AMERICAN HEALTH CONSULTANTS®

TB MONITOR™

The Monthly Report on TB Prevention, Control, and Treatment

INSIDE

FEBRUARY 1999

VOL. 6, NO. 2 (pages 13-24)

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CDC may cut TB funds for big cities in new cooperative agreement plans

States may be given power to approve cities' applications for funds

On Feb. 24, members of the National Tuberculosis Controllers Association (NTCA) will meet in Chicago to study their collective financial futures. At the top of the agenda is the unveiling of new priorities by which cooperative agreement funds will be divvied up next year when grants from the Centers for Disease Control and Prevention (CDC) are "re-competed." That will start in fall 2000, when TB programs must submit new applications for funding. Also at stake is the future of separate funding agreements the CDC maintains with several big cities.

CDC will convene TB controllers from the 50 states, the nine big cities that receive their own funds (with the District of Columbia making 10), plus the seven territories. Working closely with representatives of the NTCA, CDC officials have struggled during past months to come up with a fair method to apportion the smaller funding pie, says **Walter Paige**, executive directive of the Atlanta-based NTCA. A decision to discontinue the practice of using "carry-over" funding means there will be less new money to go around, so competition for available money will be keener than ever.

Does separate funding encourage 'double-dipping'?

One question the CDC is expected to address is whether separate funding for some big cities will be trimmed or eliminated. Since 1993, at the height of the national upsurge in TB cases, a handful of cities has received separate funding. In the years that followed, case rates in many of those cities have come back down. Critics have argued that continuing to provide separate big-city funding needlessly pits cities against states and has led some cities to misspend their funds. In addition — from the standpoint of some states in which no cities get their own money — the practice of funding big cities separately amounts to "double-dipping."

"My guess is that CDC will wind up still funding at least some of the cities," says **Bruce Davidson,** MD, MPH, outgoing president of the NTCA. "There's still discussion going on about how that could be optimally handled." One proposed solution has been to give states the power to review, and perhaps to approve, big cities' applications for cooperative funds, Davidson adds.

The CDC "has been working really closely with us," says **Carol J. Pozsik**, RN, MPH, director of the Division of TB Control in South Carolina and incoming president of the NTCA. "They want to make sure they're being fair and equitable to the little guy as well as the big guy. That's what we're all interested in — that we don't lose what we've got."

When money is re-competed, applicants will find the bar has been raised a notch higher when it comes to accountability, with a renewed emphasis on outcomes, Paige notes.

Dilemmas without easy answers

Along with the city-vs.-state conflict, CDC officials have had to wrestle with other issues that don't offer easy solutions, Paige says. For example, which programs should get more money — those with big caseloads or those that have worked efficiently to reduce their caseloads? "You want to direct money toward places where there's a problem, but you don't want to penalize places that have done a good job," he says.

A similar dilemma is what to do with programs that have developed a good relationship with their political jurisdictions and are getting funds from them. If they've worked hard to win support from state legislatures, they shouldn't be penalized; at the same time, programs that don't benefit from extra largesse from state coffers need a helping hand, Paige says.

One likely solution will be to set up two "pots" of funding, he suggests. From the larger pot will come money for top-priority activities, including case-finding, treatment, and investigation of close contacts to cases. The second, smaller pot would be reserved for activities of secondary importance, such as programs aimed at screening targeted populations; to qualify, programs would need to show they'd done a good job on top-priority activities.

There's talk of establishing separate categories of funding for cities and states as well. Such a system might help states without big cities that qualify for separate funds feel less slighted, Paige adds.

Last month, this year's slate of new officers was installed at the TB controllers' organization. Sue C. Etkind, RN, MS, director of the TB control program in Massachusetts, was elected vice-president. Denise Ingman, TB program coordinator in Montana, was chosen secretary, and John Bernardo, MD, TB controller in Boston, was elected treasurer.

After the NTCA concludes its meeting, the North American chapter of the International Union Against Tuberculosis and Lung Disease will hold its annual conference, which will last through February 27. ■

Surgeon general endorses blueprint for TB vaccine

Cooperation critical to accelerate vaccine search

U.S. Surgeon General David Satcher, MD, gave a thumbs-up to the 20-year long-range plan, or "blueprint," which maps out the strategy for developing a better vaccine against tuberculosis. At a December 16 meeting in Washington, DC, in which he was briefed on the blueprint, Satcher expressed his commitment to seeing the plan through to implementation, says **Anthony Fauci**, MD, chief of the National Institute of Allergy and Infectious Diseases (NIAID) in Bethesda, MD. "He's definitely heavily invested," Fauci says.

