Partnering with Data Analytics to Promote Survivorship Care Plan Success

BY ANDREA ROWE, BS, RHIT; ALICIA ROSALES, LCSW, OSW-C;
AND CHRISTOPHER WEED

In 2016 there were an estimated 15.5 million cancer survivors living in the United States. This number is expected to grow to more than 20 million before 2026. During the past 20 years, patient survivor advocates and national organizations have encouraged cancer survivors to take an active role in their health journey after treatment. This includes requesting a survivorship care plan from their oncology providers.

The survivorship care plan is the patient's guide to life after cancer. It outlines the treatment the patient received; recommendations for surveillance, follow-up, and care coordination; and the long-term risks related to treatment. In 2007 the Institute of Medicine (now the National Academy of Medicine) released *From Cancer Patient to Cancer Survivor: Lost in Transition*, a report that outlines the struggles cancer survivors face when treatment ends. The report encouraged all cancer survivors to request a survivorship care plan from their oncologist.[1] During the past decade, several national oncology organizations such as the National Comprehensive Cancer Network, the American Society of Clinical Oncology, and the American College of Surgeons have followed suit with clinical recommendations and accreditation requirements related to survivorship care planning.

With these recommendations, the survivorship care plan became part of the standard of cancer care. Oncology programs have invested in both clinical and non-clinical resources to meet and accurately report on this standard. Comprehensive reporting on compliance requires a cohesive, open, and dedicated relationship between two teams: the clinical team and the report development team. This article outlines how one oncology program is pushing through the inherent challenges to find success with delivering and reporting on survivorship care planning.

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In Pursuit of Standard 3.3

When the Commission on Cancer (CoC) released an updated version of the *Cancer Program Standards* in 2012, including a new standard for survivorship care planning, oncology programs that sought accreditation had to make new strategic investments

in staff and program support.[2] "Standard 3.3: Survivorship Care Plan" is one of the most challenging new standards for CoC accreditation to date. Up to 80 percent of cancer program leaders have identified Standard 3.3 as one of the most difficult to achieve.[3] In 2014 a CoC survey of program participants revealed that only 37 percent of programs felt "completely confident" that they would be able to implement Standard 3.3 by 2015.[4]

The relevant literature cites multiple implementation difficulties among cancer programs attempting to achieve Standard 3.3, such as limited staffing, lack of reimbursement, limited integration of an electronic health record (EHR), and more. In addition, most oncology programs are so consumed with developing and implementing survivorship care that they have paid little attention to actually tracking and reporting their survivorship care plan compliance.

Survivorship at MSTI

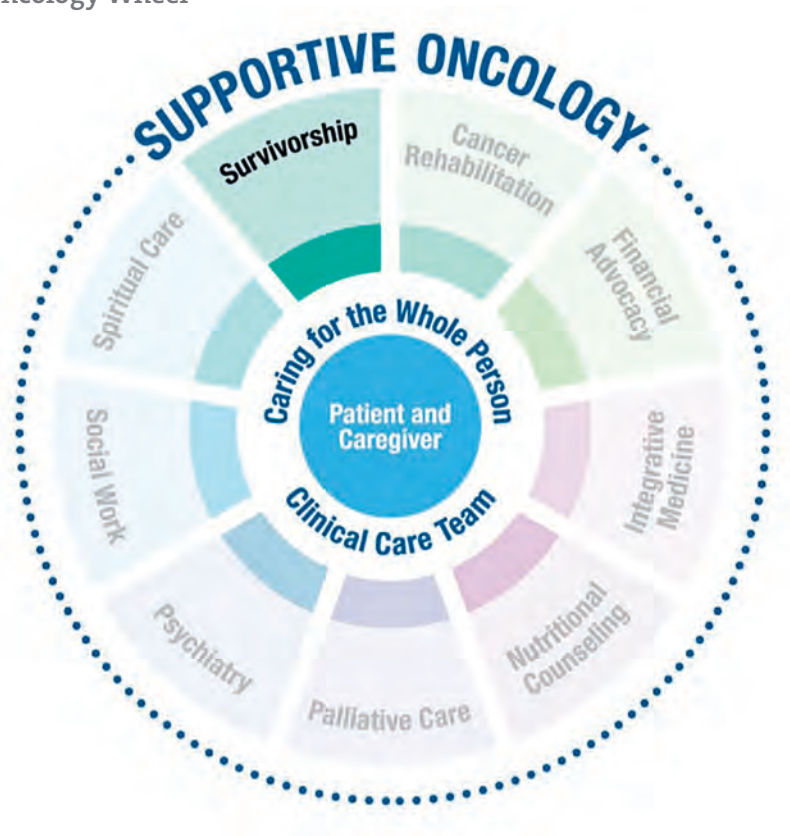
St. Luke's Mountain States Tumor Institute (MSTI) began building its survivorship program with evaluation and reporting in mind. MSTI is a multidisciplinary, medium-sized, hospital-based community cancer center with five outpatient clinics stretching across southern Idaho. MSTI sees approximately 3,500 new analytic cases a year; that is, cases that are both diagnosed and treated at MSTI. The multidisciplinary care provided by the cancer center includes surgical oncology, medical oncology, and radiation oncology services provided by both employed and contracted physicians. MSTI also has a robust supportive oncology program that promotes integrated survivorship care (see Figure 1, below).

MSTI has provided survivorship care plans to patients since 2010. Initially, the cancer program focused on patients with breast cancer; it has since been expanded to include patients with all cancer types who meet the criteria for survivorship care plans outlined by the CoC. MSTI nursing staff identify patients who are likely to be eligible for survivorship care when they begin treatment with curative intent. Oncologists and primary registered nurses track those patients throughout their treatment and discuss survivorship with them at their first follow-up appointment after treatment is completed.

Reporting Challenges

MSTI's survivorship care plan program has taken a proactive approach to ensure that eligible patients are identified early, which has required a significant investment in time and resources. When MSTI first began providing survivorship care plans, its oncology service line was using a different EHR than the rest of the health

Figure 1. Supportive Oncology Wheel



system. This made the evaluation of the survivorship program a highly manual process in which tracking and reporting required many staff hours.

The process required the oncology team to create a custom report within the EHR to identify when cancer patients had completed radiation or infusion chemotherapy. As such, reporting capabilities were highly limited and unable to identify the patients receiving oral chemotherapy or those treated with definitive surgery only. The report was also not able to filter out patients with advanced disease or those receiving therapy with palliative intent. Each patient the report did identify was reviewed manually by a clinical team member to determine eligibility for the survivorship care plan program. Patients who were eligible were marked accordingly and tracked to ensure that orders were placed and that patients attended their survivorship appointments.

Though the program was generally successful, the process had limitations and was time consuming. Compliance calculations were essentially an educated guess, defined as the number of survivorship care plans delivered divided by the number of analytic cases closed by the tumor registrars during the same period. There was no way to identify eligible patients who may have been omitted by the report; the clinical team could only base compliance calculations on the information provided by the report and the tumor registry.

