other key informants. These methods provided a rich source of information pertaining to an organization’s clinical practices, physical capacity, staff experiences, and quality of cancer care, to name a few. For consistency, authors would generate codes/codebooks to analyze transcripts and recordings from interviews, relying on models such as the Consolidated Framework for Implementation Research (CFIR) or the Practical, Robust Implementation and Sustainability Model (PRISM). Overall, the bulk of these approaches were used to identify organizational factors that relate to implementation sustainability and/or effectiveness.

To study implementation projects and barriers to implementation in cancer care delivery, authors analyzed prospective data, retrospective data, and data pre/post-intervention. Sources of data varied from annual progress reports to electronic health records or medical records. Authors used these databases to measure quality metrics for compliance (e.g., Breast Imaging Center of Excellence (BICOE) status), processes (e.g., management plans), and effectiveness of an intervention (e.g., changes in screening rates). In some cases, the findings were related to clinical outcomes. In others, the authors reported organizational factors that supported or hindered an intervention and which factors related to organizational performance or adherence/compliance.

In some of these studies the intervention’s implementation was measured and outcome was assessed directly. These projects typically involved authors working within an organization to establish an improvement program aimed at raising clinical care quality. The interventions themselves often involved an electronic system that either reported adverse events/errors or functioned as a clinical reminder with outcomes relating to patient safety and compliance.

Supporting Guiding Question 2, tables 5-7 list the organizational context measures, organizational process measures, and organizational models with measurements that appeared in studies categorized under the theme of Implementation of Improvement Projects and Barriers to Implementation. Tables 5-7 also list items according to whether the focus of the study was on cancer screening, diagnosis, or treatment.

Results from these studies typically looked at intermediate organizational outcomes: barriers/facilitators, organizational factors, implementation effectiveness/sustainability, and healthcare quality. Outcomes included changes in screening rates post intervention or related screening rates to an organizational care quality metric. Due to the heterogeneity of the data analysis and ‘tools’ employed, the studies reported varied results among cancer treatment centers. The individual studies were limited in their scope, reporting results only from a local health organization or a state’s health system (e.g., Maryland’s health system). Also, most studies did not measure patient-level outcomes or clinical practice (i.e., workflow). The purpose of these studies was not to determine how organizational factors affected patient outcomes, but they provide valuable insight to useful approaches, models, and measurements for studying organizational characteristics in the context of cancer care delivery. This theme, identified inductively, corresponds to the subdomain “Organizational Learning and Quality Improvement Activities” under the Organizational Process domain in the Integrated Framework.
### Table 5. Summary of organizational context constructs related to cancer care screening, treatment, and diagnosis within the Implementation Projects and Barriers category

<table>
<thead>
<tr>
<th>Screening</th>
<th>Diagnosis</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Quality of care metrics</td>
<td>N/A</td>
<td>• Patient care environment</td>
</tr>
<tr>
<td>• Vertical integration</td>
<td></td>
<td>• Ownership type</td>
</tr>
<tr>
<td>• Patient pool and patient care environment</td>
<td></td>
<td>• Type of organization/partnership (e.g., safety net clinic/system or training organization)</td>
</tr>
<tr>
<td>• Infrastructure</td>
<td></td>
<td>• Organizational maturity, size, and structure</td>
</tr>
<tr>
<td>• Type of organization/partnership (e.g., safety net clinic/system or training organization)</td>
<td></td>
<td>• Compliance with patient-centered oncology standards (access, specialty practice responsibilities, practice team, comprehensive health assessment, evidence-based decision support, care planning and support self-care, medication management, coordinate care transition, implement and demonstrate)</td>
</tr>
<tr>
<td>• Meets specific benchmarks (Chicago Breast Cancer Quality Consortium (2006-2013)) (determined by recall rate, biopsy recommendation rate, cancer abnormal, cancer biopsied, screen detection rate, proportion minimal, proportion early stage)</td>
<td></td>
<td>• Cultural and linguistic competence</td>
</tr>
<tr>
<td>• Organizational maturity, size, and structure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Screening policies, practices, and beliefs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Colorectal cancer screening toolkit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Determined as a Federally Qualified Health Center</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Participant of Community Ambassador Program</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Use of electronic health records / medical records</td>
<td></td>
<td>• Near-miss risk index</td>
</tr>
<tr>
<td>• Use of physician and patient reminder systems</td>
<td></td>
<td>• Use of electronic event-reporting systems</td>
</tr>
<tr>
<td>• Patient navigation</td>
<td></td>
<td>• Use of electronic health records /medical records, patient portals, patient-reported outcomes, and telemedicine services</td>
</tr>
<tr>
<td>• Use of electronic clinical reminders</td>
<td></td>
<td>• Centralization</td>
</tr>
<tr>
<td>• Physician engagement and work environment</td>
<td></td>
<td>• Primary Care Redesign team-based model</td>
</tr>
<tr>
<td>• Staff facilitation</td>
<td></td>
<td>• Treatment team integration</td>
</tr>
<tr>
<td>• Patient-oriented and provider-oriented evidenced based practices</td>
<td></td>
<td>• Integration of care coordinators</td>
</tr>
<tr>
<td>• Use of nurse practitioner/physician assistants</td>
<td>N/A</td>
<td>• Palliative care consultation</td>
</tr>
<tr>
<td>• Care management (administrative processes, referral protocol/schedule, treatment and diagnosis standards, screening procedures and health education)</td>
<td></td>
<td>• Radiation management plan</td>
</tr>
<tr>
<td>• Radiation oncology resident continuity clinic (faculty supervision, clinical environment, resident perception, and educational experience)</td>
<td></td>
<td>• Care management (administrative processes, referral protocol/schedule, treatment and diagnosis standards, screening procedures and health education)</td>
</tr>
<tr>
<td>• Care coordination</td>
<td></td>
<td>• Medical specialty/access to specialist</td>
</tr>
<tr>
<td>• Radiation oncology resident continuity clinic (faculty supervision, clinical environment, resident perception, and educational experience)</td>
<td></td>
<td>• Use of healthcare Failure Mode and Effect Analysis</td>
</tr>
<tr>
<td>• Use of healthcare Failure Mode and Effect Analysis</td>
<td></td>
<td>• Peer-review program</td>
</tr>
<tr>
<td>• Work enhancement programs</td>
<td></td>
<td>• Work enhancement programs</td>
</tr>
</tbody>
</table>

N/A = Not available
Table 7. Summary of organizational models with measurements related to cancer care screening, treatment and diagnosis within the Implementation Projects and Barriers category

<table>
<thead>
<tr>
<th>Screening</th>
<th>Diagnosis</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Practical, Robust Implementation and Sustainability Model</td>
<td>N/A</td>
<td>• Participation in Oncology Care Model</td>
</tr>
<tr>
<td>• Patient Navigation Sustainability Assessment Tool for Preventative Cancer Screening</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Consolidated Framework for Implementation Research constructs and subconstructs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• The Chronic Care Model</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

N/A = Not available

Guiding Question 2: Participation in Total Care Delivery Models

We categorized eleven studies under Guiding Question 2 as examining impacts of an organizational context measure, participation in total care delivery models (that is, care models that set tenets and include structural features to drive the total care approach for all care, for all patients, such as the Patient-Centered Medical Home) on cancer care outcomes. These delivery models were: the Quality Oncology Practice Initiative (1 study in Michigan), the Health Disparities Cancer Collaborative (1 study, multi-state), the Northeastern Pennsylvania Chronic Care Initiative (1 study), the Rhode Island Chronic Care Sustainability Initiative (1 study), and the Patient-Centered Medical Home (PCMH) (7 studies, 1 in Colorado, 1 nationwide, 1 New England region, and four in New York State). This topic was tied for the second most populous category in our review, indicating that cancer care outcomes are an important focus of many total care delivery models. The studies in this category were published between 2012 and 2021, with six published in 2015 and 2016 coinciding with the timeline of increased interest in evaluating PCMH models. The studies differed in their approaches to establishing pathways from an intervention (care model or program) to organizational process changes to organizational outcomes, to clinical process changes, to cancer care outcomes. Those with the most rigorous study designs tended to measure participation in the intervention (the only organizational characteristic) and cancer care process measures (e.g., screening rates) compared to a control group. The studies with cross-sectional approaches tended to measure intermediate points or mediators in the pathways as well as multiple organizational concepts and measures representing structures, processes, and context. Designs favored before-after studies with or without controls or cross-sectional studies with or without controls. There was one randomized controlled trial (RCT), two longitudinal cohort studies with two subgroups, and one continuous quality improvement data collection with no control.

