

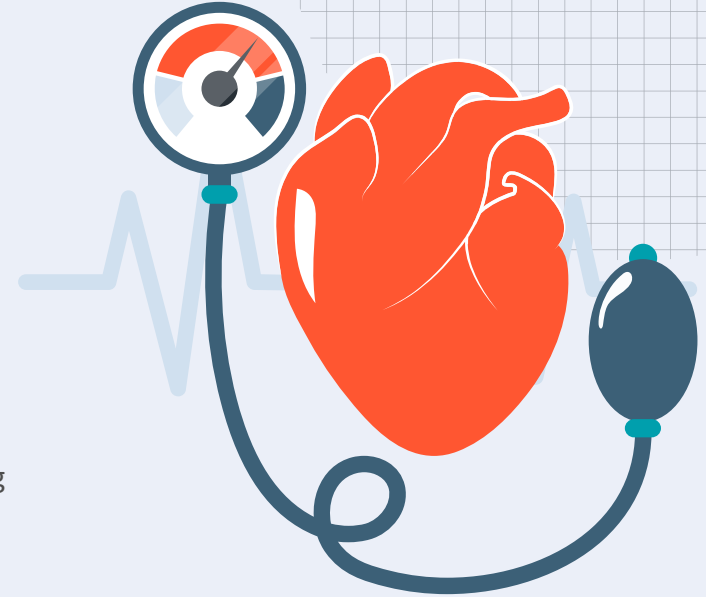
# Exploring the Impact of Adding a Low-Priority Room in Patient Management

Simulation of Patient Management and Waiting Time Analysis

Tarbiat Modares University - Faculty of Industrial and Systems Engineering

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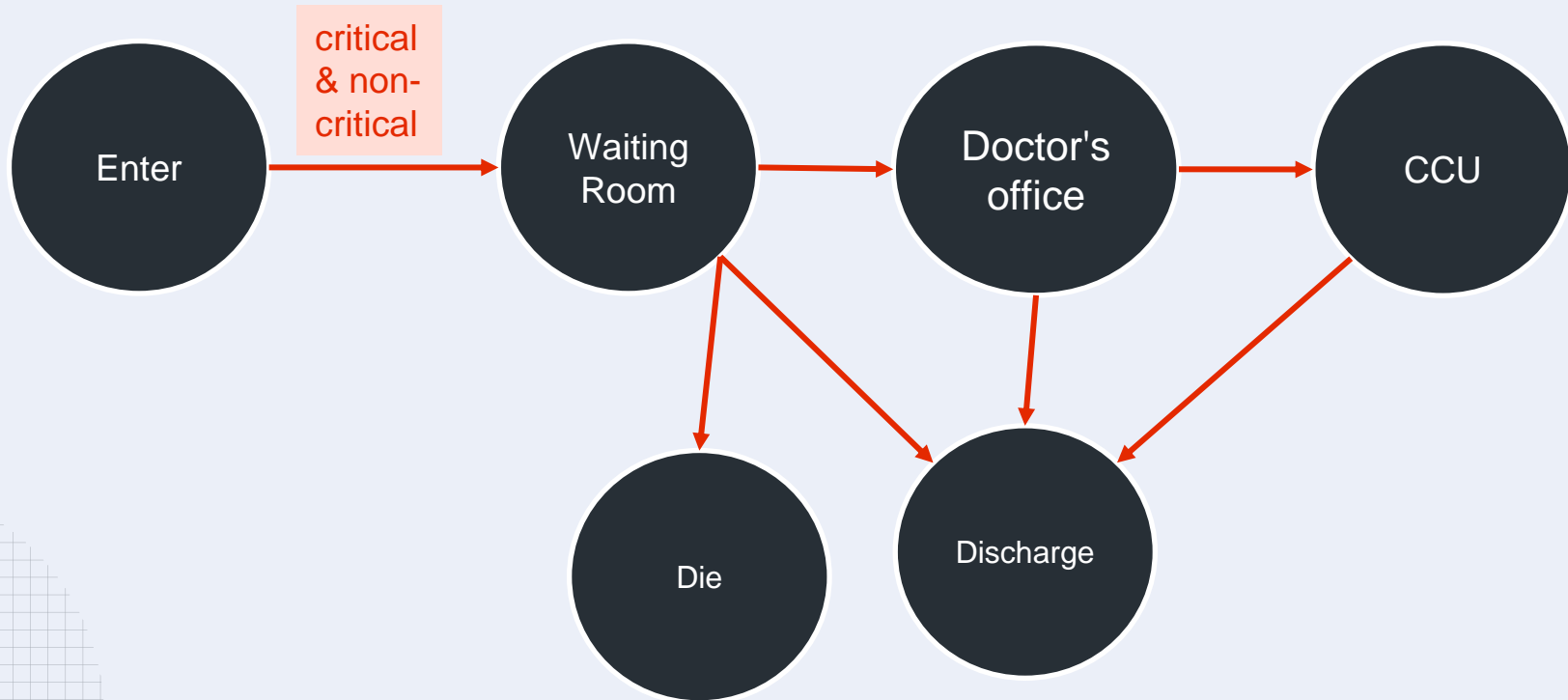


