Epidemiology of Tuberculosis in Los Angeles County

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Los Angeles County TB Control Program

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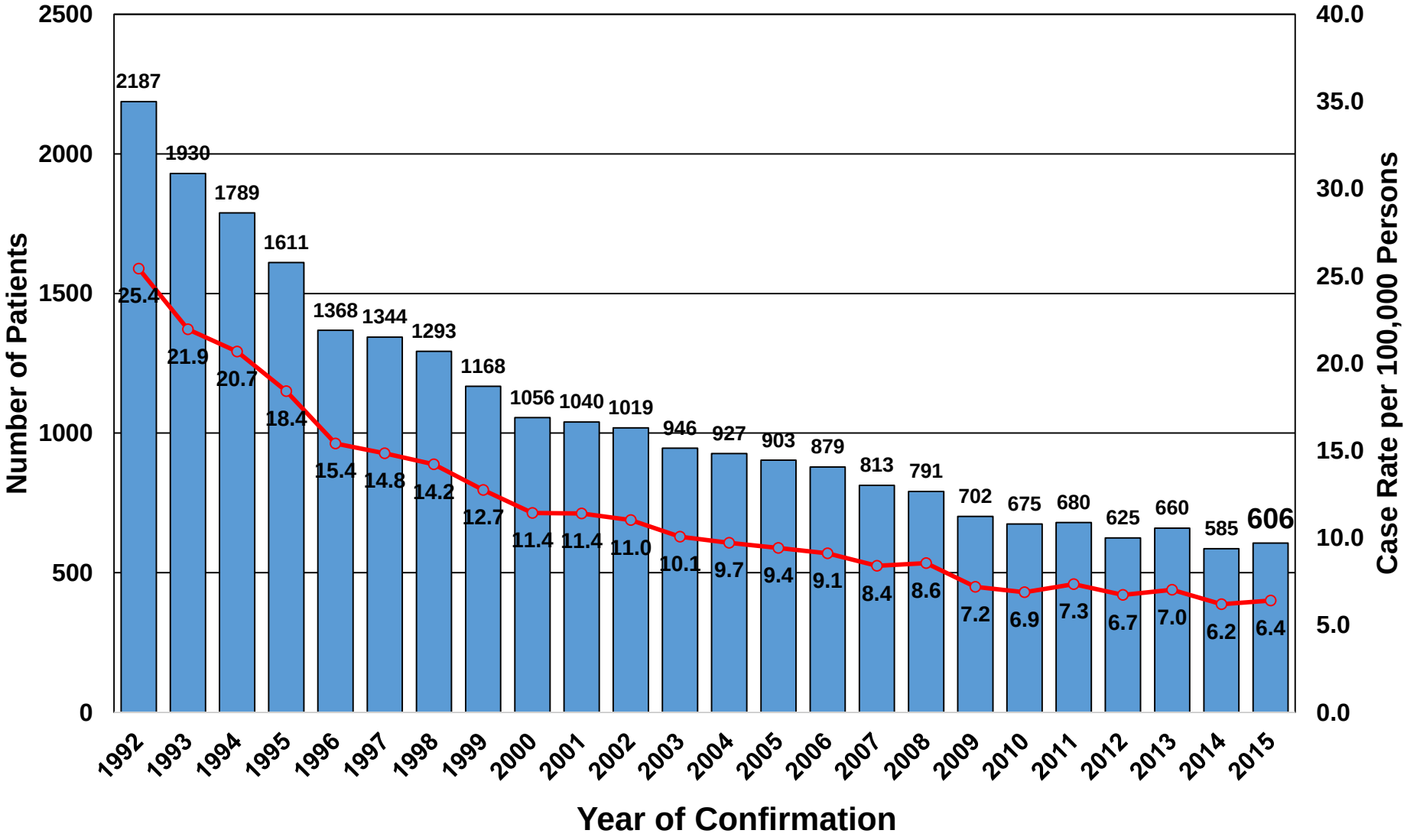
Learning Objectives

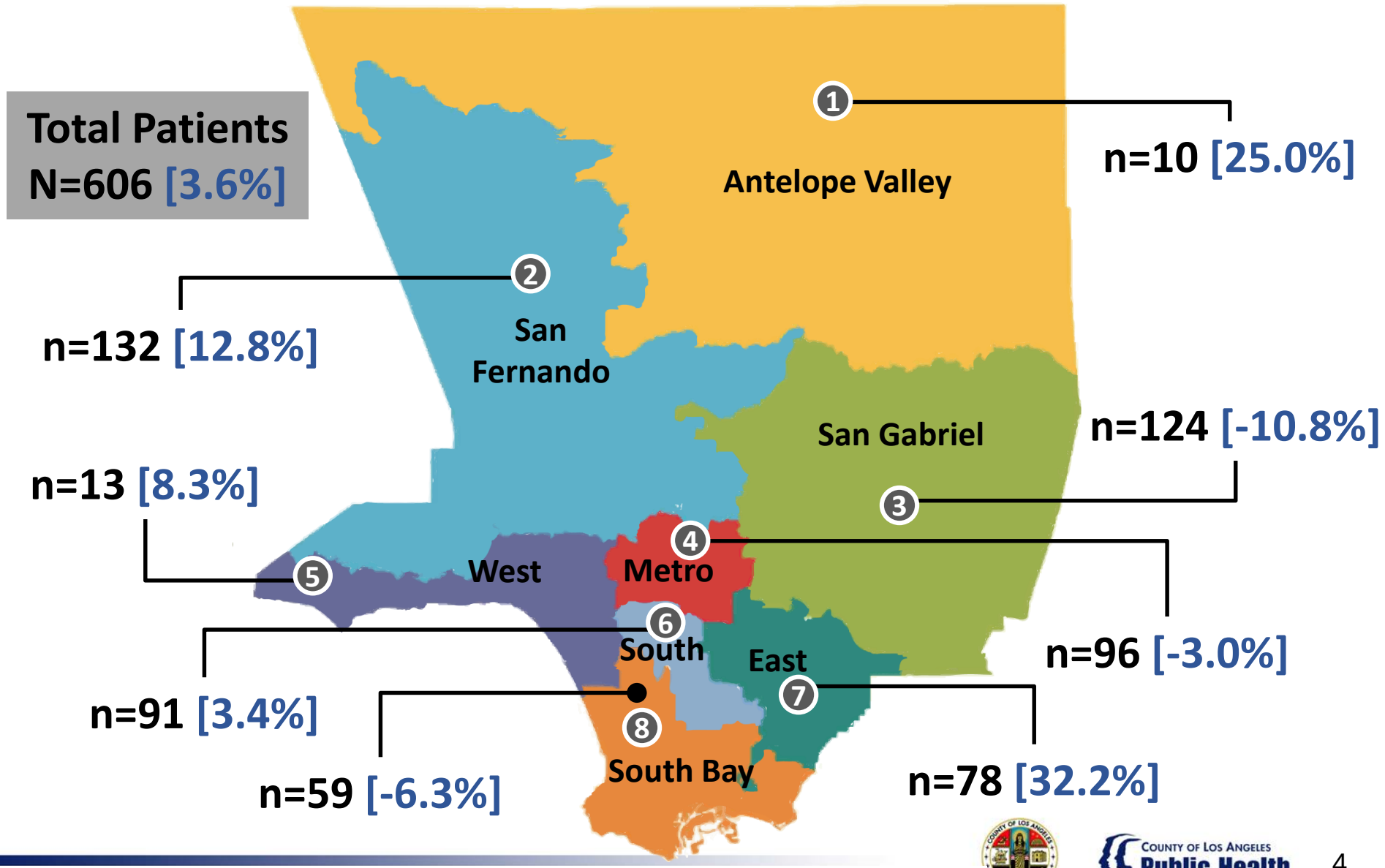
- Describe the basic trends and patterns of tuberculosis in Los Angeles County in 2015
- Describe the epidemiology of TB among specific population subsets
- Describe the demographics and clinical characteristics of our TB cases
- Describe two current tuberculosis outbreaks in LA County

TB Cases in LA County, 1992-2015



LA County TB Patients. Data exclude Pasadena and Long Beach TB Patients.
Based on TRIMS data, updated 2/8/16. Data are provisional and subject to change. Population estimates source: Internal Services Department Social Services Systems Division, *2014 Population Estimates, prepared for County of Los Angeles*, 2014. 2015 population estimates based on latest available data (2014).

TB patients by Service Planning Area 2015



LA County TB Patients. Data exclude Pasadena and Long Beach TB Patients. Based on TRIMS data, updated 2/8/16. Data are provisional and subject to change. Three Patients were excluded because they were classified as Admin Headquarters In this figure, SPA refers to the SPA that confirmed the patient. Percent Change is calculated by: ((2015-2014)/2014)*100

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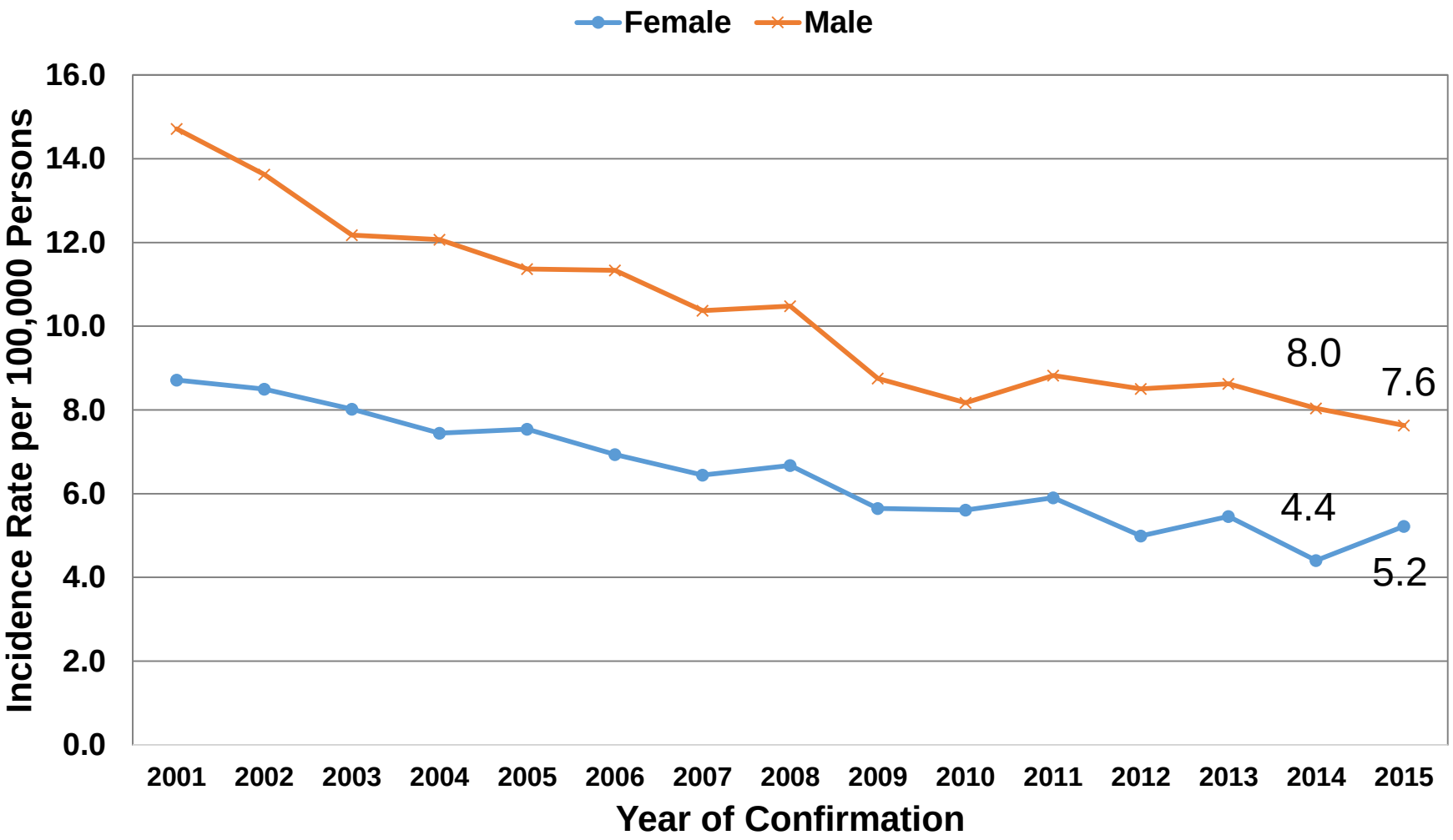
DEMOGRAPHICS of TUBERCULOSIS PATIENTS

TB Case Rates by Sex: LA County 2001-2015



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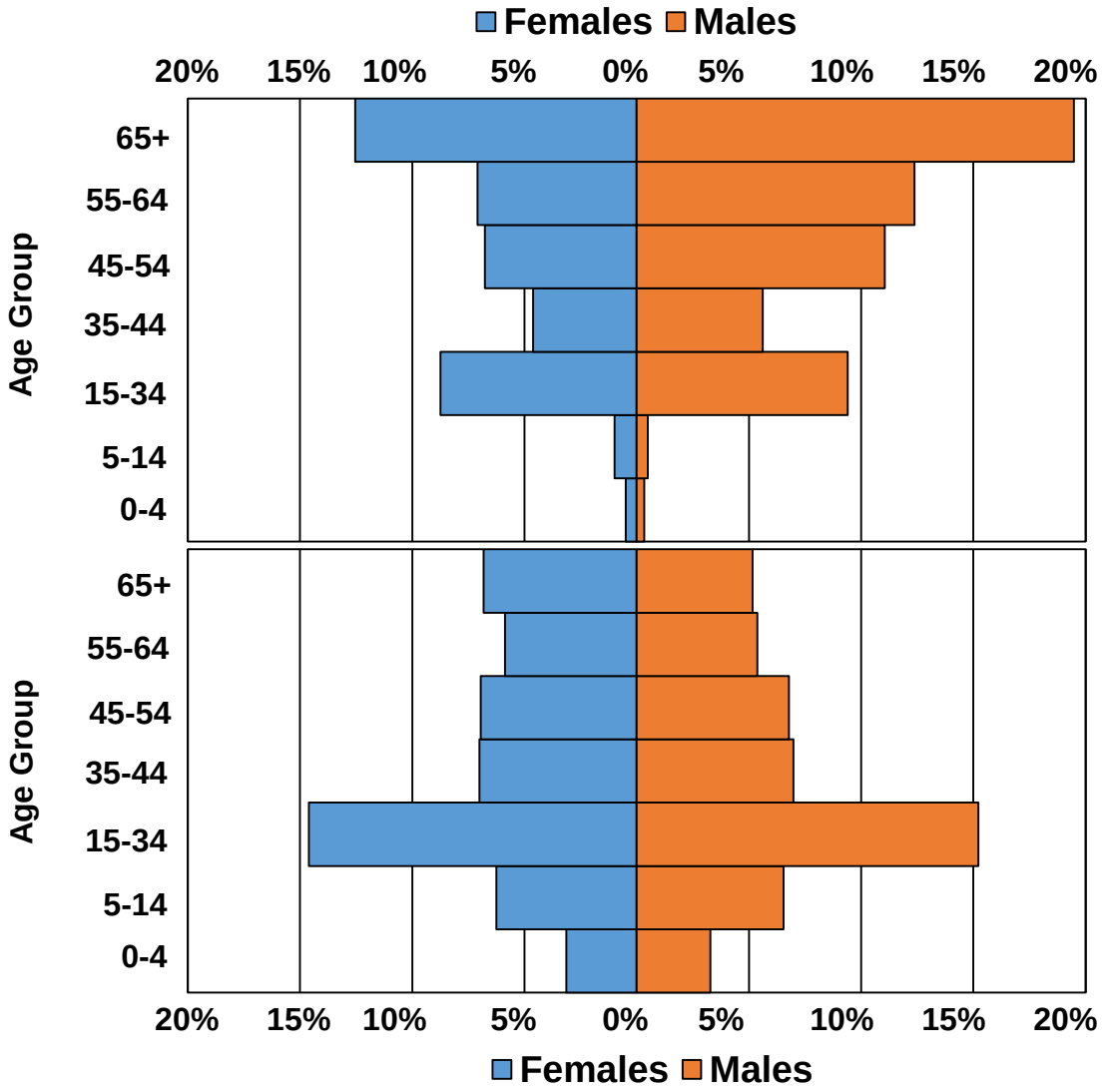
Age-Gender Distributions: LA County 2014-2015



LA County TB patients, 2015

LA County population (2014)

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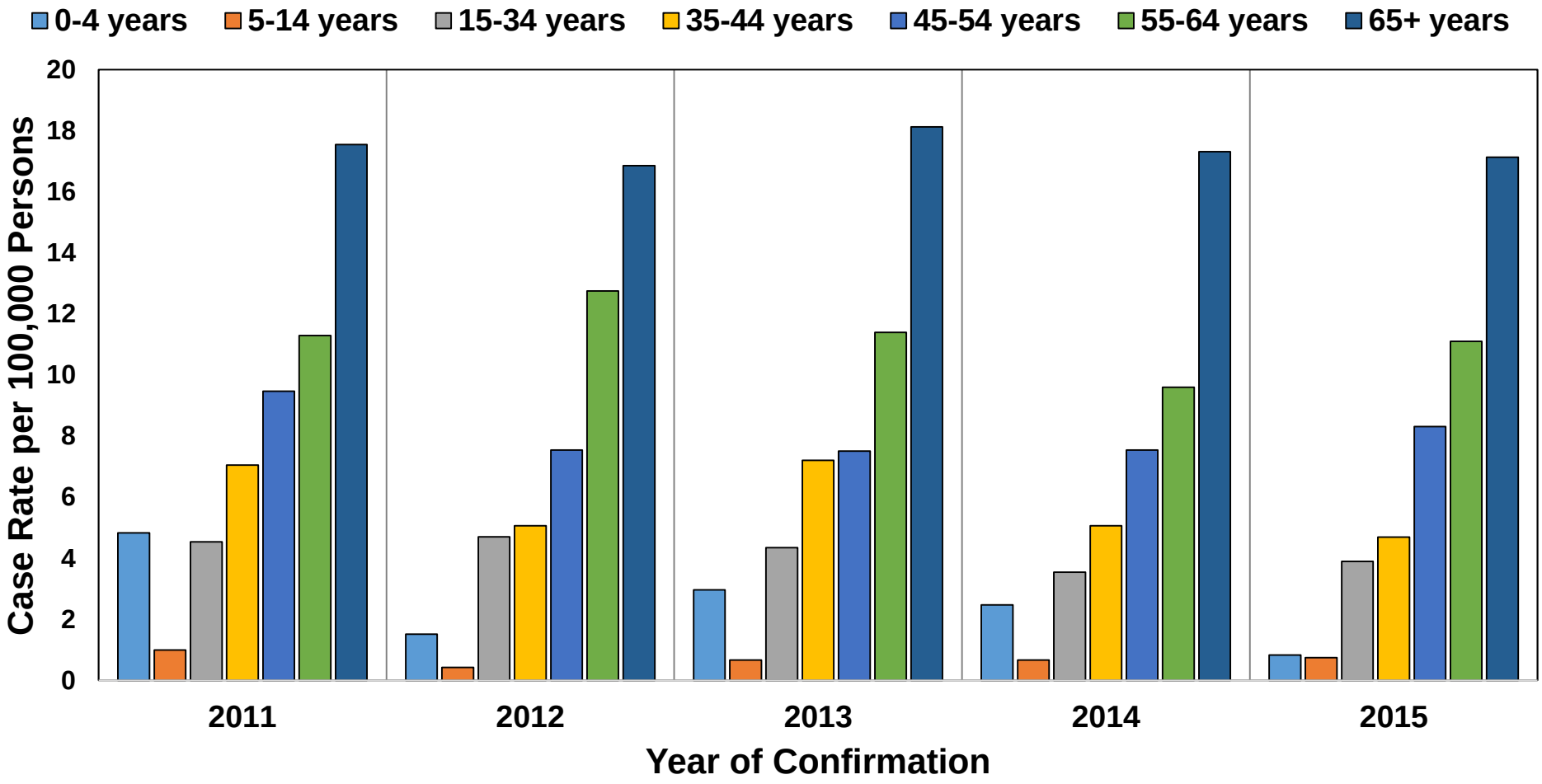
TB Case Rates by Age: LA County 2011-2015



