

ASSOCIATION OF COMMUNITY  
CANCER CENTERS

MULTIDISCIPLINARY  
ACUTE LYMPHOCYTIC  
LEUKEMIA CARE:  
MODELS OF QUALITY  
IMPROVEMENT



Quality improvement (QI) is increasingly important as healthcare organizations pursue greater efficiency and value in the services they provide. The Institute for Healthcare Improvement views QI as a rapid-cycle test of a new process that is designed to improve quality, safety, and value in healthcare. Using Plan-Do-Study-Act methodology, the rapid-cycle approach identifies a need for improvement, determines the necessary steps to implement change, establishes metrics to measure progress, and immediately implements small tests of the changes needed for improvement (see Figure 1, right, page 65).

The Association of Community Cancer Centers (ACCC) has supported QI initiatives for many years through its Visiting Experts Program. In 2020 ACCC offered QI programs designed to optimize care for patients with acute lymphocytic leukemia (ALL). Via custom workshops, multidisciplinary team members from three cancer programs appraised their own challenges and opportunities to improve care and developed QI plans that were specific, measurable, and actionable over a six-month time frame. The QI time frame included workshop participation, baseline data reporting, progress calls with ACCC, and outcomes evaluation.

### Acute Lymphocytic Leukemia

ALL is an uncommon cancer that accounts for less than 1 percent of all cancers in the United States.<sup>1</sup> This heterogenous hematologic malignancy involves the proliferation of immature lymphoid cells in peripheral blood, bone marrow, and other organs. The risk for developing ALL is highest for children, decreases in a person's mid-20s, and rises after the age of 50 years. About 27 percent of patients with ALL are diagnosed at age 45 years or older.<sup>2</sup> For many patients, the diagnostic journey begins in the emergency room, where clinical presentation and peripheral blood parameters prompt bone marrow biopsy. Biopsy findings are central to diagnosis, and prognostic factors include white blood cell count at diagnosis, disease subtype, time to achieve complete remission, and quantification of measurable residual disease, which also supports risk stratification and therapeutic decisions. National Comprehensive Cancer Network guidelines recommend clinical trial participation or chemotherapy for induction therapy for all

patients whenever possible. Allogenic hematopoietic cell transplant for eligible patients or multi-agent chemotherapy are recommended as consolidation therapies, depending on risk. Five-year survival for adults 40 to 59 years is 24 percent and for adults 60 to 69 years it is 17.7 percent.<sup>2</sup> More than 80 percent of adults diagnosed with ALL achieve complete remission, although relapse is likely for 30 to 50 percent of these patients.<sup>3-5</sup> Outcomes for patients who relapse are poor, with an estimated survival of approximately 10 percent.<sup>3-5</sup> Immunotherapy with blinatumomab, inotuzumab ozogamicin, or tisagenlecleucel are recommended as remission induction approaches for patients with relapsed or refractory ALL.<sup>2</sup> These agents need to be administered in cancer programs with expertise in immunotherapy administration and management of toxicities, which can be potentially life-threatening.

### ALL Visiting Experts Program

ACCC conducted three visiting experts workshops focused on care for patients with ALL. The six-hour workshops were held live at Inova Schar Cancer Institute in Fairfax, Va., and online at Altru Cancer Center in Grand Forks, N.D., and Vanderbilt University Medical Center in Nashville, Tenn. Each cancer program received content presentations from visiting expert faculty and participated in extensive, facilitated discussions to develop a QI intervention. In the ACCC process, these discussions allow team members to review and prioritize potential challenges they can reasonably address within a six-month period and evaluate the likely impact and feasibility of each challenge. When attendees have established consensus about which challenge to tackle, they identify a clear aim, document steps to achieve the aim within the timeline, and describe measures for tracking progress. Table 1, page 65, provides an overview of the ALL Visiting Experts Program.