# 01 Introduction

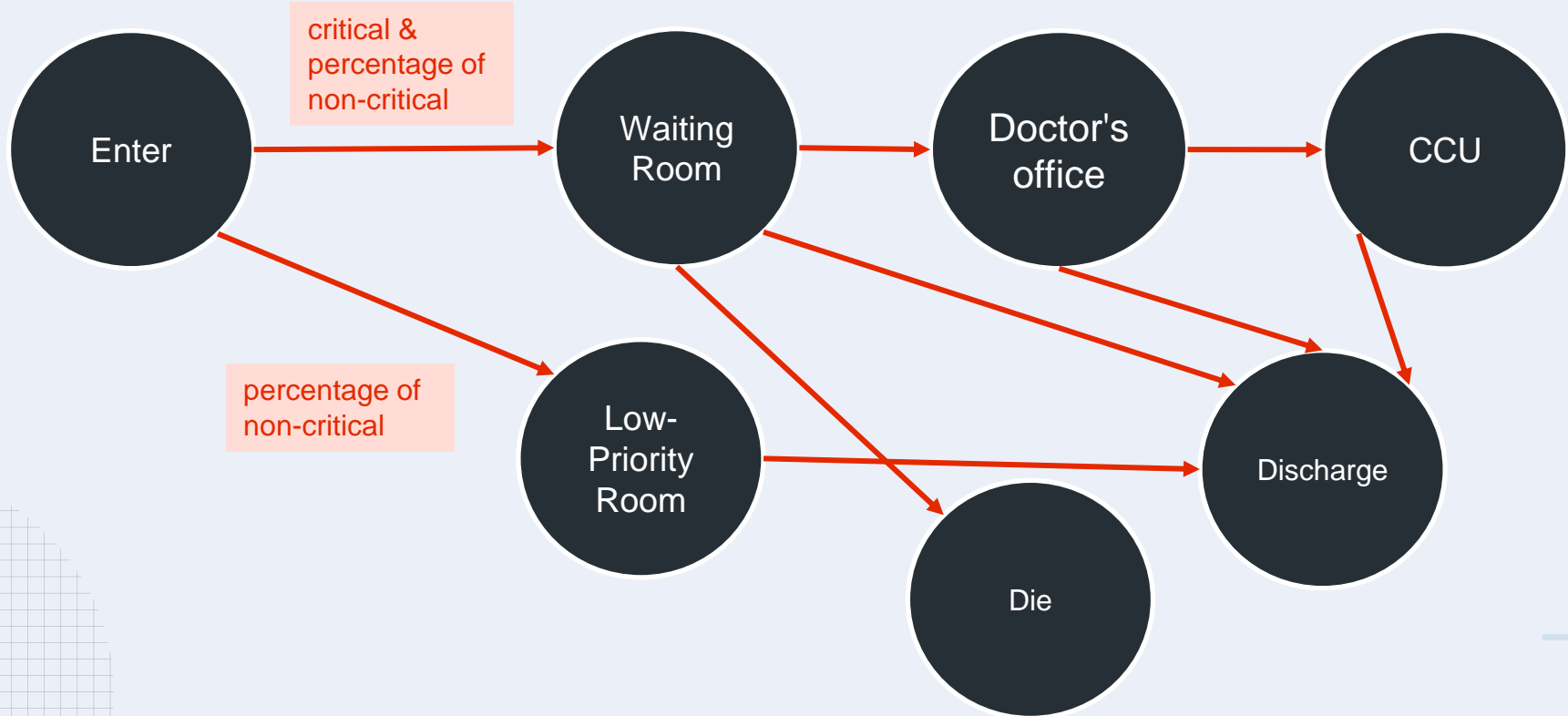
Analyze the effect of introducing a low-priority room on patient waiting times and deaths.



