SIMUL8

— Healthcare —

Your Guide to Simulation for Health

Simulation is relied on by healthcare and human service organizations across the world to **make risk-free decisions**, **improve systems of care** and **reduce costs**.

www.SIMUL8Healthcare.com

" Trials have shown that modeling and simulation could reduce medical error costs **by up to $17 Billion** across the country. "

Congressman J. Randy Forbes

What is simulation?

Simulation is using software to emulate a real world situation. But there are lots of variations of simulation. Here we are talking about process, or to be official, discrete event simulation.

In process simulation you take a flow of events that happen over time in the real world and put them into your simulation model. For example, the planning of O.R. utilization, managing Emergency Departments, or the staff assignment and daily resource requirements of a hospital.

The simulation is time based, and takes into account all the real world resources and constraints involved, as well as the way these things interact with each other as time passes.

Most importantly, process simulation also builds in the randomness you would see in real life. For example, it doesn't always take exactly 5 minutes for a patient to be seen, and outpatients don't arrive at the clinic every 15 minutes.

This means that the simulation really can match reality, so when you make changes to the simulation it will demonstrate exactly how the system would behave in real life.

A uniquely powerful approach to decision making.

Simulation is a powerful technique that allows you to make bold, confident decisions because it gives you the evidence to be sure of your choices.

It's all based on complicated sophisticated mathematic algorithms but you don't need to know anything about these. Simulation software takes care of all the complicated statistics. *You just need to focus on the decision making.*

Why use simulation in healthcare?

Simulation software can be used to simulate common problems faced by healthcare organizations across the world. These are just a few examples of how it is being used right now.

Reach E.R waiting times targets with simulation

Simulation of patient and clinician interactions has been used for over a decade by health services to reduce waiting times and improve patient care.

Changing patient care pathways

Planning for the outcome of implementing new services is a difficult task. Simulation allows you to see the impact of change before action.

Resource capacity and planning

From bed management decisions to planning staff schedules, simulation helps identify opportunities for improving patient flow through better resource utilization and staff capacity.

Managing out-patient flow

Simulation can be used to test methods to improve patient visit efficiency without affecting the daily running of a clinic.

> " Although it is a rare occurrence, pilots regularly rehearse engine failure in simulators, so that when faced with a real situation habit takes over. *Simulation enables people* to train for rare events that do not occur often in real life. "

Sir Liam Donaldson
Chief Medical Officer

Winter pressures and system resilience
Simulation is used to visually test demand during peak seasons and emergency situations, such as a Flu pandemic, to forecast requirements and manage resources.

Pharmaceutical industry
From the pharmaceutical manufacturing process, to clinical trial through to drug adoption, simulation is used throughout the pharmaceutical industry.

Design of healthcare facilities
Balance the needs of budget constraints with clinicians' visions by planning beds, staffing and more in advance with simulation to ensure new health facilities function efficiently and safely.

Whole system strategic planning
SIMUL8 has the only whole healthcare system planning tool, allowing you to simulate the entire system and see effects throughout.

SIMUL8 simulation software is being used by healthcare organizations around the world to build a business case for change on a range of healthcare issues.

How does simulation work?

1. Draw your process

Creating a simulation is like drawing a flowchart. Then you add timing information, when work arrives (resources, patients, paper work, etc.) and the time tasks take to complete. Add in some rules about where work goes and you've built your simulation.

2. Run your simulation

When you click run, every individual action is simulated. Every significant event that happens in your process, all the clashes for resources (like people) and delays (queues caused by things not taking the same amount of time) is simulated. The clock in the corner of the screen tells you what the equivalent time would be in the real world.

3. Visualize

Simulation is animated. You can run the simulation at full speed to quickly get results. Or run it slowly and watch every piece of work flow through your system. This enables visualization of your process. You can see where queues build up, where resources are over-utilized and where the system is under resourced.

> " This kind of software *really comes into its own* as healthcare organizations test out new ways of meeting new challenges. "
>
> **Dr Nick Gaunt**
> **NHS Institute for Innovation**

4. See the impact

The software automatically collects performance measures as the simulation runs so that you can not only see visually what will happen, you also get accurate numerical results about every part of your process.

5. Optimize your process

Now you can ask "what-if". Make a change, run the simulation again and see the impact of that change. Each scenario you run, taking you a step closer to optimizing your process.

8 simulation success stories

Simulation consistently delivers significant value - strategic to operational, top-line to bottom-line - to the organizations and staff that use it.

A few examples:

1. **Memorial Health System** ensured the feasibility of a $31 million OR expansion project and improved patient satisfaction from the 57th to the 99th percentile.

