SUMMARY

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TB In the United States
With Perspective on the Foreign Born Population

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***Please note:** Data and analysis discussed in these presentations were current when presented. Data collection and analysis are ongoing in many cases; therefore updates may be forthcoming elsewhere on this website, through publications such as CDC's Morbidity and Mortality Weekly Report or other venues. Presentations themselves will not be updated. Please bear this in mind when citing data from these presentations.*

You can log onto the Web site at www.bt.cdc.gov/coca to view or download a copy of the full slide set that accompanied this presentation.

Part I: Overview:

The **National TB Surveillance System** draws on data from 59 reporting areas, including:

- the 50 states
- the District of Columbia
- New York City
- Puerto Rico
- six jurisdictions in the Pacific and Caribbean.

The data presented here are taken from the 50 states and the District of Columbia, including NYC. Data from the other jurisdictions are customarily utilized for special analyses only.

Data are reported on a three-part form, which is called the report of a verified case of tuberculosis and includes:

- patient demographics
- laboratory results
- drug susceptibility results
- treatment outcomes.

Those data are transmitted electronically to CDC on a periodic basis by each of the reporting areas.

Our **case definition** focuses on incident cases, that is cases of active disease, which have not been previously reported. Those cases are confirmed as TB in one of three ways:

- about 81% are confirmed through culture, with another 1% through NAA or other means of bacteriologic confirmation
- 12% on the basis of clinical evidence
- 7% on the basis of a provider diagnosis with no other indication of the basis. In the past, efforts to confirm the validity of provider diagnosis have indicated that the majority of these cases are, in fact, clinical TB as accepted here in the Division.

Morbidity and Mortality

TB morbidity in the United States achieved its lowest level ever in the past reporting year, calendar year 2004, with a total of 14,511 cases provisionally. This is the lowest rate we've ever achieved: **4.9 cases per 100,000**.

As you can see in the next graph entitled *"Tuberculosis Case Rates and Death Rates United States 1953-2003,"* the number of cases has been falling since surveillance began in the early 1950s. The death rate from tuberculosis has reached low, but not zero levels.

The next slide which enlarges the portion of the graph from 1983 to 2003, shows the much discussed increase in tuberculosis morbidity -- which occurred in the late 1980s through the early 1990s -- and was responsible for the increased attention that TB gained during the 1990s and the substantial increase in budget dedicated to control of this ever-present problem.

Age and Gender

The next slide shows case rates across the United States by state, with states along the borders and in the Southeast particularly showing a case rate higher than the national average. This is a feature of tuberculosis, which will appear repeatedly throughout this presentation. **About a third of the cases occur in the 25 to 44 year age group** (as shown on the next slide), with about 17% in persons under that age and about 20% occurring in persons over the age of 65.

As you can see on the next slide, **the proportion of males exceeds the proportion of females in all age groups 25 years and older**, with the proportions approximately equal in the younger age groups. In 2003 and 2004 (although the final case counts and the graphics for 2004 were not ready at the time of this presentation), about 19% of cases were white, about 28% black or African American, 28% Hispanic or Latino, 23% Asian and one percent native Hawaiian or other Pacific Islander. One percent was American Indian or Alaskan native.

Ethnicity

The next slide shows the tuberculosis case rates by race ethnicity in the United States over the past ten years. The case rate in non-Hispanic whites has been quite low over this period of time and has continued to decline. Notably **the case rates in Asian Pacific Islanders in purple at the top and blacks in yellow and in Hispanics and American Indians/Alaskan natives have all been substantially higher**. The rate in Asians and Pacific islanders, in fact, is almost a log higher than the rate in the non-Hispanic whites. This continues to be a challenge as we attempt to address the disparity in rates across ethnic groups.

HIV Co-infection

HIV co-infection peaked in the early 1990s as best we can estimate. Reporting of HIV status in persons reported with TB is still less than complete in the United States, although **the majority of reporting areas now report HIV status in at least 75% of cases**, although there's still significant gaps.

The estimated proportion of persons with HIV co-infection and TB has fallen from a peak across all ages (lower purple bar) at about 15% and is now approximately 9% to 10% across the United States as a whole. The rate in persons age 25 to 44 -- substantially higher since that's a group with much higher prevalence of HIV co-infection -- has also declined over this period of time.

