More Than the Sum of Its Parts: How Multidisciplinary Cancer Care Can Benefit Patients, Providers, and Health Systems

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Multidisciplinary cancer care has gained some traction in academic cancer centers worldwide. Such models not only enhance the quality of care through deliberative collaboration but also can be cost-effective for health systems and society. They can also be more patient-centered and allow patients to see all specialists in one visit, ultimately receiving a final consensus treatment plan. However, there are important impediments to widespread implementation, the most pressing of which include administrative and financial concerns at the facility level. Processes that emphasize the efficiency of clinic operations—considering patient-specific needs for each clinic day—allow for deployment of necessary resources (and only necessary resources) to meet the needs of patients and their caregivers. We provide a framework to achieve more robust delivery of multidisciplinary care to patients with cancer.

Too often, cancer care is organized around physicians. Patients and families are often required to make multiple visits to physicians before a final diagnosis is reached. Once patients are diagnosed with cancer, they are hurriedly added into the busy schedules of specialists, and can wait weeks or even months before initiating proper treatment. Specialists often fall short of communicating pertinent information to each other, delaying consensus on diagnoses and treatment plans. This lack of cohesion can increase stress, confusion, and anxiety for patients and result in incorrect diagnoses—and downstream—inappropriate treatments.

Multidisciplinary care can offer a welcome departure from this scenario. In multidisciplinary care, specialists come together into a single forum to discuss patient cases. The model has become increasingly common in academic cancer centers in the form of tumor boards, disease-specific conferences, and multidisciplinary clinics. In principle, multidisciplinary care mirrors the scientific community’s gold standard for academic veracity: peer review. Determining a patient’s pathologic diagnosis, stage of disease, and likely prognostic course is by no means trivial. Oncologic specialists such as radiologists and pathologists are required to interpret multiple diagnostic tests. Multidisciplinary care models require these experts to consult with each other directly, producing a cohesive diagnosis and multiple reasonable treatment options. The entire treatment team presents these options to patients, who can then choose their course in accordance with their values.

Hence, by its nature, multidisciplinary cancer care offers a more patient-centered approach. With individual visits, the consultant who encounters a patient initially often determines the ultimate course of treatment. This is primarily because evidence-based treatment pathways are not yet available for every cancer (especially rare malignancies); as a result, patient and clinician preference becomes paramount. But patients’ preferences may be met more consistently if they can see all or most of their caregivers in a coordinated setting.

In addition, multidisciplinary clinics are more convenient for patients. One report showed reductions in time from biopsy to treatment by 21 days and significantly fewer in-person consult visits for patients with pancreatic cancer. This convenience is especially important for those with more limited resources and time. In this context, patient satisfaction surveys evaluating multidisciplinary cancer clinics have been favorable.

As much as peer review enhances our pursuit of scientific truth, evidence does suggest that diagnostic truth is also reached more often with multidisciplinary cancer care.
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two percent of patients with breast cancer and 23% of patients with pancreatic cancer have had changes in diagnosis or disease stage after referral to a multidisciplinary clinic. The association is understandable: a cohesive group of providers is now directing care, reducing the likelihood of missing information that is germane to the patient’s diagnosis. In addition, misdiagnosis is not a trivial concern. Experts estimate that wrong diagnoses account for at least 40,000 patient deaths per year for patients with all medical conditions. This number may significantly underrepresent the death rate in patients with cancer.

Although changes in diagnoses do not guarantee that the new diagnosis is more accurate, reports suggest that patients who receive multidisciplinary care have better clinical outcomes. Observational assessments of patients treated in multidisciplinary clinics for breast, ovarian, and pancreatic cancers report improved survival. As a result, several clinical practice guidelines in both Europe and the United States recommend the use of multidisciplinary clinics as a strategy to improve cancer care quality.

Multidisciplinary clinics can also allow providers to treat patients sooner in the disease course. Patients with pancreatic cancer who received care in a multidisciplinary clinic received treatment 20 days earlier than those seen by individual physicians.