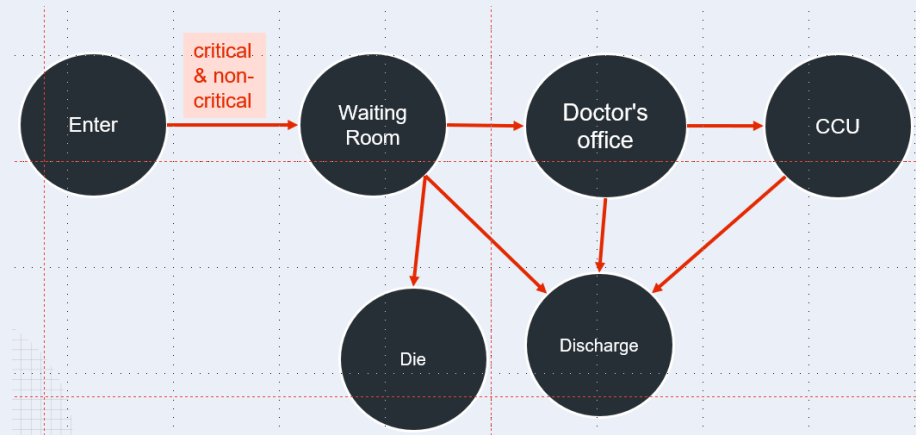
# Simplified Current Flowchart



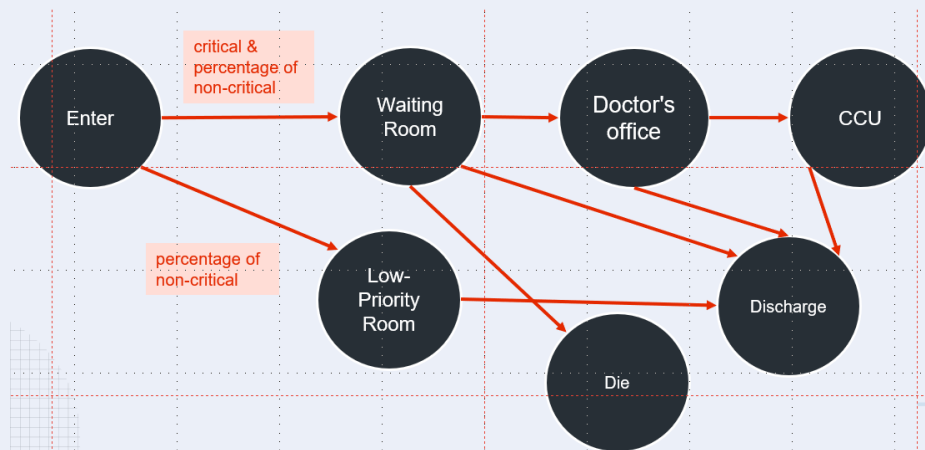
# Suggested Flowchart



# Simplified Flowchart



# Suggested Flowchart



## 02 Scenarios



# Scenarios

Number	Scenario	Waiting (Normal) Room	Low-Priority Room
Scenario 1	Current	100 %	0 %
Scenario 2	20 % of non-critical patients go to LP room	80 %	20 %
Scenario 3	Half of non-critical patients go to LP room	50 %	50 %
Scenario 4	80 % of non-critical patients go to LP room	20 %	80 %
Scenario 5	All of non-critical patients go to LP room	0 %	100 %