Most studies measured as their primary outcomes breast, cervical, and colorectal cancer screening rates. The inclusion of all three of these outcomes was not consistent across these ten studies and findings were mixed, which might be explained by differences in study design, such as differing length of the observation period, differing use of electronic health records, and differing role of other organizational characteristics as mediators. The studies that found negative impacts of total care delivery model participation on primary outcomes tended to explore organizational characteristics more often, including as mediators, in their analyses generally searching for explanations for poorer outcomes than anticipated from applying the model.

As a group, this category of studies included discussion of 44 organizational concepts and measures representing structures, processes, and context, including: participation in the model in
general, achieving high-level PCMH recognition, use of the chronic care model, teamwork, cancer care process improvement, performance feedback, registry use, care management, outreach systems to contact patients, electronic health record capabilities, access to care, career satisfaction, work-life balance, patient care processes, professional experience, improvements in resident continuity, care transitions, culturally competent care, improved access and coordination between primary and specialty care, care coordination and integration, type of screening performance reports, systems for patient reminders, and processes in 7 types of cancer care (that include 35 measures total). Those 44 also included 9 areas of the National Committee for Quality Assurance (NCQA) Physician Practice Connections Standards and 6 subscales (52 items) of the Safety Net Medical Home Scale. Four studies measured organizational characteristics via self-constructed surveys or a data entry tool developed for those studies specifically. Four studies provided a brief description of their measured organizational concepts, but in three of those studies the only measured concept was PCMH participation.

This inductively revealed theme maps onto the Integrated Framework category of “Payment model and payment program participation” under Financial Structures within the Organizational Context domain.

Guiding Question 2: Structural and Resource-related Characteristics

The approach in another eleven studies under Guiding Question 2 was to report on organizational structure and resource-related characteristics in cancer care delivery, a construct within organizational context. The studies in this group were published between 2013 and 2022. Designs employed were prospective or retrospective cohort and cross-sectional designs, with the majority of studies employing the latter.

Six studies looked at the association between cancer screening and patient, practice, or health system characteristics such as appointment availability and frequency, academic affiliations, staffing mix, geographic location, and patient-panel race and ethnicity, age, and socio-economic variables. The remainder identified or described the effect of organizational factors and characteristics on quality of cancer care and patient enrollment, including type of facility (e.g., imaging center, outpatient center, diagnostic clinic, mobile unit), scheduling capacity, system support, and certification status.

This category of studies included discussion of many organizational concepts and measures representing process and context, such as: organizational size and volume, use of patient portal or electronic records, academic arrangements, incentives for primary care performance, cost and payment methods, staffing, skill types, beliefs, and screening processes. Outcomes and measures were obtained by several methods including structured discussion with staff members, utilization of electronic health records, survey questionnaires, registered surveys such as the Veterans Health Administration Healthcare Analysis and Information Group survey, national databases such as the Veterans Affairs Decision Support System Laboratory Data Set, and Medicare claims. Notable drawbacks were the use of cross-sectional studies or designs which hinder making a causal inference. However, many of the studies used a large sample size of either participants, practices, or national databases which help with generalizability and reliability.

This revealed theme is closely aligned with the organizational structure and capacity subdomains of organizational context in the Integrated Framework.
Guiding Question 2: Workload/Workflow Design/Work Performance

Nine studies related to workload, workflow, or work performance themes. The studies in this group were published between 2013 and 2022. Designs employed were cross-sectional, prospective cohort, pre/post comparison, comparative case study, and RCT. Studies in this category investigated the association of operational efficiency, staff workload, and performance with quality improvement, patient care, and screening efficiency. Outcomes and measures were obtained through collection of quantitative data from patient records, health system scheduling records, interview-based surveys, and national databases.

This category of studies included discussion of several organizational concepts and measures representing context and processes, such as: workload levels for clinicians and nursing staff, changes in workflow, treatment rates, standardization of staff functions, patient volumes, physician scheduling, frequency of clinical functions, trends of services, screening rates, team structure, and infrastructure development. Although this category does include an RCT, it was only one study with a limited number of participating practices. In addition, this trial may be subject to reporting bias as the volunteer practices may have been more motivated to improve cancer screenings.

Articles in this inductively identified theme tended to straddle concepts as presented in the Integrated Framework that were categorized either as Context or Process. This highlights the idea that studies often do not fall cleanly into one domain (as organized in a framework) but that studies considering a path to an outcome would likely include structure, process and context contributors. The framework does cover this theme, however, in its organizational Outcomes domain which includes efficiency and workload and its process domain (e.g., “care management processes” (mentioning workflows) as well as “configuration” including workflow policies.

Guiding Question 2: Organizational Reactions to Environmental Forces

Also addressing Guiding Question 2, five studies examined organizational programs and features set up in response to external influences. One study had a clear definition of the environment (e.g., hospital-referral regions) while others did not. The studies in this group were generally published in more recent years, between 2014 and 2022, with only one study before 2014. Designs employed were cross-sectional based on a survey or national databases, and one retrospective cohort. Studies in this group examined market competition, or the participation in a peer performance-report-card program from an external agency as external or environmental influences on the organization.

This category of studies discussed organizational concepts and measures representing context, including: provider practice competition; implementation of a community breast center report card; accreditation status; workforce characteristics including demographic features; insurance coverage; and cancer care team support from the community. While some of the studies used nationally representative data, others focused on a specific institution, limiting the generalizability or external validity of findings. The studies rarely demonstrated relationships of the measures with patient outcomes.

In the Integrated Framework, this inductive theme is not a distinct category of environmental influences on the organization or organizational efforts to control the environment. However, two Integrated Framework categories reflected related constructs: Participation in state or national quality improvement collaboratives under organizational learning and quality improvement activities in the Process domain and the competition-collaboration continuum under organizational culture, a Context subdomain.
Guiding Question 2: Leadership

Three studies were related to the theme of leadership and its impact on cancer care delivery and outcomes.\textsuperscript{134-136} One study examined leadership perspectives on implementing a lung cancer screening program.\textsuperscript{134} Another study assessed the impact of peer review quality assurance using chart reviews,\textsuperscript{135} and the last study looked at the impact of an EBP leadership immersion intervention.\textsuperscript{136} The studies in this group were published between 2012 and 2022. Study designs employed were two cross-sectional studies\textsuperscript{134, 135} and one prospective cohort,\textsuperscript{136} with the two cross-sectional studies collecting data through surveys and interviews.\textsuperscript{134, 135}

The prospective cohort study which looked at the impact of an EBP leadership program used EBP belief and implementation scales for knowledge, beliefs, competencies, implementation, organizational culture, and readiness for system-wide integration.\textsuperscript{136} All scales were tested for validity and reliability.

This category of studies included discussion of allocation of resources, need for collaboration, facilitators and barriers to program implementation, peer review of treatment modalities, use of technologies, organizational readiness, and leadership knowledge, beliefs, competencies, and behaviors. Notable limitations to these studies were the use of hand-written notes for interviews rather than recordings in one study,\textsuperscript{134} dependence on memory and recollection with no method for validation in one study,\textsuperscript{135} and low response rates for some measures in another study.\textsuperscript{136} All three studies used self-reported outcome measures which may hinder reproducibility.

