



THE PUBLIC'S HEALTH

Newsletter for Medical Professionals in Los Angeles County

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An Historical Perspective on World TB Day

World TB Day commemorates Dr. Robert Koch's discovery of the causative agent of Tuberculosis. Koch (1843-1910) made his famous report on the tubercle bacillus before the Berlin Physiological Society on March 24, 1882. The importance of his findings raised Koch to the level of Louis Pasteur in bacteriological research. He was awarded the Nobel Prize for Medicine in 1905.

In 1876, Koch received a microscope from his wife on his birthday and set up a primitive laboratory to study microbes in relation to infectious diseases. During the next three years, Koch virtually laid the foundation of bacteriological technique. He introduced methods for examination of bacteria on cover slips and glass slides, the hanging drop technique, the fixing and staining of bacteria, their culture by the poured plate method, and the photography of organisms. He also invented steam sterilization and demonstrated staphylococci and streptococci as the causes of wound infection.

While attending a meeting in London in 1881, Koch was so stimulated by the deliberations on TB and hearing about the world-wide ravages of the disease that he returned to Berlin determined to find the causative organism. He improved the methods of staining and purification techniques, and bacterial growth media including agar plates and the Petri dish. With these techniques, he discovered the bacterium. At that time, TB was the cause of one in seven deaths in Europe and the U.S.

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The 2006 Laboratory Practices Survey

Tuberculosis is a significant but diminishing threat to the public's health in Los Angeles County. The critical role of the laboratory to help control and eventually eliminate the spread of TB has been elucidated by the CDC and the California Health and Safety Code. The use of rapid, more sensitive methods of diagnosing *Mycobacterium tuberculosis* (MTB) which result in fewer reporting delays to the clinician and the use of key laboratory performance indicators have been identified as essential components to securing the laboratory's role in TB control and elimination.

The latest laboratory techniques for rapidly diagnosing MTB are being used in this county. These methods include fluorochrome staining for acid-fast bacillus (AFB) smear microscopy, radiometric culture systems or equivalent rapid culture methods, high-performance liquid chromatography (HPLC) and nucleic acid hybridization assays for identification, and radiometric system for first-line drug susceptibility testing.

Expectations and standards

Benchmark objectives for the performance of mycobacterial analysis have been set by the CDC to establish uniform laboratory performance expectations and develop standardized measures of laboratory performance. The turnaround time (TAT) for MTB testing and reporting of results to the clinician is a key indicator, and objectives for the TATs for testing and reporting are: AFB smear microscopy by fluorochrome staining within 24 hours of laboratory receipt of specimen, MTB culture using radiometric system or equivalent rapid method for culture within 14 days of specimen receipt, identification of MTB isolates within 17-21 days of specimen receipt, and drug susceptibility testing within 28 days of specimen receipt.¹

As part of the TB Control Program's legal mandate to conduct TB disease surveillance, the program surveys both private and public sector laboratories throughout

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A Historical Perspective...from page 1

Probably as important as his work on TB, are Koch's Postulates, which say that to establish that an organism is the cause of a disease, it must be:

- Found in all cases of the disease examined
- Prepared and maintained in a pure culture
- Capable of producing the original infection, even after several generations in culture
- Be retrievable from an inoculated animal and cultured again

In 1982, on the 100th anniversary of Koch's presentation, the International Union Against Tuberculosis and Lung Disease (IUATLD) proposed that March 24th be officially proclaimed World TB Day. In 1996, the World Health Organization and a wide range of other organizations joined the IUATLD to increase the impact of World TB Day.

World TB Day serves as an occasion for people around the world to raise awareness of this international health threat and recognize the collaborative efforts of all countries involved in fighting this disease.

The CDC, the National Tuberculosis Controllers Association, state controllers associations, and local county jurisdictions participate in public awareness campaigns intended to inform the public and elected representatives of the impact of TB in the U.S. and on the critical and continued need for sustained funding to support the work to control and eradicate TB.

Today, TB remains a global health threat. It is estimated that one of three persons in the world is infected with TB. Every day, 5,000 people in the world die of TB, and 450,000 multidrug-resistance TB cases occur annually [1].

In recognition of World TB Day 2007, the county's Department of Public Health will work with community based organizations to provide the public with information on TB. Under the theme, "TB Here Is TB Everywhere," messages targeted to high-risk population groups will emphasize that TB is a universal public health threat. At shopping malls, churches, and in the media, the public will be informed of the disease's continuing threat, the importance of knowing signs and symptoms, the need for early diagnosis, and the importance of appropriate treatment until complete recovery is achieved.