Present at the meeting were top-level representatives from the National Institutes of Health (NIH), the Centers for Disease Control and Prevention, the U.S. Food and Drug Administration, the United States Agency for International Development, and the U.S. Advisory Committee for Elimination of Tuberculosis (ACET).

In addition to being surgeon general and assistant to U.S. Secretary of Health Donna

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Shalala, Satcher directs the national vaccine program. Gaining his approval was a critical step in the process of securing the estimated $800 million in funds that will be needed to implement the strategy outlined in the blueprint, says **Dan Salmon**, MPH, policy fellow at the Atlanta-based National Vaccine Program Office (NVPO).

Goal: Establish framework of cooperation

Money, however, wasn't the primary focus of the briefing, Fauci says. Instead, talk focused on concepts presented in the blueprint. "The subject of funding came up only once or twice; but obviously, some new money will be needed. What we're trying to do right now is establish a framework for the next 10 to 20 years so we can make sure that we have the necessary resources."

Satcher told the group its next task is to put together an interagency task force, which will be charged with implementing the strategies outlined in the blueprint. "The task force's first job will be to attach a budget to the plan of action," says **Ann Ginsberg**, MD, PhD, program officer for tuberculosis, leprosy, and other mycobacterial diseases in the Division of Microbiology and Infectious Diseases at the NIH in Bethesda, MD. "Second, they will be charged with overseeing all the activities related to vaccine development, making sure all the players are talking to each other and coordinating their work."

> **"A lot more work needs to be done on finding a better animal model."**

Satcher made a point of complimenting the group on its work. "He said it was gratifying to see so many agencies and departments coming together with such a well-coordinated plan and presenting such a good briefing, and that it was clear everyone had worked really hard on this," says Salmon. "It was a nice pat on the back."

According to blueprint estimates, it will take about $800 million over the next 20 years to develop a vaccine against TB that works better than BCG. Some of that money will come from in-house sources such as the CDC and NIH, Fauci says, but the rest presumably will be new money that will have to be appropriated by Congress on an annual basis.

Already, the NIH has elevated the development of a TB vaccine to a top priority with budget decisions reflecting that change, Fauci says. "In 1991, my institute's budget for TB was $3.7 million," he says. "In 1999, it's $41.5 million. So as you can see, we've greatly accelerated our TB budget. A lot of that [money] will ultimately feed into what we need for the development of a vaccine."

Though the strategic plan has become known as "the NIH blueprint," Fauci and others at the meeting with Satcher emphasize it by no means represents the NIH alone. "It's an interdepartmental blueprint; the NIH is just one of many players," Fauci says.

During the meeting with Satcher, Fauci outlined what the NIH sees as its roles:

- continue conducting vaccine research;
- explore new avenues of research expected to spin off from the completion of the sequencing of the TB genome;
- help develop an international network for conducting Phase I, II, and II trials for testing candidate vaccines developed in the laboratory.

The creation of the vaccine blueprint reflects a growing sense in the public health community, both in the United States and abroad, that the fight to eliminate TB cannot be won without a better vaccine. That conclusion has led TB researchers not just to look for more funding for their efforts, but also to better coordinate those efforts.

"If you were to throw a billion dollars at [vaccine development], but efforts weren't well-coordinated, the money would probably have limited utility," Salmon points out. "Likewise, if you had a great plan but no resources, you wouldn't get much accomplished, either."

Increase private-sector involvement

Although its members haven't been determined, creation of the task force already is proceeding in high gear, says Salmon. "We've decided it's of utmost importance to move very quickly on this."

The hope is that better coordination will move research forward at a faster pace, with more attention paid to some key areas that have been lagging behind, says Ginsberg.

In the short-term, the blueprint aims to increase private-sector involvement, involve vaccine manufacturers at an earlier stage in research occurring in public and academic circles, and better coordinate the work of the private sector with the other two spheres of endeavor, she says. "There's a fair

amount of interest among vaccine-makers, but they've been holding back, waiting for proof of principle. If any of the candidate vaccines looked consistently better than BCG in the animal models, manufacturers would begin to gear up and hop on board."

The fact that BCG is still used as the gold standard points to another gap that needs to be addressed, she adds. BCG is used as the standard because it gives such good protection against TB in animal models; but in humans, clearly, it works far less effectively.

"One thing that's telling us is that our animal models aren't good enough yet," Ginsberg says. "A lot more work needs to be done on finding a better animal model."

Originally, the blueprint was developed from a workshop the NIH held in conjunction with the NVPO last March. Since then, its authors have gotten "a lot of input from the broad research community as well as from the vaccine-development community," she adds.

Last August, the blueprint was presented to an international symposium, and copies have been circulated among industry and academic leaders. This past fall, a revised blueprint was approved by ACET and the National Vaccine Advisory Committee.