### The Inova Schar Cancer Institute Experience

Inova Schar Cancer Institute in Fairfax, Va., is part of the Inova Health System and provides oncology care via a dedicated inpatient unit that is supported by four hematologists/oncologists on rotation, advanced practice providers (APPs), pharmacists, nurse navigators, and social workers. At diagnosis, patients with ALL



Inova Schar Cancer Institute

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are transferred to the oncology inpatient unit and connected with an inpatient program (Life with Cancer) to address psychosocial concerns, fertility preservation, and insurance-related issues. After the inpatient stay, patients transition to the outpatient clinic with the support of a nurse navigator.

### **Increasing Clinical Confidence via Nurse/Pharmacist Visits**

In March 2020, 12 workshop participants representing pharmacy, nursing, medical oncology, pathology, social work, and QI identified outpatient capabilities as a key area in need of QI. Although the outpatient physician clinic sees patients with a wide variety of hematologic malignancies every day, outpatient nurses were less comfortable caring for patients with ALL than for patients with other hematologic malignancies due to lack of opportunities for building skills in interpreting lab results, managing complex treatment regimens, coordinating procedures (e.g., lumbar punctures and intrathecal chemotherapy), and monitoring treatment-related adverse effects. At the same time, the transition to out-

patient care can be anxiety-provoking for patients because they have less frequent contact with their providers when they move to the outpatient setting. Participants agreed that an intervention designed to increase the frequency of nurse/pharmacist visits by 25 percent for patients with ALL in the outpatient setting and provide education about ALL to outpatient clinic and infusion nurses would improve patient care and enhance nurse confidence when caring for this patient population (see Table 2, page 66).

### **Repurposing Existing Tools**

One month into the QI initiative, the team repurposed an existing scheduling option in their clinical management system to establish a schedule for nurse/pharmacist visits for patients with ALL. Halfway through the QI time frame, the team had delivered education to 60 percent ( $n = 30$ ) of infusion nurses on ALL causes, symptoms, diagnostic testing, treatment, and survivorship and conducted a pre- and post-test, which demonstrated discernible

Figure 1. Institute for Healthcare Improvement: Six Steps in Rapid Cycle Improvement

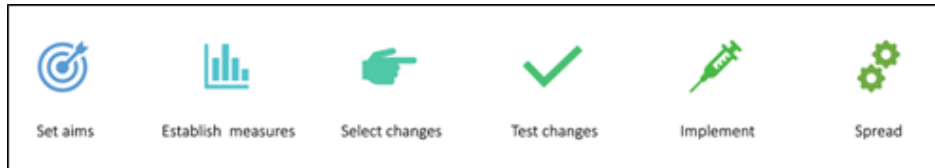


Table 1. Overview of the ALL Visiting Experts Program

Program Goals
Educate attendees on effective practices for supporting, treating, and managing patients with ALL.
Facilitate development of a tailored QI intervention focused on optimizing care for patients with ALL.
Follow cancer program implementation progress for six months.
Visiting Expert Faculty
Firas El Chaer, MD, assistant professor of medicine, Department of Hematology and Oncology, University of Virginia
Rima Koka, MD, PhD, assistant professor, associate residency program director, Department of Pathology, associate director, Section of Hematology, Department of Pathology, University of Maryland School of Medicine
Jeff Klaus, PharmD, BCPS, clinical pharmacy specialist, Hematologic Malignancies/Hematopoietic Cell Transplantation, Barnes Jewish Hospital
Meredith Barnhart, PhD, LCSW-R, OSW-C, director, Information Resource Center, The Leukemia & Lymphoma Society
Content Presentations
An Overview of ALL and Measurable Residual Disease Testing
Management of BCR-ABL Tyrosine Kinase Inhibitors and ALL Immunotherapy Reactions
The Leukemia & Lymphoma Society Education and Services
QI Process
Development of QI Intervention in ALL Visiting Experts Workshop
QI Intervention Launch and Identification of Baseline Data
Progress Check-In Calls with ACCC at 1, 3, and 6 Months
Team Evaluation Interviews and Final Data Collection
Completion of Final Project Summary Report

learning gains. The team had also developed a rubric to structure the nurse/pharmacist visits (Table 3, right).