Robert Miodovski, M.P.H.

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Multi-Drug Resistant TB in Los Angeles County

She was first treated for TB at seven years old while living in Korea. By the age of 21, she had relapsed at least twice and her organism had acquired resistance to multiple TB drugs. Over the next 20 years, she failed multiple retreatment attempts for multidrug-resistant TB (MDR-TB) and underwent four surgical procedures to remove her right lung, lobe by lobe, and to collapse her chest wall. She developed a bronchopleurocutaneous fistula, secondary infection with methicillin-resistant Staphylococcus aureus, pulmonary hypertension and respiratory insufficiency, and she suffered several episodes of cardiopulmonary arrest resulting in hypoxic brain damage. In 2006, the patient died of complications to extensively drug-resistant TB, a severe form of MDR-TB.

Treating multi-drug resistant TB

MDR-TB is defined as TB resistant to at least both isoniazid (INH) and rifampin (RIF), our two most effective TB drugs. MDR-TB is a public health threat because it is very difficult to cure and there is no therapy with proven efficacy for the treatment of latent MDR-TB infection. The treatment of MDR-TB usually requires: the use of more toxic, less effective medications given for at least 18 to 24 months after cultures convert to negative; special monitoring (e.g., audiogram in a sound-proof booth, therapeutic drug monitoring) for adverse drug effects; and susceptibility testing to second- and third-line TB drugs. Some cases require prolonged hospitalization to start therapy, deal with medical complications and prevent the spread of MDR-TB in the community.

While treatment costs for drug-sensitive TB is approximately \$3,800 per case (which includes the cost of daily directly observed therapy), the direct medical costs associated with MDR-TB hospitalization has ranged from \$15,000 to \$137,000 [1]. Thus, MDR-TB is an enormous resource sink.

Approximately one-third of California's MDR-TB cases reside in our county. Los Angeles leads the state in number of MDR-TB cases among its local health jurisdictions (129 cases in 1995-2005, followed by San Diego County at 43 cases, Orange at 37, and San Francisco at 29) [2].

Most of Los Angeles County's MDR-TB cases are foreign-born. The countries of origin for the county's MDR-TB cases (2000-2005):

Mexico	19
Philippines	14
Korea	7
Vietnam	6
U.S.A.	6
China	5
Armenia	3
Cambodia	1
Guatemala	1
Peru	1
Tibet	1
TOTAL	65

In this cohort, 64 of the 65 cases (98.5%) had pulmonary MDR-TB indicating that they were potentially infectious. Ten percent of the MDR-TB cases were HIV-infected. In contrast, over 80% of MDR-TB cases reported in outbreaks in other health jurisdictions (e.g., New York City) were infected with HIV [3]. The mortality rate of persons with both MDR-TB and HIV is very high, and MDR-TB can spread rapidly in this immunocompromised population.

In 1993, the county's TB Control Program formed the MDR-TB Unit to provide medical and nursing consultative services in response to the increasing number of MDR-TB cases in Los Angeles County. This unit closely monitors and provides written medical consultation on all MDR-TB cases.

To date, well over 130 MDR-TB cases have been overseen by this unit in close partnership with the staff based in 11 Public Health centers, and of the cases that were treated since the unit began in 1993, none to date has relapsed. Nevertheless, there remains an urgent need to maintain the public health infrastructure necessary to prevent additional cases of MDR-TB, especially given the rising incidence of this disease globally.

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Brief Report of the TB Burden in Los Angeles County

As a result of successful public health efforts and strategies to manage tuberculosis (TB) (identifying and diagnosing new cases, locating contacts to those new cases, and treating latent TB infection [LTBI] and active disease cases) the number of TB cases in the county has declined steadily since 1992. Despite this reduction, it would be shortsighted to believe TB is close to the point of eradication. While the case load in the county has decreased since the peak of the TB epidemic in 1992, the burden of TB around the world has continued to increase, and the public health infrastructure is threatened by funding reductions. Local success can result in complacency and resurgence of disease if aggressive public health efforts to detect and treat TB in population subgroups are not maintained.

The Los Angeles County TB Control Program, in partnership with the Community Health Care Services, California Department of Health Services, and the Centers for Disease Control and Prevention (CDC), continues to advance effective strategies to identify and treat high-risk population groups, including homeless individuals, foreign-born, and persons infected with HIV. This article presents a brief overview of TB in the county and contrasts it with data from California and the United States.

