Assessing School Lockdown Procedures Using an Agent-Based Simulation Model

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On average, thirteen thousand Americans fall victim to gun violence each year. Gun violence is the second-leading cause of death for teens in the United States, 58% are homicides - approximately 3.4 thousand children under the age of 17. This year (2019), there have been 22 school shootings where one or more people have been injured or killed. The protocol for manhunts are lockdowns. Research on the effectiveness of lockdowns is sparse as the only data is that of actual emergencies. However, there is a way to assess an institution's individual effectiveness in the event of an active shooter situation. This can be done using modeling simulation software to map out the tested institution and analyze the actions of predetermined agent behaviors, based on their role in varying scenarios and time to neutralize the offender. Computer simulations are an effective way of testing emergency scenarios as they provide accurate, iterable, risk-free environments to understand the outcome of most situations. Based on the data, one can note that there was no correlation between response time and the amount of time needed to neutralize the offender. However, a direct correlation can be noted between the response time and the number of casualties as expected. An increase of one minute in response time caused a 15% increase in casualties. Additionally, while building the simulation it was discovered that the variance of shooting range caused by the shooter's weapon also has a major impact on the casualty rate of the student body.

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