New EHR, New Approach

In October 2016 St. Luke's Health System implemented a single system-wide EHR spanning all care settings. The EHR incorporates a foundation reporting function that can identify patients who complete chemotherapy, report the number of days lapsed since the end of treatment, and report whether a survivorship care plan has been delivered to a patient. But this foundation report was unable to identify patients undergoing radiation or patients who had surgery only. It also could not provide any analytics or high-level summary data with which to evaluate program compliance with survivorship care plan delivery.

After using the new EHR for six months, it became clear to the oncology staff that the foundation reporting available could not provide the necessary data to report survivorship care plan compliance to the CoC. That was going to require additional resources and support from the report development team, which needed to understand each of the variables necessary to create a meaningful survivorship compliance report. Accordingly, the survivorship program manager began meeting regularly with the report developers to create a more comprehensive reporting capacity.

The Report Development Process

The maintenance required for the ongoing, accurate reporting of survivorship care plan compliance meant that oncology staff and the report development team had to approach the project as a continually evolving one. Workflows would need to be modified on an ongoing basis to meet the multidimensional needs of both patients and clinicians. Thus, the relationship between the clinical team and the report development team had to be built on a solid foundation.

Step 1: Define Your Goal

Any report development process typically begins with a request for data. The report development team meets with the requester to discuss the desired parameters of the report. These parameters should include the purpose of the report, the data elements needed, defined metrics, visualizations needed, workflows involved, and EHR build specifics. The development of the report can then begin. The requester and the report development team typically work through several iterations of the report until the requester accepts it as complete and accurate.

In this case, the report development team needed to appreciate the complexities of the survivorship workflow, understand the clinical indicators for survivorship, know how eligible patients are identified in the EHR, and understand which documentation to look for. Report development team members also had to know the key reporting metrics required by the CoC. This information helped the team understand that a broad range of patients with various diagnoses undergoing different types of treatment are eligible to receive survivorship care plans. Being able to identify which specific patients should receive a survivorship care plan from the long list of patients within the system-wide EHR was the development team's first priority.

Step 2: Define Your Patient List

The reporting process requires report developers to first identify all patients in the EHR who have a cancer diagnosis. This initial data pull yields the names of tens of thousands of patients. Report developers then determine disease stage. Patients with stage IV disease are removed, because they do not meet the CoC eligibility criteria for survivorship. Next, report developers identify patients who have received cancer treatment within the past two years. Treatment is defined as chemotherapy, radiation therapy, and/or surgery.

The report development team meets with the survivorship program manager to review and validate their results after each revision of the report. Ultimately, the team identifies the appropriate patients and creates a list of individuals with cancer diagnoses who are treated with curative intent by completing surgery, chemotherapy, or radiation therapy with no additional treatments planned.

Step 3: Verify Data Elements

Developing a survivorship care plan report requires significant collaboration and validation between the clinical team and the report development team. The underlying data are unique and disparate, and data elements are entered into the EHR in a variety of ways, depending on treatment type and intent. The workflow associated with each treatment modality is also unique to each treatment scenario. For example, providers often select a diagnosis code from a pre-populated list of diagnosis descriptions that may be close to the patient's diagnosis but not the most accurate. Though the provider notes or text documentation for the patient are always the best source of clinical information, notes or text do not offer discrete data fields for the report development team to pull from. The team must rely on discrete data entered into the appropriate tables and fields built into the EHR.

Step 4: Identify Eligible Patients

Though discrete fields are critical for accurately identifying patients with eligible diagnoses, the variability within diagnosis descriptions makes it difficult to ensure the accurate identification of patients. Report developers must identify all potentially eligible diagnosis codes and descriptions and remove any that are ineligible. This includes identifying any benign diagnoses that may be incidentally included, such as patients with chronic malignant hematology who remain on treatment indefinitely.

The survivorship program manager should also identify metastatic cancers within the patient list because they, too, are ineligible for survivorship due to advanced disease. As an example of how difficult this can be, diagnosis descriptions have multiple variations of the word "metastatic," including "metastasis," "metastases," and "metastasized." These permutations must be verified and accounted for within the report.

Step 5: Track Delivery Metrics

Once a list of eligible patients is generated from the EHR, report developers associate additional data elements with the patients listed. These include the variables associated with their treatment, including treatment start and end dates, care team data, diagnosis and staging information, and other elements. Developers then use treatment end dates to calculate due dates for survivorship care plan delivery. Once a survivorship care plan has been delivered to a patient, the report should track the delivery date and method of delivery (in person or by mail). Report developers can group delivered survivorship care plans by the number of months it took to deliver the plan compared to the treatment end date.

Step 6: Account for Different Scenarios

To break down all potential scenarios within the clinical workflow, the report development team works with the clinical team to understand business rules, assign logic, and create the metrics required by the CoC. These workflows are dependent on the treatment plan for each patient. For example, patients may begin with surgery and never have additional treatment. In this case, the end of therapy is defined as the date of surgery, and the survivorship care plan delivery due date is calculated as six months after the date of the surgery. Some patients proceed to chemotherapy and radiation therapy, whereas others may have only one or the other. Still other patients are placed on long-term maintenance drugs; in that case, the survivorship care plan delivery due date is calculated as 18 months from the diagnosis date.

The survivorship program manager and the report development team meet regularly to flesh out each scenario and identify example patients within the EHR to determine when and how survivorship orders are to be placed. This allows report developers to correctly identify end-of-treatment dates for patients within each scenario. Deviations from the standard workflow inevitably occur, and report developers must be able to identify all potential deviations and their impact on the data. Some examples of deviations from the standard workflow include:

- The survivorship appointment was ordered and canceled.
- The patient did not attend the survivorship appointment.
- The patient declined the survivorship appointment, and the survivorship care plan was mailed.

Delivery Stats for All Eligible Patients, Figure 2, right, summarizes the variation in the survivorship care plan delivery workflow.

Step 7: Account for Elements of the Report

One of the most daunting aspects of survivorship care reporting is that it crosses the entire continuum of the cancer care experience. Among others, all of these elements must be included in the report:

- Cancer diagnosis date
- Identification of treatment intent
- Staging (or lack thereof in a structured field)
- Oral chemotherapy treatment via medications processed through the MSTI clinic or hospital
- Oral chemotherapy treatment via mail order
- Radiation treatment
- Chemotherapy infusion treatment
- Surgical treatment/intervention
- Hospice (as an exclusion)
- Survivorship appointment
- Delivery of the survivorship care plan
- Follow-up appointments