During 2005 (the most recent year for which national data are available), a total of 14,097 TB cases (4.8 cases per 100,000 population) were reported in the United States, representing a 3.8% decrease in cases from 2004. The TB rate was the lowest recorded since national reporting began in 1953.¹

In 2006 (provisional data), there were 886 confirmed cases of TB in Los Angeles County, representing a 2.2% decrease from 2005 (906 cases) and a 59.7% decrease since 1992 (2,198 cases). This is the fourteenth consecutive year of decline since the peak of the TB epidemic in 1992 and marks the fourth year in a row where the county's TB burden fell below 1,000.²

The TB rate among foreign-born individuals remains disproportionately high. In the United States in 2005, 55% of TB cases were foreign-born.¹ In Los Angeles County in 2006, however, 690 (77.9%) cases were foreign-born.

While the case load in the county has decreased since the peak of the TB epidemic in 1992, the burden of TB around the world has continued to increase, and the public health infrastructure is threatened by funding reductions.

In 2006, Hispanics comprised the racial/ethnic group with the largest proportion of cases in the county (395 cases, 44.6%), followed by Asians (330 cases, 37.2%). In California, Asians and Hispanics comprised 43.1% and 39.2% of the total cases in 2004, respectively.³

Targeted interventions for these at-risk populations, continued collaborative efforts toward the global and local fight against TB, and adequate resources are essential to eliminate TB in the county and the world. Los Angeles County TB Control Program has recently partnered with several community organizations, including Breathe California and JWCH Institute, and formed a TB Coalition that provides education and outreach to at-risk populations in the county. If you would like more information regarding the TB Coalition, please contact Ms. Jennifer Bartlett at jbartlett@breathela.org.

David Meyer, M.P.H.

Epidemiologist, Tuberculosis Control Program

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- 3 California Department of Health Services. Report on Tuberculosis in California, 2004. March 2006

Strategies to Increase Tuberculosis Treatment Completion

The TB Control Program's Incentive and Enabler Project provides services to homeless and other indigent tuberculosis patients with suspected or confirmed TB disease and to contacts of active TB cases. The project was initiated in 1987 after a review of hospitalized homeless TB patients revealed that providing treatment to TB patients in an inpatient setting was prohibitively expensive and treatment completion rates abysmal. The average cost to treat a single TB patient at Rancho Los Amigo Rehabilitation Center was a staggering \$70,000 and on average, only 53% of patients completed treatment.

Project parameter

In response, the State of California funded a pilot project to provide outpatient treatment services to homeless TB patients assessed as having a need for food and/or housing. Meal and housing vouchers were given to these patients in an effort to "enable" them to adhere to a regimen given by directly observed therapy (DOT) and thus complete treatment.

In 1991, the Board of Supervisors approved \$1.3 million to augment local TB Control efforts in the Skid Row area of downtown Los Angeles (Central Health District). In 1992, the Board approved two contracts — the Weingart Café and the Single Room Occupancy Corporation — and established an M.O.U. with the Antelope Valley Rehabilitation Centers to provide substance abuse rehabilitation services to identified TB patients.

The provision of food and housing to homeless, indigent patients as a way of improving treatment outcomes proved to be so successful that in 1993, after another study revealed that the average cost to successfully treat one patient was reduced to \$3,000 (a \$67,000 savings), the project was expanded to include other health districts. In addition, the TB Control Program was given additional funding by the state to purchase items such as MTA tokens, fast food coupons, and grocery store coupons to provide to TB patients as a reward or "incentive" for continuing to adhere to DOT.

Current services and costs

The Incentive and Enabler Program currently provides services to approximately 150 TB patients per year, or approximately 15% of total TB patients followed by the county's TB Control Program, and spends an average of \$2,000 per TB patient who receives these services. The demographics of the approximately 150 patients participating in the project are predominantly:

- Male
- Foreign-born
- Between the ages of 25 and 64 years
- Black or Hispanic
- Cared for by the public sector.

The risk factors associated with these patients are:

- Homelessness
- Substance Abuse
- HIV-seropositivity or AIDS

In a 2003 study, the countywide treatment completion rate was 77%, the rate for homeless persons who did not receive housing and/or incentives was 59%, and the treatment completion rate for homeless patients who received housing and/or incentives was 79%. As the data indicates, the provision of housing and/or incentives have a significant impact on treatment.

Due to its great success, the Incentive and Enabler Project was honored by the National Tuberculosis Controllers Association in 1994. The Project now serves as a role model for other TB Control Programs around the nation.

Questions?

For more information regarding the Incentive and Enabler Project contact Leslie Barnett at 213/744-6160.

Leslie Barnett, RAI
Tuberculosis Control Program

The TB Control Program's Incentive and Enabler Project was honored by the National Tuberculosis Controllers Association in 1994. The Project now serves as a role model for other TB Control Programs around the nation.

