

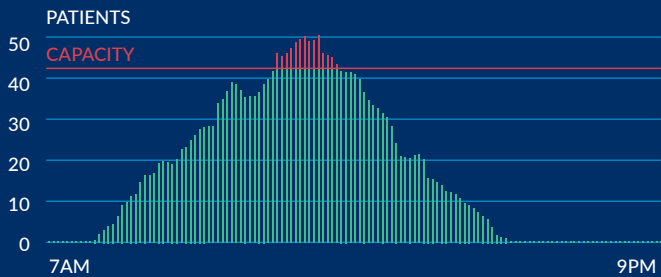


iQueue

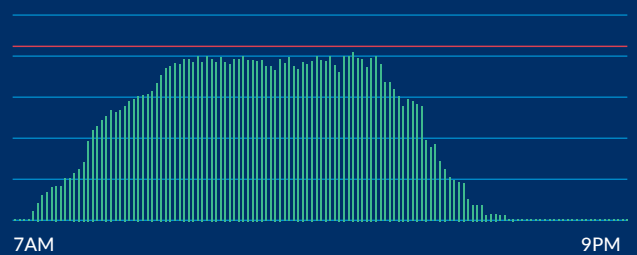
For Infusion Centers

LOWERING WAIT TIMES AT

| | |
|--|--|
| | |
| | |
| | |
| | |
| | |
| | |



UTILIZATION CURVE BEFORE



UTILIZATION CURVE AFTER

150+

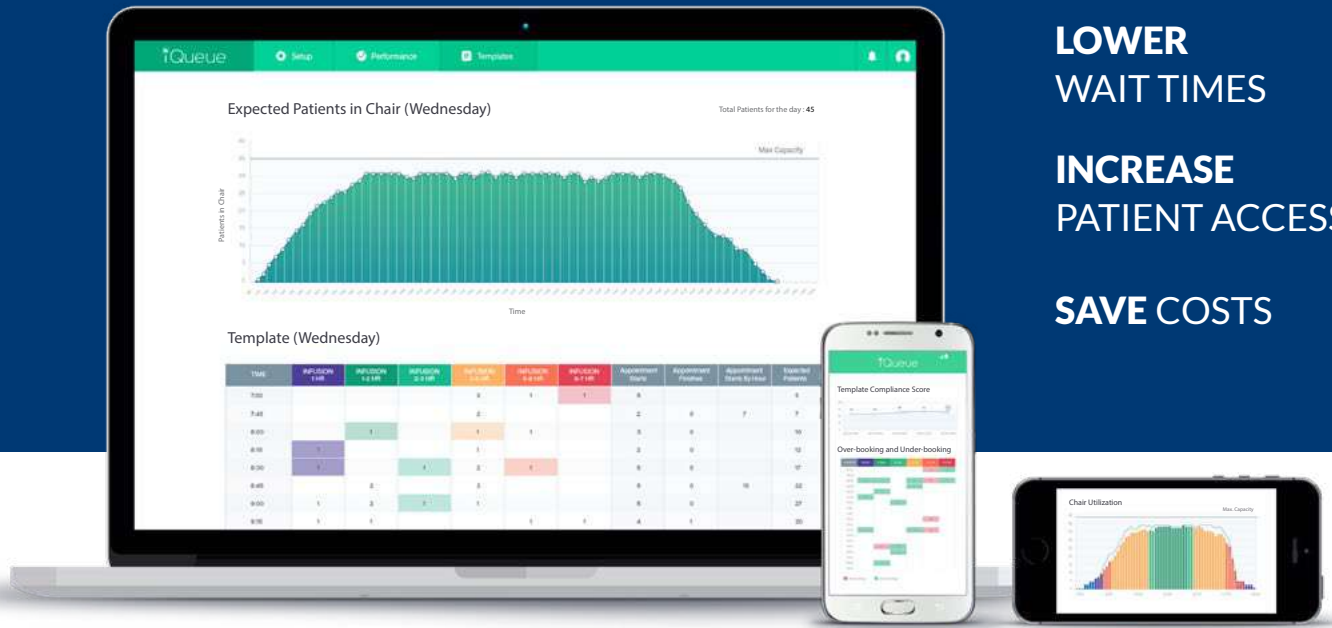
Infusion Centers

300,000+

Additional Treatments

4,000+

Chairs Under Management



**LOWER
WAIT TIMES**

**INCREASE
PATIENT ACCESS**

SAVE COSTS

**Schedule smarter
through optimized templates**

Set yourself up for a smooth flow with templates engineered to minimize delays by level-loading the day

**Manage the day
before it unfolds**

Use utilization projections by time of day to help anticipate bottlenecks and steer add-ons

**Understand your resource
utilization in seconds**

Built-in reporting and allocation models make it easy to track utilization patterns and opportunities