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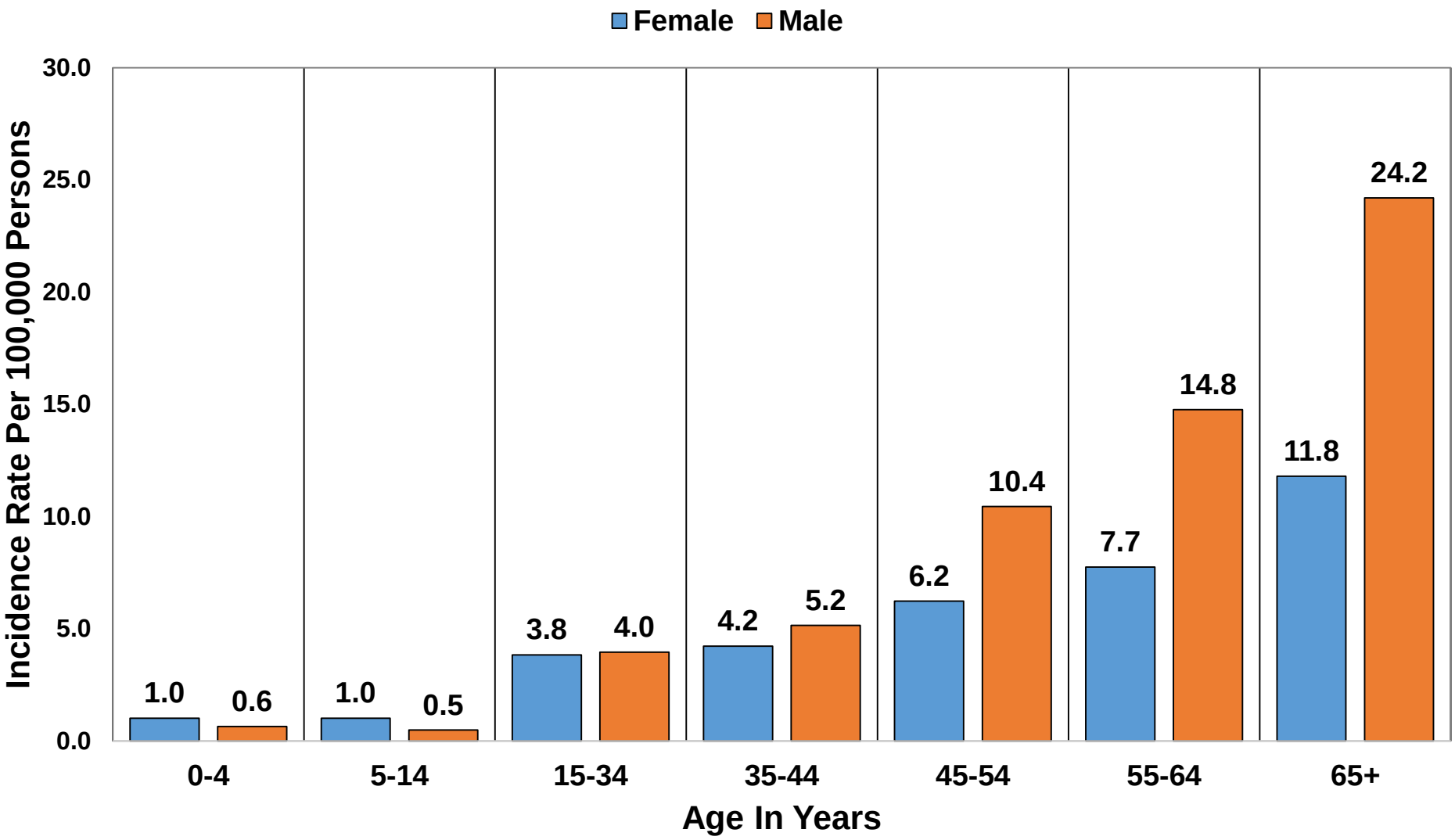
TB Case Rates by Sex and Age: LA County 2015



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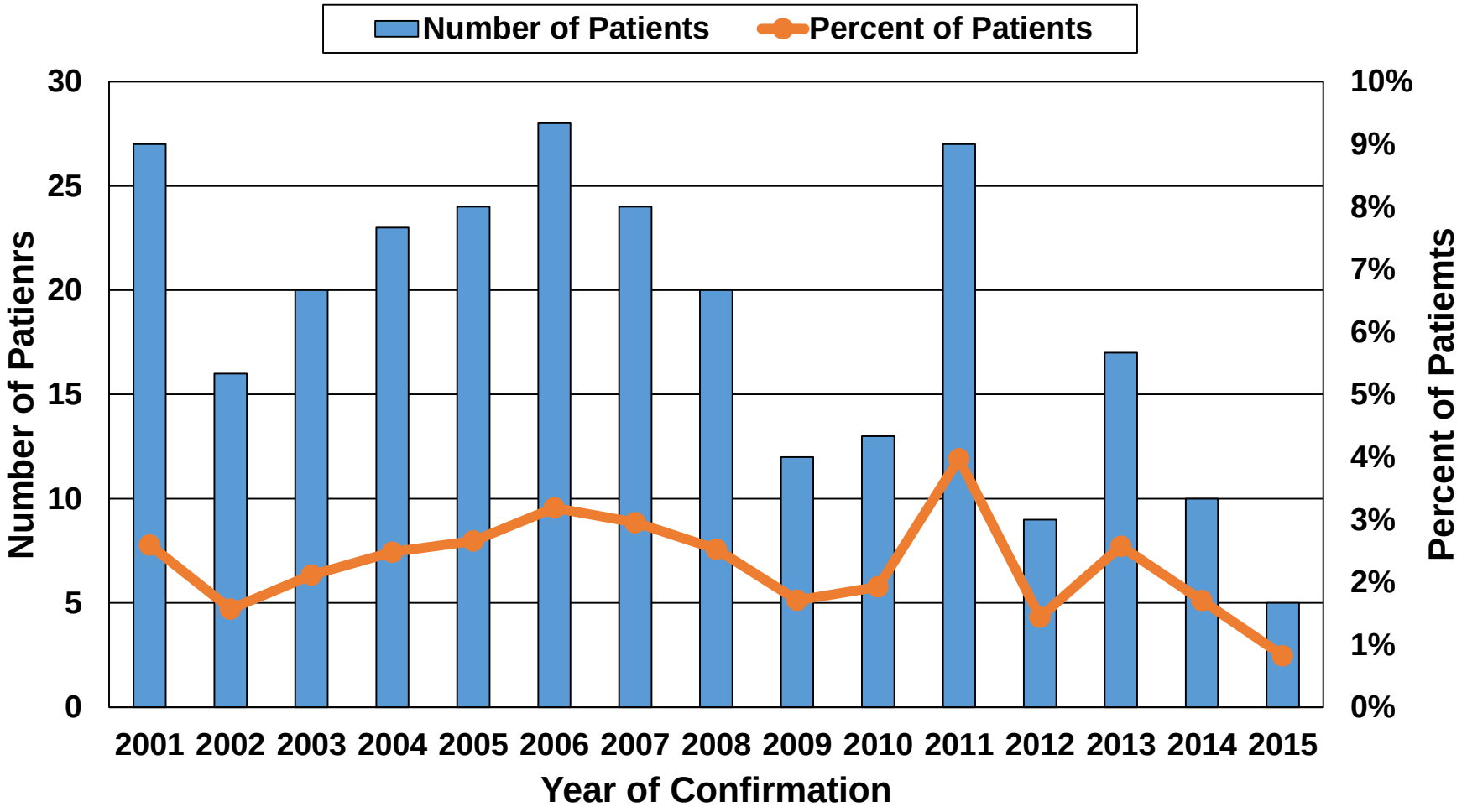
Tuberculosis in children under 5 years: LA County 2001-2015



LA County TB Patients. Data exclude Pasadena and Long Beach TB patients.
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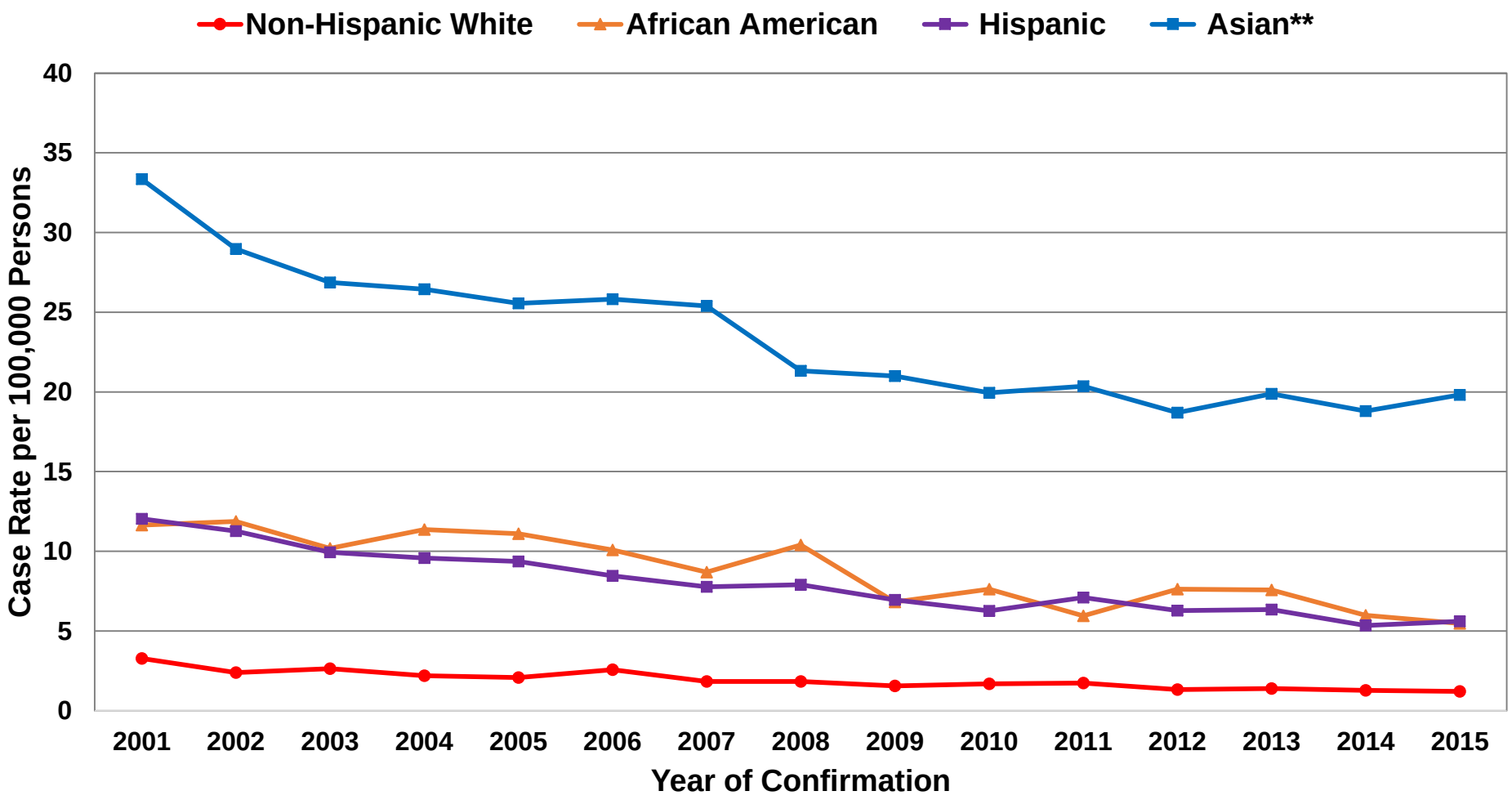
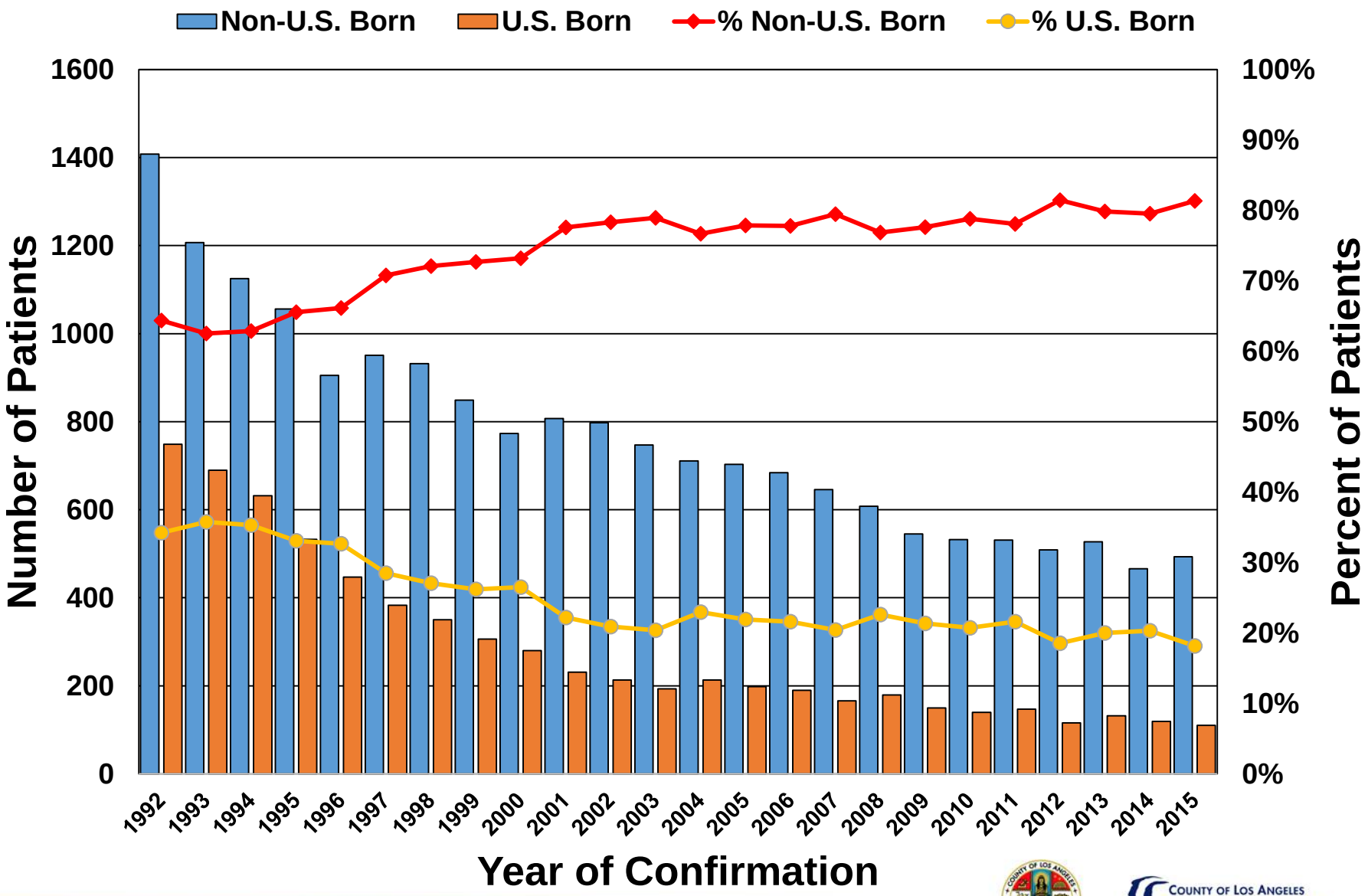
TB Rates by Race/Ethnicity: LA County 2001-2015



**Asian includes NHPI (Native Hawaiian / Pacific Islander). LA County TB Patients. Data exclude Pasadena and Long Beach TB patients. Based on TRIMS data, updated 2/8/16. Data are provisional and subject to change. Population estimates source: Internal Services Department Social Services Systems Division, *2014 Population Estimates, prepared for County of Los Angeles*, 2014.. 2015 population estimates based on latest available data (2014).

U.S. and Non-U.S. Born TB Patients: LA County 1992-2015



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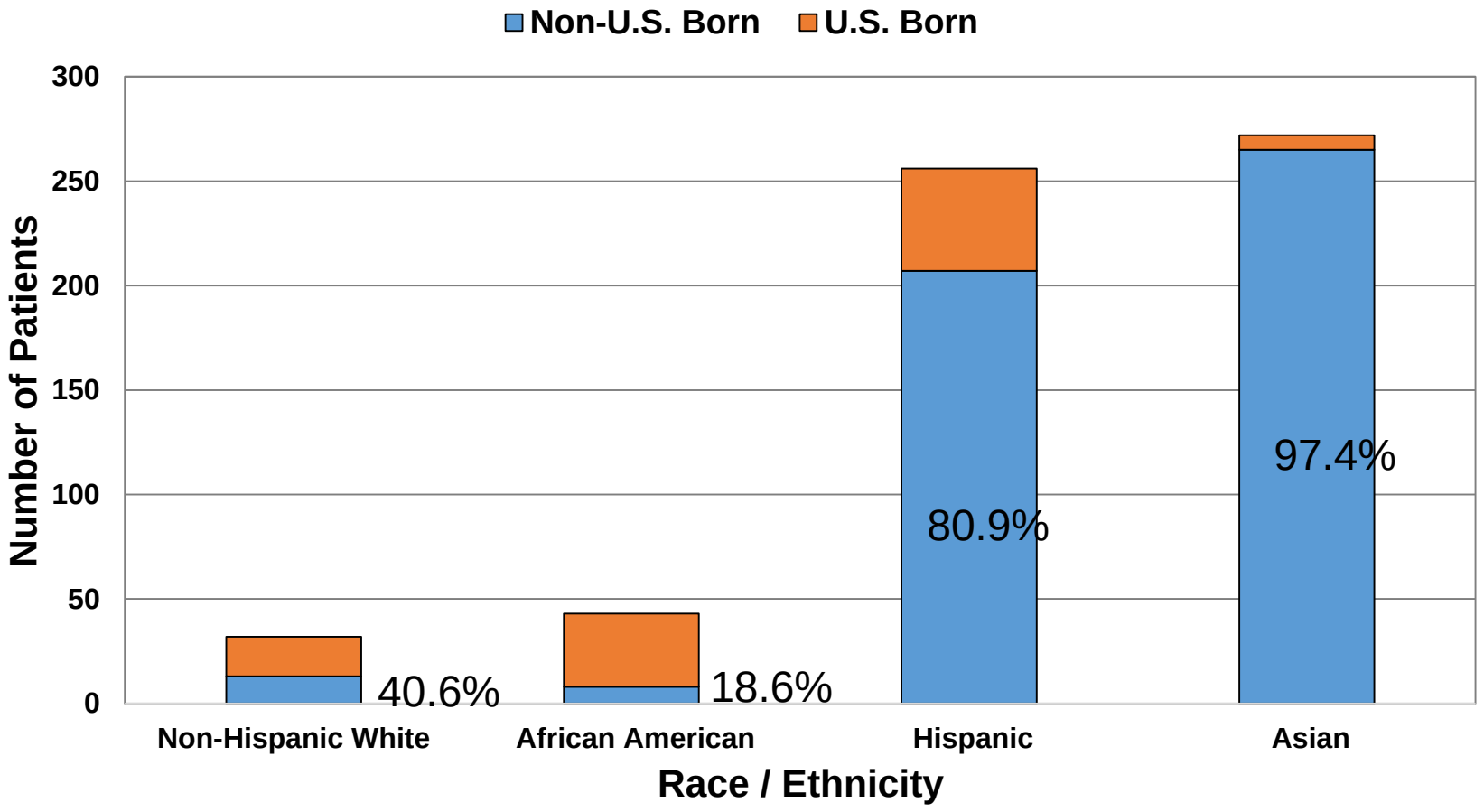
U.S. and Non-U.S. Born TB Patients by Race/Ethnicity: LA County 2015



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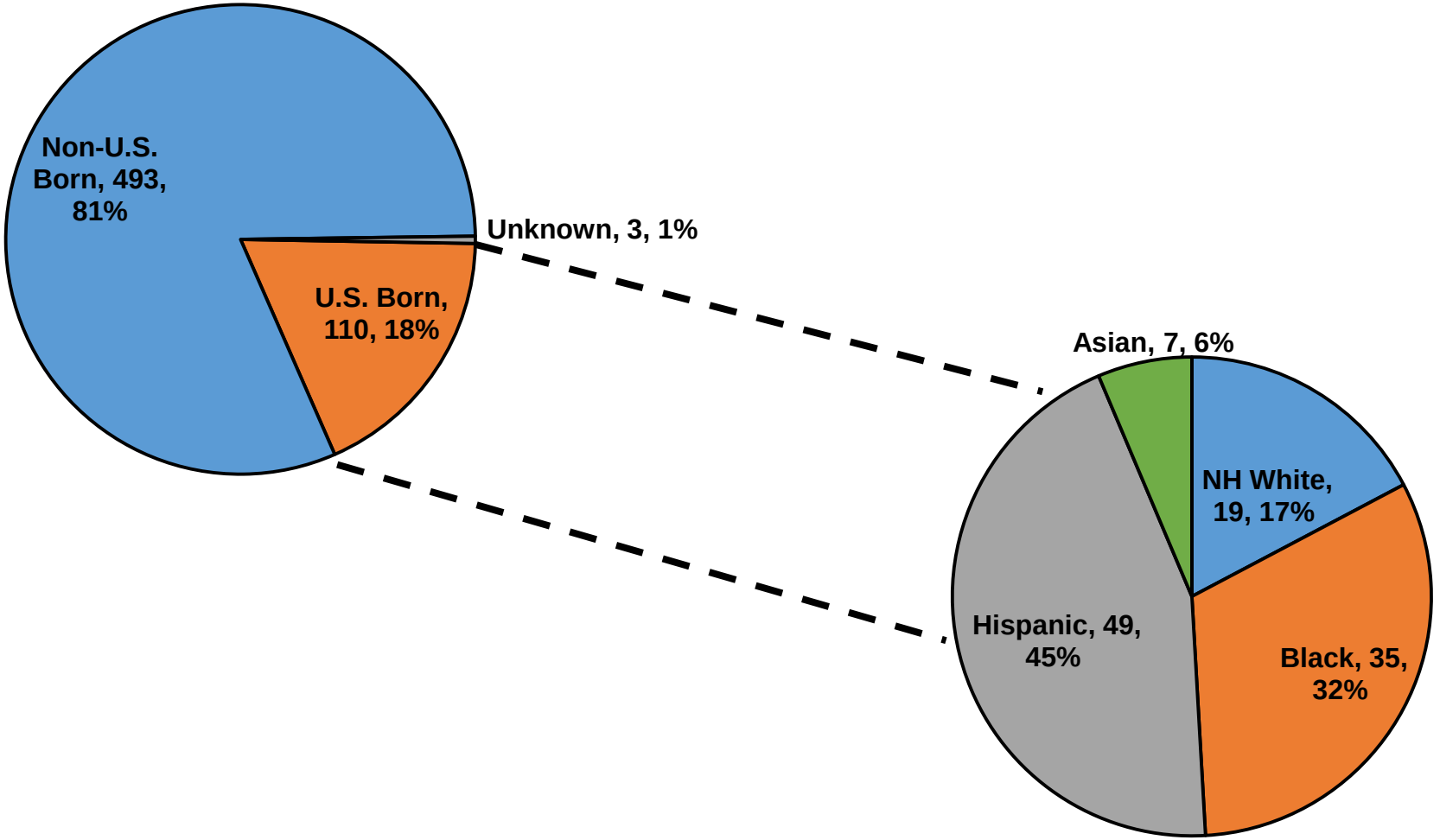
TB Patients by Nativity and Race/Ethnicity: LA County 2015



