**Agent-Based Simulation for Workflow in Emergency Department:**

Purpose of Paper

Develop ABS to allow free exploration of ED performance under various settings

Characterize and study ED performance under different settings

Triage and radiology procedure processes

Illustrate how changes affect patient throughput time (and other measures)

Conclusion

ABS can be used to plan changes, locate bottlenecks, and study relationships

Complexity Factors

Variation in number and condition of new patients

Simultaneous demands and competing priorities for caregivers

Deficiency in resources (beds, equipment, personnel, etc.)

Inefficient communication among caregivers

Multiple delays

Interruptions and shift changes

Netlogo 4.0.3 – Open-source software package

A picture containing table

Description automatically generated

Simulated Workflow – Detail steps in the process by a patient

Agents and Rules – Patients and caregivers given different appearances and rules

Simulation Inputs – Adjust aspects of workflow characteristics

Patient Arrival

Patients at ED front door

Peak hours per day

Patients per hour during peak hours

Patients per hour during non-peak hours

Patients’ maximum waiting time

Triage

Number of triage nurses

Average triage time

Random variation of triage time

Adjustment of triage nurse number

Upper and lower limit for triage adjustment

Maximum number of triage nurses

Nurse Care

Number of beds

Bedside nurses

Average nurse screen time

Random variation of nurse screen time

Average disposition time

Physician Care

Number of physicians

Average physician exam time

Average radiology review time

Radiology Order

Radiology likelihood

Number of radiologists

Average radiology procedure time

Simulation Outputs