Multiple Drug Resistance

One of the features of TB which is of greatest concern to us is the occurrence of multiple drug resistant (MDR) TB. This is TB that's resistant to both **isoniazid and rifampin.** Tuberculosis with this type of resistance:

- takes three to four times to as long to treat
- carries a substantially higher rate of morbidity and mortality
- is at least ten-fold more costly to treat.

The number of cases of primary MDR, that's MDR that's present at the time of diagnosis and not acquired as a result of non-compliance (poor drug taking by the patient), had peaked in the early 1990s at the level of between 2% and 3% and has declined since that time, thanks to considerably greater efforts devoted to TB control, to a level of approximately one percent.

The next slide shows mode of treatment administration in persons reported with tuberculosis from 1993 to 2001, showing the steady increase in the use of directly observed therapy (DOT). One of the consequences of this is shown on the next slide, which is a gradual increase in the proportion of patients who have completed TB therapy within a period of one year or less. As you can see, the improvement in overall completion of therapy has been more modest over that period of time.

U.S. Foreign Born Population

According to the U.S. Bureau of the Census, "Foreign Born" refers to anyone who is not a U.S. citizen at birth, including:

- immigrants
- temporary migrants
- humanitarian migrants
- refugees
- individuals illegally present in the United States who were not born here.

An immigrant is someone from outside the U.S. who is not a legal resident of the U.S., and who is admitted into the country for lawful permanent residence as defined in the Immigration and Nationality Act.

The 2000 census estimated that 11% of the U.S. population of 281 million individuals is foreign born. That's a total of 31 million persons.

The next slide shows the distribution of those individuals by their region of birth:

- just over 50 % come from Latin America
- 27% from Asia
- 15% from Europe
- 3% from Africa
- 3% from other regions.

The next slide shows the percent foreign born within each state at the time of the 2000 census. As you can see, again, the darker states, the states marked in darker green are those with a higher proportion or percentage of foreign born within each state. You can see that again, the **states along the coast and including the state of Florida are notably darker colored, indicating a higher percentage of foreign born** within those states.

The next slide shows the top five states with the highest foreign born populations:

- California
- New York
- Texas
- Florida
- Illinois

States that have experienced the highest percent changes in foreign born populations over the decade of the 1990s include:

- North Carolina
- Georgia
- Nevada
- Arkansas
- Utah.

So, there are both states with large numbers of foreign born population and states experiencing a large influx of new migrants.

Age and Gender Distribution
The next slide shows the age distribution by gender for the native and foreign born populations. Notably, the foreign born population tends to be predominantly young adults with much smaller proportions reflected by young children and older adults. This differs, of course, from those many countries from which many of these individuals come, where a large proportion of the population is under the age of 15.

Naturalization
Individuals become naturalized in the U.S. over time, but it is a slow process, as you can see from the next slide, *"Percentage of Foreign Born Naturalized by Year of Entry into the U.S."* Of those who entered between 1990 and 2002, only 13% have been naturalized; whereas among those entering before 1970, approximately 81% have been naturalized.

Education
The next slide shows the percent of the foreign born population with less than a ninth grade education. Overall, **about 22% of the foreign born population age 25 and over have less than a ninth grade education**, compared to about 4% in the native born U.S. population. That figure is particularly high amongst foreign born persons in the U.S. that come from Latin America, 35% having less than a ninth grade education.

Spoken Language
Finally, the language spoken at home for the foreign born is frequently a language other than English, and in many cases, does not include English at all. Of the foreign born population:

- about 45% speak Spanish at home
- 18% speak Asian or Pacific islanders' language
- 20% speak various other languages.

So there's a considerable linguistic diversity in our foreign born population.

Foreign Born Vs. U.S. Born TB Cases

The next slide shows the number of TB cases in U.S. born versus foreign born persons in the U.S. from 1993 to 2003. Several trends are evident in the slide. The first is that the total number of cases in the foreign born has been relatively stable over the past decade at some 7,000 to 8,000 cases. What has changed, notably, are the number of cases in the U.S. born population, with the consequence that the proportion of the total cases that occur in foreign born individuals has steadily increased, shown in the yellow line, rising to a level of 54% in 2004. So, for the past three years, over half of the TB cases in the United States have occurred in individuals born outside of the U.S. This fact alone makes it clear why we are so concerned with TB in the foreign born as part of our effort to eliminate TB in the United States.