Experience suggests that multidisciplinary care can also be more cost-effective. For example, by achieving correct diagnoses at the outset, multidisciplinary settings may limit unnecessary or ineffective therapies. In our clinic, about 13% of patients with pancreatic cancer were upstaged to metastatic disease, which allowed us to avoid futile attempts at resection. Referral to a multidisciplinary clinic soon after a suspicion of pancreatic cancer may spare patients from undergoing unnecessary and dangerous staging procedures. For example, before being evaluated in our pancreatic multidisciplinary clinic, patients with resectable disease underwent a mean of 3 procedures (biopsies/imaging) with a mean added cost of $3,371 per patient. In addition, these unnecessary preoperative tests and interventions were associated with a longer time to definitive surgical intervention, which could ultimately affect survival.

Furthermore, including clinicians such as social workers and pain specialists in treatment planning allows for more thorough evaluations of patients’ functional status and quality of life. This not only is better for patients but also can spur further cost savings: adequate earlier treatment of pain and other symptoms may prevent expensive downstream clinical encounters, such as emergency room visits and hospital admissions. We also see the opportunity for cost savings to society, because reducing the number of clinic day visits can allow patients and their caregivers fewer losses of productivity.

Despite these benefits, why haven’t multidisciplinary clinics become the predominant form of cancer care delivery? Resistance is mainly at the facility level. First, multidisciplinary clinics require coordinating the schedules of multiple clinicians, support staff, and clinic space, leading to administrative challenges. Second, cancer center administrators worry about achieving adequate patient throughput with multidisciplinary care. Patients are often in rooms for several hours while each consultant sees them separately. This raises financial concerns over inefficient use of clinic space and physician time. Third, and most concerning, are some objective reports suggesting that providers’ well-being may be compromised in multidisciplinary settings. Medical and surgical oncologists participating in multidisciplinary teams have experienced measurable increases in job stress without a commensurate rise in job satisfaction, according to one European study. Team leaders and nurses have also reported higher rates of emotional exhaustion from mounting workloads.

These issues reflect the substantial operational challenges of managing the time of many important personnel in the same setting. These issues are not insurmountable, however. Preparing patient insurance forms, obtaining medical records and imaging, and performing other administrative tasks proactively before the day of clinic allows clinic time to be spent focusing on patients’ symptomatic and psychosocial problems, which are especially prevalent in patients with cancer. Timely completion of these
tasks on clinic day requires standardization of workflow for each team member, which also allows for higher patient volumes while maintaining high-quality care.

Standardization provides other benefits as well. For example, using operational data from our multidisciplinary clinic and publicly available Medicare reimbursement rates, we estimated the cost impact of missing important symptoms and not addressing patient concerns adequately during clinic (Table 1). Standardization allows for more reliable completion of these essential tasks and could liberate resources needed to provide care for additional patients. In addition, our clinic garners more outpatient revenue per patient than for patients with the same diagnosis who come with individual referrals. Data suggest that this is because patients are more likely to return for further care if they came through our multidisciplinary program, regardless of their region of origin.  

<table>
<thead>
<tr>
<th>Missed Task</th>
<th>Preventable Problem</th>
<th>Available Encounter</th>
<th>Physician Costs Per Avoidable Encounter (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Failure to address a patient’s abdominal pain in clinic</td>
<td>Patient develops worsened abdominal pain</td>
<td>Emergency department visit</td>
<td>$114.44&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Failure to identify unresectable or metastatic disease at presentation</td>
<td>Patient is assumed to have resectable disease</td>
<td>Patient taken to operating room but resection not possible</td>
<td>$766.69&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Failure to explain equivocal or uncertain disease stage to patients</td>
<td>Patient leaves clinic with concerns and/or unanswered questions</td>
<td>Patient makes phone call to clinic, consuming physician time</td>
<td>$6.25&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<sup>a</sup>Based on 3.36 Medicare relative value units (RVUs) at 2013 rate (http://www.acep.org/Content.aspx?id=82998).

<sup>b</sup>Based on 22.51 Medicare RVUs for exploratory laparotomy at 2013 rate (http://www.codingbooks.com/Assets/PCE12pg315.pdf).

<sup>c</sup>Based on average salary data for entry-level tenure-track faculty at Johns Hopkins Hospital and an assumed average phone call time of 5 minutes per patient.

We are also exploring other strategies for increasing efficiency. For example, given that workload has been shown to affect physician performance, we are implementing a health care “cognitive load balancing” methodology that can mine clinical data to predict the need for each type of provider for each patient in advance, allowing them to be present only if needed. Conversely, when providers are overburdened because of high patient volume and complexity, the methodology allows for a clinic coordinator to mobilize staff such as mid-level providers and pain specialists to shoulder tasks that are performable by other providers.

