Patient Transit Simulation

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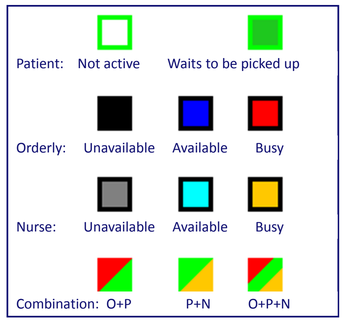
Introduction

The subject of the study is the patient transit process. Orderlies transit patients from wards to treatment rooms and back. According to their appointment time, patients often arrive too late at their destination. *The aim* is to analyze and optimize the way of scheduling the orderlies to pick up patients.

Figure 2: Legend icons in simulation

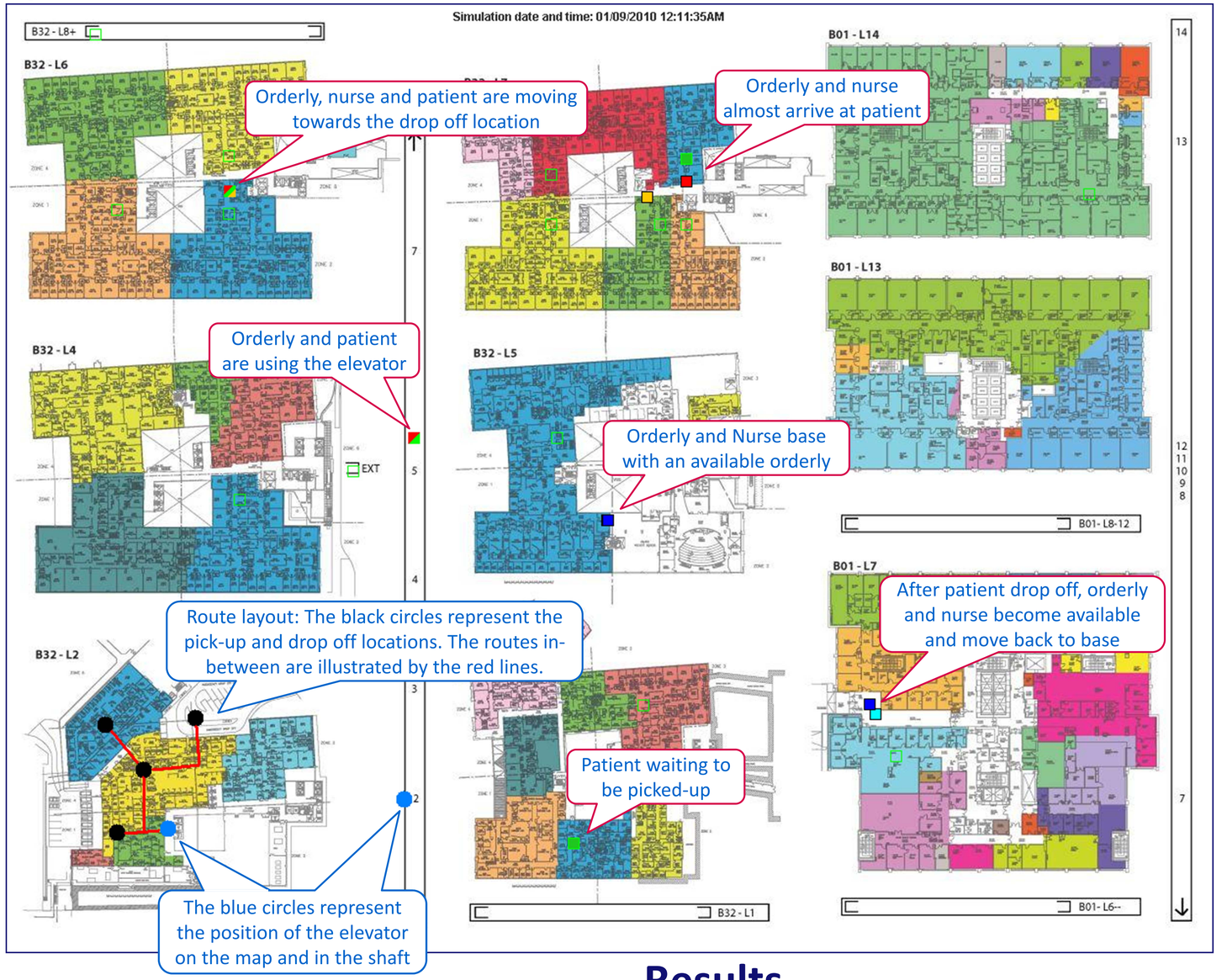


Simulation

We have built a simulation model (in Java) that consists of two buildings with a total of 9 floors, see Figure 1. The routes between all locations, almost 1500 in total, have been defined in an efficient way for ease of use. The movements of each orderly and transit nurse are included in the model. We have included realistic waiting times, including some variation, for patient drop offs and pick-ups and also for elevator delays. This screenshot of the simulation shows some events that can occur, for example the arrival of a nurse and orderly to pick-up a patient.

Figure 2 explains what each icon in the simulation represents.

Figure 1: Screenshot of the Patient Transit simulation

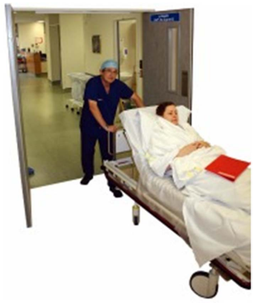


Results

Currently, the difference between our simulated transit times and transit times from historical data is < 2 minutes, but the variation needs improvement (see Table 1).

Conclusion

Our simulation model closely represents the orderly transits in the real-world. Further calibration will ensure a very good match. Using this model, different dispatch policies and orderly staffing levels can be evaluated before trialling them in the real-world. This will assist Transit Services in providing high levels of service where patients arrive at their destinations with minimal or no delays. This will improve patient's experiences and help increase the efficiency of other hospital services such as radiology.



Future work

- Calibrate the existing model
- Experiment with different dispatching policies
- Model the arrivals of requests, instead of using historical data, to add generality and flexibility
- Build an approximated analytical queuing model to speed up the evaluation of changes to orderly transits

Table 1: Difference between simulated and historical drop off

Mean	Standard deviation	
1.66	15.24	[minutes]

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