

# Determining the Value-on-Investment of Provider-to-Provider Virtual Consultation for Cancer Care

David I. Shalowitz, MD, MSHP<sup>1,2</sup> , Bryan Arkwright, MHA<sup>3,4,5</sup>  and Emily E. Bunce, MD<sup>6</sup>

<sup>1</sup>West Michigan Cancer Center, Kalamazoo, Michigan, USA; <sup>2</sup>Collaborative on Equity in Rural Cancer Care, Kalamazoo, Michigan, USA; <sup>3</sup>Cromford Health, Charlotte, North Carolina, USA; <sup>4</sup>Wake Forest University School of Law, Winston-Salem, North Carolina, USA; <sup>5</sup>Partners in Digital Health, New York City, New York, USA; <sup>6</sup>Section on Maternal-Fetal Medicine, Department of Obstetrics and Gynecology, Wake Forest School of Medicine, Winston-Salem, North Carolina, USA

Corresponding Author: David I. Shalowitz, Email: david.shalowitz@gmail.com

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## Abstract

**Background:** Access to high-quality cancer care in the United States remains a challenge in part due to a geographic mismatch between patients with cancers and the oncologic specialists best able to serve them. There is therefore an urgent need to develop communication strategies that allow oncologists to determine which patients might benefit from referral for subspecialty cancer care and to allow subspecialists to guide care remotely when patients are unable or unwilling to travel. Unfortunately, virtual consultation between clinicians has been understudied and likely underutilized in cancer care. Health systems may be hesitant to implement a virtual consultation program without data on such a program's value.

**Research design:** We outline a framework for calculating the value on investment (VOI) for a provider-to-provider virtual consultation framework to improve geographic access to cancer care. For each element of VOI, we suggest specific outcomes that health systems might utilize to determine the value of implementing virtual provider-to-provider consultation.

**Results:** Elements of VOI include direct and indirect revenue, institutional halo effect, hospital-based care, infrastructure considerations, subspecialty resource utilization, continuity of care, patient-reported outcomes, clinical trial enrollment, and program monitoring and quality improvement.

**Conclusion:** Implementation of virtual consultation between general and subspecialty oncologists offers health systems the potential for substantial VOI, largely through improving clinical outcomes by optimizing the resources involved in patients' cancer care.

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Access to high-quality cancer care in the United States remains a challenge in part due to a geographic mismatch between patients with cancers and the oncologic specialists best able to serve them. For example, although the standard of care for patients with gynecologic cancers includes consultation with a subspecialist gynecologic oncologist,<sup>1-4</sup> approximately 15 million women have geographic barriers to care<sup>5,6</sup> and are thereby less likely to receive guideline-adherent care and at risk for worse cancer-related survival.<sup>7</sup> Patients with geographic barriers to care may also be less likely to receive high-quality treatment for breast,<sup>8</sup> colon,<sup>9</sup> rectal,<sup>10</sup> esophagegastric,<sup>11</sup> and lung cancers.<sup>12</sup>

There is an urgent need to develop communication strategies that allow oncologists to determine which patients might benefit from referral for subspecialty cancer care and to allow subspecialists to guide care remotely when patients are unable or unwilling to travel for cancer care. Virtual consultation between clinicians, without direct patient involvement, has its origins in the common, somewhat informal, “curbside” consultation process.<sup>13</sup> However, this process has become more formalized in multiple settings, including synchronous (i.e., “live”) virtual consultation between rural primary care providers and specialists in the University of New Mexico's Project ECHO<sup>14</sup> and asynchronous (i.e., “store-and-forward”)

consultation between primary care providers and specialists via the Association of American Medical Colleges' Project CORE.<sup>15</sup> Unfortunately, virtual consultation between clinicians has been understudied and likely underutilized in cancer care.<sup>16</sup> Barriers to the implementation of this modality of cancer care have not, to our knowledge, been studied; however, health systems may be hesitant to implement a virtual consultation program without data on such a program's value.