What is the GOTCH law?

You are probably aware of the mandate to report suspected and confirmed cases of tuberculosis (TB) within one day of diagnosis¹. But what is the “Gotch Law”...many people have heard of this term but what is it exactly? Whom does this law affect? What do physicians, nurses and health facilities administrators need to know?

In 1993, the California State Assembly passed Assembly Bill (AB) 803. This bill required health facilities to submit a written treatment plan for TB suspects and cases to the local health authority prior to discharge. The bill was signed into law by Governor Wilson and became effective January 1, 1994. The current revised version of the bill, AB 804 became the California Health and Safety Code (HSC) on January 1, 1995. Many people still refer to this legislation as the “Gotch Law” after its author’s name. Applicable sections of the HSC used by TB control are HSC § 121361 and 121362 which increase authority to local health jurisdictions for the control of TB.

In Los Angeles County, the Local Health Officer has delegated approval of the written treatment plan to the Director of the TB Control Program. Standardized reporting forms (Confidential Hospitalized TB Suspect/Case Report H-803) and discharge care plan approval forms (Confidential Hospitalized TB Suspect/Discharge Care Plan Approval Request H-804) are available on the TB Control Program’s website at www.lapublichealth.org/tb or by contacting the TB Control Program office at 213 744-6160.

Health facilities must submit the completed H-803 when they admit a known TB patient into the facility or when they diagnose active TB disease in a patient currently admitted. Before health facilities discharge or release a TB case or suspect or before transferring the patient to another facility, the facility must submit the written discharge plan (H-804).

To facilitate timely and appropriate discharge, the provider should submit the written treatment plan to the TB Control Program one to two days prior to the anticipated discharge date. TB Control Program staff will review the plan within 24 hours of receipt. The plan must be approved by TB Control Program staff prior to proceeding with the discharge. If there are any problems identified with the plan, TB Control Program notifies the facility of what needs to take place in order to approve the plan.

Many people still refer to this legislation as the “Gotch Law” after its author’s name. This bill required health facilities to submit a written treatment plan for TB suspects and cases to the local health authority prior to discharge.

The TB Control Program Surveillance Nursing Unit assists the Program Director in the review and approval of TB discharge care plans. When a discharge care plan is received, the nurse reviews the information submitted as the treatment plan must contain specific information regarding the patient’s social and medical status. The TB Control Program will prioritize patients who are considered contagious to ensure they are not placed in living situations that pose high risk of transmission or exposure of susceptible individuals.

Examples of high-risk living situations include homeless shelters, skilled nursing facilities, nursing homes, drug and alcohol rehabilitation centers, HIV congregate living centers, hospices, and households where small children or immunocompromised individuals may be present. The nurses also assess the treatment plan to determine if the plan is consistent with the guidelines of the American Thoracic Society (ATS) and CDC. TB Control Program physicians work with the program’s nursing staff to review treatment plans for complicated cases which require an individualized treatment plan.

TB Control Program nursing and physician staff are available during regular business hours to assist health facilities to meet the provisions of this legislation. After hours, and on weekends or holidays, health facility personnel may contact the Los Angeles County Operator at (213) 974-1234 and ask to speak to the Public Health Administrative Officer of the Day (AOD). A response will usually occur within one hour.

Jeanne Soukup, RN

Program Specialist, Tuberculosis Control Program

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1. State Health And Safety Code, Division 105, Part 5, and Administrative Codes, Title 17, Chapter 4 Section 2500

2006 Lab Practices Survey...Continued from page 1

the county biennially. The information collected in this survey is used to identify the methods used for diagnosing MTB, identify TATs, and follow the progress towards meeting test reporting objectives.

This article outlines the results of the laboratory survey administered in 2006.

Methods

A line listing of laboratories in the county that perform mycobacterial studies, including AFB smear microscopy, MTB culture, and/or MTB drug susceptibility testing was generated; this comprehensive list was compiled in coordination with the county's Sexually Transmitted Disease Program. The self-administered survey tool consisted of a two-page questionnaire that assessed MTB diagnostic methodologies and services provided by private and public sector laboratories. A follow-up telephone call was placed to the laboratories that did not acknowledge receipt of the survey from the initial mailing.

Results

Of the 488 surveys mailed, 393 (81%) laboratories responded; 32 (8%) of the 393 laboratories performed onsite testing for TB. Of these, 30 (94%) reported positive AFB results within one day and 2 (6%) did not indicate their timeline for reporting positive AFB results. Most laboratories reported TB results to the local health officer by fax (28, 88%), and 5 (16%) laboratories reported by phone. No laboratories reported results using e-mail.