The next slide shows this data by state in 1993 and in 2003. The number of states in which over half of the reported TB cases occurred in foreign born individual increased substantially over the decade, moving from a phenomenon that was isolated really to the West coast to one that now stretches across the country.

The next slide shows similar data, but has in addition both case counts and case rates by place of birth. So, that the line with the white circles at the bottom shows the declining case rate in the U.S. born and the line with the triangles near the top of the slide shows similarly a declining, but considerably higher case rate in foreign born individuals in the

United States with almost a ten-fold difference. That's reflected on the next slide in detail, where I show you the actual numbers for '92 and 2002.

The gap in TB rates between the foreign born and the U.S. born is obviously widening. In 1992 the case rate in foreign born was 34.5% and that U.S. born was 8.2% for a rate ratio of 4.2. That rate ratio has increased to 8.4 in 2002. So, though although we are achieving substantial reductions in the number of cases occurring in the U.S. born population, we are achieving smaller reductions in the rate and numbers of cases in the foreign born.

Foreign Born TB Cases by State

The next slide shows the percentage of foreign born TB cases in the United States in 2004 by state. Again, you can see that the darker states are those who reported a higher percentage of foreign born TB cases as a proportion of the total number of cases. I've noted that the proportion for the entire U.S. shown in the bottom of the slide was approximately 54%.

If you look at the next slide, it compares the percentage of foreign born TB cases with the percentage of foreign born. And once again, you see that those states that have a higher proportion of foreign born TB cases are those by and large with a higher proportion of foreign born within each state, not surprisingly and logically.

Countries of Birth

The countries of birth for foreign born individuals are shown on the next slide:

- about a quarter, or 26% of the total TB cases reported in 2003, occurred in persons whose country of birth was Mexico
- 12% came from the Philippines
- 7% from Vietnam
- 8% from India
- 5% from China
- 3% from Haiti
- 2% from South Korea
- a little over a third came from over 100 other nations throughout the world.

Those reported TB cases resided in the United States for varying periods of time.

Length of Residence Prior to Diagnosis

The next slide shows the length of U.S. residence prior to the diagnosis of tuberculosis in foreign born persons reported with TB in 2003. As you can see, about approximately 20% of patients have resided in the U.S. for less than one year, about 25% to 30% have resided for one to four years; and the largest proportion, of course again quite logically, have resided here for more than five years, representing reactivation disease.

Multiple Drug Resistant TB in Foreign Born Cases

Multiply drug resistant tuberculosis remains a concern in the foreign born population in particular. Multiple drug resistance is a problem in a diversity of areas across the globe, and these are reflected in the occurrence of higher rates of MDR in our foreign born patients in the United States.

Consistently since the mid '90s, the percent of foreign born TB cases resistant to at least isoniazid and rifampin has been about twice -- approaching 2% -- that occurring in the U.S. born population.

Social Challenges

While the U.S. born population of TB cases involves individuals who are largely part of minority populations and includes high concentrations of elderly persons, homeless persons and persons for whom substance abuse and HIV co-infection are a problem, the foreign born population is made up of individuals whose culture is different from the dominant culture here in the United States, for example:

- their language is often different
- they are often unfamiliar with Western medical approaches
- they are far more likely to be affected by issues of stigma attached to the diagnosis of TB
- they may have limited access to care
- they may frequently be influenced by fear of deportation.

All of these pose challenges to TB control among the foreign born in the United States.

Number of Foreign Born Individuals Entering the U.S.
The Institute of Medicine Report published several years ago, cited a number of challenges to the effort to make continued progress toward the elimination of tuberculosis in the United States. Prominent among the recommendations made in that report was an emphasis on maintenance of TB control with a particular focus on the foreign born and an emphasis on the overseas screening and stateside notification activities.