Optimized Infusion Scheduling Template

| | [1] | [2] | [3-5] | [6-8] | [9+] |
|-------|-------|-------|---------|---------|--------|
| 7:00 | 1 | 3 | | | |
| 7:10 | 2 | | | | |
| 7:20 | | | | | |
| 7:30 | | | | | |
| 7:40 | | | | | |
| 7:50 | | | | | |
| 8:00 | | | 2 | 2 | |
| 8:10 | | | | 1 | 2 |
| 8:20 | | | | | |
| 8:30 | | | | | |
| 8:40 | | | | | |
| 8:50 | | | | | |
| 9:00 | 1 | | | | 1 |
| 9:10 | | 2 | | 1 | |
| 9:20 | | | 1 | | |
| 9:30 | | 3 | | | |
| 9:40 | | | 1 | | 1 |
| 9:50 | | | | | |
| 10:00 | | | 1 | 1 | |
| 10:10 | 2 | 1 | | | |
| 10:20 | | | 1 | | |
| 10:30 | | | | | |
| 10:40 | | | 1 | | |
| 10:50 | 1 | | | 1 | |

Infusion durations split into five categories

10 minute start intervals all day

Simultaneous patient starts match up to nursing schedule

Duration span provides a system buffer

Number of available appointments per duration and time slot

Problem

The **Stanford Cancer Center** is one of 47 elite NCI designated Comprehensive Cancer Centers in the entire country. Stanford advances the understanding and treatment of cancer through a multidisciplinary, integrated and collaborative community of physicians and scientists. It performs over 65,000 infusions annually across 3 centers and is growing steadily. The Center was experiencing the following operational challenges:

- Triangular usage profile that resulted in excess capacity in the mornings and evenings and peaks at mid-day
- Long patient wait times during the middle of the day
- High overtime costs
- Resources not being used optimally

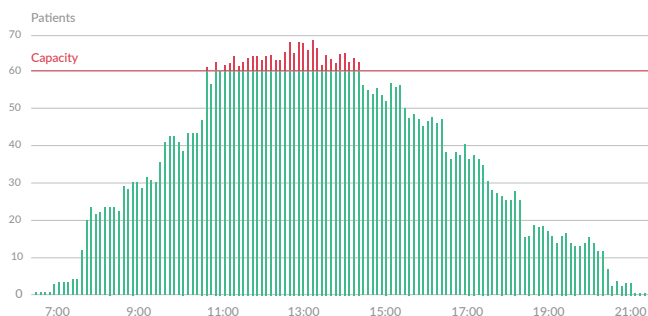
Solution

Stanford partnered with LeanTaaS to jointly develop **iQueue for Infusion Centers** and deployed it at one of its 60 chair centers to create optimized infusion scheduling templates.

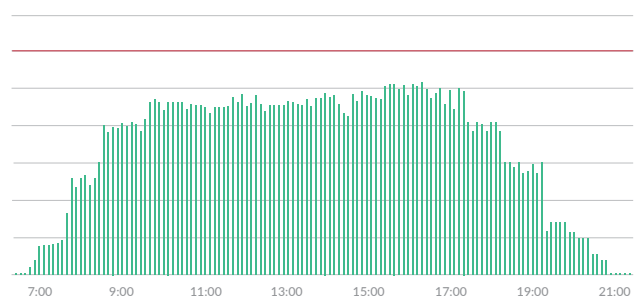
iQueue for Infusion Centers uses data science and machine learning to create optimized scheduling templates in order to continuously maximize patient flow and chair usage.



Utilization Curve **Before**



Utilization Curve **After**



Results

31%

↓ LOWER
Median Wait
Times

78%

↓ LOWER
Emergency Call Back
Overtime Pay

17%

↓ LOWER
Total Cost per Unit
of Service

25

↑ HIGHER
Percentile Points in
Nursing Satisfaction

Problem

NewYork-Presbyterian is home to two of the nation's leading cancer centers – the **NCI-designated** Herbert Irving Comprehensive Cancer Center of NYP/Columbia University Medical Center and the NYP/Weill Cornell Ronald P. Stanton Clinical Cancer Program and the Weill Cornell Medicine Sandra and Edward Meyer Cancer Center.

As a leading cancer center, NYP treats some **7,500 adult and pediatric patients** newly diagnosed with cancer each year.

- Consistently operating at capacity
- A peaky utilization profile leading to extended wait times in the middle of the day

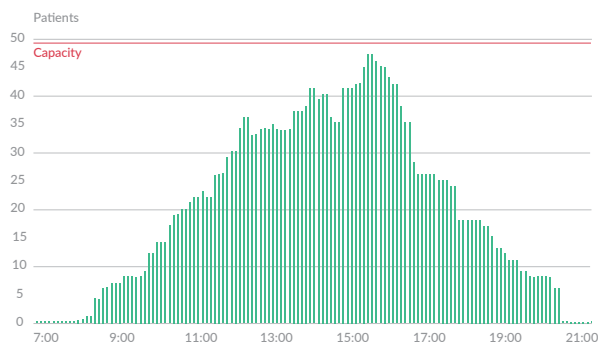
Solution

Leadership at NYP deployed **iQueue for Infusion Centers** at one of its centers with 49 chairs to create optimized infusion scheduling templates.