LA County TB Patients. Data exclude Pasadena and Long Beach TB patients.
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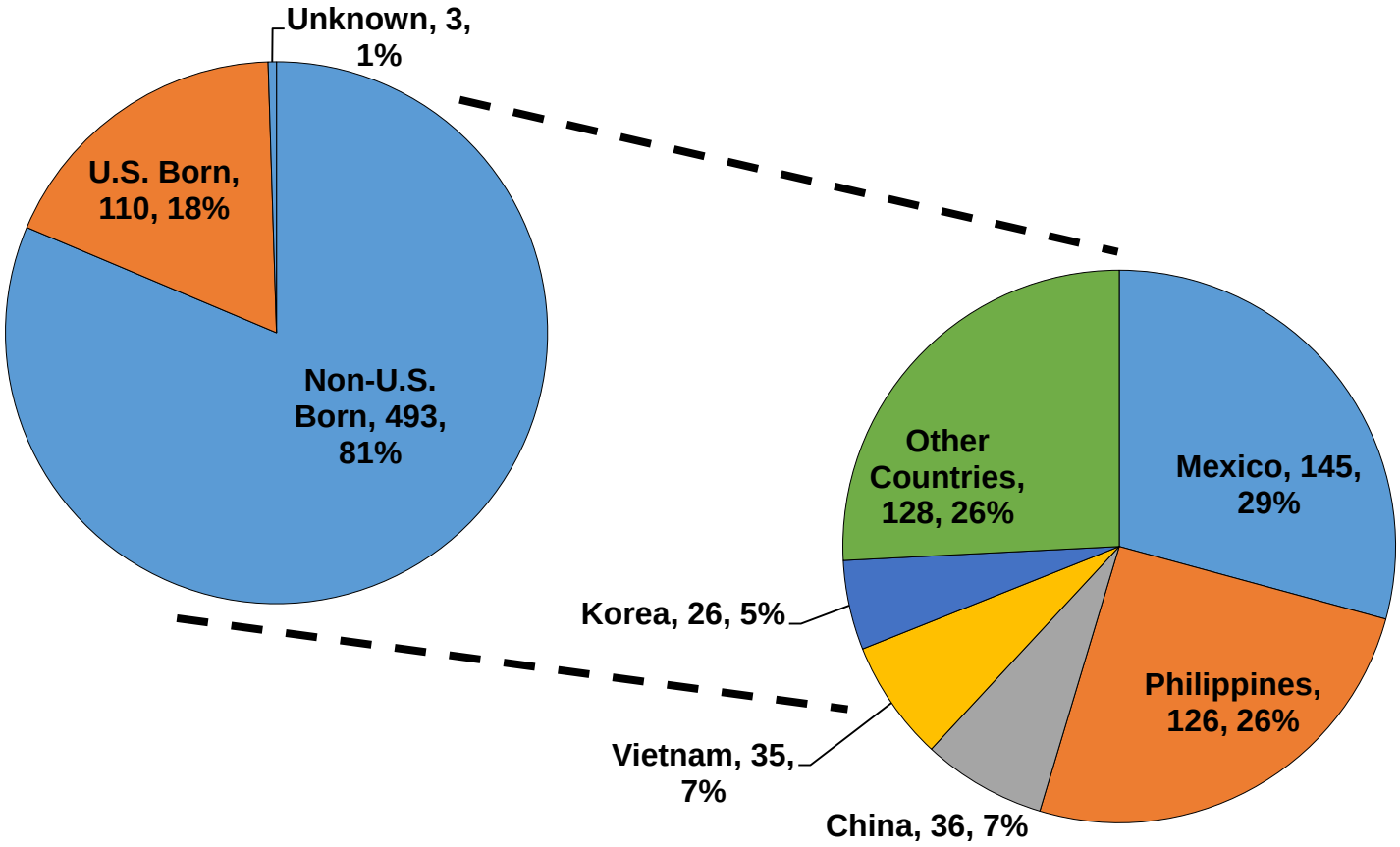
Asian includes NHPI (Native Hawaiian / Pacific Islander).

TB Patients by Nativity and Country of Birth: LA County 2015



*Korea includes Democratic People's Republic of Korea & Republic of Korea
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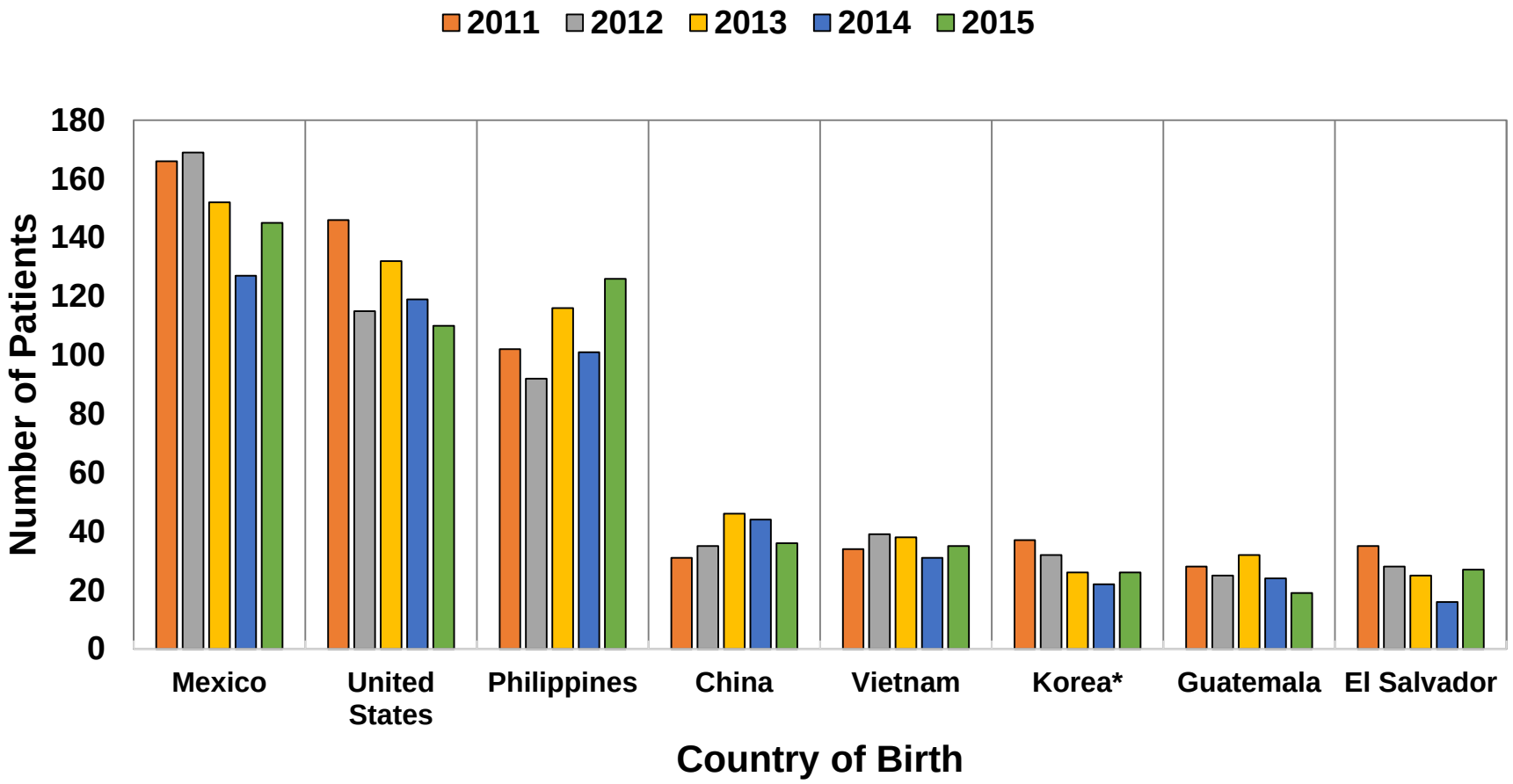
TB Patients by Country of Birth (8 highest): LA County 2011-2015



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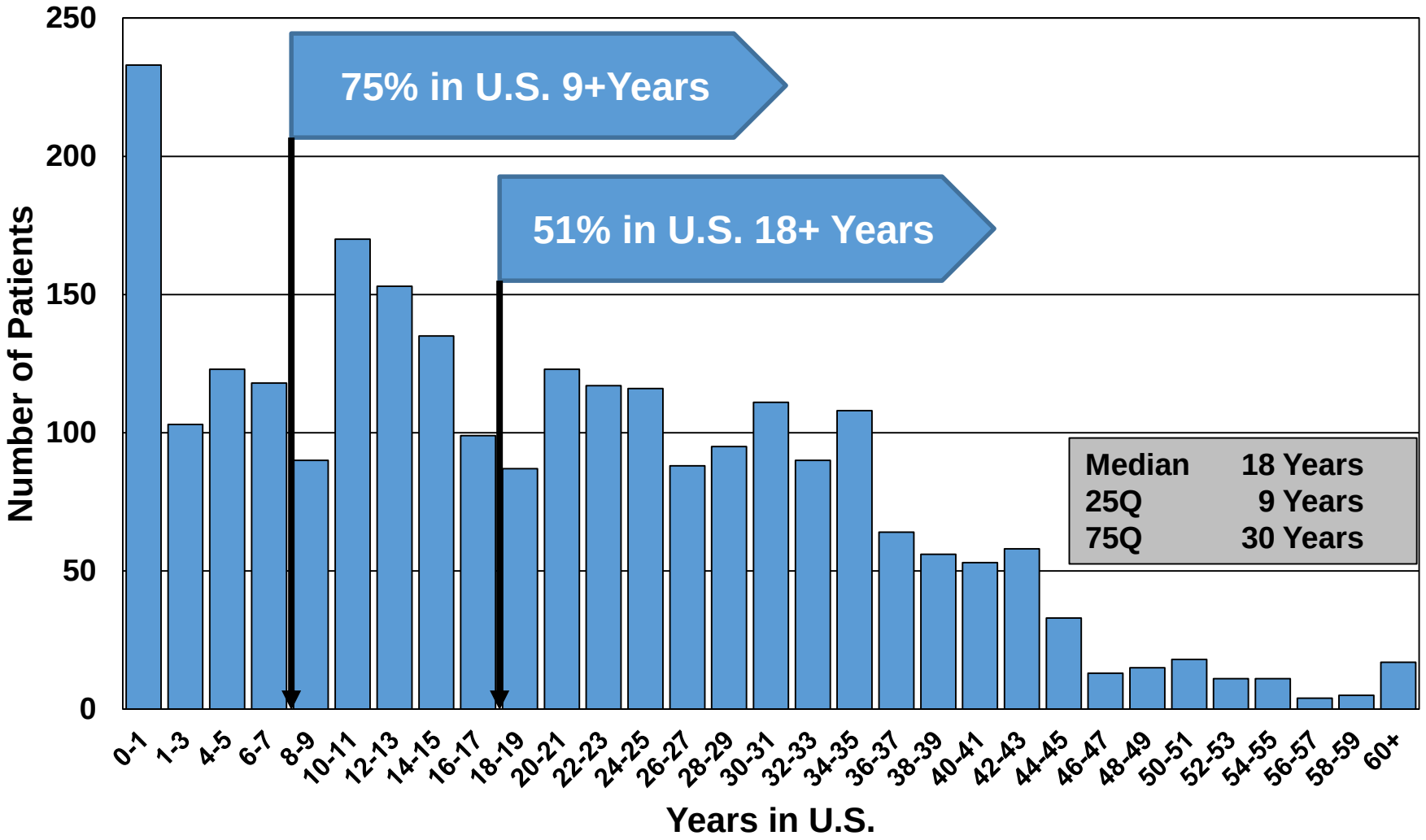
Non-U.S. Born Patients by Years in the U.S. at TB diagnosis: LA County 2011-2015



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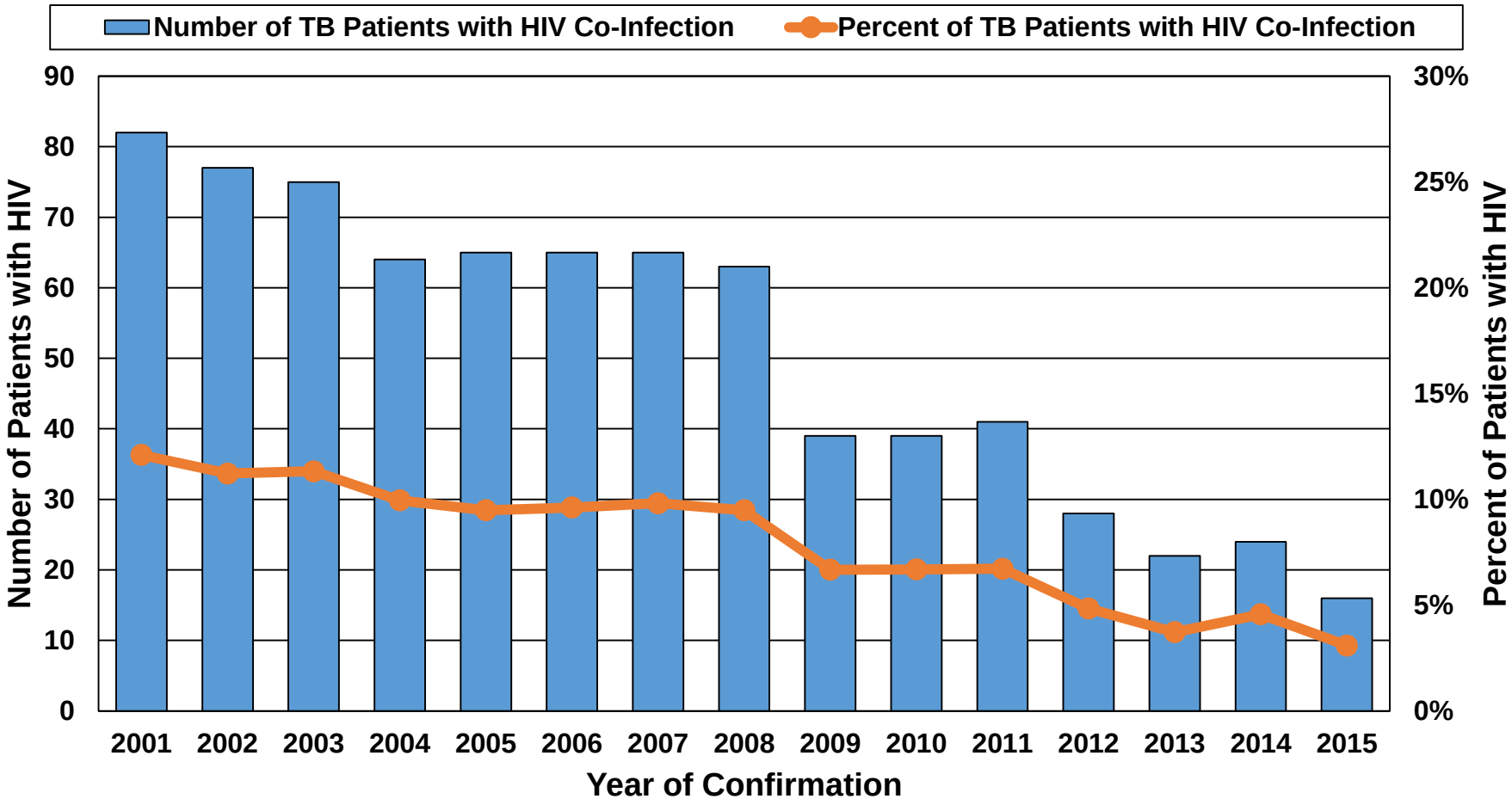
Tuberculosis Patients with known HIV Co-Infection: LA County 2001-2015



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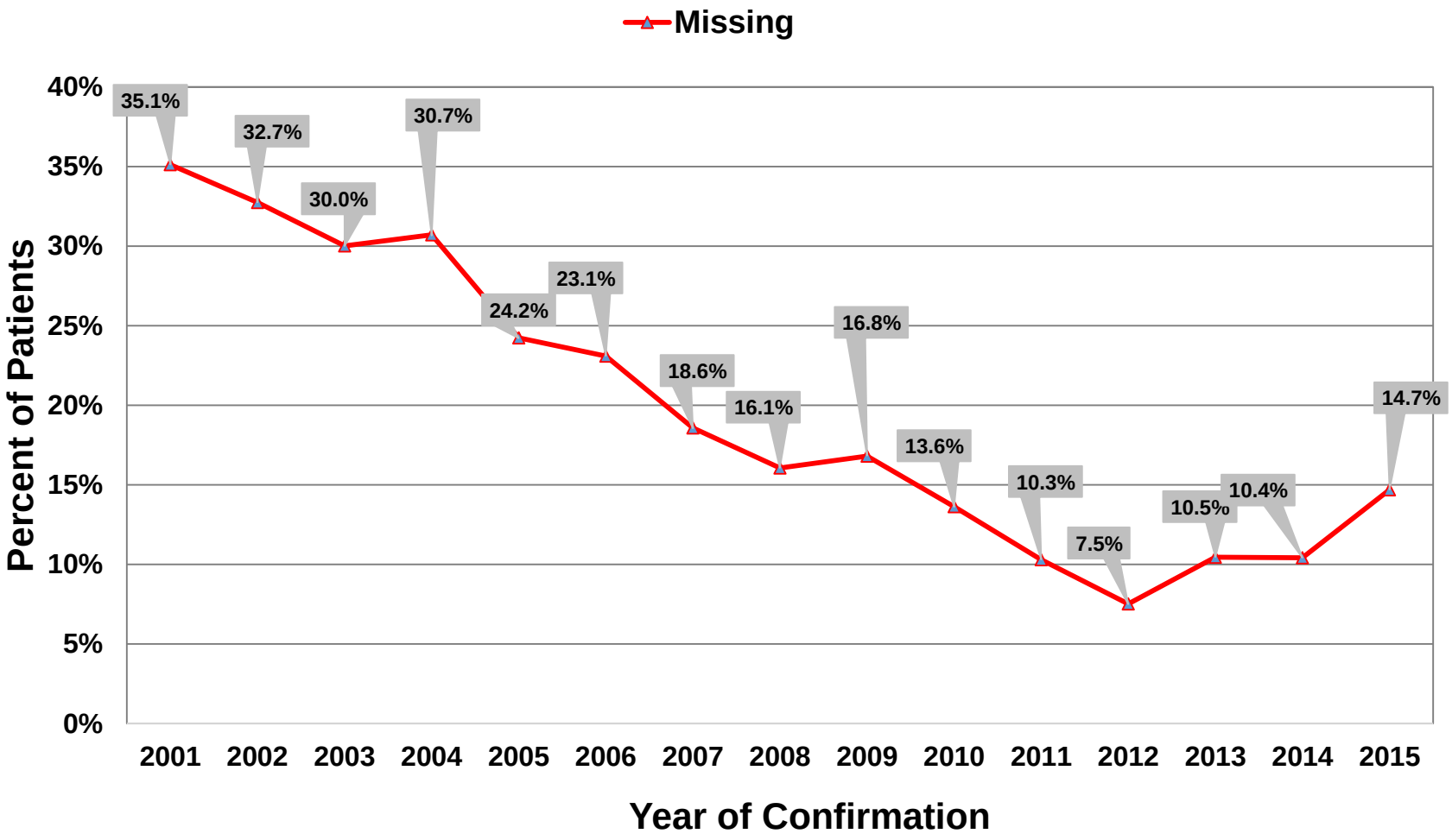
TB Patients missing HIV Status: LA County 2001-2015



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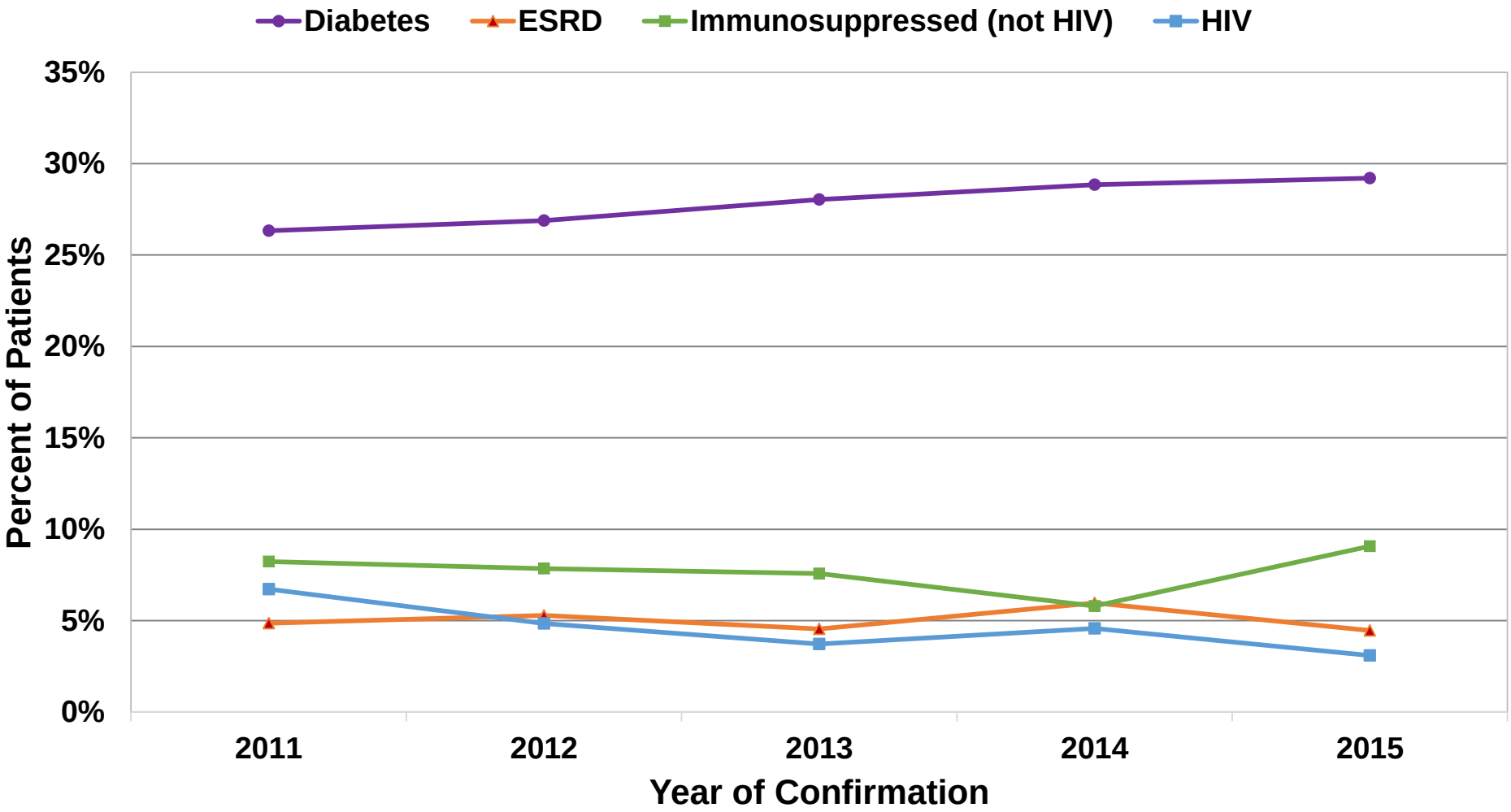
Key Comorbidities among TB Patients: LA County 2011-2015



