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Georgia Epidemiology Report

Challenges to Tuberculosis Elimination in Gwinnett County, Georgia

The epidemiology of tuberculosis (TB) in Gwinnett County, Georgia, is unique among the 159 counties in Georgia in two respects: 1) the county reported steadily increasing numbers of TB cases between 2001 and 2006; and 2) foreign-born persons accounted for more than 75% of the county's TB cases each year for the past 8 years. This article summarizes important epidemiologic TB trends and challenges to TB elimination in Gwinnett County – a county 30 miles northeast of Atlanta and one of the fastest-growing counties in the United States [1].

Overview

The national TB elimination goal for the United States is to achieve an incidence of <1 case per 1,000,000 population by the year 2010 and an interim goal of 3.5 cases per 100,000 for the year 2000 [2]. Georgia and Gwinnett County have not yet achieved this goal, however, Gwinnett County's TB case rates steadily increased during 2001 to 2006 (from 3.2 cases per 100,000 population to 7.8 per 100,000) while Georgia's TB case rates were declining (from 6.9 to 5.0 per 100,000) over the same time period [Figures 1-2]. The number of TB cases in Gwinnett County increased 195% from 2001 to 2006 (from 20 to 59 cases, Figure 1), outpacing the growth in Gwinnett County's population, which increased 20% from 2001 to 2006 (from 622,512 to 749,836 persons) [3]. In contrast, there was a 12% decrease in TB cases in Georgia over the same time period [Figure 2]. The numbers of foreign-born (FB) TB cases and US-born cases tripled from 2001 to 2006 with a 25% and 27% average annual increase among FB and US-born cases respectively [Figure 3]. Gwinnett County has ranked third among counties in Georgia in TB case numbers and case rates since 1993, when expanded surveillance for TB started in Georgia, with only DeKalb and Fulton Counties reporting more cases and higher rates. All three counties are located in populous metropolitan Atlanta. Nearly two-thirds of TB cases in Gwinnett County over the past 5 years resided in the cities of Lawrenceville and Norcross.

Figure 1. TB Cases and Case Rates, Gwinnett County, 1996 - 2007

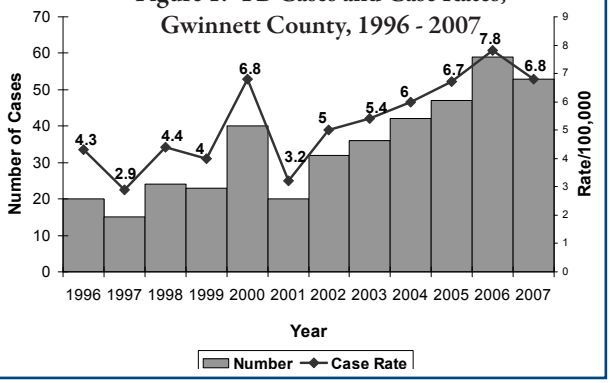
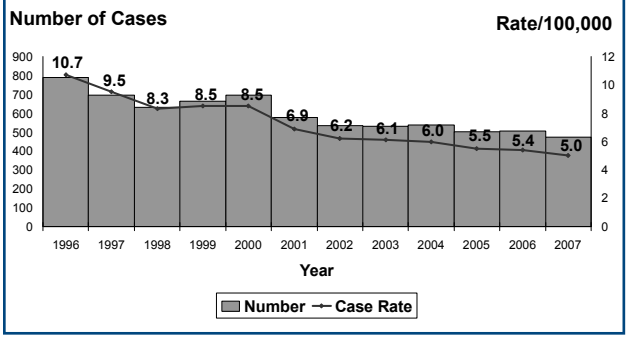