Maintaining the Report

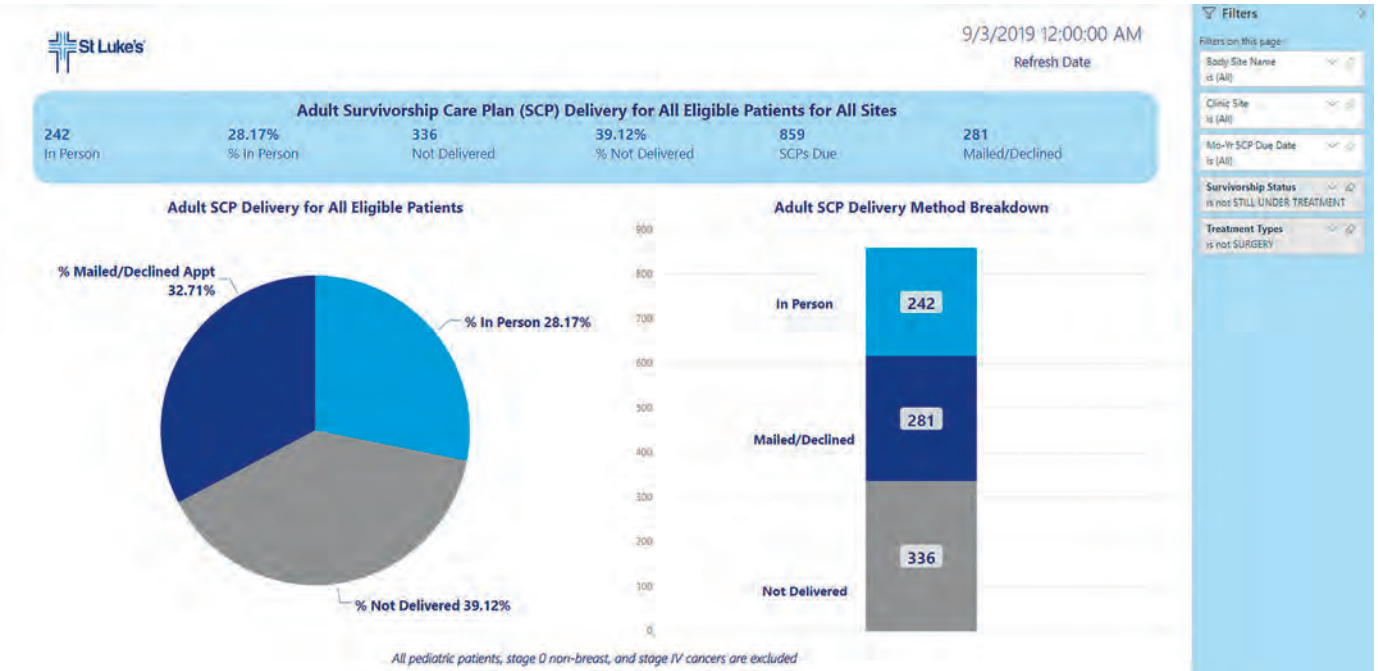
Ongoing maintenance of reports that span the continuum of care, such as survivorship, means that the report development team is working on a continually evolving project. In other words, the work is truly never done because the manner in which patients receive care and clinicians provide care is constantly advancing. Workflows are modified to meet the multidimensional needs of both the patient and the clinician, and the report refinement process is ongoing. These impending changes demand that the relationship between the clinical team and the report development team be built on healthy and respectful communication.

It is essential that the report development team and survivorship program manager meet frequently to review data and ensure that the report is accurately capturing the care delivered and documented. The MSTI team meets monthly, at which time its members discuss variable ongoing issues. Accurately capturing clinical workflows and understanding their impact on the report's data is a frequent topic of discussion. The clinical team continually identifies additional patients who need to be removed from the list and creates exclusionary criteria that the report development team incorporates into the report.

Break-fixes are one of the foremost reasons the relationship between the clinical team and the report development team must be strong. When the report "breaks," it is no longer completely accurate, and the report development team must determine the scope and full impact of the break. The two teams depend heavily on one another to identify the problems creating the break, such as missing data or patients who are included when they should be excluded.

For example, a break-fix could occur when the names of several oral chemotherapy patients with blank survivorship care

Figure 2. Adult Survivorship Care Plan Delivery for All Eligible Patients for All Sites



plan due dates appear in the data. (Oral chemotherapy at MSTI is handled by the oral chemotherapy pharmacy team, so the necessary pharmacy team members must be pulled into the conversation to identify what changed in the workflow and documentation process.) Once this break-fix is detected, report developers troubleshoot possible reasons for the missing due dates and communicate their findings to the survivorship program manager. The two teams then meet and review example patients within the EHR to determine their next steps.

Immediate communication is essential when a team member identifies something that may be broken or missing. Some break-fixes are minor, whereas others can require an extensive rebuild. The report development team should approach any potential break-fix in a systematic manner:

- Troubleshooting
- Scoping the break
- Modifying the report
- Validating changes made to the report
- Conducting user acceptance testing or validation
- Overseeing final approval to keep the fix in place.

Any changes to EHR build or clinical workflows should be communicated to the report development team early in the process so that it is able to proactively modify the report to account for any changes. The report development team can also make recommendations to ensure that data are captured via discrete structured fields rather than free text fields, which can breed inconsistency.

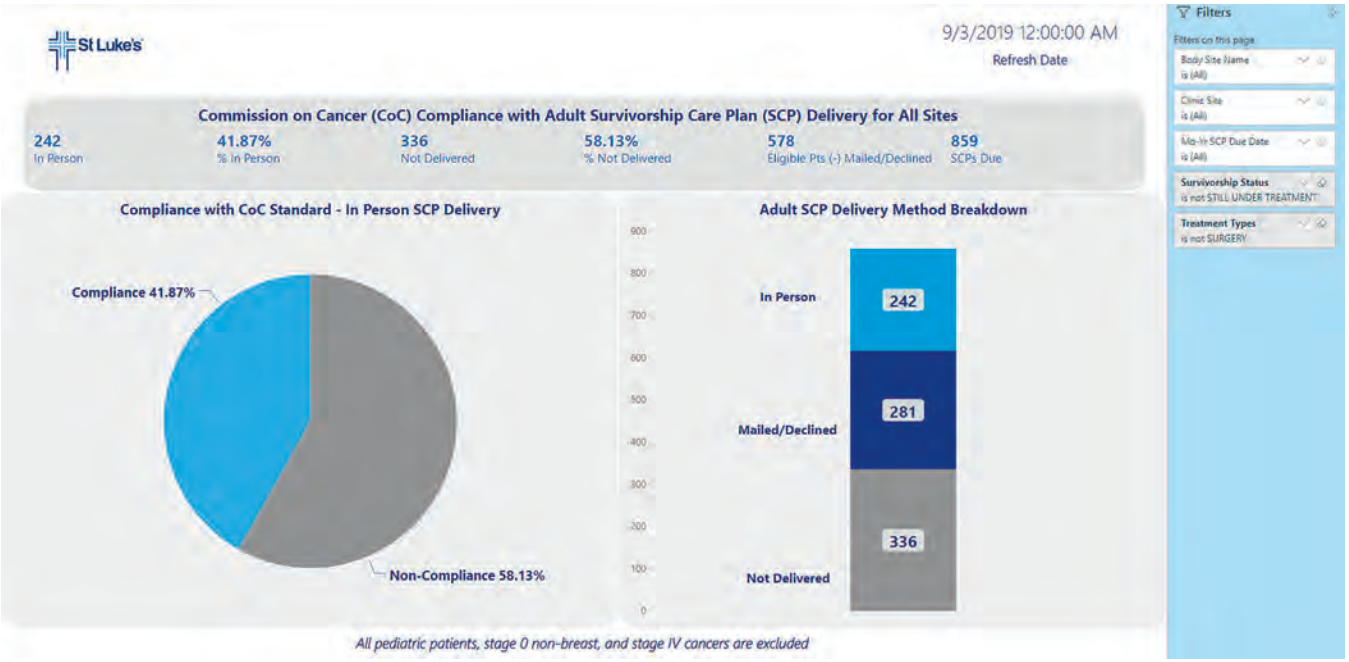
The clinical team needs to be engaged in the use of structured fields very early in the build and workflow development process so that team members understand the impact on reporting—regardless of whether the reporting need is related to regulatory or accreditation requirements. Structured fields also allow for consistent identification of patient populations for treatment purposes and identifying opportunities for improving the care provided to the patient.

