SIMUL8 Healthcare

Simulation for Design

Good design reduces long-term operating costs, increases patient and staff satisfaction, and improves clinical quality and outcomes. As a result, architects and designers are quickly discovering that simulation is the missing link between excellent design and successful implementation.

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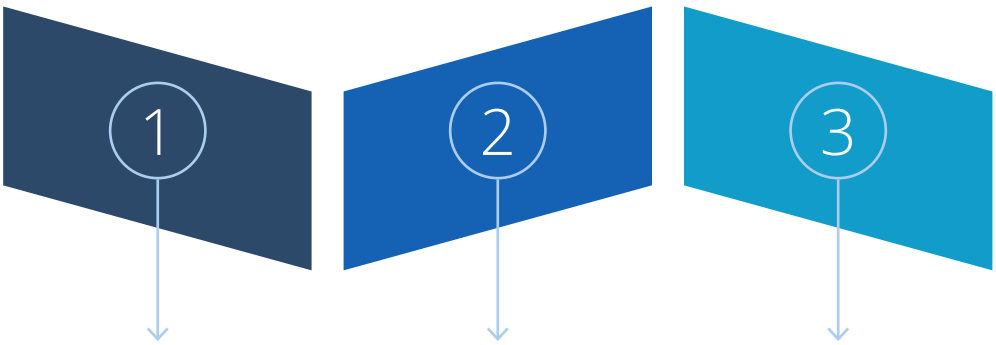
Simulation is integrated into the design process in many ways, but there are three typical scenarios.

You apply simulation when you want to:



Spatial design cannot take place without knowing how the space will be used. By using simulation to think about how people ***move through the space***, and ***how equipment is used*** in the area, you can ***test alternatives*** and find the best possible layout for your situation.

Typical applications include:

- Implementing a new patient flow (ex. Fast Track) in a space-constrained ED
- Maximizing utilization of limited inpatient beds
- Anticipating downstream effects from an expanding OR
- Restructuring a medical office to support increased patient volume

What is simulation?

A simulation looks and acts just like your real life environment, except that it is all inside a computer. ***This allows you to experiment*** with the physical layout and processes in order to find out what the effects would be, without having to wait for construction or make changes to the actual physical environment.

Enhancing design with process analysis

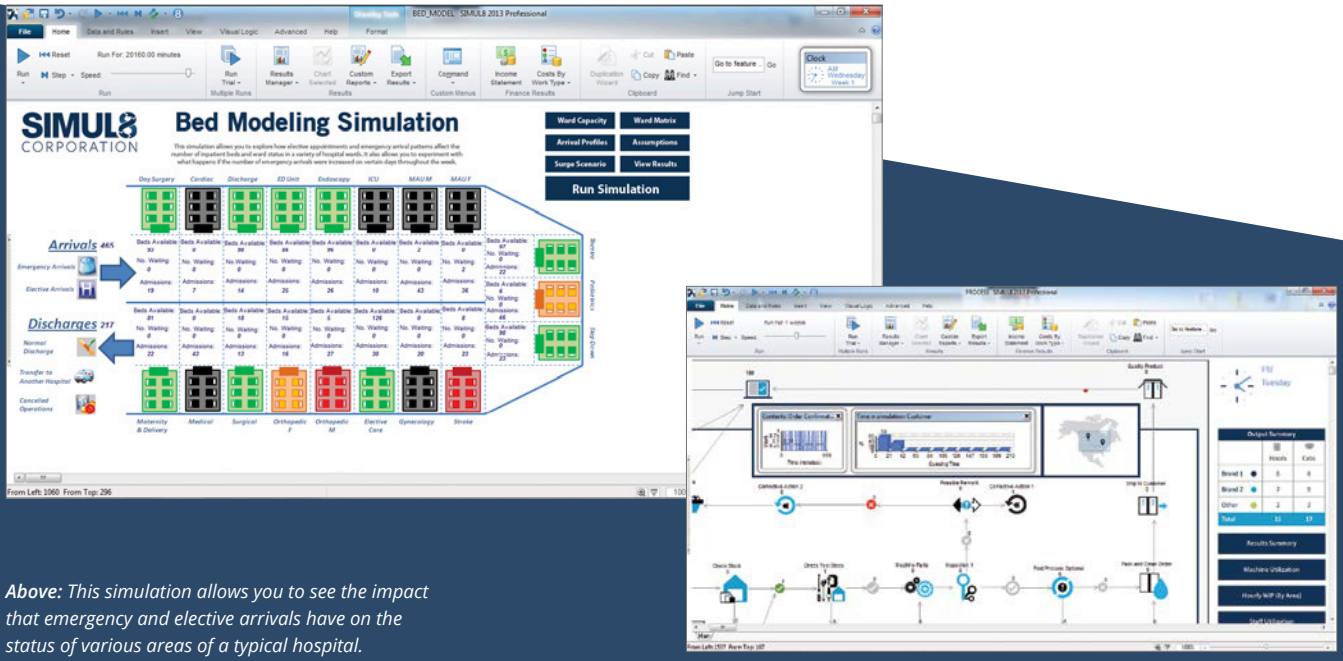
There are many benefits to ***using simulation as an integral part of the design process***, whether you are starting from scratch or working with existing physical spaces.

Visual complexity

Designing spaces and layouts for healthcare is an exceptionally difficult task. This is due partially to the many complexities that need to be considered, including patient-specific factors, a highly structured regulatory environment, and continually evolving clinical practice patterns. Simulation creates an environment where you can truly see what's happening to the patient and staff flows from a bird's-eye view and gain a deeper understanding of how each component directly (and indirectly) affects another.

