

TB MONITOR

The Monthly Report on TB Prevention, Control, and Treatment

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TB bugs, other virulent pathogens go out with the trash, critics charge

Lack of regs means many labs don't decontaminate before they dump

Many laboratories in the United States licensed to handle TB cultures and other highly virulent pathogens are disposing of their wastes without decontaminating them first, experts say.

Such practices were tied to a 1997 outbreak of TB that occurred among workers in a Washington state biomedical waste-disposal facility, investigators say. The same situation could easily happen again, some experts contend, unless states pass regulations to force clinical laboratories and other waste generators to decontaminate infectious wastes on site.

At present, South Carolina is the only state that requires laboratories to treat biomedical wastes before disposing of them, says **Ira Salkin**, PhD, director of the medical waste program at the New York

Labs that don't decontaminate biomedical wastes could find themselves held liable.

State Department of Health's Wadsworth Center in Albany. "In other words, in 49 states, a generator [of biomedical wastes] has the right either to treat TB cultures on site — or not to," Salkin explains. "Basically, the trouble is [that] what happens to garbage is very low on most people's priority list."

He predicts that sometime in the next four to 12 months, a regulation will take effect in New York state requiring on-site decontamination of TB and other Biosafety Level 3 and 4 wastes. (In every state, federal regulations require that Biosafety Level 5 wastes, such as ebola virus, be destroyed before their disposal.)

There is an urgent need for other states to implement a regulation similar to what may go into effect soon in New York, Salkin and others contend.

"We're talking about TB cultures that have been grown in extremely high concentrations and which may be resistant to one, two, even three or more frontline drugs," says **Eugene Cole**, DrPH, MPH, director of DynCorps Health Research Services in Raleigh, NC, and an expert on infectious waste disposal. "All states ought to require TB waste to be treated before it leaves the facilities. It's simply the prudent thing to do."

In New York, an unpublished survey of clinical laboratories found that "the majority" do not first treat biomedical waste before disposing

of it, says Salkin. In Washington state, where three workers at a disposal facility fell ill with TB within the same six-month period (one with a multidrug-resistant strain of TB), a similar survey found that of 44 laboratories licensed to handle TB, 20 were sending out their TB wastes untreated — to one of the state’s two biomedical waste-disposal facilities or, in one instance, to a landfill.¹ (See related story, p. 47.)

Throughout the nation, there are 682,400 medical waste-generating facilities, according to 1994 data from the Environmental Protection Agency. Each year, those facilities generate 3.36 million tons of waste, including 504,000 tons of infectious waste.

Ten years ago, most facilities took care of the problem by incinerating infectious wastes on site, says **Wayne Turnberg**, public health advisor to the Washington State Department of Health and author of a book on biomedical waste disposal.²

But since passage of the federal Clean Air Act of 1990, the situation has changed; in every state, most on-site incinerators have been shut down. At the same time, says Salkin, the health care industry, feeling the pinch of tightened economic constraints, has begun cutting corners, often by unplugging autoclaves once used to decontaminate infectious wastes and laying off technicians once paid to run them.

\$1.5-billion industry mostly unregulated

The result has been the rapid growth of a highly competitive, \$1.5 billion-a-year industry dedicated to taking out the biomedical garbage. “We now have a nation that’s sending its medical waste to these regional treatment facilities,” adds Turnberg, “and there’s not a whole lot of attention paid to how the facilities are run.”

True, a patchwork of laws and regulations governs various aspects of the biomedical waste-disposal industry. A new Department of Transportation (DOT) regulation, for example, requires waste generators to wrap all Biosafety

Level 3 and 4 wastes destined for off-site disposal in a sturdy, absorbent type of special packaging called PG-2. The packaging is specially designed to protect against spills and falls, says Salkin.

That DOT regulation is neither well-known to waste generators nor well-enforced, Salkin says. Nor, he adds, is it enough: “In a perfect world, maybe it would be, but what happens when a truck or a semi overturns, and suddenly you’ve got live MTB all over the place? It’s always better to send out a dead pathogen than a live pathogen, properly packaged.”

Cole says the greatest day-to-day danger lies not in isolated accidents that may occur during transport, but in the ongoing perils the wastes pose to the workers whose job it is to load and unload the stuff.

“These [disposal] facilities typically transport waste in large containers that are reusable,” Cole says. “Sometimes the waste is boxed or bagged; other times it’s loose. A number of times I’ve seen workers at these places pop the lid off a 32-gallon container and dump the contents into another container. As they draw the container back, you can see fluids dripping and blood flying through the air.”

