

# Making Corrections Safer With Technology

By NIJ Staff

*Authors' Note: Points of view expressed in this article do not represent the official position or policies of the U.S. Department of Justice.*

Technology can help make correctional work safer — body armor that protects officers from stabbings, devices that detect drugs in the mail, and technology that monitors behavior and detects prohibited electronic devices like cell phones. The Office of Justice Programs (OJP), National Institute of Justice (NIJ), is supporting two projects now under development that aim to prevent violence and disruption through clever use of technology. One is creating toothbrushes and razors that inmates cannot fashion into weapons. The other is developing software that can help predict whether a facility will experience a disruption. OJP is committed to supporting the development of such safety technologies to be used in the nation's correctional facilities.

## Better, Safer Hygiene

Inmates often painstakingly turn their toothbrushes and razors into deadly weapons. Corrections officials want to encourage hygiene, but they do not want to inadvertently deliver the raw materials for creative inmates' potentially dangerous handiwork. Paul Biermann and a team of scientists from the Johns Hopkins University Applied Physics Laboratory (APL) are trying to alter the standard toothbrush and safety razor just enough so that, in addition to being as useless as possible as weapons, they are practical, easy and affordable to manufacture.

Previous solutions to this problem have changed the basic structure of the devices; for example, handles

were cut very short or were oddly shaped. However, this made them difficult to use, and in corrections, inmates need to be encouraged — not discouraged — from maintaining their hygiene (especially dental hygiene) to reduce costs of medical care.

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Biermann's team decided that it was the materials used to construct the hygiene items, not their shape or design, that had to be changed. Standard toothbrushes and razor handles are made from thermoplastic resins, plastics that soften when heated and harden when cooled. This allows them to be reshaped and also makes it possible to embed into them sharp objects such as nails, strips of sheet metal or multiple razor blades.

Using a type of urethane rubber that APL has used in designing submarine components, Biermann says the team has created a toothbrush that looks and performs like any household toothbrush but bends on contact if jabbed like a weapon. Though it can be

sharpened to a point through friction, the result is more like sharpening an eraser than pencil lead. In addition, when heated, the thermosetting material chars and disintegrates instead of softening and rehardening, so embedding metal objects into it is impossible.

Of course, with a razor, the concern goes beyond the handle to the blade itself. The APL team is developing a way to modify a commercially available safety blade to make it even safer. The razor is sliced through at several points from its back edge almost all the way to its sharp edge. When bonded to a urethane housing, the blade simply cannot be removed in one piece; at most, it can be peeled off in tiny pieces.

The APL team is in discussions with several manufacturers to mass produce the toothbrush and razor and is very interested in hearing from additional vendors. Meanwhile, the team is working on ways to remove the weaponization potential for other objects commonly found in correctional facilities. They have already developed a broom handle that breaks away when it strikes something, avoiding the potential for serious injury. Another idea under discussion is a soft padlock that, for example, cannot be put in a sock and turned into a bludgeon (like a hard metal one).

## Using Data to Predict Risk

The Florida Department of Corrections (FDC) is involved in a project called Correctional Operational Trend Analysis System, or COTAS. The project involves sifting through commonly collected data to identify trends and patterns that can signal an emerging problem in prisons. The program's

leaders, David Ensley and Tommy Tucker, and team members at FDC are creating software that is similar to crime-mapping software. Users will ultimately be able to view a map of Florida that shows symbols indicating the level of current disruption and the level of predicted future disruptions at institutions. Users will have the ability to click on particular sites and investigate at a greater level of detail. For example, if a facility shows a high potential for future disruption based on a high number of positive drug tests, the warden will be able to obtain a list of the inmates testing positive, along with their assigned locations within the facility. This will assist the warden in planning corrective actions.

As they sift through data to see which items will yield the best results, the COTAS team is trying to figure out:

- Can the system focus on just a small number of predictors of future disruption, rather than overwhelming management staff with information?
- How can people get the information they need from the system in a timely fashion?

Initially, analysts are focusing on determining what measurable factors are statistically significant predictors of future prison disruptions. Significant factors can include both facility characteristics and inmate characteristics. Potentially significant factors are being assessed to find the smallest and simplest collection of factors that, separately or collectively, predict disruptive acts. Information technology (IT) staff, working with management staff who will be the eventual users of the system, will then design an application that consolidates these factors into one “scorecard” that administrators can use to predict risk.

The IT partners are now designing processes to take data from the large number of different sources and move them to a data warehouse that structures the information in a way that makes access quick and easy. Research and data analysts will continue to be involved in monitoring the validity of the identified predictive factors and identifying additional predictive factors. Managers in the FDC are involved in the design process, creating procedures to react to “hot spots” (facilities or parts of facilities where disruptions have been occurring or are predicted

to occur) on the scorecard and to bring such institutions back in line with other comparable institutions. Managers will also be suggesting items they want to see on the scorecard, even if they are not significant predictors of disruption.

The project is working to enable FDC to reduce escapes, prison rapes, staff assaults and the use of force. It is hoped that the project will serve as a national cost-savings model to track and analyze key indicators of prison disruption and promote the long-term safety of the public, staff and inmates. This column frequently describes projects that are contributing to a safer environment for officers and inmates alike. Read previous articles about tools and technology to make prisons safer at [www.ojp.usdoj.gov/nij/journals/255/corrections\\_today.html](http://www.ojp.usdoj.gov/nij/journals/255/corrections_today.html).

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*For more information about safer hygiene devices, contact Paul Biermann at the Johns Hopkins University Applied Physics Laboratory at (240) 228-6911 or [paul.biermann@jhuapl.edu](mailto:paul.biermann@jhuapl.edu). For more information about COTAS, contact David Ensley at the Florida Department of Corrections at (850) 410-4482 or [ensley.david@mail.dc.state.fl.us](mailto:ensley.david@mail.dc.state.fl.us).*