This emergent theme was partly represented in the Integrated Framework in the constructs of “knowledge, attitudes, beliefs of managers, providers, staff about organizational characteristics, policies, or processes” under the culture subdomain of the Context domain and as “leadership structures” under the structure subdomain of the Context domain. However, the notion of leadership skill and tactics as an organizational asset, or as a process characteristic (the act of leading and making decisions for the organization) were not easily identified in the Framework.

Guiding Question 2: Psychological States/Traits of Providers and Provider Groups

Three studies answering Guiding Question 2 were related to psychological states or traits among or across providers and provider groups.\textsuperscript{137-139} The studies were published between 2014 and 2022, with all three studies using a cross-sectional design. Two of the studies looked at burnout, with one observing the association of burnout with organizational context and practice models,\textsuperscript{138} and the second study looking at burnout predictors among chairs of radiation oncology programs.\textsuperscript{137} The third study observed factors associated with job satisfaction among clinicians in a medical oncology program.\textsuperscript{139} All three studies used mailed or online questionnaires to collect and document outcome measures.

This category included discussion of stressors, level of exhaustion, organization characteristics that affect job satisfaction and burnout such as daily patient volume, role, communication domains, team structures, and workload support. Notable drawbacks to the included studies are the use of cross-sectional design and possible response bias from participants due to self-reporting measures.

This theme emerged from our reading of studies with some organizational process measurement. It is most closely aligned with the constructs of “knowledge, attitudes, beliefs of managers, providers, staff about organizational characteristics, policies, or processes” and “organizational climate” under the organizational culture subdomain of the Context domain. However, aspects of the team processes subdomain under the organizational Process domain also
apply, as does the “workforce” construct under the “other organizational outcomes” subdomain. As with other findings of incomplete overlap with the Integrated Framework, findings for this inductively identified theme point to variability within the organizational sciences field in how these ideas are named and classified.

**Guiding Question 2: Financial Metrics or Financial Performance**

Two studies measured financial metrics or financial performance.\(^{140, 141}\) Both used multi-year data and assessed the role of financial integration and incentives on cancer-care related outcomes (e.g., service utilization and spending). Studies in this group were generally published in more recent years (2016 and 2019) and focused on the association of the outcomes with the financial metrics of interest, using administrative claims data or payment data. Ownership status of physician practices and changes in Medicare payment rates were used as financial metrics. These studies used relatively large administrative datasets: one sourced from a large insurance company (Blue Cross/Blue Shield of Texas) and the other used nationally representative Medicare claims data.

Financial integration of billing through hospitals from private practices raised patient spending but did not improve quality of care.\(^ {142}\) Increasing physician fees in office-based practices resulted in an increase in procedures and spending.\(^ {141}\)

This theme may overlap with the “financial structure” subdomain of Context in the Integrated Framework (perhaps within the payment models construct), but financial metrics of performance are not specifically listed.

**Guiding Question 2: Impact of Training, Training Types, Workforce Capacity Assessments**

Two studies were categorized as observing the impact of training, training types, and workforce capacity assessments on cancer care delivery and outcomes.\(^ {143, 144}\) The studies used a cross-sectional design\(^ {143}\) and a retrospective cohort design,\(^ {144}\) and all were published between 2012 to 2018. The cross-sectional study observed the effect of team-based reflection on quality improvement implementation where primary practice team members were given training on reflective adaptive processes.\(^ {143}\) The retrospective cohort study looked at the association between provider and team experience and patient survival, utilization, and adherence to guidelines, focusing on workforce capacity with quality of care.\(^ {144}\)

Studies in this category included discussion of team-based communication, team-based motivation and process reflection, team structure, and relationships (e.g., shared consultations) on quality of care. Measures were obtained through interviews with primary care team members, patient charts, or medical claims data. Only one study used a state-wide cancer care database (North Carolina Central Cancer Registry),\(^ {144}\) while the cross-sectional study recorded interviews,\(^ {143}\) which may limit the generalizability and reproducibility.

Although there is a “capacity” subdomain of Context in the Integrated Framework, it refers to human and capital assets and resources. This emergent theme described more a process of developing skills and capacity in the workforce, specifically for communication and quality improvement. The “organizational learning” and “team processes” subdomains of Process also overlap with this inductively identified theme.

**Guiding Question 2: New Roles or Team Composition**

Two studies were categorized to the theme of new roles or team composition.\(^ {145, 146}\) The studies were published in 2017 and 2019, and used a cross-sectional\(^ {146}\) and a pre/post design.\(^ {145}\)
Both studies investigated effects of changing team composition, including the incorporation of specialties in team-based care. The cross-sectional study observed the impact of a pharmacist-embedded model on improving quality measures, integrating a full-time pharmacist as part of a team-based comprehensive care program. The prospective cohort study looked to quantitatively describe palliative care referral rates and symptom burdens along with implementing a palliative care referral system in a single cancer center, with the objective of increasing integration of palliative care services in ambulatory oncology.

Together, these studies assessed quality measures such as patient vaccination rate and cancer screening rates, the use of tools to characterize symptom burden, and under-utilization of services by oncologists. Outcomes and measures were collected through use of medical records and the administration of the Edmonton Symptom Assessment System questionnaire. A notable drawback to the studies is they were only conducted in a single center and did not report on participant demographics, which limit the generalizability.

Although not explicitly listed in this way, this revealed theme would likely be a Context domain element under staffing and skill-mix in the Integrated Framework.

Guiding Question 2: Safety and Safety Culture

Two studies related to safety and safety culture. One study reported on the implementation of a comprehensive safety culture program and its association with staff safety knowledge and cancer care outcomes. The other study assessed change in near-miss rates associated with the implementation of a Crew Resource Management program. The studies in this group were published in 2014 and 2016. Designs employed were simple pre/post comparisons, primarily descriptive -- using simple statistics based on survey or documented records of outcome measures.

This category of studies discussed five organizational concepts and measures representing process and context, including: implementation of an educational program; implementation of electronic peer review; frequency of safety communication by leadership; frequency of safety assessment; and implementation of resource management program. Notable drawbacks in these studies were that one was conducted in a single center, which reduces generalizability, while the other study did not report negative findings or study limitations which could be an indicator of reporting bias.

With reference to the Integrated Framework, a state of organizational safety itself likely fits under the “other organizational outcome” subdomain within the Outcomes domain. Safety culture would be classified under the “organizational climate” construct within the “organizational culture” subdomain of Context.

Guiding Question 2: Organizational Readiness

One study considered a kind of organizational readiness. The cross-sectional study was published in 2021 and focused on the readiness of United States cancer care programs to provide age-friendly care and treatment. This study included in the discussion an overall measure representing processes and context including: organization capacity to assess dementia, frailty, and track falls, nurse navigation, provision for non-medical programs for older adults, and service comprehensiveness. Outcomes and measures were obtained through a survey sent to ambulatory oncology program administrators, directors, chief medical officers, and practice administrators. Notable drawbacks of this study were its cross-sectional design and a low response rate, which affects its generalizability.
This theme is not explicitly called out in the Integrated Framework but might be considered a blend of the subdomains of “capacity” and “organizational culture” under the Context domain, again possibly pointing to variations in conceptualization within organizational terminology.

**Guiding Question 3: Which healthcare organization context and process characteristics have been examined in studies assessing the delivery of cancer screening, diagnosis, and treatment?**

**Main Findings on Guiding Question 3**

We sought to detail which healthcare organization context and process characteristics have been examined in studies of cancer screening, diagnosis, and treatment, specifically by recounting design, setting, population, organizational measures, and primary and secondary clinical outcomes. Study designs among the selected studies included mostly prospective or retrospective cohort designs, and mostly measured organization- or unit-level outcomes rather than patient-level outcomes. We considered studies within the broad classifications of cancer screening, diagnosis, and treatment and noted some differences by those foci: screening-related studies were mostly categorized thematically as total care model studies and tended to be conducted in general medical settings (i.e., not cancer-specific), which makes sense for screening. Treatment-related studies covered a greater variety of settings, themes, and cancer types. Across all the studies, measured organizational characteristics tended to be the less complex notions of size, payment program participation, or patient-population demographics. Few studied in-depth organizational concepts of teamwork, provider attitudes and traits, or centralization.