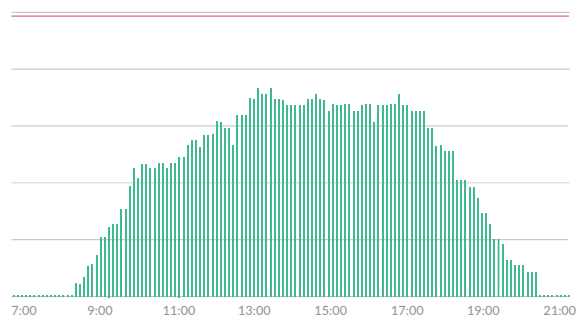
iQueue for Infusion Centers uses data science and machine learning to create optimized scheduling templates in order to continuously maximize patient flow and chair usage.



Utilization Curve **Before**



Utilization Curve **After**



Results

55%

↓ LOWER
Waiting Times
at Peak Hours

40%

↓ LOWER
Average
Waiting Time

17%

↑ HIGHER
Patient
Volumes



Problem

The UCSF Helen Diller Family Comprehensive Cancer Center is one of 47 elite **NCI-designated Cancer Centers** in the United States, and is one of only two centers in the Bay Area to receive the prestigious designation of “comprehensive” from the National Cancer Institute.

In the past year, the Center experienced a **21% growth** rate in treatment volumes and were experiencing the following operational challenges:

- Consistently operating over capacity
- A peaky utilization profile leading to extended wait times in the middle of the day
- Strained resources, resulting in decreasing staff and patient satisfaction

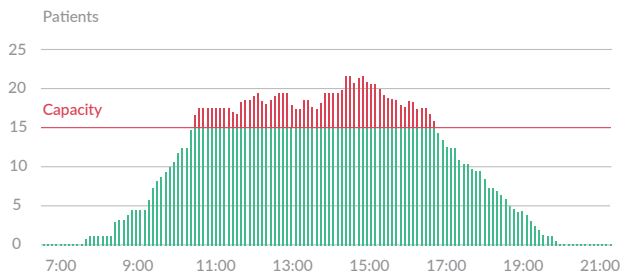
Solution

Leadership at the Helen Diller Family Comprehensive Cancer Center deployed **iQueue for Infusion Centers** at one of its centers with 12 chairs and 3 beds to create optimized infusion scheduling templates. After realizing significant results, iQueue for Infusion Centers was deployed at **4 additional centers** that collectively added 82 more chairs.

iQueue for Infusion Centers uses data science and machine learning to create optimized scheduling templates in order to continuously maximize patient flow and chair usage.

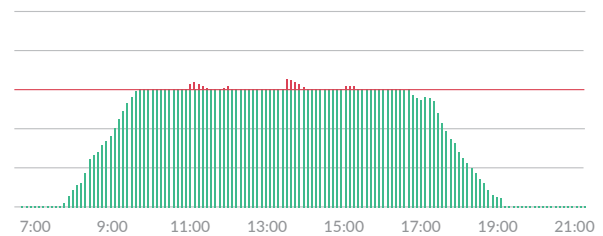


Utilization Curve **Before**



- Frequent “mid-day” peaks and slow mornings and evenings
- Frequent overflow in waiting rooms - long patient waiting times

Utilization Curve **After**



- Even workload throughout the day allows for more predictable schedules
- Unlock capacity to help deal with unexpected delays and add-ons

Results

31%

↓ LOWER
Waiting Times
at Peak Hours

26%

↓ LOWER
Average
Waiting Time

42%

↓ LOWER
Average Hours
Over Capacity

8%

↓ LOWER
Overall Average
Daily Peak



Problem

The University of Colorado Cancer Center in Denver is one of 47 elite **NCI designated Comprehensive Cancer Centers** in the entire country and the only one in Colorado.

Known worldwide for developing and setting new standards in the treatment of many types of cancer, it has 175 chairs spread across 10 centers and sees **double-digit growth** in treatment volumes every year. The Center was experiencing the following operational challenges:

- Consistently operating at capacity
- Frequent "mid-day" peaks and slow mornings and evenings
- Frequent overflow in waiting rooms - long patient waiting times
- Sometimes patients would wait hours for chairs to become available

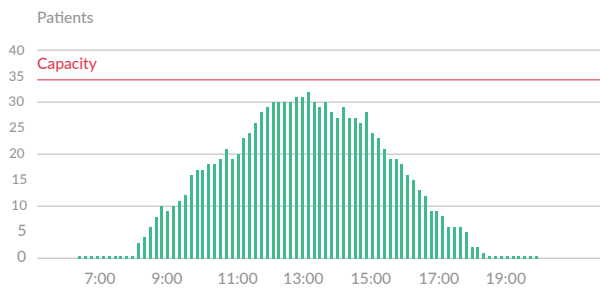
Solution

Leadership at UCHealth deployed **iQueue for Infusion Centers** at one of its centers with 28 chairs and 6 private rooms to create optimized infusion scheduling templates. After realizing significant results, iQueue for Infusion Centers was deployed at **6 additional centers** that collectively added 104 more chairs.

