

**Value of TB Screening  
Among Foreign Born Persons:  
U.S. (California) Perspective**

**February 27, 2015**

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## Outline

- **Foreign born / Immigration in California**
- **TB in California among foreign-born**
- **Current screening programs**
- **Gaps / Opportunities**
- **TB in longstanding foreign born residents**

A green rectangular sign with rounded corners and a white border, mounted on two wooden posts. The sign reads "Welcome to California" in white, bold, sans-serif capital letters. The background of the sign is a vibrant green. The sign is positioned on the right side of a two-lane asphalt road that stretches into the distance. The landscape is arid, with dry, brownish hills and sparse vegetation under a clear blue sky. A small vehicle is visible in the distance on the road.

**Welcome  
to  
California**

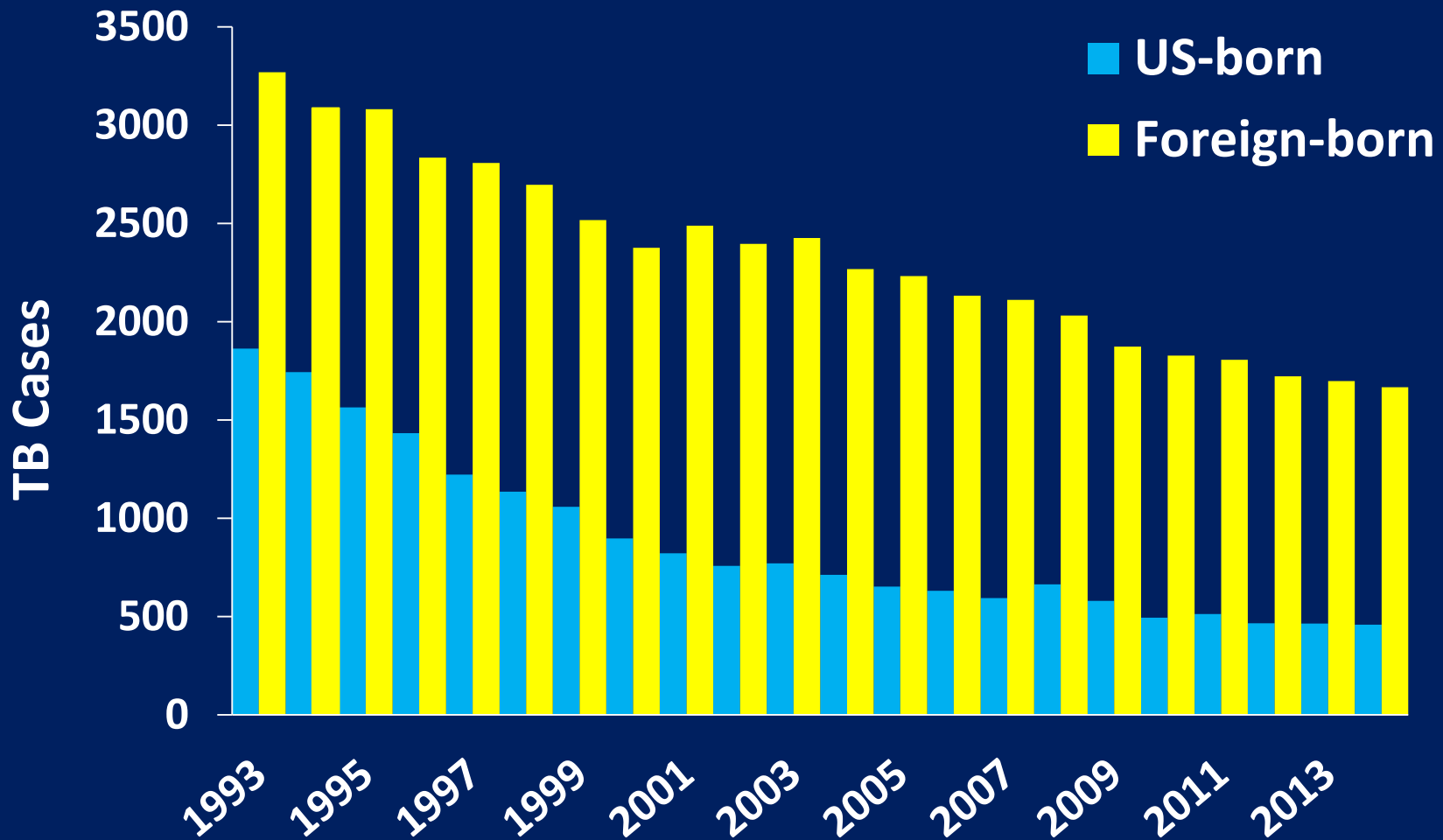
# Immigrants in California

- **> 10 million immigrants (27% of CA pop.)**
  - ~25% of foreign-born in U.S.
- **50% of children with an immigrant parent**
- **53% from Latin America; 37% from Asia**
  - 2007-2011: 53% from Asia; 31% from Latin America
- **Estimated 2.5 million undocumented**

From Public Policy Institute of California ([http://www.ppic.org/main/publication\\_show.asp?i=258](http://www.ppic.org/main/publication_show.asp?i=258))

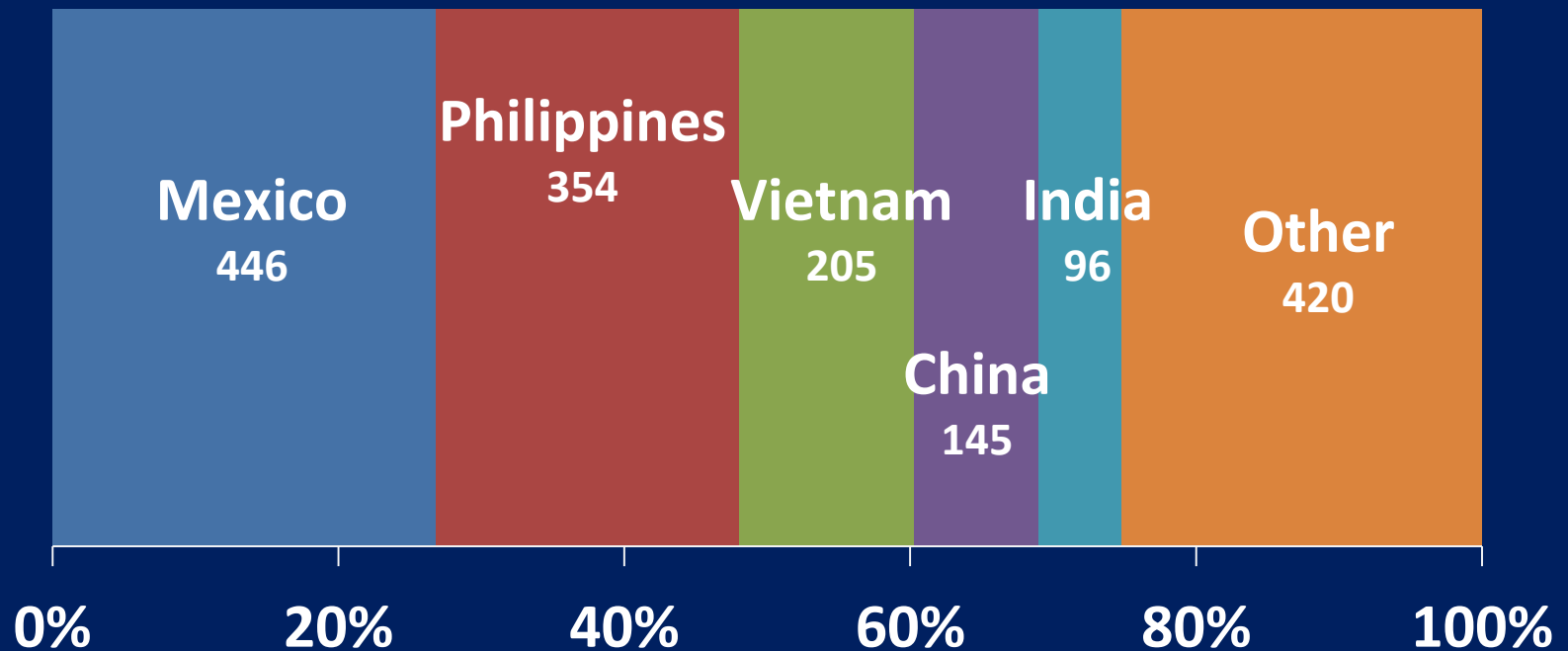
Sources: U.S. Census Bureau Decennial Censuses, American Community Survey, and the Department of Homeland Security.

