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BRIEF REPORT: Tuberculosis among Incarcerated Hispanic Persons — United States, 1993–2014

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Abstract

Purpose: We sought to describe characteristics of Hispanic persons receiving tuberculosis (TB) diagnoses while incarcerated and to compare their characteristics with those of non-Hispanic incarcerated TB patients.

Methods: We analyzed all verified TB cases among incarcerated persons reported to the National Tuberculosis Surveillance System (NTSS) during 1993–2014. Data were stratified by birth origin and by Hispanic or non-Hispanic ethnicity. We calculated odds ratios to contrast sociodemographic and clinical characteristics between Hispanic and non-Hispanic persons.

Findings: After declines during 1993–2002, the annual proportion of Hispanic TB patients who were incarcerated at diagnosis grew from 4.9% to 8.4% between 2003 and 2014. During 2003–2014, 530 (19%) of the 2,813 incarcerated U.S.-born TB patients were Hispanic, and 2,289 (86%) of the 2,650 foreign-born were Hispanic. Most incarcerated TB patients were men ages 15–44 in local jails, but Hispanic patients had twice the odds of being in federal prisons, and about a third of all foreign-born were in the NTSS facility category that includes U.S. Immigration and Customs Enforcement detention centers. Nearly all the 2,289 Hispanic foreign-born originated from Mexico or Central America, and nearly half received a TB diagnosis within 1 year of arrival. Substance abuse in the year before TB diagnosis was prominent among incarcerated Hispanics.

Conclusion: Foreign birth recent arrival in the United States characterized many of the Hispanic persons who received a TB diagnosis while incarcerated. Incarceration offers an important opportunity for early detection and treatment of TB infection or disease.

Keywords

incarceration; Hispanic; tuberculosis

The United States continues to become more ethnically diverse. Nationally, the Hispanic population in the United States has grown from 4.5% of the overall population in 1970 to 17.4% in 2014.¹ However, the incidence of TB among Hispanic persons has declined by

75%, from 19.9 cases per 100,000 population in 1993 to 5.0 cases per 100,000 population in 2014.² Nonetheless, both the rate of TB and the risk of incarceration are higher among persons of Hispanic ethnicity than among non-Hispanic white persons.^{2,3}

In 2014, approximately 2.3 million persons in the United States were incarcerated,⁴ many in correctional facilities situated in rural communities.^{5–6} In 2007, the proportion of inmates with Hispanic ethnicity in local jails was 16% and in state prisons was 19%, slightly greater than their 13% proportion in the overall population.³ However, the number of Hispanic persons with federal criminal sentences has outstripped overall Hispanic population growth, accounting for half the growth in the total number of federal inmates during 1991–2007.³ By 2007, non-U.S. citizen Hispanics comprised 29% of federal inmates, and U.S. citizen Hispanics comprised another 11%.³

U.S. Immigration and Customs Enforcement (ICE), which is under the U.S. Department of Homeland Security, apprehends > 400,000 persons annually.⁷ Most TB patients in ICE facilities are from Mexico or Central America.⁸ About one third of ICE detainees are housed in ICE facilities, many of which were built in rural communities, with most of the remainder in local jails or state prisons under agreements with ICE.^{7,9}

Despite these national trends, to date no description of TB among incarcerated Hispanic persons, in the context of their increasing incarceration rates, has been made. To guide TB prevention and control strategies in jails, prisons, and ICE facilities, we sought to describe characteristics of Hispanic persons receiving TB diagnoses while incarcerated and to compare their characteristics with those of non-Hispanic incarcerated TB patients.

METHODS

Data source and definitions

The primary data source for this analysis was the National Tuberculosis Surveillance System (NTSS), which receives reports of verified cases of TB from health departments. NTSS collects deidentified demographic, TB risk factor, and clinical information on all TB cases in the United States.^{2,10}

We analyzed NTSS data for all verified TB cases reported during 1993–2014 by the 50 U.S. states and the District of Columbia among persons who were residents of a correctional facility at the time their diagnostic evaluation for TB was initiated. The type of facility is also recorded: local jail, state prison, federal prison, juvenile detention facility, or a category called *other facility type*. The *other facility type* is a broad category that includes not only ICE detention centers but also other incarceration settings such as Indian reservation or military facilities.¹⁰ Additionally, the NTSS records (beginning with cases reported in 2009) whether an incarcerated TB patient was in ICE custody at the time of diagnosis, regardless of the correctly facility type.¹⁰

Analytic approach

For this retrospective cross-sectional analysis of existing NTSS data, we grouped patients into two broad categories based on self-reported ethnicity — Hispanic ethnicity or non-

Hispanic ethnicity — without regard to race (e.g., white, black). Because the epidemiology of TB in the United States differs markedly between the U.S.- and foreign-born,^{2,11–12} we stratified our analysis by these 2 groups. We compared the prevalence of demographic and clinical characteristics, as well as the social risk factors that are routinely reported in the NTSS (ie, homelessness or substance use in the year leading up to TB diagnosis), between Hispanic and non-Hispanic incarcerated TB patients.

