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The Center for Education and Research in Information Assurance and Security

# Effectiveness of Unarmed Response to Active Shooter Incidents

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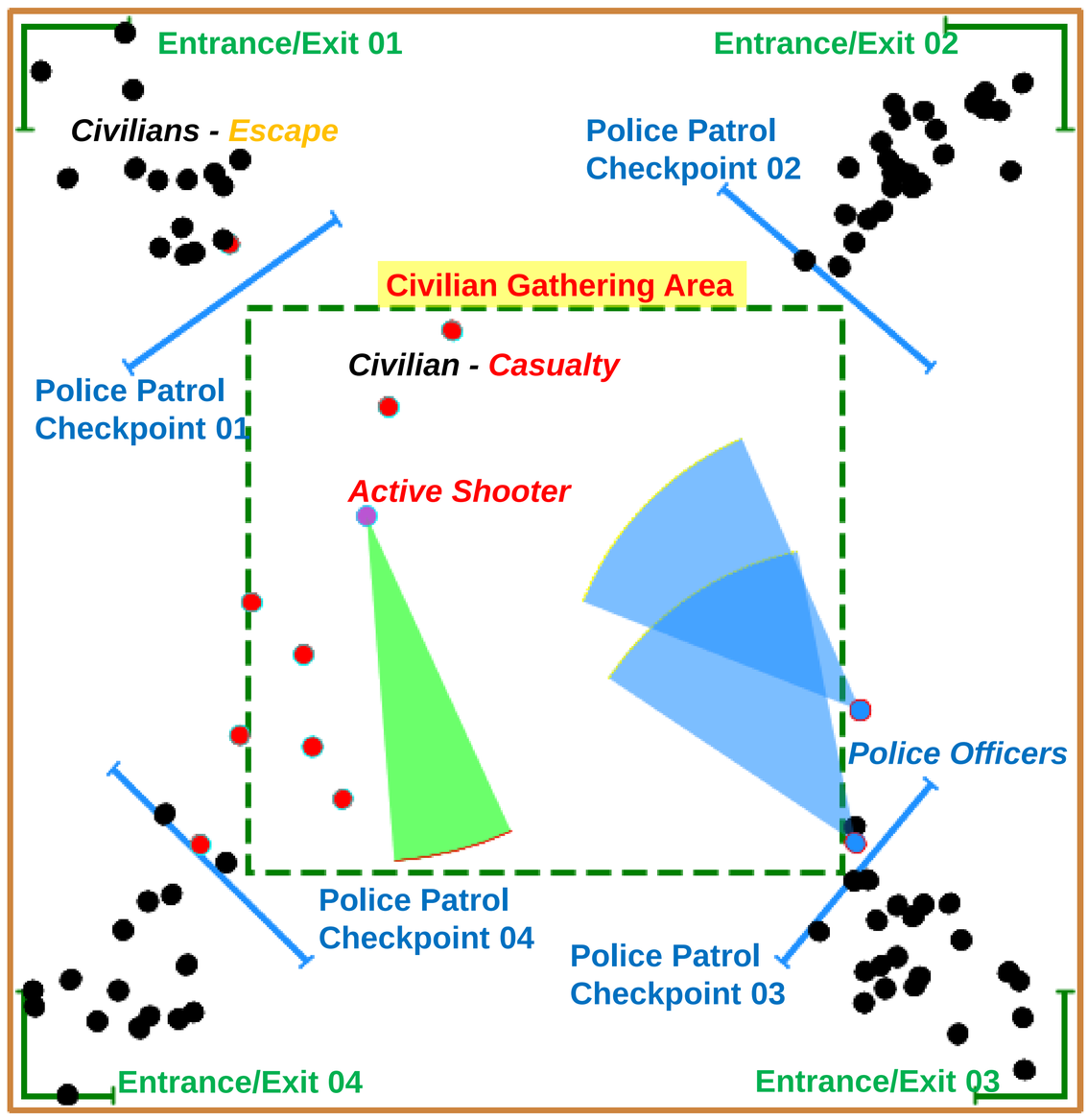
## Model Methodology

- Created an agent-based model replicating an open area with high pedestrian traffic with police presence.
- The model has a default value of one shooter agent, two police officers, and 500 civilians entering the model at 1000 agents per hour.
- All agents enter the model via random entrance/exit.
- The police agents patrol the model by continued selection of random patrol checkpoints.
- After 10 minutes of model runtime, the shooter moves to the center of the model. Upon arrival, the shooter begins to discharge at both the police officer and the civilians.
- The civilian's cognitive and the police response time delay is set to 0 and can be adjusted by the user.
- The civilians escape by running toward the nearest entrance/exit while the police agents move toward the shooter.

