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Latent tuberculous infection in the United States and Canada: who completes treatment and why?

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SUMMARY

OBJECTIVES—To assess latent tuberculous infection (LTBI) treatment completion rates in a large prospective US/Canada multisite cohort and identify associated risk factors.

METHODS—This prospective cohort study assessed factors associated with LTBI treatment completion through interviews with persons who initiated treatment at 12 sites. Interviews were conducted at treatment initiation and completion/cessation. Participants received usual care according to each clinic's procedure. Multivariable models were constructed based on stepwise assessment of potential predictors and interactions.

RESULTS—Of 1515 participants initiating LTBI treatment, 1323 had information available on treatment completion; 617 (46.6%) completed treatment. Baseline predictors of completion included male sex, foreign birth, not thinking it would be a problem to take anti-tuberculosis medication, and having health insurance. Participants in stable housing who received monthly appointment reminders were more likely to complete treatment than those without stable housing or without monthly reminders. End-of-treatment predictors of non-completion included severe symptoms and the inconvenience of clinic/pharmacy schedules, barriers to care and changes of residence. Common reasons for treatment non-completion were patient concerns about tolerability/toxicity, appointment conflicts, low prioritization of TB, and forgetfulness.

CONCLUSIONS—Less than half of treatment initiators completed treatment in our multisite study. Addressing tangible issues such as not having health insurance, toxicity concerns, and clinic accessibility could help to improve treatment completion rates.

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Keywords

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AN ESTIMATED 9–14 million persons in the United States have latent tuberculous infection (LTBI) and are therefore at risk for progression to active tuberculosis (TB) disease.[1] With declining numbers of active TB cases in the United States and Canada, TB prevention and care programs increasingly focus on identifying and treating LTBI as key to eliminating TB in these countries.[2,3] Approximately 300 000 individuals are treated for LTBI in the United States annually.[4] While the Centers for Disease Control and Prevention (CDC) have set a target of 79% completion by 2015,[5] actual LTBI treatment completion rates in the United States and Canada are generally reported to range from 20% to 65% for a 6-month course of self-administered treatment, although a few smaller studies have shown higher completion rates.[6] A large retrospective multisite study recently reported completion rates for the standard 9-month isoniazid (INH) regimen ranging from 30% to 60%.[7]

To move towards TB elimination, TB control efforts in the United States and Canada should focus efforts on improving completion of LTBI treatment. Understanding barriers to and factors associated with the completion of LTBI treatment will facilitate the development of effective, appropriate interventions.

We conducted a large-scale prospective study, guided by a socio-ecological framework,[8] of individuals offered LTBI treatment in 30 clinics associated with 12 sites (11 US and one Canadian) of the Tuberculosis Epidemiologic Studies Consortium (TBESC),[9] funded by the CDC. This is the third report on the results of this study. Earlier work reported on acceptance of LTBI treatment[10] and treatment discontinuation due to adverse events.[11] In this analysis, we assess LTBI treatment completion rates and identify risk factors associated with completion/non-completion of LTBI treatment.

MATERIALS AND METHODS

Design, setting, and sample

From March 2007 to September 2008, persons eligible for LTBI treatment according to current CDC guidelines on the tuberculin skin test (TST)[5] at participating clinics were referred by providers to research staff. More details on study design are provided in Colson et al.[10] and are not repeated here.

The study was approved by the institutional review boards (IRB) of the CDC and the oversight committees of jurisdictional entities and study sites. All participants provided written informed consent and received usual care according to the standard operating procedures of the clinics.

Definitions

Study definition of treatment completion was based on specified number of doses completed within a specified time period for each regimen.[2] See Pettit et al. for further details.[11]

Measures

Data were collected through in-person interviews administered by trained study staff when participants initiated treatment (baseline) and completed/defaulted from treatment (exit), abstraction of data from participants' medical charts, and clinic surveys. See Colson et al.[10] and Pettit et al.[11] for further details on in-person interviews and chart abstraction. At each site, the study coordinator and clinic director determined who would complete the clinic survey, in which information was collected on clinic population, procedures, and services. All data collection instruments underwent pilot testing.