We calculated odds ratios and their corresponding 95% confidence intervals for the individual associations of demographic, risk factor, and clinical characteristics with being a Hispanic person who receives a TB diagnosis while incarcerated. We present unadjusted odds ratios because multivariable logistic regression did not change individual odds ratio point estimates > 10%, suggesting adjustment for other characteristics was unnecessary. All analyses were conducted using SAS version 9.3 (SAS Institute, Cary, NC).

Ethics statement

Data for this analysis were collected by local and state health departments as part of routine public health surveillance. This secondary analysis was not considered by the Centers for Disease Control and Prevention to constitute research involving human subjects.

RESULTS

Case inclusion and subsequent focus on 2003–2014

During 1993–2014, a total of 12,847 TB cases among persons who were incarcerated at diagnosis were reported in the United States. The Figure shows how the national proportion of TB cases that occurred in somebody incarcerated at TB diagnosis declined during 1993–2002 for both Hispanic and non-Hispanic populations. However, between 2003 and 2014, the annual proportion of Hispanic TB patients who were incarcerated at diagnosis grew from 4.9% to 8.4%, while the corresponding proportion among non-Hispanic TB patients continued to decline. Because of this trend, and preliminary analysis demonstrating no notable differences during 1993–2002 between Hispanic and non-Hispanic incarcerated TB patients (data not shown), we focused our subsequent analyses on the TB cases reported among incarcerated persons during 2003–2014.

A total of 5,502 TB cases were reported among incarcerated persons during 2003–2014. After excluding the 21 patients with unknown birth origin, 11 with unknown race/ethnicity, and 7 with unknown age or who were 14 years old, 5,463 TB cases remained for the rest of the analysis.

Patient characteristics

During 2003–2014, 530 (19%) of the 2,813 incarcerated U.S.-born TB patients were Hispanic, and 2,289 (86%) of the 2,650 foreign-born were Hispanic. The Table shows the characteristics of these 5,463 patients, stratified by birth origin and Hispanic ethnicity. Nearly all the 2,289 Hispanic foreign-born patients originated from one of four countries: Mexico (1,495 patients, or 65.3%), Honduras (306, or 13.4%), Guatemala (196, or 8.6%), or El Salvador (142, or 6.2%). Nearly half (44.0%) of the foreign-born Hispanic patients

with a reported U.S. arrival date received a TB diagnosis within a year of arrival, in contrast to most of the other foreign-born who received a TB diagnosis after arriving in the United States > 2 years prior.

Regardless of birth origin or ethnicity, the preponderance of incarcerated persons to receive TB diagnoses were men between the ages of 15 and 44 who were in local jails. About a third of all foreign-born were in the *other facility type* category that includes ICE detention facilities. Our internal analysis with the new ICE custody variable introduced to the NTSS in 2009 suggests that for the majority of cases in this review, being in *other facility type* does indeed correspond to an ICE facility (i.e., during 2009–2014, 91% of TB patients in *other facility type* were also in ICE custody). Although a smaller proportion were in federal (non-ICE) prisons, Hispanic patients, regardless of birth origin, had twice the odds of being in federal prisons, compared with non-Hispanic incarcerated persons (Table).

Incarcerated Hispanic patients were generally younger than non-Hispanics. A large proportion of U.S.-born Hispanic patients had excess alcohol use (35.8%) and noninjection drug use (40.2%). Both U.S.-born and foreign-born Hispanic patients had a higher prevalence of injection drug use within the year before TB diagnosis. Foreign-born Hispanic patients had less substance use than either U.S.-born group but more than was reported among other the foreign-born (Table).