Nor does the protective gear always provide adequate protection that workplace regulations require workers to wear, Cole adds. “I remember watching one guy unloading stuff with his face shield up. I watched until I couldn’t stand it any longer, then I asked him, ‘Say, shouldn’t you be wearing your face shield while you do that?’” Cole says the worker grinned ruefully and replied: “Yeah, I probably should. But after a few minutes, the face shield gets so splattered I can’t see through it.”

Soon, the stakes will rise even higher as more and more labs begin working with bio-warfare agents such as anthrax, Cole asserts. “Laboratories will have to have the ability to maintain and identify these organisms; we’ll need to maintain stock cultures of them. What will happen to all those test tubes and agar plates?”

COMING IN FUTURE MONTHS

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■ DOTS takes knocks in South Africa

■ Public relations takes on TB

■ How DNA fingerprinting exposed an epidemic among crack users

If and when New York state passes the regulation Cole and Salkin want to see in place, Cole hopes the effect will be to induce other states to implement similar regulations. Until then, Cole says he'd like to see professional associations push harder for on-site decontamination of TB and certain other virulent pathogens (such as vancomycin-resistant *staphylococcus aureus*). Abiding by recommendations from the Centers for Disease Control and Prevention and the National Institutes of Health could, perhaps, become part of the accreditation process for labs, he adds.

In the meantime, labs that don't decontaminate biomedical wastes could find themselves held legally liable, Cole warns. "It's like with chemical hazardous waste — if you generate it, it's a cradle-to-grave responsibility."

References

1. KL Cairns, K Johnson, C Diamond, et al. Biomedical waste disposal practices of laboratories processing *Mycobacterium tuberculosis* specimens, Washington State, 1997. Abstract and poster presentation at the International Union Against Tuberculosis and Lung Disease, North American chapter conference. Chicago; 1999.
2. Turnberg WL. *Risk Assessment Policy and Management*. New York City: John Wiley and Sons Inc.; 1996. ■

Three workers fall sick at waste-disposal plant

Investigation uncovers lack of decontamination

Lewis County, Washington, a bucolic community of 66,000, sees so few cases of tuberculosis that public health officials don't even bother to calculate TB incidence rates there. That's why they were puzzled when first one, then two, then three workers at a county biomedical waste-disposal facility came down with active TB.

Tests showed that an isolate from one patient was resistant to a single frontline drug; a second patient was found to have multidrug-resistant TB. That second discovery "was a really big flag, since we simply don't have MDR-TB in the Northwest to any appreciable extent," says **Kammy Johnson**, DVM, MS, PhD, an epidemiological investigative service officer assigned to the Washington state health department. "Even

though biomedical waste had never been reported as an occupational hazard, that's when we knew we were dealing with something other than person-to-person transmission."

Skin tests on other workers at the facility turned up 13 positive reactors as well — an ambiguous finding, Johnson notes, since it's impossible to say whether the finding reflects the workers' exposure to infectious wastes or to an infectious co-worker.

As the outbreak investigation proceeded, a study of how laboratories in the state licensed to handle TB cultures uncovered more news: Nearly half the labs in the state licensed to handle TB (a total of 20 out of 44) were shipping their TB stocks and cultures off site without first decontaminating them.

NIOSH inspectors called in

In an attempt to pinpoint how the exposures might have occurred, the state called in the National Institute of Occupational Safety and Health (NIOSH) to inspect the waste-disposal facility. The findings, though indeterminate, were enlightening.

Waste at the facility is packed into 40- to 60-gallon containers, inspectors found, which workers unload by hand. The containers are emptied into processing equipment, where the waste is shredded, blown into another part of the system, and then heat-treated by microwaves.

The shredding and blowing portions of the process take place under negative pressure. Even so, NIOSH inspectors found instances in which, Johnson says, "they felt it was plausible" that workers may have been exposed to airborne pathogens, perhaps by coming into contact with air that had leaked from the system, handling contaminated equipment, or entering the facility before it had been decontaminated.

Legally, the only recourse available to the state health department was to tell the Lewis County facility to begin requiring that workers don full-face respirators before entering the processing facility.

Shredding and blowing wastes are not unusual in such facilities, experts say. "These places are all over the country, and they operate on the same principle: They shred the waste first," says **Wayne Turnberg**, public health adviser to the state health department. Many states demand that biomedical waste be ground before it's heated, for the simple reason that landfill operators don't like looking at

it in its unaltered form, he adds.

Theoretically, disposal facilities could opt for other technologies less apt to produce airborne suspensions of particles. “There’s one technology that consists of using a strong base, such as sodium hydroxide, that’s used a lot in veterinary settings,” Turnberg says. “It’s like something out of a horror show — the sodium hydroxide can reduce an entire horse carcass to basically nothing.”