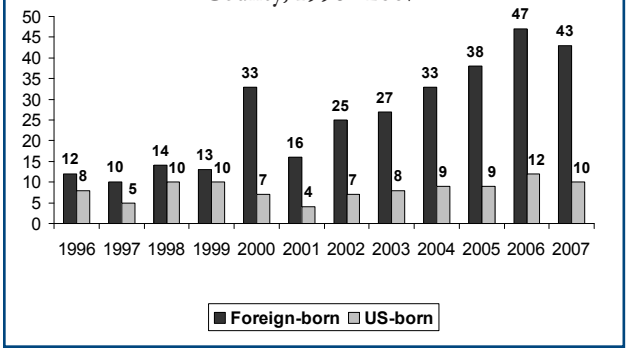
Figure 2. TB Cases and Case Rates, Georgia, 1996 - 2007



Foreign-born TB Cases

From 1996 to 1999, foreign-born TB cases accounted for 56%-67% of all TB cases in Gwinnett County. In 2000, the proportion of foreign-born TB cases of all TB cases in Gwinnett County increased to 82%, and foreign-born TB cases accounted for 75% or more of all TB cases in the county from 2001 to 2007 [Figure 3]. This increase in the numbers and proportion of foreign-born TB cases coincided with a 92% increase in the number of foreign-born residents (from 99,518 to 190,805 persons) and an increase in the proportion of the foreign-born population (17% to 25%) in Gwinnett County from 2000 to 2007 [4].

Figure 3. US-born and Foreign-born TB Cases, Gwinnett County, 1996 - 2007



In 2007, among 43 foreign-born cases in Gwinnett County, 46% were in Asians and 28% were in Hispanics, though Asians and Hispanics made up only 9% and 17% of the county's population, respectively. More than half (57%) of foreign-born TB cases in Gwinnett County were reported in persons from four countries: Vietnam (9 cases), Mexico (7), Honduras (4), and India (4). Ten foreign-born cases had a TB condition (either non-infectious active TB or not clinically active TB) diagnosed before entering the U.S. as part of the federal government's refugee and immigrant medical screening process. The majority (53%) of foreign-born TB cases in Gwinnett County were diagnosed within 8 years after their arrival in the U.S. U.S.-born children exposed to foreign-born parents with TB also contributed to Gwinnett County's TB morbidity in 2007; of 10 U.S.-born cases in 2007, three were children with at least one foreign-born parent who was

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originally from a country with a high TB prevalence. Regardless of country of origin, TB case rates in Gwinnett County were highest among Asians (29.7 per 100,000) followed by Hispanics (10.6/100,000), non-Hispanic blacks (6.9/100,000) and non-Hispanic whites (1.5/100,000).

TB in Children

TB in children younger than 5 years old is considered a sentinel public health event because it can be a marker for recent transmission from an adult source case and because infected young children have a higher risk for rapid progression to active TB disease that may further progress to potentially lethal forms of TB [5]. The risk for developing active TB is also increased among adolescents and young adults with a positive tuberculin skin test [5]. In Gwinnett County in 2007, the lowest TB case rate (0.9/100,000) among age groups was in children 5 to 14 years old while the highest rate (11.2/100,000) was among persons 15 to 24 years old. In 2007, three cases were reported among children under five years old but none developed severe forms of TB; two were identified by contact investigations of adult relatives with active TB who lived in the same household as the child. A spike in the number of TB cases among Gwinnett County school children occurred in 2007 which generated considerable media attention; seven student cases were reported that year compared to only two student cases reported per year in the three preceding years. The median age of the seven student cases in 2007 was 15 years old (range: 7–19), five were high school students, and four were foreign-born students who originated from four different regions of the world.

TB Treatment Completion

Treatment for patients with drug susceptible TB takes at least six to nine months to complete with a combination of several anti-TB antibiotics [6]. County health departments (CHDs) go to great lengths to ensure that patients complete TB treatment. Public health staff make home visits to provide directly observed therapy (DOT) to TB patients, supply transportation tokens and fast food coupons for indigents, give temporary shelter for homeless patients, and even pursue legal court orders compelling non-adherent infectious patients to comply with a TB treatment plan. From 1996-2000, more than 90% of TB patients in Gwinnett County completed their treatment, putting the county on par with state averages for treatment completion. During 2001 and 2003 however, and for the past two consecutive years that have complete data on treatment outcomes, TB treatment completion in Gwinnett County fell below 90% (83% in 2005 and 87% in 2006). The 15 cases that did not complete treatment during those two years were all foreign-born; nine were Hispanic, three were Asian, and three were black. Ten cases did not complete treatment in Gwinnett County because they were lost to follow-up (six returned to their country of origin without a forwarding address) and five were uncooperative or refused treatment.