In this article, we outline a framework for calculating the value on investment (VOI) for implementing a provider-to-provider virtual consultation framework to improve geographic access to cancer care. Importantly, we use the concept of VOI rather than "return on investment" in recognition that virtual provider-to-provider consultation has substantial value and benefit to patients, community providers, oncologists, and larger healthcare ecosystems beyond revenue generation.<sup>17</sup> This framework considers VOI for multiple stakeholders and may be useful for both institutional decision-making and trial design. For each element of VOI, we suggest specific outcomes that health systems might evaluate to determine the value of implementing virtual provider-to-provider consultation. This work is exempt from Institutional Review Board review, as it does not report on human subject research. For the same reason, informed consent is not applicable.

Telemedical consultation between rural clinicians and subspecialist oncologists (i.e., "provider-to-provider" consultation) has the potential to offer patients the benefit of subspecialty guidance in their care without the need for an additional in-person or virtual visit. Virtual consultation with clinician colleagues can assist community oncologists in triaging patients to initial medical or surgical management, screening for enrollment on a clinical trial and selecting next steps for challenging cases. This use of telemedicine can be helpful to health systems seeking to improve digital health equity for cancer care by decreasing geographic access disparities. Although derived from the ubiquitous practice of curbside consultation, utilization of telemedicine to formalize virtual consultation allows health systems to standardize the consult process, generate and track revenue, implement quality improvement, and facilitate electronic transfer and evaluation of patient data.

Virtual provider-to-provider consultations may be conducted via either synchronous (i.e., real-time) or asynchronous (i.e., store-and-forward) approaches. For example, synchronous consultation permits virtual tumor boards involving community oncologists and colleagues at a referral center for treatment planning and clinical trial enrollment; asynchronous consultation allows a community surgical oncologist to upload imaging for review to determine whether a patient requires the resources of a high-acuity surgical center, or whether a procedure may

reasonably be performed locally. In the framework below, we primarily consider the specific case of virtual consultations between general and subspecialty oncologists, though the framework may be applied to other consultative relationships in cancer care, including communication between oncologists and primary care providers.

## Elements of Value on Investment

### *Direct Revenue*

Current regulations under the Centers for Medicare and Medicaid Services (CMS) permit direct billing for time spent on provider-to-provider virtual consultation, even if patients are not directly involved (Table 1). Both general and subspecialty oncology practices should consider the financial benefit accruing from the direct revenue generated, balanced against the administrative cost of billing. For both practices, billing may partially offset the effort needed to initiate, review, and communicate the results of the consultation. Consulting centers should consider that there may be a logistical burden associated with collecting insurance or billing information for patients who are otherwise not established within their health system. Potential revenue generated by direct billing for virtual consultations should be collected prospectively during the implementation of provider-to-provider virtual consultation, as should the cost for various referral centers to establish a billing relationship for patients not previously seen. Attention should be paid to the expected payer mix for the patient population involved in virtual consultations, as reimbursement may vary depending on the extent to which payer parity has been implemented locally for telemedicine services.

When a provider-to-provider consultation is billed directly, the majority of revenue from patients who benefit from virtual consultation will come from oncology services and procedures delivered in person. Importantly, both originating community oncology practices and subspecialty centers may realize the benefit. Subspecialty centers may gain patient volume from practices otherwise not likely to refer for consultation or transfer care, and community oncology practices may, after a virtual consultation, be able to retain patients that otherwise would have unnecessarily transferred care. Finally, for some patients, virtual consultation may allow both clinical practices and patients to benefit from care coordination and sharing, for example, high-complexity surgical treatment at a referral center, followed by adjuvant chemotherapy delivered locally.