DISCUSSION

Since 2003, a growing proportion of persons receiving TB diagnoses while incarcerated have been Hispanic. Our analyses of incarcerated TB patients during 2003–2014 shows foreign birth and recent arrival in the United States were associated with Hispanic ethnicity. Substance abuse was prominent among incarcerated Hispanic patients. These findings highlight the social complexities associated with incarcerated Hispanic persons in the United States.^{3,13} Because correctional facilities are often situated in rural communities,^{5–6} addressing these complexities could require collaboration between facility personnel, healthcare providers, and local health department staff in rural areas of the United States that typically have few TB cases and thus less familiarity with TB.^{14–15}

Incarceration offers an important opportunity for early detection and treatment of TB infection or disease in a population that might otherwise not have received that care. Most unauthorized Hispanic immigrants in the United States are from Mexico or Central American countries,^{8,16} which is consistent with our finding of over a third of foreign-born Hispanic TB patients in the NTSS *other facility type* category that includes ICE detention facilities. Annual TB incidence in Mexico was estimated at 19–23 cases per 100,000 persons in 2014, and TB rates in Central America were even higher, well above the 3 cases per 100,000 in the United States.^{1,17} The growing proportion of foreign-born Hispanics under custody has been attributed to the heightened focus on immigration enforcement.^{3,7} Following a peak in 2007, the estimated number of undocumented immigrants in the United States has decreased.^{7,18}

An important limitation of this analysis is that the NTSS currently defines incarceration status only on the basis of when the TB diagnostic evaluation began,¹⁰ so we might have underestimated the proportion of TB cases associated with incarceration. Length of incarceration and the circumstances leading to the TB diagnosis were unknown, limiting our ability to understand where TB transmission occurred and which TB case detection strategies work best in this population. Incomplete data on HIV infection also limited our ability to examine HIV's role in this population.

Despite declining TB incidence in the United States,¹ incarcerated persons, particularly foreign-born Hispanics, represent a high-risk group for having latent TB infection and for developing active TB disease. Incarceration offers an important opportunity for TB control efforts, including not only intake screening but also treatment of latent TB infection to prevent later progression to active TB disease.¹⁴ The once-weekly 12-dose regimen for latent TB infection can be a particularly favorable option to implement in correctional settings.^{19–21} Curing and preventing TB benefits both individuals and the communities where they will live following their release.

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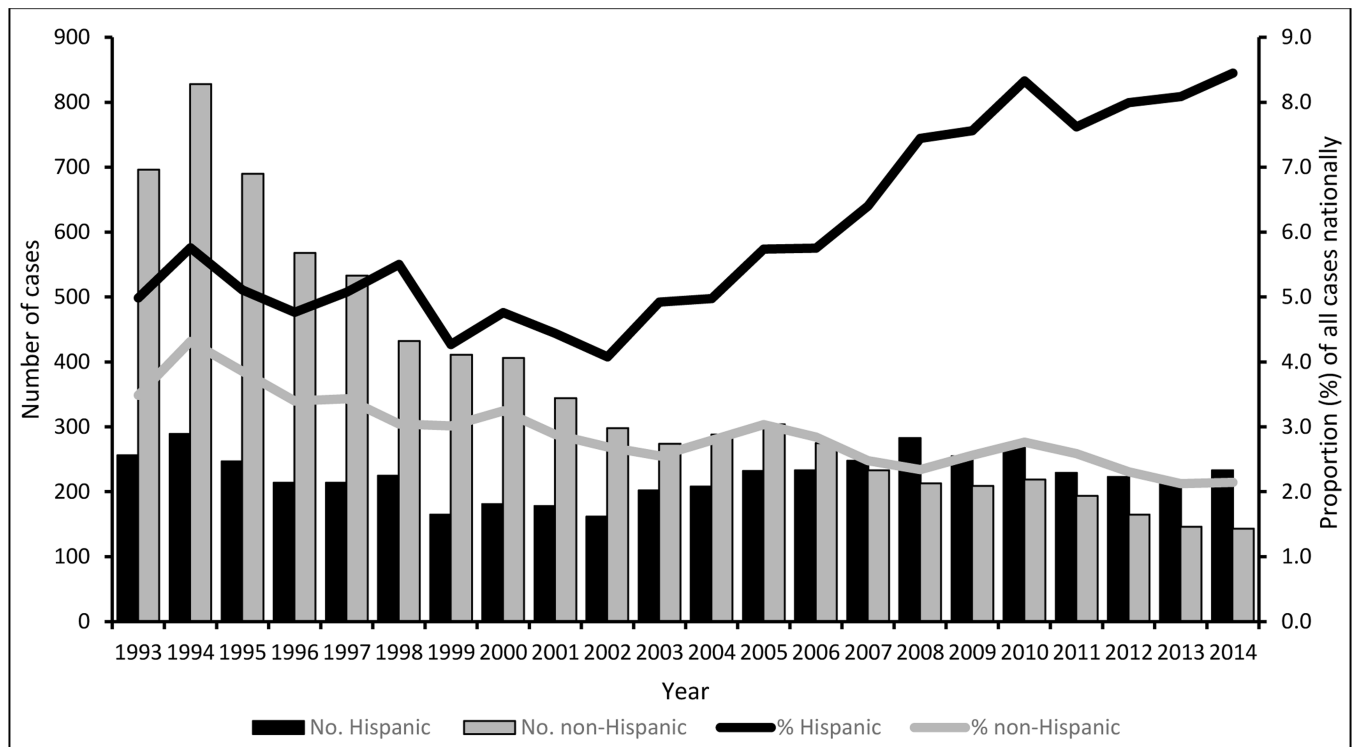
Disclosures:

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention. The authors report no conflicts of interest.

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**FIGURE.**

Tuberculosis Cases Among the Incarcerated — as Number and Proportion of Total Tuberculosis Cases in United States, by Hispanic Ethnicity, 1993–2014 (N=12,847)

TABLE.

Characteristics of Tuberculosis Patients 15 Years of Age Who Were Incarcerated at Diagnosis, by Birth Origin and Hispanic Ethnicity — United States, 2003–2014 (N=5,463)

Characteristics	U.S.-born incarcerated patients (N=2,813)			Foreign-born incarcerated patients (N=2,650)		
	Hispanic n=530 n (%)	Non-Hispanic n=2,283 n (%)	Odds ratios for Hispanic ethnicity (95% confidence interval)	Hispanic n=2,289 n (%)	Non-Hispanic n=361 n (%)	Odds ratios for Hispanic ethnicity (95% confidence interval)
Years since arrival in the United States	Not applicable					
< 1				1,006 (44.0)	127 (35.2)	1.7 (1.3–2.2)
1–2				200 (8.7)	20 (5.5)	2.2 (1.3–3.5)
> 2				866 (37.8)	187 (51.8)	referent
Unknown				217 (9.5)	27 (7.5)	1.7 (1.1–2.7)
Correctional facility type						
Local jail ^a	306 (57.7)	1,181 (51.7)	referent	909 (39.7)	153 (42.4)	referent
State prison	139 (26.2)	877 (38.4)	0.6 (0.5–0.8)	120 (5.2)	39 (10.8)	0.5 (0.3–0.8)
Federal prison	57 (10.8)	88 (3.9)	2.5 (1.8–3.6)	441 (19.3)	34 (9.4)	2.2 (1.5–3.2)
Juvenile detention	9 (1.7)	11 (0.5)	3.2 (1.3–7.7)	15 (0.7)	2 (0.1)	1.3 (0.3–5.6)
Other facility type ^b	16 (3.0)	68 (3.0)	0.9 (0.5–1.6)	773 (33.8)	114 (31.6)	1.1 (0.9–1.5)
Unknown	3 (0.6)	58 (2.5)	0.2 (0.1–0.6)	31 (1.4)	19 (5.3)	0.3 (0.2–0.5)
Age group (years)						
15–24	113 (21.3)	213 (9.3)	3.8 (2.9–5.1)	478 (20.9)	61 (16.9)	1.7 (1.2–2.4)
25–44	275 (51.9)	1,088 (47.7)	1.8 (1.5–2.3)	1,415 (61.8)	212 (58.7)	1.4 (1.1–1.9)
45–64	128 (24.2)	926 (40.6)	referent	380 (16.6)	80 (22.2)	referent
65+	14 (2.6)	56 (2.4)	1.8 (1.0–3.3)	16 (0.7)	8(2.2)	0.4 (0.2–1.0)
Sex						
Male	482 (90.9)	1,990 (87.2)	1.5 (1.1–2.0)	2,191 (95.7)	339 (93.9)	1.5 (0.9–2.3)
Female	48 (9.1)	294 (12.8)	referent	98 (4.3)	22 (6.1)	referent
HIV infection						
Positive	61 (11.5)	395 (17.3)	0.8 (0.6–1.1)	121 (5.3)	31 (8.6)	0.6 (0.4–0.9)
Negative	313 (59.1)	1,586 (69.5)	referent	1,570 (68.6)	245 (67.9)	referent
Not reported/other result	156 (29.4)	302 (13.2)	2.6 (2.1–3.3)	598 (26.1)	85 (23.5)	1.1 (0.8–1.4)
Previous tuberculosis diagnosis						
Yes	18 (3.4)	140 (6.1)	0.5 (0.3–0.9)	151 (6.6)	24 (6.6)	1.0 (0.6–1.5)
No	507 (95.7)	2,119 (92.8)	referent	2,115 (92.4)	328 (90.9)	referent
Unknown	5 (0.9)	24 (1.1)	0.9 (0.3–2.3)	23 (1.0)	9 (2.5)	0.4 (0.2–0.9)