But one expert in infectious waste exposure says the real hazards to workers at such disposal facilities don’t result from the processing itself, but from workers’ handling of wastes as they are loaded and unloaded (**see cover story**). At such points in the process, “there’s generally a lot of blood and other fluids splattering around,” says Turnberg. “If it gets sloppy, it can become very risky.”

Despite outbreak, no bills passed

Following the Lewis County outbreak, a handful of legislative measures were proposed in Washington state aimed at protecting workers at waste-disposal facilities. Among them were bills that would have required:

- facilities generating biomedical wastes (such as laboratories) to decontaminate them before sending them off-site;
- the state to review and approve new “alternative-waste” technologies such as the patented shred-and-blow method used at the Lewis County facility;
- waste-treatment facilities to have a hazard-analysis control plan in place;
- counties to address waste-disposal problems on a local basis.

Not one of the proposed measures passed. The reason? “Generators of the waste — hospitals, clinics, doctors’ offices — all have an economic and operational stake in how they get rid of this stuff,” says **Brian Peyton**, assistant director for legislative and constituent relations for the state health department. “Plus, risk to the public health simply wasn’t perceived as great as the risk posed by other public health problems. That’s just the way these things work.”

Ironically, many waste generators have autoclaves and theoretically could treat their wastes on site, notes Turnberg. “But there would be a capital expense to the labs; the process [of shipping wastes off-site] couldn’t be easily reversed. In a sense, the cat’s already out of the bag.” ■

New form keeps track of wayward patients

Form becomes written resource for TB controllers

Clinicians at the University of California in San Francisco have developed a tracking form, which they say helps them keep tabs on homeless people and other members of marginal populations at high risk for getting lost to follow-up.

The aim of the tracking form is simple, says **Jacqueline Tulskey**, MD, associate professor in the department of medicine at the University of California in San Francisco: “It answers the question, ‘If I needed to find you, how could I do it?’”

To get at that single, vital piece of information, Tulskey and her colleagues have developed a detailed, eight-page tracking form. That may sound like a time-consuming chore, but it’s often time well spent, she says. Interviewers often can get the information on two occasions: when someone comes in for the placement of a skin test, and when the subject returns to have the test read.

A written record

Though the form covers a wide range of information, including questions about a person’s three closest contacts, it’s quite different from the standard contact investigation, Tulskey notes. “This is the kind of thing that public health people and outreach workers have been doing for years without really thinking about it,” she says. “What we’ve done is compile it and write it down.” Written down, the form serves to remind and prompt interviewers to ask the right questions; in addition, it serves as a written resource that can be used by anyone, should a patient disappear.

“The advantage is that once you have the information on the form, anyone can pull it out of the chart and use it,” she says. “They can read, for example, that [an infected] person’s mother lives in Bruno. Maybe he didn’t know her phone number, but he did give us the street where she lives. Plus, he goes to this food line three times a week . . . and so on.”

Along with TB patients, the form works equally well for varied populations and under many different circumstances, Tulskey notes. At the moment, researchers in one project are using tracking forms to improve follow-up among candidates for prophylactic therapy who’ve been

released from jail recently, a notoriously tough population to track.

Keeping up with such people “is totally hard,” she concedes. “But what we’re finding [by using the tracking form] is, we’ve been able to improve follow-up from about 1% to about 33%.”

Close contacts most often cited on the tracking form tend to be female relatives, especially mothers, she says. “That’s probably because women tend to be more stable and are less apt to be homeless or substance abusers,” she notes. But moms, sisters, and aunts aren’t the only resources the form lists; sometimes, subjects turn out to have an e-mail address at the local library, an acquaintance who works the front desk of a shelter, or a needle-exchange site they visit frequently.

The form also prompts questioners to find out what agency or program, if any, acted as the referral agent. “One thing you want to find out is who sent this person to us,” says Tulsy. “Why did they want to get screened in the first place?” Knowing whether a needle-exchange program or a drug treatment center referred someone is important information to have because it often offers a clue about where someone can be found.

To obtain a copy of the tracking form, readers may contact Tulsy’s assistant, Heather Long, at (415) 206-4982. ■

CDC national study of CIs finds gaps

Results will be used in training

A large-scale study of contact investigations (CIs) at 11 U.S. sites found considerable variation in how the investigations are performed and what data are gathered, says **Suzanne Marks**, MPH, MA, an epidemiologist with the Division of TB Elimination (DTBE) at the Centers for Disease Control and Prevention. She served as the study’s principal investigator.

In many instances, even high-risk contacts (such as children under age 6 and contacts who are HIV-positive) are not started on preventive therapy (PT) regardless of their skin-test results, Marks says.