NOTE: Patients may have more than one comorbidity

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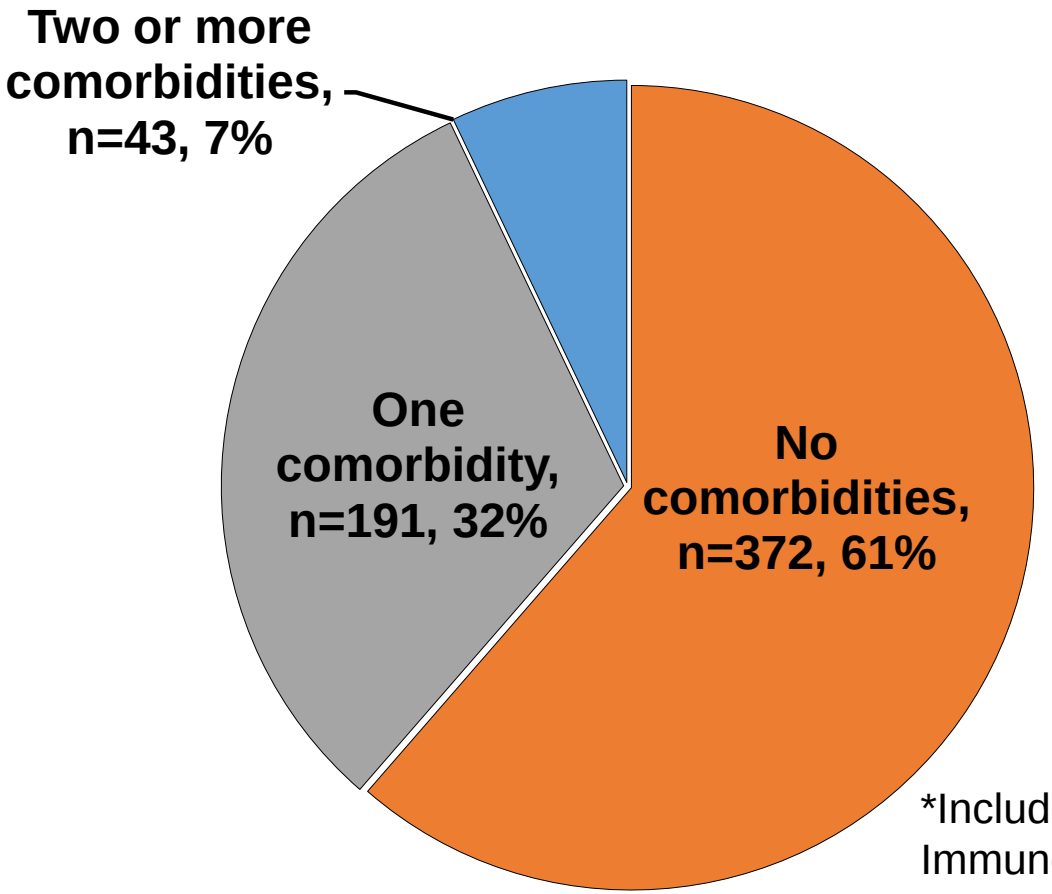
Number of Comorbidities* among TB Patients: LA County 2015 (n=606)



*Includes HIV, DM, Immunosuppressed, ESRD, Organ transplant, TNF-alpha therapy

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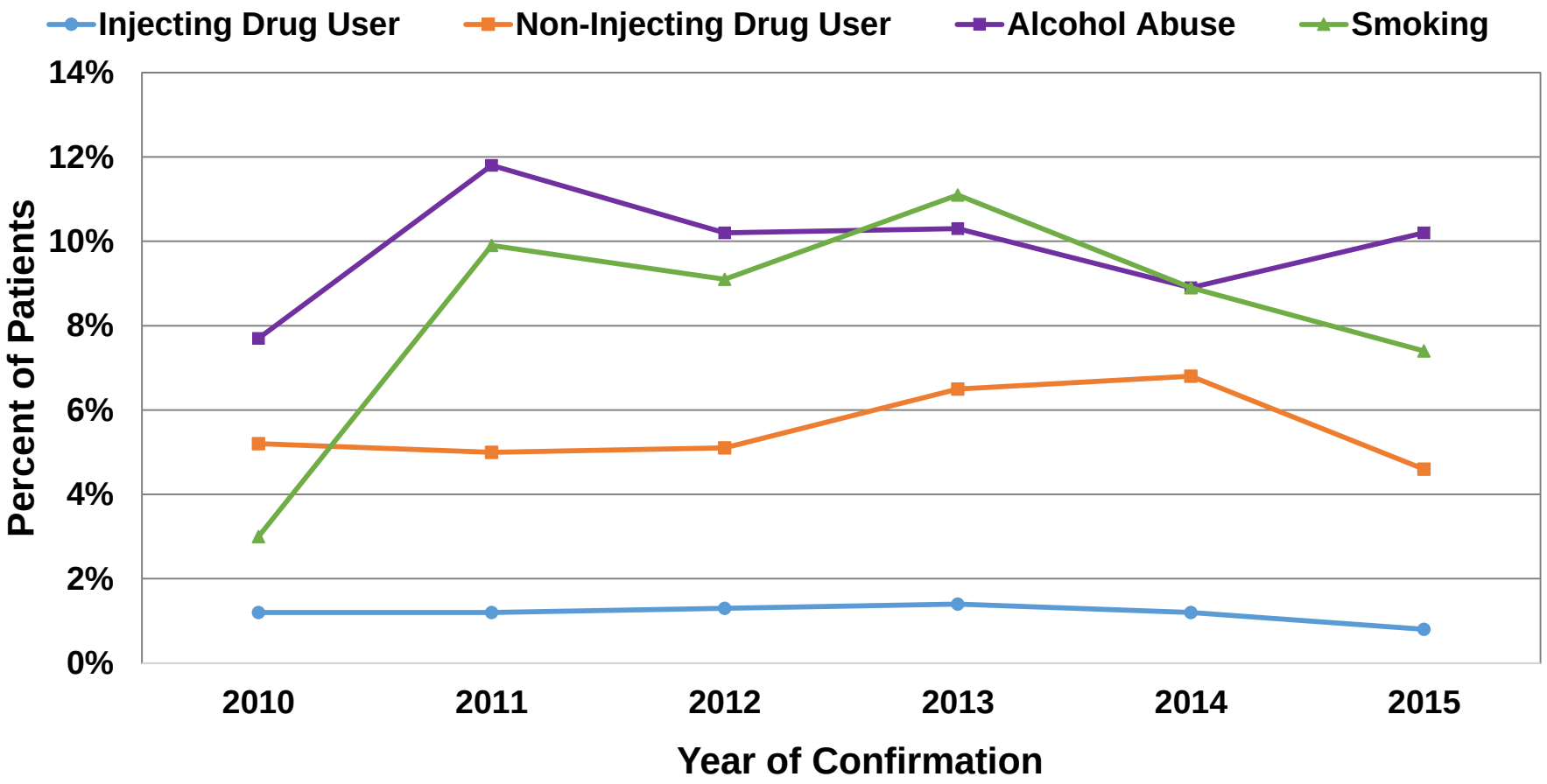
TB Patients by Behavioral Risk Factors: LA County 2010-2015



NOTE: Patients may have more than one risk factor

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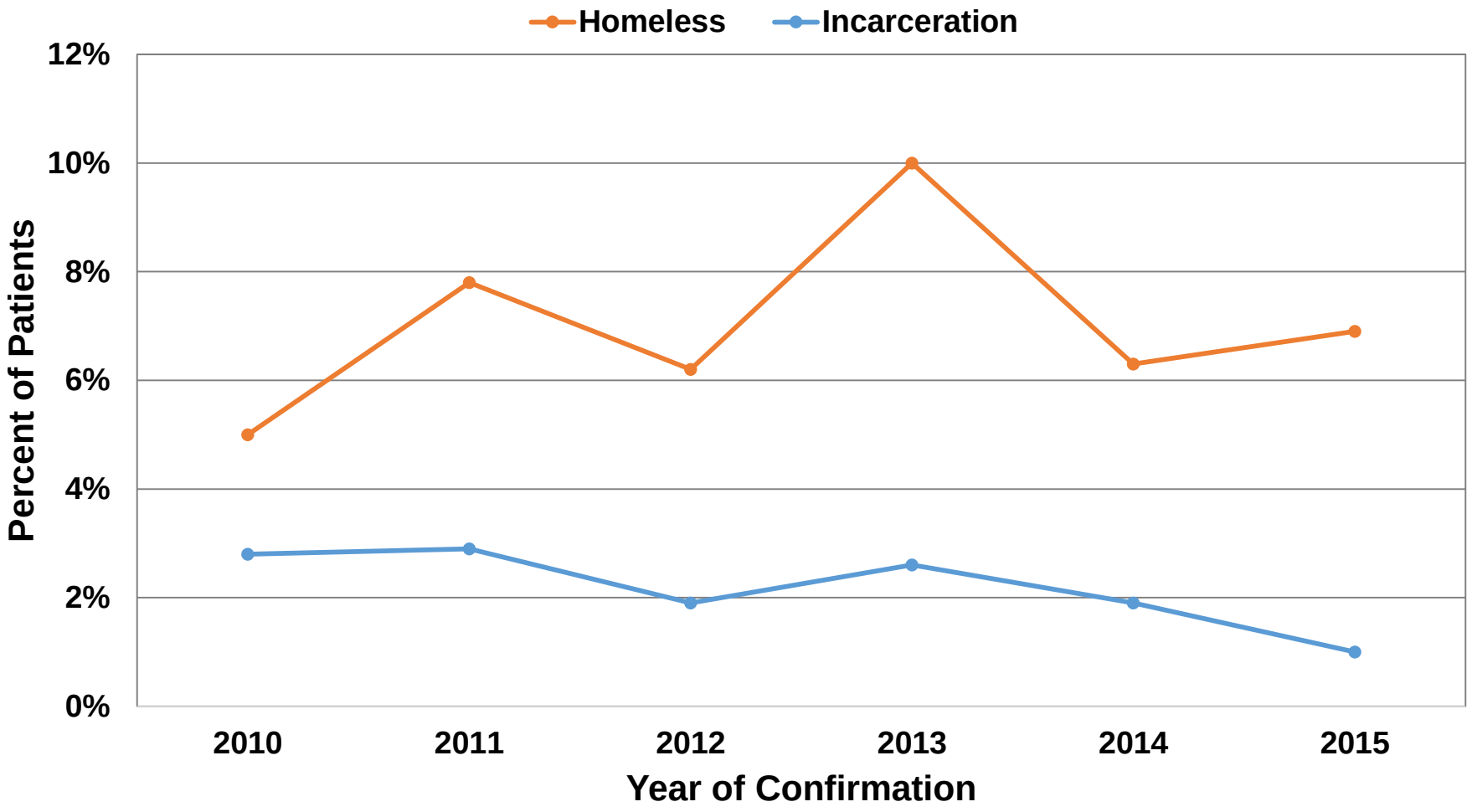
TB Patients by Social Risk Factors: LA County 2010-2015



NOTE: Patients may have more than one risk factor

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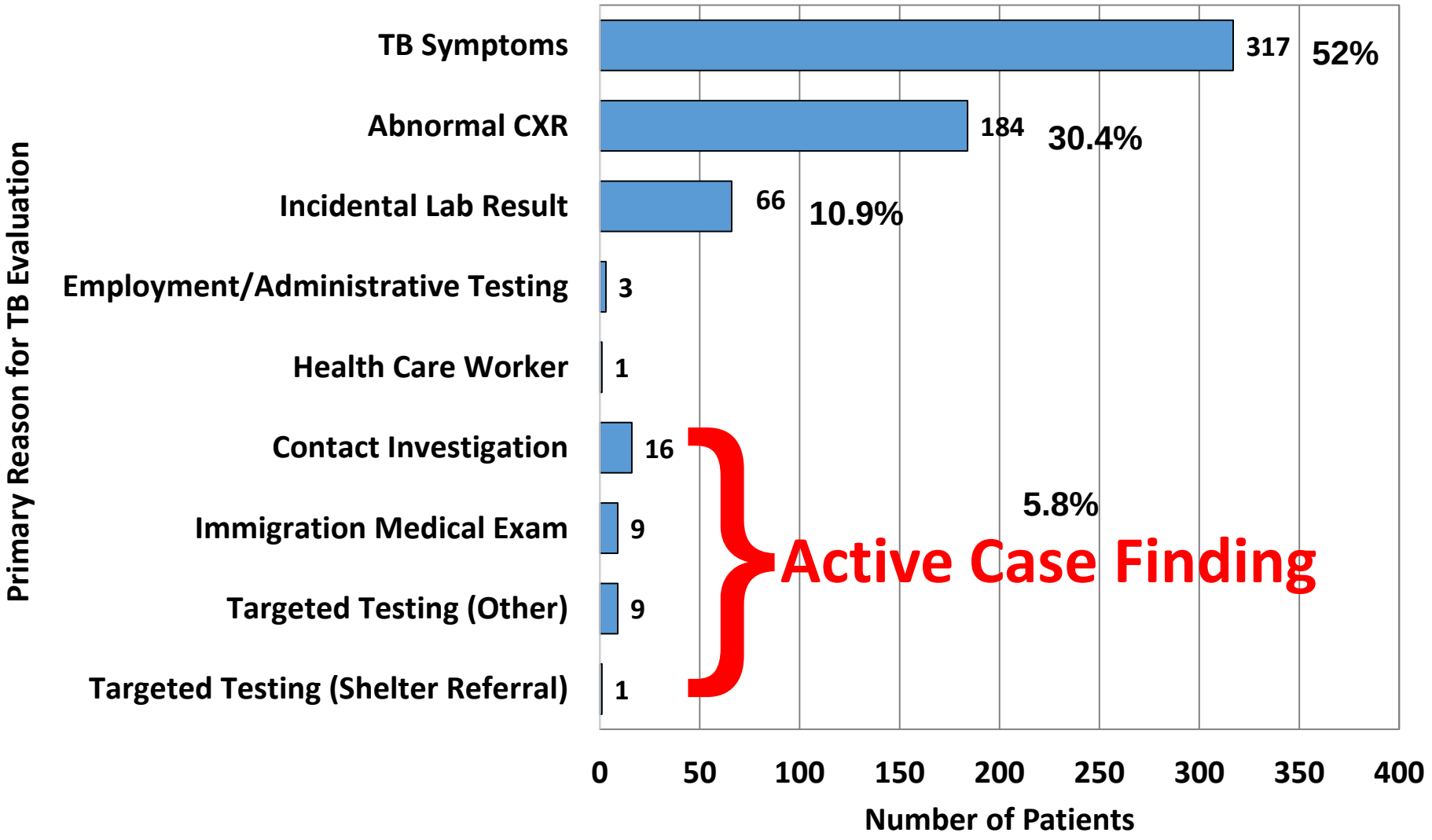
*Incarceration includes: Federal Prisons, State Prisons, Local Jails, Juvenile Detention Facilities, and Other forms of incarceration (e.g. ICE, Military Holding Facilities)

CLINICAL CHARACTERISTICS of TUBERCULOSIS PATIENTS

Primary Reason for TB Evaluation: LA County 2015



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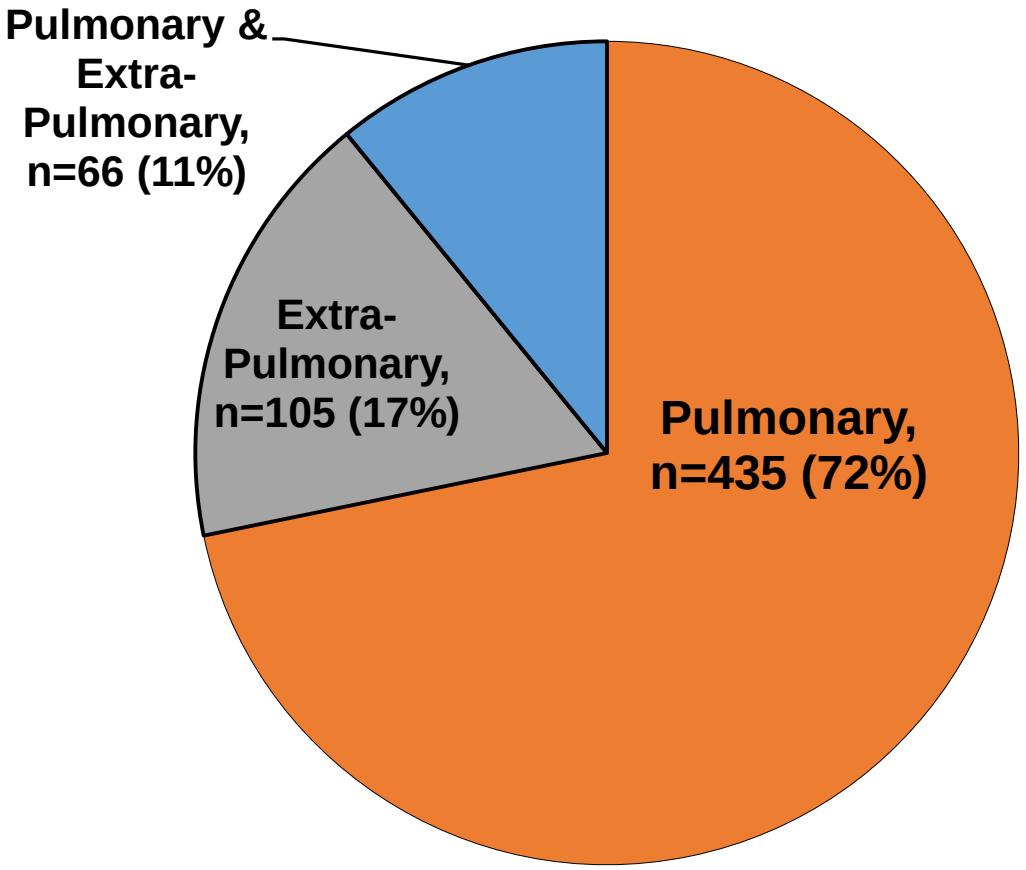
TB Patients by Site of Disease: LA County 2015 (N=606)



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TB Patients by Smear Positivity and Type of Confirmation: LA County 2015

Site of TB Disease	Sputum Smear Positive		Sputum Culture Positive**	Other Culture Positive**	NAAT Positive	Clinical Confirmation
	No	Yes				
	%	%	%	%	%	%
Pulmonary	37.5	62.5	88.3	70.2	72.7	7.6
Extra-pulmonary	98.4	1.6	0	75	**16.7**	17.4
Both Pulmonary and Extra-pulmonary	54.8	45.2	78.7	79.3	63	4.5

*Smear and culture positivity defined as within 14 days of treatment start date. **Sputum culture includes 'sputum' and 'direct sputum' specimens only. Other culture excludes 'sputum' and 'direct sputum' specimens. Data exclude Long Beach and Pasadena TB cases. Data are provisional and subject to change.

