

MANAGEMENT OF TB IN THE HOMELESS: CDC'S EXPERIENCE WITH OUTBREAKS

Sapna Bamrah Morris, MD

**International Union Against Tuberculosis and Other
Lung Diseases- North American Regional Meeting
March 2, 2013**

Background

- **1% of the U.S. population experiences homelessness in a given year**
- **Well-established association between TB and the homeless**



Photo taken with written consent
by Isabelle Sanchez

CDC Experience: TB Outbreaks and Homelessness

- ❑ **72% of domestic TB outbreaks investigated by CDC in 2002–2010 involved homelessness**
 - In one outbreak, all 31 cases in a 2-year period were linked to a single homeless shelter
- ❑ **Factors promoting TB transmission among persons experiencing homelessness**
 - Vulnerable persons in crowded congregate settings
 - Name-based contact investigations of limited utility
 - Timely diagnosis and treatment completion challenging

National Analysis of TB Genotyping, 2005–2009

□ Genotyping analysis (2005–2009)*

- SatScan-based, 3 overlapping 3-year periods, clusters ($n \geq 2$), where clusters indicate recent transmission
- 11.2% of homeless persons with TB in clusters
- Homeless persons with TB more likely in clusters:
OR = 2.4 (Adjusted OR = 1.4)
- Substance users with TB more likely in clusters:
OR = 2.3 (Adjusted OR = 1.4)

* Source: Moonan PK, Ghosh S, Oeltmann JE, Kammerer JS, Cowan LS, Navin TR. Using genotyping and geospatial scanning to estimate recent Mycobacterium tuberculosis transmission, United States. Emerg Infect Dis, 2012 Mar.

ACET Recommendations to Prevent and Control TB among the Homeless

- ❑ **Advisory Council on the Elimination of Tuberculosis (ACET) published recommendations in 1992 addressing TB in homeless populations:**
 - TB case finding and treatment completion
 - LTBI screening and treatment if HIV infection or other medical condition that increases TB risk
 - Examine (and potentially retreat) inadequately treated recent TB disease and infection
 - Contact investigation, including screenings at shelters

