

# Balancing **patient satisfaction** and **staff efficiency**

**Geisinger Health System introduces an on-demand patient meal service with a 98% Service-Level Agreement guarantee using SIMUL8.**

**Geisinger Health System**, one of America's largest health service organizations, is globally recognized for its use of cutting-edge research and technology to deliver outstanding levels of quality, patient service and innovation.

Geisinger utilized SIMUL8's powerful discrete event simulation technology in the planning and development of an on-demand food service system which would allow patients to order what they wanted, when they wanted it and be guaranteed delivery within 45 minutes.

With the objective of boosting satisfaction through the new service and in turn, increasing profitability, Geisinger achieved an impressive service level of 98%.

## **Geisinger Health System's achievements using SIMUL8:**

- ✓ Systematic simulation results supported the management team at each stage of the decision making process
- ✓ Revealed an optimal model for on-demand food delivery, achieving a 98% service level of deliveries completed in under 45 minutes
- ✓ Identified an innovative six-zone delivery layout and hourly staff schedule, achieving an 88.4% resource utilization rate

# Geisinger

## **Acknowledgements to:**

Seth Hostetler, Lead Process Engineer, Care Support Services Division at Geisinger Health System



## Why are food services a key issue for healthcare?

Patient food service is one aspect of healthcare which is often scrutinized, becoming a central issue for hospital administrators in recent years.

Nutritional intake from food can lead to speedier recovery times and decrease duration of stay, which in turn has **a huge impact on hospital running costs**.

As well as having a pivotal role in the healing process, the quality of hospital food has been found to **significantly influence patient satisfaction** with their entire hospital experience.

Administrators have become particularly focused on food in recent years as a result of Medicare taking patient satisfaction performance into account in its payments to hospitals.

### Did you know?

According to the Environmental Protection Agency, U.S. hospitals generate about **170,000 tons** of food waste every year.

Combined with increased competition, made more transparent with the use of publicly available, standardized patient surveys, it's unsurprising that hospitals are becoming more focused on satisfaction in a bid to boost referrals and ultimately, **profitability**.

Adopting a hotel-style “room service” has been shown to provide other valuable benefits for hospitals, including a **reduction in food costs and waste**. One hospital reduced their food costs by **\$400,000** within the first year of implementing such a system.

It's clear that there are obvious benefits for hospitals to deliver quality, customer-focused food services. **So why is this such a difficult idea for hospitals to implement?**

The difficulty lies in **striking a balance** between achieving patient satisfaction whilst also maximizing use of, often limited, hospital resources and staff.

**This is where simulation helped Geisinger Health System to optimize their food service.**

# Geisinger's on-demand food delivery challenge

Geisinger Health System, like many U.S. hospitals, uses the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS), to monitor patient satisfaction. This national, standardized survey provides a valuable opportunity to learn where patient care and satisfaction could be improved.

From HCAHPS scores, Geisinger identified an opportunity to enhance satisfaction by transitioning from scheduled meal services, to a flexible, on-demand room food delivery system.

However, with a complex network of 18 inpatient units, each containing multiple services with overlapping pathways, there were several uncertainties around how best to implement the new system.

As such, Geisinger needed a comprehensive solution which would be able to model this important system **in a risk-free environment** and provide **quick, reliable answers** to their questions.

Recognizing the complex trade-offs, and having previously achieved **an impressive 40% reduction in workload for linen services**, SIMUL8's powerful simulation software was the clear, cost-effective choice for Geisinger.

**Seth Hostetler**, Lead Process Engineer, and his team applied a two-phase process to provide Geisinger's management team with the vital information and recommendations needed to modernize the inpatient food system.