Health systems may reasonably be concerned about a net loss in revenue from cancer care if some services are shifted to the community from high-complexity settings. While this outcome is possible, we suggest it is unlikely, as an increase in high-complexity care may balance a decrease in routine care. Nevertheless, we recommend that

Table 1. CMS interprofessional consultation fee for service code and RVU detail<sup>18,19</sup>

CPT Code	Reported By	Concluded With	Time Required	How Time is Spent	2022 Work RVUs	2022 Total RVUs <sup>a</sup>	2022 Payment
99446	Consultant	Verbal and written report to requestor	5–10 min	Reviewing pertinent medical records, lab/imaging studies, medication profile, etc. and medical consultative verbal or internet discussion	0.35	0.52	\$17.46
99447	Consultant	Verbal and written report to requestor	11–20 min	Reviewing pertinent medical records, lab/imaging studies, medication profile, etc. and medical consultative verbal or internet discussion	0.70	1.05	\$35.26
99448	Consultant	Verbal and written report to requestor	21–30 min	Reviewing pertinent medical records, lab/imaging studies, medication profile, etc. and medical consultative verbal or internet discussion	1.05	1.58	\$53.06
99449	Consultant	Verbal and written report to requestor	≥ 31 min	Reviewing pertinent medical records, lab/imaging studies, medication profile, etc. and medical consultative verbal or internet discussion	1.40	2.12	\$71.20
99451	Consultant	Written report to treating/requesting clinician	≥ 5 min	Reviewing pertinent medical records, lab/imaging studies, medication profile, etc. and medical consultative verbal or internet discussion	0.70	1.05	\$35.26
99452	Treating/ Requesting clinician	N/A	≥ 16 min <sup>b</sup>	Preparing for the consult and/or the actual time spent communication with the consultant	0.70	1.06	\$35.60

Indirect revenue. a: For codes 99446-99449, more than 50% of the service time must be consultative time and not time used to review data. Do not report codes 99446-99449 if data review time is greater than 50% of the total service time. b: Code 99452 can be reported in addition to non-direct prolonged services (99358-99359) if appropriate (see CPT manual). Not included in this article. Facility and non-facility RVUs are identical. CMS: Centers for Medicare and Medicaid Services; CPT: Current Procedural Terminology; RVU: Relative Value Unit.

wherever possible, clinical practices initiating virtual consultation between clinicians should track the care received by participating patients and the site at which care is eventually delivered to ensure that the financial implications are consistent with health systems' missions. Additionally, we would encourage policymakers to consider revenue in context with all the elements of VOI described herein.

#### *Institutional Halo Effect*

The “halo effect” refers to the influence of an impression gained of one aspect of an individual on a separate, unrelated aspect of the individual (or institution).<sup>20</sup> In the setting of a newly implemented cancer consultation program, a referral center may build a reputation for oncologic excellence and accessibility that influences referrals in other service lines. For example, if a community oncologist has a favorable experience through a virtual consultation with a subspecialist gynecologic oncologist, they might be more likely to refer a patient with colon cancer to the same referral center for treatment or consideration of a clinical trial. The halo effect might also increase referrals from non-oncologic specialists if the promotion of the virtual consultation program reaches clinicians who do not provide cancer care. Institutions should therefore

track all referrals from practices involved in virtual consultation programs irrespective of disease site.

#### *Hospital-based Care*

In addition to its outpatient applications, virtual consultation can assist with the treatment of patients with known or suspected cancers hospitalized in community settings without access to specialized oncology care. Importantly, virtual inpatient consultation by subspecialty cancer clinicians may be needed for reasons of staffing, geography, or infection control, as seen during the SARS-CoV-2 pandemic.<sup>21</sup> For example, emergency medicine clinicians might utilize virtual access to oncologists to determine whether a patient presenting with a cancer-related issue requires hospitalization locally or transfer of care; likewise, an inpatient care provider might virtually consult a subspecialist to determine whether a transfer is needed or if care may continue in the current location. This model of initial management and triage guided by a remote specialist has been perhaps best integrated into the care of rural patients with acute ischemic stroke<sup>22</sup>; however, to our knowledge, this application of telemedicine has not yet been studied for patients with cancer. As with outpatient care, appropriate triage for inpatients with cancer

can save the expense (and potential morbidity) associated with patient transfer, decrease patient census in referral centers, and increase revenue at community hospitals that might otherwise have shifted to referral centers. Each of these variables should be modeled prior to implementation of virtual consultation and tracked after implementation.