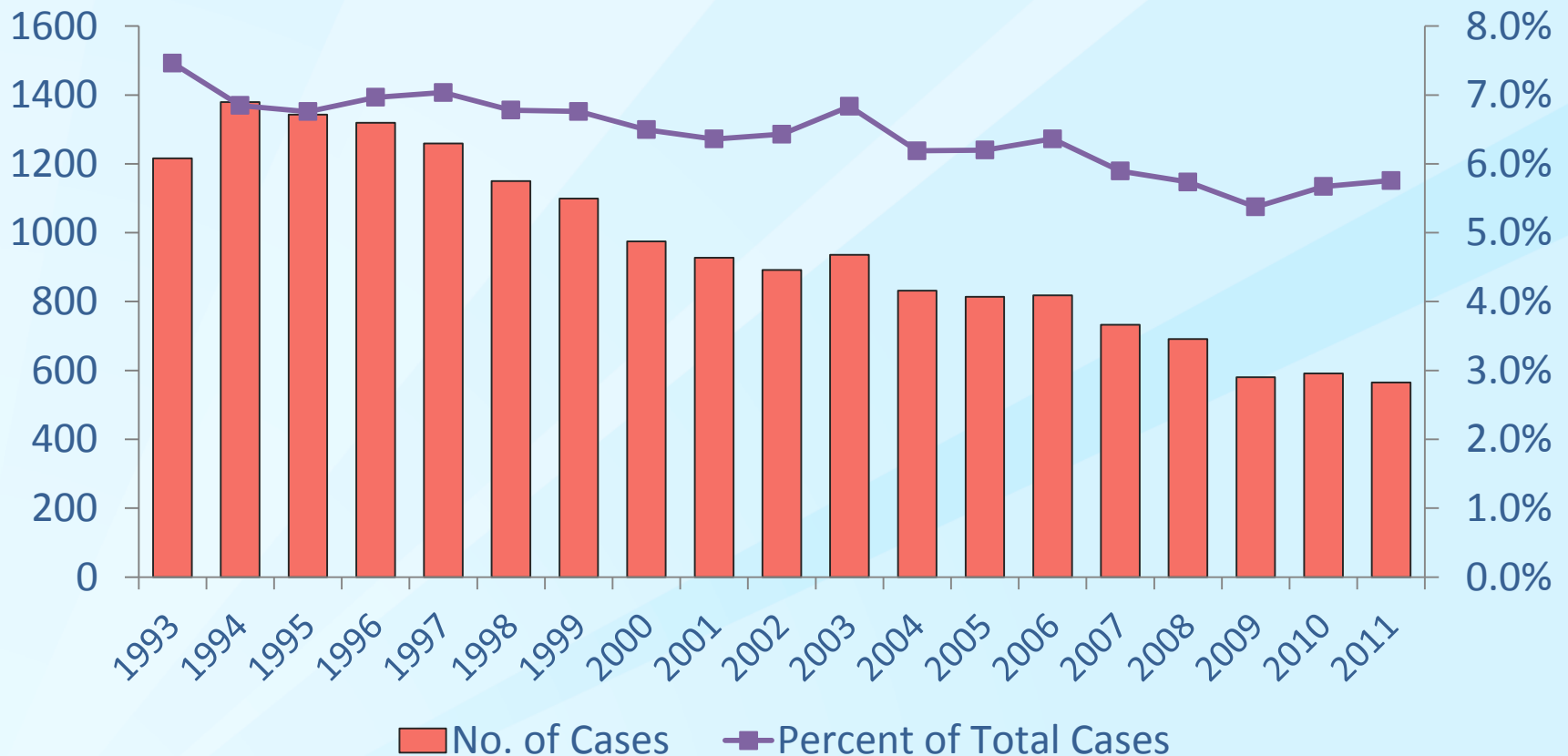
EPIDEMIOLOGY OF TB IN PERSONS EXPERIENCING HOMELESSNESS

Surveillance* Definition of Homelessness

- ❑ **Homeless variable added in 1993**
- ❑ **At any time during the 12 months before the TB diagnostic evaluation**
- ❑ **One of the following**
 - No fixed, regular, and adequate nighttime residence
 - Primary nighttime residence was
 - Publicly or privately operated shelter
 - Institution that provides temporary residence
 - Building not designated for, or ordinarily used as, regular sleeping accommodation for human beings
 - Alternating between multiple residences

* Definition of homelessness in the Report of Verified Case of TB (RVCT)

TB Cases Reported as Homeless in the 12 Months Prior to Diagnosis, Age ≥15, United States, 1993-2011*