Characteristics	U.S.-born incarcerated patients (N=2,813)			Foreign-born incarcerated patients (N=2,650)		
	Hispanic n=530 n (%)	Non-Hispanic n=2,283 n (%)	Odds ratios for Hispanic ethnicity (95% confidence interval)	Hispanic n=2,289 n (%)	Non-Hispanic n=361 n (%)	Odds ratios for Hispanic ethnicity (95% confidence interval)
Homeless within past year						
Yes	63 (11.9)	445 (19.4)	0.6 (0.4–0.7)	190 (8.3)	57 (15.8)	0.5 (0.4–0.7)
No	455 (85.8)	1,813 (79.1)	referent	1,873 (81.8)	281 (77.8)	referent
Unknown	12 (2.3)	33 (1.4)	1.5 (0.8–2.9)	226 (9.9)	23 (6.4)	1.5 (0.9–2.3)
Excess alcohol use within past year						
Yes	190 (35.8)	733 (32.1)	1.1 (0.9–1.4)	526 (23.0)	57 (15.8)	1.6 (1.2–2.2)
No	330 (62.3)	1,457 (63.8)	referent	1,494 (65.3)	265 (73.4)	referent
Unknown	10 (1.9)	93 (4.1)	0.5 (0.2–0.9)	269 (11.8)	39 (10.8)	1.2 (0.9–1.8)
Noninjection drug use within past year						
Yes	213 (40.2)	794 (34.8)	1.2 (1.0–1.5)	511 (22.3)	42 (11.6)	2.3 (1.6–3.2)
No	306 (57.7)	1,393 (61.0)	referent	1,503 (65.7)	280 (77.6)	referent
Unknown	11 (2.1)	96 (4.2)	0.5 (0.3–1.0)	275 (12.0)	39 (10.8)	1.3 (0.9–1.9)
Injection drug use within past year						
Yes	85 (16.0)	220 (9.6)	1.8 (1.3–2.3)	142 (6.2)	8 (2.2)	3.0 (1.4–6.1)
No	430 (81.1)	1,961 (85.9)	referent	1,874 (81.9)	315 (87.3)	referent
Unknown	15 (2.8)	102 (4.5)	0.7 (0.4–1.2)	273 (11.9)	38 (10.5)	1.2 (0.8–1.7)
Anatomic site of disease						
Pulmonary only	426 (80.4)	1,794 (78.6)	1.3 (0.9–1.7)	2,111 (92.2)	315 (87.3)	2.3 (1.5–3.6)
Extrapulmonary only	59 (11.1)	317 (13.9)	referent	83 (3.6)	29 (8.0)	referent
Both	44 (8.3)	171 (7.5)	1.4 (0.9–2.1)	95 (4.2)	17 (4.7)	1.9 (1.0–3.8)
Unknown	1 (0.2)	1 (< 0.1)				
Sputum smear status						
Positive	195 (36.8)	807 (35.3)	1.1 (0.9–1.4)	793 (34.6)	108 (29.9)	1.2 (0.9–1.5)
Negative	281 (53.0)	1,287 (56.4)	referent	1,399 (61.1)	229 (63.4)	referent
Not done or unknown	54 (10.2)	189 (8.3)	4.5 (0.3–73.4)	97 (4.2)	24 (6.6)	0.7 (0.4–1.1)
Cavitary disease based on chest radiograph						
Yes	118 (22.3)	495 (21.7)	1.0 (0.8–1.3)	467 (20.4)	60 (16.6)	1.2 (0.9–1.7)
No	332 (62.6)	1,456 (63.8)	referent	1,639 (71.6)	258 (71.5)	referent
Unknown	0 (15.1)	332 (14.5)	1.1 (0.8–1.4)	183 (8.0)	43 (11.9)	0.7 (0.5–1.0)

^aChosen as the referent group because most persons who received TB diagnoses while incarcerated were in local jails.

^b *Other facility type* is the National Tuberculosis Surveillance System category that includes U.S. Immigration and Customs Enforcement detention centers and other incarceration settings such as Indian reservation or military facilities.¹⁰

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