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Making things work in your practice

SOLUTIONS

House of cards: Using process simulation modeling as the glue for practice transformation

A dapting to the current healthcare environment for most medical groups may feel like a house of cards, each card representing a different initiative precariously stacked, one on top of the other, with the slightest slip causing the pieces to crumble.

Medical groups are scrambling to understand changing reimbursement structures, to establish new systems of care and to integrate with larger health systems to manage populations of patients, all while trying to maintain patient and provider satisfaction. With all of these factors competing for attention and change fatigue rampant among providers and staff, it can be difficult to implement the necessary changes to help achieve a vision for practice transformation.

Because of this fragility, practices often fear that the change itself will be their undoing. However, successful change can be achieved with thoughtful planning, the necessary tools and stakeholder engagement to motivate commitment. Simulation modeling is one tool that can assist practices in modifying practice patterns with minimal disruption to operations, resulting in better outcomes.

Simulation modeling allows us to test the operational efficiency of future designs under different scenarios before implementing the best option.

What is simulation modeling?

Simulation modeling utilizes specific software to test and redesign workflow alternatives in a static environment. It enables fast and cost-effective modeling of practice operations to understand the impact of design alternatives without directly impacting operations. The advantage of simulation modeling is that it can be performed for any workflow. For example, you can study patient flow through a clinic, patient scheduling to maximize capacity and the effectiveness of a call center.

We can use modeling software to answer business questions such as what is the most effective use of resources? How should we change our patient workflows to maximize efficiency? Do we need additional space and what is the most appropriate configuration? It also serves as a tool to engage providers and senior leaders in the need for change. Good process modeling systems have animation capabilities and reporting tools that allow for meaningful conversations regarding outcomes and the financial performance of select scenarios.

Simulation modeling allows us to test the operational efficiency of future designs under different scenarios before implementing the best option. In the past, testing a scenario meant changing roles and responsibilities, adapting workflow processes, modifying information technology and potentially investing in new staff or facilities. This all takes time and money and can be disruptive to the organization. Simulation modeling allows us to quickly test multiple scenarios without the time and money investment.

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Scenarios can include changes in controlled parameters such as capacities, layout, staffing, cycle time and scheduling practices, as well as uncontrolled parameters such as volume, patient mix, arrival patterns and other actions. Processes are complex and often have multiple solutions with interrelated dependencies. Changing one step in a workflow may have unintended consequences down the line. Modeling allows us to identify these interdependencies upfront, resulting in fewer failed trials down the road.

In the past, simulation modeling was often limited due to accessibility of data. However, the rapid implementation of information technology and improvements in modeling software make it possible for practices to export data from their systems into the modeling software, allowing for greater accuracy across a larger data set. To maximize patient throughput by studying a physician's schedule, for example, you could export the schedule for the past year and virtually test it under various conditions. You could also load existing call center data (number of calls, time to answer, hold time, etc.) and run various scenarios to determine the correct staffing level based on current or projected future volume.

The following case study describes an operational process that required redesign and the outcome achieved using simulation modeling. Identifying variables and running various scenarios helped to identify process constraints and resulted in a unique conclusion that what might not otherwise have been implemented.



Figure 1. An example of a process simulation model

Case study

A medical group was re-evaluating its care delivery model and restructuring its clinic scheduling templates within its surgical practices as a result of long patient cycle times. Inefficiencies in the system led to providers working well past the clinic's hours of operation, resulting in patient and provider dissatisfaction. The medical group wanted to determine if a 1:1 physician-to-advancedpractice-provider (APP) model created greater efficiencies than the existing practice of utilizing a pool of APPs. The average cycle time (time patient arrived until discharge) for the practice ranged from 62 to 139 minutes for patients with scheduled appointments.

Simulation modeling technology was used to test four combinations of two primary variables: the care model (1:1 vs. pool scenarios) and clinic schedule alignment (APP and physician schedule alignment vs. no change) in order to evaluate the effects on patient waiting and cycle time. Detailed information was obtained on the APP and physician clinic scheduling templates, which included the number of slots by appointment type each day, total task time by position and average cycle time per patient visit. A current state model was built and validated to ensure model efficacy.

Scenario 1 represented the current state with a pooling care model and no adjustments to the clinic schedules. Scenario 2 used the same pooling care model with modification to the scheduling templates to determine if aligning the APP's schedule to better match the physicians would decrease patient waiting. In order to test the 1:1 care model ratio for Scenario 3, the simulation model was modified to include an additional APP which required touch points with a specific physician, but no changes to the schedule were made. In Scenario 4 both the 1:1 model and schedule adjustments were made. Scenario 3 quickly demonstrated that the exam rooms become a bottleneck when an additional APP was added to the clinic, so an optimization was run and an additional three rooms were added to this scenario to allow for a comparison of cycle times absent this constraint.

Outcome

A number of variables had a direct impact on the simulation modeling results, including clinic start time, duration of appointments, appointment schedule cohesiveness among physicians and APPs, and the number and type of patients seen per day, as well as resources such as exam rooms. As a result, some changes were made to streamline provider schedules to maximize appointment availability, including staggering APP and physician templates, changing start and end times and moderating patient flow throughout the day.

Process modeling can be a very effective tool when engaging in workflow redesign and can be very powerful in engaging providers, staff and leadership in workflow changes.

Based on the simulation with streamlined schedules, the medical group determined that the pool scenario created the most efficiencies in productivity, reducing average wait time by 27 to 70 minutes. The 1:1 ratio increased wait time, as physician time and space were the major constraints. Given the current space and with no changes to the duration of physician appointments, the medical group discovered it was best served to streamline schedules using the existing pool scenario.

Through the use of simulation modeling, the medical group was able to determine the most effective use of staffing resources before making significant changes to its provider schedules. It was also able to identify the major constraints in the process that helped the group convey its need for additional space to senior leadership.

Process modeling can be a very effective tool when engaging in workflow redesign and can be very powerful in engaging providers, staff and leadership in workflow changes. Used in concert with traditional tenants of workflow redesign, simulation modeling can serve as the glue in our house of cards.

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