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Developing an Efficient and Effective COVID Testing Strategy for the United States Corps of Cadets: Preliminary Results of a Recent Simulation Study

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Abstract: The United States Corps of Cadets will require an efficient and effective COVID testing policy to balance force protection and mission requirements. In an effort to explore the decision space of this problem and understand the potential outcomes across this space, the authors developed a custom computer simulation model that represents the typical dynamics of cadet life during an academic term. These dynamics include time spent in a barracks room, company area, team or club practice area, and classrooms or instructional spaces. As cadets pursue activities across these spaces, mixing and interactions between cadets occur, presenting opportunities for COVID to spread given an infection exists. USMA leadership holds several policy levers capable of detecting and preventing disease spread. The most powerful levers include testing policies as well as activity policies and prohibitions. In order to understand the effect of various policy configurations, the authors explored an efficient design of experiments (DOE), an experimental construct that systematically and intelligently spans the decision space. Results of the computer simulation model and the DOE show that testing only symptomatic cadets will not protect against an outbreak of COVID. Promising testing strategies include adaptive testing that results in 100% testing of close contacts of a symptomatic cadet that tests positive for COVID. Close contacts include cadets in the same company, team, or instructional section.

Keywords: COVID testing strategy. Simulation

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