A higher profile for vaccine development

"Ultimately, what we hope the blueprint will do is produce a new vaccine within the next 20 years," says Ginsberg. "But in the shorter term, we hope it will raise the profile of TB vaccine development as a priority, both here and globally. We need to get all the various players more involved, including the funding agencies, the academic scientists, the vaccine manufacturers, and all the other stakeholders."

That effort will require both better coordination and more funding, she adds. "More money, yes; it's clearly going to take more money than is currently being devoted. But we also need to coordinate and get all the partners involved as early as possible."

Satcher, appointed to the post of surgeon general last February, has devoted a big part of his career to championing the fight against infectious diseases, and he has warned repeatedly against complacency in that struggle. As a 2-year-old boy growing up in Anniston, AL, he nearly died of whooping cough; that experience spurred him, while head of the CDC, to lead a nationwide drive to increase childhood vaccinations. He began his practice as a family physician working in inner-city health clinics and urban hospitals, and he regards the poor as his most important constituents.

When he was nominated to the post of surgeon general, Satcher said his goal was "to make the greatest difference to those who have the greatest need." ■

Prisons conference stresses TB opportunities

Captive audience available for isoniazid therapy

Jails and prisons offer a unique opportunity for practicing preventive medicine, says one of the speakers scheduled for a Feb. 24 satellite conference on TB in correctional facilities. "The prison is a great place to practice public health," says **Stephen Weis**, DO, medical director of the TB clinic in Tarrant County, TX, and professor of medicine at the University of North Texas Health Science Center at Fort Worth.

"TB rates are going down in prisons, but this population still has an incredible number of individuals with TB infection," he notes. Inmates often are members of groups at especially high risk for TB infection — injecting-drug users or alcohol and crack cocaine abusers, for example. Yet in the free world, it's nearly impossible to get them through a course of isoniazid prophylaxis, Weis adds. In a correctional facility, on the other hand, "we've got them," he says.

> **"TB is dropping faster among the prison population than among the general population."**

At the jail in Tarrant County (with an inmate population of about 3,500), Weis takes advantage of the opportunity, placing as many as 35 people on preventive therapy every other week. Critics of his aggressive approach toward isoniazid preventive therapy say he's not assured of getting everyone through an entire six-month course of isoniazid. "But the way I look at it, every dose counts," he says. "The day I see them is the day we start them on therapy. We have a bottle of pills right there," so every incoming inmate

under age 35 get his first biweekly dose on the spot.

There's more good news on the TB front in correctional facilities. In a study that looked at skin-test positivity rates of the more than 27,000 correctional officers who work in Texas state prisons, the results were found to be lower than rates for the general population, says **Mike Kelley**, MD, chief of preventive medicine for the state's criminal justice department. Kelley also is a scheduled speaker at the satellite broadcast.

"Even though the rates for TB are still much higher among the inmate population than among the general population, TB is dropping faster among prison populations than among the general population," he says. With TB and HIV disease finally under control, hepatitis C is likely to be the next infectious disease prison authorities will find themselves grappling with, he adds.

The three-hour, national satellite broadcast is co-sponsored by the Texas departments of health and criminal justice, says **Ray Silva**, corrections program coordinator with the state health department. There will be no charge for sites wishing to receive the broadcast. **(See editor's note, below.)**

Live presentations are included

The program will consist of live presentations from Austin, TX, with a few pre-taped sections to illustrate some points. The broadcast will include information on:

- the status of TB in correctional facilities;
- transmission of TB;
- diagnosis and treatment of TB;
- the basics of a screening program;
- transportation of persons with TB;
- intake issues;
- training correctional staff to "think TB";
- contact investigations.

Other scheduled speakers include John Weisbuch, MD, board chair of the National Commission on Correctional Health Care; Newton Kendig, MD, TB controller for Maricopa County (AZ); Orlando H. Pile, MD, chief of infectious diseases at the Los Angeles County jail; and Brian Smith, MD, MPH, the Texas health department's regional director.

(Editor's note: For more information on the broadcast, contact Ray Silva or Ann Tyree by phone at (512) 458-7447 or send e-mail to ray.silva@tdh.state.tx.us or ann.tyree@tdh.state.tx.us.) ■

1-800 service aids cross-border referrals

Bilingual operators make cross-border referrals

Along the U.S./Mexican border, it happens all the time: A TB patient in the midst of treatment leaves the country. Whether he leaves for good or only for a short while, unless his health care provider can find a way to intervene, his TB treatment will be interrupted.

Typically, cross-border referrals are fraught with obstacles, including language and monetary barriers, legal problems, and a lack of understanding about how a foreign health care system operates.