A huge number of migrants enter the U.S. every year. As shown on the next slide, **approximately 30 million visitors cross the U.S. borders without visas each year, but in a documented fashion. About 28 million non-immigrants with visas enter the U.S. each year.** These are taken from 2002 data from the Department of Homeland Security. Immigrants and refugees, for whom the best established system concerning TB control and prevention exists among foreign born individuals, make up only about 411,000 of the total.

Undocumented migrants, at the time of this particular estimate, may have been 275,000; but again, estimates of undocumented migrants may vary several-fold because we do not have reliable means to obtain these estimates. **Overall, we estimate that almost 60 million persons enter the U.S. on an annual basis.** That includes a small number of individuals who have entered previously and are adjusting their status within the U.S.

Number of Individuals Screened Before Entering the U.S.
On the next slide, you can see that the number of foreign born persons screened for TB before entering the U.S. is actually quite a small number. About 384,000 immigrants are screened in addition to some 27,000 refugees and 679,000 status adjusters.

The TB screening performed consists of a chest x-ray and tuberculosis skin testing or a chest x-ray and a sputum smear. In the case of immigrants and refugees, screening is limited to persons who are at least 15 years of age.

That screening mostly takes place overseas, although status adjusters, of course, are examined within the United States. **The foreign born persons not screened for TB before U.S. entry include the 30 million visitors who did not require visas and the roughly 28 million who had non-immigrant visas.**

Screening, Prevention and Notification
The opportunities for TB prevention for foreign born immigrants and refugees are shown on the next slide occur, using panel physicians designated by the Department of State and the

Division of Global Migration and Quarantine, as well as status adjusters within the United States who see civil surgeons.

Immigrants and refugees who enter the U.S. pass through the **Bureau of Customs and Border Protection**, who are responsible for enforcing customs and immigration laws at and between the 307 ports of entry. There are approximately **30,000 inspectors** from the customs service, the Immigration and Naturalization Service, Homeland Protection and Quarantine Bureau, and the Department of Agriculture, all working together in this new bureau. The border patrol from INS is also part of the Bureau of Customs and Border Protection.

The number of quarantine stations is considerably smaller. There are approximately eight of those staffed by CDC around the country. The objectives of the overseas TB screening is to restrict the travel or entry of persons with infectious TB, so called Class A TB, which is AFB smear positive, and to identify persons with suspect TB, requiring follow-up stateside evaluation in order to notify receiving jurisdictions of the arrival of these individuals.

The process involves, as shown on the next slide, the overseas medical exam, to which I already eluded, classification of those individuals, notification or designation on their visa of the classification status, followed by domestic notification and hopefully follow-up by a local TB program.

As noted earlier, the overseas screening process classifies individuals on the basis of a chest radiograph and an AFB smear as either inactive TB, so called Class B2, at the top of the next slide, or in the case of individuals who appear to have active TB, as judged by the chest radiograph, either Class A if they are smear positive or Class B1 if they have negative smears. Individual in Class B1 are thought to be non-infectious but active TB, based on the finding of negative sputum smears coupled, with a chest radiograph pattern consistent with active tuberculosis.

Only the Class A individuals are restricted from travel to the United States. Class B1 and B2 are admitted to the United States and expected to be followed up in the local health departments in the jurisdictions to which they will be traveling. Notifications then are generated by the CDC quarantine stations and mailed to health departments with follow-up evaluation and that follow-up should, in principle, be submitted to CDC.

A sample year, 2003, of TB classifications for refugees and immigrants is shown in the next slide. A small number of Class A individuals eventually traveled to the U.S., but **over 4,000 Class B1s and almost 3,400 Class B2s** did so. **These are individuals who have substantial rates of eventual development of active TB while in the U.S.** As you can see in a study by Nancy Binkin and colleagues published in 1996, those rate estimates were between 3% and 14% for Class B1s and 0.4% to 3.8% for Class B2s.

If you use these same notification data to calculate similar rates, the indication is that they may be, in some cases, similarly phenomenal. Of the 3,019 B1s who were followed up in 2003, approximately a little over half of those patients had an AFB smear reported to CDC.