**Guiding Question 3a: For each identified study, what were the following: i) Study design; ii) Setting; iii) Population; iv) Measures of organizational context and process characteristics (e.g., measurement instrument name and type, number of items, references, etc.); and v) Primary and secondary clinical outcomes studied?**

We identified 25 studies that had strong relevance to the Guiding Questions and featured a description of the organizational concepts involved. The studies addressing Guiding Question 3 were spread primarily between addressing screening (12 studies) and treatment (9 studies) outcomes, while two studies explicitly considered diagnostic outcomes. Two studies considered the outcome of comprehensive cancer care. In each outcome category, we summarize study designs, settings, populations, the primary and secondary clinical outcomes studied, and the measures of organizational context and process used in these studies (Tables 8-9 and Figures 5-6). Fifteen studies among those meeting criteria for Guiding Question 3 directly associated healthcare organization context and process characteristics with clinical outcomes of cancer screening, diagnosis, or treatment. Twelve tested organizational characteristics against a clinical primary outcome, and four included a clinical secondary outcome.
<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Characteristic type</th>
<th>Number of studies</th>
</tr>
</thead>
<tbody>
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<td>Study design</td>
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<td>Prospective cohort</td>
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<tr>
<td></td>
<td>Retrospective cohort</td>
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<td>Cross-sectional</td>
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<tr>
<td></td>
<td>Longitudinal qualitative case studies</td>
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</tr>
<tr>
<td></td>
<td>Comparative case study</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Pre/post comparison</td>
<td>2</td>
</tr>
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<td>Cancer care</td>
<td>Screening</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Diagnosis and Treatment</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Treatment</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Comprehensive cancer care</td>
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</tr>
<tr>
<td>Level of organization</td>
<td>Individual practice or clinic</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>National level of integrated delivery system (or multi-institutional system)</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Entity within a hospital</td>
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</tr>
<tr>
<td></td>
<td>Hospital</td>
<td>3</td>
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<tr>
<td></td>
<td>Regional level of integrated delivery system (or multi-institutional System)</td>
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</tr>
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<td></td>
<td>Not reported</td>
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<td>Setting</td>
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</tr>
<tr>
<td></td>
<td>Accountable care organizations</td>
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</tr>
<tr>
<td></td>
<td>Colorectal cancer control program awardees and partner clinics</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Community cancer center</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Includes academic centers, community cancer programs, other specified cancer programs</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Medical oncology practices</td>
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<tr>
<td></td>
<td>National comprehensive cancer center</td>
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<tr>
<td></td>
<td>Non-cancer center/General medical center</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Non-hospital-based office, hospital-based, community health center</td>
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<tr>
<td></td>
<td>American Hospital Association survey pool</td>
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<td></td>
<td>Outpatient cancer center</td>
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<td></td>
<td>Psychiatric rehabilitation program</td>
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<td>Veterans Affairs medical center</td>
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<td>Veterans Affairs medical centers and community-based outpatient clinic</td>
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<tr>
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<td>Data collection methods</td>
<td>Primary quantitative data collection</td>
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<td>Secondary data analysis</td>
<td>9</td>
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<td></td>
<td>Interviews</td>
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<td>Interviews and secondary data analysis</td>
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<td></td>
<td>Assessments/Questionnaires</td>
<td>1</td>
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<tr>
<td></td>
<td>Survey</td>
<td>1</td>
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<tr>
<td>Primary outcomes</td>
<td>Accreditation</td>
<td>1</td>
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<tr>
<td></td>
<td>Adherence to best practices</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Cancer screening rates</td>
<td>6</td>
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<tr>
<td></td>
<td>Care utilization</td>
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</tr>
<tr>
<td></td>
<td>Collaboration and teamwork</td>
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</tr>
<tr>
<td></td>
<td>Complications or adverse events</td>
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</tr>
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<td></td>
<td>Organizational factors and processes</td>
<td>8</td>
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<td>Physician enrollment in National Cancer Institute Community Clinical Oncology Program</td>
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<td></td>
<td>Workload</td>
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<td>Secondary outcomes</td>
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<td></td>
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<td></td>
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<td></td>
<td>Complications or adverse events</td>
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<tr>
<td></td>
<td>Number of surveillance radiology studies</td>
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<td>2</td>
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<td>Quality of care</td>
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Figure 5. Studies on Guiding Question 3 by publication year
Table 9a. Healthcare organizational context characteristics in studies on Guiding Question 3 related to screening, diagnosis, or treatment of cancer (N=23)

<table>
<thead>
<tr>
<th>Organizational characteristics reported in the included studies*</th>
<th>Number of Screening Studies (7 studies total)</th>
<th>Number of Diagnosis/Treatment Studies (1 study total)</th>
<th>Number of Treatment Studies (5 studies total)</th>
<th>Number of Studies on Other or Multiple Aspects of Cancer Care (1 Study Total)</th>
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<td>Academic arrangements</td>
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<td>Health information technology infrastructure</td>
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<td>Knowledge, attitudes, beliefs of managers, providers, staff about organizational characteristics, policies, or processes</td>
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<td>Location</td>
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<td>Service comprehensiveness</td>
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<td>Size and volume</td>
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<td>Staffing and skill-mix</td>
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<tr>
<td>Other- physical Assets, Human Capital</td>
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</table>

*Definitions are listed in Table 1a, Total exceeds the number for overall because studies could be included for more than one characteristic Gray area – 0 studies

Table 9b. Healthcare organizational process characteristics in studies on Guiding Question 3 related to screening, diagnosis, or treatment of cancer (N=24)

<table>
<thead>
<tr>
<th>Organizational processes reported in the included studies</th>
<th>Number of Screening Studies (12 studies total)</th>
<th>Number of Diagnosis/Treatment Studies (2 studies total)</th>
<th>Number of Treatment Studies (8 studies total)</th>
<th>Number of Studies on Other or Multiple Aspects of Cancer Care (1 Study Total)</th>
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<td>Care coordination</td>
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<td>Care management processes</td>
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<td>Communication</td>
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<tr>
<td>Participation in state or national quality improvement collaboratives</td>
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<td>Use of quality improvement or other improvement methods</td>
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<td>Other- cross-sector partnerships, multilevel interventions, provider/team training</td>
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<td>0</td>
<td>1</td>
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Total exceeds the number for overall because studies could be included for more than one characteristic Gray area – 0 studies
Guiding Question 3a: Screening Outcomes

Twelve of the studies addressing Guiding Question 3 focused on cancer screening. Thematically, the largest number of studies in this group (4) addressed participation in total care delivery models, such as if participating health centers were more likely to implement organizational process changes, and the effect of participation in a total care delivery model on healthcare utilization and quality. These studies were conducted between 2011 and 2022, with nine published up to 2016 and three since 2018.