*Updated as of June 25, 2012

Note: Homeless within past 12 months of TB diagnosis



TB Incidence

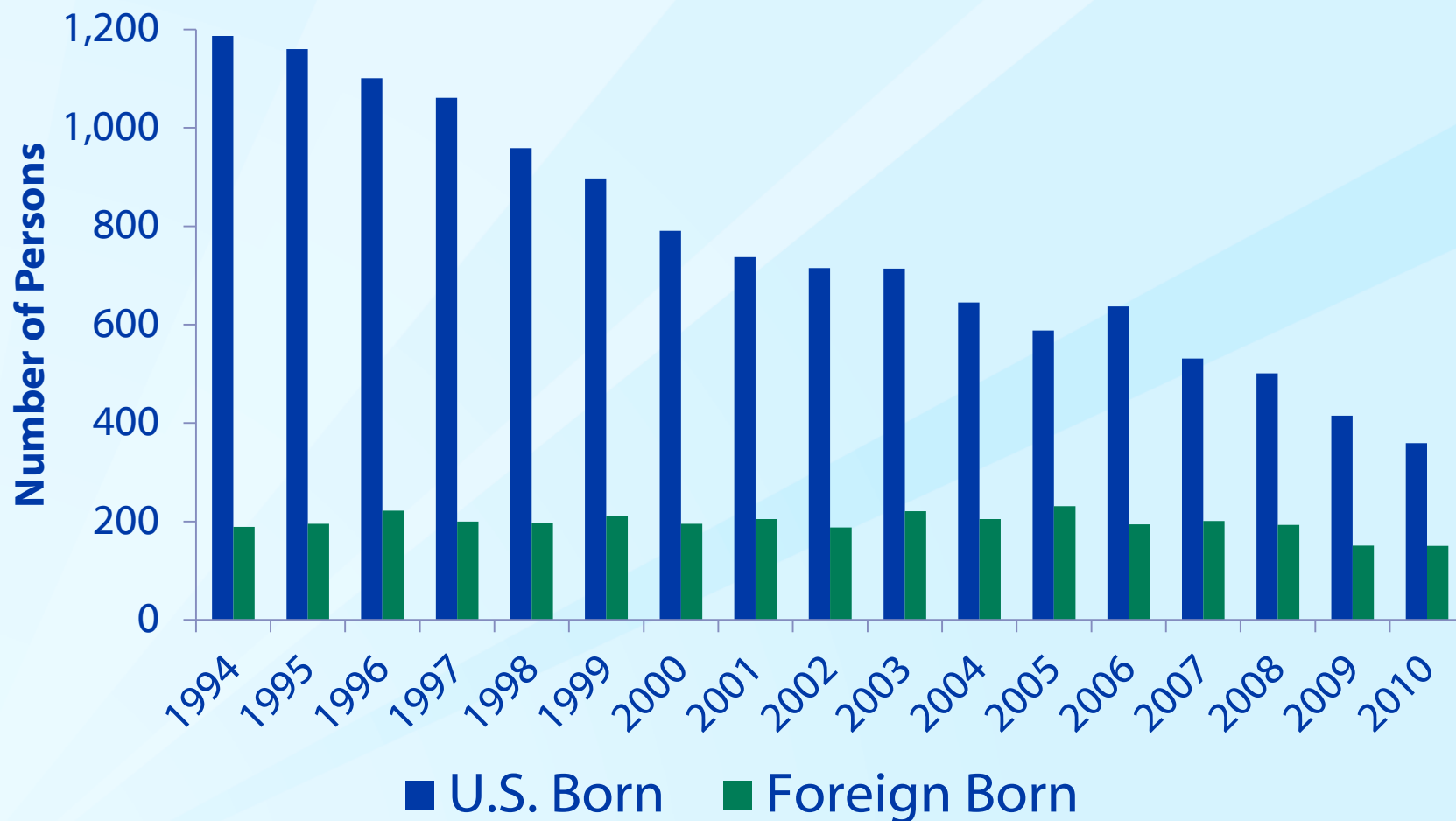
□ U.S. TB incidence rate

- 2007 (Jan 1 – Dec 30, 2007) 4.4 per 100,000
- 2008 (Jan 1 – Dec 30, 2008) 4.2 per 100,000
- 2009 (Jan 1 – Dec 30, 2009) 3.8 per 100,000