Her study, along with a second one directed by Mary Reichler, MD, a medical epidemiologist in

the DTBE, are “the first major, nationwide studies that have been done on contact investigations,” Marks says. The CDC will use results of the two studies to improve contact investigation and training, she adds.

Researchers for the Marks study reviewed records from CIs for 1,048 cases of infectious pulmonary TB. The total number of contacts investigated was 13,029, including 5,625 close contacts and 7,404 casual (or status “unknown”) contacts.

Investigators found a mean number of five close contacts per case and a median of four. The number of close contacts in the study ranged from zero to 75. As for casual contacts (or those of unknown status), the mean was seven, and the median was zero (reflecting the fact that the number of casual contacts ranged from zero to a mind-boggling 822).

On the basis of the study, investigators reached the following preliminary conclusions:

- Procedures for CIs differed widely among sites, including who does the CI, who supervises it, and what data are collected.
- Cases with zero contacts were more likely to be U.S.-born, males, substance abusers, or homeless.
- For contacts, high-risk factors for disease (especially HIV) and for nonadherence (substance abuse, homelessness) often are not recorded.
- Only half of close contacts known to be at high risk for disease were placed on PT regardless of tuberculin skin-test (TST) results.
- Only two of the 11 sites recorded the date of the contact’s last exposure to the infectious case, which forms the basis for determination of the follow-up TST date.
- There was no record of a follow-up TST for 43% of initial TST negatives.
- For a third of those who started on PT, completion status was listed as either “refused/uncooperative,” “lost to follow-up,” or “unknown.”
- Fifty-seven percent of those started on PT were known to have completed it, but only 44% of those eligible for PT were known to have done so.
- Those started on PT who didn’t complete took a median of two to three months of PT.
- Asian and foreign-born persons were more likely to complete PT.
- Children under age 6 were not more likely to complete PT.
- For other high-risk groups (HIV-positive individuals and substance abusers), data were too limited to draw conclusions about rates of PT completion. ■

Potato-chip containers figure in Canadian flap

Postal workers nervous about TB in the mail

As some experts in the United States fretted about live TB bugs in landfills (see cover story), Canadian postal workers spent the spring wrangling with provincial TB controllers over how specimens are transported in the mail from suspected TB cases.

Many of the specimens in question come from suspected TB cases who live in the northernmost reaches of the sparsely populated Saskatchewan Province. Under the country's newly centralized TB control system, more than half of the specimens are dispatched, via the Canadian post, to the University Hospital Laboratory in Saskatoon.

“The laboratory tells me they have not received anything packaged in potato-chip containers.”

When postal workers went public with their complaints, they charged that samples were being sent “improperly packaged” through the mail. According to a report in the *Vancouver Sun*, one sample mailed recently had been placed in an empty potato-chip container sealed with masking tape.

“The laboratory tells me they have not received anything packaged in potato-chip containers,” says **Vernon Hoepner**, MD, head of TB control for Saskatchewan Province. He adds, however, that the containers in which specimens are mailed for laboratory analysis do, in fact, bear some resemblance to used potato-chip containers, a fact he speculates may have led to the charge.

Cardboard cylinders about 5 inches high and 1.25 inches in diameter, the approved containers come equipped with a metal screw-cap; inside, specimens are placed into a second, smaller, plastic container, which is placed into a zip-locked plastic bag.

Over the years, the most frequent complaint from postal workers is that the lids sometimes are not screwed on tightly, says Hoepner. Postal workers also complain the zip-locked bags aren't zipped. None of those complaints has arisen within the past six months, he adds.

The northern portions of Saskatchewan have considerably higher TB rates than other parts of the country, Hoepner says: about 100/100,000, which is well above the national average of 7/100,000. Adding to postal workers' anxiety, he says, may be the annual flood of TB-related material, which inundates the post office every spring, marking the advent of World TB Day.

To air out the issues, a meeting was held recently among postal workers, union representatives, and the head of the hospital laboratory, Hoepner says. During the talks, the hospital laboratory chief emphasized that even if the containers were somehow damaged during shipment, risk to postal workers was slight, he says.

“It also became apparent that contrary to policy, sometimes postal workers were putting these containers into [larger containers], which would sometimes hold as much as 100 kilograms of mail,” he adds. “That has the potential to crush them.”

The university lab in Saskatoon receives about 85% of all TB samples from around the province, says Hoepner, including about 3,500 containers sent through the mail. But since they are the ones at greatest risk for exposure, workers at the hospital lab “would be the first to flag us if there were improperly closed samples,” he notes. “And they're not restless about this at all.”