Inova Schar Cancer Institute saw four patients with newly diagnosed ALL between March and June and the QI team anticipated that they would initiate the nurse/pharmacist visit with these new patients. Given the low volume for patients with ALL ( $n = 19$  in 2019), the team also expanded catchment to include patients with other hematologic malignancies to allow for more effective evaluation of the feasibility and acceptability of the nurse/pharmacist visit.

**Pivot Required: Tracking Patient-Provider Interaction Frequency**

Staffing redeployment to meet COVID-19 requirements, high clinic nurse caseload, and a surge of oncology patients with complex needs in June thwarted team attempts to implement the nurse/pharmacist visits. Undeterred, the QI team developed a template to track visits of new patients with ALL seen in the QI period ( $n = 8$ ). Jillian Powers, BSN, RN, OCN, the oncology nurse navigator, explained that this tool enabled nurses to track patients who visited the outpatient setting for lab work, transfusion support, and chemotherapy. Powers shared, “I was able to track the frequency of how often they were seen by one of our providers, either a nurse practitioner or a physician. And then, I was also able to track when they had communication with the clinic nurse, whether it was in person or by MyChart message, or a telephone call regarding their care or questions they had. So, we were able to track the frequency of how often they were seen by providers rather than the nurse visits that we had intended to do.”

The tracking tool now provides a structure for both the inpatient and outpatient care teams that helps to streamline communication and identify future opportunities to integrate nurse/pharmacist visits with other clinical visits. The QI team plans to use this tracking tool as a model for other cancer types in both inpatient and outpatient settings.

**Refocusing on the Big Picture**

Although the nurse/pharmacist visits could not be implemented as intended, attention to process steps and thoughtful planning allowed the team to pivot and create a surrogate tool that supplied invaluable data about patient transitions from inpatient care to the outpatient setting. Allison Anderson, BSN, RN, the outpatient clinic nurse working with the QI team, emphasized, “We were able to very easily identify things that needed to be tracked and monitored. And we were able to find opportunities to capture the patient and their needs, to make sure that nothing falls through the cracks, and to ensure that there is consistency with our care. It was more difficult to put it into action, but it was an excellent opportunity to identify those factors. The project really helped us refocus on the big picture.” There were discernible gains for

**Table 2. Inova Schar Cancer Institute: Overview of QI Activities and Measures of Success**

Activity	Measure of Success
1. Create schedule in Epic for lab check and nurse/pharmacist visit	Schedule in Epic
2. Develop a process for what is covered with patients during nurse/pharmacist visit	Rubric for nurses/pharmacists to follow
3. Implement nurse/pharmacist visit	<ul style="list-style-type: none"> <li>Track number of patients seen</li> <li>Track number of questions raised by patients during visit</li> <li>Track percentage of nurses/pharmacists who follow rubric during visit</li> </ul>
4. Create a process for outpatient clinic nurses to shadow during nurse/pharmacist visit	<ul style="list-style-type: none"> <li>Track number of nurses who shadow visits</li> <li>Measure percentage increase in outpatient nurse confidence from pre to post</li> </ul>
5. Implement lunch-and-learns or other educational series for outpatient nursing staff	<ul style="list-style-type: none"> <li>50 nurses participate in educational sessions</li> <li>Measure percentage increase in outpatient nurse confidence from pre to post</li> </ul>

clinic staff. For instance, they were able to develop a more comprehensive picture of patients’ lab results, which in turn helped them to anticipate patient symptoms and side effects. Anderson stressed that, overall, participating in the planning process increased communication between her, other team members, and patients and helped the team identify barriers that they needed to address and resources they need to marshal to ensure continuity of care.