# TB Cases in US- and Foreign-born Persons, California, 1993-2014

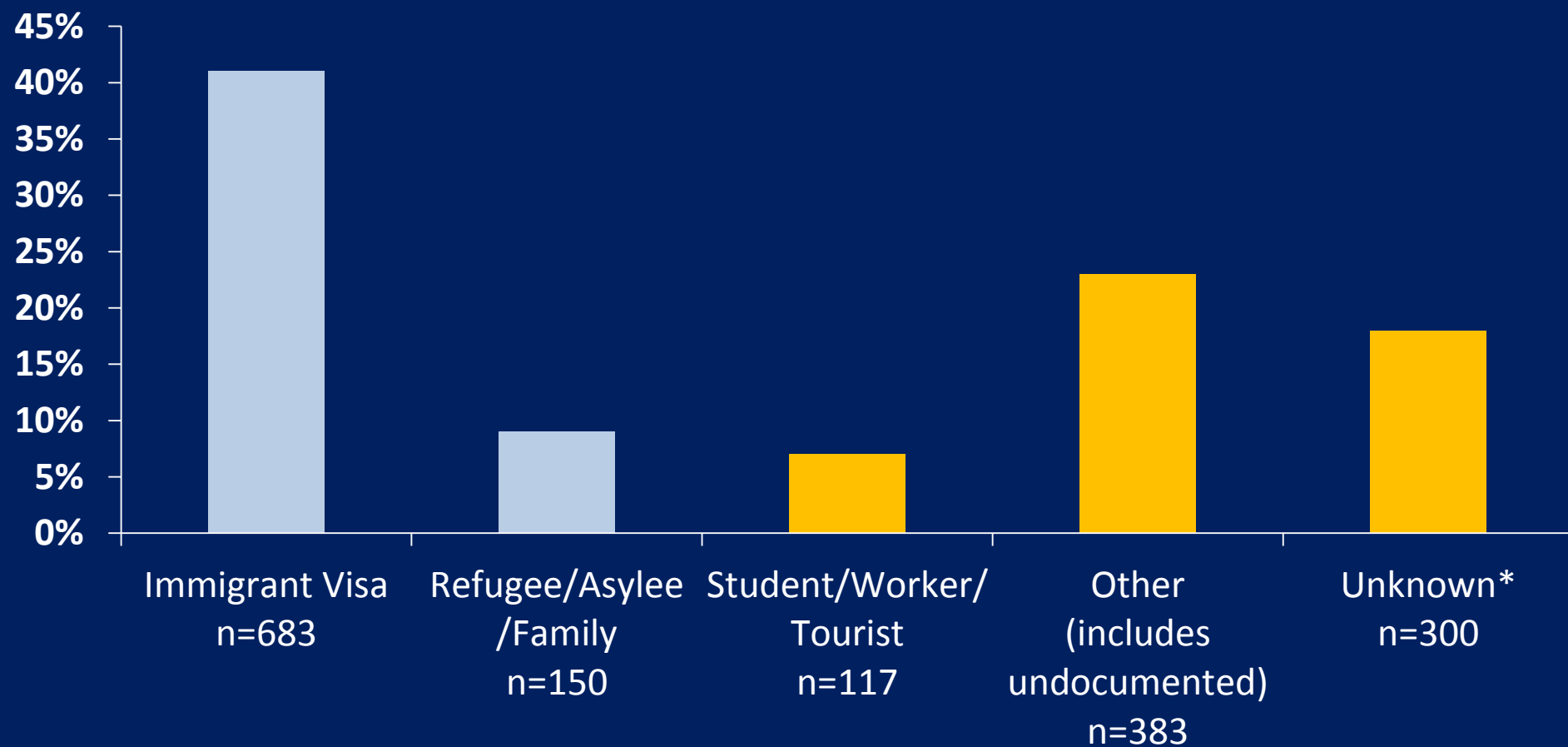


# Countries of Birth for Foreign Born Persons with TB California, 2014

N=1,666

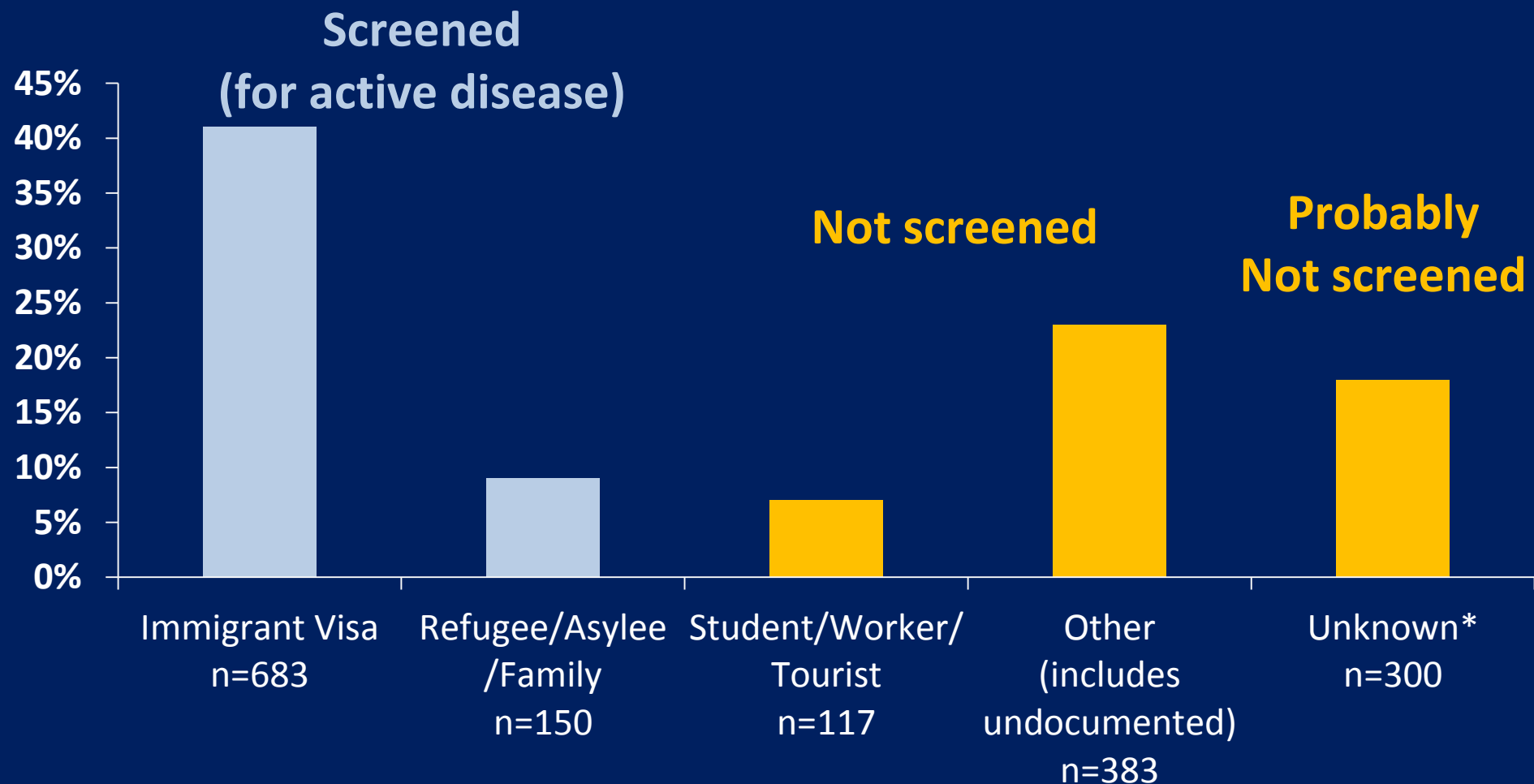


# Immigration Status at First US Entry persons with TB — California, 2014



\* Includes persons from counties with policies against collecting immigration status information

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# Newcomers to California

	New immigrants	Nonimmigrant Admissions	No legal status
Examples	"Green Card" holders Refugees	Tourists Students Workers	Undocumented
Number per year	200,000	11,000,000 (640,000 students/ workers)	?
TB screening required?	Yes	No	N/A