At last word, the dispute seemed to have been ironed out to the satisfaction of all parties. TB controllers, for their part, have agreed to pack the smaller, second container, already ensconced in its zip-locked bag, inside some additional absorbent material before mailing it. ■

New trial weighs INH against RIF/PZA regimen

Study eyes INH effects on the over-35 crowd

Finding new ways to expand preventive therapy for TB-infected people — either with a new short-course regimen or by expanding the uses of a tried-and-true agent — is the aim of a new study now enrolling patients in San Francisco.

First, the study will look at safety, completion rates, and efficacy of rifampin/pyrazinamide (RIF/PZA), the new short-course prophylactic regimen recently approved for HIV-positive

patients latently infected with TB. The RIF/PZA regimen will be tried against isoniazid (INH) — the standard approved therapy — among patients who are HIV-negative.

Just as interesting, the study also is designed to see whether INH works as well among people over age 35 as among younger subjects who meet the current guidelines for receiving prophylaxis with the drug.

“One interesting issue here is whether INH toxicity will turn out to be as high as was previously supposed,” says **Robert Jasmer**, MD, study coordinator and an assistant professor of medicine at the University of California in San Francisco and San Francisco General Hospital. “We could find out that age 35 isn’t an appropriate cut-off after all. There’s also a need to figure out whether RIF/PZA will work as well as INH among HIV-negative people.”

Use of INH may be increased

On the basis of data that are still coming in, many experts are beginning to conclude INH can be used more liberally than was originally supposed. A recently published study by Charles Nolan, MD, TB controller of Seattle-King County, suggests that may be the case. Nolan’s study found that out of a total of 11,141 patients placed on INH prophylaxis over a six-year period, only 11 experienced hepatotoxic reactions.¹

Though Nolan and colleagues did not routinely offer INH to older patients, Jasmer’s study will do so. The study is designed so that the first arm consists of patients who do meet current criteria for receiving INH, and the second arm does not. Patients in both arms will be randomly assigned to receive either RIF/PZA or INH, Jasmer adds. “We’re going to give INH freely to people over age 35, but we’ll be doing lots of enhanced, very intensive monitoring,” he says.

Eventually, Jasmer hopes to enroll 600 patients. Of the 50 who already are enrolled, most are under age 35; and although one subject has dropped out so far, complaining of headache and dizziness, no one in either arm has experienced any major toxicity, he notes.

Reference

1. Nolan CM, Goldberg SV, Buskin SE. Hepatotoxicity associated with isoniazid preventive therapy. *JAMA* 1999; 281:1,014-1,018. ■

A new face at PP 55 brings ideas, energy

Merck’s Douglas assumes post this month

When **Gordon Douglas**, MD, president of Merck Vaccines, retires from the business of making vaccines this month, he won’t be putting his feet up. Instead, Douglas plans to step into a new full-time position, that of managing the day-to-day operations at Princeton Project 55 (PP 55), a public service organization founded by consumer activist Ralph Nader and consisting of Princeton University alumni.

Along with extensive TB-related expertise, Douglas will bring to PP 55 a focus that Nader has not had the time to provide. Many observers predict that Douglas’ arrival at the helm of the organization will bring fresh energy to the group’s fight to make TB more visible on national policy-makers’ radar screens.

Douglas says he harbors few illusions about the difficulty of the challenge that lies ahead. “The fact that TB kills 3 million people a year, that it’s the No. 1 killer among infectious diseases worldwide, to most people, all that seems like just one more piece of bad news. What we have to do is try different approaches and try to discover what messages resonate with people. We need to find new ways to attach the message more closely to individual concerns.”

TB control is good foreign policy

One idea is to position TB not as a single entity, but as one of a group of “emerging infectious diseases,” he says. “If you talk about TB to someone in Congress, it seems like a narrowly focused issue. But ‘emerging infectious diseases’ — that’s something people are worried about and something they can readily relate to.”

Global TB control also should be framed as good foreign policy, Douglas says. “It’s one sure way that we as a nation can help poor countries to grow. That’s another way we can tie TB into a bigger picture and help it to resonate better.”

It’s also important to send out consistent messages about TB, he adds. “If one group is talking about one thing, and a second group about another, it confuses people. That’s why part of what needs to be done is to build coalitions and make sure we’re all sending the same message.”

There's no single prototype organization Douglas aims to emulate, he adds, but as a long-time board member of the International AIDS Vaccine Initiative, he plans to push equally hard for the development of a better vaccine for TB. "The focus on vaccine development is absolutely critical," he says. "It's also something that, until recently, has been missing from TB messages. Until we have a vaccine, we won't materially affect the world's death rate from TB or control the epidemic."