A new outpatient nurse practitioner started in October 2020 and Jillian Powers, the nurse navigator, felt that the new tracking process would help orient her to the management of patients with ALL. Additionally, QI team members view their endeavor as a first step toward raising wider awareness among Inova Schar Cancer Institute staff and leadership about how hematology care

**Table 3. Nurse/Pharmacist Visit Rubric**

Topic to be Addressed	Action Items
<b>Registered Nurse</b>	
Lab results	<ul style="list-style-type: none"> <li>Review available lab results.</li> </ul>
Disease symptoms/ treatment side effects	<ul style="list-style-type: none"> <li>Inquire about any symptoms/side effects patient is currently having.</li> <li>Provide education on self-care management. Report uncontrolled or severe issues to MD.</li> <li>Establish follow-up plan to re-evaluate.</li> </ul>
Home medications	<ul style="list-style-type: none"> <li>Ensure patient has adequate supply of all necessary home medications.                             <ul style="list-style-type: none"> <li>Send refills to pharmacy if necessary.</li> </ul> </li> <li>If patient on specialty drug, confirm patient has been in touch with pharmacy for timely refills/delivery.</li> <li>Refer to clinical pharmacist for monthly medication review visit and as needed for questions/education related to current/new medications.</li> </ul>
Psychosocial needs	<ul style="list-style-type: none"> <li>Inquire about any current psychosocial issues the patient may have.</li> <li>Refer to <i>Life with Cancer</i> therapists/services as needed.</li> <li>Refer to Inova Schar Cancer Institute case management as needed.</li> </ul>
Appointments	<ul style="list-style-type: none"> <li>Confirm and review upcoming infusion/admission/APP/physician/nurse visits and provide printed schedule.</li> </ul>
<b>Clinical Pharmacist</b>	
Home medications	<ul style="list-style-type: none"> <li>Ensure patient is taking all home medications as prescribed.</li> <li>Ensure patient is taking all prescribed PRN (as needed) home medications appropriately for symptom management.</li> </ul>
Current treatment regimen	<ul style="list-style-type: none"> <li>Ensure patient is aware/has good understanding of current treatment regimen schedule and reportable side effects of drugs in regimen.</li> <li>Provide education/treatment calendar as needed.</li> </ul>
Clinical pharmacist recommendations	<ul style="list-style-type: none"> <li>Consult with attending oncology physician for any recommendations for drug discontinuation, dose adjustments, or additions.</li> </ul>

differs from solid tumors, especially how patients with ALL require intensive monitoring, labs, tracking, and transfusion support. Contingent on staffing, the QI team anticipates growing their nurse/pharmacist visits beyond ALL disease management to become standard of care for all patients with cancer. For now, Powers is hopeful that the project is sustainable and will strengthen relationships between patients and providers, help patients better manage side effects, and reduce patient anxiety as they transition from inpatient to outpatient care.

**The Altru Cancer Center Experience**

The Altru Cancer Center in Grand Forks, N.D. is part of the Altru Health System, which serves northeast North Dakota and northwest Minnesota. Altru Cancer Center has seven outreach clinics across its service area and is accredited by the American

College of Surgeons’ Commission on Cancer. Recently, in response to costs and the changing medical landscape, cancer care at Altru Cancer Center was consolidated to provide diagnosis and treatment for many cancer types in an inpatient multi-specialty unit (MSU). Specialist care, including ALL evaluation, is provided through the Mayo Clinic Care Network, an approximately six-hour drive from Grand Forks.

**Building Clinical Competency in ALL Therapy**

Provider capacity is limited in this North Dakota community—many providers leave the area and recruitment to the area is challenging, especially in oncology. As a result of this recruitment challenge, many MSU nurses lack training in blood counts, are unfamiliar with approaches to oncologic emergency, and feel underprepared to manage patients with ALL. The low annual



Altru Cancer Center

volume of patients with ALL at Altru Cancer Center ( $n = 6$  from 2018 to 2020) compounds this collective sense of unfamiliarity with management considerations specific to ALL and presents few opportunities for nurses to build competency in managing patients with this disease. To build clinical competency, the seven participants who attended the workshop in March, including nurses, the chaplain, a clinical nurse educator, a family nurse practitioner, and the director of cancer services, agreed to focus their QI intervention on supporting nurses to meet Oncology Nursing Society (ONS) standards for performing ALL induction, consolidation, and salvage treatment.