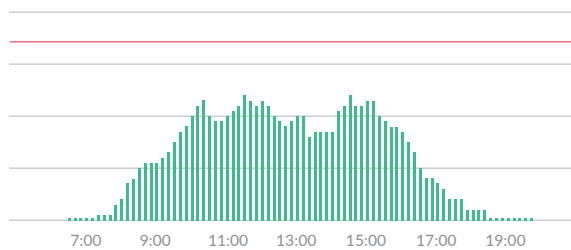
iQueue for Infusion Centers uses data science and machine learning to create optimized scheduling templates in order to continuously maximize patient flow and chair usage.



Utilization Curve **Before**



Utilization Curve **After**



Results

33%

↓ LOWER
Waiting Times
at Peak Hours

15%

↓ LOWER
Average
Waiting Time

14%

↑ HIGHER
Patient
Volumes

28%

↓ LOWER
Overtime
Hours

Problem

The Comprehensive Cancer Center of Wake Forest Baptist Health in Winston-Salem, North Carolina has been one of 47 elite **NCI designated Cancer Centers** for over 40 years.

Acknowledged as one of the nation's leaders in the fight against cancer, the Comprehensive Cancer Center has 35 infusion chairs & 8 private rooms and has seen **6% growth** rate in treatment volumes for the past 3 years.

- Consistently operating at capacity
- Peak periods of high utilization for treatment chairs between 10am and 2pm
- Strained resources, resulting in decreasing staff and patient satisfaction

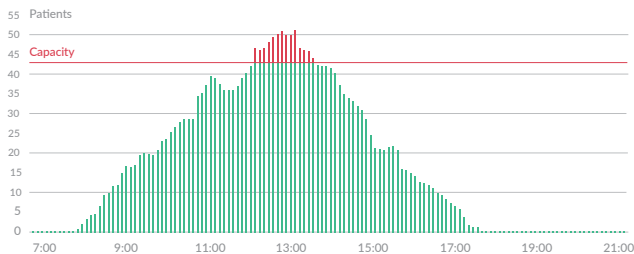
Solution

Leadership at the Cancer Center center deployed **iQueue for Infusion Centers** at one of its centers with 35 chairs and 8 beds to create optimized infusion scheduling templates.

iQueue for Infusion Centers uses data science and machine learning to create optimized scheduling templates in order to continuously maximize patient flow and chair usage.

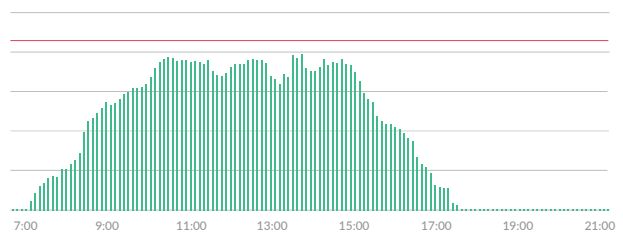


Utilization Curve **Before**



- Frequent "mid-day" peaks and slow mornings and evenings
- Frequent overflow in waiting rooms - long patient waiting times

Utilization Curve **After**



- Even workload throughout the day allows for more predictable schedules
- Unlock capacity to help deal with unexpected delays and add-ons

Results

25%

↓ LOWER
Waiting Times
at Peak Hours

27%

↓ LOWER
Days Over
Capacity

74%

↓ LOWER
Days where Hours of Operation
needed to be extended

Problem

Huntsman Cancer Institute (HCI) is part of the University of Utah Health Care system. HCI is a **National Cancer Institute (NCI)**-Designated Comprehensive Cancer Center, which means it meets the highest standards for cancer care and research and receives support for its scientific endeavors.