On the basis of those who had an interpretable smear result, either positive or negative, rates of 3,700 and 2,800 per 100,000 can be estimated for persons who are Class B1 and Class B2 at entry. So, **there's a very significant reservoir of soon to be active TB**

occurring simply in the immigrants and refugees who are crossing the border each year.

There's a substantial period of time involved in addressing TB control issues associated with these individuals as well. On the next slide we show the median time intervals for migrants with suspect TB and subsequent AFB positive smears. **A period of almost half a year passes between the time of the overseas exam when they are smear negative and the time of the U.S. exam when they're found to be smear positive.**

Current challenges and opportunities then include efforts to increase quality assurance of the overseas TB screenings, some limitations in the current screening algorithm related both to sensitivity and specificity of the algorithm, as well as limitations in the nature of the diagnostic tools we have available and the local resources.

Timely stateside notification continues to be a challenge and is being addressed through the phased implementation of an electronic notification service and finally, expansion of the scope in underlying objectives of these screening activities, to include others in the large group of migrants entering the U.S.

Current TB Management Projects in the Foreign Born Population

Tracking and Referral: The Bi-National Health Card

I'd like now to move to two examples of TB in the foreign born that are relative to the national effort to eliminate TB. The first involves the ***U.S. Mexico by National Tuberculosis Referral and Case Management Project***. The United States border with Mexico includes four U.S. states and six Mexican states. That border is approximately two miles long and those ten states house a population of approximately 9 million persons. Over a million border crossings occur each day.

In 2003, approximately 2,050 U.S. TB cases involved persons whose place of birth was Mexico. Seventy percent of that total is reported from the four U.S. border states shown here:

- California
- Arizona
- New Mexico
- Texas.

Consequently, the Division and CDC have thought it quite appropriate to work to improve tuberculosis prevention and control in that area. Goals of the bi-national project include:

- insuring continuity of care and completion of therapy in persons reported with TB from Mexico who enter the U.S.
- reducing TB incidence and preventing drug resistance in such individuals
- coordinating referral of patients between the two national health systems
- potentially providing a model for management of other similar diseases across the U.S./Mexico border.

A key element in this process has been the development of a **bi-national health card** which includes (pictured on the next slide):

- a unique identification number
- a location where the card was issued
- a treatment initiation date

- a date of the last dose of TB treatment
- indication of what regimen was used and whether or not this was given by directly observed therapy
- a toll free telephone numbers to be used both in the U.S. and in Mexico

Patients eligible to receive the card (including in the U.S.) are persons who are Mexican born and/or Mexico bound with active tuberculosis diagnosed, as well as persons with suspect TB who are being held in U.S. Immigration and Customs Enforcement detention centers. Mexican citizens with active TB along the Border States are also eligible to receive the bi-national card and services through that project.

A number of pilot sites have initiated work with the bi-national card as part of this project; they're shown on the next slide. The expectation is that data will flow from the TB provider within the U.S. as the patient moves through a referral system; then it will follow the patient on the U.S. side and transfer across the border into a referral system that will register the patient and notify providers in an appropriate location -- and importantly -- provide final outcome of therapy to providers on both the U.S. and Mexico side of the border. **As of the end of 2004, approximately 488 cards had been distributed from U.S. pilot sites and about 703 from pilot sites in Mexico.**

The project involves a huge and significant number of partners, which are listed on the next slide, and include the many state and local and federal agencies that you would expect might be involved in such an effort. The project responds to the identified TB needs in the region, and it has become an integral part of TB management in the Customs and Immigration and Customs Enforcement Detention Centers.

There is, based on the number and enthusiasm of the individual partners, strong political commitment at all levels and the project represents a potential model for consensus for bi-national collaboration.
We hope it will lead to improved treatment outcomes; however it faces a number of challenges:

- the flow of information regarding notifications and referrals
- management of the database
- obtain the treatment outcome status of patients who've moved continues to be difficult
- budgetary needs are substantial and uncertain at this point, in part due to the substantial budget cuts that CDC has realized over the past several years. The bi-national project's funding here in the Division remains a bit uncertain at this time.

Drug Sensitivity and Multiple Drug Resistance in Thailand Refugees
The second example I wanted to cite involves drug sensitive and multi-drug resistant tuberculosis occurring among U.S. bound Hmong refugees. This is an outbreak, which has achieved some publicity over the past several months and is a good illustration of the challenges that confront us in seeking to control TB in the many diverse foreign born populations.

