

Evaluating Hospital Inpatient C



Healthcare

Problem

When creating a modern hospital, healthcare specialists face a never-ending list of important questions to ask and important decisions to make. Stockholm County, Sweden was in the process of building a new, highly specialized hospital. The Health Administration of the county questioned whether they would get an acceptable level of care production with

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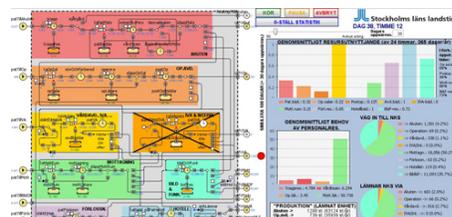
understanding of the issue, which often leads to new questions asked and a need to expand or change the scope of the model.

Whereas the first version of this model focused on the total capacity and possible amount of care production, the second version allowed the users to experiment with various patient allocation scenarios for the inpatient care. The second version also enabled them to divide patients into various clinical groups with unique traits and provided a decision-support tool to balance the way these needs were addressed by different inpatient care resources.

Solution

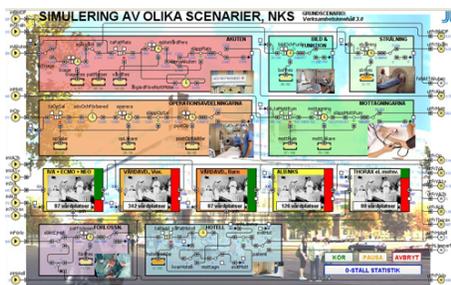
To best solve real-world problems with simulation, the person in charge of modeling also has to have a strong understanding of strategic and/or operational challenges in the industry (in this case – healthcare), and not purely modeling aptitude. This ensures that he/she is able to grasp the essence of the problem, interpret, and sometimes reformulate it, to build a better model that adds value. In this project, it was competence in the fields of strategy, management, and production that allowed the modeler to evolve his vision of the problem, and change the simulation objective to find answers to the questions that the stakeholders really needed to ask.

Before the simulation project, the effort had a tendency to focus on the various organizational parts of



taken into account. The model was designed to reflect this systematic approach.

In the first model, each organizational part was described using discrete event simulation in a very simplified form, in terms of key processes and primary resources, and then these pieces were tied together to model various possible patient flows. After this, it was possible to experiment with an infinite number of hypothetical scenarios, by experimenting with Demand (incoming patients), Resource levels (number of beds, rooms, etc.), Times with variations (expected inpatient care time, expected operating time, etc.), and Strategies (how patients were expected to navigate through the hospital).



Second version of the hospital model

The second version of the model separated the inpatients into clinical groups. This was done to better take into account the very different traits and needs in different cases, as well as to better see whether a discussed allocation of the patient categories, given the different

alternatives, was well balanced or even possible. The model was also given a different appearance, so that it was visually clear that this was a new model, even though most of the logic was the same.

Both versions of the model focused on the physical resources rather than human and personnel resources.

a meso abstraction level case, like this one.

Outcome

The statistics provided by the model included achieved care production and resource utilization rate. This helped to gain an understanding of whether the hospital capacity was acceptable.

Thanks to the model, care production could be estimated in terms of operations carried out, inpatient care delivered, etc., given the scenario and circumstances under consideration. By doing this, possible risks/challenges could be pinpointed and discussed while looking at resource utilization.

Major conclusions made with the model confirmed what many stakeholders had claimed for a long time, that the resource level for inpatient care was far lower than needed. But through the model and argumentation of the simulation project manager, the decision makers were encouraged to take action to address the problem.

In complex issues, often with conflicting interests, major benefits of using dynamic models are more often qualitative than quantitative (even though figures also play an important role). The reasons for this are the following:

- Models gather all the relevant dimensions, issues, parameters, indicators, etc., in one place (the model), and make it visual. This often serves as a catalyst to raising the understanding and level of discussion.
- Models allow for an infinite number of scenarios to

thinking, rather than operations management and system thinking. That is why it is necessary to make issues like the ones covered in this project easily understandable. Simulation can help decision makers in the area of healthcare push discussions in a better direction and, as a result, make better decisions.

This model has also acted as a template for other models in cases where the issue was to analyze operations at existing hospitals. This model's logic can be seen as generic, enabling planners to look at a hospital as a system and to evaluate whether the system is in balance or not.

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