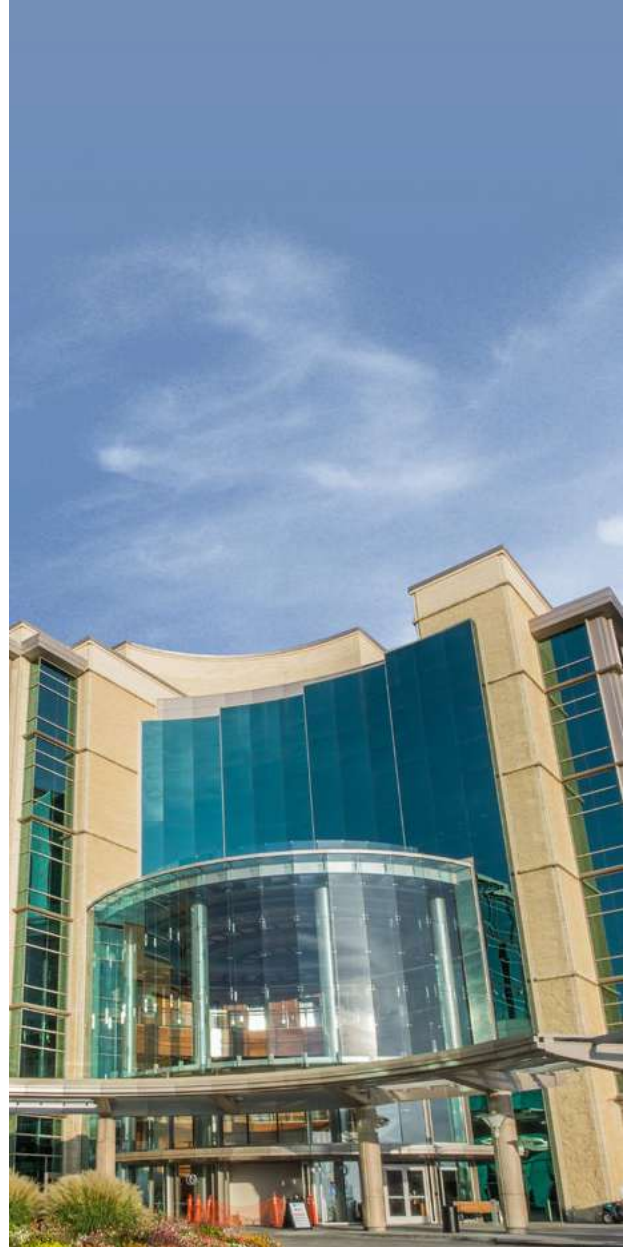
HCI is also a member of the National Comprehensive Cancer Network (NCCN), a not-for-profit alliance of the world's leading cancer centers. The Center was experiencing much busier days due to an increase in volume, and was experiencing the following operational challenges:

- Increasing volumes was making it hard to find slots for longer treatments
- Exceeding capacity in peak hours and peak days was impacting patient wait times
- Exceeding capacity in peak hours was affecting nurse satisfaction

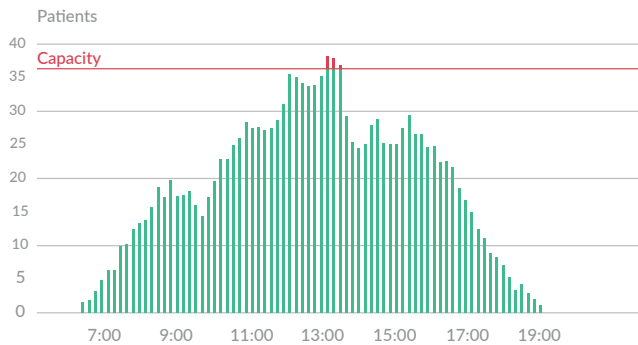
Solution

HCI deployed **iQueue for Infusion Centers** at its 36-chair center to create optimized infusion scheduling templates.

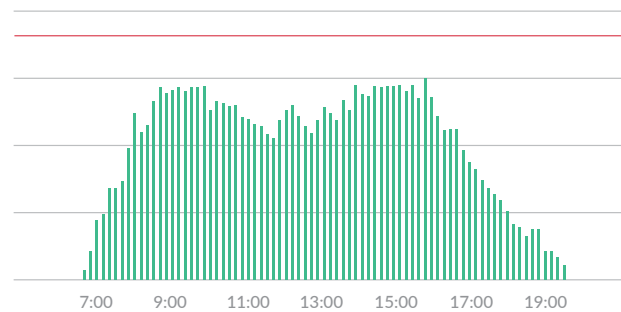
iQueue for Infusion Centers uses data science and machine learning to create optimized scheduling templates in order to continuously maximize patient flow and chair usage.



Utilization Curve **Before**



Utilization Curve **After**



Results

16%
↓ DECREASE IN
Average Wait Times on
Peak Day

26%
↓ DECREASE IN
Average Wait Time
During Peak Hours

0 days
↓ ABOVE
Capacity Since
implementation

Memorial Sloan Kettering Cancer Center

Problem

Memorial Sloan Kettering Cancer Center – the world’s oldest and largest private cancer center – has devoted more than 130 years to exceptional patient care, innovative research, and outstanding educational programs. Today, MSKCC is one of 47 National Cancer Institute–designated Comprehensive Cancer Centers.

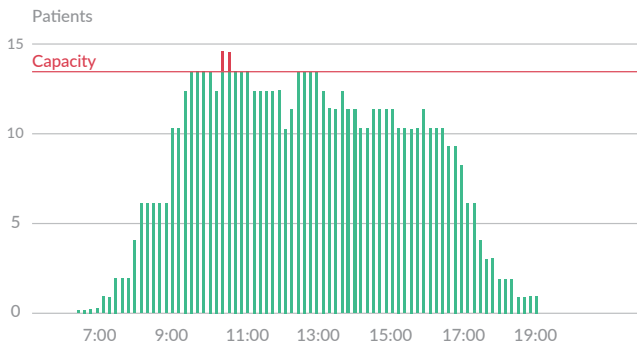
Improving patient wait times for infusion is of paramount importance for MSK. Over the course of the past 10 years, MSK has engaged with various consulting firms and process improvement experts – as well as their internal team of industrial engineers and analysts – in an attempt to design interactive tools that would help them better predict and plan for the extreme variability in operational workflows of their high volume infusion units which are distributed in New York City and the surrounding suburban areas. Most of these efforts yielded small and unsustainable improvement without offering MSK what it needed most: a predictive tool or simulation model that could be used for planning volume, visit distribution and resource utilization for their infusion units.