Directly Observed Therapy

The American Thoracic Society and the U.S. Centers for Disease Control (CDC) recommends that TB treatment should be given by directly observed therapy (DOT), in which public health staff watch TB patients ingest every dose of their medications to ensure treatment adherence [6]. However, the percentage of TB patients in Gwinnett County who received TB treatment exclusively by DOT throughout the entire duration of their treatment is declining. During 2000-2003, the percent of TB patients per year who received DOT for the entire duration of their TB treatment was 79% (30 of 38), 59% (10 of 17), 62% (18 of 29), and 71% (25 of 35). In contrast, during 2004-2005, only 57% of 86 TB patients in Gwinnett County received TB treatment entirely by DOT, and in 2006, only 46% of 54 TB patients received TB treatment entirely by DOT; 48% of patients in 2006 had treatment that was partially by DOT and partially self-administered, and 6% self-administered all their TB medications. During 2004-2006, of seven patients who self-administered all their TB medications, four were exclusively under the care of private providers and two were managed by both the CHD and a private provider. CHD staff reported that at least two private providers were not supportive of their patients being on DOT.

Contact Investigation and Latent TB Infection (LTBI) Therapy

CHD staff conduct contact investigations routinely for every TB case, regardless of whether the case is managed by a public or private provider. Contacts with a positive tuberculin skin test (TST) but a normal chest radiograph and no TB signs or symptoms have latent TB infection (LTBI). Persons with LTBI are not ill or contagious but they have a 10% chance of developing active TB over their lifetime if they do not complete LTBI therapy [2]. LTBI is generally treated with isoniazid for nine months to prevent active TB disease from developing [6]. Among 266 contacts to TB cases in Gwinnett County that were evaluated in 2006 (this excludes school contacts evaluated during post-exposure mass screenings), 83 (31%) had LTBI and 5 (2%) had active TB, which is higher than the state average for contacts with LTBI (22%) and active TB (1%). Among 50 infected contacts started on LTBI therapy, 35 (70%) completed therapy, which exceeds the state's 56% LTBI treatment completion rate for 2006. Among the 15 infected contacts that did not complete LTBI therapy; nine chose to stop therapy on their own, four were lost to follow-up, one had an adverse reaction to the medication, and one contact's provider decided to stop the medication.

Health Care Resource Capacity

In 2007, the majority (59%) of TB patients in Gwinnett County were initially reported from a hospital (21 patients were admitted to Gwinnett Medical Center, a private hospital in Lawrenceville). After hospital discharge, TB patients are typically referred to the Gwinnett CHD and health centers for follow-up. Over the past five years, the Georgia TB Program funded positions in Gwinnett County for four nurses and one outreach worker with state grant-in-aid monies, and a county pharmacist position through a federal grant. Federal, state, and county funding for health care personnel, however, has not increased to keep up with the county's increased TB client workload. Despite the preponderance of TB cases that are foreign-born, there is only one bilingual TB case manager (fluent in Spanish and English) for Gwinnett County.