2. Simulation helped the **UK NHS** understand how they could save $166 million by moving treatment of dermatology from hospital outpatient departments into the community.

3. **Geisinger Health System** planned and development of an on-demand food service system with a 98% SLA guarantee using SIMUL8.

4. **Wyeth Pharmaceutical** used simulation on 2 projects, each of which took less than a month from start to finish, resulting in avoiding expansion costs of up to $2 million.

5. Toronto's **The Scarborough Hospital** identified more than $50,000 in cost savings per annum and greatly reduced turnaround times in their patient transportation department.

6. **Johns Hopkins** Comprehensive Transplant Center simulated all the complex elements involved in a transplant case, from resources to time-commitments, to establish where improvements could be made to reduce costs and improve quality of life.

7. The **Mexican Foundation for Health** used simulation to predict the future economic burden of obesity in children and determine the shape their health services will need to be to cope.

8. **Mount Sinai Hospital** used simulation to test scenarios surrounding insured vs. uninsured women and the impact of service changes on patient care, bed capacity and cost.

Browse our case studies and learn how organizations are using simulation to improve their processes and increase ROI.

What are the benefits of using simulation?

✓ **Better decision making**

Using simulation all your decisions will be evidence based. You can compare multiple different scenarios to consider all possible angles. As a result you will know your process inside out and be confident in making bold decisions.

✓ **Test ideas in a risk free environment**

Experimenting in real life is costly. It's not only the capital expenditure of hiring new staff or purchasing new equipment, it's the cost of the ramifications of these decisions. What if you fire 3 staff and then find you can't cope with the workload and you can't meet demand? The only cost with simulation is the software and the time required to build the simulation.

✓ **No need need to wait to see what will happen**

A simulation runs much faster than real life - so you can try many ideas in a few minutes. If you want to know whether hiring another 3 Doctors will reduce patient waiting lists over the next 2 years you'll actually have to wait 2 years. With simulation you can run 2, 10 or even 100 years into the future in seconds. So you can get the answer now instead of when it's too late to do anything about it.

✓ **Test different ideas under the exact same circumstances**

In real life it's impossible to repeat the exact circumstances again. You can't test different ideas under the exact same circumstances. How do you know which idea is the best? With simulation you can test the same system again and again with different inputs.

✓ Helps focus thinking and communication

Simulation provides a vehicle for discussion about all aspects of a process. The rule and data collection forces you to consider why elements work in a certain way, if they could work better. It also brings to the surface inconsistencies and inefficiencies especially between different parts of a process that work independently. Sometimes the simulation doesn't even have to be finished - the framework it has provided to think through the issues reveals the solution.

✓ Visualization and animation

Simulation is visual and animated. It lets you clearly describe your proposal to others. It's more convincing than just displaying the end results as people can't see where these came from. Simulation is so effective at communicating ideas that many companies now use it as a sales tool to sell their products.

> " Until we utilized SIMUL8, there was no real means of testing changes without risk.
>
> The fact that simulation can *safely test the impact of changes* and *support decision making* is very valuable in a healthcare environment. "

Carly Henshaw, Improvement Facilitator
The Scarborough Hospital

5 signs you could benefit from simulation

1. You face complex decisions

Are you faced with more decision factors than you can get your arms around? Do you need to make changes to your process but can't risk it going wrong? As humans there are only so many variables we can hold in our heads at one time. A computer can easily and accurately process the complicated interactions that happen in your process.

2. You're having problems with processes

One or more of your processes is broken or needs to work a lot better. Many small, day-to-day decisions are not being made well, and it's having an impact on your performance.

3. You can't wait to see the impact

If your decisions will have implications in months or years to come then it's impossible to put a change in place and see what the outcome will be. With simulation you can fast forward to see the impact of your choices.

4. Your service has variability or uncertainty

If events in your service don't always take the exact same time, or you can't predict exactly when new demand will arrive then you have variability. If you use other techniques like spreadsheet modeling you'll have to rely on averages. Averages can never truly reflect the real world and when just a little real world variability is added the results can be wildly different. Simulation can be made to match your process exactly.

5. Your service doesn't exist yet

You need to create a new service, but how can you know it will work? Will it be able to cope with demand? Simulation can help you design your process and validate your assumptions before waiting for the real system to be ready.

" SIMUL8 has been a valuable application for expanding our range and depth of analytical abilities. It should be considered an important tool in the design of *every robust process improvement program*. "

Todd S. Roberts, System Director of Operations Improvement Memorial Health System

Do you have any questions about using simulation?

At SIMUL8, we're always happy to talk through your unique challenges and discuss how they could be approached with simulation.

With powerful software and years of experience of improving processes and reducing costs for healthcare organizations, we can help you to launch and grow successful simulation programs.

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