#### *Infrastructure Considerations*

Implementation of virtual provider-to-provider consultation requires adjustment to infrastructure at community oncology practices and referral centers. However, the investment required will depend on the resources already in place. Successful implementation of any telemedicine program requires both technological and administrative support to ensure adequate ease of use for the end users. For example, for centers with pre-existing telemedicine infrastructure, minimal staff expansion may be needed to facilitate assistance with ensuring required patient data accompany a virtual consultation request. Likewise, if the local electronic medical record allows for remote review of history, laboratory results, imaging, etc., there may be minimal startup cost needed for hardware and software beyond initial user training and technical support. However, if the medical record systems at community and referral centers do not allow direct transfer of patient data for review, substantial outlay may be needed to either expand the capability of existing systems or purchase/develop a platform or integration to support virtual consultation. Finally, depending on the volume of virtual consultations initiated or received, clinicians' time may have to be somewhat reorganized or protected to allow for expeditious management of virtual consultations; there may therefore be an opportunity cost for institutions to maintain a virtual consultation program if clinicians' time is reallocated from other activities. All software, hardware, and personnel changes to support provider-to-provider consultation should be anticipated and tracked when possible to assist in the calculation of VOI.

#### *Subspecialty Resource Utilization*

Virtual provider-to-provider consultation may improve the optimization of the case mixture of patients seen in person in general and subspecialty oncology clinics. While "optimal" patient allocation may vary among health systems, in general, patients scheduled for ongoing care in subspecialty clinics should be those who require subspecialty services, while others continue care with general oncologists with subspecialty consultation as needed. We anticipate that optimizing patient allocation will improve efficiency and job satisfaction for both subspecialists and general oncologists, as both groups will be better able to provide care consistent with their desired scope of practice.<sup>23</sup>

#### *Continuity of Care*

For community cancer care providers, virtual provider-to-provider consultation may allow for care continuity and retention of patient volumes and revenue if care can be safely provided locally. If needed, episodic guidance of subspecialty oncologists could be provided, with the option of referral for in-person subspecialty care if the need arises. Likewise, if patients seen for in-person consultation with a subspecialty oncologist ultimately receive ongoing care in the community, the availability of virtual consultation with the community clinician may facilitate continuity of care for the subspecialist. Improvements in the continuity of cancer care are likely to improve patients' perceived health-related quality of life<sup>24,25</sup> and clinicians' satisfaction and perception of effectiveness in their job.<sup>24</sup> We therefore recommend including assessments of clinicians' and patients' satisfaction with care continuity before, during, and after implementation of a virtual consultation program.

#### *Patient-Reported Outcomes*

Health systems considering the implementation of virtual consultation between cancer clinicians should take into account the substantial benefit that such a program would have for cancer patients. It is well established that patients appreciate the potential of telemedicine to save them the substantial burdens associated with travel for cancer care, including time spent in transit, lost wages, discomfort, and cost of transportation.<sup>26</sup> Additionally, for some patients, formal subspecialty evaluation may not be necessary, obviating the need for any direct interaction between the patient and a cancer subspecialist. Consistent with informal curbside consultations, patients may not incur out-of-pocket expenses for subspecialists' review of their case. We hypothesize that patients benefiting from "no-cost" subspecialty input into their care will have both a favorable impression of their cancer care overall and their community oncologists. However, any effect on patient satisfaction needs to be empirically assessed as part of the implementation of a virtual consultation program.

For the substantial proportion of patients who are reluctant to travel long distances for subspecialty cancer care,<sup>27,28</sup> reduction of unnecessary in-person referrals may also improve concordance between care delivery and patients' preferences. Consideration of patients' preferences for treatment, at a minimum, demonstrates respect for patients as persons<sup>29</sup> and may also lead to improved cancer-specific outcomes.<sup>30</sup> However, the multimodal expenses and burdens for patients associated with travel for care contribute to the prevalence and magnitude of financial toxicity associated with cancer treatment.<sup>31</sup> Site of cancer care has been independently associated with financial toxicity to patients<sup>32</sup>; unnecessary referrals for subspecialty cancer care may also be associated with "surprise billing"<sup>33</sup> associated with out-of-network

oncologists.<sup>34</sup> Patients' cost savings associated with virtual, provider-to-provider oncologic consultation is likely to be substantial, extrapolating from available comparisons of in-person versus patient-facing telemedical encounters.<sup>35</sup> The impact of program implementation on financial toxicity should, therefore, also be modeled prospectively and assessed after program rollout.