INH monoresistance

	Total TB Cases	Culture positive cases with DST	INH resistance Yes		MDR Yes	
	Number of Cases	Number of Cases	Number of Cases	%INH resistant	Number of Cases	%MDR
Country						
Mexico	2096	1624	126	7.8%	15	0.9%
United States	1747	1221	56	4.6%	7	0.6%
Philippines	1191	1015	161	15.9%	18	1.8%
China	447	371	32	8.6%	9	2.4%
Vietnam	429	364	60	16.5%	4	1.1%
Korea*	402	334	51	15.3%	11	3.3%
Guatemala	346	283	27	9.5%	5	1.8%
El Salvador	293	223	14	6.3%	1	0.4%
India	153	122	11	9.0%	2	1.6%
Taiwan	87	76	6	7.9%	0	0.0%
Honduras	78	67	3	4.5%	1	1.5%
Peru	71	61	7	11.5%	3	4.9%
Cambodia	72	58	9	15.5%	3	5.2%
Iran	68	57	4	7.0%	0	0.0%
Indonesia	61	54	6	11.1%	1	1.9%
Armenia	55	46	3	6.5%	2	4.3%
Ethiopia	50	41	3	7.3%	1	2.4%
Burma	43	34	2	5.9%	1	2.9%
Thailand	45	34	4	11.8%	2	5.9%
Japan	35	32	0	0.0%	0	0.0%
Hong Kong	30	26	2	7.7%	0	0.0%

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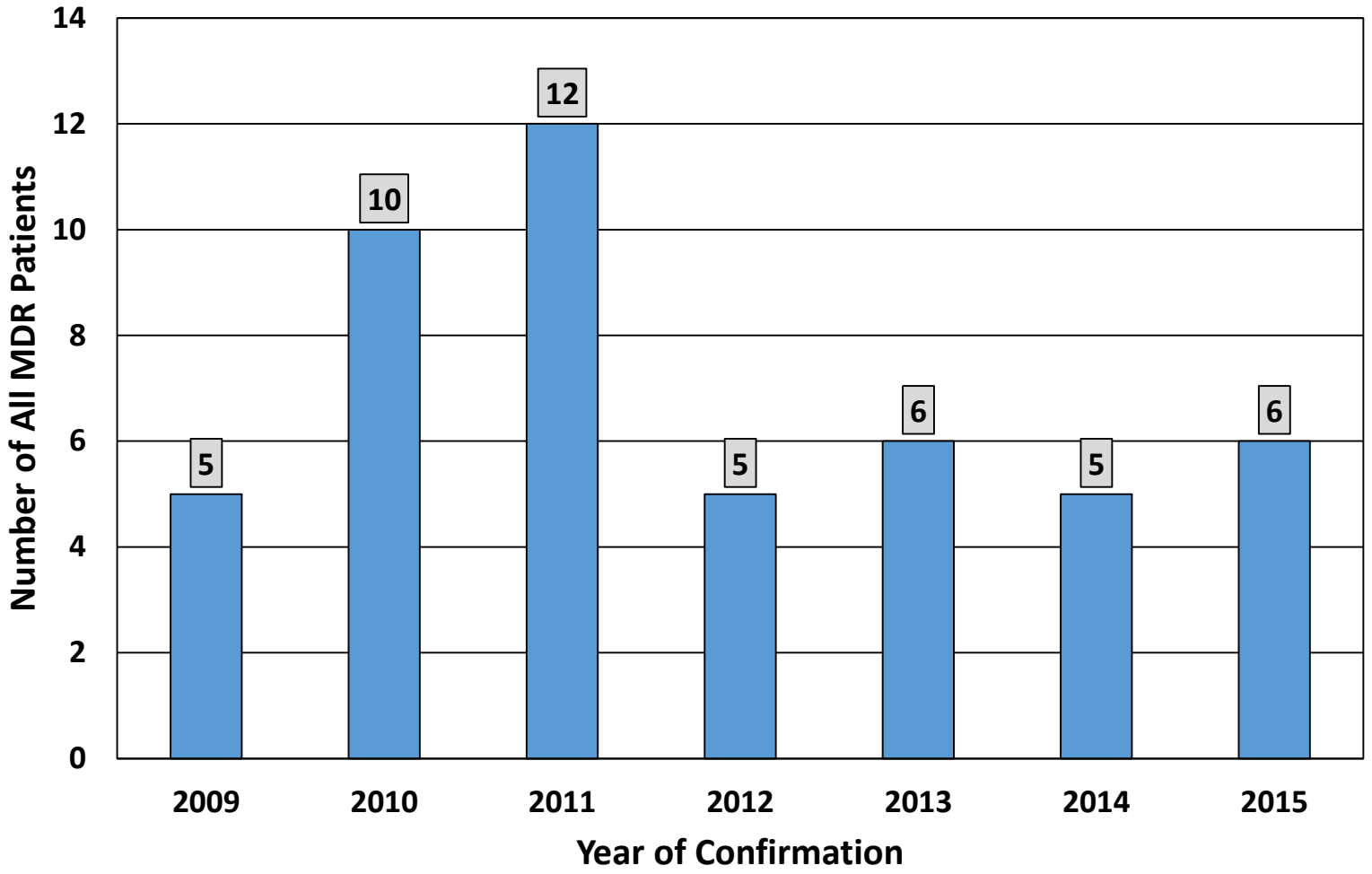
Multi-Drug Resistant TB (MDR-TB) Patients* confirmed in LA County 2009-2015



*Includes MDR, pre-XDR, and XDR patients

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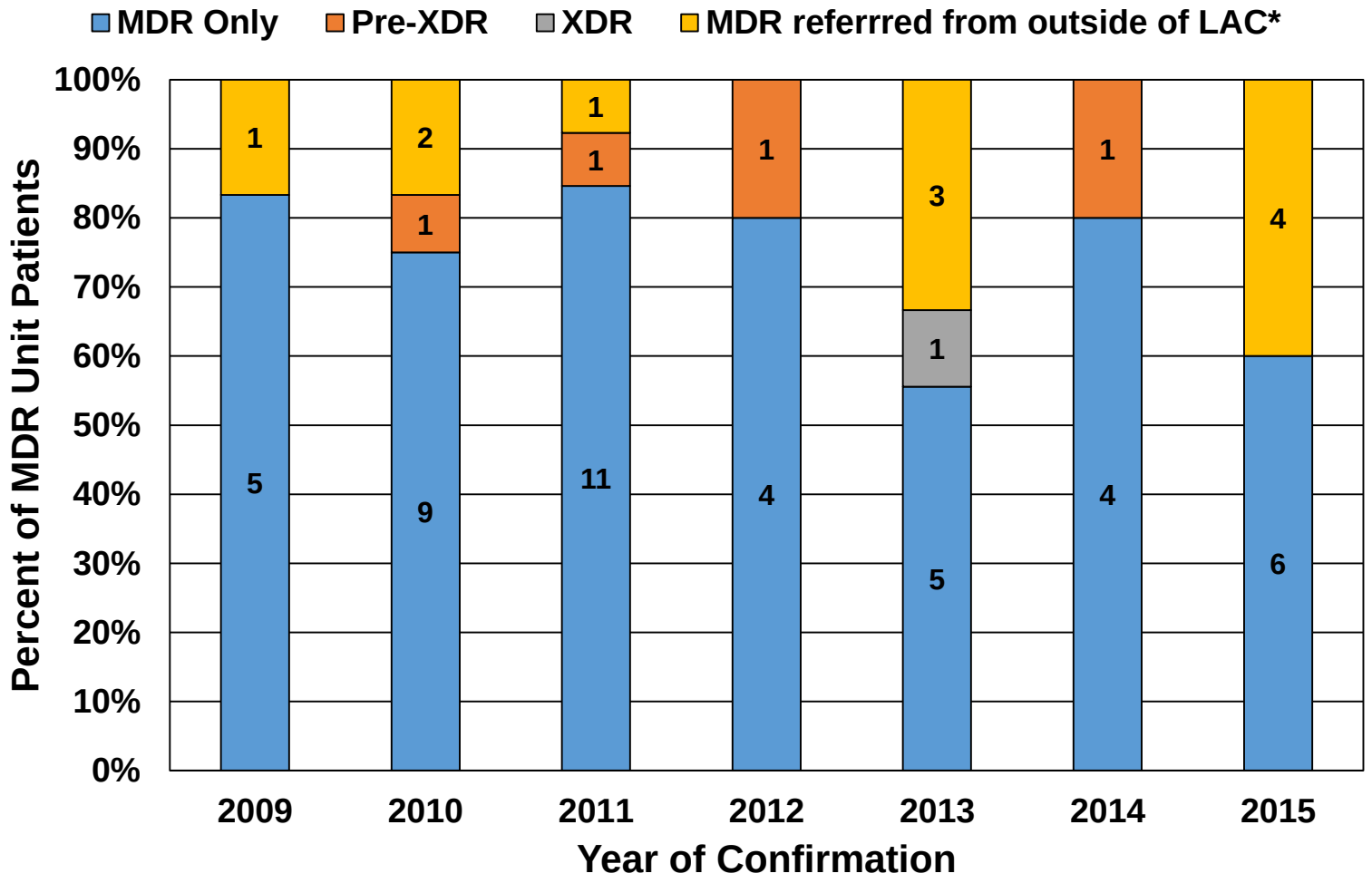
Multi-Drug Resistant TB (MDR-TB) Patients: LA County 2009-2015



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*Includes only confirmed (counted) patients

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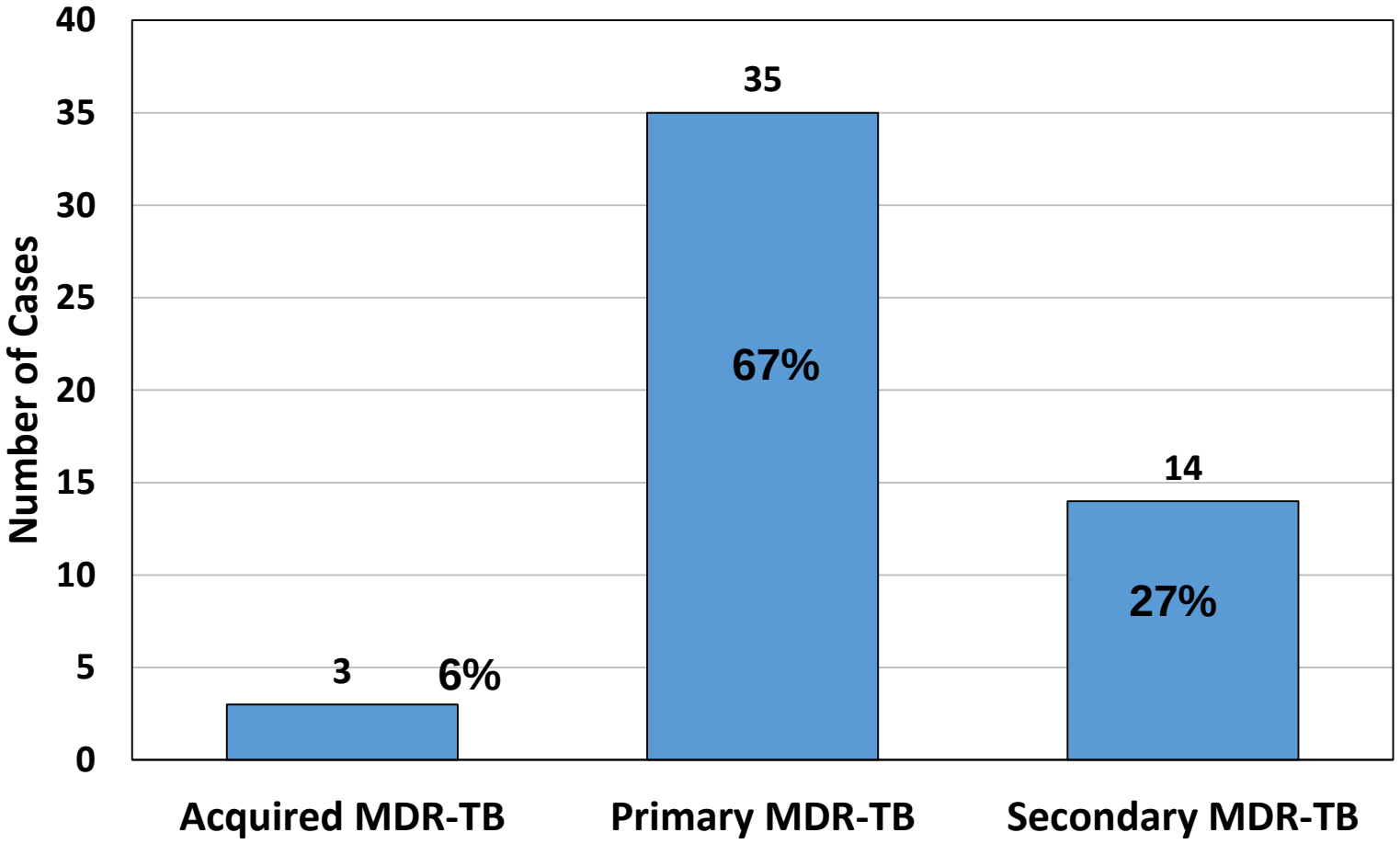
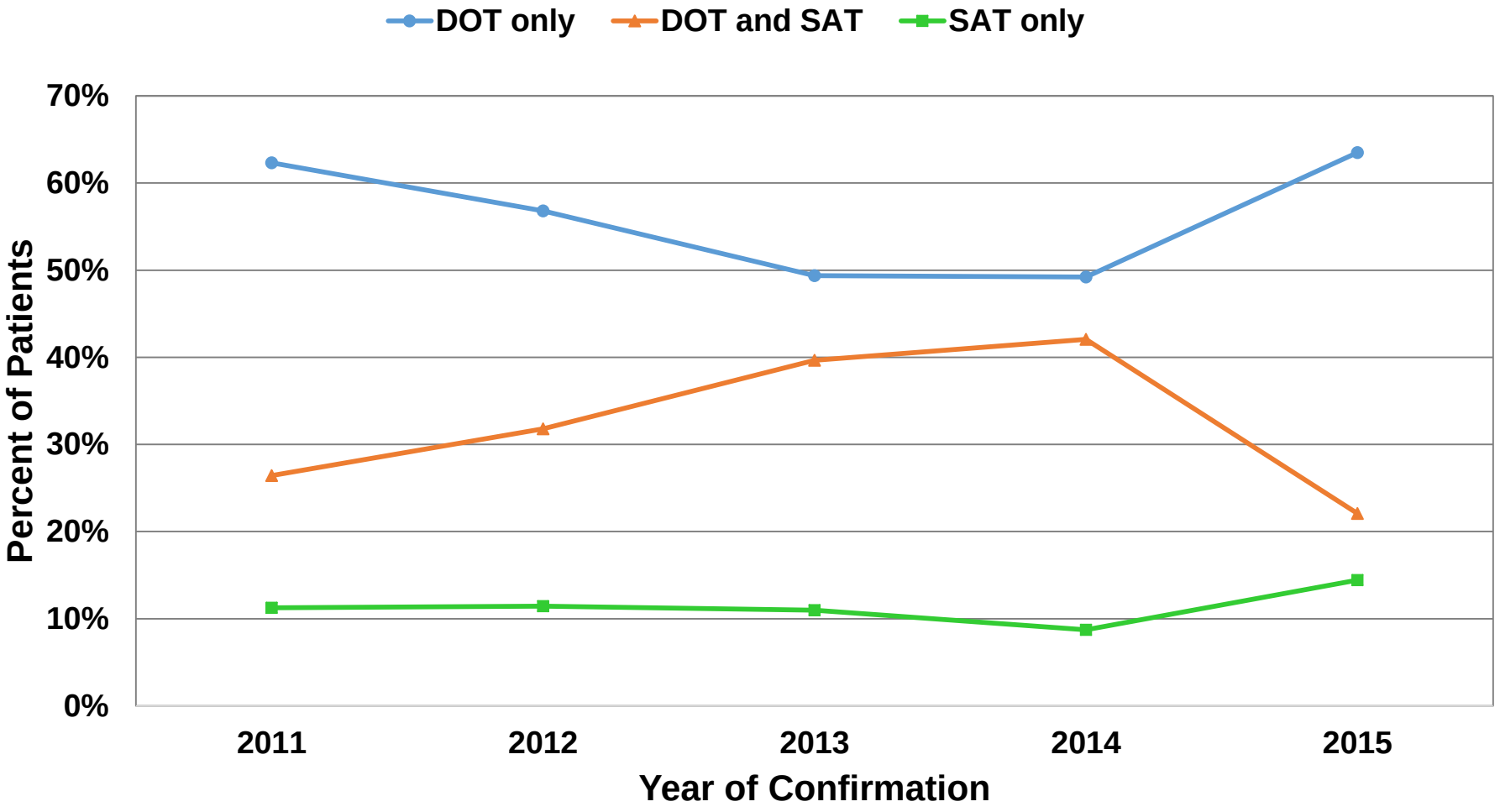
MDR-TB Cases by MDR Infection History



Rogers, C.J., Rosales, M., Hwang, S.K., Yu, S., Chang, A.H., & Ghosh, JK. A Supplemental Surveillance Database for Multidrug-Resistant Tuberculosis Cases in Los Angeles County, California. Poster presented at the 2016 National Tuberculosis Controllers Association Conference - February 25 -27, 2016 - Denver, CO Corresponding author: crogers@ph.lacounty.gov

TB Patients by Type of Therapy Administration*: LA County 2011-2015



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*Direct Observed Therapy (DOT); Self Administered Therapy (SAT).

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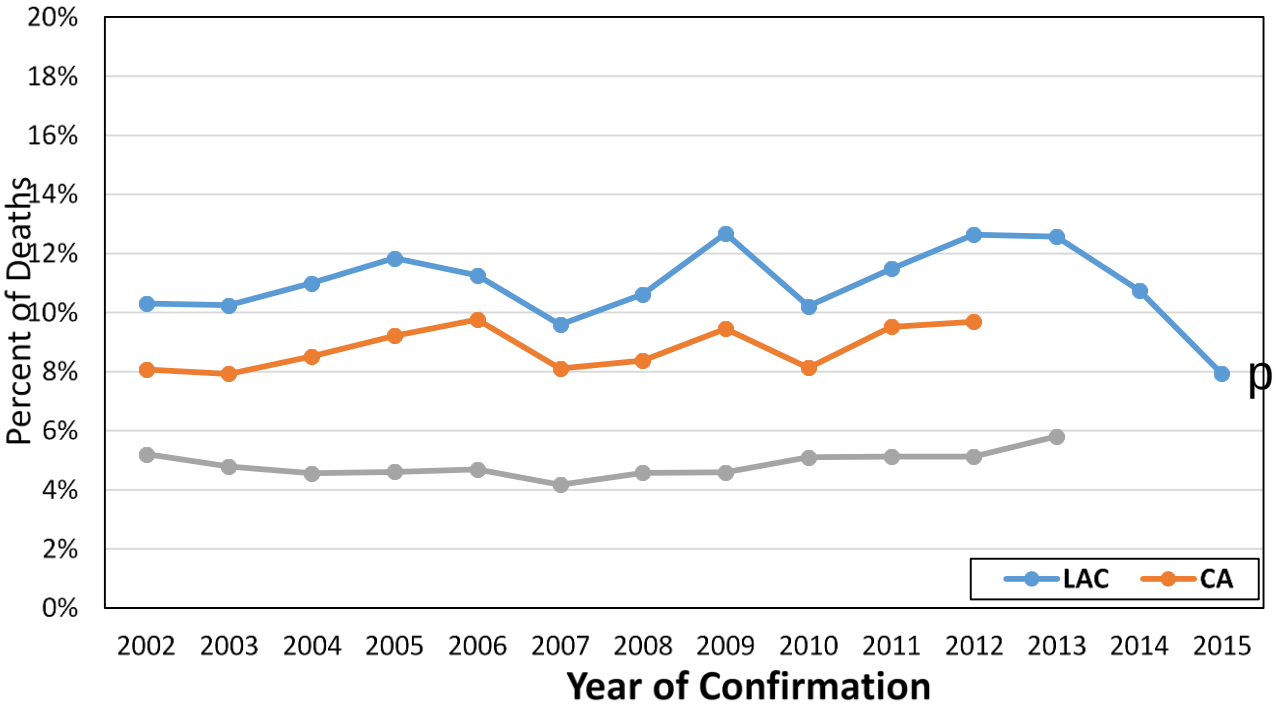
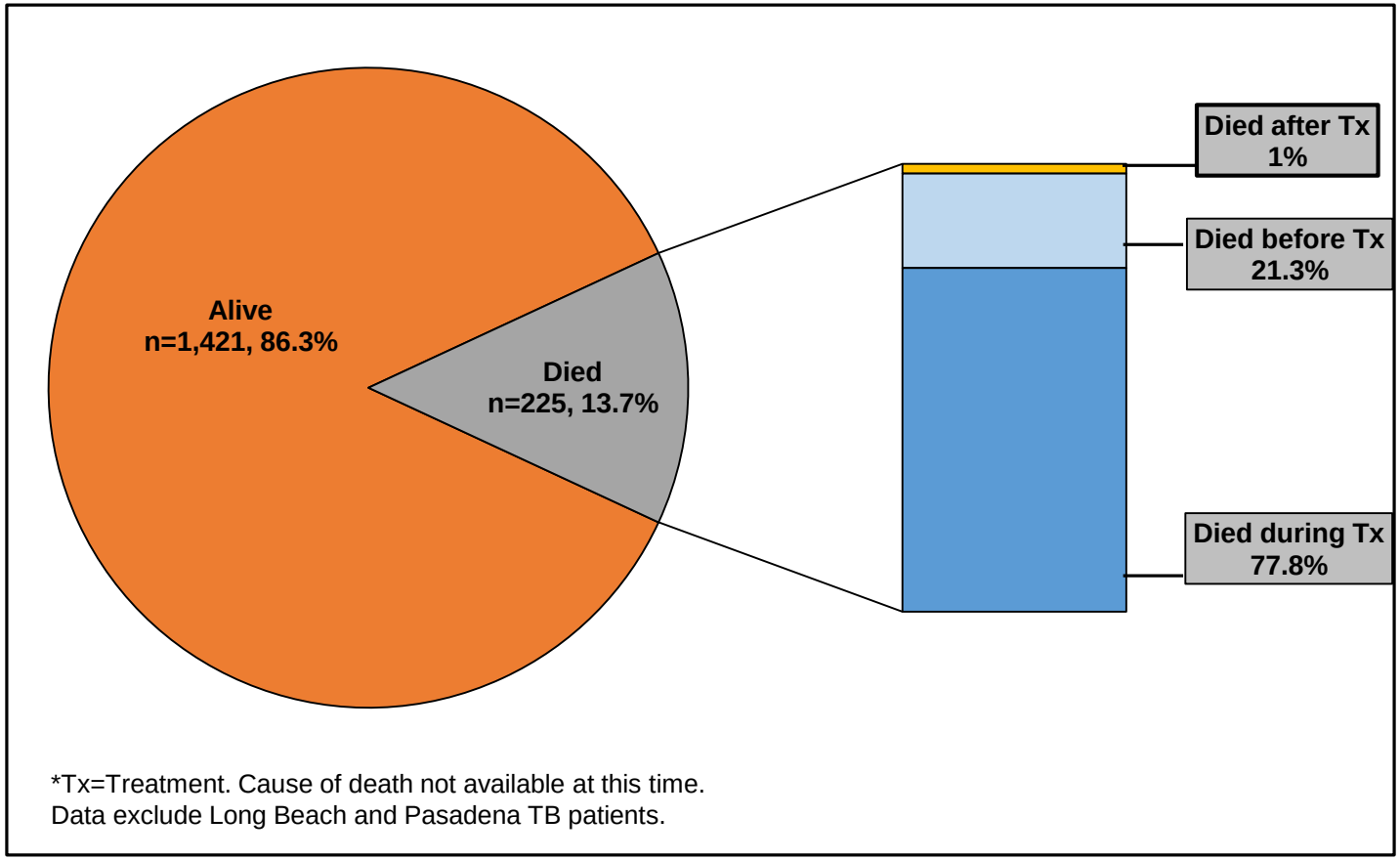
TB mortality in LA County vs CA, vs US



