



Simulations Show Which COVID-19 Policies Matter Most in Jails

Key Takeaways

- Resuming high-contact activities, such as basketball, posed the greatest risk of large COVID-19 outbreaks among residents.
- Staff infection levels stayed similar across every scenario tested because ongoing community transmission outside the jail affected staff regardless of the policies in place inside the facility.
- Analytical tools can provide practical insights for correctional decision makers faced with programming selection choices during a pandemic.

Why This Matters

Jails struggled to manage COVID-19 because people moved in and out constantly, and staff traveled between the jail and the surrounding community every day. This made it difficult for correctional administrators to determine which mitigation efforts mattered most as they considered reopening programs and activities.

Previously, researchers used several analytical methods to study how COVID-19 spread through detention facilities at the population level. This study applied a method called agent-based modeling (ABM), which simulates each individual person separately. The model, Simulation Applications for Forecasting Effective Responses in Corrections (SAFER-C™), allows researchers to customize simulations to reflect facility-specific operations and policies.

The SAFER-C tool can be used to assess “what if” scenarios with different programming options. The detailed outputs from these analyses can inform jail leadership’s decisions as they transition to higher activity levels and resume out-of-cell activities while mitigating and managing transmission risks such as those from COVID-19.

How the Study Worked

The researchers built a simulation tool called SAFER-C that tracks daily contact among individual residents and staff in a jail housing unit. They based the simulation on real operations and policies, including de-identified data patterns from the District of Columbia Department of Corrections, and applied it to a generalized 100-bed housing unit with 5 to 25 people entering or leaving each day over a 25-day period.

The team ran nine different scenarios through the simulation. These scenarios were designed to inform questions such as “What is the effect of increasing the number of residents interacting together during out-of-cell time?”, “What is the effect of different vaccination rates within the resident population?”, and “What is the effect of reintroducing high-contact activities?”

Each scenario was repeated 10,000 times to capture a wide range of possible outcomes rather than a single prediction. This approach is more reliable than a simple before-and-after comparison because it shows the full range of what could happen under each policy, including rare but severe outbreaks, instead of relying on one fixed outcome.

What Was Learned

- **High-contact activities resulted in the worst outbreaks.** When high-contact activities were reintroduced with one initial infection, the average number of resident infections rose to 6.6, with a worst-case scenario of 60 infections, compared with an average of 3.6 and a worst-case scenario of 29 under baseline precautions.
- **Starting with more infections made high-contact outbreaks substantially worse.** When the simulation began with five infections instead of one, the average number of resident infections during high-contact scenarios increased to 23.9, with a worst-case scenario of 81 infections.
- **Group size alone made only a small difference.** Larger out-of-cell group sizes raised the worst-case number of infections (from 10 to 29) but had little effect on the average, suggesting that smaller group sizes may prevent incidence of more severe but less likely outbreaks.
- **Vaccination rate alone made only a small difference.** Raising the initial vaccination rate to 50 percent or 70 percent had little effect on its own because resident vaccination rates dropped quickly. Even when the facility started at 50 percent or 70 percent fully vaccinated, that share fell below 40 percent by day five as new intakes arrived with the lower vaccination rate of the surrounding community.

What This Means in Practice

This work was performed while the District of Columbia Department of Corrections was considering policies for reopening. The results from the baseline analysis were reviewed by the agency's inmate health providers and District of Columbia Health officials, who validated the range of the results through expert judgment. The simulations provided valuable insight and helped the facility leadership explain why certain behaviors were emerging (e.g., why the overall resident vaccination rate hovered around 36 to 37 percent despite continued increases in participation in the vaccination program).

The findings from this study suggest that analytical tools such as SAFER-C can provide practical insights for decision makers regarding different programming scenarios for detention facilities during a pandemic. The agent-based modeling approach in SAFER-C allows users to evaluate the potential impact of increasing out-of-cell group sizes, changing vaccination rates, and reintroducing high-contact activities on facility populations. The tool's detailed output helps decision makers identify more vulnerable groups, detect riskier activities, and understand the effects of mitigation efforts.

Source article

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