Published accounts suggest that this strategy works to reduce inpatient readmissions using the method of Process Arbitrage. Through standardizing workflow and prioritizing completion of relevant tasks for our patients with pancreatic cancer, we project substantial
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annualized savings, arriving at a possible margin gain of more than 5% (Table 2). These savings come from a greater time allotted to first-line providers to assess acute symptoms (preventing downstream emergency department visits), address patient questions and concerns (preventing phone calls for unanswered questions), and, most importantly, achieve more accurate disease staging as early as possible (preventing needlessly invasive or risky procedures). We also offer an organizational framework that has enhanced our clinic’s overall operational performance, and have outlined generalizable lessons for any cancer clinic to achieve similar outcomes (Figure 1).

Table 2 Potential Impact of Process Arbitrage for Selected Tasks on Quality and Costs in a Pancreatic Multidisciplinary Clinic

<table>
<thead>
<tr>
<th>Missed Task and Preventable Problem</th>
<th>Mechanism of Intervention</th>
<th>Frequency of Occurrence</th>
<th>Projected Annualized Savings(^a) (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Failure to evaluate abdominal pain in clinic, leading to ED visit for uncontrolled pain</td>
<td>Ensure that pain specialist sees each patient with pain score &gt;4 on a scale of 1 to 10</td>
<td>8% of patient census</td>
<td>$4,394.50</td>
</tr>
<tr>
<td>Failure to identify unresectable or metastatic disease at presentation, leading to surgery without resection</td>
<td>Ensure more time is allocated to physician assessment and imaging review</td>
<td>3% of patient census</td>
<td>$10,514.00</td>
</tr>
<tr>
<td>Failure to explain equivocal or uncertain disease stage to (borderline resectable or otherwise unknown disease stage), leading to downstream phone calls</td>
<td>Ensure more time is allocated to addressing patient’s questions (longer physician counseling time)</td>
<td>30% of patient census</td>
<td>$900.00</td>
</tr>
<tr>
<td>Total savings</td>
<td></td>
<td></td>
<td>$15,808.00</td>
</tr>
<tr>
<td>Average annual operational costs(^b)</td>
<td></td>
<td></td>
<td>$283,561.00</td>
</tr>
<tr>
<td>Margin gained</td>
<td></td>
<td></td>
<td>5.6%</td>
</tr>
</tbody>
</table>

\(^a\)Based on an average of 10 patients per multidisciplinary clinic day and 48 clinic days per year.
\(^b\)Based on weighted average of operational costs in an empiric case study.
Abbreviation: ED, emergency department.

Multidisciplinary care confers many benefits to patients and their caregivers. Our experience reveals that patients take comfort in knowing that multiple physicians are discussing their case thoroughly. At the facility level, myriad challenges exist, but these are surmountable with thoughtful operational strategies. With robust clinical practice guidelines such as those offered by NCCN, implementing multidisciplinary care is made even easier for some cancers through standardization. More objective research is needed to assess the true effect of multidisciplinary cancer care on clinical outcomes, costs, and patient and provider satisfaction. After standards are developed for measuring outcomes associated with operational care models, the quality, efficiency, and safety of multidisciplinary cancer care should only improve.
The Last Word

More information about the 4 Ps of efficiency in a multidisciplinary cancer care center can be found at www.JNCCN.org.

**Figure 1** The 4 Ps of efficiency in multidisciplinary care models. The 4 levels represent essential elements of an efficient multidisciplinary clinic. Each level buttresses the one above; for example, selecting an appropriate patient population (b) is required before predicting expected resource needs on clinic day (c). **a. Process:** Define, map, and systematize the patient triage process, assigning roles to staff as appropriate. To maximize valuable clinician time, staff can be assign tasks for which they have a comparative advantage. **b. Population:** Pre-select patient populations are more likely to benefit from care by multiple specialists. These patients are not necessarily later stage, but those with complex comorbidities, equivocal disease presentations, or diagnostic uncertainties. **c. Prediction:** Determine the unique resource needs of each patient prior to clinic day. While this task may seem daunting, we are studying predictive algorithms for resource needs based on key elements in patients’ medical history. **d. Portability:** Staff a clinic coordinator to manage real-time changes in expected task requirements, moving key staff where they are needed. The coordinator can also play a role in maintaining patient follow-up.

**References**