PP 55's principal role is to "energize" the process of advocating for a vaccine and for better TB control, he adds. "People in the struggle against TB sometimes get discouraged, but we are going to re-energize them," he says. "I've been on the board of PP 55 but until now, I haven't had as much time to devote to it as I would have liked. As a Merck corporate officer, I must retire at age 65, so as of May 1st, I'm out of here."

Nader will continue to play an important role in guiding PP 55, he says. "But I'll be able to provide more day-to-day direction and to give the talented young people we've hired as project managers the ongoing support they need." ■

Case totals down in 1998 for sixth consecutive year

Long-term commitment is still necessary

For the sixth consecutive year, the number of TB cases has gone down, the Division of Tuberculosis Elimination (DTBE) at the Centers for Disease Control and Prevention (CDC) announced last month. Last year's total of reported TB cases for the nation stood at 18,371, compared with 19,851 cases for 1997.

Last year also saw decreases in 39 of 53 reporting areas, which include all 50 states, plus Washington, DC, New York City, and Puerto Rico. That left 14 of the 53 areas reporting either increases or no change in case totals. In 1997, by comparison, 18 of 53 areas reported either increases or no change in cases.

As in years past, CDC experts seasoned their satisfaction with the good news with caution. "It's good news, of course," says **John Seggerson**, associate director for external relations for the DTBE. "But the nature of TB control is that it has to be a long-term commitment. That means if you

let up on control, you're going to see a resurgence in disease."

That theme was echoed by **Ken Castro**, MD, director of the DTBE, in a speech on March 23 marking World TB Day. "With TB, it's easy to become complacent," Castro warned. "We tend to have a very short attention span when it comes to this disease."

Two problems still loom large

He used the same occasion to note that two problems in particular continue to pose a threat to TB control in the United States; namely, the persistence of drug-resistant strains of the disease and the presence of foreign-born populations who have latent TB infection. The upsurge in resistant strains of TB, both globally and at home, means TB can no longer be regarded with complacency, Castro said. "There is a belief that TB is a disease of the past, that TB is our grandparents' disease. Yet the TB we face today is often far more complex than what our grandparents faced. If we don't stop TB today, the TB our grandchildren face will be even more difficult to cure."

By the CDC's most recent estimates, 43 states now have reported instances of multidrug-resistant disease.

As for TB among the foreign-born, that probably will pose the biggest challenge to TB controllers in the United States in the future, Castro added. "In the U.S., we have only begun to scratch the surface of screening for latent disease. Increasingly, our ability to meet this challenge will be the measure of our success." The proportion of TB among the foreign-born, which stood at only 22% of the national total in 1986, at last count had edged up to 40% of the total.

DTBE experts are still analyzing 1998 data to see how last year's numbers have modified trends in drug-resistant disease, the proportion of cases occurring among the foreign-born, and other facets of the U.S. epidemic.

The increase in the proportion of foreign-born cases holds two implications, Castro noted: First, it means new ways must be found to reach out to foreign-born populations. Second, it indicates America must take a more active role in global TB control. Castro also said last year's success in driving down case totals masks problems confined to certain locales. "The status of the epidemic varies from community to community," he

(Continued on page 54)

Reported Tuberculosis Cases Counted January-December 1997 and 1998

Reporting Area	1997	1998	Change in Cases	Percent Change
Alabama	405	381	-24	-5.93
Alaska	78	55	-23	-29.49
Arizona	296	254	-42	-14.19
Arkansas	200	171	-29	-14.50
California	4,056	3,855	-201	-4.96
Colorado	94	79	-15	-15.96
Connecticut	128	128	0	0.00
Delaware	39	36	-3	-7.69
District of Columbia	110	107	-3	-2.73
Florida	1,400	1,304	-96	-6.86
Georgia	696	631	-65	-9.34
Hawaii	167	181	14	8.38
Idaho	15	14	-1	-6.67
Illinois	974	850	-124	-12.73
Indiana	168	188	20	11.90
Iowa	74	55	-19	-25.68
Kansas	78	56	-22	-28.21
Kentucky	198	179	-19	-9.60
Louisiana	406	380	-26	-6.40
Maine	21	13	-8	-38.10
Maryland	340	324	-16	-4.71
Massachusetts	268	283	15	5.60
Michigan	374	385	11	2.94
Minnesota	161	161	0	0.00
Mississippi	245	225	-20	-8.16
Missouri	248	183	-65	-26.21
Montana	18	20	2	11.11
Nebraska	22	31	9	40.91
Nevada	112	128	16	14.29
New Hampshire	17	14	-3	-17.65
New Jersey	718	640	-78	-10.86
New Mexico	71	68	-3	-4.23
New York City	1,730	1,558	-172	-9.94
New York state	535	442	-93	-17.38
North Carolina	463	498	35	7.56
North Dakota	12	10	-2	-16.67
Ohio	286	231	-55	-19.23
Oklahoma	212	199	-13	-6.13
Oregon	161	156	-5	-3.11
Pennsylvania	528	448	-80	-15.15
Rhode Island	38	63	25	65.79
South Carolina	328	286	-42	-12.80
South Dakota	19	23	4	21.05
Tennessee	467	439	-28	-6.00
Texas	1,992	1,820	-172	-8.63
Utah	36	52	16	44.44
Vermont	6	5	-1	-16.67
Virginia	350	342	-8	-2.29
Washington	305	265	-40	-13.11
West Virginia	54	42	-12	-22.22
Wisconsin	130	109	-21	-16.15
Wyoming	2	4	2	100.00
Total United States	19,851	18,371	-1,480	-7.46
Puerto Rico	257	201	-56	-21.79