Report Visualizations

Maintaining a survivorship care plan is a complex process, making it difficult to visualize in a meaningful way. But it is essential to turn the data collected in the report into actionable information that informs clinical and management team decision making. To do this, it helps to evaluate the needs of your intended audience and collect the relevant metrics to help them visualize the information relevant to them. Simple visualizations are typically easier to understand.

The current version of the MSTI survivorship report contains a high-level summary page that depicts compliance with Standard 3.3. In CoC Compliance Summary, Figure 3, page 44, the column chart on the right depicts survivorship care plan delivery broken

Figure 3. Summary of the Commission on Cancer Compliance with Adult Survivorship Care Plan Delivery for All Sites



down by delivery method. Delivery in person is the preferred delivery method and part of the standard's compliance calculation. The pie chart on the left shows the count and percentage in compliance compared to the count and percentage in noncompliance. This high-level summary is intended to help management and leadership quickly determine compliance status.

Slicers allow the audience to further define the patient population to pinpoint areas requiring more focus. Filters include clinic site, survivorship care plan due date (based on treatment end date), survivorship (care plan) status, treatment type (including various treatment combinations), and cancer site. (Note: Not all filters are depicted in Figure 3.)

Clinical staff use the report to identify patients who need a survivorship care plan delivered. The patient lists summaries in Figures 4A-4C, right, provide the detail necessary for clinical staff to facilitate delivery by the survivorship care plan due date or mark the patient's plan as not needed. Filters are also available within these summaries, including final treatment date, survivorship-ordered appointments, last updated by staff name, and survivorship appointment status. (Note: Not all filters are depicted in Figures 4A-4C.)

The survivorship report can also produce other specific summaries. Figure 5, page 46, shows the percentage of survivorship care plans delivered on time (within six months of final treatment) and cumulative delivery statistics. This summary is actionable and directs the clinical staff to a list of patients that need to have their survivorship care plans delivered. Figure 6, page 47, is a report for the survivorship program manager that shows both cumulative and trended delivery of survivorship care plans, as well as CoC compliance statistics.

Figure 7, page 47, is a physician-specific summary that provides insight into the surgery-only patient population. Before the MSTI team created this customized report, the clinical teams had not been able to appropriately identify surgery-only patients. The survivorship program manager will work collaboratively with surgical groups in the future to include their patients in the survivorship care plan delivery process.

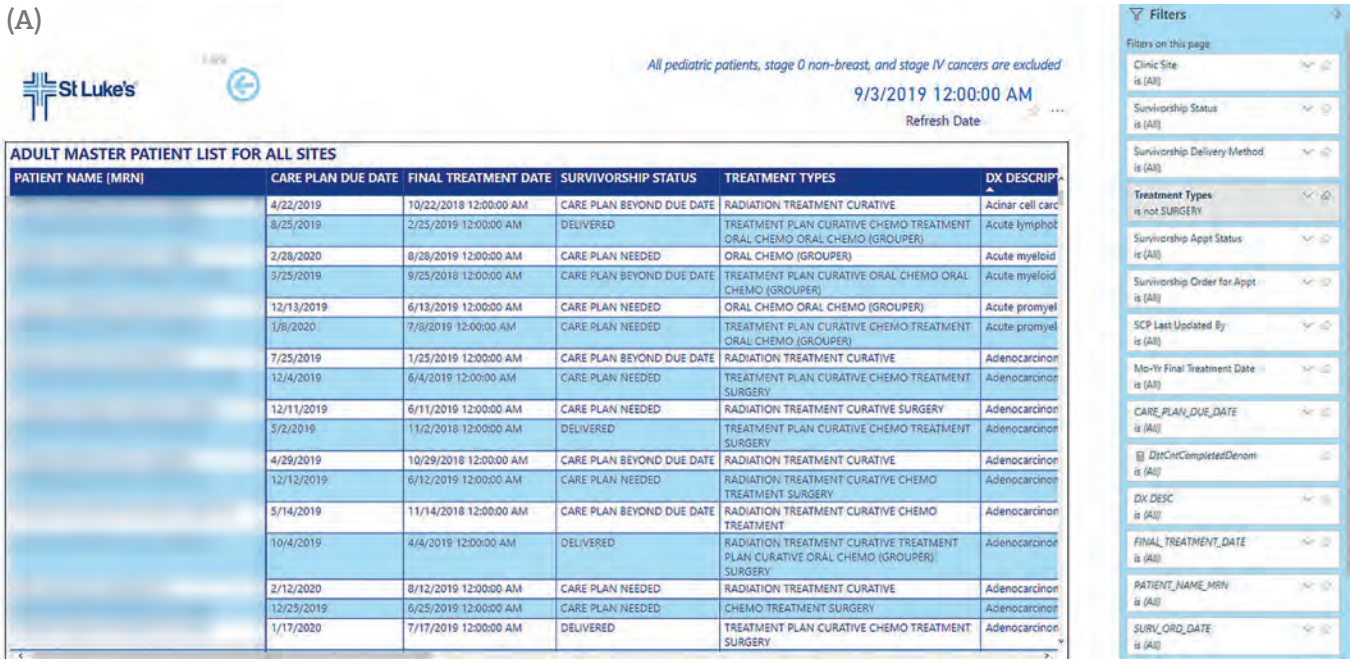
The report also provides delivery statistics trended over time to easily visualize whether delivery statistics are moving in the right direction. Figure 8, page 48, shows the percentage of overall survivorship care plans delivered—regardless of delivery method. Figure 9, page 48, breaks out delivery of survivorship care plans in person, mailed, and/or declined and then shows trending data of in-person delivery. Figure 10, page 49, shows the percentage of survivor care plans that were delivered on time or by the due date.

Though most people tend to respond well to visual representation of data, others prefer to interpret raw data in a table form; all reports show data in both formats to help all staff digest information and be prepared to effect change when necessary.