*"How many staff will we need?"*

*"What will the optimal schedule be?"*

*"Should we wait until delivery carts are full, or dispatch them at regular intervals?"*

*"How do we ensure a guaranteed service level – and what should that level be?"*

*"We start out with a simplistic simulation model, something that is not as time-intensive to put together. **This allows us to get management understanding how simulation works and the kind of data we'll need.** We do an initial phase to prove out the concept and get some feedback and then we go in at a much detailed level."*



**Seth Hostetler, Lead Process Engineer, Geisinger Health System**

# Phase one: simulating the new system

## Creating the simulation

With Geisinger having previously developed an efficiency improvement simulation with SIMUL8, there was already a detailed existing simulation of its hallway network for Seth's team to build on.

Using SIMUL8, the team could easily add the proposed food delivery system as a new component on the existing simulation. Not only did this save valuable time, but it allowed Geisinger to **understand how different resources could be coordinated** across departments.

## Identifying the parameters for testing

To assess potential constraints on the system, Geisinger identified three key parameters to rigorously test and verify using SIMUL8's simulation software:

**Service time expectation:** how often patients received their meal within a set time.

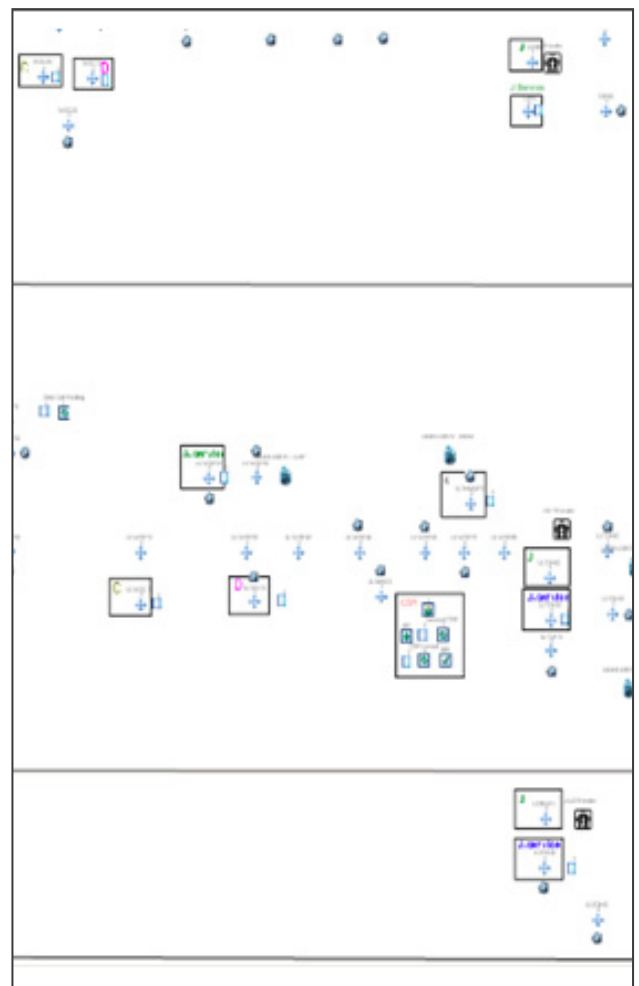
**Resource utilization:** how quickly delivery carts should be dispatched to maximize their capacity, as well as the number of carts that which would be required over a day.

**Staff efficiency:** the total number of trips made in a day and the staff resource which would be required.

*"In the simulation itself there are 2 miles of hallway, 38 elevators, 11 floors, 200 network nodes. There are about 1,500 objects in there in total, as well as 35 different transport types. **There are a lot of different things at play here** and it's been fortunate that we have been able **to keep reusing the simulation and building on top.**"*