Source: Centers for Disease Control and Prevention, Atlanta.

said. “Many communities lack the resources to reach out to high-risk populations, screen properly for cases, do necessary follow-up investigations, and provide DOTS [directly observed therapy, short-course].”

Castro and World Health Organization experts also pointed to continuing problems in global TB control, among them the epidemic of multidrug-resistant TB that menaces Eastern Europe and Russia, and low worldwide enrollment in the WHO-approved DOTS. With only 16% of infectious cases enrolled in DOTS programs, it is imperative to increase political commitment to implementation of DOTS, the experts said.

“The fundamentals of TB control are not complex,” noted Castro. “But building and sustaining the commitment needed to carry them out are daunting.”

The CDC is committed to helping the WHO in its effort to increase the necessary commitment, he added, and for good reason: “What we do globally will benefit us here at home.” ■

Strain W ‘family’ found in Russian prisons

A bad actor made worse by drug resistance

The same family of TB strains that produced strain W — the agent that wreaked havoc during the multidrug-resistant TB outbreak earlier this decade — appears to be widespread throughout prison systems in the former Soviet Union, says **Barry Kreiswirth**, PhD, director of the Tuberculosis Center at the Public Health Research Institute (PHRI) in New York City.

That discovery is the result of two kinds of research, he says. By examining the molecular “fingerprints” of hundreds of isolates over recent years, PHRI has identified similarities among types of the strain W family, he says, allowing investigators to develop a sense of what features have persisted over time in the strain family.

At the same time, researchers have been scrutinizing hundreds of isolates supplied by Russia’s national TB laboratory in Moscow. (See related stories, pp. 55-56.) Since those isolates represent a cross-section of isolates from penal colonies all over Russia, PHRI researchers have concluded

that the same sorts of features they’ve spotted in the 10 or so versions of strain W that have turned up in the United States also are present in the cultures from the Moscow lab.

That’s not good news, says Kreiswirth. “All we can say for sure is that when you see strains like this, you should be worried,” he says.

The strain W family is clustered throughout the prison system in Russia and is widespread across the entire country, he adds. “We’re seeing the same strain types scattered across 19 oblasts [the equivalent of provinces], all the way from the Sea of Japan in the East, to Chechnya and Georgia in the West.”

Along the way, PHRI researchers also have decided that there is something inherent in the nature of the strain W family that makes it unusually successful in humans, Kreiswirth says. That contradicts previous thinking on the subject, he adds. At one time, TB experts surmised that strain W spread quickly chiefly because clinicians, not suspecting it was resistant to so many frontline agents, weren’t treating patients effectively soon enough, so patients remained infectious for longer periods of time. Plus, the thinking went, the strain spread especially fast because many hosts were immune-compromised by HIV.

Now, it appears that along with those two factors, there is a third reason, still unknown, for strain W’s success, Kreiswirth says. “We have yet to figure out what makes these strains unique and what causes them to spread so rapidly. What we do know is that these strains are more able to cause disease and that they’re more able to spread rapidly. No wonder we had such a disaster in the early ‘90s.”

The discovery that the strain W family is widespread throughout Russia and other countries in the former Soviet Union also contradicts previous assumptions about the family’s epidemiology, he says. The strain family has long been known to Europeans as “the Beijing family” and is found throughout Asia, including China, Singapore, Thailand, and Tibet. Now, PHRI researchers are finding the family has made itself at home in Russia as well, probably over a long time span of “who knows how many generations,” he says.

Tools available to PHRI researchers are refined enough that investigators can detect subtle similarities common to evolving variations of a strain over time, Kreiswirth says. “In just four years, we’ve seen about 10 types of the W strain. So it’s not surprising that over thousands of years, it looks very different. Still, we have the tools to

follow all the little components. In effect, we're following a moving target."