Fit like a glove

Developing new space is an expensive undertaking, which is why it is so important to get it right the first time. In today's environment, many architectural and design firms use a "rule of thumb" for key sizing decisions such as the number of rooms per clinician or the size of a waiting room. Simulation allows you to design a space that is exactly what YOU need for YOUR processes and patient volumes using organization-specific information, which means that you don't have to rely on industry averages.



Above: *This simulation allows you to see the impact that emergency and elective arrivals have on the status of various areas of a typical hospital.*

Stretch the limits

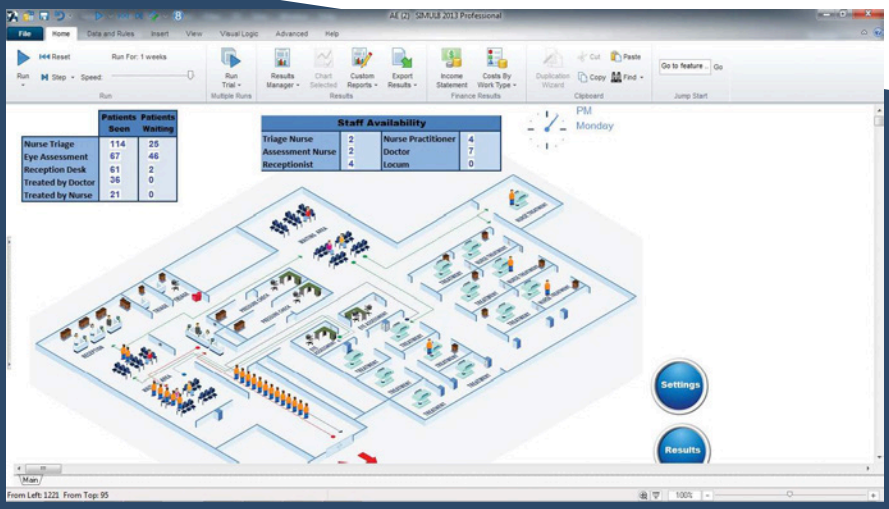
Whether you are designing a brand new space or redeveloping an old one, you need to know how much your space can really handle. This is particularly true if you face seasonality (such as flu season), need to prepare for surges in demand (such as disaster planning), or anticipate continued organizational growth. ***Simulation is the only way to test these scenarios before they happen***, and in any of these situations, understanding the true "breaking point" for your space, processes, and staff is critically important.

View the whole system

Throughout the design and implementation process, you want to see how the proposed design affects not only space, but also staff and equipment needs, anticipated processes, and expected operating costs. These interdependencies are too complex to model in traditional spreadsheets or even using LEAN and Six Sigma. Simulation allows you to see the big picture and understand any downstream effects before a single dollar is spent on construction.

Test every idea

During the design (and especially the redesign) process, there are many ideas about ways to update, improve, and modify the proposed layout. It is nearly impossible to tell which ideas will work, and which will only increase costs or will prove ineffective. As a result, many good ideas get missed because there is simply no way to know for sure what impacts they would have. However, this issue can be resolved by using simulation. Once a "base model" is built, it allows you to quickly look at EVERY idea in a zero-cost environment. By doing so, you get the best possible design and incorporate a key tenant of LEAN – getting input from everyone.



Left: *This example patient flow model is based around a hospital A&E department. The user can adjust the input patient volumes by hour or day, and set the staffing shift patterns for all doctor, nurse and even reception staff.*

Above: *Close-up of patient-flow model.*

Summary

Simulation allows you to build in variability, so you can be sure your model performs just like it will in real life. By doing so, you can be sure that your designs are robust enough to handle the challenges and unexpected changes that are bound to happen over time. With simulation and evidence-based design decisions, your design will be built to last, resulting in lower operating costs and increased customer satisfaction.

By implementing simulation early in the design stage, you will generate unexpected insight and create a more robust design. This is what sets world class architects and designers apart from their competition and ensures that you have developed the best design possible.

Brittany Hagedorn

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Brittany Hagedorn, LEED AP, CSSBB, has broad healthcare expertise as well as experience in building design. Her background includes Lean/Six Sigma and project management, strategic planning and integration, business development, patient safety and clinical quality, and operations and supply management. She also enjoys sharing her learnings with others through speaking engagements and teaching for professional development courses. Most of all, Brittany is interested in bringing innovative tools to healthcare and design, in order to improve both the quality and value of healthcare services.

Brittany has a B.S. in Systems Science and Mathematics and an MBA, both from Washington University. She is the Healthcare Lead for North America for SIMUL8 Corporation and the President of Bonsai Resource Group, Inc., a consulting firm providing systems engineering services to health and social services.

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Michele S. Stuart, PMP, PE, has performed management improvement, cost reduction, systems and statistical analysis for over 30 years. With a Master's degree in Industrial Engineering and Operations Research from Va. Tech, Michele has an extensive background in project management, business process re-engineering, productivity and methods improvement, workspace/ warehouse layout and redesign, inventory control, and staffing, scheduling and routing improvement.

She is President and founder of Productivity Management Consultants (PMC), recently re-branded as Efficiency Engineers, a consulting firm specializing in Business Optimization through Industrial Engineering and Information Technology. As a Project Management Professional (PMP) and Professional Engineer (PE), she has done projects for all types of organizations from retail to municipal to manufacturing to healthcare both in the US and in Europe ranging in size from small, family-owned businesses to major metropolitan governmental groups.

Make fast, confident decisions with simulation

Learn more about using simulation for Healthcare on our website or contact the SIMUL8 Healthcare team to discuss how simulation could benefit your organization.

www.SIMUL8Healthcare.com/contact-us