San Diego TB controllers recently have created a new program they hope will serve as a solution to at least some of those problems. Called CURE-TB, the program offers bilingual patient referrals between physicians and public health agencies on the American and Mexican sides of the border. Equipped with knowledge of how each country's public health infrastructure operates, its two full-time staff members are able to call ahead across the border. That way, they can help ensure TB patients don't get lost to follow-up when they leave one country for the other.

The service is free. In the United States, patients and providers who want a referral to Mexico can call 1-800-789-1751. In Mexico, the only difference is that patients must dial 001 instead of 1. Basically, CURE-TB aims to make it as simple for a health care provider in the United States to talk to a counterpart in Mexico as it is for TB controllers here to talk to one another, says **Kathleen Moser**, MD, TB control officer for San Diego.

How do you call TB control in Oaxaca?

"Here in the U.S., if I have a patient turn up who's been [undergoing TB treatment] in Nebraska or Ohio, I can just call Nebraska or Ohio," Moser says. "It's a lot harder if you have a patient who's headed somewhere in Mexico. People don't usually know how to go about calling the public health department in, say, Oaxaca. It's partly the language barrier, and partly it's not knowing how the [health care] system in Mexico works."

The telephone number is staffed continuously by two bilingual employees, she says. (Even the name "CURE-TB" was selected specifically

because it means the same in Spanish and English, she adds.)

The state of California pays the salary for one of the staff members; money for the second comes from a temporary grant from the Centers for Disease Control and Prevention in Atlanta.

San Diego TB controllers have begun to publicize the program and its telephone number, and they are working hard to spread the word of the program's existence to physicians and public health agencies both here and in Mexico. Since the hope is that patients as well as physicians will use the phone number, pocket-size business cards also have been printed and distributed. That way, patients can call the 1-800 number on the card from their destination, says Moser.

"In Mexico, cost can be a big barrier; people there often don't have the money to make a long-distance phone call."

She hopes the new service also will be used by TB controllers and private physicians in the United States who encounter a patient headed to Mexico but aren't sure about how to give him the referral he needs.

"We just sent [a notice] to all the U.S. states that have a lot of Mexican patients, saying they can use us to refer their patients back to Mexico," she says. "That means that if some private physician [with a binational patient] calls us from somewhere in the middle of Wyoming, for example, we will contact the health department in Wyoming to make sure they know about the patient and that they have the information on him; and we'll also help them refer the patient to Mexico." (For phone calls between U.S. locales and San Diego, Moser asks that users take advantage of their own telephone systems, reserving the 1-800 number for cross-border purposes.)

Hearing a friendly voice reassures patients

The program is designed especially to be non-threatening to individual patients. "Suppose a patient is headed south and gets stuck in Tijuana, and he can't get home to Guadalajara," says Moser. "If he calls, we can tell him exactly where to go for care in Tijuana."

She also likes the idea that the new system may help TB controllers in the states establish ties to the physicians who are treating their patients in Mexico. "We've already begun to get calls, mostly from physicians in Tijuana [across the border from San Diego]. In Mexico, cost can be a big barrier; people there often don't have the money to make a long-distance phone call."

The system uses patients' real names, not unique identifiers, but staff make a point of reassuring callers their data will be kept in confidence, she says. "We try as much as we can to get to the patients themselves. Certainly, we're not asking them to come north; we're just telling them that if they do, to call us, because it's important to us that they don't spread disease."

Controllers coordinate with INS

San Diego TB controllers also are working hard to establish better links with the Immigration and Naturalization Service (INS).

"We ask them to tell us where [deported patients] are going and to let us talk to them; that when they get there, they'll at least know how to continue their TB treatment," she says. "We've already been called by some [deportees] on the 1-800 number, asking what they should do now and where they should go to keep up with their treatment."

The fact that the system works by telephone (instead of through paper correspondence or records) offers advantages, she says. "For one thing, we don't think people usually carry paper records — they just lose them."

A phone call also is much more personal, she says. "It's one-on-one. Our people talk directly to the patients." At first, offers to help may be met with suspicion, she adds. "There's usually a little initial distrust. It's like, 'You're who? In San Diego? You're with the health department?' But our people always say, 'Don't worry — all we care about is your health.'"

Moser says the new program will succeed because it provides a personal connection. "When you talk about case management and getting patients to do the right thing, it's because you talk to them," she says. "If you don't do that, they don't think it matters. We tell people to call whenever they need us, whichever side of the border they're on.

"We reassure them that we want to talk to them not because of anything to do with their legal status, but purely because it's important to their health and to the health of their kids and their families. And that's something they can relate to and appreciate." ■

Bilateral funding a plus for cross-border projects

Trio of projects wins U.S./Mexican commitment

An unfortunate characteristic of most cross-border projects is that all the money comes from the American side, says **Kathleen Moser**, MD, TB control officer of San Diego County.