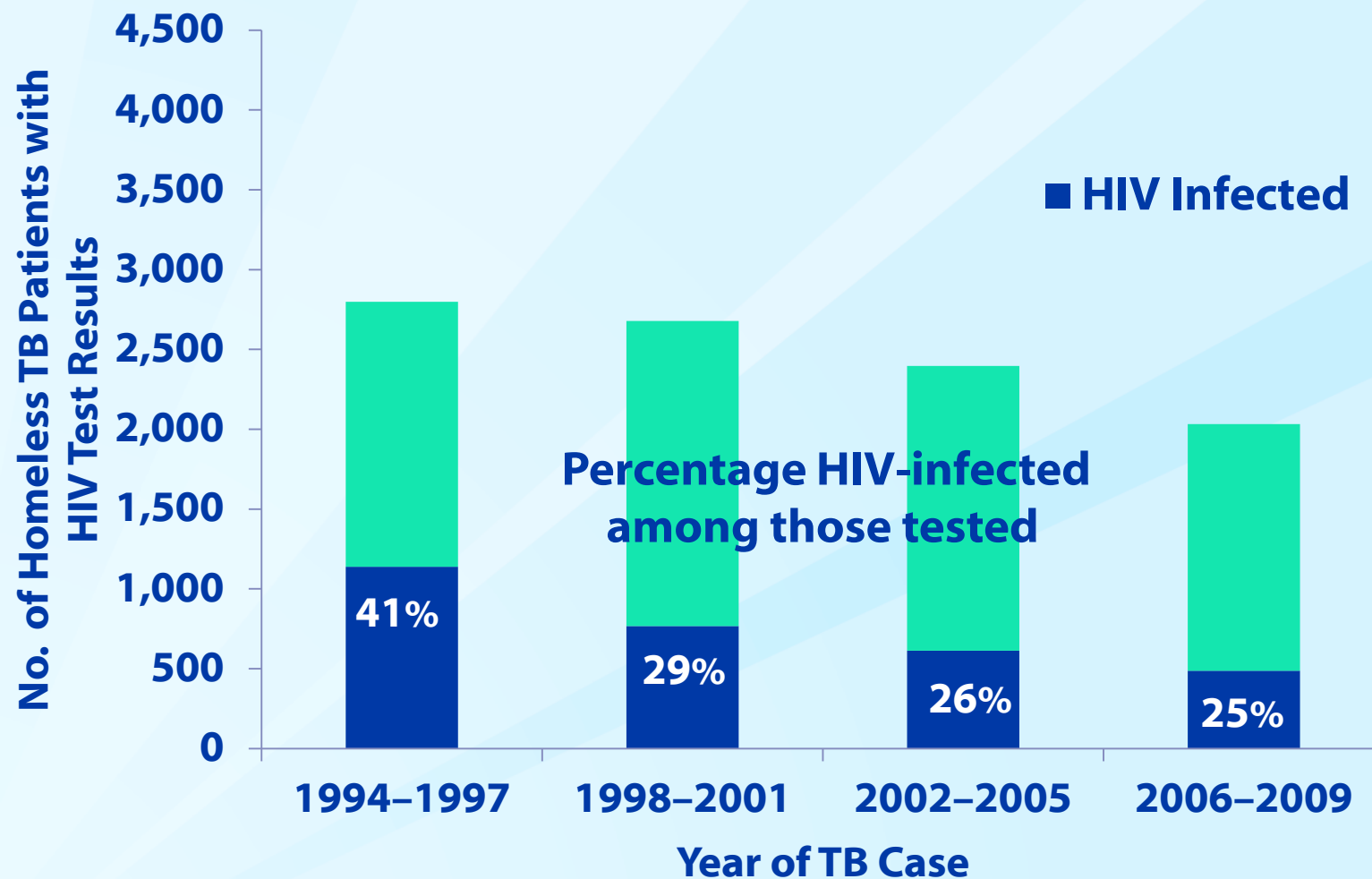
□ TB incidence rate in the homeless

- 2007 (Oct 1, 2006–Sept 30, 2007) 46 per 100,000
- 2008 (Oct 1, 2007–Sept 30, 2008) 45 per 100,000
- 2009 (Oct 1, 2008–Sept 30, 2009) 40 per 100,000
- Over 3 years 44 per 100,000

Number of TB Cases in U.S.-born vs. Foreign-born Homeless Persons — United States, 1994–2010