Community Outreach

To address the increase in TB cases among Hispanics in Gwinnett County, the Georgia TB Program and the Gwinnett CHD sponsored 10 interviews with health care providers serving the local Hispanic community, seven patient interviews, and two focus groups that were conducted by an Emory University graduate student to assess the knowledge, attitude, and perceptions of the Hispanic population about TB and access to health services. These interviews revealed gaps in knowledge about TB transmission, a preference for Spanish-speaking private providers for primary health care, instances of delayed diagnosis of TB by private providers, inadequate interpreter services at CHDs, satisfaction with

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the health care provided by CHD TB clinic staff, but a perception that Hispanics would receive poor customer service during intake at CHDs. Health care providers stated that some of their patients avoided seeking care at the CHD for fear of deportation. In addition, many of their patients suffered from low literacy, limited financial resources, and lack of health insurance. Health care providers were not aware of the services provided by CHDs and they felt that CHDs should work closely with Hispanic-serving clinics to improve the health of Hispanics in Gwinnett County.
These results were presented at a meeting with key stakeholders and providers of services to the Hispanic community in Gwinnett County. As an outcome of this meeting, the state and district TB programs are collaborating with community organizations to plan educational outreach activities for the Hispanic community.

Discussion and Conclusions

Gwinnett County's rapidly-growing population and rise in foreign-born TB cases present unique challenges for TB elimination in the county. Due to budgetary shortfalls, state and federal funding streams have not been able to provide the county with more resources to cope with the increase in their TB client load. In the current environment of diminishing resources, it will become even more important to establish priority activities and focus interventions to attain national and state TB program objectives.

As Gwinnett County, along with the rest of Metropolitan Atlanta, becomes more of an international community linked to a global economy, the area's population can be expected to become increasingly culturally diverse. Culturally competent and bilingual staff can help to improve communication with non-English speaking foreign-born patients. The Southeastern National TB Center, a regional resource facility located in Gainesville, Florida, which is funded by CDC, has developed communication tool kits targeting foreign-born patients that can be used to impart key messages about TB. Some of these products were distributed at the Latin American Association Headquarters in Atlanta, when the focus group and interview findings were presented to key stakeholders of Gwinnett County's Hispanic community. Community educational campaigns to raise TB awareness may need to include information that patient encounters for public health assistance to test and treat communicable diseases are exempt from recent state legislation that requires verification of lawful presence in the United States from persons applying for local public services, and thus this legislation should not be a potential barrier to health care access and TB clinic services.

Gwinnett County's TB treatment completion rate is negatively impacted by the return of foreign-born patients to their home countries during treatment. If patients inform CHD staff of their impending departure and they meet the World Health Organization (WHO) criteria of TB patients who may travel, the state TB Program will mail a notification form to TB control personnel in the patient's country of destination using the National TB Program contact information list provided in CDC's Division of TB Elimination website [7, 8]. The state TB Program can refer patients who move to Latin American countries to TBNet or CureTB, two federally funded agencies that monitor treatment completion of TB patients who travel back and forth between Latin America and the U.S [9,10]. CHDs can advise patients on the importance of completing treatment and give them a referral form, preferably translated in their native language, to present to their primary care providers in their home countries for continuation of treatment.

Gwinnett County authorities have raised the question of whether routine school entrance TB screening should be performed countywide due to sporadic spikes in the number of student TB cases. However, routine TB screening in a student population is not advisable because of the low prevalence of TB among children and the enormous public health resources it would take to annually screen a huge but low-risk population (the Gwinnett Public School System is the largest school system in Georgia with 114 schools and a projected 2008-09 enrollment of 159,000-plus students) [11]. In addition, a sizeable proportion of the TST positive results in screenings of low-risk populations may be false positive results caused by nonspecific reactivity or exposure to nontuberculous mycobacteria in the environment [13,14]. In such a setting, LTBI treatment may be given needlessly to a substantial number of students with false positive TSTs. To reduce the number of false-positive TST results in such a population, the optimal approach recommended by CDC is administration of a screening questionnaire (similar to that used by the Georgia Health Check program, Georgia's preventive health care program for children) that assesses risk factors for TB so that only children with specific risk factors for LTBI would be given a TST [12, 14].

Evidence-based, priority strategies that guide TB programs in the U.S. include: 1) early identification of TB cases and completion of TB treatment; 2) contact evaluation and treatment of LTBI to prevent disease; and 3) targeted testing and LBTI treatment among high-risk populations [14]. To overcome barriers to implementing these strategies in Gwinnett County, adequate resources are needed to support the county's public health infrastructure to ensure that all patients complete treatment by DOT, that non-adherent patients are managed as allowed by state TB laws, that thorough contact investigations are performed, public health staff are culturally competent, and more bilingual staff are hired. Partnering with community-based organizations to promote awareness about TB and CHD TB services, while educating community health care providers about TB diagnosis and management would complement these key strategies to protect Gwinnett County communities from TB.