Screening-related studies included a range of designs, from an RCT\(^90\) to prospective\(^113\) and retrospective cohort designs,\(^ {95, 100, 106, 153-155} \) to cross-sectional inquiries,\(^ {89, 118, 156} \) and a comparative case study design.\(^ {127} \) The number of participating organizations ranged from 2 to 167. The RCT\(^90\) was conducted in an academic cancer center and one other study was conducted in a community cancer center.\(^ {100} \) Other studies were set in general medical settings,\(^ {89, 103, 106, 153-159} \) including two Veterans Affairs centers\(^ {118, 157} \) and one psychiatric rehabilitation center.\(^ {152} \)

Regarding populations studied, the screening-related studies were more heavily focused on patients with a history of cancer\(^ {95, 100, 106, 154-156, 158-160} \) versus other populations. The cancer types/sites considered were breast,\(^ {83, 89, 91, 153-155, 158} \) cervical,\(^ {83, 89, 91, 95, 153-155, 158} \) colon, rectal and colorectal,\(^ {83, 91, 153-155, 158-160} \) and, less often, lung.\(^ {118, 154, 155} \)

The screening-related studies related to Guiding Question 3 measured primary outcomes of colorectal screening rates;\(^ {90} \) probability of cancer screening;\(^ {150} \) reception of cancer screening reports;\(^ {104} \) breast cancer screening percentage;\(^ {116} \) cervical, breast, and colorectal cancer screening;\(^ {152} \) percentage of patients who received cervical cancer screening;\(^ {103} \) and percentage of men at risk who received prostate specific antigen screening.\(^ {113} \) Five studies included screening outcomes as secondary rather than primary measures.\(^ {83, 91, 154, 158, 159} \) For these studies, organizational process, structure, or context measures were the primary measures, including chronic care implementation and teamwork;\(^ {100} \) PCMH level I recognition;\(^ {83} \) organizational factors (physical assets, human capital [staff mix], organizational competencies [authority in staff hiring, determining primary care components and processes, communication and
cooperation], utilization of computerized patient record system, quality improvement orientation); use of comprehensive systems strategies; and finally, forming partnerships, sharing performance data, and establishing quality improvement process and infrastructure. Not all studies listed secondary outcomes, but four specified additional screening or treatment measures.

In the screening-related studies, the measures of organizational context included most commonly were size/volume, payment model and payment program participation, and demographics and financial status of patient panel. Less-often measured were organization type, PCMH/not, affiliation, organization location, staffing and skill mix, service comprehensiveness, health information technology infrastructure, physical assets and human capital, and cross-sector partnerships and multilevel interventions.

The measures used in these studies to evaluate organizational processes included: screening processes, participation in state or national collaboratives, care management processes, and use of quality improvement or other improvement methods (e.g., lean six sigma, Comprehensive Unit Safety Program). As an example, one study listed as contributing measures: access and communication, patient tracking and registry, care management, patient self-management support, electronic prescribing, test tracking, referral tracking, performance, and advanced electronic communication. Instruments, where available, along with further study details, are described in Appendix D, Evidence Tables D-5 through D-8.

Guiding Question 3a: Diagnosis and Treatment Outcomes

Two studies that included both diagnostic and treatment outcomes met criteria for Guiding Question 3. The 2019 study used a retrospective cohort design in more than 1300 academic, community, and other specified cancer programs to study whether accreditation was associated with improved performance on primary outcomes of compliance with six breast cancer diagnosis and treatment quality measures for adjuvant treatment, needle/core biopsy, and breast conservation therapy. We thematically categorized accreditation as an organizational characteristic that is a response to external or environmental influences. The study’s organizational measures included: organization type; size and volume; geographic characteristics (patient distance to facility, rural/urban); location (in terms of United States Census region); and demographics and financial status of patient panels. No detailed instrumentation was provided with the study. The 2022 study was thematically categorized in how organizational characteristics or processes affect workload, workflow design, or work performance, comparing the improvements of molecular order sets and precision before and after the roll-out of a pilot program improving precision oncology workflows. The study was conducted in a regional cancer network and included organizational process such as use of hospital information technology systems, referral processes, and clinical decision support. Further study details are described in Appendix D, Evidence Tables D-9 through D-12.

Guiding Question 3a: Treatment Outcomes

Nine studies addressing Guiding Question 3 examined cancer treatment outcomes. Studies of treatment-related topics covered a range of thematic categories, including: impact of total care delivery models; workforce training or capacity assessment; implementation projects and barrier assessments; structural or resource characteristics; and workload, workflow, or work performance. These studies were published between 2012 and 2022, most (6) since 2017. The designs for treatment-related studies were mostly retrospective or prospective cohort studies (5)
and cross-sectional (3) designs. One was a longitudinal case study design. Most studies used cancer-specific settings: outpatient or community cancer centers; medical oncology practices; Colorectal Cancer Control Program awardees and partner clinics; an academic cancer center; and a hospital radiation oncology department. Two studied noncancer settings including a general medical hospital or hospital systems. One setting was left unspecified. Given the nature of these studies as focusing on treatment, all examined populations of patients with a history of cancer or providers/organizations treating patients with cancer. Cancer types examined included: breast, colon, rectal or colorectal, lung, non-Hodgkin’s lymphoma, and sarcoma. In two studies the type of cancer was not specified, or only described as “cancers requiring surgery.”

The treatment-related studies used primary or secondary outcomes at the organization level for the most part. These included measures of: adherence to quality care processes or indicators, improvement of quality scores, underuse of breast cancer care, workload and procedural compliance and time-to-scenario completion, organizational factors or conditions (e.g., electronic health record use, leadership support, patient-centered culture, information sharing), serious errors reaching the patient, and physician enrollment in the NCI CCOP. Two studies focused on patient-level outcomes. One had as its primary outcome adherence to guidelines and included secondary outcomes of 5-year overall survival, number of surveillance radiology studies, any unplanned hospitalization, and any emergency department visit. Another had a patient-level primary outcome of 30-day postoperative complications and a secondary outcome of 30-day mortality and readmissions.

As shown in Table 9, the organizational context measures evaluated in the treatment-related group included the typical consideration of size and volume, organization type, as well as demographics of patient panels, affiliation, location, and service comprehensiveness [see Table 1a for definition]. With greater novelty, some assessed centralization (e.g., how consolidated units are or decision-making is), provider and team experience, organizational factors such as integration of evidence-based interventions, adoption of team-based approach, leadership support, and knowledge, attitudes, beliefs of managers, providers, staff about organizational characteristics, policies, or processes. Examples of measurement and instrumentation along with other study details are included in Appendix D, Evidence Tables D-13 through D-16.

As also shown in Table 9, the cancer treatment-related studies used several organizational process measures, including: care management processes, participation in state or national quality improvement collaboratives, use of quality improvement or other improvement methods (e.g., Lean Six Sigma, Comprehensive Unit Safety Program), provider/team training, and workload as determined by hospital patient records and physician scheduling records. Measurement of organizational phenomena within a category varied substantially, however. For example, care management processes were measured as a module score related to core processes, processes specific to cancer-type or disease-specific processes, processes relating to supportive care, and processes involved in end-of-life care. In another study, care management processes were measured more as guideline compliance (e.g., consultation with a medical oncologist for stage III patients and initiation of chemotherapy within 120 days of surgery for colon cancer).

**Guiding Question 3a: Comprehensive Cancer Care**

Two studies met the criterion for Guiding Question 3 but did not consider screening, diagnosis, or treatment specifically. Instead, they addressed organizational influences on...
comprehensive cancer care. Thematically, the studies were classified under leadership\textsuperscript{136} and workload, workflow design, or work performance.\textsuperscript{129} The 2022 study focusing on leadership sought to test effects of an EBP leadership immersion intervention on EBP attributes over time among two cohorts of leaders at one national comprehensive cancer center. It relied on a prospective cohort design and studied providers rather than a patient population.\textsuperscript{136}

The primary outcomes of the study focusing on leadership were EBP knowledge, implementation, and readiness assessed via a Likert-scaled survey.\textsuperscript{136} The prospective cohort study which looked at the impact of an EBP leadership program used EBP beliefs and implementation scales such as: the EBP Knowledge Scale (25 multiple choice and 13 true/false questions), EBP Belief Scale (16 item scale), EBP Competency Scale (24 skills evaluated on 4-point Likert scale), EBP Implementation Scale (18-item frequency scale), and The Organizational Culture and Readiness System-wide Integration of EBP Scale. Specific items assessed knowledge, attitudes, and beliefs of managers, providers, and staff about organizational characteristics, policies, or processes. Instruments included the EBP Knowledge Scale; EBP Belief Scale; EBP Competency Scale; EBP Implementation Scale; and The Organizational Culture and Readiness System-wide Integration of EBP Scale.\textsuperscript{136}

The 2022 study focusing on workload, workflow, or work performance looked at identifying and addressing inefficiencies in a high-volume radiation oncology clinic. This was done by comparing the before and after utilization of process maps and optimizing patient flow.\textsuperscript{129} The study looked at waiting room times, waiting time for physicians, time in room to arrival of physician, and total cycle time as the primary outcomes. The measures were obtained from electronic health records and in-person observations. No further details were given on instrumentation. See Appendix D, Evidence Tables D-17 through D-20 for additional details on instrumentation.

