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Evaluating a Novel Patient Intake Model for Newly Referred Patients Seeking Cancer Care: An Evidence-Based Practice Project

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ABSTRACT

Introduction: Cancer survivors must engage in a complex medical system that requires coordinating care, traveling for treatment, obtaining referrals, and scheduling multiple appointments with various teams. Cancer care facilities are implementing oncology navigation programs that help survivors navigate barriers in complex cancer care systems. However, new patients require additional support prior to their first visit. This article aims to describe the development and design of Miami Cancer Institute’s (MCI) Intake NOW program and evaluate its effects on scheduling-related outcomes among individuals seeking to establish cancer care.

Methods: We conducted a retrospective data analysis before and after the MCI Intake NOW program, which took place from January to June 2023. We extracted Phase 2 and 3 data to reflect two months before and two months after implementation of Phase 3 of the pilot evidence-based practice project. We assessed five outcomes—24-hour meaningful contact, scheduling lead time, intake turnaround time, intake lead time, and eligibility to move up—using Student’s t-test, Mann-Whitney U test, and Chi-square test.

Results: More patients experienced 24-hour meaningful contact with the Intake nurse in Phase 3. Additionally, median scheduling lead time and median intake turnaround time were significantly lower in Phase 3. Furthermore, median intake lead time was significantly lower, and fewer patients were eligible to move up in Phase 3.

Discussion: The MCI Intake NOW program improved scheduling-related outcomes and outperformed many other cancer care facilities. The program can potentially be a model that cancer care facilities can use to streamline the intake process. However, further studies are needed to evaluate its potential utility fully.

Keywords: Patient Intake, Oncology, Navigation

INTRODUCTION

Cancer is an increasingly common and burdensome disease, wherein 39.5% of individuals will be diagnosed with cancer during their lifetime (National Cancer Institute [NCI], 2020). Over 18 million new cancer diagnoses and 9.5 million cancer-related deaths occurred globally in 2018 (NCI, 2020). Worse still, annual cancer occurrences and cancer-related deaths worldwide are expected to increase to 29.5 million and 16.4 million by 2040 (NCI, 2020). Total cancer care costs in the United States were over $150 billion in 2018 and are expected to rise due to in-
creased prevalence, survivorship rates, and the development of new, more expensive treatments (NCI, 2020).

In addition to the increasing societal impact, the burden a cancer diagnosis places on the cancer survivor and their social support system extends beyond the existential concerns of the disease itself. For example, cancer survivors often face financial hardship (Yabroff et al., 2023), emotional distress (Grégoire et al., 2021), and social isolation (Christensen et al., 2022). Cancer survivors must also engage in a complex medical system that requires them to coordinate their care, travel for treatment, obtain referrals and insurance authorizations, and schedule multiple appointments with various treatment teams (Miller et al., 2021; Rodrigues et al., 2021).

Oncology navigation programs help cancer survivors navigate barriers in complex cancer care systems, ensuring they can receive timely care, crucial interventions, and necessary support from their healthcare team (National Breast Cancer Foundation, 2022; Simpson, 2023). Navigation programs utilize oncology nurse navigators (ONNs) and patient navigators (PNs)—specially trained nurses and lay individuals who help cancer survivors access and navigate the healthcare system (Kagan et al., 2020; Rodrigues et al., 2021). Oncology navigation increases cancer survivors’ access to diagnostic services and decreases the time needed to achieve diagnostic resolution and treatment (Rodrigues et al., 2021). Cancer survivors receiving ONN support report lower symptoms of anxiety (Mertz et al., 2017; Rodrigues et al., 2021), depression (Mertz et al., 2017; Rodrigues et al., 2021), stress (Swanson & Koch, 2010; Rodrigues et al., 2021), and experience shorter hospital length of stay (Lee et al., 2011; Rodrigues et al., 2021; Chan et al., 2023). However, benefiting from an oncology navigation program requires cancer survivors to have access to cancer centers that provide specialized care and support.

