



GE HealthCare

# Capacity Strategy Powered by a Digital Twin: Examining Use Case Scenarios

Digital Twin Executive Brief



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Healthcare delivery is inherently complex, with each change creating a ripple effect across the care continuum. Strategic capacity decisions demand innovative tools. Using GE HealthCare's Digital Twin technology, the Command Center team provides hospital leaders with a powerful way to model and test changes before implementation. This approach helps save time, resources, and costs while improving confidence in decision-making.

GE HealthCare's Command Center and Digital Twin technologies enable hospital leaders to quickly test facility and performance improvement initiatives without costly and resource-intensive pilots. The Digital Twin's power comes from its ability to simulate and measure the impact of many possible changes simultaneously. As a result, stakeholders are confident about the decisions made because they know each option and every combination of options will be evaluated thoroughly and objectively.

In this work, GE HealthCare's Command Center team collaborates with provider executives to drive the process from launch to completion. From governance to communication, from data collection to stakeholder engagement, from scenario frameworks to iterative analysis, and from Digital Twin creation to go-forward plan, the team works side-by-side with the provider team to analyze data, make decisions, and drive action.

## Making informed strategic capacity decisions

For more than twenty years, GE HealthCare has been helping providers make strategic decisions informed by innovative simulation modeling applications. Our team has helped optimize new hospital design, support budget planning, scope and prioritize performance improvement programs, allocate capacity within a hospital and across a hospital network, guide clinical program planning across hospitals, and much more.

### Some examples include:

- **Capacity strategy** – With a focus on adding capacity without physical expansion, the Digital Twin software simulation modeling helps hospitals gain a deep understanding of patient volumes, improve patient placement, optimize workflows, and balance utilization across the system. Digital Twin can also be used for surge planning.
- **Planned expansions and new builds** – When the hospital leadership team needs to determine the size and scope of a planned expansion, our team collaborates with them to simulate capacities, understand how location can impact patient volumes, define future patient placement algorithms, and analyze workflows to define optimal footprints and layouts.
- **Department/unit redesign** – Modeling different scenarios allows the hospital to focus on clinical pathways and project the impact of different layouts on patient flow and clinician workflows before any physical changes are made.

Healthcare leaders face difficult, complex decisions that require them to evaluate different combinations of variables that impact demand, improvement, and capacity to determine the best strategy for optimizing patient flow, capital investment, and operational efficiency. Here are examples of scenarios where the Digital Twin can help:

- Operating at or near maximum occupancy with no new beds on the horizon
- Considering building replacement beds and/or new beds in a new tower
- Desire to integrate clinical programs across multiple hospitals
- Desire to resolve varying unit-level occupancy patterns
- Need to optimize the surgical schedule for both surgical throughput and to reduce variation on downstream services
- Considering strategic changes to clinical programs such as creating observation units or dedicating IMC capacity to stroke patients
- Considering a long list of improvement projects and unsure where to start or which to prioritize
- Need to develop contingency plans for patient surges related to seasonality and other variables

## Optimizing Command Center functionality at AdventHealth



AdventHealth Mission Control

When planning the functional design of a new 12,000-square-foot command center, AdventHealth worked with the GE HealthCare Command Center team to leverage Digital Twin technology. The collaborative, data-driven methodology helped the team create comprehensive, integrated improvement plans.

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Testing different scenarios based on growth, bed mix, clinical programs, and new efficiencies provided essential insights about which functions, resources, and staff members should be centralized within the command center, such as patient placement, transfer coordination, nurse scheduling, admitting, air and ground dispatch, and critical care transporters.<sup>1</sup>

*“By collecting data about existing inpatient and outpatient operations and modeling scenarios that utilized potential process improvements from our new command center, we clarified how the command center should function to have the most impact”.*

Sanjay Pattani, MD, MHSA, FACEP, VP and Associate Chief Medical Officer, Mission Control and Attending, Emergency Medicine at AdventHealth

## Surge planning at Children’s Mercy Kansas City



Children’s Mercy Kansas City Patient Progression Hub

Seasonality can impact demand and capacity, especially in pediatrics. To optimize hospital-wide planning for winter surges, Children’s Mercy Kansas City and the GE HealthCare Command Center team use Digital Twin technology. Now, they are better equipped to predict when surges will hit, what diagnoses are likely to be most prevalent, and what kind of resources the hospital will need to allocate to open additional bed space during the surge. As a result, Children’s Mercy can have the space prepared in advance and be prudent with resource allocation – valuable healthcare staff can be onboarded, trained, and assigned when and where they are needed most.<sup>2</sup>

*“It’s important that we’re prepared for surges, and the Digital Twin has been remarkable in helping us do that”.*

Stephanie Meyer, Senior Vice President and Chief Nursing Officer at Children’s Mercy Kansas City

## Powerful simulation tool designed for healthcare

GE HealthCare specifically designed the Digital Twin as an industrial-grade discrete event-simulation model for use in healthcare. Properly modeling patient and staff behavior, variation in demand and supply, and patient pathways – as well as the required specificity and speed of implementation – required a new and more powerful tool. The Digital Twin is purpose-built to focus on the problems and scenarios that differentiate healthcare from other industries.

The Digital Twin has some key attributes designed to meet the needs of healthcare providers:

1. **Speed.** Instead of taking 1-2 years to model a hospital, the GE HealthCare analytics consultants can model US academic medical centers in a few months, including time to gather data, review workflows, and build the model. This speed enables hospital leaders to run more scenarios and develop better-informed go-forward plans.
2. **Modular.** Digital Twin is built to be expanded. It might start by modeling an ED, then add the OR, then the complete hospital; and later add the other hospitals in the system. Or, the process can start with hospital system macro-dynamics and work back to the unit- and department-level micro-dynamics.
3. **Long-lasting.** With data updates every 6-12 months, the simulation model can be used to test additional scenarios as needed for many years.
4. **Dynamic.** Traditional modeling approaches are static and rely on average behaviors, such as average length of stay, average acuity, and average demand. Hospitals and patients are variable, interdependent, and dynamic, rarely acting as the average indicates. Digital Twin learns the statistical behaviors of patients, staff, and resources so the scenarios are true to life.