**Guiding Question 4: What are the evidence gaps and future research needs?**

**Main Findings on Guiding Question 4**

To address what evidence gaps and future research needs are, we revisited advice of the Key Informants, our own overview of problems in adequately assessing organizational characteristics, and the results of our review of the literature. We identified the utility and importance of measuring organizational phenomena. We also highlight the need for additional high-quality measurement of organizational constructs, a lack of standardized measures, and a need for more complex and in-depth organizational measurement to improve understanding of organizational influences on cancer care.

**Guiding Question 4a: What are the evidence gaps in the current understanding of how organizational characteristics impact cancer care delivery and cancer-related outcomes?**

Based on input of KIs and our review of the literature on organizational characteristics that influence cancer care delivery, we identified several gaps and critiques regarding the relationships of organizational structure, context, and processes to how cancer care is delivered and the outcomes of screening, diagnosis, and treatment. KIs cautioned that the influence on organizations and patient care of the COVID-19 pandemic are just beginning to appear in the literature and questions remain about how organizations can remain vigilant and better prepare
for future shocks to the system. In addition, they noted that terminology is not used consistently in the literature. As an example, "organization structure" is used inconsistently in the literature, having both a broad connotation following Donabedian and a more specific one referring to "the segmentation of an organization into sub-units and the integrating mechanisms that are intended to span those sub-units." Some organization characteristics would be considered structure by some authors and not by others. In turn, lack of consistent terms leads to difficulty in measurement due to the range of interpretations (e.g., creating ambiguity in survey responses).\textsuperscript{168} Furthermore, KIs noted that additional attention to defining the unit of analysis in relevant frameworks may enhance their utility. For example, frameworks intended to represent person-level phenomena may be inappropriately assumed to apply to organizational decision-making. They also pointed to some ambiguity in traditional definitions of organizational types, e.g., that academic and community settings are becoming more homogenous as community hospitals expand into academic roles. KIs also pointed to the importance of considering temporal factors and structural and temporal complexity in current and future examinations of organizational characteristics. For example, team dynamics and leadership buy-in are understood to change over time but may be measured only once to minimize respondent burden; the resultant understanding of the influence of these organizational characteristics would thus be incomplete.

Our review of the literature highlighted other important lessons. This report was not designed to explore the extent to which the field includes and explores a broader set of cancer-related outcomes including palliative care, end-of-life care, and survivorship. For example, notably omitted by our predetermined scope is the Nekhlyudov survivorship framework.\textsuperscript{169} Further, few studies focused on diagnosis as an outcome. These additional cancer-related outcomes are vital to understanding the full continuum of the cancer experience. Indeed, the trajectory of disease has become more varied with the advent of new technologies and medications, as well as the variation in people’s health at any age.

In general, explicit reliance on theory or theoretical frameworks was unusual across the reviewed studies (e.g., Table 7 is somewhat sparse). We also found a wide range in the rigor of measurement and reporting of organizational characteristics. Notably, organizational ownership was reported in only three cases among the 23 selected studies for Guiding Question 3. We noted that studies may connect organizational characteristics and cancer outcomes but may not investigate mechanisms by which these effects are produced.\textsuperscript{103} Theory is needed to guide interventions to accommodate or modify features of organizational context and processes based on clear understanding of mechanisms underlying the relationship between organizational characteristics and cancer outcomes. Theory would help to address the decisional dilemma we raised--of how we can define and measure organizational characteristics to improve research on cancer care delivery and enhance cancer care and outcomes--by identifying interventions that are likely to address the mechanisms underlying organizational characteristics’ influence on cancer outcomes.

Studies we reviewed provided further insight into the state of the current literature. The studies differed in their approaches to establishing pathways from an intervention (e.g., intervention, care model, or program) to organizational process changes, to organizational outcomes, to clinical process changes, and to cancer care outcomes. Those with the most rigorous study designs tended to measure participation in an intervention (as the only organizational characteristic) and cancer care process measures (e.g., screening rates) compared to a control group. The studies with cross-sectional approaches measured intermediate points or mediators in the pathways (e.g., teamwork, access/communication),\textsuperscript{100, 103} such as multiple organizational concepts and measures representing structures, processes, and context. In
addition, the studies that found no association between primary outcomes and organizational characteristics explored organizational characteristics more often, including as mediators, in their analyses (for example, EHR use or patient tracking and registry functions).\textsuperscript{83, 108} This suggests that authors recognize the disruptive or promotive effects that organizations and systems have on efforts to provide cancer care.

Other insights on gaps in the literature included a need for additional study on such topics as: multilevel interventions that consider provider-level factors such as training and practice-level factors including system design;\textsuperscript{89, 123} the effects of accreditation on oncologic and patient-reported outcomes;\textsuperscript{133} the effects of providing formal EBP education to healthcare leaders;\textsuperscript{136} the impact of specific policies and economic incentives for specific organizational design choices such as centralization (consolidation of delivery sites) of care delivery;\textsuperscript{151} and wide performance gaps that remain in some specific clinical areas.\textsuperscript{115} In particular, the relative lack of organizational interventions such as longitudinal leadership training, institution of a quality management infrastructure, or a total care model, specifically for cancer care may be due to the difficulties of linking these interventions to outcomes and therefore, of obtaining funding for such research.

**Guiding Question 4b: What methodologic approaches or measurement tools are needed to better understand the impact of organizational context and processes on the delivery of and outcomes associated with cancer screening, diagnosis, and treatment?**

Research conducted to date reflects both the opportunities and challenges in assessing organizational characteristics. In their review of cancer care delivery research protocols from the National Cancer Institute (NCI) Community Oncology Research Program (NCORP), Weaver et al. found that assessment of organizational characteristics was common (15/19 protocols, 79%), with 15 of 19 protocols including some assessment of structural characteristics, 14 protocols assessing at least one process measure, and 12 protocols assessing organization-level outcomes.\textsuperscript{3} While assessing organizational characteristics was common, the extent to which measurement approaches were based on organizational theories was more variable. Most intervention protocols referred to implementation science frameworks,\textsuperscript{3} which call on many, although often not all, relevant healthcare organization characteristics or theories. In addition, many measures used to assess organizational characteristics were investigator-developed, with little or no information about the instrument’s validity or psychometric performance.\textsuperscript{3}

Studies we reviewed suggested the need to develop tools and incentives to inspire improvement in cancer care delivery.\textsuperscript{115} We note that use of organizational theories to inform measurement approaches and tools is lacking in many cases. For example, organizational characteristics influencing the efficiency and quality of healthcare delivery involve multiple levels (e.g., clinic, system, and local community environment) and multiple perspectives (e.g., patient, provider, administrative),\textsuperscript{3} but often only one, or a few levels and/or perspectives are addressed. The result is a dearth of evidence that applies well to complex, real world circumstances. Also, changes in care delivery models are influenced by contextual characteristics within the organization, system, and community surrounding the organization.\textsuperscript{12} Measurement of these non-structural characteristics using externally valid constructs is difficult.\textsuperscript{3} For example, while measuring the number of beds and patient volume may be straightforward, assessing organizational change (e.g., readiness to adopt a new healthcare delivery model) is a much more complex undertaking, generally requiring labor intensive surveying or interviewing to
appropriately characterize. Even where solid instrumentation exists, *de novo* instruments are regularly developed due to lack of awareness of existing measures, differing disciplinary roots (e.g., psychology versus political science versus epidemiology) or to the incentives of grantsmanship and the emphasis on novelty and originality in academia. This proliferation of instruments, tools, and measure definitions makes it difficult to draw conclusions across the body of the literature. If measures are not comparable then one cannot easily compare effects of alternative interventions, for example.