provisional

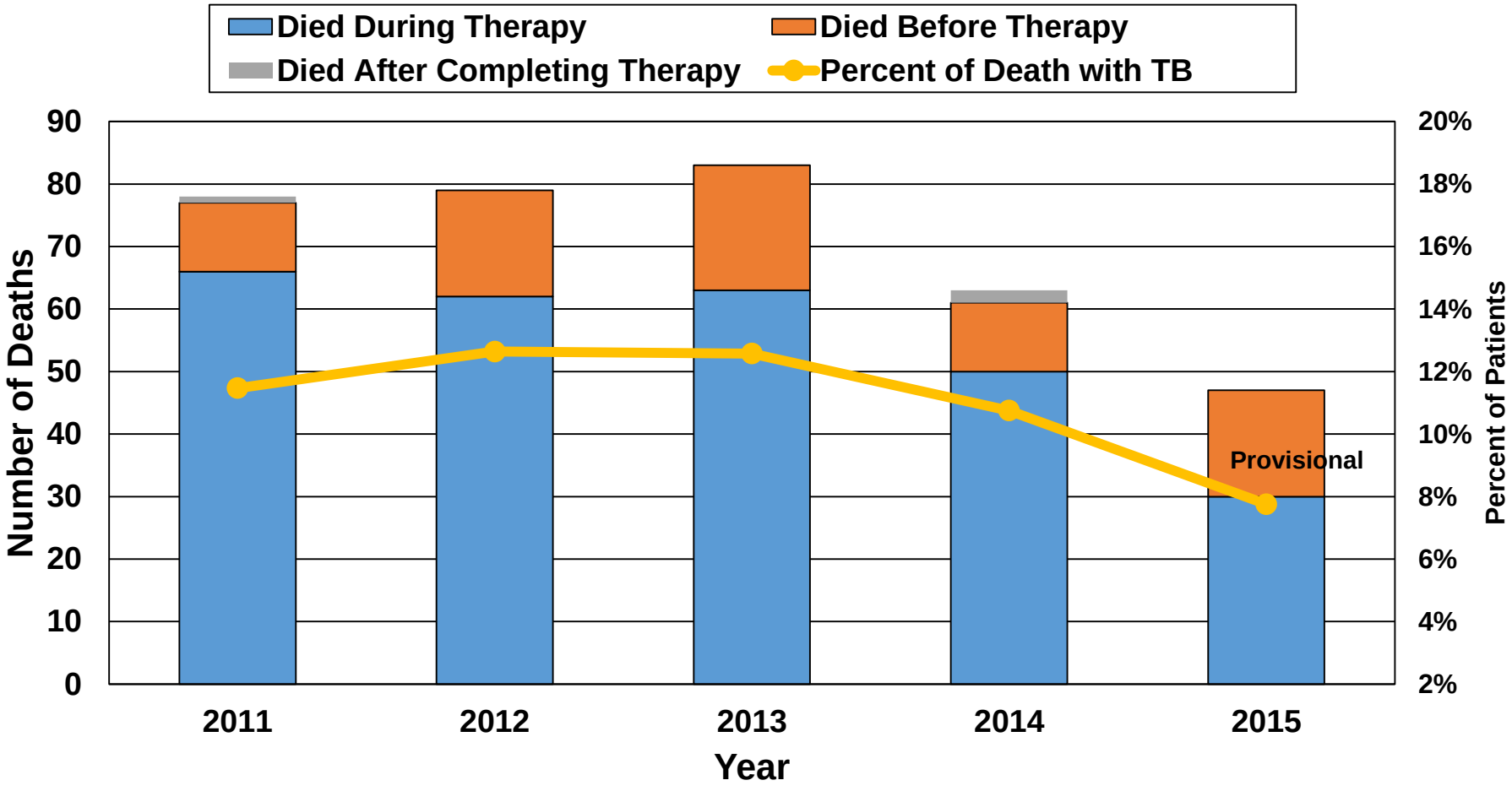
*Based on most recent available data. Percent of deaths based on total TB patients reported annually. California data source: California Department of Public Health Tuberculosis Control Branch, Report on Tuberculosis in California (2004-2014). United States data source: Centers for Disease Control and Prevention, Reported Tuberculosis in the United States, 2014.

Deaths Among TB Patients: LA County 2012-2014



*Tx=Treatment. Cause of death not available at this time.
Data exclude Long Beach and Pasadena TB patients.

Deaths in Persons with Tuberculosis: LA County 2011-2014



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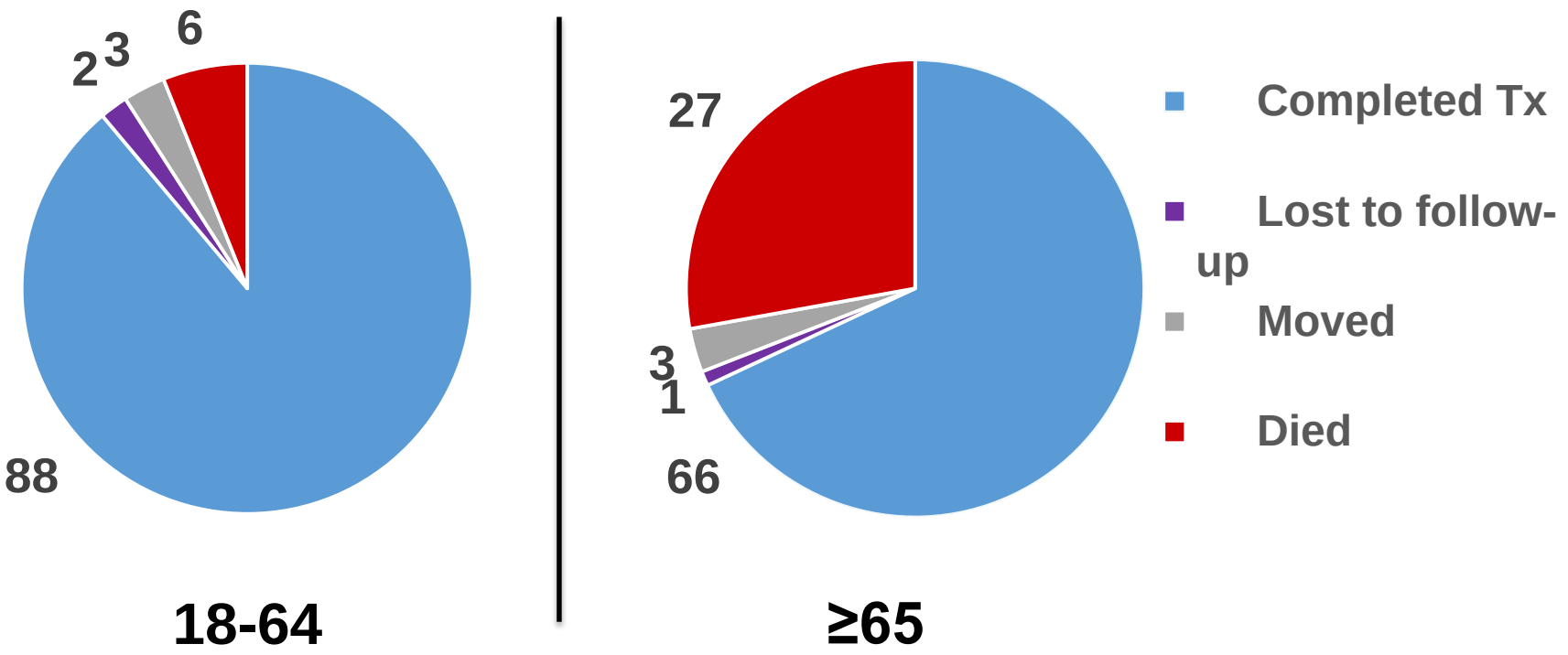
Mortality by Age Group

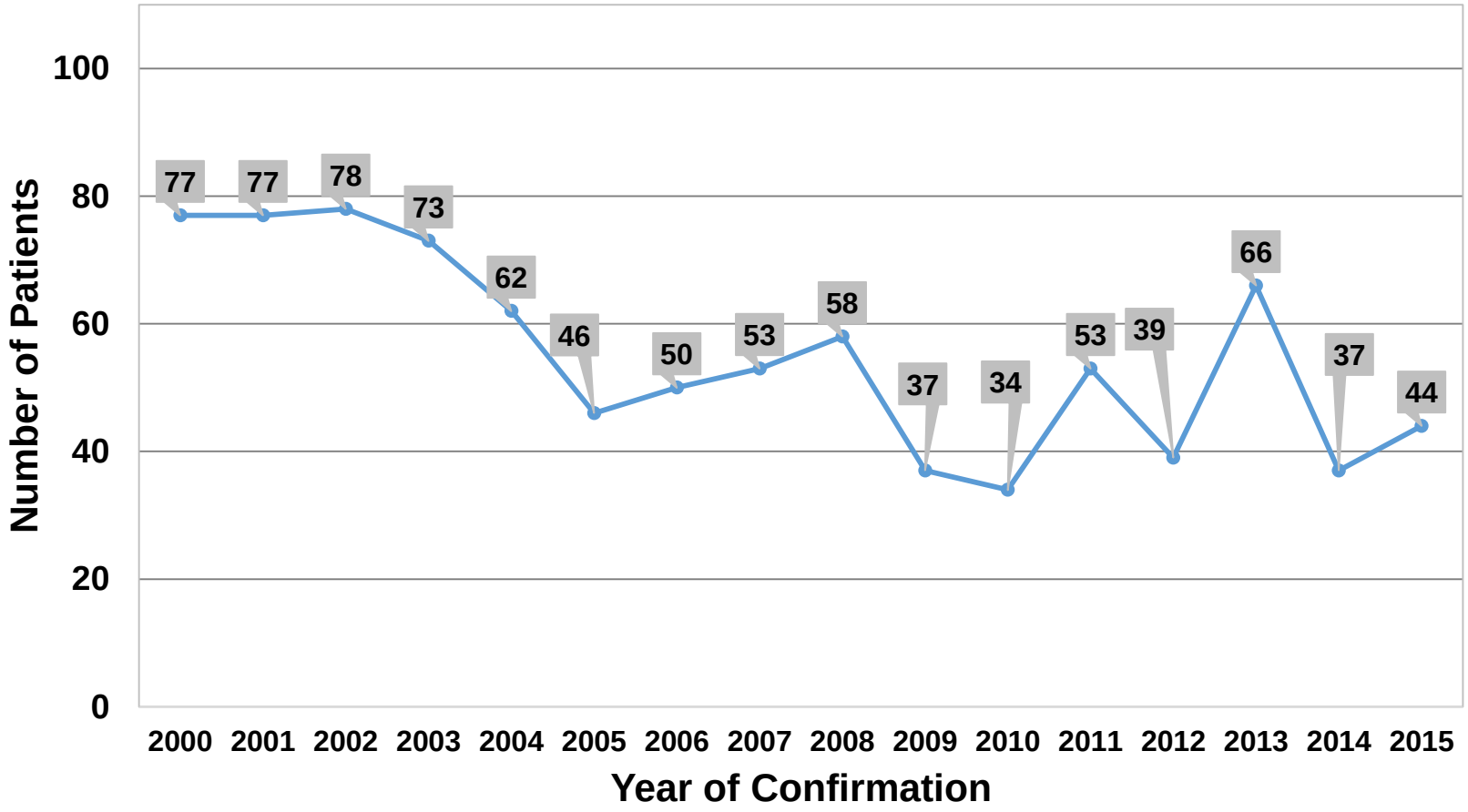


Case Closure
LA County, 2009 – 2013, N=3,163

POPULATIONS OF SPECIAL INTEREST

HOMELESS

TB Patients Experiencing Homelessness: LA County 2000-2015



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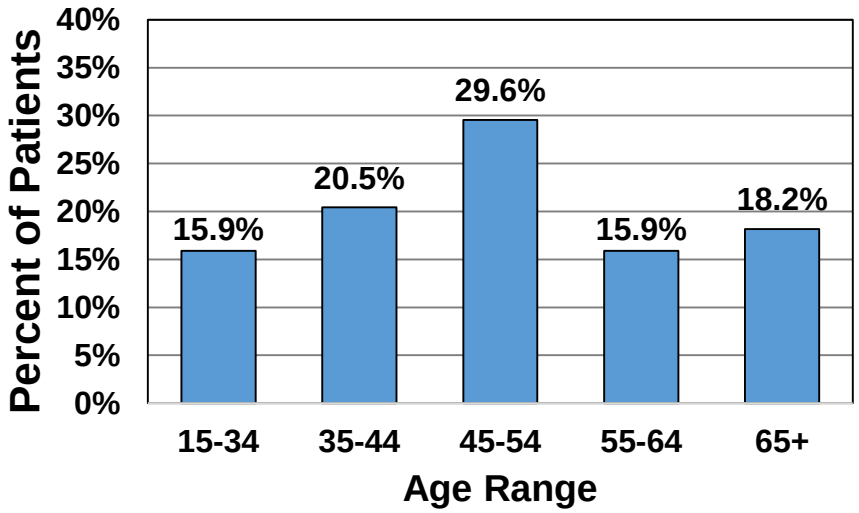
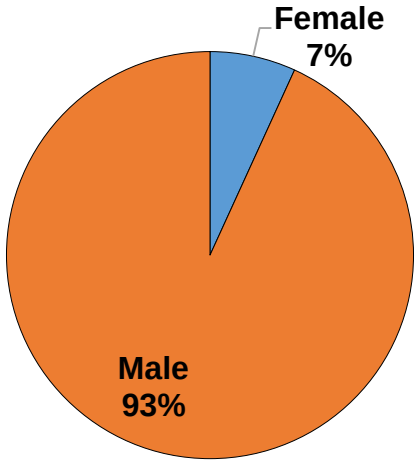
Homeless TB Patients by Age: LA County 2015



Homeless TB Patients by Sex: LA County 2015



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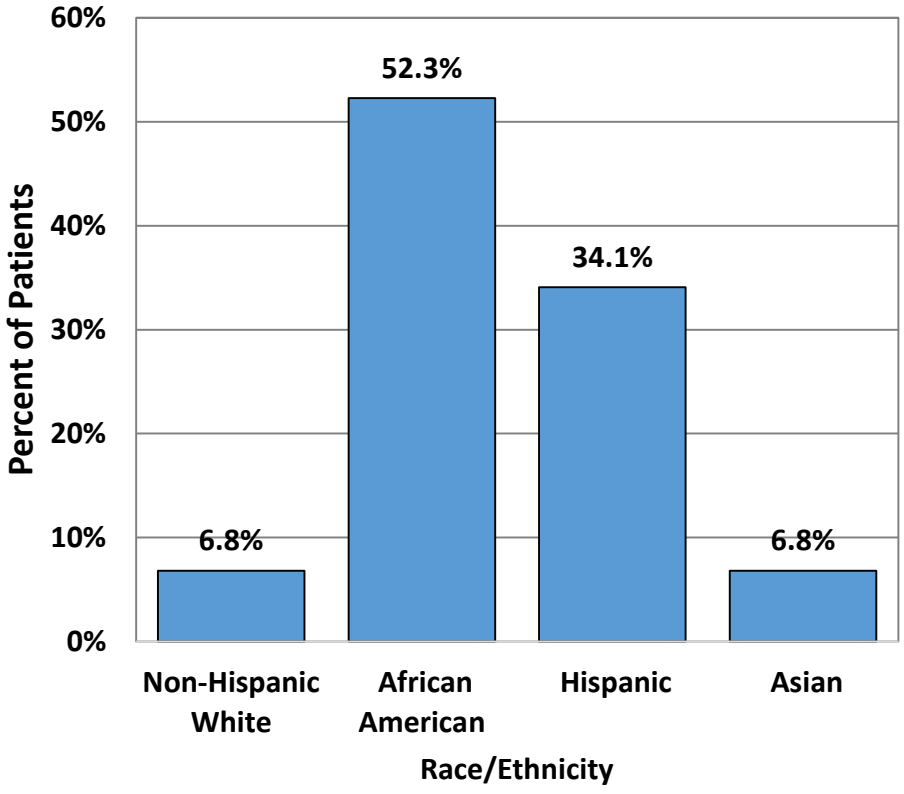
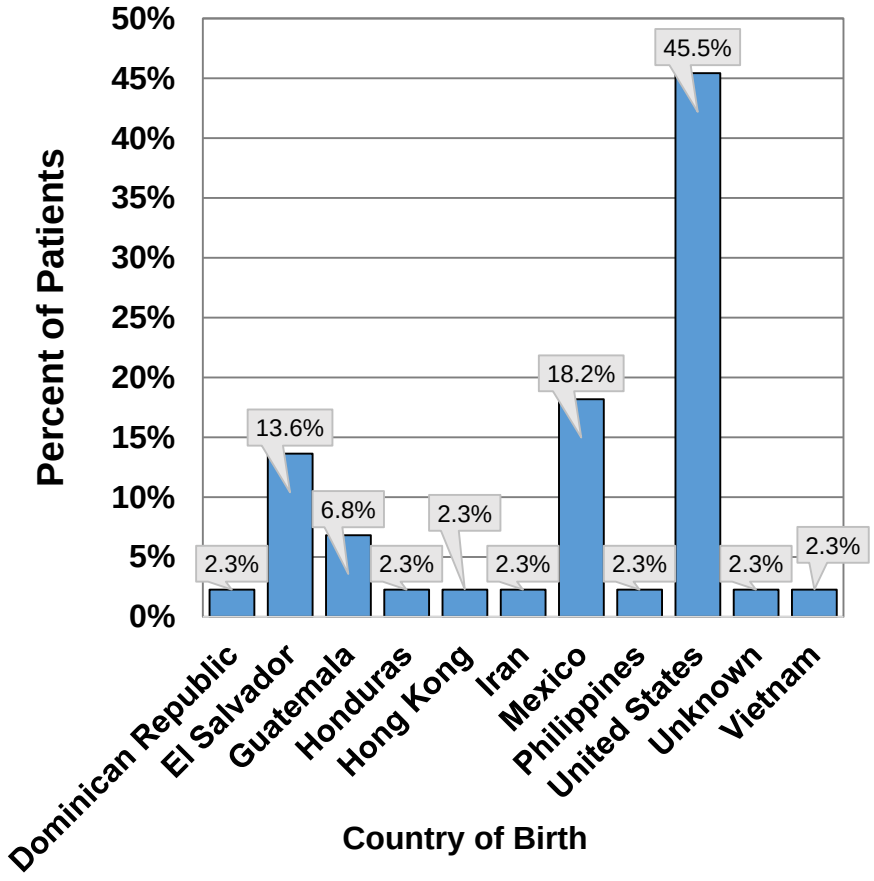
Homeless TB Patients by Race/Ethnicity: LA County 2015



Homeless TB Patients by Country of Birth: LA County 2015



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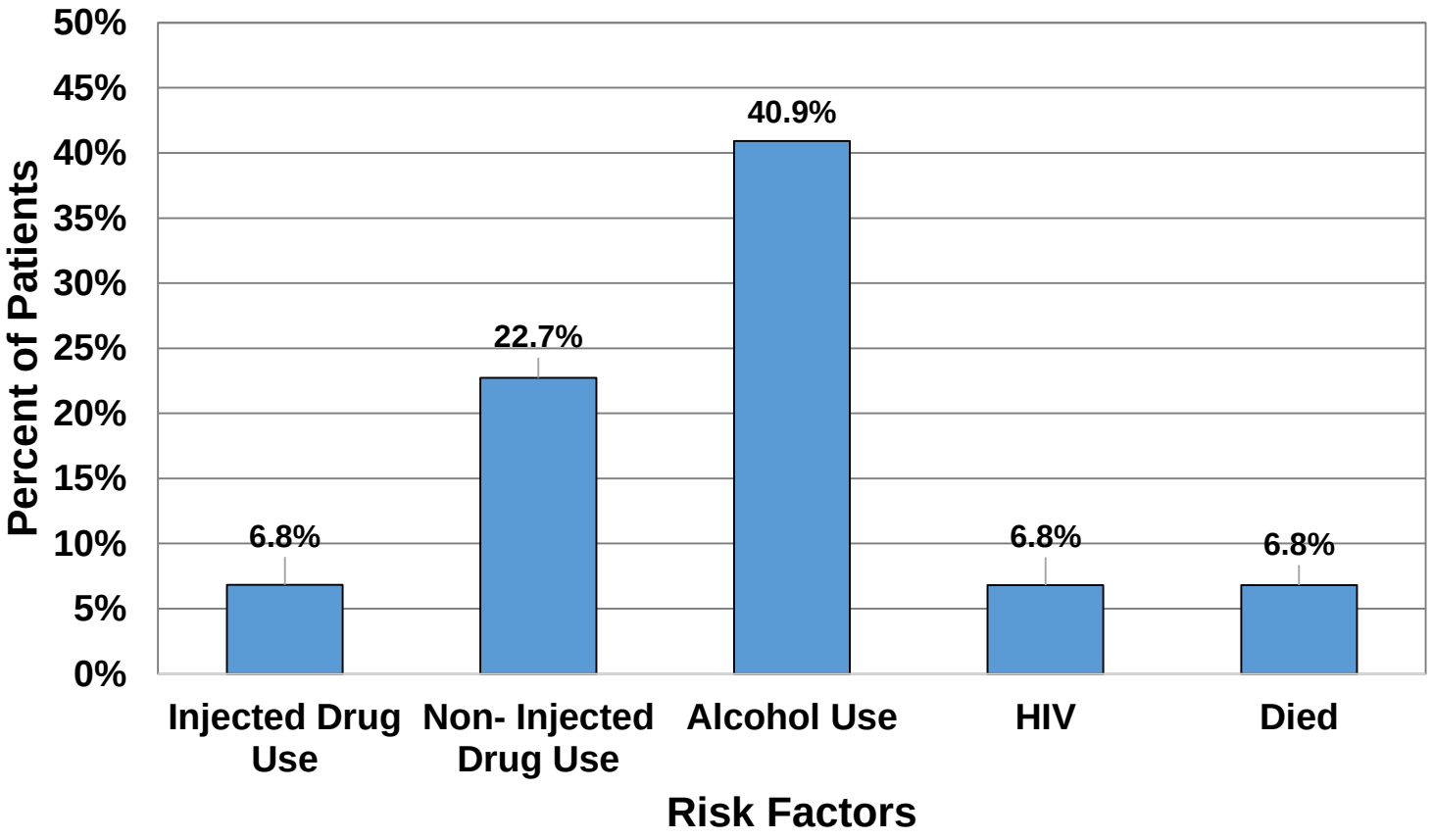
Risk Factors and Mortality among Homeless TB Patients: LA County 2015