# 03 Simulation

With NetLogo

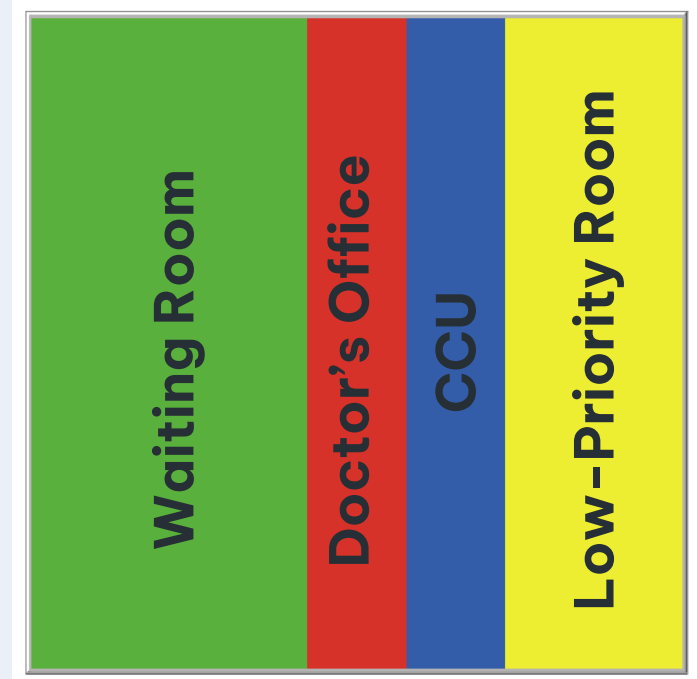




# Environment Setup

## Room Types:

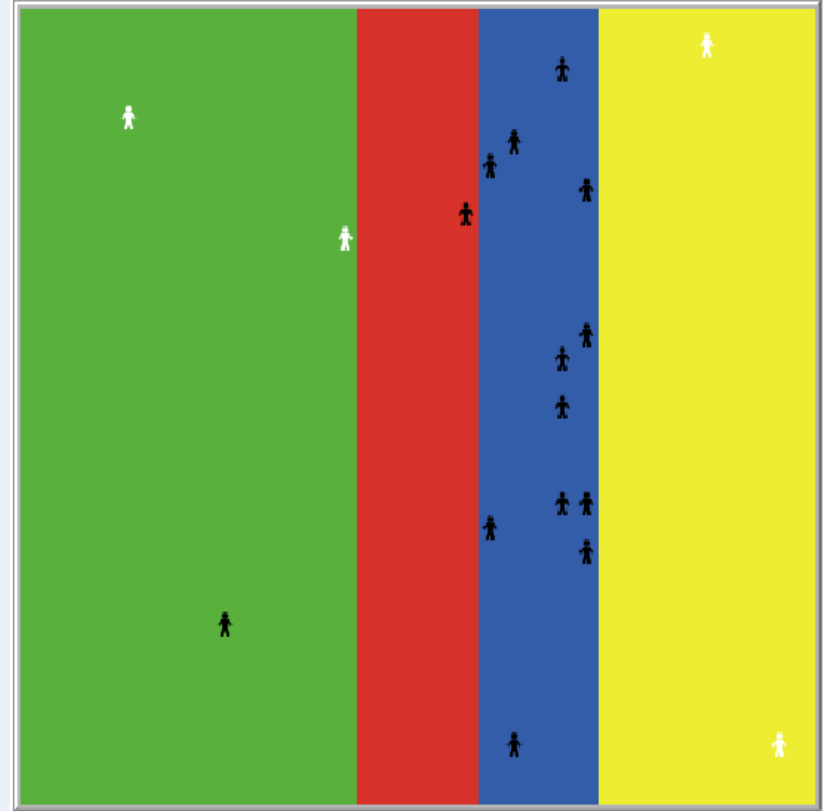
- Waiting Room (**Green**): For critical and percentage of non-critical patients.
- Doctor's Office (**Red**): Treatment area.
- CCU (**Blue**): Intensive care for critical patients.
- Low-Priority Room (**Yellow**): Optional room for non-critical patients.