Hmong refugees in Thailand are a group of mountain dwellers from Vietnam and Laos who were historically persecuted. They fled from Laos to Thailand over 20 years ago and the first wave of U.S. resettlement began over ten years ago.

In 2004, these refugees were targeted for urgent resettlement in the U.S., including the 15,000 refugees in the Wat Tham Krabok camp, about half of whom were less than 15 years

of age. High TB rates were anticipated and an effort to enhance TB diagnosis and treatment was undertaken.

As you can see on the next slide, overseas TB screening began in 2004. Enhanced screening was implemented beginning in July 2005, but in the period between June 2004 and January of 2005, four cases of multiple drug resistant TB were reported overseas and six active TB cases --including two MDR cases -- were reported among Hmong who had already arrived in the United States. This led to an effort to better define the problem. Movement was temporarily halted as additional overseas data were gathered, and enhanced screening and treatment efforts were undertaken.

Of the total population of 15,645 about 52% were under the age of 15 and 48% over age 15. As of early February, about 9,500 had already arrived in the U.S. and slightly over 6,000 remained in Thailand. The majority of the 7,499 adults underwent an initial overseas screening, with 351 being cultured, 56 of those cultures positive, including 17 with MDR TB.

In Thailand, as of early February, at least 247 active cases had been identified. Of these, 175 were already on treatment. This led to estimates of active disease and MDR of 3,294 per 100,000 and 227 per 100,000, based on the numbers cited.

Hmong arrived in the United States and went predominantly to five states:

- Minnesota
- California
- Wisconsin
- Michigan
- North Carolina,

with a small number being resettled in 22 other states.

Efforts to control the outbreak amongst the Hmong have focused on these five states. Over the 12-month period from March 2004 to February 2005, approximately 16 new active cases have been identified in Thailand. There were 311 Class B1s identified in Thailand and 74 B1s who had already arrived in the United States, as well as 97 B2s in Thailand and 87 B2s in the United States, individuals with suspected inactive tuberculosis.

As of April 7th of this year, **a total of 36 verified TB cases in Hmong refugees had been reported from four states**:

- 29 from California
- 5 from Wisconsin
- 1 from Minnesota
- 1 from Ohio

At least four of these were MDR TB. Twenty-one of the 36 cases occurred in adults of whom eight had an overseas TB classification. Thus, the majority of cases actually arrived in the U.S. without a TB classification. And 15 of the total 36 cases occurred in children under the age of 15 who wouldn't have been screened under the current algorithm.

The risk of TB after infection is quite high in the first year and declines markedly over subsequent years. Thus with substantial transmission potentially occurring in the refugee camps in Thailand, it's not surprising that very high rates of TB occur quite rapidly in the refugees arriving in the U.S.

Finally, data from the National TB Genotyping and Surveillance Network over the years 1996 to 2000 demonstrated, as shown in this table, that clustering of genotypes, which is

thought to indicate recent transmission of tuberculosis, is particularly present among U.S. born individuals, but is not notable among foreign born being in the same locality.

However, data such as those coming from the Hmong outbreak, suggest that our approach to the issue of clustering in the foreign born may require modification, and it may not be adequate to simply consider clustering within the geographic area in which individuals are being diagnosed. It may be important to begin to focus our efforts on some of the refugee camps from which individuals are arriving.

Conclusion

In summary, then, the future burden of TB in the United States will be increasingly driven by patterns in immigration, while other factors that will affect future TB burden include TB among the hard to reach, the poor and the disenfranchised.

I'd like to note that much of the information I presented was put together with the assistance of Kenneth Castro, our Division Director, Michael Iademarco, our Divisional Associate Director for Science, Thomas Navin from our Surveillance Epidemiology and Outbreak Investigation Branch; Kayla Laserson from our International Program and Research Branch; Susan Maloney from NCID's Division of Global Migration and Quarantine; and Zachary Taylor and Philip Lobue from our Field Services and Evaluation Branch.