(continued on page 49)

Figure 4. Master Lists for (A) Adult, (B) Pediatric, and (C) Surgery Only Patients

(A)



(B)

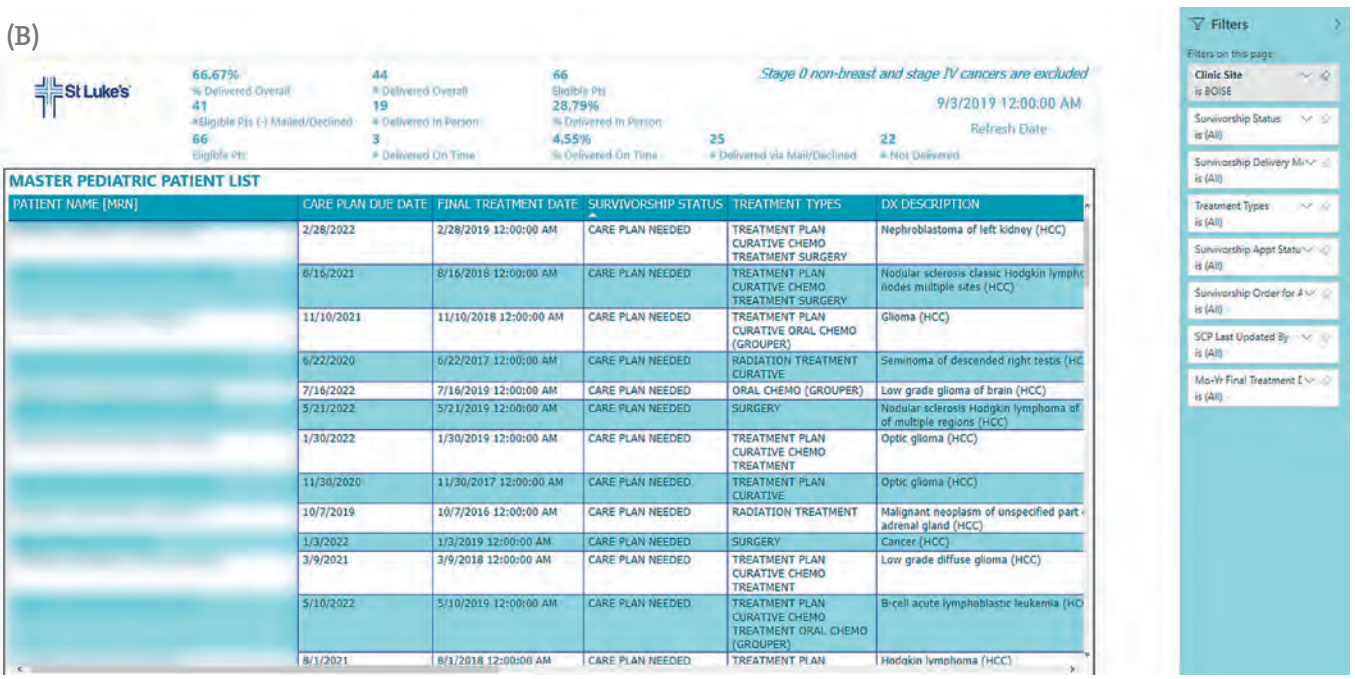


Figure 4. Master Lists for (A) Adult, (B) Pediatric, and (C) Surgery Only Patients (continued)

(C)

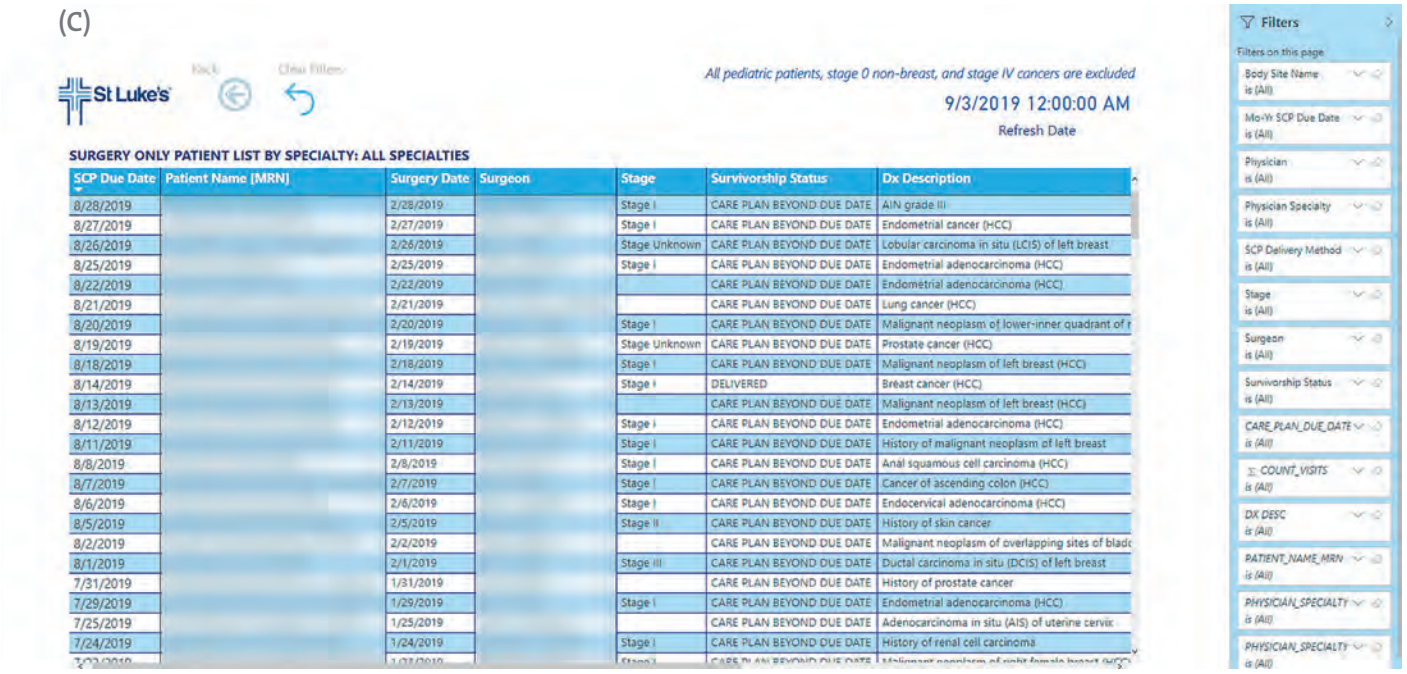


Figure 5. High-Level Performance Improvement Summary – Adult Survivorship Care Plans to Be Delivered