Solution

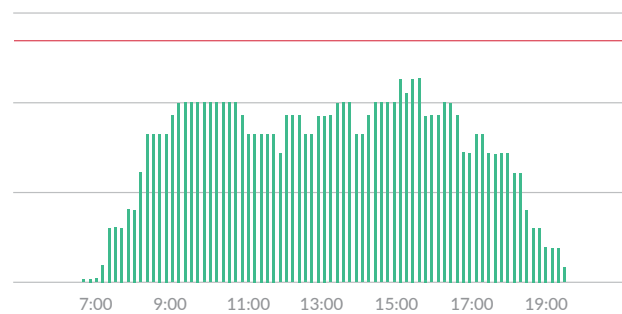
MSKCC leaders tested iQueue for Infusion Centers at its 13-chair Gynecologic Oncology Infusion unit in midtown Manhattan with the goal of optimizing their templates, providing daily management guidance about what to expect each day, understanding what went wrong and – most importantly – use schedule alert tools that help staff react to changing conditions.



Utilization Curve **Before**



Utilization Curve **After**



Results

31%

↓ DECREASE IN
overall average
wait times

26%

↓ DECREASE IN
average wait times
during peak hours

32%

↓ DECREASE IN
average wait times
on peak days

22%

↑ INCREASE IN
average volumes on
slowest day of the week

Problem

Located on Munson Medical Center's main campus in Traverse City, MI, the Cowell Family Cancer Center is transforming cancer care in northern Michigan. In 2017, the center was recognized by the advocacy group **Less Cancer** for its leadership in cancer prevention efforts.

Prior to implementing iQueue for Infusion Centers, Munson's scheduling process depended heavily on the charge nurse and took 2 to 4 hours each day to complete. Adding to the complexity was the fact that the schedule was actually maintained in two systems, which necessitated an extra step in the process to assure both schedules matched. Center staff lacked visibility beyond the day's schedule in terms of foreseeing the work week ahead, which left the staff feeling helpless to plan ahead. As a result, the center often experienced days with extremely high patient volumes and a pace so frenetic that nurses would often miss lunches, stay late beyond the anticipated closing time, and in work in constant "survival mode". Patient safety – especially during the peak hours between 10am and 2pm – remained an ever-present concern.

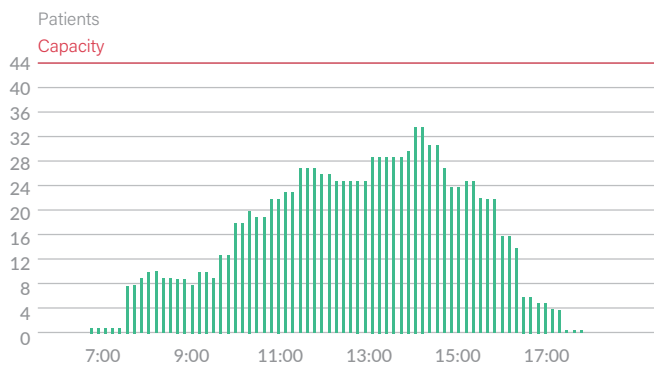
To improve conditions, center administrators tried changing the scheduling method from scheduling-by-nurse to scheduling-by-pod, restricting certain treatments (e.g. BCG) to certain days, reserving appointments for injections/port flushes, and shifting non-oncology patients to certain weekdays. Despite these efforts, the center did not see meaningful, lasting improvement.

Solution

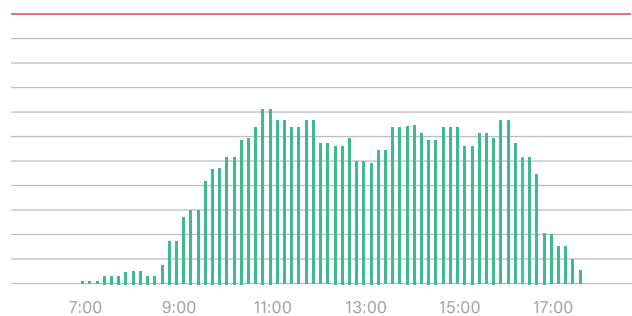
Staff were eager to try the different approach iQueue for Infusion Centers offered because the scheduling methods from before were not working. After fine-tuning the initial templates during a "break-in" period, the staff was able to immediately feel the benefits. "Sometimes, I think the staff forget how far we've come with LeanTaaS," said Kate Swisher, Manger Nursing Services. "The days before were frenetic, missed lunches were common, and extended days happened frequently. Further, the nurses felt like they had no say in how the patients were scheduled or assigned to them. This has changed completely."