In 2016, Miami Cancer Institute (MCI) implemented a formal oncology navigation program staffed by ONNs and PNs who specialized in guiding patients from their first visit through their entire course of treatment. However, we recognized that new patients referred to MCI would require additional support prior to their first visit. Thus, MCI launched its Patient Intake Services department in 2016 to assist newly referred patients in establishing specialty oncology care for benign, high-risk, and malignant diagnoses. The Intake team initially included medical records coordinators and Intake nurses whose roles were to perform the administrative and supportive functions necessary to ease patient burden when initiating care. In 2020, MCI’s Intake and Navigation departments united under joint nursing leadership, allowing Intake nurses to refer newly diagnosed patients to oncology navigation services more efficiently and providing opportunities for shared education and professional development.

In September 2022, the Intake team launched a pilot project to streamline the intake process further, enhance the patient experience, and improve scheduling-related outcomes among newly referred patients. This initiative resulted in the creation of a new intake model we call MCI Intake NOW (Nursing On Demand Workflow) in which new patients calling MCI for the first time would be connected to an Intake nurse who would answer their questions, provide support, and begin preparing the patient for their first MCI visit. The MCI Intake NOW program is currently in its third and final pilot phase before institute-wide implementation. This article describes the development and design of MCI Intake NOW and the evaluation of its effects on scheduling-related outcomes among individuals seeking to establish oncology care at MCI.

**MATERIALS AND METHODS**

We conducted our pilot evidence-based practice (EBP) project at MCI, a
445,000-square-foot facility dedicated to providing cutting-edge cancer care to the greater South Florida community. First, we conducted the retrospective analysis from January to June 2023. Because the pilot EBP project used fully anonymized administrative data, the project was exempt from review by the Institutional Review Board at MCI, and neither HIPAA authorization nor informed consent was required. We used the Revised Standards for Quality Improvement Reporting Excellence (SQUIRE) 2.0 (Ogrinc et al., 2016) to guide the design and reporting of our pilot EBP project.

**Standard Intake**

Before MCI Intake NOW, upcoming new patient visits were identified via a standardized bi-weekly report generated from the electronic medical record. This report consistently captured the 50 to 70% of new patients with a 14-day or more scheduling lead time. Once identified, these new patients were added to a department-wide tracking list and were assigned to a disease site-specialized medical records coordinator and Intake nurse. Additionally, patients with less than 14 days of scheduling lead time were identified by an add-on report, which was produced throughout each day. These late add-on cases were prioritized for completion over those with 14-day or more scheduling lead times. The Intake team’s initial service standard included a goal of a 3 to 5-day intake lead time to allow providers and clinic staff time to review the chart, plan for the patient visit, and organize their clinic day.

**MCI Intake NOW**

During the planning phase of MCI Intake NOW, 24-hour meaningful contact was introduced to the Intake team as a new goal. All patients in the pilot would be connected to an Intake nurse who would answer their questions and begin preparing them for their first visit within 24 hours of their scheduling phone call. In the initial design, schedulers would obtain the patient’s information, schedule the first visit with an oncology provider, and offer the patient a phone appointment with an Intake nurse. The assigned Intake nurse would then call the patient, establish meaningful contact, and initiate the intake process. The scheduled intake call was designed to result in a more efficient intake process and fewer outbound patient phone calls. Another primary objective of this pilot was to prioritize the intake process according to time of scheduling instead of appointment time, no longer prioritizing add-on cases, to allow more time to complete each intake. We shifted the focus from intake lead time to intake turnaround time—the total time needed to complete each intake.

**Phase 1**

Phase 1 of the MCI Intake NOW pilot occurred between September and October 2022. During this phase, schedulers offered patients a next-day, 60-minute phone appointment with the Intake nurse, who would establish meaningful contact and complete the entire intake interview. However, this proved impractical. Patients frequently forgot about the scheduled phone call or requested that the Intake nurses call them back at a more convenient time. Despite our best scripting efforts, many patients could not list their current medications, providers, or past diagnostic and treatment history. We realized the need for a brief preliminary call to establish contact with the patient and perform initial fact-finding to guide records collection. Intake nurses also recommended that the scheduling department transfer the phone call to the Intake nurse to allow the Intake nurse to speak directly to the patient during the same encounter and eliminate repeated call attempts and voicemails.