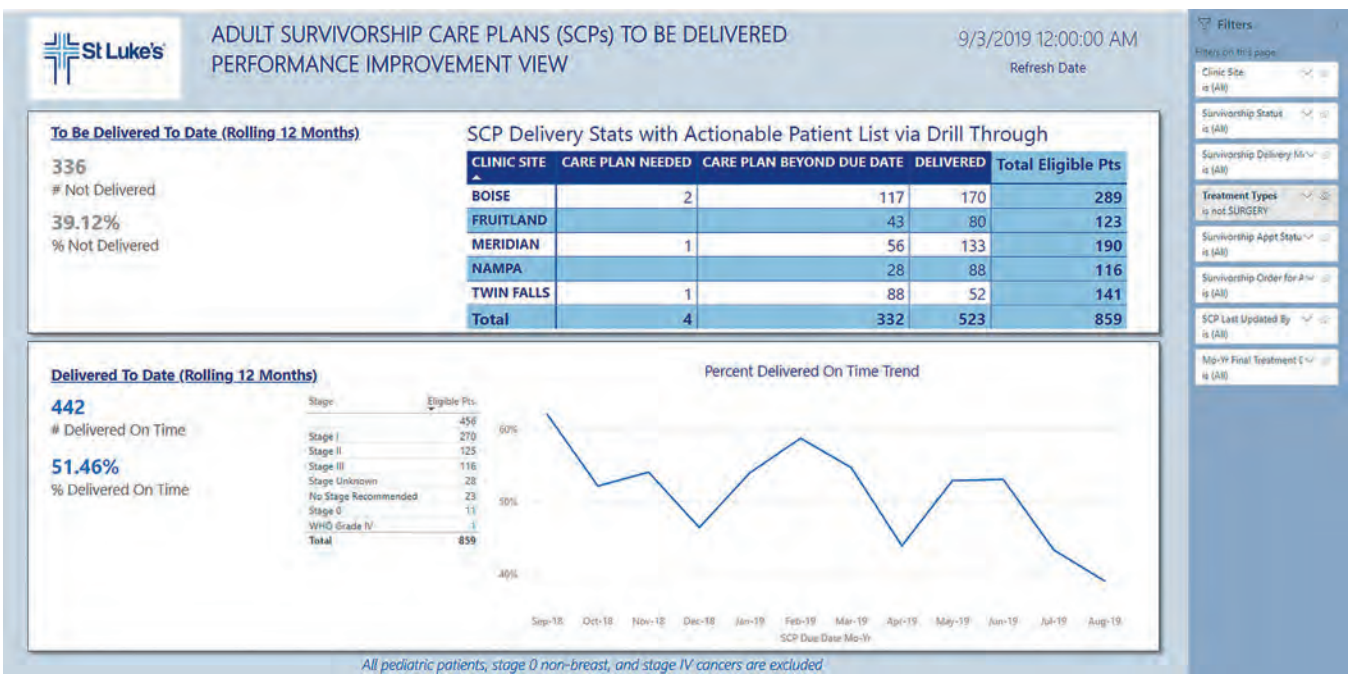


Figure 6. High Level Management Summary – Adult Survivorship Care Plans Delivery Statistics