The team decided on a combination of didactic and practicum learning tactics to improve clinical competency among MSU nurses. The goal was to increase competency by 50 percent as measured by the ability of staff to achieve the following:

- Earn an ONS provider card for chemotherapy and immunotherapy (previously chemotherapy and biotherapy)
- Participate in an education activity to improve patient outcomes

- Pass a 25-question ALL-specific written test
- Participate in a practicum learning experience.

Participants in the QI initiative would also be able to accrue points on the Nursing Clinical Ladder, which is a program designed to reward professional development for nurses.

In May, one month into the initiative, two of the four core QI team members were reassigned to focus on efforts related to the COVID-19 pandemic. Despite their departure, the QI team implemented a competence procedure to identify nurses eligible for ONS chemotherapy/immunotherapy certification (Table 4, right).

### **Earning the ONS Provider Card**

Six of ten inpatient nurses had already received their ONS provider cards for chemotherapy and immunotherapy by the first QI milestone and the ALL-specific online test was anticipated to launch in June. However, by July, Altru Health System had undergone significant restructuring. The director of Cancer

**Table 4. Inpatient Chemotherapy/ Immunotherapy Competence Procedure**

**Purpose:** Organize information on chemotherapy/ immunotherapy certification and enhance administration capacity in the inpatient setting.

1. Manager or Supervisor will recognize nurses with strong skill and knowledge to prepare for certification. Minimum of 6 months of independent nursing care is preferred.
2. Nurse agrees to undertake this responsibility.
3. Nurse will go online to the Oncology Nursing Society webpage and sign up to take the course: Fundamentals of Chemotherapy Immunotherapy Administration Certification Course.
  - a. A copy of certificate will be kept on file in NetLearning.
4. Nurse will complete Employee Health form.
5. Nurse will complete Hazardous Drug Risk Acknowledgement form.
6. Nurse will spend time at the Cancer Center administering agents with the following time frame and objectives:
  - a. Nurse will use proper technique while accessing port.
  - b. Nurse will learn and use proper technique and utilization of the CSTD (closed system transfer device) to priming chemotherapy.
  - c. Nurse will use proper technique and safety precautions while hanging chemotherapy.
  - d. Nurse will be introduced to Epic Beacon.
7. Nurse will schedule time with inpatient validator to review inpatient Epic Beacon for releasing orders. The inpatient validator will then sign off validation in NetLearning.
8. The certification class is renewed every other year. On the year in between, nurse will need to take class offered by the Cancer Center to maintain validation.

Services had departed, and more than 170 employees were unexpectedly laid off. Those remaining had adopted additional roles and responsibilities.

Though this organizational restructuring undoubtedly slowed implementation of the intervention, by the end of the QI time frame the overall number of inpatient MSU nurses with ONS provider cards increased by 125 percent (Figure 2, page 70). The team expects a total of 11 certified nurses by the end of 2020.

Moreover, an unanticipated outcome from the QI intervention was a 42 percent increase in the number of port-validated nurses from 12 to 17. Prior to the intervention, there was no full coverage by port-validated staff on the inpatient unit, leading to occasional treatment delays for patients with cancer.