This article was written by Rose-Marie Sales, M.D., M.P.H.[1], Alana Sulka[2], William Blomenkamp[2], Lisa Watson[3], and Beverly DeVoe-Payton, M.H.S.[1]

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Reported Cases of Selected Notifiable Diseases in Georgia, Profile* for July 2008

Selected Notifiable Diseases	Total Reported for July 2008	Previous 3 Months Total Ending in July			Previous 12 Months Total Ending in July		
	2008	2006	2007	2008	2006	2007	2008
Campylobacteriosis	108	170	252	258	573	662	701
Chlamydia trachomatis	224	10280	11122	1753	38119	42428	32116
Cryptosporidiosis	22	54	54	53	202	271	268
E. coli O157:H7	4	17	8	18	43	32	55
Giardiasis	98	168	155	199	694	677	711
Gonorrhea	170	5459	4758	760	18907	19202	12978
Haemophilus influenzae (invasive)	12	27	22	31	116	120	150
Hepatitis A (acute)	3	19	22	9	85	70	47
Hepatitis B (acute)	15	55	34	49	188	166	159
Legionellosis	2	13	10	7	36	46	38
Lyme Disease	5	5	8	13	8	10	18
Meningococcal Disease (invasive)	2	2	4	6	15	20	27
Mumps	0	3	0	1	5	0	2
Pertussis	6	8	6	9	32	26	19
Rubella	0	0	0	0	0	0	0
Salmonellosis	346	548	496	771	1915	1896	2264
Shigellosis	55	291	633	339	948	1821	1418
Syphilis - Primary	5	28	27	28	136	106	108
Syphilis - Secondary	29	112	150	124	473	553	617
Syphilis - Early Latent	25	112	114	85	403	424	410
Syphilis - Other**	65	247	327	245	990	1123	1164
Syphilis - Congenital	0	1	2	1	8	10	8
Tuberculosis	37	143	120	137	524	493	478

* The cumulative numbers in the above table reflect the date the disease was first diagnosed rather than the date the report was received at the state office, and therefore are subject to change over time due to late reporting. The 3 month delay in the disease profile for a given month is designed to minimize any changes that may occur. This method of summarizing data is expected to provide a better overall measure of disease trends and patterns in Georgia.

** Other syphilis includes latent (unknown duration), late latent, late with symptomatic manifestations, and neurosyphilis.

AIDS Profile Update

Report Period	Disease Classification	Total Cases Reported*			Percent Female	Risk Group Distribution %						Race Distribution %			
		<13yrs	>=13yrs	Total		MSM	IDU	MSM&IDU	HS	Unknown	Perinatal	White	Black	Hispanic	Other
Latest 12 Months	HIV, non-AIDS	18	3,000	3,018	28	25	2	1	4	67	1	18	77	4	1
9/07-8/08	AIDS	2	1,826	1,828	28	29	3	1	7	60	<1	17	77	5	1
Five Years Ago:**	HIV, non-AIDS	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9/03-8/04	AIDS	11	1,663	1,674	29	34	7	2	16	39	1	18	76	5	1
Cumulative:	HIV, non-AIDS	219	12,626	12,845	31	28	6	2	10	53	2	21	74	4	1
07/81-8/08	AIDS	239	32,959	33,198	20	43	14	5	14	23	1	30	67	3	1

Yrs - Age at diagnosis in years **MSM - Men having sex with men** **IDU - Injection drug users** **HS - Heterosexual**

* Case totals are accumulated by date of report to the Epidemiology Section ** Due to a change in the surveillance system, case counts may be artificially low during this time period
***HIV, non-AIDS was not collected until 12/31/2003