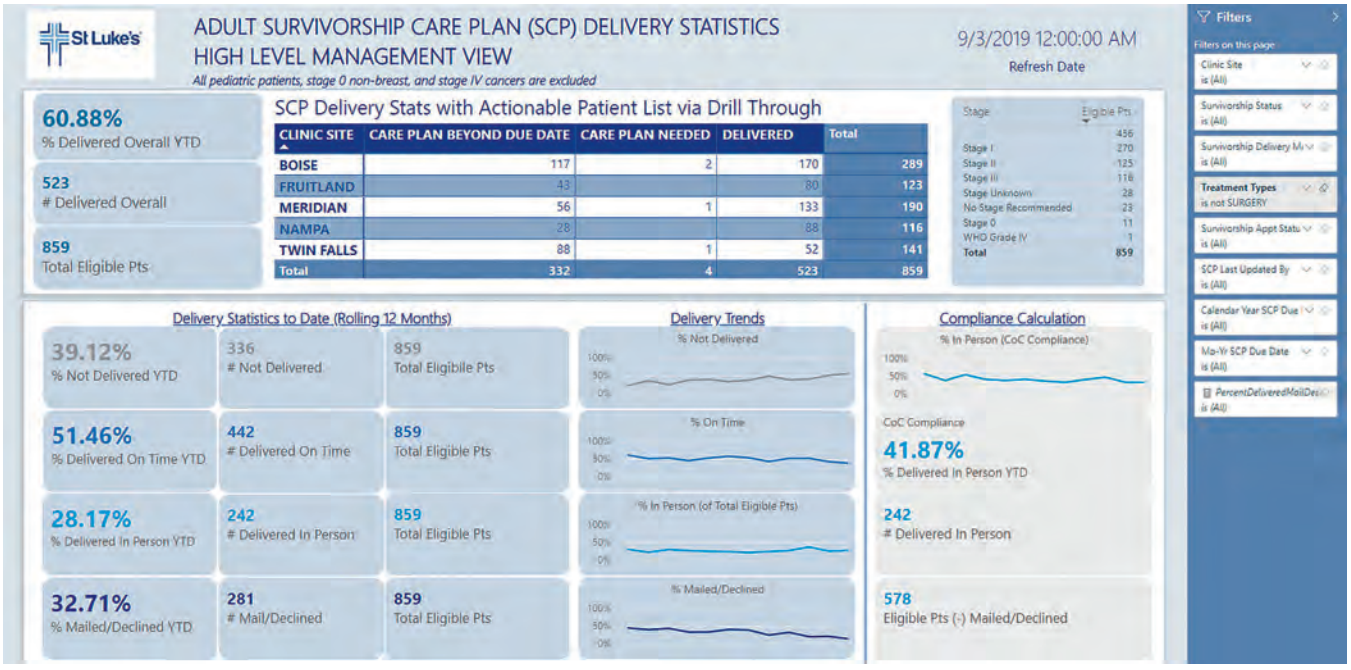


Figure 7. High Level Summary - Surgery Only

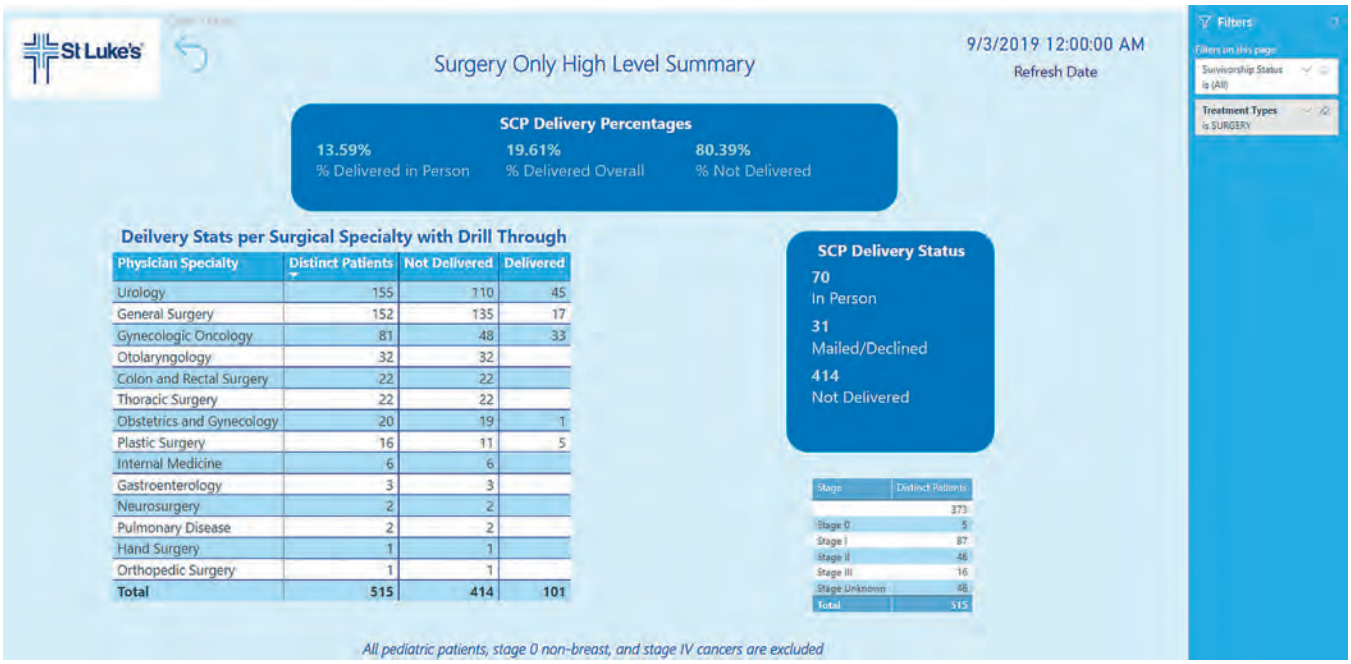
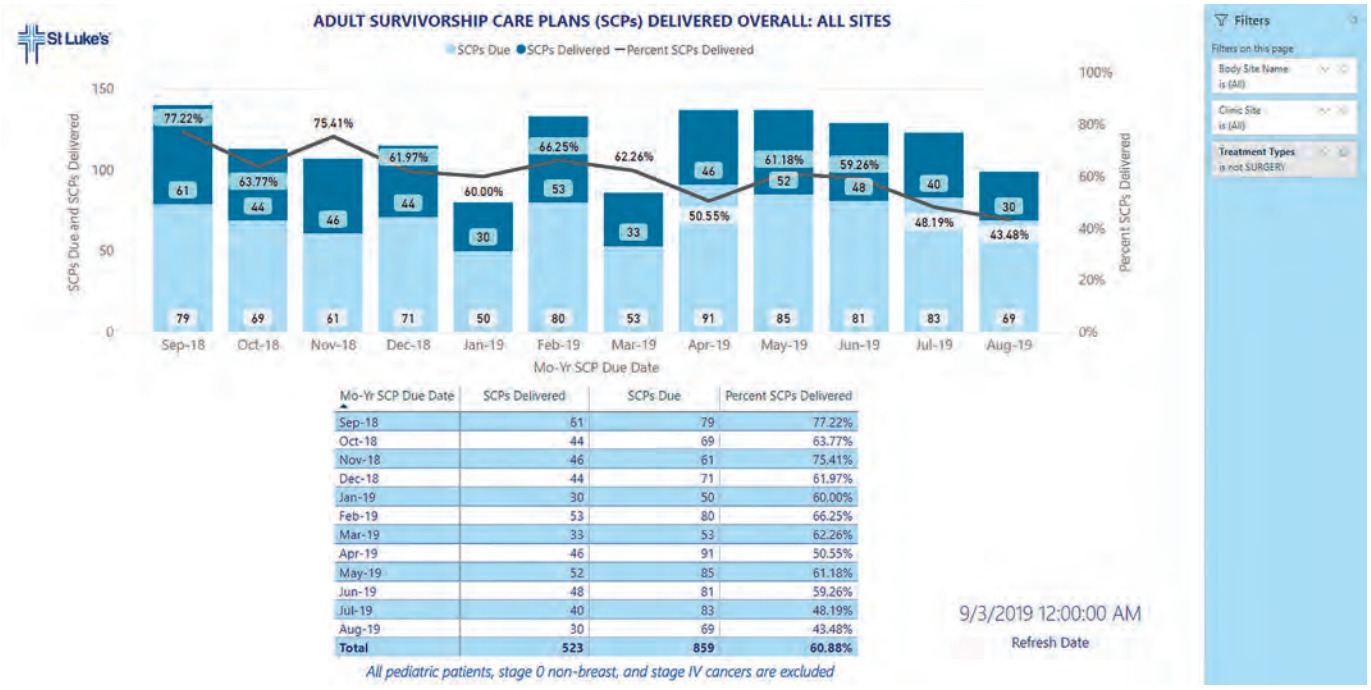


Figure 8. Adult Survivorship Care Plans Delivered Overall: All Sites



Mo-Yr SCP Due Date	SCPs Delivered	SCPs Due	Percent SCPs Delivered
Sep-18	61	79	77.22%
Oct-18	44	69	63.77%
Nov-18	46	61	75.41%
Dec-18	44	71	61.97%
Jan-19	30	50	60.00%
Feb-19	53	80	66.25%
Mar-19	33	53	62.26%
Apr-19	46	91	50.55%
May-19	52	85	61.18%
Jun-19	48	81	59.26%
Jul-19	40	83	48.19%
Aug-19	30	69	43.48%
Total	**523**	**859**	**60.88%**

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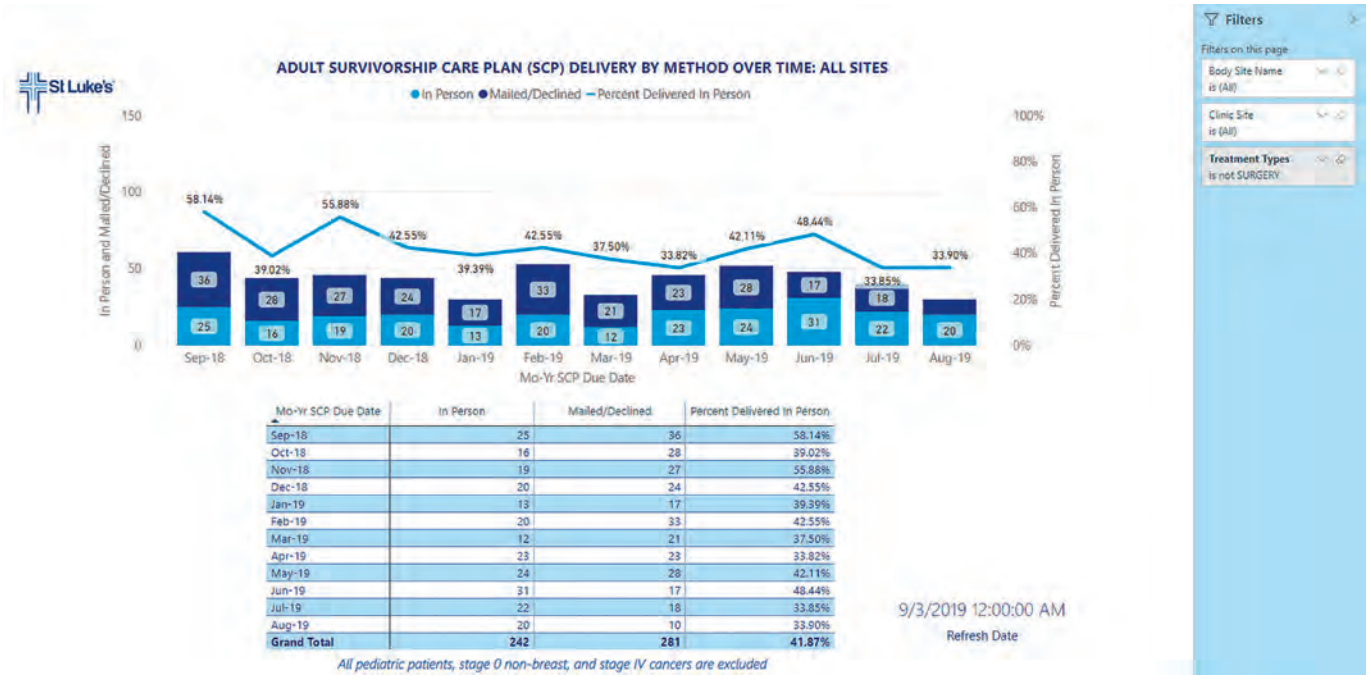
All pediatric patients, stage 0 non-breast, and stage IV cancers are excluded