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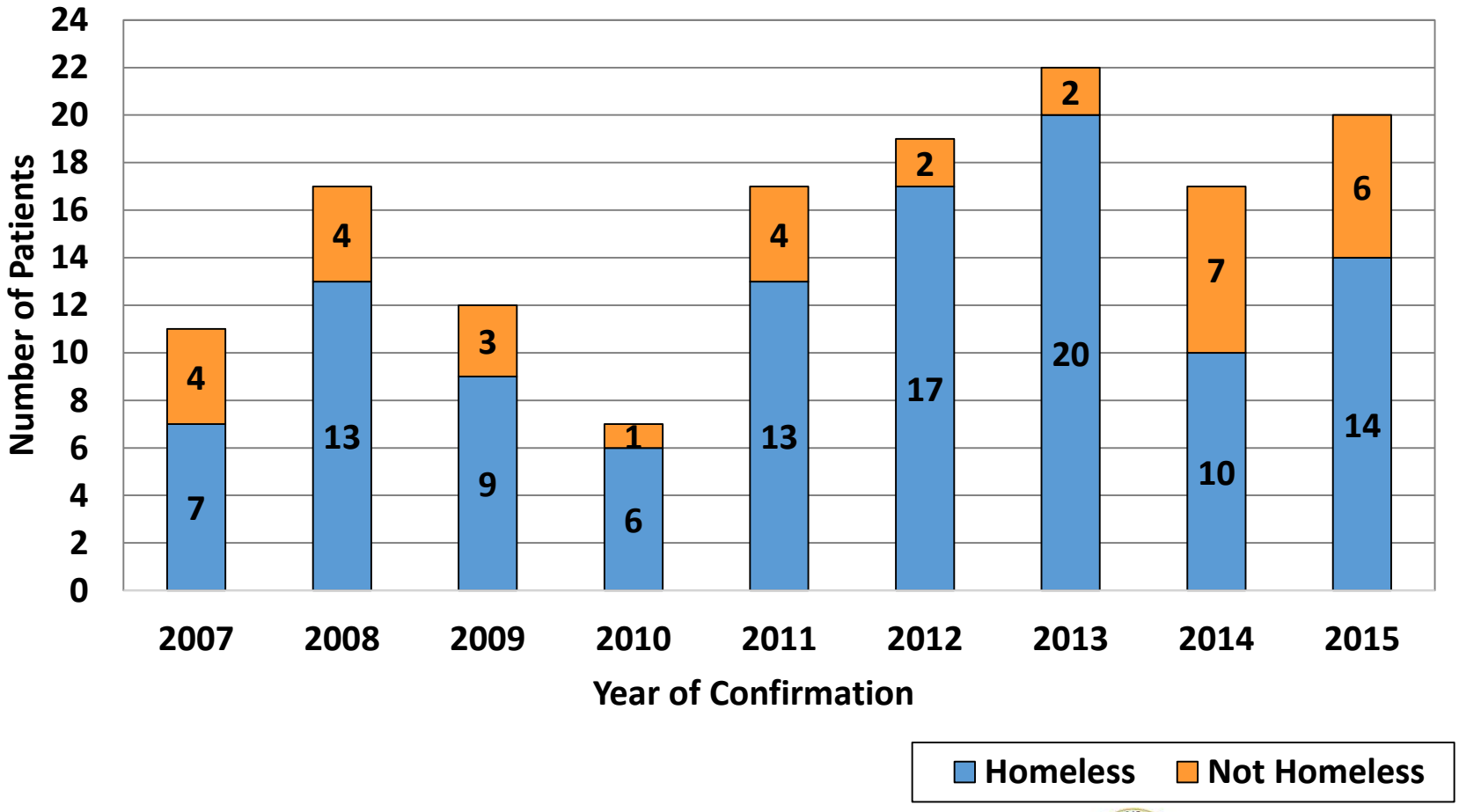
Homeless TB Patients Hospital source: LA County 2007-2015

	Homeless Cases				All
	LAC/USC		Non LAC/USC		
	n	%	n	%	n
All	163	38%	258	61%	421
-					
2007	23	43%	30	56%	53
2008	26	44%	32	55%	58
2009	14	37%	23	62%	37
2010	5	14%	29	85%	34
2011	22	41%	31	58%	53
2012	13	33%	26	66%	39
2013	28	42%	38	57%	66
2014	17	45%	20	54%	37
2015	15	34%	29	65%	44

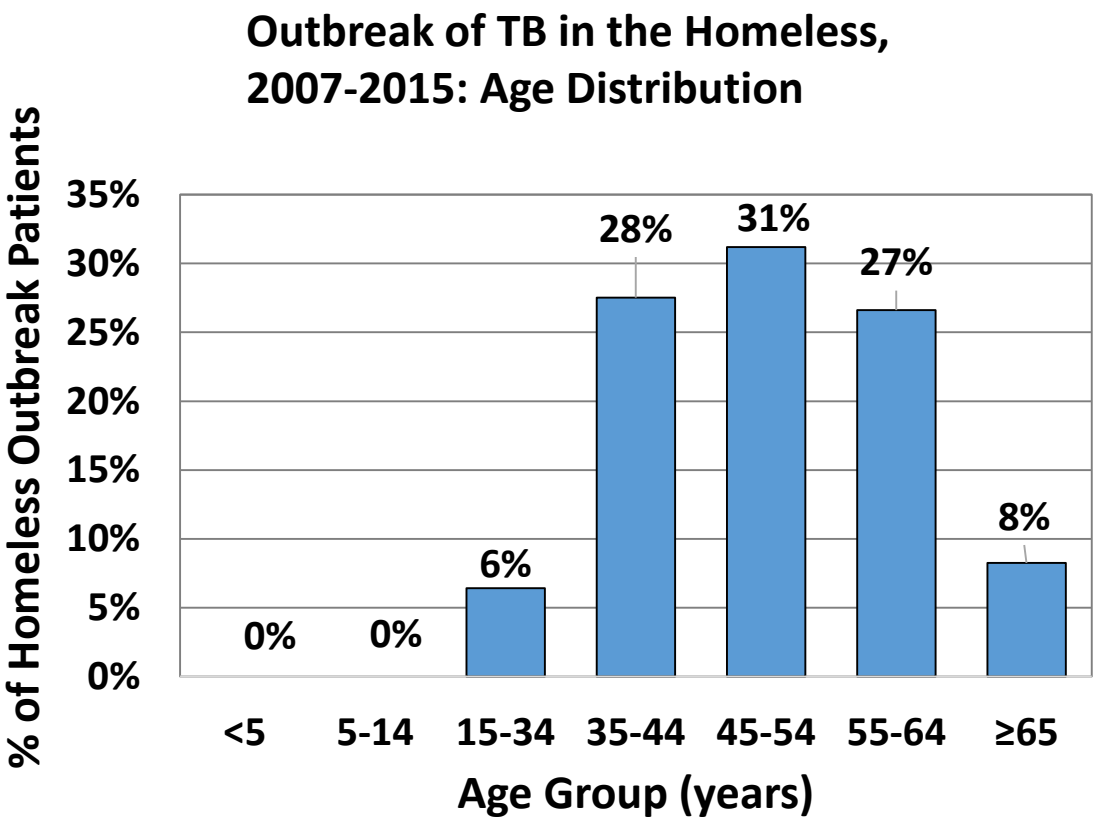
TB Outbreak #1 Update: Epi-Curve
Genotypic cluster G11610:
"Large Homeless Outbreak"

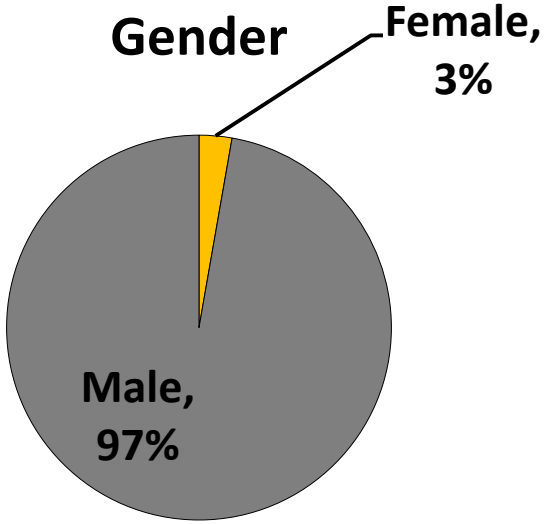


LA County TB Patients. Data exclude Pasadena and Long Beach TB patients.
Based on TRIMS and data from the Genotype Cluster and Investigation Assessment Unit, TBCP, updated 2/17/16.
Data are provisional and subject to change. Patients are defined as "homeless" per RVCT definition.

County of Los Angeles Public Health

TB Outbreak Update: Demographics of Homeless patients in Genotypic cluster G11610: LA County 2007-2015





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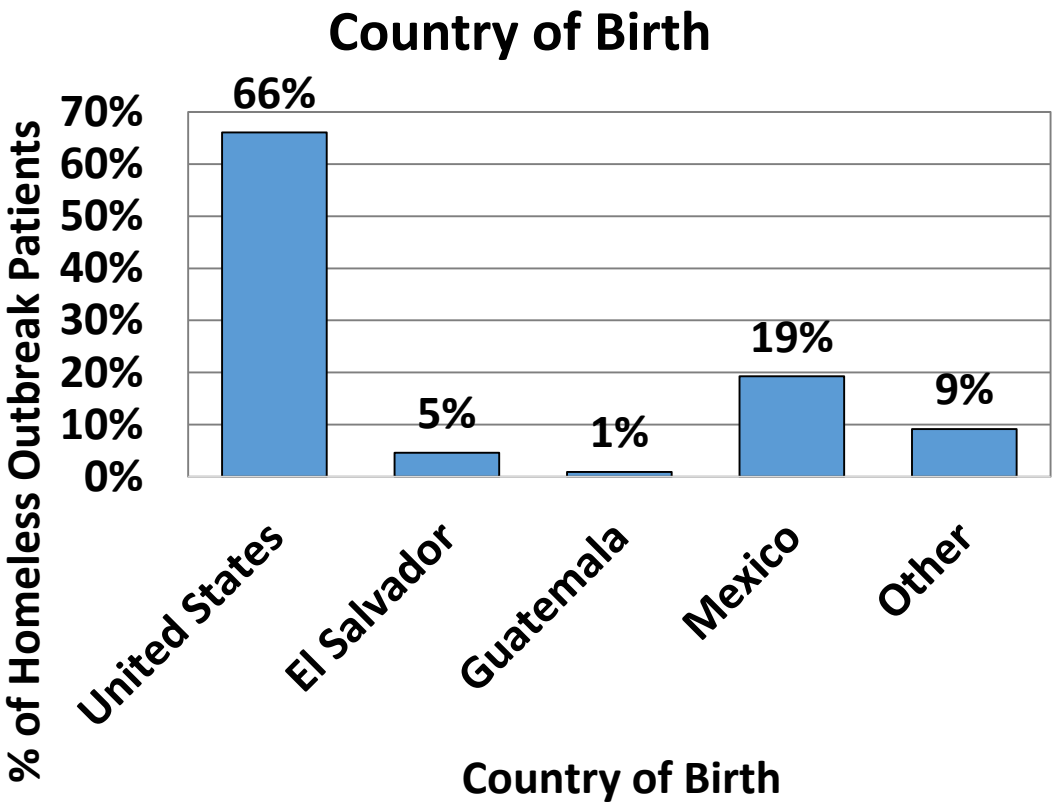

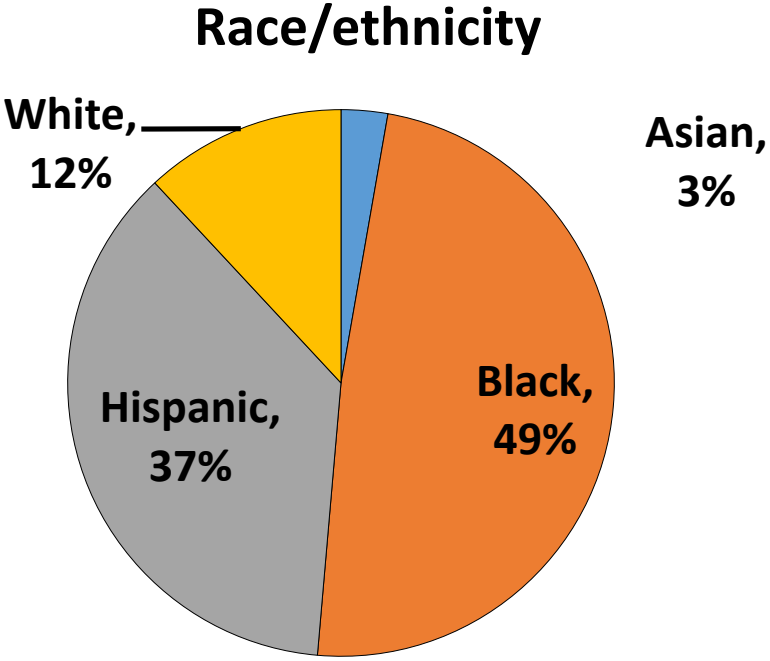

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TB Screening and Treatment among Private Providers Serving Homeless Populations

- Capturing TB screening records for TB clearance
- Encouraging 3HP use
- TBCP weekly screening @ Pathways
- Coming soon: CHS run onsite Pathways to Home clinic

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JWCH INSTITUTE, Inc.

St. John's Well Child & Family Center

Central City Community Health Center

LOS ANGELES CHRISTIAN HEALTH CENTERS "SERVING ALL, WITH OPEN HEARTS"

Logo sources:
URM - http://urm.org/ CCCHC - http://centralcityhealth.org/
JWCH - http://jwchinstitute.org/ LACHC - http://www.lachc.com/
SJWCFC - http://www.wellchild.org/

County of Los Angeles Public Health

TB Screening and Treatment among Private Providers Serving Homeless Populations

- Since 2013, screened 3186
- 408 lost
- 307 TBI+
- 92 started tx
- 57 (62%) completed

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County of Los Angeles Public Health

Homeless 3HP Treatment Status– CHS and LACHC
As of February 9, 2016

Status	Homeless					
	Yes	%	No	%	Total	% among Patients with Closure
Initiated Treatment	**240**		46		286	
Pending Closure	**22**	**9%**	6	13%	28	10%
Completed 3HP Treatment	**157**	**65%**	37	80%	194	68%
Stopped, Medical Reason*	**9**	**4%**	2	4%	11	4%
Stopped, Other Reason**	**52**	**22%**	1	2%	53	18%

*Includes 8 patients stopping due to AE: 4 elevated LFT's, 1 nausea/vomiting, 1 dry mouth, 1 rash, 1 other
The overwhelming majority of these patients were treated by CHS, and were homeless.
14 patients were identified as Contacts.
9 patients were identified as B-notifications.
All were administered by DOT.
** Other reason includes AMA, lost, moved, or previous treatment

LA County TB Patients. Data exclude Pasadena and Long Beach TB patients.
Based on TRIMS data, updated 2/17/16. Data are provisional and subject to change.

SPECIAL PROJECTS

Outbreak #1 Homeless Outbreak
Contact Investigation at Homeless Shelter

- Large number of homeless cluster patients have been housed at one large shelter in LA County
- Ongoing transmission has been suspected
- CDC conducted a large outbreak investigation, (known as Epi Aid) in 2013, the methods of which can be applied to prioritization of contacts in ongoing contact investigations (CIs)

Linde L, Poonja S, Curley C, et al. A Contact Investigation for Three Recent Cases in the Large Tuberculosis Outbreak within the Homeless Communities of Los Angeles County, California. Poster session presented at National Tuberculosis Controllers Association (NTCA) Annual Conference; 2016 Feb 24-27; Denver, CO. Corresponding author: llinde@ph.lacounty.gov

2013 EpiAid Investigation at Homeless Shelter

2013 CDC Epi Aid Contact Prioritization		
Tier	**Definition**	**Identified (n)**
I	HIV+, or >120 days of exposure	2,474
II	30-120 days of exposure AND last exposed AFTER January 1, 2012	1,690
III	30-120 days of exposure AND last exposed BEFORE January 1, 2012	1,267
IV	1-29 days of exposure	12,226
Total		17,657

Note: Included contacts to 45 cases with exposure in various shelters

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2015 Contact Investigation at Homeless Shelter: Patient Information

- 3 homeless TB patients (all smear 4+/cavitary) presented in early 2015
- All were at the same shelter during their infectious periods –their exposure periods were consecutive and non-overlapping between 10/2014 and 2/2015
- Performed one combined CI for contacts to all three patients at the shelter using CDC Epi Aid prioritization methodology

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2015 Contact Investigation at Homeless Shelter: Contact Prioritization

Tier	Definition	Identified (n)
I	≥ 60 total days of exposure, OR ≥ 50 days of exposure to case #1*	173
II	Not in Tier I, and total days of exposure ≥ 30 and < 60	249
III	Total days of exposure ≥ 1 and < 30	871
Total**		1,293

*A holdover from initial CI assessment of the three patients separately
**Excluding n=2 contacts Tier IV (0 days exposure)

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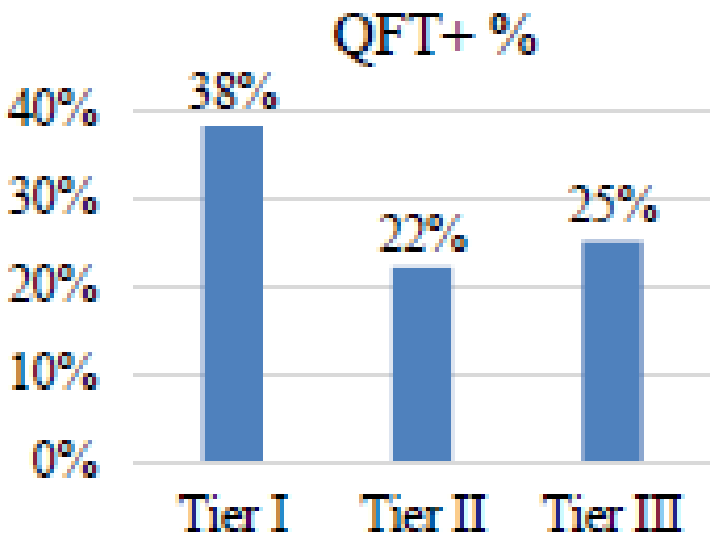
2015 Contact Investigation at Homeless Shelter: Contact Prioritization

Overall Screening Results

Tier	Evaluated (n)	QFT+ (n (%))
I	68	26 (38%)
II	18	4 (22%)
III	24	6 (25%)
Total	110	36 (33%)

Note: 5 Tier I and 1 Tier III contacts lost to X-ray follow up – LTBI confirmed rates are 31% and 19% for Tier I and Tier III, respectively.