HIV Infection among Homeless Persons with TB — United States*, 1994–2009



*Excluding CA, RI, VT

Substance Use among Homeless Persons with TB — United States, 1994–2009

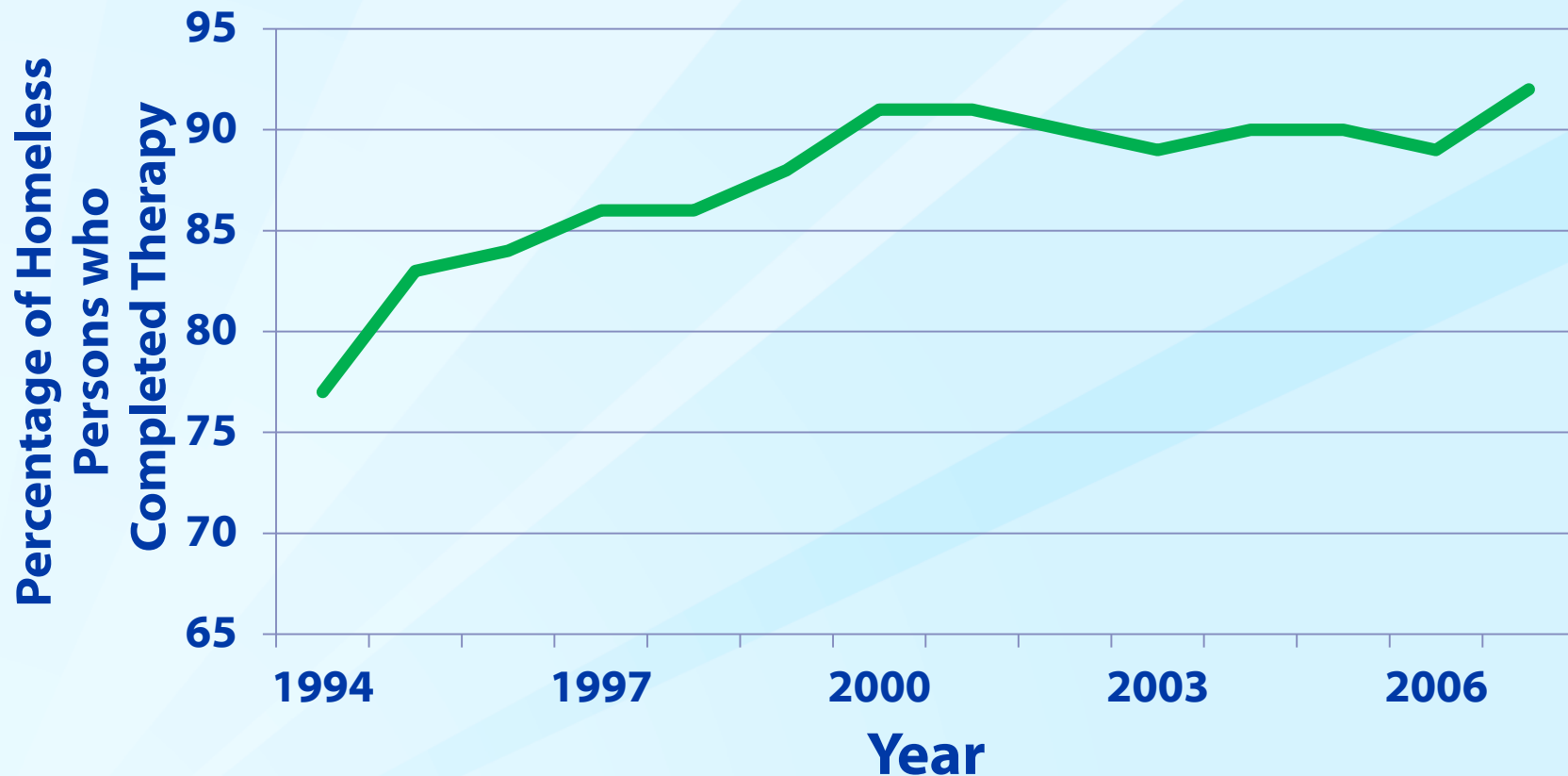
Substance used in past year	Homeless N=15,919		Non-Homeless N=242,084		Prevalence Odds Ratio (95% CI)
	n	(%)	n	(%)	
Excess alcohol	8,444	(53)	27,543	(11)	10 (9.6–10.3)
Non-injection drug	4,941	(35)	13,067	(6)	9 (8.5–9.2)
Injection drug	2,038	(14)	4,358	(2)	9 (8.2–9.1)
Any of the above substances	10,308	(65)	34,470	(14)	11 (10.7–11.5)

Incarceration by Housing Status in Persons with TB — United States, 1994–2009

Characteristic	Homeless N=15,919		Non-Homeless N=242,084	
	n	(%)	n	(%)
Correctional institution at time of diagnosis	1,430	(9)	7,655	(3)
Type of correctional institution				
Local Jail	1,146	(80)	3,721	(49)
State prison	142	(10)	2,481	(32)
Federal prison	41	(3)	537	(7)

Note: p values <0.01 for all comparisons listed

Homeless Persons with TB who Completed Treatment — United States, 1994–2007



Source: National TB Surveillance System, CDC

TB Treatment Outcomes* by Housing Status — United States, 1994–2007

Outcome	Homeless N=14,005		Non-Homeless N=209,593		Prevalence Odds Ratio (95% CI)
	n	(%)	n	(%)	
Completed	11,087	(79)	178,202	(85)	0.5 (0.47–0.53)
Died during treatment	1,246	(8.8)	17,951	(8.5)	1.0 (0.98–1.1)
Moved	568	(4)	6,384	(3)	1.4 (1.2–1.5)
Lost	933	(7)	4,570	(2)	3.2 (3.0–3.4)
Refused	100	(0.7)	476	(0.7)	1.1 (0.9–1.3)

*Outcome defined only for those who initiated therapy (excluding dead at diagnosis).

CDC EXPERIENCE DURING OUTBREAK INVESTIGATIONS

TB Outbreaks

- ❑ U.S. TB outbreaks typically involve U.S.-born persons with multiple social risk factors for TB***
 - Overwhelming even to well-resourced programs**

- ❑ TB partners can ask CDC for assistance with outbreaks exceeding local surge capacity**

- ❑ Cutbacks expected to exacerbate difficulties detecting and responding to outbreaks**

* Mitruka K, Oeltmann JE, Ijaz K, Haddad MB. TB outbreak investigations in the United States, 2002–2008. *Emerg Infect Dis* 2011; 17(3):425–431.