As the approach to obtaining 24-hour meaningful contact evolved, it began to resemble the efforts of another MCI support department—Patient Access to Care. Patient Access to Care reported to Scheduling leadership and included
expert nurses responsible for providing clinical guidance to schedulers, reviewing new patient appointments for accuracy, maintaining provider scheduling templates and waitlists, and prioritizing upcoming visits. Patient Access to Care nurses were not included in the initial MCI Intake NOW pilot. At the end of Phase 1, we decided to test a workflow incorporating these nurses to bridge the patient journey from scheduling to intake more efficiently.

**Phase 2**

Phase 2 of the MCI Intake NOW pilot occurred between October 2022 and January 2023. To address the two major deficiencies identified in Phase 1—the need for a brief, preliminary phone call between the Intake nurse and patient and the overlap of Intake nurse roles with those in the Patient Access to Care team—per diem Intake nurses were trained to accept warm transfers of patient phone calls from schedulers immediately after new patient appointments were scheduled. Whenever warm transfers were not possible (e.g., patient refusal), schedulers would manually refer patients to the per diem Intake nurses, who would then establish meaningful contact.

The goal of expediting the first appointment was also added to the pilot. Our team understood that offering an earlier appointment was contingent on a completed intake and MCI provider availability. Thus, two new metrics were introduced at this phase: (1) eligible to move up (i.e., patients with intake completed five or more business days prior to their scheduled first visit) and (2) visits that were moved up.

**Phase 3**

Phase 3 launched on January 18, 2023. We implemented a revised template for the department tracking list, including MCI Intake NOW metrics and critical fields to support triaging incoming patients. This template included visual flags, conditional color-coding, and other tools to help support the anticipated transition of all Intake operations to the MCI Intake NOW model. The focus of Phase 3 was two-fold: (1) to test the revised template in the existing pilot population in preparation for further rollout and (2) to plan for a potential merger with Patient Access to Care nurses. Warm transfers continued. However, the new department tracking list allowed us to identify and contact patients who would have been missed had we continued to rely solely on manual referrals.

**Inclusion and Exclusion Criteria**

Our pilot EBP project included newly referred individuals aged 18 years or older seeking to establish cancer care at MCI for the first time. We limited the data to individuals being treated for skin, head, neck, and endocrine conditions because these populations approximated those throughout MCI disease sites, and the staff within these specialties had previous experience conducting EBP projects. We further limited inclusion to patients whose intake process was completed via Phase 2 or Phase 3 of the Intake NOW pilot because these phases recorded the same outcome metrics, making comparison possible.

We excluded individuals who were establishing care for routine skin cancer surveillance. Although these individuals were included in either Phase 2 or Phase 3 of MCI Intake NOW, the scheduling needs and clinical priority of those seeking routine skin surveillance are drastically different from those with potential, confirmed, or recurrent malignancy, precluding comparison.

**Measures**

We assessed the success of the pilot EBP project across five outcomes: 24-hour meaningful contact, scheduling lead time, intake turnaround time, intake lead time, and eligibility to move up. We defined 24-hour meaningful contact as the Intake nurse having a direct conversation via phone call with the newly referred patient within 24 hours of receiv-
ing their request to establish or re-establish care. **Scheduling lead time** was defined as the number of days between the date the patient requested to establish or re-establish care and the date their first appointment was initially scheduled. **Intake turnaround time** was defined as the number of days required for a patient’s intake process to be completed. We defined **intake lead time** as the number of days between the intake being completed and the first appointment. Last, patients were deemed **eligible to move up** if their intake was completed five or more days before their originally scheduled appointment. Scheduling lead time, intake turnaround time, and intake lead time were treated as continuous variables. We dichotomized 24-hour meaningful contact and eligibility to move up as yes/no outcomes.

**Data Management and Analysis**

One author (M.N.) extracted Phase 2 and 3 data from an administrative database to reflect two months before and two months after the implementation of Phase 3 of the pilot EBP project. Phase 2 data included patients who sought care between November 17, 2022, and January 17, 2023. Phase 3 data included patients who sought care between January 18, 2023, and March 18, 2023.