Utilization Curve **Before**



Utilization Curve **After**



Results

14%

↓ DECREASE IN overall average wait times

8%

↑ INCREASE IN volume without additional chairs, staff or operating hours

15%

Additional capacity unlocked

27%

↑ INCREASE IN the frequency of nurses leaving on-time

Problem

The University of Maryland Marlene and Stewart Greenebaum Comprehensive Cancer Center (UMGCCC) is a **NCI-designated Comprehensive Cancer Center** located on the medical campus of the University of Maryland at Baltimore.

UMGCCC has experienced tremendous growth over the last several years, producing roughly 50,000 outpatient visits, 1,800 inpatient admissions, and over 3,000 new patients annually, drawing from both local and regional markets. Infusion volumes are expected to continue to exceed 22,000 visits annually. As a result, the center experienced:

- Consistently operating at capacity
- Extended patient wait times in the middle of the day
- Strained resources and staff needing to stay past operating hours

Solution

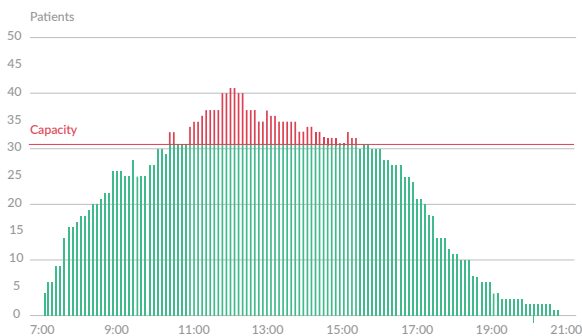
Leadership at UMGCCC deployed **iQueue for Infusion Centers** for 29 chairs and 2 beds to create optimized infusion scheduling templates.

iQueue for Infusion Centers uses data science and constraint-based optimization to create level-loaded scheduling templates to continuously maximize patient flow and chair usage. The solution also provides daily management tools to keep everything on-track with:

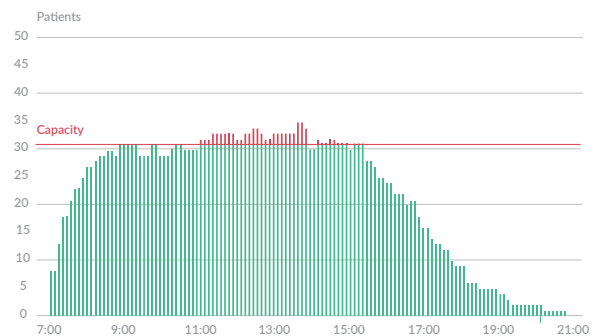
- Utilization projections by time of day to help foresee bottlenecks, steer add-ons, and anticipate no-shows
- Daily huddle reports that provide staff with a start-of-the-day view of expected chair utilization, template compliance (how close to the optimal schedule the day's appointments are), and over- and under-booking estimations.
- Schedule grooming tools that help level-load scheduled appointments by identifying which appointments to move and where to move them
- Ongoing operational check-ins and scenario planning that adapt templates to support changes in demand and new process improvement initiatives.



Utilization Curve **Before**



Utilization Curve **After**



Results

45%

↓ **DECREASE IN**
Average time over
maximum chair capacity

36%

↓ **DECREASE IN**
average
patient wait time

48%

↓ **DECREASE IN**
Number of weekdays running
past normal operating hours

59%

↓ **DECREASE IN**
Average hours
nurse overtime



Problem

TriHealth Cancer Institute is one of six institutes providing specialized, patient-centered care in the unified TriHealth system, which has been named among the country's Top 100 Most Integrated Health Networks.

In the past year, the institute experienced a very high growth rate in treatment volumes across its seven centers—including a **26% increase in volume** at its busiest center, Kenwood—and was looking for a way to improve patient experience by minimizing wait times, balancing acuity levels with staff effort, and scheduling more accurately. They sought a data-driven approach to understand why days in their seven centers did not always go as expected and to anticipate bottlenecks in future days.

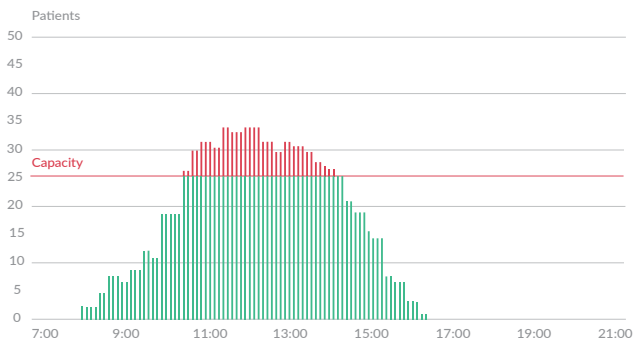
Solution

Center leaders initially deployed iQueue for Infusion Centers at its Kenwood center with 23 chairs to optimize their scheduling templates, provide daily management guidance about what to expect each day, understand why days did not go as planned, and most importantly help staff react to changing conditions through iQueue nurse allocation and schedule alert tools.