Analysis

A knowledge score was constructed by calculating the mean of correct answers to knowledge items. Assessment of problematic drug/alcohol use was based on reported symptoms of addiction and use of rehabilitation services. A barriers-to-care scale was calculated from eight possible concerns. Acculturation scores were divided into three equal-sized groups. Student's *t*-test was used for continuous variables and χ^2 or Fisher's exact test for categorical variables. The Holm-Bonferroni approach was used to adjust for multiple comparisons, with the procedure being applied separately to baseline and exit data to assess the significance.[12] Irrespective of the Holm-Bonferroni criteria, variables with $P < 0.10$ and variables hypothesized a priori to be predictors were candidates for multivariable models. The Holm-Bonferroni method was applied separately to each model to assess significance of model coefficients. Hierarchical models were used to adjust for clustering by clinic; potential predictors were selected for multivariable models using stepwise selection methods. Significant interactions were identified using stepwise selection. Two models were created: one predicting baseline characteristics associated with treatment completion, including clinic characteristics, using binomial regression; and a second to assess factors associated with treatment completion at end of treatment. All statistical analyses were performed using SAS version 9.2 (Statistical Analysis System, Cary, NC, USA).

RESULTS

Study participants and clinics

Each of the 12 TBESC sites was associated with one to five public health clinics that enrolled study participants; enrollment into the larger study is discussed in Colson et al.[10] This analysis follows the 1515 enrollees who accepted LTBI treatment (see Colson et al. for an analysis of LTBI treatment acceptance[10]); of this group, the clinic charts of 192 participants could not be located, resulting in 1323 participants with evaluable outcomes and therefore eligible for the completion analysis. The 192 participants lacking chart information were concentrated in two clinics. According to data from the baseline interview, participants with missing charts differed from participants with evaluable outcomes as regards sex (more females for missing charts), income (lower income), inconvenience in getting to clinic (fewer with no inconvenience), and stopping medications if feeling sick (fewer would stop).

The majority of the participants were women, and the mean age was 37.2 years (Table 1). Hispanics comprised 31.2% of the sample, Asians 28.9%, and non-Hispanic Blacks 24.5%. Approximately three quarters were born outside the United States and Canada.

Treatment completion rates

Of the 1323 treatment acceptors with evaluable outcomes, 617 (46.6%) completed INH treatment; the median completion rate among clinics was 48.4% (interquartile range 35.0–59.0). Of 1279 study participants who were prescribed 9 months of INH, 595 (46.5%) completed treatment. An additional 44 were prescribed 6 months of INH, and 22 (50.0%) completed treatment (Figure). Sixty-two (4.7%) participants had a regimen change to 4 months of rifampin (RMP) during treatment, two were transferred to directly observed therapy for LTBI, and two developed active TB. These 66 participants were classified as non-completers of self-administered INH treatment. Of the 62 participants who were switched to 4 months of RMP, 47 (75.8%) completed treatment.

Baseline predictors of treatment completion

As shown in Table 1, treatment completion rates were strongly associated with race/ethnicity (highest for Asians), health insurance (lower for those without), acculturation (lowest for US- and Canada-born), drug use (lower for those with past or present drug problems), apprehension about medications (‘would stop meds if I feel sick’), the original reason for testing (lowest for living situation, highest for visa status/regular check-up), whether clinics provided appointment reminders (higher when appointments provided), and whether clinics had social workers on site (lower when on site). None of the remaining variables in Table 1 met the Holm-Bonferroni criterion for significance.

In multivariable analysis, male sex (adjusted risk ratio [aRR] 1.19, 95% confidence interval [CI] 1.08–1.31), foreign birth (aRR 1.19, 95%CI 1.07–1.33), and having health insurance (aRR 1.24, 95%CI 1.08–1.42) were independent predictors of treatment completion; thinking it would be a problem to take TB medication (aRR 0.68, 95%CI 0.50–0.92) was a predictor of treatment non-completion (Table 2). There was a significant interaction between housing and appointment reminders: participants in stable housing who received monthly appointment reminders were more likely to complete than those without stable housing or those not receiving reminders (aRR 1.80, 95%CI 1.24–2.61). Knowing that TB is transmitted through the air did not meet the Holm-Bonferroni criterion for significance as predictors of non-completion. Other predictors significant on univariate analysis were not significant on multivariable analysis. In particular, the availability of social workers was not significant as an independent predictor in the multivariable analysis. Clinics with social workers available either part or all of the time served fewer persons who were foreign-born (59.4% vs. 73.3% overall) and populations with less health insurance coverage (55.9% vs. 59.8% overall), both factors that are represented in the model. The original reason for testing was not significant in the multivariable model.