Another measurement challenge stems from the findings that studies intended to measure the effects of organizational characteristics are often observational and highly variable in their design and methods. This finding can lead to difficulty homing in on generalizable information, especially since observational studies only provide evidence of associations between outcomes and organizational characteristics. Thus, stronger study designs are needed to measure associations, and any potential causal effects of organizational characteristics on cancer care outcomes.

Other challenges must be addressed when measuring the effects of organizational characteristics on cancer care. Multiple types of organizations are involved in cancer care delivery, ranging from solo practices to large integrated health systems; no standard description of these organization types exists or perhaps could even effectively be developed. The Commission on Cancer categorizes different types of cancer programs using facility type, program structure, services offered, and caseload, however, it only applies to centers that treat cancer (i.e., would not include the screening and, to a certain extent diagnosis, which are also addressed in this Technical Brief). For healthcare organizations more generally, the AHRQ Compendium paved the way by beginning a conversation about how to categorize different organization or system types. Further, since the same patient may be seen and cared for by multiple types of organizations, analyses that do not account for different organizational types and designs will sometimes compare apples and oranges. For example, one breast cancer patient may be diagnosed at a stand-alone imaging facility, have surgery at an academic medical center, and receive chemotherapy close to home at a small medical oncology practice. A different breast cancer patient may experience her entire cancer journey in a single, integrated healthcare delivery system. This continuum between modular and integrated care delivery raises questions within and across delivery systems regarding how care will be coordinated within and between systems, who will be responsible for providing supportive services such as psychosocial care, which arrangement stands to provide the highest quality and best patient experience, or whether there exists a consistent “best” type of organizational design. Even more concerning, this complexity exists within variable organizational contexts (i.e., geographic areas, degrees of rurality, and so on). Thus, tools to evaluate coordination of multidisciplinary care are needed to better measure the effects of organizational characteristics including contextual factors on cancer care.

Not only are better organizational instruments, measures, and tools called for in cancer-related research, but there may be a case for standardization of assessments, terminology, and characteristics. Development of standardized measures may increase ease of use and expand the population of researchers able to collect and analyze organizational influences on cancer care. One downside of standardization, however, is that it can also be used to exclude (from publication and from funding) those who do not use the standard measures, stifling creativity and potentially reducing diversity among researchers. As issues and perspectives change over time, standardization can cause stagnation of a field. As an example, we are more aware now than ever of how organizational features can produce inequities in care. Thus, the field must consider how
an increased focus on equity in health care delivery may alter the assessment of organizational characteristics and what aspects of organizations to attend to. The National Cancer Care Network (NCCN) has provided development of a report card assessing equitable care delivery, which could provide data to assess how this might change or improve over time.\textsuperscript{173}

Although patient characteristics can explain some variance in cancer care delivery and outcomes, much of the variance may be attributable to hospitals’ negotiating power with insurers, system-level infrastructure readiness, variable leadership and teamwork, organizational culture differences, or the clinical workforce network within the community. Therefore, efforts to measure the effects of organizational characteristics on cancer care must account for such variation in incorporating organizational characteristics, contextual elements, and processes in cancer care delivery research. Attention to methods improvement and standardization should perhaps precede investigations of which factors are most influential, in order to be sure such assessments are accurately made. Such efforts will help to enhance our knowledge of the context and environment where the care is delivered, improve the reliable performance of interventions as they are disseminated in new settings, and reduce waste in public investment. Ultimately, such knowledge will help to improve patient outcomes over the continuum of cancer care.
Summary and Implications

For Guiding Question 1, we abstracted 17 frameworks that covered a range of applications. Our comparison of these frameworks to the Integrated Framework supports the comprehensiveness of the Integrated Framework, though a few organizational characteristics (accessibility, readiness for change, experience with change, absorptive capacity, and complexity) were found in multiple abstracted frameworks and not explicitly identified in the Integrated Framework. In general, using a framework is essential for both research and practice, as it maps out the path by which outcomes are achieved. It describes our baseline understanding, governs measurement, guides the specification of expected relationships, and signals weak spots in organizational processes. Although the additional characteristics and phenomena we identified are important in other relevant frameworks, we did not compare their weight in producing outcomes with the existing Integrated Framework elements. Empiric testing would be the optimal method to make such claims. Further, it may be the case that the “missing” elements are included in the Integrated Framework under other terminology, which varies broadly across the cancer care and organizational fields. Providing the definitive explanation of terms, differentiating them from each other, and providing a complete classification scheme are important next steps as described more below. This Technical Brief findings provide important foundational information to support these discussions.

In the short-term, the Integrated Framework developers can use this Technical Brief’s information to determine whether these characteristics are indeed missing and, if so, whether they warrant being added. Overall, the review provides reassurance that key domains and subdomains are already included in the Integrated Framework. Much remains to be considered with respect to the terms, classification, and anticipated relationships among organizational elements.

For Guiding Questions 2-4, we identified 90 studies offering approaches to understanding how organizational characteristics are described, measured, and tested in the context of cancer care delivery. After topically categorizing and describing these studies thematically for Guiding Question 2, we selected 25 studies with strong fit to Guiding Question 3 and sufficiently detailed description of measurement to permit replication. We sorted these studies by whether they focused on screening, diagnosis, or treatment, and detailed their study designs, primary and secondary outcomes, and organizational characteristics measured. We also reviewed 33 grey literature resources and summarized 8 relevant briefs, reports, or white papers. Overall, we found that cancer-related studies that include organizational measures have used approaches that include quantitative, qualitative, and mixed methods seeking to achieve both formative and summative purposes, a full range of study designs from case studies to RCTs, and examine organizational topic areas including project implementation and barrier assessment, participation in total care models, and relationships of structural characteristics such as organizational type and size with patient- and organization-level outcomes. We provide a catalog of organizational measures that have been examined in the cancer care literature, noting little standardization of measures across studies and variation in terms used.

For Guiding Question 4, we enumerated gaps remaining in the literature and identified fruitful areas for future research. Among the themes identified were continuing challenges in effectively measuring organizational factors, opacity of our understanding of how the multilevel aspects of organizational context and process might affect care, and a lack of standardization of terminology or measures in organizational research on cancer care. Together these gaps lead to the conclusion that organizational features of the system are influential and useful to assess when
precisely defined, but currently remain poorly understood and present a prime area for elucidation through further research (Table 10).