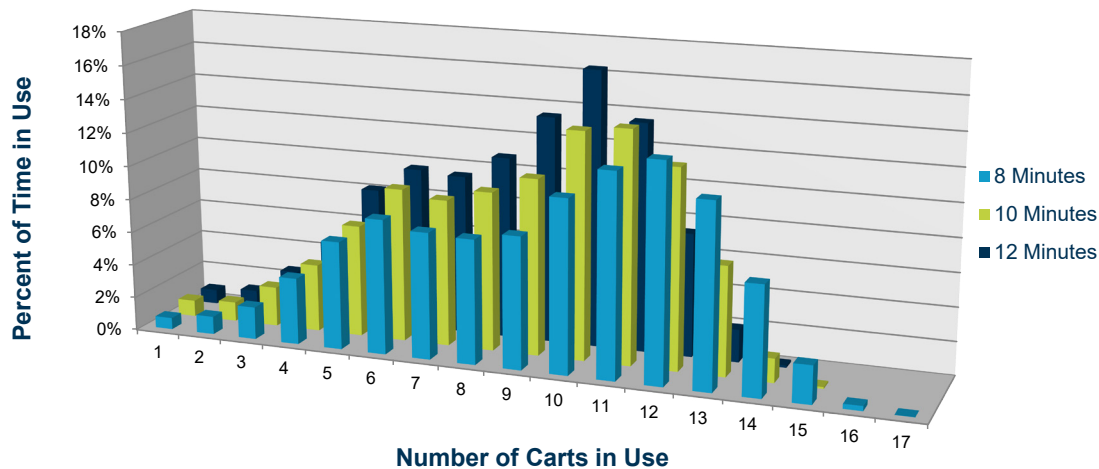
*The way SIMUL8 is structured **makes it very easy to add to different aspects of the model.**"*

*"We had **three simple objectives:** Create a representation of the new model; use this simulation to **determine** how the different parameters are going to affect the service levels as well as **resource requirements** and provide some **initial recommendations for the system changes.**"*



The Geisinger Health System  
Internal Logistics Simulation Model

## Usage Profile for the 12-Tray Cart



### Making the initial recommendations

The initial phase of the simulation investigated the optimum dispatch intervals of delivery carts (8, 10 & 12 minutes), as well the effect of cart capacity on utilization (using 12, 14 and 18-tray cart options).

**The simulation quickly proved that cart capacity was not a constraint**, with SIMUL8 showing that the highest possible utilization was 49% using a 12 minute dispatch time and a 12-tray cart.

What's more, as capacity size increased, utilization of the carts actually **decreased**. This meant the team could recommend that more costly 14 or 18 capacity carts would not need to be purchased.

By ruling out capacity as a significant constraint, Seth's team could focus their attention on the optimum dispatch time.

Further results showed that an eight-minute dispatch timer provided the best performance in terms of service time. However, as carts would be dispatched more frequently with fewer meals on board, this resulted in lower cart utilization. This would then require more carts and staff, and therefore, higher costs.

Although a longer dispatch time would result in better cart utilization, it would lead to a rise in total service time. This would not only increase the chance of meals arriving late but potentially risk patient satisfaction.

**As we can see, SIMUL8's results highlighted a balance that would need to be struck between service level and the most efficient utilization of Geisinger's resources.**

Using the results of this first phase simulation, Seth's team could provide valuable insight and recommendations for the management team when considering the implications of increased costs versus improving patient satisfaction.

*"If we wait an extra two minutes, it's not that we're delivering an extra two minutes later. In those extra minutes, **we're also collecting more meals**, so now we have more deliveries we have to make.*

*Those extra two minutes might **add an extra six or seven minutes** in the total service time for the patient at the end of that trip."*

*“This is where we’re providing the information to the management team. **We’re not making the decisions for them, but we are able to provide them all the necessary information** to help answer questions like ‘would be worth hiring three more staff members to be able to run an eight-minute dispatch timer?’”*

**Seth Hostetler, Lead Process Engineer, Geisinger Health System**

## Phase two: using simulation to assess resource needs

### Introducing real-world constraints

In phase two of the simulation, Geisinger’s management team sought to build on the initial results by introducing realistic constraints. These included **existing staff schedules, food preparation time and cart cleaning time.**

This would allow for results which were more representative, on which important decisions about the service’s balance between patient expectations and staff efficiency could be based.

Using SIMUL8 to easily import existing staff schedules into the simulation, Geisinger were able to identify an issue with staff utilization.