Factors associated with completion at end of treatment

Of the 1323 participants with evaluable outcomes, 939 returned for an exit interview (Table 3). Completion rates were lower for participants who moved frequently during treatment (P=0.0012), who lost their jobs during treatment (P=0.0053), who found the clinic schedule ‘very inconvenient’ (P=0.0007), or who found getting medications ‘very inconvenient’ (P < 0.0001). Experiencing severe symptoms strongly predicted non-completion, as only 9.3% of those reporting severe symptoms completed treatment (P < 0.0001) vs. 62.9% for those with

non-severe symptoms and 69.5% for those with no symptoms. Completers had significantly lower scores on the barriers-to-care scale than non-completers (P=0.0001).

Multivariable analysis (Table 4) highlighted severe symptoms and inconvenience of clinic and pharmacy schedules to be most strongly associated with treatment non-completion. Participants who reported severe symptoms were least likely to complete treatment; among those without severe symptoms (i.e., either non-severe or no symptoms), participants who reported major inconveniences with medication/clinic schedules appeared to be less likely to complete than those with minor inconveniences, but both groups were far more likely to complete than those who experienced severe symptoms ($P < 0.0001$). Barriers to care and changes of residence were also associated with non-completion using the Holm-Bonferroni criteria.

Reasons for stopping medications

Among participants who did not complete LTBI treatment, the most frequently reported reasons for stopping were pill-related (52.5%), with 45.8% reporting tolerability and toxicity issues (Table 5). Appointments conflicting with job (6.3%), believing that TB is a low priority (4.6%), and believing that medications are not beneficial (4.67%) were other reported reasons for stopping treatment.

DISCUSSION

Completion of LTBI treatment benefits both the treated individual and society in general by preventing cases of active, infectious TB disease. Understanding factors associated with treatment completion and developing interventions to support treatment completion are therefore critical to public health policy.[13,14] This study was guided by a socio-ecological framework, which is based on the premise that multiple levels—individual, interpersonal, organizational and community—influence human behavior in different ways and to different degrees.[8] While not a nationally representative sample, this is a large prospective multisite cohort study, including 12 sites and 30 clinics. This represents an advance over the single-site retrospective studies found in the literature. Furthermore, our study represents a substantial contribution to the literature on LTBI, as it is the first time a comprehensive approach was taken to gather and analyze information on LTBI treatment regarding provider-patient communication, clinic characteristics, and community norms, in addition to individual patient behavior and cognition in general clinic populations.

Less than half of those who initiated self-administered INH in this study completed treatment, in line with other studies.[6,7] Moreover, if one looks at treatment completion among those who were prescribed INH, including the 247 who declined LTBI treatment,[10] the completion rate drops to 39% (617/1570). In contrast to Shieh et al.,[15] we found a number of significant associations between completion and demographic or socio-economic characteristics, possibly because of the larger study sample size. At baseline, male sex, foreign birth, and health insurance were strongly associated with completion, while drug use and concern about side effects (‘would stop meds if feel sick’) were strongly associated with non-completion. Previous studies examining sex differences have found contradictory results;[6] our result reinforces an earlier report that females in LTBI treatment were more

likely to discontinue due to adverse effects.[11] In unadjusted analysis, both Asian race and lower acculturation were associated with higher completion rates; in multivariable analysis, foreign birth represents these factors. An earlier report from this study reported higher acceptance rates for persons with lower acculturation.[10] Health insurance was strongly associated with higher completion in both crude and adjusted analyses. Importantly, participants in stable housing who attended clinics that sent appointment reminders were more likely to complete treatment than those without stable housing or those treated at clinics that did not send reminders. Completion rates were substantially lower among subjects who reported drug problems; while this group represents a small proportion of the study population (7.3%), drug use could be a greater factor in some clinic settings.