Table 10. Summary, Implications, and Next Steps

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<th>Guiding Question</th>
<th>Summary and implications</th>
<th>Next steps</th>
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| GQ1              | • A framework is essential for both research and practice.  
|                  | • Findings largely support the Integrated Framework.  
|                  | • Variables for the Integrated Framework to consider (if not already included under different terminology):  
|                  | o Accessibility  
|                  | o Readiness for change  
|                  | o Experience with change  
|                  | o Absorptive capacity  
|                  | o Complexity  
|                  | • Considerations should be made for definitive:  
|                  | o Explanation of terms  
|                  | o Classification of schemes  
|                  | o Defining relationships among organizational elements  
| GQ2              | • Approaches that have been utilized include quantitative, qualitative, and mixed methods.  
|                  | • A wide range of study designs utilized including case studies, observational studies, and RCTs.  
|                  | • Organizational topic areas include:  
|                  | o Project implementation and barrier assessment  
|                  | o Participation in total care models  
|                  | o Relationships of structural characteristics  
|                  | • Further guidance needed, such as a compendium of measures, definitions, and measurement approaches.  
| GQ3              | • Organizational measurement areas include:  
|                  | o Size  
|                  | o Payment program participation  
|                  | o Demographics of the patient population  
|                  | o Teamwork  
|                  | o Provider attitudes  
|                  | o Centralization  
|                  | • Need for definition of terms and measures.  
| GQ4              | • Challenges in effectively measuring organizational factors.  
|                  | • Need for clarity of understanding on how multilevel aspects of organizational context and process affect care.  
|                  | • Lack of standardization of terminology.  
|                  | • Lack of standardization of measures in organizational research.  
|                  | • Additional investment needed to further the development and application of methods to study organizational characteristics.  
|                  | • Future investments should include:  
|                  | o Training in multilevel analyses  
|                  | o Structural equation modeling  
|                  | o Handling mediators and moderators in analyses  

GQ=Guiding Question; RCT = randomized controlled trial

Strengths and Limitations

To address the questions in this Technical Brief, we limited our literature search strategy to US-based cancer-related publications from 2010 forward (though Guided Question 1 included frameworks published prior to 2010 if mentioned in publications since 2010). We focused on US-based studies as the organization, financing, and delivery of health care in the US is unique. However, publications from prior to 2010, in the organization’s literature outside of cancer care delivery, and in other countries could have offered insights in addressing the Guiding Questions.

Despite these literature search restrictions, the broad literature search strategy resulted in many records. We used artificial intelligence (AI) to expedite the screening process. However, two reviewers screened 10% of the records, and this information informed the AI system’s review. In addition, a single reviewer evaluated 10% of the AI reviewed records to ensure accuracy and consistency. It is possible that studies that might have qualified for inclusion were
missed, but it is unlikely that, given the methodologic nature of this topic, missed studies would substantively alter our findings.

For Guiding Question 1, two reviewers determined eligibility of frameworks for inclusion. It was not always clear what constitutes a framework. For the purposes of this project, we defined an organizational framework as “a framework or organization of the characteristics used to evaluate healthcare organizations.” To be included, frameworks had to address multiple domains/subdomains of the Integrated Framework. Some topics were tangentially related but not included. For example, accreditation standards that evaluate organizational characteristics were generally not included. On the other hand, literature on multilevel research, if it included measurement of organizational characteristics, was generally included. Given that we found few characteristics in the 17 abstracted frameworks that were not already covered in the Integrated Framework, it is unlikely that any excluded frameworks would have substantially affected our findings. Arguably, some of the frameworks that were included could have been excluded. Again, this is a grey area.

Also, the comparison of the characteristics in the included frameworks to the Integrated Framework was subject to interpretation. While we are confident that the key concepts are covered, nuances in interpretation may vary. For example, the Integrated Framework includes the characteristic “financial solvency” whereas other frameworks included more specific characteristics such as profitability and liquid asset availability. Some specific terms might not be in the Integrated Framework but might be implied or incorporated in broader terms (e.g., the more specific “standard practice concerning patient contact” versus the more general “care management processes”). In addition, as noted previously, there is a lack of agreement regarding the definitions of key concepts in the field. For Guiding Question 1, Table 3, the abstracted categories and characteristics were taken directly from the papers to minimize the need to deduce framework components from the text. Some readers might question whether the characteristics abstracted truly qualify as organizational context or process. This ambiguity calls for further work to agree on terms and promote their use in further research, though such common terminology systems should not be used to limit intellectual diversity and innovation.

A second team member evaluated the comparison of the characteristics from the abstracted frameworks to the Integrated Framework so that the final column of Table 3 reflects the interpretation of two reviewers. However, all readers of the report can compare the characteristics listed in the third column of Table 3 to the Integrated Framework (Table 1a-1c) and make their own judgements about what is included and what may be missing.

For Guiding Questions 2-4, the chief limitation of this work was the need to involve a large team in screening, categorizing, reviewing, abstracting, and summarizing studies for feasibility, which may decrease consistency in how studies were categorized according to themes and what information was considered most relevant for reporting. We addressed this problem by using double review whenever possible, creating templates, and calibrating team members’ understanding through discussion of conflicts and subsequent rounds of review. Despite this limitation, having multiple perspectives on each stage of the process likely strengthened the rigor and reliability of our research processes. We also found the pursuit of recommended grey literature sources to be challenging. Some expert recommendations pointed to websites that included interesting materials and many products relevant to organizational characteristics, but that had marginal relevance to cancer care or had so many individual items that comprehensive assessment was not feasible. We addressed this problem by targeting non-published written reports, briefs and white papers that included organizational characteristics and specifically addressed cancer care. For Guiding Question 4, the limited focus on organizational
Next Steps

Guiding Question 1 sought to compare the Integrated Framework to the content of other frameworks associated with cancer screening, diagnosis, and treatment to evaluate whether key organizational characteristics are missing. The Guiding Question 1 findings largely support the comprehensiveness of the Integrated Framework, because the overwhelming majority of characteristics found in other frameworks are already included in the Integrated Framework. A few variables, most notably accessibility, readiness for change, experience with change, absorptive capacity, and complexity, were identified from other frameworks and are arguably not explicitly included in the Integrated Framework. The Integrated Framework developers should evaluate the relevance and importance of variables found in other frameworks, perhaps through an expert panel approach, and determine whether they warrant inclusion in the Integrated Framework. Otherwise, the Integrated Framework should not require substantial revision. Further work could undertake a process of definitively describing, classifying, differentiating, serially ordering, and ultimately testing of organizational concepts as related to cancer care.

The goals of Guiding Questions 2-4 were to describe the field of current organizational research in the context of cancer care, to assess the state of measurement in the field and to identify gaps in the available literature. The findings for Guiding Questions 2-4 suggest that guidance on organizational characteristics used in cancer care research to date will permit progress toward our consolidating and applying best evidence in this complex and changing care area. Guidance in the form of a compendium of measures, suggested definitions and measurement approaches would be a welcome support to researchers who recognize the importance of organizational influences but are not sure how to manage the enormity of the task of meaningfully measuring them. Such a compendium could encourage rigorous research without stifling creativity in developing new and better measurement approaches to a wide array of important organizational concepts. Similarly, generation of scientific and/or publication guidelines (e.g., CONSORT) for these kinds of studies could prompt cancer researchers on reporting expectations that would make the consolidation of knowledge easier in the future.

NCI and AHRQ could advance the field by convening an expert panel to review the Integrated Framework, this Technical Brief, and other sources and debate the included elements, final terminology, best practice measurement, and anticipated relationships among the elements included in the Integrated Framework. This could be conducted as a Delphi process in several rounds with a prioritization process that includes consideration of strength of anticipated associations, feasibility of measurement, and commonality in systems today. The findings of the panel could form a compendium of organizational phenomena that influence cancer screening, diagnosis, and treatment, possibly adding the important focus of survivorship (the latter of which may in fact implicate a different set of organizational concerns). Once a “state of the art” is defined, NCI alone or in collaboration with other parts of NIH, AHRQ and the Veteran’s Administration could consider sponsoring a conference, similar to the NCI’s pre-pandemic conference on Organizational Research in Healthcare, to disseminate findings and engage a broader array of researchers and other audiences in the work.

Other recommendations include additional investment to advance the development and application of methods to study organizational characteristics. Such investment could include training in multilevel and hierarchical analyses, structural equation modeling, and handling mediators and moderators in analyses; efforts to change other training (e.g., in organizational
science) and mentorship; incentives for multilevel/organizational interventions; and improvement of the caliber of scientific review in this arena, are all potential outcomes of this effort that could be realized.
References

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