Examples of Recent Investigations

- ❑ **Drug-resistant outbreak at urban shelter**
- ❑ **Outbreaks associated with shelter & jail**
- ❑ **Outbreak at an assisted living facility for adults with mental illness**
 - Resident population frequented homeless shelters
- ❑ **Outbreak among homeless in a suburban community of <100,000 total persons**
- ❑ **Outbreaks among homeless involving multiple homeless service centers**
 - Thousands of persons exposed at a service center to an infectious case during each outbreak

Common Themes

- ❑ **U.S.-born, men, & substance use common**
- ❑ **Prolonged infectious periods due to diagnostic delays**
- ❑ **Challenging to identify & locate contacts for evaluation**
 - Transient population, aliases common
 - Substance use, mental illness as barriers to care
 - Mistrust of authorities, reluctance to access care
- ❑ **Timely diagnosis & treatment of LTBI difficult**
- ❑ **Drug use-sites & jails were frequent transmission sites**

Findings Suggesting Transmission in Shelters

- Patient utilized services (e.g., overnight or daytime) at a shelter during infectious period or was exposed to another contagious patient who utilized services**
 - Might involve patients without an overnight stay
- Multiple cases with matching genotype patterns among persons with shared history of shelter use**
- In one outbreak, patient played cards with clients at shelter, but did not utilize shelter services**
 - Might involve patients who never used shelter services

CDC Experience with On-site Case Finding

- ❑ On-site case finding utilized as a supplement to traditional name-based contact investigations
- ❑ Examples from two investigations in 2009

Setting	Average nightly census (persons)	Population's housing status
Urban emergency overnight shelter	400–600	Homeless
Assisted living facility for adults with mental illness	80	Intermittent housed at facility but frequently stayed in homeless shelters

CDC Experience with On-site Case Finding

- ❑ Offered all staff and clients onsite services for TB evaluation, including TB symptom screening, chest radiography, clinician assessment, & TB skin test or blood test
 - Referrals for inpatient care (respiratory isolation) at discretion of onsite clinician based on symptoms, medical history (e.g., HIV)
- ❑ Results of on-site case finding

Number	Shelter	Facility
Participants	311	74
Diagnosed with latent TB infection	117 (38%)	66 (89%)
Diagnosed with active TB disease	5 (2%)	0

CDC Experience with On-site Case Finding

- ❑ **Required buy-in of shelter staff**
 - Impact on delivery of shelter services
 - Security concerns
- ❑ **Atypical work hours**
 - Some shelters have daytime lockout, so on-site activities in early morning or late evening
 - Overtime, special approvals for work hours
- ❑ **Incentives, education, & visible shelter staff participation to encourage participation of shelter clients**
- ❑ **Protection of health department staff**
 - Infection controls, environmental safety (e.g., extreme temps)

CDC Experience with On-site Case Finding

- ❑ **When possible, identified exposed cohort to target for active case-finding**
 - Bed maps, dates of stay, shelter staff
 - Can require complex data management with close cooperation of shelter
- ❑ **Maintain confidentiality**
- ❑ **Opportunity to evaluate for multiple health conditions in population with barriers to health care**
 - Assess for multiple conditions (e.g., diabetes)
 - Offer vaccinations (e.g., during flu season)
 - In one outbreak where HIV prevalence was high and a syphilis outbreak had occurred, testing for HIV and syphilis were offered

CDC Experience with On-site Case Finding

- ❑ **Has worked best when all services offered onsite**
 - Symptom screening
 - Test for TB infection
 - Chest radiography with “wet reads”
 - Sputum collection
 - Clinician available onsite
 - Hospitals aware of activities
- ❑ **IGRA versus TST**
 - Advantages of IGRA: second visit not required for result, test for multiple conditions using single venous puncture
 - Disadvantages: of IGRA: costs, laboratory capacity, need for phlebotomists, influence of environmental conditions (e.g., extreme cold temperatures in one outbreak)

Other Examples of Interventions

- ❑ **Housing first programs:** an immediate and primary focus on helping individuals and families quickly access and sustain permanent housing
- ❑ **Housing first programs have demonstrated**
 - Improved HIV treatment adherence
 - Improved overall health outcomes
 - Cost savings
 - Improved patient experience
- ❑ **Supportive housing during TB treatment**
 - Provides curative treatment to patient, removes infectious case from congregate setting → interrupts TB transmission
 - Reduces the effect of unstable housing as a barrier to adherence