Public health implications for the United States are clear, he adds. "It's bad enough that we're spreading TB. By creating multidrug-resistant strains, we're adding even more ammunition." ■

TB in Russia's prisons is now mostly resistant

DOTS may be making things worse, not better

Most TB cases in prisons in countries throughout the former Soviet Union, including Russia, are now resistant to at least one drug, with about a fourth of all cases among prisoners resistant to at least two frontline drugs, says **Michael**

Kimerling, MD, MPH, medical director for the Russian TB program of the New York City-based Public Health Research Institute (PHRI). He also is a consultant to the Belgian arm of *Medicins Sans Frontieres*, which is working to fight TB in Russian prisons, as well.

"The epidemiology of MDR-TB is enormous, and DOTS [directly observed therapy, short-course] as it now exists is inadequate," he says. "What you've got in the prisons is actually a dual epidemic: one of drug-sensitive TB and another of drug-resistant disease. But it's resistant disease that's taking over."

The more epidemiologists look, the more they are finding the same rates of resistant and multidrug-resistant (MDR) disease are starting to turn up in other countries that make up the former Soviet Union, he adds. "What we are seeing are the same patterns and the same problems in Russia as in Azerbaijan and Kazakhstan."

Resistant forms of TB continue to spread beyond the prisons, he adds. At present, only the Siberian oblast, or province, of Tomsk is providing consistent follow-up to prisoners once they have been released into the community. Outside the prisons, the rate of multidrug-resistant TB is about 5% to 7%, according to available data, Kimerling says. (That compares to about 1.4% MDR among all cases in the United States, according to the most recent available figure.)

Inside Russian prisons, the situation is much worse. "About 20% to 30% of cases that are culture-proven are MDR-TB," says Kimerling.

"And in another proportion of cases, we're seeing intermediate resistance patterns. The result is that in Tomsk, only about 30% of all TB cases in the prisons are pan-sensitive" — that is, responsive to all frontline drugs.

In Kemerovo, a region adjacent to Tomsk where Kimerling also has been gathering data, rates of pan-sensitive TB inside prisons appear to be closer to 40%, with resistant strains accounting for the remainder. The irony is that under such circumstances, DOTS is actually worse than useless, since its application is creating more resistance, he says. It has taken non-governmental organizations (NGOs), such as PHRI or the Massachusetts-based Partners in Health, to point that out, he adds.

"The World Health Organization can't afford to take that kind of position. It takes an NGO or a private donor like [George] Soros to take that kind of risk and to be willing to think outside the

Report
from
Russia

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box, and that's critical to making the necessary adjustments to any program," he says.

Being able to envision unconventional solutions such as DOTS-Plus, which the new paradigm developed by Partners in Health has been dubbed, doesn't solve the problem, Kimerling adds. "In Russia, you don't have a national program; it's difficult to build a DOTS-Plus program where you don't even have DOTS. So you have to develop the infrastructure and build a DOTS-Plus program all at the same time. That makes it all a lot more complicated and prevents you from moving as quickly as you'd like to be." ■

Russian TB in the U.S.? Not yet, but maybe soon

Student's tale hints at what's to come

In the United States, only isolated cases of disease have been linked to the Russian epidemic thus far, but that may change soon, TB experts in this country say. In Massachusetts, with a sizeable population of Russian immigrants, "we're doing a lot of testing, but we see very little disease," says **Edward Nardell**, MD, medical adviser to the state's health department and professor of pulmonary medicine at Cambridge University Hospital.

"Those who come here are highly educated and used to dealing with government officials, which means they tend to resist prophylaxis especially hard," he adds. "But that picture doesn't reflect current conditions in Russia at all. There, people in prisons are spilling over into the community, and, eventually, we'll see some of that."

Michael Kimerling, MD, MPH, a medical director for New York City-based Public Health Research Institute and consultant with Doctors Without Borders, recounts an anecdote he says proves his point: Recently, a Russian university student who'd come to the United States to study was diagnosed with multidrug-resistant TB. When one of Kimerling's colleagues, a physician who works at the American university where the Russian student fell sick, explained what was wrong, the student reacted with disbelief, saying, "That can't be possible. I've never been in a prison."

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"That means that a person from an upper-class Russian family, a family that's able to send their child to an American university, doesn't realize he's at risk; but that in fact, TB is already spreading to the Russian middle classes and upper classes," he says. "To me that's incredible. It's how it was here in America a hundred years ago." ■

CE objectives

After reading each issue of TB Monitor, health care professionals will be able to:

- Identify clinical, ethical, legal and social issues related to the care of TB patients.
- Summarize new information about TB prevention, control and treatment.
- Explain developments in the regulatory arena and how they apply to TB control measures.
- Share acquired knowledge of new clinical and technological developments and advances with staff. ■