A separate model reflecting participants' experiences while on treatment shows that not experiencing severe symptoms, having minimal barriers to care, convenient clinic schedules, and not moving during treatment were all independently associated with increased treatment completion. An earlier study[10] reported that convenience of clinic schedules also affected the likelihood of accepting LTBI treatment.

Our study had some limitations. Only one Canadian clinic participated in the study, limiting the representation of that region. Most data were collected through face-to-face interviews, and self-reporting of some items (e.g., drug/alcohol use) may have been subject to social desirability bias. We were also unable to assess outcomes on some participants due to missing medical charts; demographic and attitudinal differences identified between these participants and those with evaluable outcomes were included as covariates in the predictive models. Outcomes could not be determined for a substantial number of participants (n = 192, 14.5%), as their medical charts could not be located; as there were more females among those missing charts than those with charts, and as females were less likely to complete treatment, it is possible that our estimated completion rate would have been even lower had we been able to locate all the charts. Only 71% of those interviewed at baseline were available for the exit interview. Finally, while we collected reasons for individuals who refused participation to study staff, we could not do so for individuals who declined to speak to clinic staff. Clinic participation was dependent on caseload (i.e., large enough caseload to meet target sample sizes) and willingness of clinic staff to participate. As in all clinic-based studies, there is the potential for bias in clinic selection. While we found an association between appointment reminders and treatment completion, the number of clinics not providing reminders was small (3 of 30 participating clinics).

CONCLUSIONS

Our study indicates that completion of LTBI treatment is actually higher among foreign than US- and Canada-born persons. Our results also suggest the importance of targeting drug users for special outreach efforts to support treatment completion. It is also vital to improve the management of side effects; prior to beginning treatment, apprehension about medications ('would stop meds if I feel sick') was an important predictor of non-completion, while experiencing symptoms during treatment was strongly associated with non-completion at study exit. TB clinics should provide appointment reminders and maintain schedules that accommodate patients' needs. The cost of TB/LTBI care should not be an impediment;

patients should be made aware that they will not be charged if they are unable to pay. Finally, efforts should be made to improve communication and coordination across clinics to facilitate completion of LTBI treatment for patients when they move.

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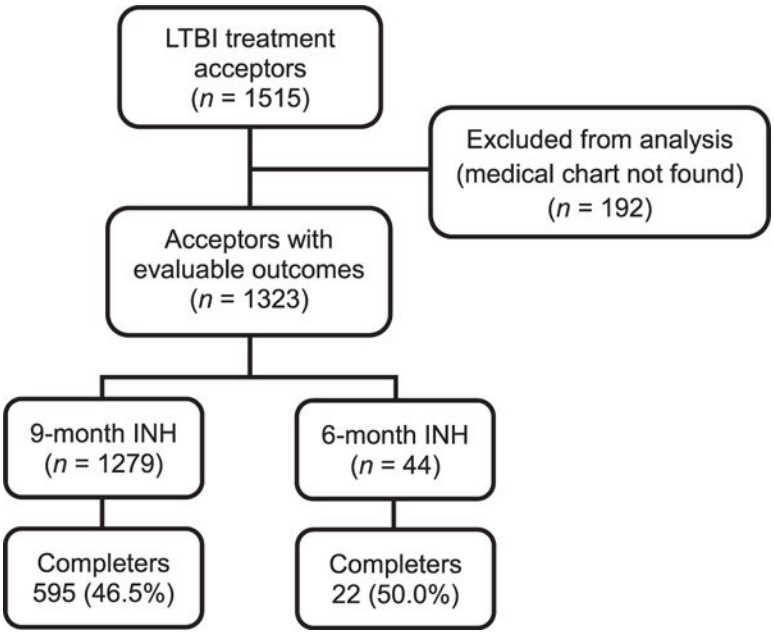

Figure.
Participant flow. LTBI = latent tuberculous infection; INH = isoniazid.