Most of the laboratories with onsite TB testing (23, 72%) reported performing AFB smear microscopy and MTB culture, 4 (13%) reported performing AFB smear microscopy and MTB culture identification, 3 (9%) reported performing AFB smear microscopy only, and 2 (6%) reported performing AFB smear microscopy, MTB culture identification, and MTB drug susceptibility testing. Seventeen (53%) reported submitting at least one subculture from each primary isolate of *M. tuberculosis*/*M. tuberculosis* complex to the local public health lab, as required. Eighteen (56%) reported an affiliation with a histopathology or surgical pathology laboratory.

Twenty-nine (91%) laboratories performed primary isolation on site. Of these, most labs (22, 76%) used both solid media and broth system and 7 (24%) used solid medium/plate. Twelve (41%) of the 29 laboratories performed isolate identification on site. Of these 12 labs, the methods used to identify MTB complex

included DNA Probe (92%), biochemical testing (67%), HPLC (17%), and PCR-based technology (8%). No laboratories reported using ρ -nitro- α -acetylamino- β -hydroxypropiofenone (NAP) testing.

Only two (6%) laboratories reported performing susceptibility testing on site. Both used solid media and broth-based systems for susceptibility testing.

Discussion

Laboratories are a key stakeholder in the fight to control TB in the county, and play an instrumental role in identifying and confirming new TB cases. These laboratories are responsible for the accurate and timely reporting of any and all findings that are suggestive of TB. Prompt reporting allows for rapid public health intervention.

A potential limitation of this survey is the modest response rate (81%); however, completed surveys from laboratories that actually perform any level of mycobacterial analysis was most likely near 100%. Over 9 out of 10 laboratories reported positive AFB results back to the physician within one working day, as mandated by the California Health and Safety Code, and more than 7 out of 10 surveyed laboratories are using rapid culture systems to cultivate MTB.

Conclusion

The information gathered from the 2006 Lab Survey helps the TB Control Program in several ways. First, the TBC Program can update the list of laboratories that are conducting any diagnostic studies for TB. Second, the survey results will identify the level of service performed, the methods and technologies used, and the work load of each laboratory. Third, staff can use this data to provide informative and constructive feedback to the laboratories on the timely and accurate reporting of TB to the clinician and establish a cooperative relationship between the program and the laboratories.

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March 24th is World TB Day. The CDC, the National Tuberculosis Controllers Association, state controllers associations, and local county jurisdictions participate in public awareness campaigns intended to inform the public and elected representatives of the impact of TB in the U.S. and on the critical and continued need for sustained funding to support the work to control and eradicate TB.

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THE PUBLIC'S HEALTH

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COUNTY OF LOS ANGELES

Public Health

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Selected Reportable Diseases (Cases)¹ — August/September 2006

Disease	THIS PERIOD AUG/SEPT2006	SAME PERIOD LAST YEAR AUG/SEPT2005	YEAR TO DATE –SEPT		YEAR END TOTALS		
			2006	2005	2005	2004	2003
AIDS ¹	238	233	1,001	1,140	1,519	2,211	2,440
Amebiasis	15	19	73	93	114	114	121
Campylobacteriosis	175	144	574	555	725	884	1,100
Chlamydial Infections	7,002	6,714	31,117	29,479	38,862	38,464	36,900
Encephalitis	7	5	50	47	57	133	38
Gonorrhea	1,882	1,929	8,255	7,827	10,494	9,696	8,078
Hepatitis Type A	53	20	452	111	480	321	374
Hepatitis Type B, acute	7	3	50	41	57	72	73
Hepatitis Type C, acute	1	0	3	1	3	5	0
Measles	0	0	1	0	0	1	0
Meningitis, viral/aseptic	100	146	276	511	515	807	899
Meningococcal Infect.	4	3	37	30	37	28	32
Mumps	13	2	18	8	8	2	10
NGU	89	154	606	907	1,101	1,470	1,410
Pertussis	39	51	207	232	438	156	130
Rubella	0	0	1	0	1	0	0
Salmonellosis	292	263	799	784	1,085	1,205	995
Shigellosis	145	138	371	454	710	625	669
Syphilis (prim. and sec.)	98	114	529	467	646	470	468
Syphilis early latent	97	106	522	425	571	395	388
Tuberculosis	132	176	477	570	906	930	949
Typhoid fever, Acute	4	3	13	10	12	13	16

1. Case totals are provisional and may vary following periodic updates of the database.