# Agents: Patients

## Attributes:

patient-status	"critical(black)" or "non-critical(white)"
treatment-time	Time required for treatment
room-assigned	Room the patient is currently in
waiting-time	Time spent waiting



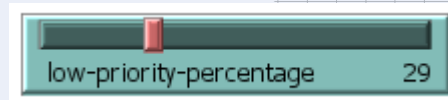
# Simulation Hyperparameters

## System Parameters

- Maximum Patients: 20,000
- Doctor's Office Capacity: 1 patient
- CCU Capacity: 12 patients
- Max Waiting Time for Critical Patients: 10 ticks (before death)

## Patient Characteristics

- 30% Critical
- 70% Non-Critical
- Low-Priority Room Allocation: Controlled via slider (0% to 100%).

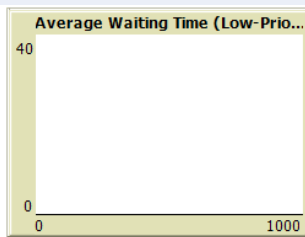
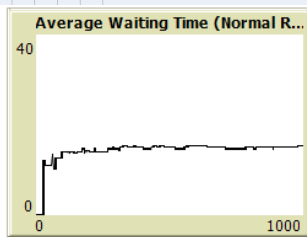
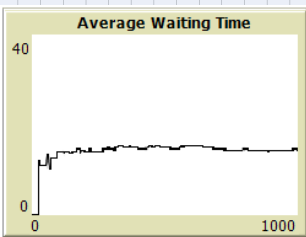


## Simulation Outputs

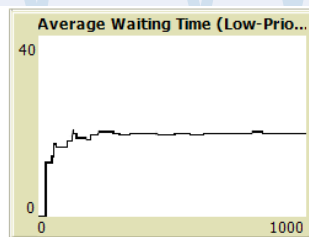
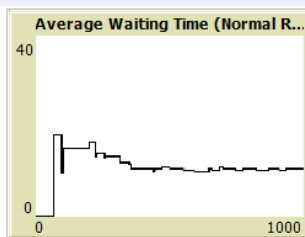
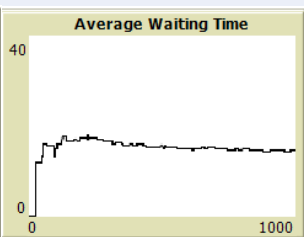
- Average Waiting Time (Overall, Normal Room, Low-Priority Room)
- Deaths Over Time

# ages

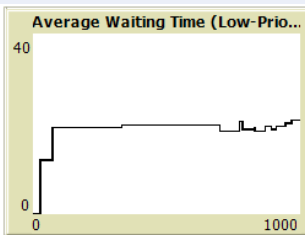
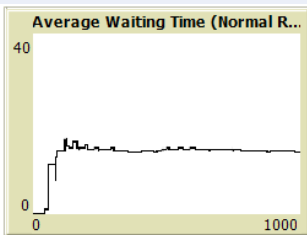
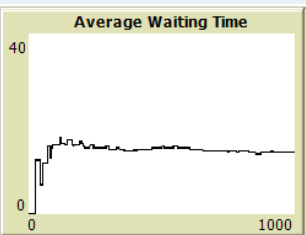
0 %