Table 1

Baseline characteristics of LTBI treatment completers and non-completers*

	Overall *n* (%)	Completers *n* (%)	Non-completers *n* (%)	*P* value†
Total	1323 (100.0)	618 (46.7)	705 (53.3)	
Demographic characteristics				
Sex				0.0065
Male	609 (46.0)	309 (50.7)	300 (49.3)	
Female	714 (54.0)	309 (43.3)	405 (56.7)	
Age, years				0.2191
18–24	243 (18.4	100 (41.2)	143 (58.8	
25–44	697 (52.7	340 (48.8)	357 (51.2)	
45–64	343 (26.0)	160 (46.6)	183 (53.4)	
⩾65	39 (3.0)	17 (43.6)	22 (56.4)	
Race/ethnicity				0.0017‡
Hispanic	413 (31.2)	180 (43.6)	233 (56.4)	
Asian	382 (28.9)	212 (55.5)	170 (44.5)	
Black non-Hispanic	324 (24.5)	142 (43.8	182 (56.2)	
White non-Hispanic	126 (9.5)	53 (42.1)	73 (57.9)	
Multiple/unknown	52 (3.9)	24 (46.2)	28 (53.8)	
Native Hawaiian/Pacific Islander	26 (2.0)	7 (26.9)	19 (73.1)	
Reason for testing				0.0086
Non-TB medical condition	28 (2.2)	12 (42.9)	16 (57.1)	
Possible exposure to someone with TB	129 (9.9)	62 (48.1)	67 (51.9)	
Pregnancy or childbirth	99 (7.6)	45 (45.5)	54 (54.5)	
Employment, insurance, school	431 (33.2)	188 (43.6	243 (56.4)	
Living situation (nursing home, homeless shelter, jail, etc.)	51 (3.9	15 (29.4)	36 (70.6)	
Regular check-up	114 (8.8)	57 (50.0)	57 (50.0)	
Referred by another doctor/HCW	62 (4.8)	35 (56.5)	27 (43.5)	
To obtain or change visa status	229 (17.6)	128 (55.9)	101 (44.1)	
Other	157 (12.1)	65 (41.4)	92 (58.6)	
HCW				0.5156
Yes	90 (6.8)	39 (43.3)	51 (56.7)	
No	1233 (93.2)	579 (47.0)	654 (53.0)	
Health insurance				0.0011‡
Yes	781 (59.8)	396 (50.7)	385 (49.3)	
No	526 (40.2)	217 (41.3)	309 (58.7)	
Currently homeless				0.0041
Yes	41 (3.1)	10 (24.4)	31 (75.6)	
No	1279 (96.9)	605 (47.3)	674 (52.7)	
Foreign-born				0.0026
Yes	970 (73.3)	478 (49.3)	492 (50.7)	

	Overall *n* (%)	Completers *n* (%)	Non-completers *n* (%)	*P* value[†]
No	353 (26.7)	140 (39.7)	213 (60.3)	
Acculturation				0.0021[‡]
Low	364 (27.6)	189 (51.9)	175 (48.1)	
Moderate	280 (21.3)	124 (44.3)	156 (55.7)	
High	320 (24.3)	163 (50.9)	157 (49.1)	
US- and Canada-born	353 (26.8)	140 (39.7)	213 (60.3)	
LTBI history				
Received BCG				0.3640
Yes	709 (53.6)	333 (47.0)	376 (53.0)	
No	456 (34.5)	204 (44.7)	252 (55.3)	
Don’t know	158 (11.9)	81 (51.3)	77 (48.7)	
Contact with TB case				0.9548
Yes	130 (9.8)	60 (46.2)	70 (53.8)	
No/unknown	1193 (90.2)	558 (46.8)	635 (53.2)	
Current alcohol use				0.0191
Yes	444 (33.6)	187 (42.1)	257 (57.9)	
No	879 (66.4	431 (49.0)	448 (51.0)	
Drug use				<0.0001[‡]
Current problem	62 (4.7)	15 (24.2)	47 (75.8)	
Prior problem	35 (2.7)	8 (22.9)	27 (77.1)	
No history of problem	169 (12.8)	79 (46.7)	90 (53.3)	
Never used	1054 (79.9)	515 (48.9	539 (51.1	
How inconvenient was getting to the clinic today?				0.0142
Not inconvenient	832 (63.0)	410 (49.3)	422 (50.7)	
A little inconvenient	370 (28.0)	164 (44.3	206 (55.7)	
Very inconvenient	119 (9.0)	43 (36.1)	76 (63.9)	
How inconvenient was the clinic schedule?				0.0199
Not inconvenient	983 (74.6)	474 (48.2)	509 (51.8)	
A little inconvenient	229 (17.4	89 (38.9)	140 (61.1)	
Very inconvenient	106 (8.0)	55 (51.9)	51 (48.1)	
Knowledge and attitudes				
Would stop medications if feel sick				<0.0001[‡]
Yes	788 (65.6)	333 (42.3)	455 (57.7)	
No	413 (34.4)	224 (54.2)	189 (45.8)	
Would stop medications to use alcohol			0.0037	
Yes	24 (1.8)	6 (25.0)	18 (75.0)	
No	814 (62.1)	363 (44.6)	451 (55.4)	
Does not drink alcohol	472 (36.0)	244 (51.7)	228 (48.3)	
Clinic characteristics				
Clinic routinely provides reminders for follow-up visits				<0.0001[‡]
Yes, to all patients	1004 (76.4)	505 (50.3)	499 (49.7)	