Because we aimed to assess the association between Phase 3 of the MCI Intake NOW pilot project and scheduling-related outcomes among individuals who completed the intake process, we utilized a per-protocol analysis and only included individuals with complete data across all five outcome measures. We used IBM SPSS Statistics version 27 for all data management and analysis. We determined the normality of continuous variables by examining normality plots and using the Shapiro-Wilk test with \( p < .05 \) to determine significance. We reported descriptive statistics of the outcome variables, including mean and standard deviation for normally distributed continuous variables, median and range for non-normally distributed continuous variables, and frequencies and percentages for categorical variables. To test for differences in the outcomes between Phase 2 and Phase 3 of the MCI Intake NOW pilot, we performed the Student’s \( t \)-test for normally distributed variables, the Mann-Whitney U test for non-normally distributed variables, and the Chi-square test for categorical variables.

**Table 1**
Analyses for Differences in Scheduling-Related Outcomes Between Phase 2 and Phase 3 of MCI Intake NOW Pilot

<table>
<thead>
<tr>
<th>Variable</th>
<th>Total Sample (n = 452) Median (Range) / n (%)</th>
<th>Phase 2 (n = 193) Median (Range) / n (%)</th>
<th>Phase 3 (n = 259) Median (Range) / n (%)</th>
<th>( p ) value</th>
</tr>
</thead>
<tbody>
<tr>
<td>24-Hour Meaningful Contact</td>
<td>259 (57.3%)</td>
<td>39 (20.2%)</td>
<td>220 (84.9%)</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Scheduling Lead Time (Days)(^a)</td>
<td>11 (0–60)</td>
<td>13 (0–33)</td>
<td>10 (4–60)</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Intake Turnaround Time (Days)(^a)</td>
<td>6 (0–47)</td>
<td>7 (0–30)</td>
<td>5 (1–47)</td>
<td>.008</td>
</tr>
<tr>
<td>Intake Lead Time (Days)(^a)</td>
<td>4 (0–30)</td>
<td>5 (0–24)</td>
<td>4 (0–30)</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Eligible to Move Up</td>
<td>205 (45.4%)</td>
<td>111 (57.5%)</td>
<td>94 (36.3%)</td>
<td>&lt; .001</td>
</tr>
</tbody>
</table>

Note. \(^a\)Analysis completed using Mann-Whitney U test.
bales. We used $p < .05$ to determine significance for all statistical tests.

**RESULTS**

In total, data from 452 patients were included in our analysis (193 from Phase 2 and 259 from Phase 3). Shapiro-Wilk tests indicated significant departures from normality for the continuous variables, including scheduling lead time [$W(452) = 0.82, p < .001$], intake turnaround time [$W(452) = 0.84, p < .001$], and intake lead time [$W(452) = 0.76, p < .001$]. Examination of the histograms revealed that the distribution of each continuous variable was right-skewed.

Full results are presented in Table 1. For the whole sample, 24-hour meaningful contact was obtained with 259 (57.3%) patients, and 205 (45.4%) were eligible to move up. The median scheduling lead time was 11 days (range: 0–60 days). The median intake turnaround time was 6 days (range: 0–47 days), and the median intake lead time was 4 days (range: 0–30 days).

Our analysis revealed statistically significant differences across all five outcome measures between patients in Phase 2 and Phase 3 of the MCI Intake NOW pilot. Compared to Phase 2, 24-hour meaningful contact was obtained with more patients in Phase 3, which was significant. The median scheduling lead time and median intake turnaround time were significantly lower in Phase 3 than in Phase 2. However, the median intake lead time was significantly lower, and fewer patients were eligible to move up in Phase 3.