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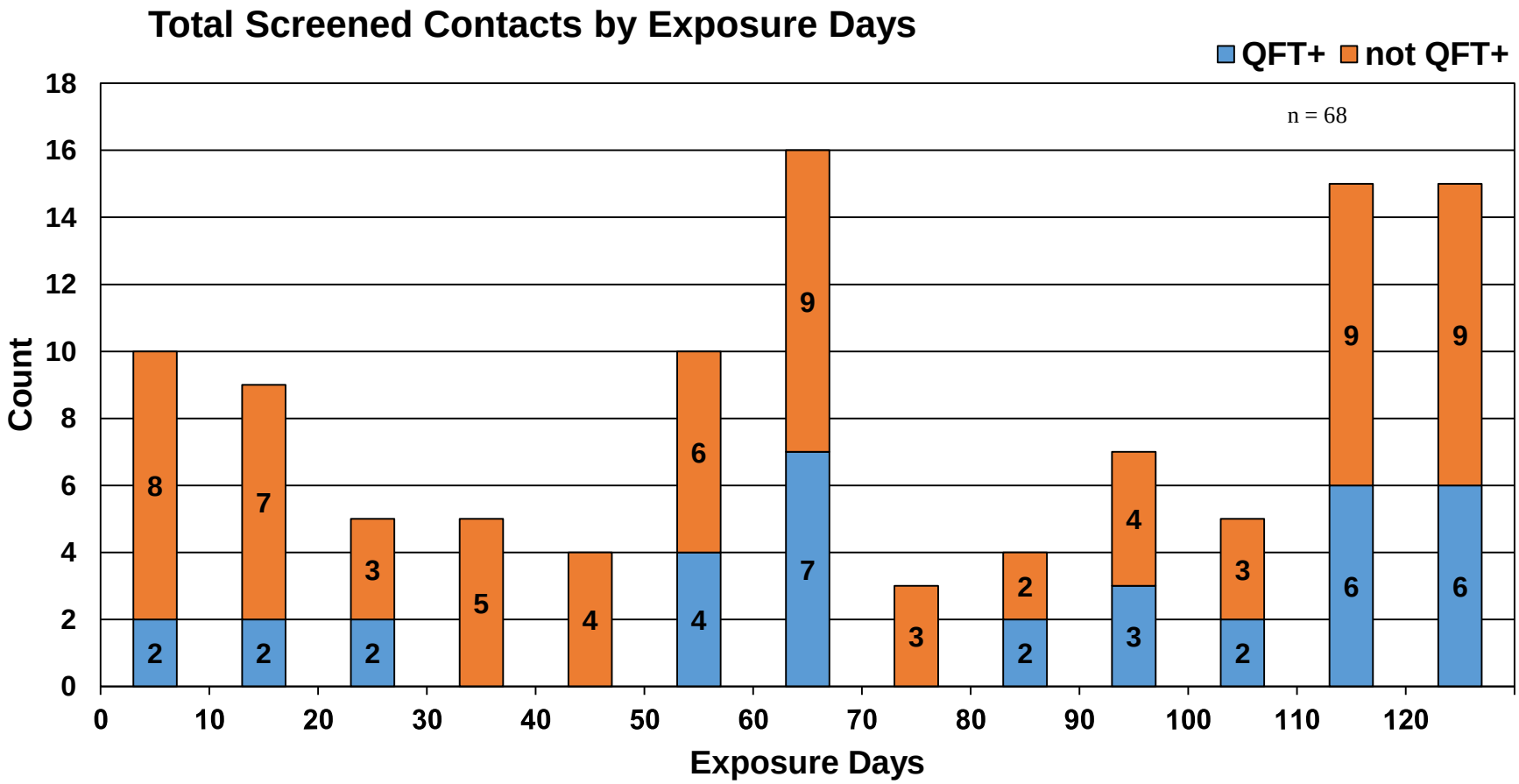
Contact Investigation at Homeless Shelter: Screening Results



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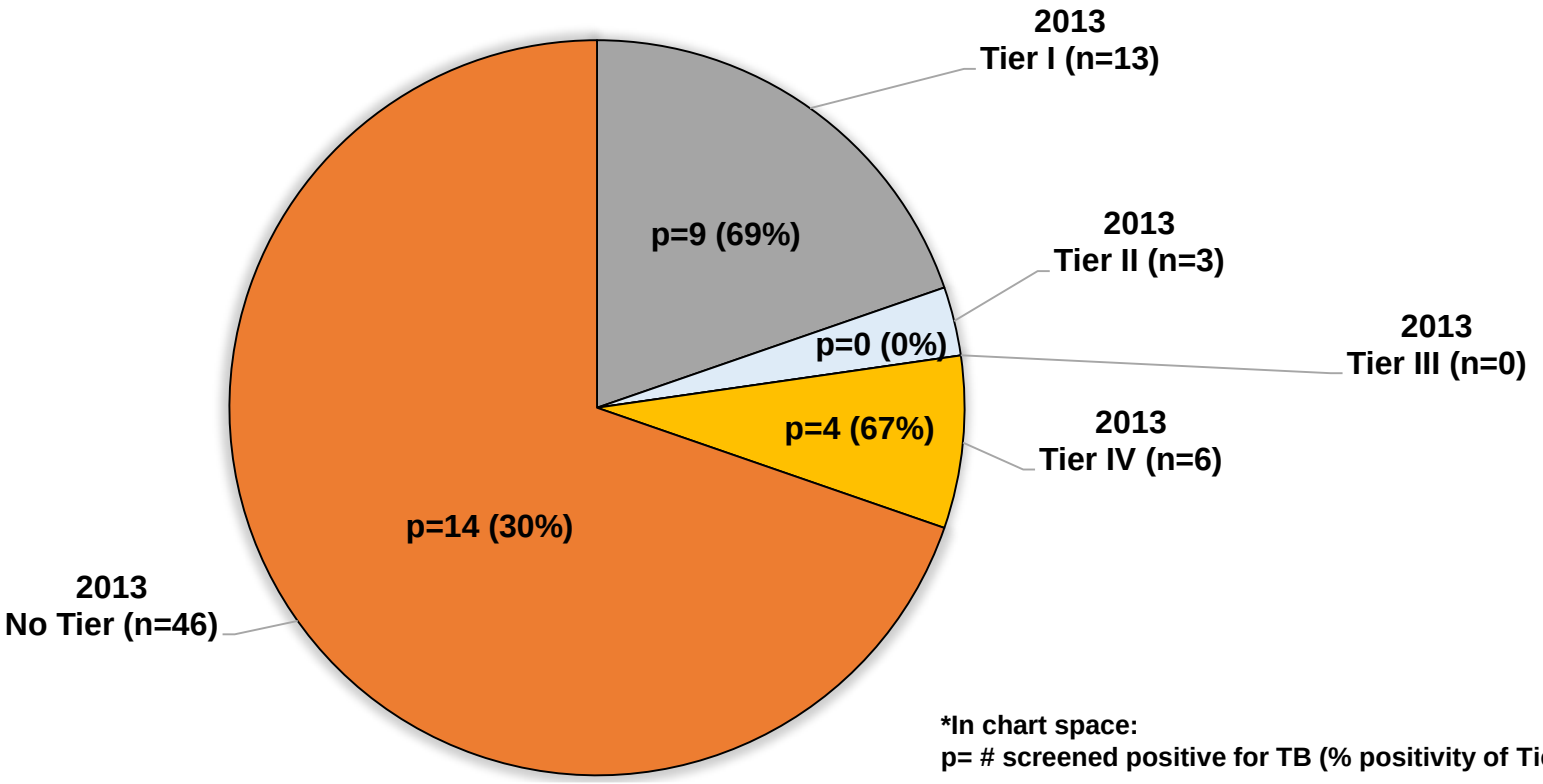
Contact Investigation at Homeless Shelter: Screened Tier I Contacts (N=68) according to prior 2013 CDC EPI Aid Tier Status



*In chart space:
p= # screened positive for TB (% positivity of Tier)

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Contact Investigation at Homeless Shelter: Summary

- LTBI data corroborate findings of 2013 Epi Aid and support this prioritization method
- Use of shelter registration data to calculate smear positive/cavitary exposure nights is useful for prioritization at this shelter
- Data show importance of contact prioritization and investigation based on recognition of the ongoing outbreak, not by individual patients

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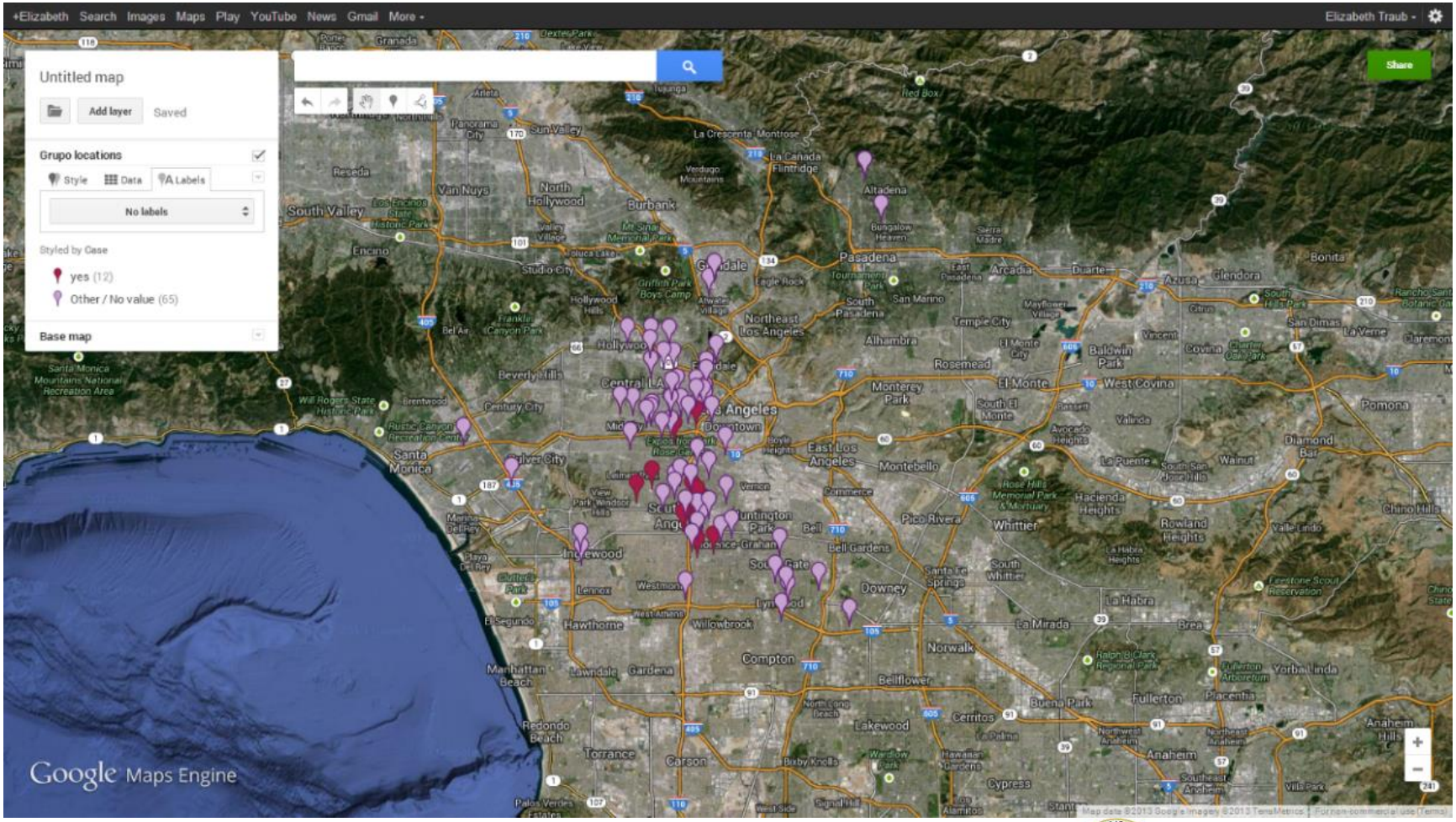
Outbreak #2
Grupo Cluster: Genotype G10161

- What are Grupos?
  - Community-based alcohol rehabilitation centers that follow a faith-based alcoholic recovery program
  - Population consists of clients that are predominantly from Central or South America
  - Provide cooperative living arrangements and meeting space for recovering drug and alcohol users
  - Sites offer dormitory and communal housing and are supported by their large network of members

Grupo Cluster: Locations in LA County



Grupo Cluster: Demographics

- 26 TB patients in LAC (2007-2015)
  - 6 confirmed TB patients in 2015
  - 23 are non-U.S. born:
    - Mexico (10)
    - El Salvador (8)
    - Guatemala (3)
    - Honduras (1)
    - Argentina (1)
  - Main risk factor: exposure to one or more Grupos
  - 58% of patients have some degree of homelessness

Based on TRIMS and data from the Genotype Cluster and Investigation Assessment Unit, TBCP.
Data are provisional and subject to change.

Grupo Cluster: Demographics Comparison between LA County and U.S.

Characteristic	Los Angeles N=26	Rest of U.S N=8
Race/Ethnicity		
Hispanic	26 (100.0%)	7 (87.5%)
Asian	0 (0.0)	1 (12.5%)
Gender		
Male	21 (91.3%)	6 (75.0%)
Female	2 (8.7%)	2 (25.0%)
Birth		
US Born	2 (7.7%)	0 (0.0%)
non-U.S. Born	23 (88.5%)	8 (100.0%)
Unknown	1 (3.8%)	

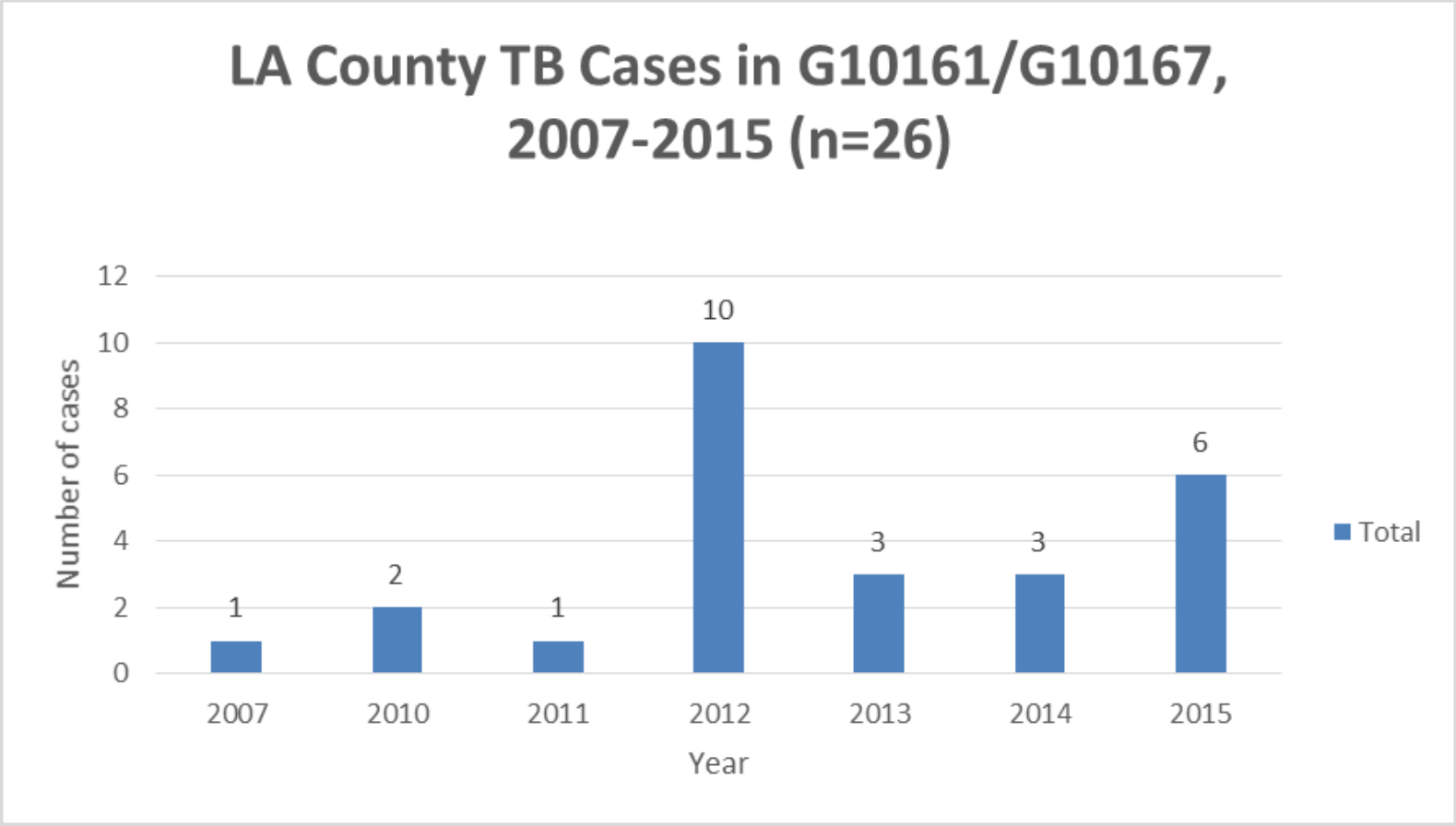
Based on TRIMS and data from the Genotype Cluster and Investigation Assessment Unit, TBCP.
Data are provisional and subject to change.

Grupo Cluster: Risk Factors: LA County

	Grupo Cluster-LAC	
Selected Risk Factors	n 26	%
Homelessness	15	58.0
Yes		
HIV	3	12.0
Yes		
Diabetes	6	23.1
Yes		
Injecting Drug Use	2	8.0
Yes		
Non-injecting Drug Use	7	27.0
Yes		
Alcohol Use	22	85.0
Yes		

Based on TRIMS and data from the Genotype Cluster and Investigation Assessment Unit, TBCP.
Data are provisional and subject to change.

Grupo Cluster: Epi Curve



Based on TRIMS and data from the Genotype Cluster and Investigation Assessment Unit, TBCP.
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Grupo Cluster: Cases in G10161/G10167, PCR00556 (n=20) with Grupo History During Exposure Period: LA County 2007-2015

Tier I: Red solid triangle

1. Grupos with cases that are cavitary and sputum smear +
2. A Grupo that has two or more cases with one of these cases being cavitary and sputum smear +

Tier II: Blue solid triangle

1. Grupos with cases that are non-cavitary and sputum smear +, or
2. Any case that is cavitary and sputum smear negative

Tier III: Green solid triangle

1. Grupos with cases that are non-cavitary and sputum smear –

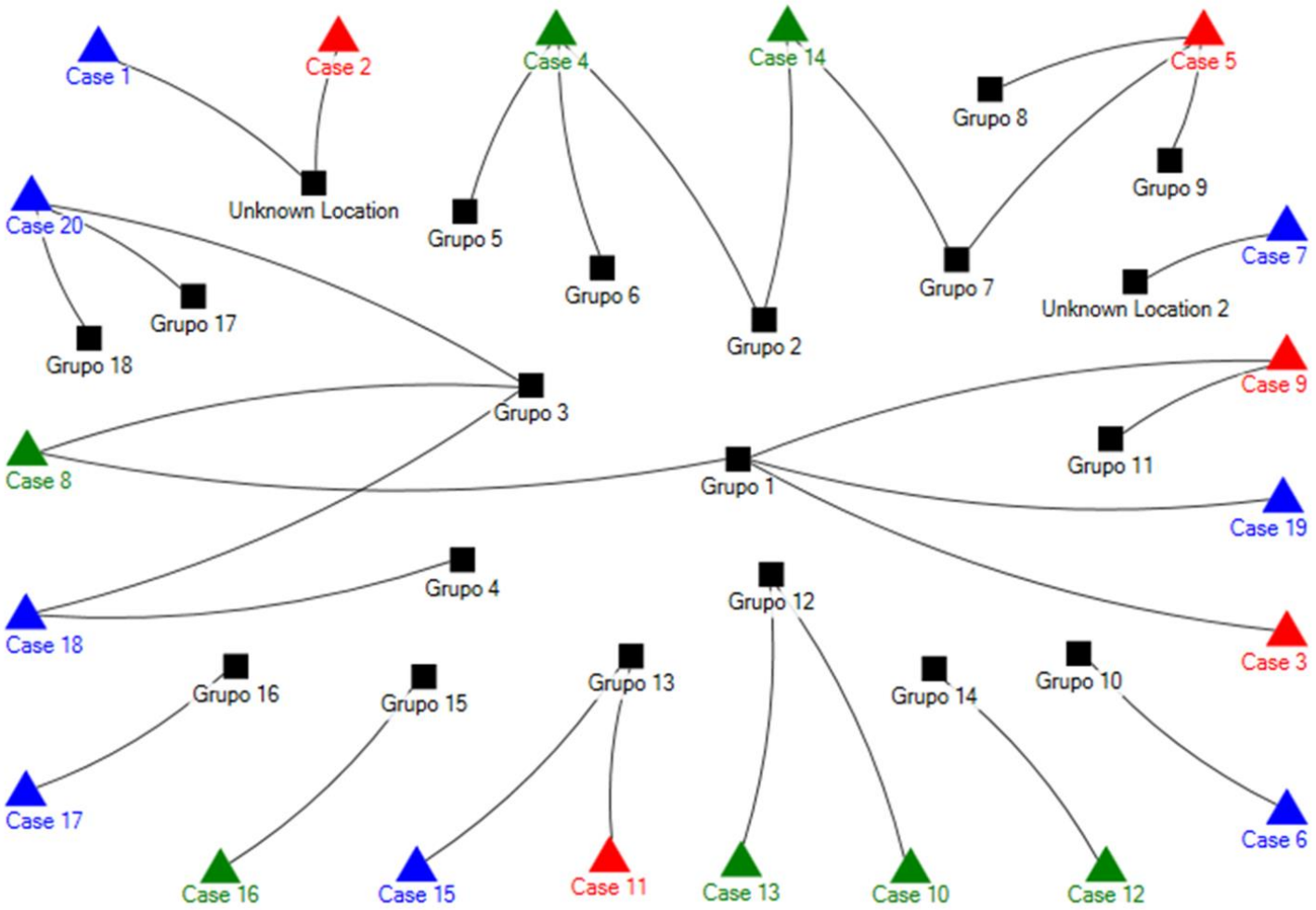
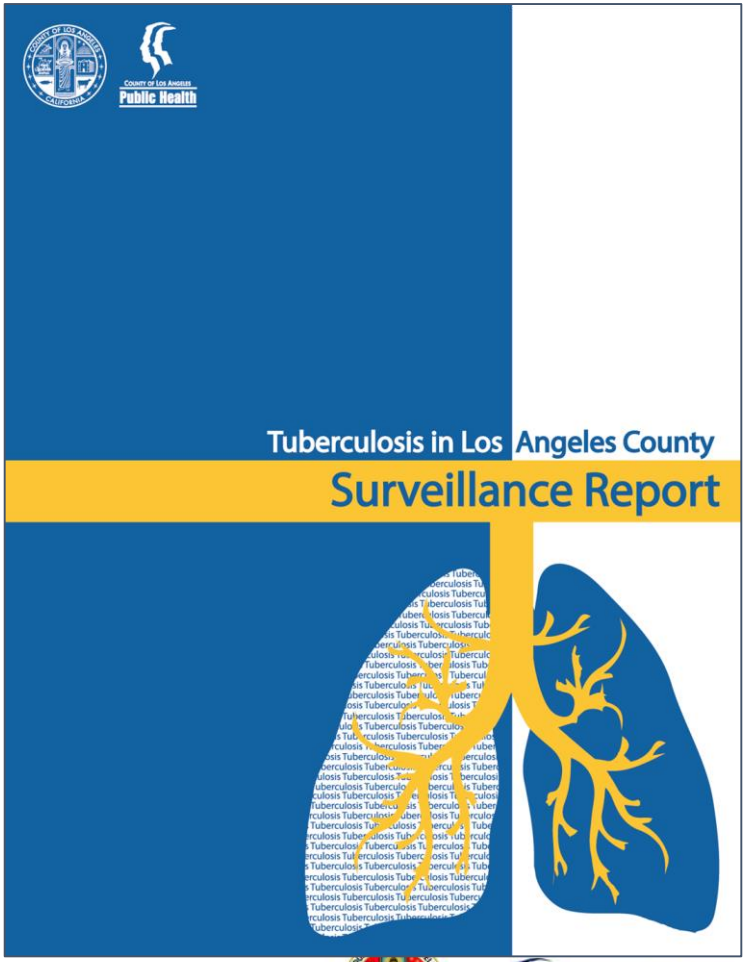


Image 1: 20 of the 26 cases in G10161/G10167, PCR00556 had Grupo history during exposure period identified during patient interviews
Source: Genotype Cluster and Investigation Assessment Unit, TBCP, NodeXL.

Coming soon:

- NAAT performance results
- Analysis of TBI Treatment in Contacts
- Implementation and Evaluation of Automated VDOT
- Mortality project continues….



Final Thoughts

How can I use epi data to communicate risk?

Am I under-reporting or misclassifying data?

How can I use data to prioritize and evaluate my work?

THANK YOU!
ANY QUESTIONS?