Part II: Q & A with Dr. Vernon

Q: For over a decade, the proportion of tuberculosis cases in foreign born persons in United States was much bigger than in the U.S. population. What do you think should be done to overcome this problem? Do you think we neglect education among refugee populations, especially education about LTBI? What do you think about starting TB treatment overseas in refugee camps?

A: Those are good questions and they are three separate issues. The general question, what we should do about TB in the foreign born, I think that part of our effort is focused on trying to better define those foreign born populations in the U.S. who are at highest risk of development of tuberculosis. Obviously, recent arrivals have a very high rate of development of active disease, and so efforts have focused on those populations in particular.

The bi-national project is an example of a project to address the single largest group of foreign born in the United States, who contribute to the domestic tuberculosis issue. But obviously, TB in the foreign born is not likely to be eliminated from the United States without substantial efforts to better control TB globally.

Consequently, the Division has placed a high priority on efforts to assist in the strengthening of local and of national TB programs across the globe, focusing particularly on partnerships with those nations whose citizens frequently migrate to the United States. So, our focus, for example, has been particularly on the countries of Mexico, Philippines, Vietnam, etc. and we have very active projects working with the national TB programs in those and a number of other countries.

The issue of treatment of latent TB infection is a challenging one on many levels. That is an approach that is widely used in the United States. We are one of the few countries in the

world that practices the wide use of preventive therapy; and it is in part the reason that we have achieved the very low rates of tuberculosis domestically that we enjoy. However, the drugs are certainly suboptimal. The minimum course of therapy is six months and the preferred course is nine months with isoniazid while rifampin treatment takes about four months. There are potentially slightly shorter regimens that might be utilized.

Our TB Trials Consortium is currently investigating the efficacy of a 12-dose, three-month once weekly regimen, based on isoniazid and rifapentine. It is hoped that with the half a dozen or so promising new compounds that are currently about to enter clinical trials, that we will have one or more new agents that might be used in an even shorter course of preventive therapy, which would greatly facilitate therapy.

Finally, with regard to the issue of engagement with refugee camps, I think this is an issue which is increasingly gaining our attention since the high rates of TB occurring in recent immigrants suggests the likelihood that transmission has occurred fairly recently. So there's good reason to focus on strengthening TB control in refugee camps.

Now, that's easy to say and hard to do. Those are usually isolated settings that are difficult to work in, often times dangerous, and so strengthening of TB control in these settings is a particular challenge, but one in which the Division is interested as well.

Q: A study three years ago showed that the TB cases among refugees are much greater than among other immigrants, even though refugees go through all those screenings before and after they came to country. Can you comment on that?

A: I'm not familiar with the particular study you're citing, so I couldn't speak to it specifically. I think that many of the circumstances that I just discussed would potentially contribute to a higher rate in that setting; although, it really depends on the circumstances of the individual migrant group. So, I'd be reluctant to generalize without seeing more data.

Q: What can public information and health educators do to assist on this issue?

A: The specific activities that would be important on the part of health educators and other public agencies concerned with educating the public really depend on the particular local circumstances and communities with which they're engaged.

My advice to groups interested in becoming involved in these areas would be to initiate discussions with your local and state TB control programs, which will be most familiar with the particular challenges they are facing. The type of challenge, the languages involved, the issues of stigma, the issues of illegal versus legal migration etc. all result in relatively different optimal approaches in different settings. Overall, though, I think that all of our foreign born communities have need for clear and accurate information, and so there's a great need to educate individuals.

There's also a great need to assist in the case management of individuals who manage to access the healthcare system here in one way or another. A particular challenge at that stage is represented by on the one hand, culture specific issues, language challenges, concerns about stigma, etc.; but also by the panoply of challenges that all our TB patients face, whether being treated for latent infection or TB disease.

A recent series of ethnographic studies conducted by the Division among half a dozen different foreign born populations in four different locations across the U.S. have one clear

theme. That theme is that foreign born patients face all of the same challenges as domestic patients, in addition to the challenges that arise uniquely from their specific national and cultural circumstances. So the challenges of inadequate reimbursement for healthcare, of transportation to clinic, of missed time from work, these kinds of challenges are as real for the foreign born as for others and they're important to address as well.

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