**DISCUSSION**

Our results indicate that the MCI Intake NOW pilot improved scheduling-related outcomes for newly referred patients. New patients seeking to establish care during the third and final phase of the MCI Intake NOW pilot experienced shorter scheduling lead times and were more likely to receive 24-hour meaningful contact from an Intake nurse. Intake turnaround time also decreased, suggesting that MCI Intake NOW improved the efficiency of the Intake process. However, intake lead time and the number of patients eligible to move up were lower in Phase 3 of MCI Intake NOW. We believe these findings to be a consequence of decreased scheduling lead times and not an indication of the program’s performance. Because scheduling lead times decreased, participants who may have been previously eligible to move up were seen sooner and no longer needed to move up. The decrease in scheduling lead time also decreased intake lead time. However, intake lead time was still within our longstanding 3 to 5-day goal established before the pilot.

In addition to improving scheduling-related outcomes within our facilities, MCI and the MCI Intake NOW program outperformed many other intake and navigation programs. Miami Cancer Institute is among the 28% of cancer care facilities that use centralized scheduling systems (Simpson, 2023), which we credit partly for improving our scheduling-related outcomes. The median scheduling lead time in the final phase of MCI Intake NOW was ten days, compared to the seven days that most academic cancer care centers target (Simpson, 2023). However, only 42% of organizations report meeting the 7-day target (Simpson, 2023). Still, many patients in Phase 2 and Phase 3 of MCI Intake NOW were seen within seven days of initial contact, and we will continue to focus on improving this metric in the future. Although 56% of cancer care facilities report collecting records before the first visit, over 20% only collect records on select patient populations (Simpson, 2023). We showed that full record collection on all patients can be accomplished in a timely manner without delaying care. Lastly, by merging the Intake and Navigation Departments, as well as the Patient Access to Care nurses, MCI joins the minority of cancer care facilities that connect all new oncology patients to ONNs prior to their first visit (Simpson,
The MCI Intake NOW program can potentially be a model that cancer care facilities can use to improve their intake processes. However, further study including all patient populations is needed to fully evaluate the effects of MCI Intake NOW on scheduling-related outcomes and identify individuals who would benefit from additional services.

Based on these findings, the MCI Intake NOW model has begun final implementation across the institute in all disease sites. The Patient Access to Care nursing team merged with the MCI Intake department to accomplish this goal. Patient Access to Care and Intake nurses cross-trained within disease site teams and revised their roles to maximize efficiency. Patient Access to Care nurses have assumed responsibility for establishing meaningful contact while Intake nurses finalize patients’ records for the first visit at MCI. To facilitate warm transfer from schedulers to nurses, the team adopted the call software that the centralized scheduling team used. Finally, leaders collaborated to migrate each team to the new process, ensuring that patient assignments were not lost during the transition. The final implementation of the new model is anticipated to be completed by the end of August 2023. Once all disease sites have been fully incorporated, the team will work to optimize patient tracking, improve provider access, and ensure each patient is offered the earliest possible appointment.

A significant limitation of the MCI Intake NOW pilot is that it only included patients with dermatology, head, neck, and endocrine conditions. Thus, we cannot extend our conclusions to other patient populations, such as individuals with breast or thoracic cancers. Our per-protocol analysis allowed us to thoroughly evaluate the effects of MCI Intake NOW on scheduling-related outcomes among individuals who completed the process but prevented us from evaluating the effects of the pilot on individuals who did not complete the intake process, such as those who canceled their appointments or sought care elsewhere—populations we would like to address in future projects. Lastly, we did not perform any subgroup analyses to evaluate if specific subgroups of patients benefited more or less than others because of the MCI Intake NOW pilot. Future work that includes subgroup analyses is needed to identify individuals who may benefit from additional contact or new services during the intake process.

**CONCLUSION**

A new cancer diagnosis places a substantial physical and emotional burden on the cancer survivor and their support system. Centralized and standardized patient intake services can streamline and ease the initiation of cancer care. The MCI Intake NOW pilot improved scheduling-related outcomes for newly referred patients. The program can potentially be a model that other cancer care facilities can use to improve their scheduling-related outcomes while increasing the services offered to newly referred patients seeking cancer care. Future work that includes subgroup analyses and evaluates the impact of MCI Intake NOW on additional patient populations will further our understanding of the utility of this program.

**DECLARATION OF INTEREST**

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.
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REFERENCES