"Because most cross-border projects are totally U.S.-funded, the balance of power is unequal," she explains. "Partly, it's an issue of whether or not you're truly partners, and whether or not both sides 'own' the project. And part of it's an issue of power — since if one country has all the power to give, they also have the power to take back."

Another disadvantage to unilaterally funded projects is purely pragmatic: Many American donor agencies are reluctant, or simply restricted by terms of their own charter, to participate in projects that are funded unilaterally.

For all these reasons, Moser is proud of having helped establish a series of projects that will enjoy bilateral funding from the United States and Mexico. The projects will target three kinds of public health problems: TB control, the spread of HIV infection, and substance abuse issues.

"Each of the projects will look a little bit different, since the issues are different," she says. "The HIV project will be mostly educational and preventive; the substance abuse project will address problem drinking in border areas; and the TB project will address outreach, directly observed therapy, and cross-border communication." One TB project that's already come to fruition is CURE-TB, which employs a 1-800 number and bilingual interpreters to help refer patients to providers on either side of the border. **(See related story, p. 17.)**

Models more similar than people think

Except for linguistic barriers, cross-border projects involving TB control are not as inherently difficult to manage as people often think, Moser says. "The model for TB control there is very similar to what we have here in the U.S. Their TB programs are run by the government, so that almost all the care for TB patients is provided by people who work for the government, and that's it, period."

In the past, the infrastructure in Mexico was more centralized than that in the United States, with various state programs tied tightly to Mexico City. ("It would be as if we here in San Diego couldn't make a move without consulting the Centers for Disease Control and Prevention first," Moser explains.)

That's changed, however. "Now, all the states in Mexico are decentralized," she adds, with Baja, to the south of California, being the last to decentralize, so "now they have their own resources and are pretty much in charge of what they do with them."

For the new trio of cross-border projects, grant applications and fundraising were spearheaded and directed by San Diego TB control, working in partnership with Project Concern International, a nonprofit organization based in San Diego that tries to arrange international projects devoted to improving public health.

"I think in any country, there's a strongly developed sense of sovereignty and pride," she says. "No one ever tells you to take your money and go home, because generally, they need it too much to do that. But I think everyone will like this arrangement a lot more." ■

TB clinics a great place to offer HIV screening

Key is to train nurses to provide counseling

Though they're often overlooked, public TB clinics are a wonderful place to do HIV screening, says **Stephen Weis**, DO, medical director of the Tarrant County, TX, TB clinic and professor of medicine at the University of North Texas Health Science Center at Fort Worth.

The key is one-stop shopping, he says. That is, if TB clinics offer an HIV test at the same time they draw blood for TB purposes, most patients will participate in the HIV screening, he says. Though it's standard practice at most TB clinics, it simply doesn't work as well to tell patients they have to make a separate trip to the HIV clinic and have blood drawn a second time.

That's a shame, says Weis, because TB clinics in many ways are an optimal point of contact for HIV screening. For one thing, there is a high prevalence of HIV infection among clients, he says. Plus, many clients, whether or not they're already infected, report engaging in many behaviors that place them at high risk for HIV infection and thus can benefit from counseling.

Finally, clients being treated for TB are less likely to be lost to follow-up than they might be at an HIV testing site because they're already coming back to the TB clinic on a regular basis for check-ups and medication refills. "I think HIV counseling is much easier to do when it's presented as a routine part of health care for TB," says Weis.

Since 1987, he has been screening for HIV virtually everyone who walks into the county TB clinic. Now, clients are so accustomed to being offered an HIV test that no one thinks anything of it, he adds. "It's like universal DOT. Once you've been doing it for awhile, people get used to the idea, and no one even questions it."

In a recently published article in the *American Journal of Public Health*, Weis tallies the yield for that nearly nine-year period of HIV surveillance.[1] Of 768 TB patients counseled and tested for HIV, 98 tested positive for HIV infection. Of the 98, 93% had one or more risk factors for HIV infection. Among those who tested HIV-negative, 42% had one or more risk factors for HIV infection.

Counseling offered for HIV screening

To make offering HIV testing feasible, Weis says the only change he's had to make in clinic procedure is to mandate that TB clinic nurses undergo training in how to offer pre- and post-test counseling for HIV screening. That out of the way, it's a simple matter to offer an HIV test as part of the routine blood work.

Weis is baffled that more TB clinics haven't done the same. "It sounds bizarre, but most TB clinics don't do that," he says. "Instead, they send patients over to the HIV clinic to be counseled and have their blood drawn." Predictably, only about half the patients bother making the extra trip. "I mean, be honest," he says, laughing. "Did you wake up this morning and say to yourself, 'One of my goals today is to have a needle stuck into my arm — twice?'"

