We jest of course, so don’t scurry for your copy of ‘Mandel’s,’ but have a look at the graph. Nationally and in Oregon, cases of tuberculosis disease (TB) among the U.S.-born have declined significantly over the past few years. In 2008, only 17 cases of TB occurred among Oregonians born in the U.S. — the remainder, 58 cases (77% of all cases) occurred among the foreign-born. We interviewed foreign-born cases reported during 2008 and reviewed their case notes to identify unique risk factors and missed opportunities for prevention. Overall, 21 of the 58 people born abroad and diagnosed with TB in Oregon in 2008 were interviewed in-person.

REFRESHER

Most people exposed to Mycobacterium tuberculosis develop an asymptomatic latent TB infection (LTBI) for short. Of these, 5%–10% develop TB disease during their lifetimes. The World Health Organization estimates that an astonishing one third of the world’s population is infected with LTBI.¹ The prevalence in the United States is much lower, closer to 5%.²

Treatment with prophylactic antibiotics, often a 9-month process, is about 85% effective in preventing progression to active disease if completed as prescribed.³

DEMOGRAPHICS

Foreign-born TB cases reported in Oregon during 2008 averaged 46 years of age; 57% were male. They came from 17 different countries of origin, the largest single contributor being Mexico (17 cases). Interviewed cases were disadvantaged compared to most Oregonians. Fewer than half graduated from high school and a third did not reach that level. More than a third had median annual household incomes less than $20,000, and 70% rated their own English level as “poor” or “none” (N.B. these interviews were conducted in Spanish and a variety of other languages). Average household size was five. In short, obstacles to successful treatment of TB disease or LTBI abound.

OPPORTUNITIES FOR PREVENTION

Our forebears would have rejoiced at the day when 75 cases comprised a year’s worth of TB in Oregon. Nevertheless, protracted treatment regimens, steeply declining budgets, communication difficulties, requirements for directly observed therapy, and occasional drug resistance burden state and local public health agencies. We can't offer a definitive solution to the challenge of reducing future cases among foreign born. But, we did learn a few things. Unfortunately, one is how difficult it might be to try to drive this case rate even lower.

Studies have shown that when tuberculosis disease develops in a foreign-born person living in the United States, the usual scenario is that the affected person was exposed to tuberculosis in their home country, developed a latent infection, and then progressed to active disease after immigrating to the U.S.⁴ In fact, immigrants are at the most risk of developing active tuberculosis within the first 5 years of their arrival to the U.S.⁵ Thus, the Centers for Disease Control and Prevention (CDC) recommend immigrants who arrived within the previous five years should be screened for LTBI. However, more than 37 million foreign-born people reside in the U.S. This group comprises a very large and often inaccessible pool of people to screen and treat to prevent the emergence of TB disease in about 5%–10%. Prophylactic antibiotics reduce that number by 85% but only for those patients who are compliant with the full course of treatment. In short, screening for and treating LTBI is an inefficient tool with which to prevent cases of TB. However, this is what we have.

Participants in our study developed tuberculosis disease over a wide range of elapsed time in relation to their arrival in the United States: 36% developed disease within the aforementioned 5-year window, and the remainder developed disease after longer periods, up to decades after their arrival in the U.S. One question that comes up is whether those who develop disease after such a long period of U.S. residency might have been exposed more recently via a recent return visit to their motherland or by a visit from a relative or friend from abroad. Indeed, we did find a higher

Figure. Tuberculosis cases in Oregon, 1993–2008

* www.who.int/mediacentre/factsheets/fs104/en/
percentage of those with late onset
disease had traveled abroad within the
last two years, compared to those who
developed TB within five years of their
initial arrival in the U.S. (5/16 [31%]
and 1/5 [20%], respectively). However
with the small sample size, this did
not reach statistical significance.

SCREENING OPPORTUNITIES

We also looked at whether partici-
pants had any formal indications for
screening by skin test or interferon
gamma release assay (such as Quan-
tiFERON®) per CDC guidelines6 prior
to their diagnosis. This includes things
like a history of diabetes or immuno-
suppression, working in healthcare,
staying in a homeless shelter, etc.
Twelve of the 21 had at least one for-
mal indication to be screened, but only
5 of 21 had actually been screened.

When a foreign national applies
for asylum or seeks to permanently
immigrate to the U.S., he or she is
required to have a chest x-ray and a
health exam to screen for tuberculo-
sis disease, but (with the exception
of children) testing for latent disease
is not required. The prevalence of
LTBI abroad is simply too high to be
addressed in this manner. Applicants
for temporary or student visas and
undocumented immigrants receive no
TB screening at all. Eight of 20 of the
foreign-born cases interviewed for this
project who disclosed their immigra-
tion status were undocumented. Those
who became permanent U.S. residents
through official channels did report
getting a chest x-ray as required. Seven
of the study participants had become
U.S. citizens since their arrival in the
U.S. and reported no medical testing as
part of this process. There is no formal
requirement for any type of medical
screening as part of attaining citizenship.

PREVENTION, ARE THERE COST-
eFFECTIVE OPTIONS?

One might notice, as we did, the
frequency of missed screening op-
opportunities among foreign-born
people with TB disease and conclude
that stricter adherence to screening
guidelines would be an easy way to
lower the number of cases in Oregon.
Unfortunately, these cases of active
disease are drawn from a large at-risk
population. The economic reality is
stark when it comes to the screening
and treating large numbers of people
with LTBI when only a minority of
them would go on to develop disease.

A study published in the New England
Journal of Medicine examined different
cost-effectiveness scenarios to reduce
the incidence of TB in the U.S. looking
at immigrants from Mexico specifically.7 One strategy entailed screening for
LTBI in all arrivals from Mexico. The
authors estimated that this approach
would cost $329 million dollars and
prevent an estimated 400 cases of TB
among persons born abroad, who are at highest risk for the disease.

Creative, population-based and
perhaps ‘out-of-the-box’ thinking are
necessary; no simple answers
emerge to the question of the best
use of public health resources to
reduce TB below its current level.
Some ideas might be to target
screenings to those with multiple
indications, and to increase
education and outreach among
foreign-born populations. A soon-
to-be released study is rumored to
demonstrate effectiveness of a
3-month, once-a-week regimen
for treatment of LTBI. Cheap and
effective shorter course LTBI treat-
ment would likely help a lot. There
are probably other good ideas out
there. Thoughts, anyone?

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