Other Examples of Interventions

- ❑ **Administrative infection controls in congregate settings**
 - Mandatory skin testing for clients
 - TB screening upon intake
 - Cough monitoring by staff
- ❑ **Case management to address multiple comorbid conditions**
 - Mental illness, substance abuse, chronic disease (e.g., cancer, diabetes)
- ❑ **Bringing treatment to the patient (i.e., directly observed therapy for TB or LTBI at a shelter or homeless service center)**

Other Examples of Interventions

- ❑ **Providing incentives (e.g., public transportation tokens) to complete evaluation & treatment**
- ❑ **Testing for multiple conditions that affect population**
 - HIV infection
 - Sexually transmitted infections
 - Diabetes
- ❑ **Using blood test for TB infection rather than skin test**
 - Test for multiple conditions
 - Single clinical encounter
 - Perhaps less stigmatizing (test result not visible)

**WHAT WILL PREVENT A FUTURE
OUTBREAK?**

Setting up Administrative Controls at Shelter

- ❑ **Mandatory TB screening at all shelters within the community**
 - Within days of access to services
 - Using referral system with TB program, health department, or health clinic serving homeless persons
- ❑ **Other administrative controls**
 - Separating patients with symptoms until evaluation is complete
 - Cough monitor (requires training)
 - Attendance logs & bed maps
 - Symptom screening upon intake (requires training)
 - Establishing timely referral procedures
 - Routine screening for TB for clients & staff

Engaging Other Homeless Agencies

❑ Health Care for the Homeless (HCH) Grantees

- There are currently >180 clinics or community health centers that provide health care for this population
- Many have mobile and street clinic components
- HCH grantees have established rapport and trust with this population
- HCH providers conduct TB screening activities to provide clearance to enter programs

❑ Shelter directors

- Often know about social networks by the relative increase in interaction with their clients

LTBI Treatment

- ❑ **Persons experiencing homelessness have increased TB risk and should be screened as part of targeted testing programs**
- ❑ **Contacts in an outbreak are at even higher risk**
- ❑ **LTBI completion rates are low in this population**
 - Improve with TB education and use of incentives
- ❑ **Some protection has been shown in those that even begin (but may not complete) LTBI treatment**

Conclusions

- ❑ **TB disproportionately affects homeless persons**
 - 10-fold higher TB incidence rate
- ❑ **Decline of TB occurring among homeless persons mirrors decline in the United States**
- ❑ **Foreign-born comprise 20% of homeless TB patients**
 - Predominantly Hispanic
 - Their characteristics more similar to U.S.-born homeless than to other foreign-born with TB

Conclusions

- ❑ **Persons who are homeless have a high prevalence of conditions that increase TB risk**
 - Both for TB infection and TB disease
 - Vulnerable populations in congregate settings → potential for explosive transmission of TB
 - Population often lacks ready access to medical care
- ❑ **Homeless persons with TB have a higher prevalence of HIV infection, previous TB, and more advanced disease**
- ❑ **Genotyping shows that homeless persons with TB are more likely to be in clusters and those clusters are more likely to grow**

Conclusions

- ❑ **Although homelessness is associated with 6% of TB cases, homelessness is a common feature of outbreaks where CDC is asked to provide assistance**
- ❑ **Interventions to interrupt transmission among homeless populations often require alternative methods**
 - Often resource-intensive, difficult to sustain

What is being done at the national level?

- ❑ **Multiple agencies & non-governmental organizations addressing homelessness & needs of the homeless**
 - Includes agencies outside of CDC & HHS
- ❑ **Effective TB control strategies should integrate interventions that address other health problems**
 - Will require collaboration across agencies & organizations
 - CDC's Division of TB Elimination is exploring CDC's role

Acknowledgments

Krista Powell
Rachel Yelk Woodruff
Jim Tobias
Sandy Althomsons
Isabelle Sanchez

Kiren Mitruka
Steve Kammerer
Carla Jeffries
Maryam Haddad
Tom Navin

For more information please contact Centers for Disease Control and Prevention

1600 Clifton Road NE, Atlanta, GA 30333

Telephone: 1-800-CDC-INFO (232-4636)/TTY: 1-888-232-6348

E-mail: cdcinfo@cdc.gov Web: <http://www.cdc.gov>

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.