Once nurses are trained to provide the requisite counseling, the rest is easy, he says. The state of Texas screens blood samples for HIV at no cost. And getting patient permission to test for HIV is much easier than most people think. "When I present this data, people are always shocked that I get such a high level of participation," he says. "They go, 'How do you do this? None of our patients would ever agree to have this done.'"

It's important to make the pitch positive, he adds. His goes something like this: "We need your permission to do this test because if you have HIV, that will affect the way we'll treat you for TB. The Centers for Disease Control and Prevention recommends that you get this test done. And it's no big deal, because we'll use this blood that we're about to draw anyway." That seems to work for almost everyone, he adds: "We've had very, very few people refuse."

Using negative terms can scare patients into saying no, he says. "Some HIV clinics, in my experience, make a point of telling the patient they can't allow anyone to find out about this — that it could cause them to lose their job or not to be able to get insurance. We look at it like we're doing our patients a service simply by offering them better health care."

Reference

1. Weis SE, Foresman B, Cook PE, et al. Universal screening at a major metropolitan TB clinic: HIV prevalence and high-risk behavior among TB patients. *Am J Public Health* 1999; 89:73. ■

Sputum, skin tests cut TB transmission in shelters

Programs help homeless in Birmingham, Denver

(Editor's note: This is the second of a two-part series on targeting special populations for TB screening.)

Public health departments shouldn't stop at providing directly observed therapy (DOT), some TB experts say. Instead, they should add location-based screening for special populations. The experts point to recent studies lending support to the idea that DOT alone isn't enough to stop the spread of disease among certain populations. One reason is that among those populations — the homeless, for example — efforts to implement DOT are hampered by the exceptional challenges of contact investigations.

In Los Angeles, TB controllers have begun using mobile chest radiography to screen the county's large and widespread population of homeless people. **(See *TB Monitor*, Jan. 1998, p. 1.)** There, that method has yielded enough active cases to convince county officials that time and money required for mobile chest X-rays have been well spent.

Other jurisdictions have been experimenting with different solutions. In Denver, for example, all homeless shelters in the city now require clients to show proof they've been skin-tested on a regular basis. In Birmingham, AL, with the endorsement of the city's shelters, TB controllers regularly collect sputum samples on site at selected night shelters.

> **"We figure we'll screen about 75% of the homeless population this year."**

TB controllers in both places say their choice of screening methods seems to be working well and fits their particular needs. "You have to find out where you have transmission in the community and then design the right program to deal with it," says **William J. Burman**, MD, infectious disease specialist at Denver Medical Health Center. "You never want to do something that dilutes the efforts of the TB control program, like screening in a low-incidence group — screening at a suburban school, for instance."

In Denver, he adds, there was no question where transmission was taking place: among the homeless population. The remainder of the TB cases result from transmission to household contacts, and controlling them requires no special programs, he says.

The number of hardcore homeless in Denver is estimated at about 3,000; a larger group consisting of the transient homeless boosts the total as high 8,000 to 9,000. Of the 87 cases of TB the city averages each year, 10 to 12 occur among the homeless population. Over the last eight to nine years, about 30 cases have been attributed to shelter transmission.

TB controllers chose skin testing as their method of screening for several reasons, Burman says. Screening with chest X-rays would have been too expensive, he explains, because "we don't have the incidence to justify that." Taking sputum samples didn't seem to be a feasible way to go, either.

Now in its third year, the skin-testing program's coverage has increased steadily; last year, outreach workers screened 5,000 people on site at shelters. "We figure we'll screen about 75% of the homeless population this year," he adds.

The percentage of cases located through on-site screening (as opposed to identifying patients who decide on their own to seek care) also has risen steadily each year the skin-test program has been in place. By last count, TB controllers were finding 75% of TB cases occurring among the homeless population through shelter screening. One more measure of the program's success is that even though numbers of homeless have increased, the number of TB cases among the homeless has stayed steady, Burman says.

Shelter clients are screened either in the evening at night shelters or during daylight hours when they show up at the day shelter for clean clothing and a shower. They receive cards, which are now a prerequisite for admission to all of the city's shelters, that document they have received the skin test. Nurses go to shelters twice a week, placing skin tests the first day and reading them the next. Most cards can be issued on the spot, as soon as the skin test has been read.

The decision by city shelters to buy into the screening, which evolved over a period of time, is key to the program's success, says Burman. The screening program began in the early 1990s, but at that point, having a card was voluntary, "which meant no one did it," he notes. Then, several cases of TB were linked to shelters, and some shelter staff were found to have converted their skin tests.

Because of those incidents and with input and encouragement from the health department, the shelters eventually decided to make having a card mandatory, he says. The move toward mandating the cards started 1995; now, all require guests to carry a card.