	Overall *n* (%)	Completers *n* (%)	Non-completers *n* (%)	*P* value[†]
Yes, to some patients	215 (16.4)	86 (40.0)	129 (60.0)	
No, to all patients	96 (7.3)	24 (25.0)	72 (75.0)	
Clinic charges for services			0.1234	
Some charges	723 (55.0)	352 (48.7)	371 (51.3)	
No charges	592 (45.0)	263 (44.4)	329 (55.6)	
On-site social worker is available				<0.0001[‡]
Always	106 (8.1)	37 (34.9)	69 (65.1)	
Sometimes	266 (20.2)	102 (38.3	164 (61.7)	
Not available	943 (71.7)	476 (50.5)	467 (49.5)	

[*] Data in this table were presented in a different format and for a slightly different study population in Pettit et al.[11]

[†] *P* values give significance values for χ^2 tests of association between the characteristics shown at left and completion of LTBI treatment.

[‡] *P* values meeting the Holm-Bonferroni significance criterion with $\alpha = 0.05$.

LTBI = latent tuberculous infection; HCW = health care worker; BCG = bacille Calmette-Guérin; TB = tuberculosis.

Table 2

Multivariable regression of baseline predictors of treatment completion

Parameter	Regression coefficient	Standard error	RR (95%CL)	*P* value
Intercept	−1.4831	0.2102	—	<0.0001*
Male sex	0.1714	0.0483	1.187 (1.08–1.31)	0.0004*
Foreign-born	0.1767	0.0569	1.193 (1.07–1.33)	0.0019*
Health insurance	0.2147	0.0702	1.240 (1.08–1.42)	0.0022*
Know that TB is transmitted through air	−0.1729	0.0784	0.841 (0.72–0.98)	0.0275
Think that taking TB meds would be a problem	−0.3927	0.1558	0.675 (0.50–0.92)	0.0118*
Current homelessness/clinic reminders				
Not homeless and clinic sends reminders to all/some patients	0.5868	0.1892	1.798 (1.24–2.61)	0.0019*
Not homeless and clinic sends reminders to no patients	−0.0297	0.2552	0.971 (0.59–1.60)	0.9075
Currently homeless	Reference	—	—	—

**P* values meeting the Holm-Bonferroni significance criterion with $\alpha = 0.05$.

RR = risk ratio; CL = confidence limit; TB = tuberculosis.