Figure 9. Adult Survivorship Care Plans Delivery by Method Over Time: All Sites



Mo-Yr SCP Due Date	In Person	Mailed/Declined	Percent Delivered In Person
Sep-18	25	36	58.14%
Oct-18	16	28	39.02%
Nov-18	19	27	55.88%
Dec-18	20	24	42.55%
Jan-19	13	17	39.39%
Feb-19	20	33	42.55%
Mar-19	12	21	37.50%
Apr-19	23	23	33.82%
May-19	24	28	42.11%
Jun-19	31	17	48.44%
Jul-19	22	18	33.85%
Aug-19	20	10	33.90%
Grand Total	**242**	**281**	**41.87%**

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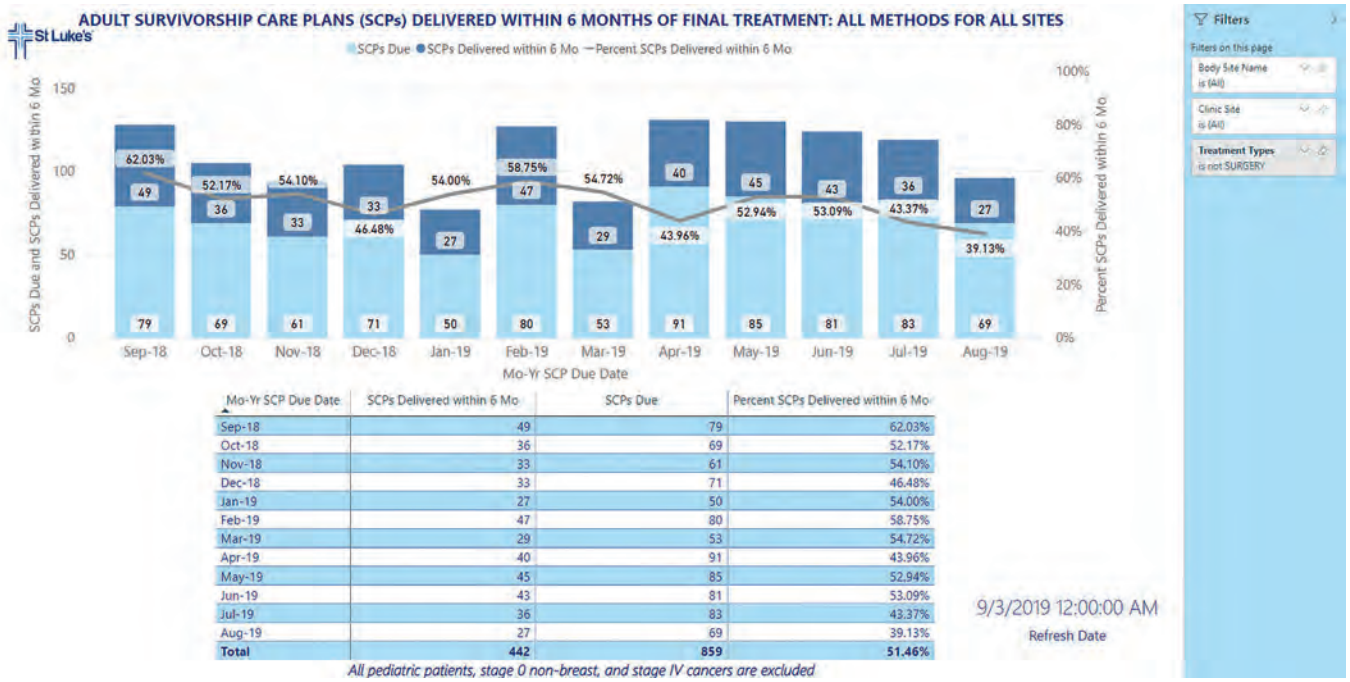
All pediatric patients, stage 0 non-breast, and stage IV cancers are excluded

Figure 10. Adult Survivorship Care Plans Delivered Within 6 Months of Final Treatment: All Methods for All Sites



Mo-Yr SCP Due Date	SCPs Delivered within 6 Mo	SCPs Due	Percent SCPs Delivered within 6 Mo
Sep-18	49	79	62.03%
Oct-18	36	69	52.17%
Nov-18	33	61	54.10%
Dec-18	33	71	46.48%
Jan-19	27	50	54.00%
Feb-19	47	80	58.75%
Mar-19	29	53	54.72%
Apr-19	40	91	43.96%
May-19	45	85	52.94%
Jun-19	43	81	53.09%
Jul-19	36	83	43.37%
Aug-19	27	69	39.13%
Total	**442**	**859**	**51.46%**

All pediatric patients, stage 0 non-breast, and stage IV cancers are excluded

(continued from page 44)

Final Thoughts

The report development team is working toward a more optimized version of the survivorship report for the future. Currently, the report is updated—or refreshed—on a monthly basis. Ideally, the team hopes to update the report on a daily basis, potentially in real time. The team is also creating more efficient methods for processing the large volume of data pulled from the underlying tables within the EHR.

Keep in mind: clinical and report development teams do not always speak the same language, which can impede progress and negatively affect outcomes. But in the case of survivorship care plan delivery, teams can find common ground in the needs of the patient. By focusing on patient-centered care, clinicians can help non-clinical teams appreciate the impact of survivorship care plans on care, and report developers can help clinical teams identify gaps in clinical practice. Working together, the two teams can construct a framework to improve the sharing of information and the successful delivery of survivorship care plans to patients so that they can better plan for their future. The report's objective data can also serve to drive clear and consistent communication with organizational leaders to prioritize improvement efforts and resource allocation. OI

Andrea Rowe, BS, RHIT, is a business intelligence analyst/developer; Alicia Rosales, LCSW, OSW-C, is an oncology service line program manager; and Christopher Weed is a talent insight analyst/developer at Mountain State Tumor Institute and Digital and Analytics, St. Luke's Health System, Boise, Idaho.

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