The system has some drawbacks

The card system isn't foolproof, he adds. The cards have become a saleable commodity on city streets. "We even know what the market value of a card is," Burman says wryly. Clients sometimes lose their cards, as well. TB controllers finally decreed that individuals must wait for a period of time before they can be re-tested, to cut down on "lost cards" that actually had been sold.

"Some shelter clients feel [the system] is a hassle," says **Jan Tapy**, an adult nurse practitioner who serves as a primary care provider at the health department. "We've had people who'd lost too many cards [and were denied a bed] leave angry." (No one, she adds, is denied a bed in really cold weather.)

But other shelter clients, newly awakened to the dangers of TB transmission, like the system, she adds. "I've had people at a shelter come up to me and say something like, 'All the people here

are coughing! I don't want to be around them.'"

The number of people with positive skin tests runs as high as 30%. Once they've been screened for active disease, about a third of those who test positive and are judged to be at high risk for reactivation are offered isoniazid prophylaxis. In one case, about 63% of close contacts to a case completed prophylactic therapy, Tapy adds.

Skin testing isn't completely accurate, of course, Burman points out. "We know that up to 20% of patients with active pulmonary TB are skin-test negative." Still, anyone who is symptomatic is referred by outreach workers doing the skin testing for a full evaluation, including a chest X-ray. "Hopefully, that means people who are sick enough to test negative are [identified]," he explains.

Those found to have active TB are hospitalized and then housed at no charge in a motel for several months until they're deemed noninfectious. "If they break their quarantine, we have a lock-up ward where they can go for a couple of days," Tapy says. "They usually get religion after that and keep the rest of their appointments."

In Birmingham, a different route

In Birmingham, TB controllers have opted instead to collect sputum samples. Over a recent nine-month period, working from cultures and smears from the samples, the process has netted seven cases — four of them smear-positive — out of 438 people screened. That represents only a portion of the city's homeless population (which, according to 1995 estimates, numbers almost 2,700); but already, DNA fingerprinting suggests there may have been a decline in recent transmission, says **Nancy Brook,** disease intervention specialist and acting director of TB control for the state of Alabama.

One reason for the program's apparent success may be indirect, she says: Having representatives from the health department show up on a regular basis at shelters probably has given TB controllers a heightened profile within the homeless community, and it may have encouraged many homeless people to seek care who might not otherwise have done so.

The Birmingham program depends partly on volunteer labor, which has been key to making it work, Brook says. Volunteers are recruited from the schools of medicine and of public health at the University of Alabama at Birmingham. Working alongside paid outreach workers from TB control, the volunteers visit four men's night shelters in the city four times a year. Plans call for expanding the visits to include two women's shelters, she says.

"Visiting four shelters four times each a year may not sound like a lot of work, but it is," she adds. Visits have to be scheduled late in the day, when outreach workers ordinarily would be ending a long day on the streets; and the worse the weather, the better the yield because homeless people are most likely to turn out in search of shelter when it's wet and cold.

Why sputum and not skin testing

The decision to begin screening the city's homeless population (and to use sputum collection as the means for doing it) was based on a number of factors, says Brook. "We had several cases [among homeless people]. When we tried to do contact investigation, we found it was almost impossible."

Once the decision to begin targeted screening was made, there was the matter of how to go about it. Offering chest X-rays wasn't feasible, not least because the county doesn't own a portable X-ray machine. Skin testing didn't seem to be a good choice, either. "We tried skin testing, but there was the problem of having to go back and read the tests," Brook says. "[Skin testing] takes a lot of time; plus, without documentation, what were we to do with people who'd test positive but who told us their skin test had looked the same way last time?"

Workers and volunteers began collecting sputum samples in 1996, with the program starting rather slowly due to personnel turnover and assorted funding problems.

Controllers rotate shelter visits

A citywide shelter policy prohibits guests from staying more than five days in a row at the same facility, so in theory, everyone should pass through each shelter sooner or later. But some people patronize one shelter exclusively, even if that means going without a bed some nights; plus, clients enrolled in substance abuse programs stay in the same place until they finish treatment. So TB controllers decided to visit at least four of the city's six major shelters four times a year.

Outreach workers and volunteers work from 5:30 p.m. to 7 p.m., screening between 30 and 60

people. The procedure includes some history-taking — what shelters the men have stayed at recently, for how long, and how long they've been in the shelter system.