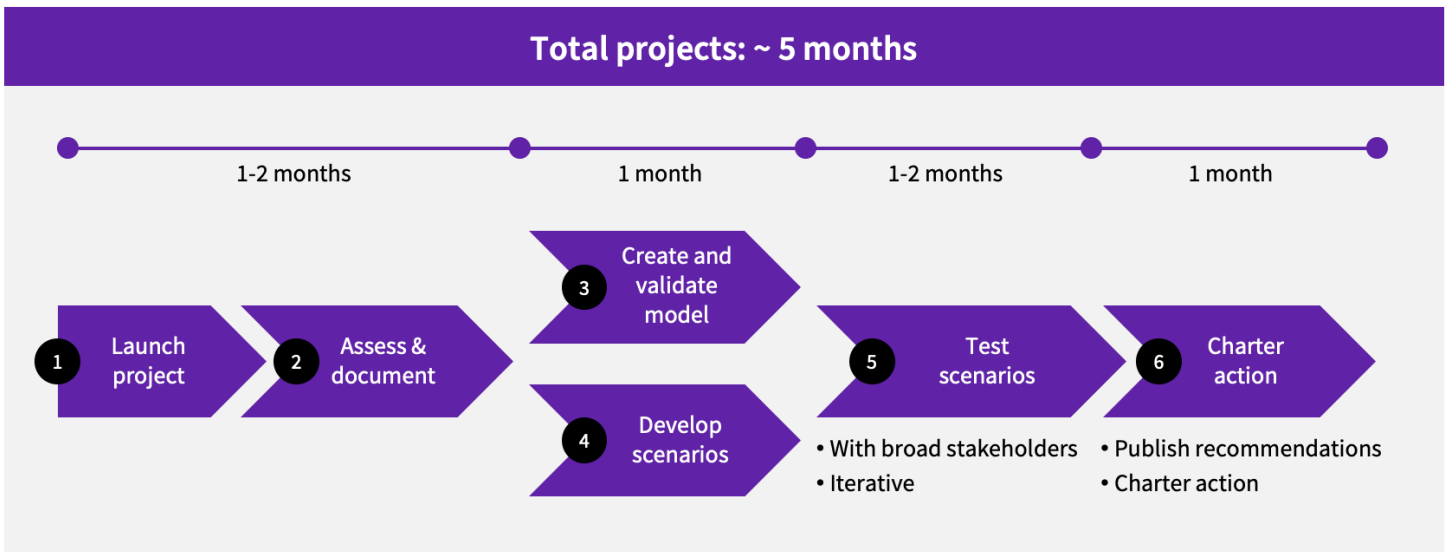
## Results in less than six months

GE HealthCare's Command Center team leads a data-driven and collaborative scenario planning process to develop recommendations using a process that usually involves six major phases of work:

- 1. Launch project** – The first several weeks of the project are important to set the tone and goals, organize governance, and create momentum. This includes forming the Steering Committee (who will oversee the work, break down barriers, weigh in on strategic priorities, and help make trade-off decisions), forming the Core Team to lead the day-to-day work, and communicating with broad stakeholders.
- 2. Assess and document** – The next few weeks involve gathering key information, documenting goals, and collecting retrospective data. GE HealthCare leverages years of experience and an in-depth data assessment tool to begin creating more clarity. This phase also includes interviews and observations that add additional context. This information helps frame key questions that will be answered through the process, such as:
  - How can current operations be optimized?
  - Which improvement projects should be prioritized? Which should be abandoned or delayed?
  - How can improvement projects be integrated for the best result?
  - How can any new construction be optimized? What should the bed mix, bed algorithm, and service mix be in the new facility?
- 3. Create and validate the Digital Twin** – GE HealthCare's Command Center team builds and validates a Digital Twin of the existing hospital and any proposed new facilities.
- 4. Develop scenarios** – In parallel with the build-out of the Digital Twin, the team engages broad stakeholders to understand possible scenarios for growth, efficiency, clinical programs, and bed mix. To get perspectives from all stakeholders, GE HealthCare hosts several highly interactive workshops to gather input on scenario options.
- 5. Test scenarios** – The team iteratively tests those scenarios in the Digital Twin to measure the impact of each in terms of census, costs, clinician travel time, patient boarding, wait times, patient flow and throughput, etc.
- 6. Develop recommendations and charter action** – The team delivers recommendations that are data-driven, specific, and endorsed by stakeholders to optimize patient care capacity in both the current and future states.



## Typical timeline



## A tool fit for the job

When you're making high-stakes decisions about your organization's capacity strategy, you need a data-driven simulation model – not a science project.

The GE HealthCare Command Center team works with stakeholders across your organization to develop a sophisticated Digital Twin, enabling quick effective testing of facility and performance initiatives.

As a result, divergent stakeholders can visualize trade-offs and have a common understanding of the outcomes of each scenario. This tool helps healthcare leaders make better-informed decisions, and hospitals around the world continue to return to this approach to drive better capacity planning and improve patient flow.

<sup>1</sup><https://www.hfmmagazine.com/articles/4452-planning-a-system-command-center>

<sup>2</sup><https://podcast.ausha.co/millennium-live-a-leadership-discovery-podcast/improving-healthcare-outcomes-with-the-patient-progression-hub>