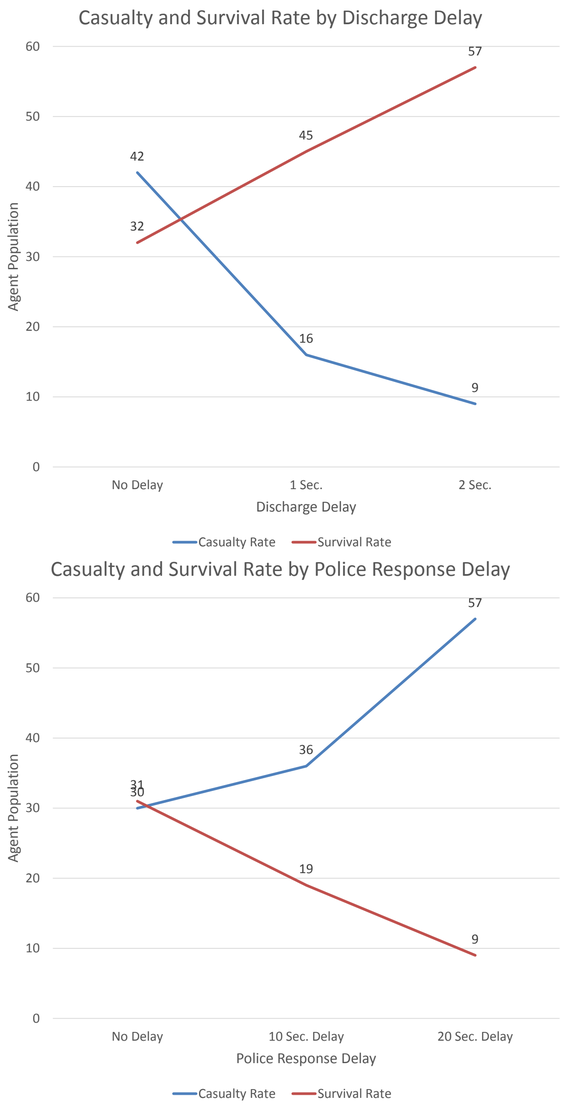


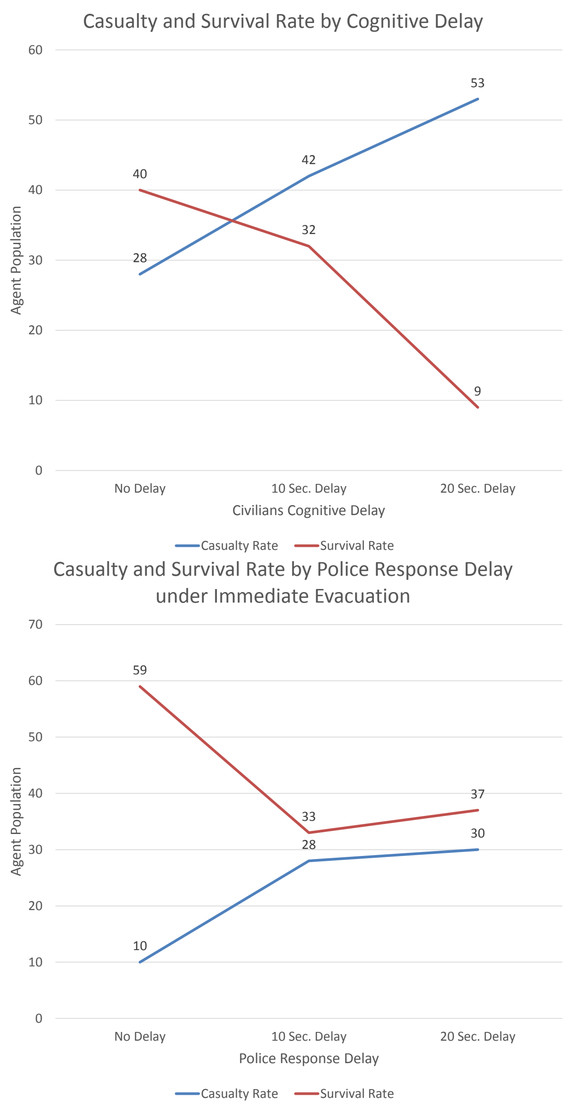

## Agents in Model

1. Active Shooter
2. Unarmed Civilians
3. Police Officers

## Notes

- Either the police and the shooter can discharge at one another.
- The shooter is stationary in this model during discharge.










## Results

- The civilian cognitive delay increases the casualty rate in contrast to the immediate action of running away from the threat.
- The police response delay increased the casualty rate, however, less significant when the civilians escape immediately.
- The shooter's rate of discharge increased the number of casualties rate despite capacity or the power the of weapon.

## Recommendations

- Educate the public on how to recognize the sound of a firearm and the importance of immediate evacuation.
- Create physical obstacles in an open area for civilians to seek shelter.
- Assign patrol details at a vantage point to locate the shooter to decrease response time.

## Future Research

- Model **RunHideFight** unarmed response to test the model's to lower the casualty rate in contrast to evacuation.
- Assess the minimum number of police agents necessary to apprehend the shooter.

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