**Clinical Education and Practicum**

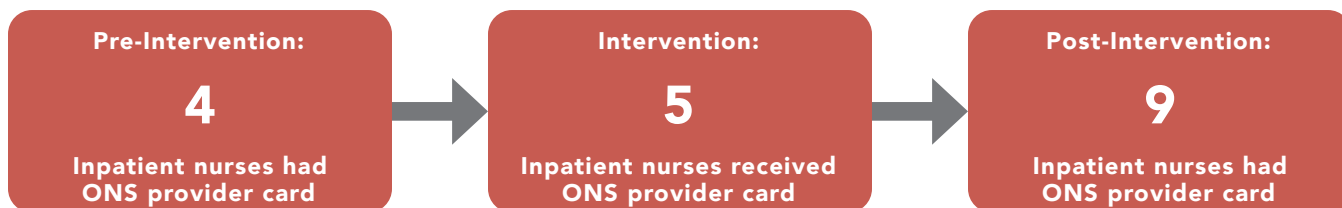
By the end of the intervention period the ALL test had been finalized, although not yet released. The original 25-question test was reduced to 11 multiple-choice and open-ended questions that focused on the clinical presentation, diagnosis, and treatment of patients with ALL, as well as on chemotherapy management considerations. To prepare for the ALL test—which Katie Richardson, MSN, RN, practice manager for Cancer Services and Palliative Care, anticipated would be delivered in late 2020 or early 2021—learners will be provided with a blood cancers 101 video and ONS articles and resources. After learners complete the test, Richardson will review results and invite learners to participate in additional educational activities to address persistent knowledge gaps. In terms of the practicum experience, the QI team was able to provide it to those with newly acquired ONS provider cards. Additionally, nurses who received their ONS provider cards shadowed nurses in the outpatient chemotherapy clinic to increase their knowledge and comfort level in caring for patients with cancer.

**Poised for Success**

This QI project served as Altru Cancer Center’s 2020 Cancer Services Quality Improvement Project and therefore garnered a strong commitment from participants to ensure success. Despite the unanticipated restructuring and layoffs that occurred during the intervention period, the QI team improved clinical competency for managing patients with ALL in the MSU by increasing the number of nurses with ONS provider cards for chemotherapy/ immunotherapy and the number of nurses equipped to manage chemotherapy portacaths. As a result of building competence through this ALL-specific clinical education, inpatient nurses now feel poised to manage patients with ALL. There is a more clearly defined process for chemotherapy delivery and Altru Cancer Center now provides full chemotherapy coverage in the MSU. Moving forward, ONS certification in chemotherapy/immunotherapy is likely to become an expectation for charge nurses in



Figure 2. Number of Inpatient Nurses with an ONS Provider Card



the MSU, and the QI initiative will be incorporated into the Clinical Ladder points system in 2021.

### The Vanderbilt University Medical Center Experience

Vanderbilt University Medical Center annually serves approximately 2 million people and is one of the largest academic medical centers in the Southeast region. Adult patients with ALL (approximately 130 per year, including those currently undergoing treatment and in various stages of follow-up) are seen in the Department of Hematology/Oncology, which is served by a long-term follow-up care clinic, and staff liaise with the Department of Pediatrics to determine care for adolescents diagnosed with ALL.

#### Assessing Need, Developing Tools, Coordinating Care

The nine participants of the May 2020 visiting experts workshop included administrators, nurses, and medical oncologists. The group highlighted the lack of centralized electronic health record (EHR) tools that the entire care team can access to coordinate care for patients with ALL. For instance, at the time of the workshop, patients received a handwritten calendar of appointment times for treatment, procedures, and associated workups. Participants felt that this calendar could be optimized to better support both internal and patient-provider communication with, for instance, reminders to acquire laboratory results from local providers; resources for patients concerning housing, emotional, or financial assistance; and automatic adjustments to a patient's monitoring schedule should treatment be delayed.

The four core QI team members, including a hematologist/oncologist, two managers (of patient care and quality and accreditation), and the hematology clinic nurse, planned to conduct a needs assessment and identify resources to support coordination of care as a platform for developing and piloting an Epic tool

prototype for patients with ALL. Conversations with stakeholders outside the QI team revealed wider interest for an EHR-based care coordination tool for ALL and throughout Vanderbilt University Medical Center. Unfortunately, however, an Epic design freeze was instated due to a system-wide upgrade. In response, the team explored existing tools in Epic that would not require additional programming and decided to create an EHR-based calendar that would help move patients with ALL through the care continuum and notify patients and providers about changes in the schedule.