#### *Clinical Trial Enrollment*

Expansion in access to clinical trials continues to be a high priority for health systems, collaborative clinical trial groups and funding organizations, given its potential to close rural-urban outcomes disparities.<sup>36</sup> Screening for enrollment in clinical trials might therefore be routinely incorporated into virtual consultations between community clinicians and referral centers. Virtual screening has the potential to improve clinical trial access for rural and otherwise underserved cancer patients, regardless of where they receive treatment. Expansion of the participant base may increase institutions' accrual credits for trials administered by collaborative groups and potentially allow trials to be administered in community sites without requiring transfer of clinical care, for example, through the National Cancer Institute's Community Oncology Research Program.<sup>37</sup> Additionally, improved clinical trial enrollment is likely to allow subspecialty centers with academic missions to open additional trials, increase secondary data analyses and other hypothesis-generating investigations, and potentially increase external funding flow for cancer research activities. We, therefore, recommend that institutions include routine clinical trial screening as part of newly implemented virtual consultation programs and prospectively track the demographics of patients who are eligible and enroll in trials. Analysis of institutional trends in clinical trial enrollment after the implementation of a virtual consultation program should consider the start date of the program as a contributing factor.

#### *Program Monitoring and Quality Improvement*

As in any new clinical enterprise, the initiation of a clinician-to-clinician telemedicine program should include robust infrastructure for continuous quality monitoring and improvement. Quality improvement initiatives will themselves have associated personnel and infrastructure costs; health systems should consider these as part of the investment in developing a high-quality virtual consultation program. Processes and outcomes to be tracked should be specified at the outset, as should processes for monitoring and implementing system improvement. Specific quality metrics related to cancer care may be developed by professional societies or healthcare systems and may include traditional clinical outcomes (e.g., survival, treatment-related morbidity), process outcomes (e.g., adherence to best-practices guidelines, healthcare

resource utilization), or patient-reported outcomes (satisfaction with care, financial toxicity).

As much as possible, quality systems should be integrated within current institutional processes to decrease duplication of effort, cost, and risk of missing adverse events. Best practices for quality improvement in system design should be followed with particular attention to those aspects of virtual provider-to-provider consultation that differ most significantly from the standard of care.<sup>38</sup> The Institute for Healthcare Improvement has highlighted the importance of safety, equity, and person-centeredness as quality principles that are often overlooked in the design of telemedicine services.<sup>39</sup> While some variables of interest may be unique to institutions, continuous evaluation of technologic processes, closed-loop communication, clinical outcomes, and equity should be included for all programs.

#### **Conclusion**

It is critically important for health systems to deliver expeditious, high-quality cancer care in locations that optimize patient outcomes while minimizing the burdens associated with care. Implementation of virtual consultation between general and subspecialty oncologists offers health systems the potential for substantial VOI, largely through improving clinical outcomes by optimizing the resources involved in patients' cancer care. The magnitude of VOI will be tightly linked with the specific characteristics of the health system employing virtual consultation, including the patient population served, the geographic distribution of cancer care sites, reimbursement opportunities, characteristics of the oncologist workforce, and others. The framework outlined here will assist health systems in prospectively determining the anticipated VOI of implementing a provider-to-provider virtual consultation program and identify focal points to ensure sustainable implementation of this approach to improving geographic disparities in cancer care.

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#### **Contributors**

Dr. Shalowitz contributed analysis, investigation, writing (original draft), writing (review and editing), supervision, project administration. Mr. Bryan Arkwright contributed

writing (original draft), writing (review and editing), and data curation. Dr. Bunce contributed writing (original draft) and writing (review and editing),

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