Table 3

End-of-study characteristics of treatment completion based on exit interviews

	Completers *n* (%)	Non-completers *n* (%)	*P* value
Total	554	385	
Currently homeless			1.0000
Yes	7 (58.3)	5 (41.7)	
No	547 (59.0)	380 (41.0)	
Number of times moved			0.0012*
0	395 (62.5)	237 (37.5)	
1	121 (56.3)	94 (43.7)	
⩾2	38 (41.8)	53 (58.2)	
Lost job because of tuberculosis			0.0053*
Yes	2 (22.2)	7 (77.8)	
No	499 (62.0)	306 (38.0)	
Not applicable	50 (50.5)	49 (49.5)	
Comfortable with language used by health care provider			0.5817
Yes	544 (58.9)	380 (41.1)	
No	9 (69.2)	4 (30.8)	
How inconvenient was the clinic schedule?			0.0007*
Not inconvenient	382 (61.0)	244 (39.0)	
A little inconvenient	139 (61.0)	89 (39.0)	
Very inconvenient	33 (38.8)	52 (61.2)	
How inconvenient was getting the medications?			<0.0001*
Not inconvenient	437 (61.8)	270 (38.2)	
A little inconvenient	98 (60.5	64 (39.5)	
Very inconvenient	18 (27.3)	48 (72.7)	
Quantity of pills taken†			<0.0001*
All	456 (75.0)	152 (25.0)	
Most	96 (46.2	112 (53.9	
Some/few	2 (2.0)	98 (98.0)	
Symptoms experienced			<0.0001*
Severe symptoms	10 (9.3)	99 (90.7)	
Non-severe symptoms	173 (62.9)	102 (37.1)	
No symptoms	370 (69.5)	162 (30.5)	
Barriers to care, mean ± SD‡	1.40 ± 0.46	1.52 ± 0.49	0.0001*

*P values meeting the Holm-Bonferroni significance criterion with $\alpha = 0.05$.

†Measured by self-report.

‡Including transportation, time off, child care, appointments, waiting time, language, cultural familiarity, running into familiar people; lower score is better.

SD = standard deviation.

Table 4

Multivariable regression of end-of-study characteristics of treatment completion based on exit interviews

Parameter	Regression coefficient	Standard error	OR (95%CL)	*P* value
No severe symptoms experienced				
Big inconvenience in clinic schedule, getting medications, or both	2.0245	0.4114	7.572 (3.38–16.98)	<0.0001*
No/minor inconvenience in clinic schedule, getting medications, or both	3.0179	0.3468	20.449 (10.35–40.39)	<0.0001*
Severe symptoms experienced	Reference	—	—	—
Barriers to care scale (per unit change, from 1 to 3)	−0.4101	0.1652	0.664 (0.48–0.92)	0.0132*
Number of times moved (per move)	−0.2082	0.0912	0.812 (0.68–0.97)	0.0226*

*
P values meeting the Holm-Bonferroni significance criterion with a = 0.05.

OR = odds ratio; CL = confidence limit.

Table 5

Reasons for stopping treatment *

	n (%)†
Economic and structural factors	30 (10.6)
Financial reasons or fears	1 (0.4)
Appointments conflict with job	18 (6.3)
Appointments conflict with family obligations	8 (2.8)
Housing problems/instability	3 (1.1)
Patient attitudes/personal factors	53 (18.7)
TB low priority compared to other things	13 (4.6)
Anti-tuberculosis drugs not beneficial	13 (4.6)
Perceived low risk of getting TB	2 (0.7)
Doesn't understand reason for medication	7 (2.5)
Sick or ill with other illnesses	10 (3.5)
Drug/alcohol abuse	1 (0.4)
Don't believe they have LTBI	7 (2.5)
Pill-related difficulties	149 (52.5)
Can't remember to take pills	16 (5.6)
Don't like taking pills	1 (0.4)
Hard to swallow	2 (0.7)
Tolerability and toxicity issues (side effects, etc.)	130 (45.8)
Patient-provider relationships	16 (5.6)
Negative experience with provider(s) (general)	3 (1.1)
Negative attitude toward LTBI treatment (general)	7 (2.5)
Poor communication with provider(s)	5 (1.8)
Lack of confidence/trust in health care system	1 (0.4)
Pattern of health care delivery	25 (8.8)
Inaccessible clinic location	14 (4.9)
Inconvenient clinic hours	6 (2.1)
Long waiting times	2 (0.7)
Unavailability/inaccessibility of other health or social services	3 (1.1)
Other	72 (25.4)
Total reporting a reason	284 (100)

* Of 989 participants in the analysis data set with an exit DCI, 12 reported never starting their medication and 325 reported stopping their medication prior to completion of treatment; 284 of the latter gave one or more reasons for stopping medication.

† The percentages are based on the numbers shown in the 'total reporting a reason' row. Respondents could report more than one reason for stopping medication, so the 'count' column totals more than the 284 who reported one or more reasons. Similarly, the 'per cent' column totals more than 100%.

TB = tuberculosis; LTBI = latent tuberculous infection; DCI = data collection instrument.