Once the survey is completed, shelter clients go back outside, usually to a station set up at the rear entrance of the shelter, for sputum collection. Hardly anyone has a problem producing a sample, Brook says. Turnaround time for lab results is quick, usually no more than two days. "It's a time-consuming process," she says. "But we are getting yields, so it's worth it." ■

Potent skin-test 'cocktail' may simplify diagnoses

May offer way to tell BCG from TB infection

A researcher working to find a better skin test for TB infection says a "cocktail" of antigens she's created may offer a solution to some problems that have plagued researchers until now. The cocktail approach was developed by **Marila Laura Gennaro,** MD, associate member of the Public Health Research Institute, a public health research firm in New York City.

One big problem with tuberculins used in skin tests currently available is that they do not distinguish among infection by *Mycobacterium tuberculosis* (MTB), *M. bovis,* BCG, or other nonpathogenic environmental mycobacteria. Someone vaccinated with BCG, therefore, may react to a tuberculin skin test as if infected with MTB.

That's not to say the purified protein derivative (PPD) used to test for TB infection is a poor reagent, says Gennaro. To the contrary, its sensitivity is exactly what makes it a good one. "Since it's a mix of proteins, it contains all the epitopes needed to elicit a delayed-type hypersensitivity response. Each T-cell clone which has previously encountered the mycobacteria and been activated will be activated by a specific antigen."

The reason for tuberculins' propensity to cross-react, making it so difficult to distinguish the source of infection, is that they contain proteins made by other mycobacteria as well as MTB; for that matter, they contain proteins made by many other bacteria in general, she adds.

Yet taken singly, a protein may not elicit any reaction at all. That leads to a stumbling block for many researchers: As they continue to isolate new proteins from TB, they keep finding antigens that work well in animal studies but fail to elicit the same kind of consistent reaction among humans.

There are many reasons for that disparity, Gennaro says. For one thing, the dose lab animals typically receive is proportionately much higher than that given to human test subjects. For another, the animals are tested only months after having been infected, whereas an antigen may be sensitive enough to react in humans years after exposure and infection have occurred.

Proceeding on the principle that more antigens will produce stronger reactions, Gennaro decided to produce a "cocktail" of antigens to see whether it would evoke a stronger response. "We took antigens already identified in the literature as being active in skin tests, or which we had identified ourselves."

TB Monitor (ISSN# 1082-8664), including **Common Sense about T B** and **TB Guide for Health Care Workers** , is published monthly by American Health Consultantsfi, 3525 Piedmont Road, Building Six, Suite 400, Atlanta, GA 30305. Telephone: (404) 262-7436. Periodical postage paid at Atlanta, GA 30304. POSTMASTER: Send address changes to **TB Monitor** , P.O. Box 740059, Atlanta, GA 30374.

This continuing education offering is sponsored by American Health Consultants which is accredited as a provider of continuing education in nursing by the American Nurses Credentialing Center's Commission on Accreditation. American Health Consultants is accredited by the Accreditation Council for Continuing Medical Education to sponsor CME for physicians. American Health Consultants designates this continuing medical education activity for 18 credit hours in Category 1 of the Physicians' Recognition Award of the American Medical Association.

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Subscription rates: U.S.A., one year (12 issues), $449. Outside U.S., add $30 per year, total prepaid in U.S. funds. One to nine additional copies, $225 per year; 10 or more additional copies, $135 per year. Call for more details. Missing issues will be fulfilled by customer service free of charge when contacted within 1 month of the missing issue date. **Back issues**, when available, are $75 each.(GST registration number R128870672.)

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She and her colleagues first tested them in animals immunized with BCG (a member of the MTB complex and similar to MTB but not pathogenic). Then they tested them in animals immunized with *M. avium*, a widespread environmental mycobacterium that is usually non-pathogenic; *M. avium* served as an example of a non-tuberculous mycobacterium.

Some antigens produced reactions in the first group of animals; others in the second group; and some in both. The next step was to make the antigen cocktails, using brews designed to elicit reactions from animals immunized with first one and then the other mycobacterium. As hoped, the cocktails retained the specificity of the antigens they contained; and as the number of antigens increased, so did the size of the reaction.

Having found what appears to be a reliable a way to distinguish mycobacterial from non-mycobacterial infection, Gennaro is hard at work on the next step: to find a mix of antigens that can distinguish among members of the same mycobacterial complex. "That's what we're doing now: working with antigens specific to BCG and MTB," she says. "Technically it's no harder; it's just a matter of finding the right antigens."

Gennaro presented her work, which also has been published,[1] at International Business Communications' International Conference on Mycobacterium Tuberculosis: Novel Therapeutic, held Dec. 10-11 in McLean, VA.

Reference

1. Konstantin L, Manca C, Collangeli R, et al. Use of *Mycobacterium tuberculosis* complex-specific antigen cocktails for a skin test specific for tuberculosis. *Infection and Immunity* 1998; 66:3,606-3,610. ■

CE objectives

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

- 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. ■