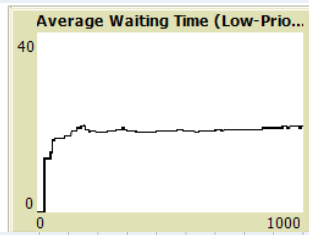
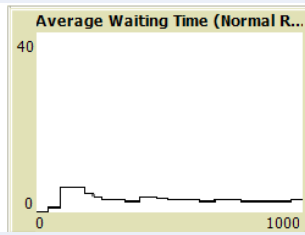
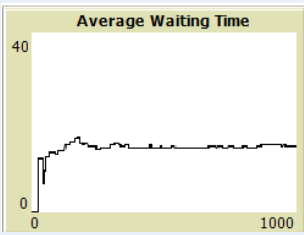
**% 80**



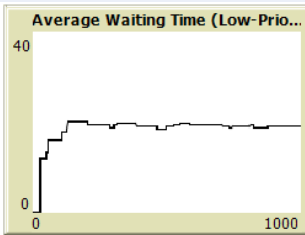
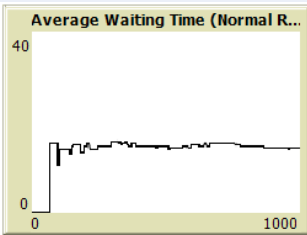
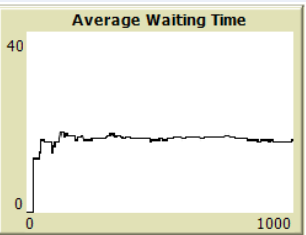
20 %



**% 100**

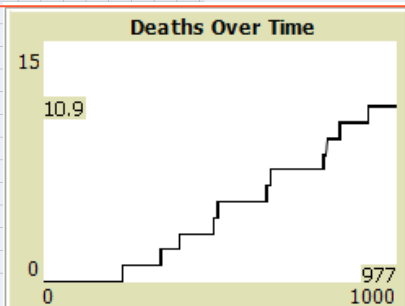


**50 %**

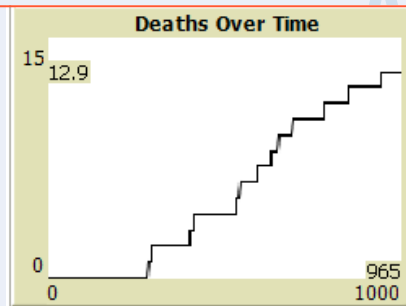


# Results: Death Over Time

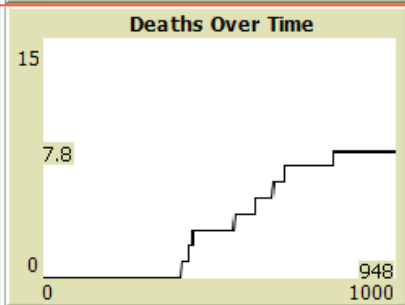
0 %



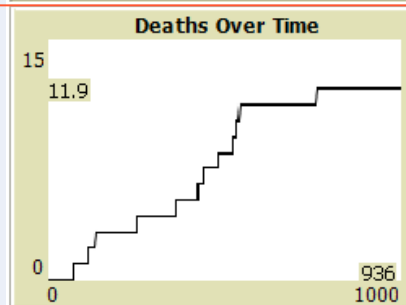
% 80



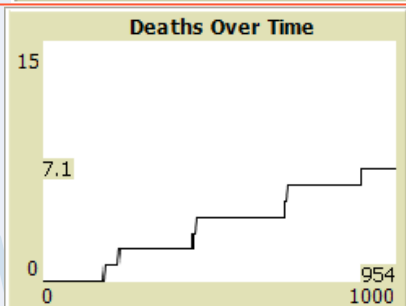
20 %



% 100



50 %



# Conclusion

- **Optimal Balance:** The **50%** LP configuration strikes the right balance between resource allocation and patient prioritization.
- **Reduced Waiting Times:** It minimizes waiting times for both critical and non-critical patients by efficiently managing patient flow.
- **Lower Death Rate:** Critical patients experience faster access to care, significantly reducing the death rate.

# Thanks!

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