At the end of the QI period, the QI team had begun using this Epic reminder tool to coordinate patient care. For instance, when one patient with ALL needed surgery (unrelated to ALL treatment), the patient's ALL treatment schedule had to be shifted by three weeks. The reminder tool was used to notify all care team members that imaging, labs, and other treatment-related components would need to be rescheduled. A reminder was also sent seven days prior to the resumption of ALL therapy to allow time for the care team to evaluate the patient's health status and readiness for treatment. Though the patient did not have access to a visual calendar, the clinic nurse was able to provide information about schedule changes and updates.

#### Determining Meaningful Measures of Success

Although Vanderbilt University Medical Center was unable to implement its original intervention as planned, the opportunity for QI combined with the addition of a new nurse to support Olalekan Oluwole, MD, the hematologist/oncologist, allowed the QI team to review clinic processes, workflow, and team communication. Amelia Taggart, RN, the hematology clinic nurse, noted that due to this review, QI team members realized that they were not aware of all the functions that Epic offers and are now being trained on other existing Epic tools that are available to



Vanderbilt University Medical Center

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streamline patient care. In addition, Caroline Cavanaugh, RN, staff nurse at the hematology clinic, found that using the reminder tool strengthened communication between her and Dr. Oluwole, with whom she now has regularly scheduled meetings to review cases and answer questions. As Cavanaugh explained, this fortified communication has enabled her to offer greater clarity to patients with ALL regarding next steps in their treatment. “I didn’t work with Epic before I came to Vanderbilt University Medical Center. I have used [the reminder tool] a lot to try and help remind me to talk to the doctor or remind both of us,” shared Cavanaugh. “And if we need to adjust [a care plan], having me in the loop helps me follow up when things need to be rescheduled or adjusted.” Since beginning to use the Epic tools, Cavanaugh has

also noticed a reduction in messages from patients with ALL and other tumor types inquiring about results or treatment-related issues.

On Nov. 1, 2020, the team introduced a new process to support communication and maintain continuity of care by assigning APPs to specific physicians. The team now plans to determine metrics, such as “missed appointments,” that will meaningfully measure the effectiveness of both the calendar tool and tighter coordination between APPs and physicians in improving patient-provider and provider-provider communication. A future goal that has emerged from participation in the QI project involves converting paper-based care pathways into EHR-based documentation that any nurse can access to support patient care.

## Closing Thoughts

QI is a form of experiential learning that involves hypothesis testing and performance improvement, but QI interventions do not always run to plan. Organizational and personnel changes are common obstacles in these initiatives and, thus, planning and implementation needs to be responsive and flexible. In addition to the hurdles that might usually be expected as part of QI, the staff involved in the interventions described were tested by the COVID-19 pandemic in unimaginable ways. Yet these committed healthcare professionals embraced their challenges and persisted with improvement in ways that speak to robust organizational commitment to QI, strong local leadership, and personal fortitude. The success of these initiatives demonstrated careful upfront cataloging of challenges that were real, the ability of participants to adapt, and creative repurposing of existing EHR-based tools. These factors point to improvement in the management of patients with ALL with the potential for sustainability well beyond the intervention period.

*Alexandra Howson, PhD, is an experienced medical writer, researcher, and educator with a strong background in principles of adult learning combined with clinical practice as a registered nurse. Based in Seattle, Howson trained in Scotland as a registered general nurse and has a doctorate in sociology.*

ACCC thanks the staff at the Inova Schar Cancer Institute, Altru Cancer Center, and Vanderbilt University Medical Center for engaging in this acute lymphocytic leukemia QI initiative and sharing their experiences. Additional resources about acute lymphocytic leukemia are available at [acc-cancer.org/all-care](http://acc-cancer.org/all-care).

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