*“We quickly realized there’s no way that they’re going to be able to handle this new system with the **current staffing.**”*

*I think the utilization was around **150%** of staff. We knew that wasn’t feasible, so we needed to **provide recommendations for a new schedule.**”*

*“The management team wanted to be able to promise a **45 minute food delivery turnaround** for patients.*

*How did we figure out how to meet that? **Resource utilization.** Time resources are in use, with resources being staff, and the total number of schedule work hours in a day.”*

### Meeting the service level challenge

With the insight from both phases of the simulation taken into account, **Geisinger’s management team made the decision to aim for a 45 minute delivery turnaround.**

The challenge for the Seth and his team was to determine the optimal staffing schedule, as well as the most efficient delivery and pickup methods, in order to achieve this service level.

To meet this challenge, **phase two of the simulation would incorporate the efficiency of combined trips** – that is, taking out the fresh meals and collecting dirty trays for cleaning on the same return trip.



Internal zoning models and new, hourly staffing schedules were incorporated to devise and test multiple scenarios for the most efficient pick-up and delivery routes.

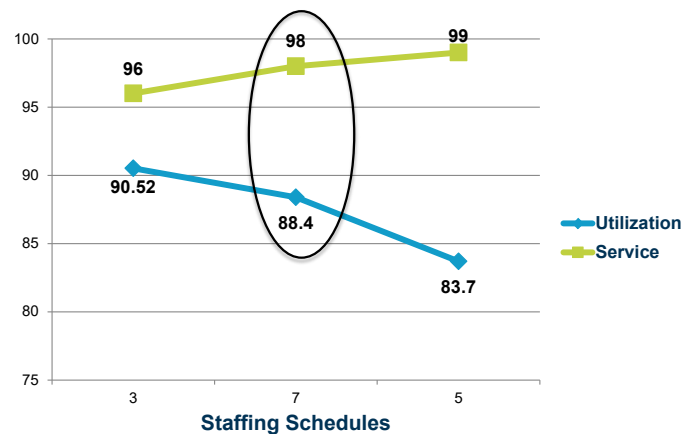
Three 24-hour simulation scenarios were run, including a standard three zone fixed route (option A), a modified pick up schedule covering three zones, a rotational route (option B), and an additional six-zone facility layout fixed route (option C).

“When we were doing this, my thoughts really were that rotational was the way to go. We looked at the six-zone as a kind of **out-of-the-blue, ‘what if’ thought**, just to add another comparison. The simulation allowed us to see that using this new granular approach was going to **be more effective** for patient service levels given our capacity.”

**Seth and his team were surprised by the results of the scenario testing.**

It had initially been expected that option B, the rotational schedule, would provide the optimum service level, however, **it was in fact option C - the six-zone layout - which delivered the best results.**

Six-Zone Operation Utilization-Service Trade-Off



## The results

Using this six-zone layout in the simulation, **98% of meals were delivered within the agreed service level** of 45 minutes.

A new work schedule was also identified which provided **a balanced, effective employee utilization of 88.4%**.

“You really want to target 85 to 90% utilization from your staff. **None of us work at 100% although we might think we do!** And so that’s what we were really not looking to go much over 90% utilization in anything we would recommend.”

Using the powerful insight gained from healthcare simulation, and the ability to incorporate Geisinger’s real-world data, Seth and his team were able to help the organization’s senior stakeholders make hugely important operational decisions around the implementation.

“The management team were very happy with the results. They were pleased that we had **a solid starting point for implementation.**”

SIMUL8 was the ideal solution to systematically **test, investigate and evaluate** throughout the planning and development of the new on-demand food delivery service.

It enabled Geisinger to achieve not just a viable on-demand food delivery simulation, reflective of real-life conditions, but **a long-term strategy** which **delivered on the objective** of improving patient satisfaction whilst maximizing staff resource cost effectively.

For more information about how SIMUL8’s powerful simulation software can deliver results for your organization, visit **[SIMUL8Healthcare.com](https://SIMUL8Healthcare.com)**