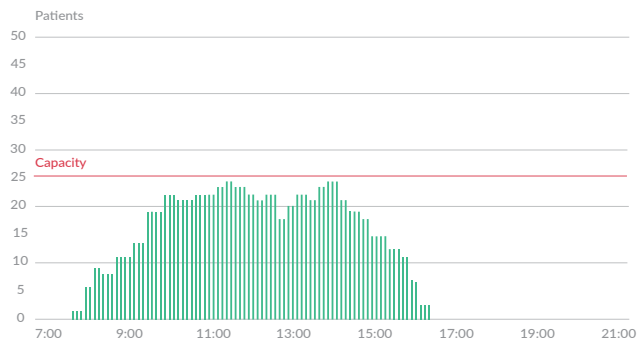
Despite having a small 8-chair waiting room and experiencing double-digit growth in patient volumes, the center achieved outstanding results at this pilot location as shown below—leading the institute to extend its use of iQueue for Infusion Centers to its other six centers, bringing the total number of chairs managed through the solution to 145.



Utilization Curve **Before**



Utilization Curve **After**



Results

15%

↓ DECREASE IN average wait times during peak hours

9%

↓ DECREASE IN average wait times

23%

↑ INCREASE IN Patient Volumes

0 days

scheduled to go over capacity

Problem

Ranked as Pennsylvania's #1 health system, Penn Medicine is a world-renowned academic medical center in Philadelphia that combines education, research, and clinical care to provide the best possible patient care.

Penn Medicine's Abramson Cancer Center Infusion Suite at the Perelman Center for Advanced Medicine sees over 50,000 infusion visits each year and was experiencing the following operational challenges:

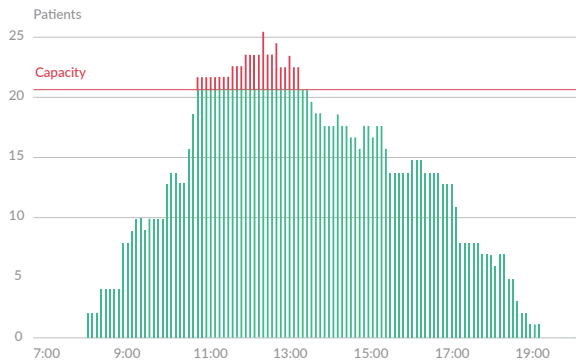
- History of patient and staff dissatisfaction with long wait times
- Nurses feeling rushed and pressured to perform essential functions such as documentation and education, because of uneven schedules and the way patients arrive throughout the day
- Extended wait times especially in the middle of the day

Solution

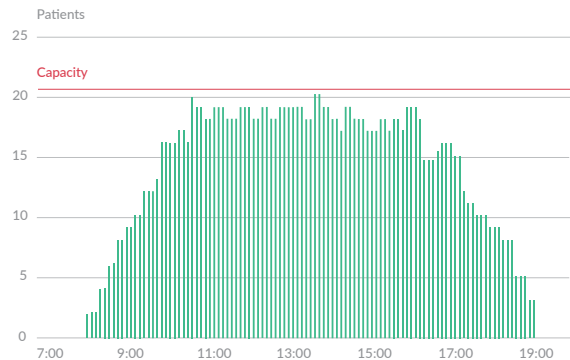
Leadership at the cancer center initially deployed **iQueue for Infusion Centers** on its 4th floor unit with 21 chairs to optimize their scheduling templates, provide daily management guidance about what to expect each day, and to understand why days did not go as planned. The center achieved outstanding results at this pilot location as shown below, and as a result, leadership extended the use of **iQueue for Infusion Centers** to many of its other floors and locations, bringing the total number of chairs managed through the solution to 181.



Utilization Curve **Before**



Utilization Curve **After**



Results

25%
↑ INCREASE IN
Patient Volumes

20%
↑ INCREASE IN
Patient Hours

22%
↓ DECREASE IN
Average wait times

13%
↓ DECREASE IN
Average wait times
during peak hours

What Your Colleagues **Are Saying**



Before we implemented iQueue for Infusion Centers, our nurses were burnt out. They rarely had time for breaks – let alone lunch – and were concerned about patient safety in the daily chaos. Now, nurses not only get their well-deserved breaks, but feel more comfortable and confident in an environment that lacks the ‘feast or famine’ conditions to which they had become accustomed.



Jamie Bachman
Executive Director, Oncology Services



We were very pleased with how fast we were able to implement iQueue for Infusion Centers and see a difference. We see lots of happier patients because things are happening on-time.



Karen Craver
Clinical Practice Administrator



Our nurses love using the huddle report every morning because it gives us a really good indication for if we can take patients back early who arrive early, and for knowing where the day’s best opportunities are for handling add-ons. Our days run much smoother because we are really utilizing our time better.



Joy Lombardi, RN, OCN
Manager



We took two years of historical data and pumped that into the analytic engine as well as operating constraints, how many infusion chairs are available, the hours when the chairs are open and the staff that’s available and that’s translated into mathematical equations into iQueue and out comes as a production schedule.



Sridhar Seshadri
Vice President, Cancer Services

CONTACT US

for a no obligation demo

info@leantaas.com

www.leantaas.com



LeanTaaS
Better Healthcare Through Math