Patients flee, drawing attention to quarantine dilemma

This past December, not too long before the Christmas holiday, 49 people being held in a facility near Port Elizabeth, South Africa cut through a perimeter fence and escaped.

These people weren't criminals locked away in a prison; they were patients at the Jose Pearson Hospital diagnosed with highly infectious, drug-resistant tuberculosis. Twenty-six of the escapees had returned on their own by mid-January. Meanwhile, as this issue of *Nature Medicine* goes to press, police and health officials continue to search for the rest of the patients, some of whom have reportedly been confined to the hospital for as long as a year and a half.

The use of mandatory isolation to keep disease such as tuberculosis in check is a centuries-old practice. Isolating people with confirmed or suspected infection has helped protect the public from diseases such as smallpox and, more recently, severe acute respiratory syndrome (SARS). A newly published review of 51 studies has found that physical barriers work better than drugs at preventing the spread of respiratory viruses (*Br. Med. J.*, doi:10.1136/bmj.39393.510347.BE).

Yet, as the incident at the Jose Pearson Hospital highlights, the approach is far from perfect. Determining when and how people should be placed in quarantine or isolated, and allocating the resources to do so, remain pressing challenges.

"The use of quarantine has been around for a really long time—and it's probably not going away," says Philip Alcabes, an epidemiologist at the Hunter College School of Health Sciences in New York. "But it's very hard to get a single universal ruling on the effectiveness of quarantine and mandatory isolation" because so many variables can affect the success of these measures.

The efficacy of isolation depends on a number of factors, among them the type of disease. For instance, researchers say the scheme would not work well for outbreaks of ordinary flu. That's because flu is highly infectious, can be transmitted before people show symptoms and has a short incubation period of a couple of days, according to Neil Ferguson, a disease-modeling expert at Imperial College in London: "By the time you actually isolated people, it would be too late to do any good."

In general, when it comes to treatable diseases like tuberculosis and measles, the World Health Organization (WHO) recommends first using basic measures, such

Closed-door policy: Quarantine measures take planning. In 2003 Singapore's Communicable Disease Center (pictured) prepared for potential SARS patients.

as providing drugs and vaccines. However, if a person refuses treatment, health officials may turn to quarantine. "It's a last resort," says Mario Raviglione, director of the WHO's Stop TB department.

"There are certain circumstances when public health trumps individual rights—when it comes to protecting lives," says Arthur Caplan, director of the Center for Bioethics at the University of Pennsylvania in Philadelphia. "But you have to be careful. The purpose is to prevent spread of disease, not to punish people."

Even if countries have hospitals and facilities equipped to properly treat infected individuals, "unless you're talking about a single individual, it's a very difficult policy to employ," Caplan notes. "It's impractical to think you could lock up thousands of people for some indefinite period of time and they'd agree to it."

Matthew Boulton appreciates the challenges associated with quarantine and mandatory isolation. As the state epidemiologist for Michigan during the SARS epidemic in 2003, he was responsible for implementing at-home quarantine for nurses who lived in Detroit but worked in Toronto, a hot spot for the disease. "It's not just the aspect of getting people to do what you tell them to do. There's also the immense cost of these measures," he says. One report estimated that infection control measures and steps taken to protect the jobs of those

quarantined during the SARS outbreak in Toronto cost \$12 million (*J. Infect.* **50**, 386–393; 2005).

Health officials must ensure that quarantine measures aren't the result of knee-jerk reactions, says Ferguson. To that end, infection surveillance systems are helping experts better characterize how diseases spread. "You need surveillance and case data," says Ferguson. "These allow you to really get a handle on what's going on and then optimize control measures in real time."

Epidemiologists and mathematical modelers should make it their priority to develop more precise ways of knowing when mandatory isolation measures are necessary, says Boulton, now an epidemiologist at the University of Michigan's School of Public Health in Ann Arbor, Michigan.

Policymakers have made some progress towards this goal: in 2005, the World Health Assembly revised the International Health Regulations to provide a new framework for a global system that can rapidly identify and contain public health emergencies.

But experts say the need for further improvements to quarantine planning is urgent, because diseases can spread quickly through rapid global travel. "Nobody knows what the next pandemic will look like, so we've got to have as many tools available to us as possible," says Boulton.

Alisa Opar, New York