# TB Screening of New Immigrants

## Legal Permanent Residents

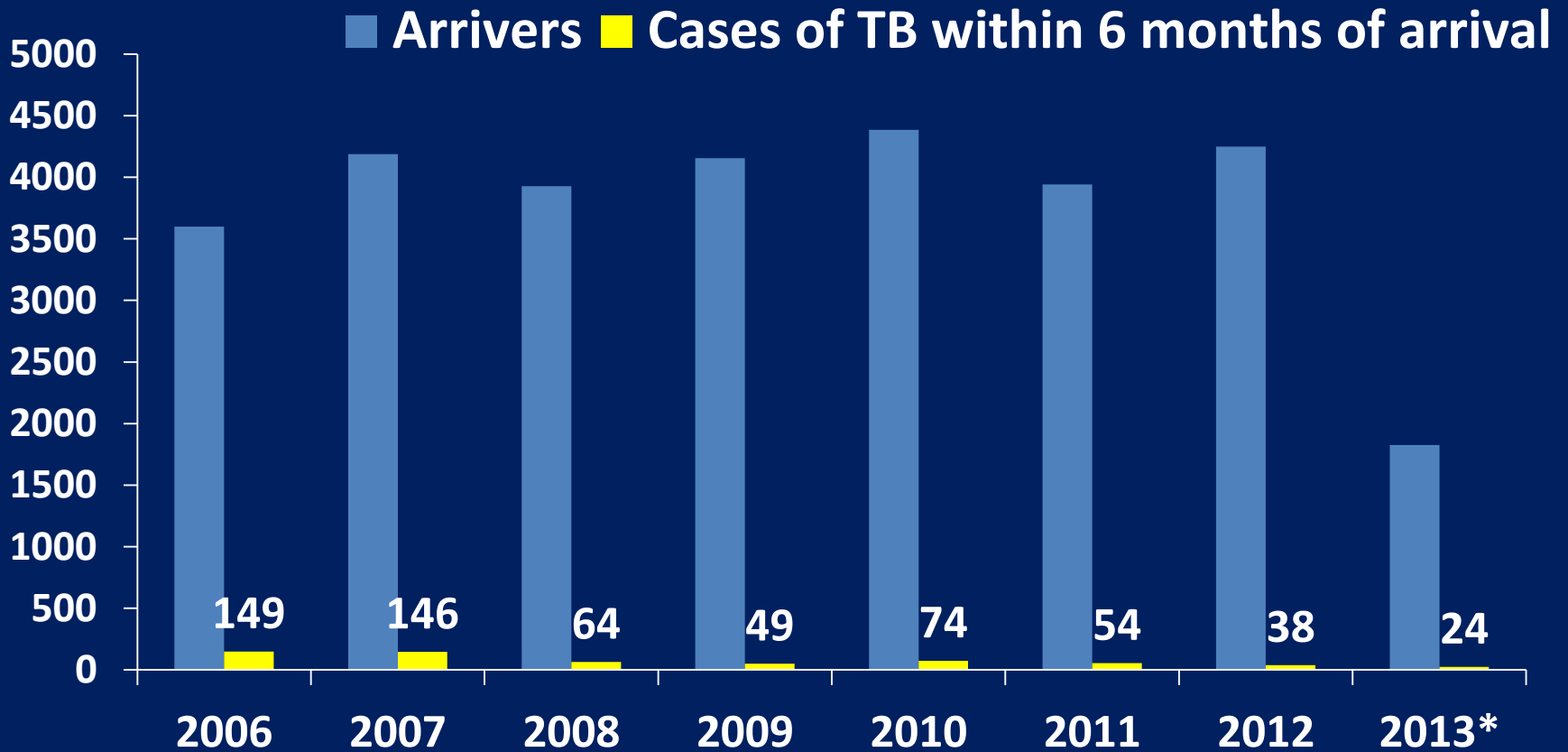
### “B-notification”

- Apply Overseas
- N=100,000 / year
- Active case finding only
  - Evaluated overseas
  - CXR (TST for children)
  - Abnormal CXR → 3 sputa smear and cx
  - If no active TB → Domestic follow-up by health department
- Data easily available

### “Status adjusters”

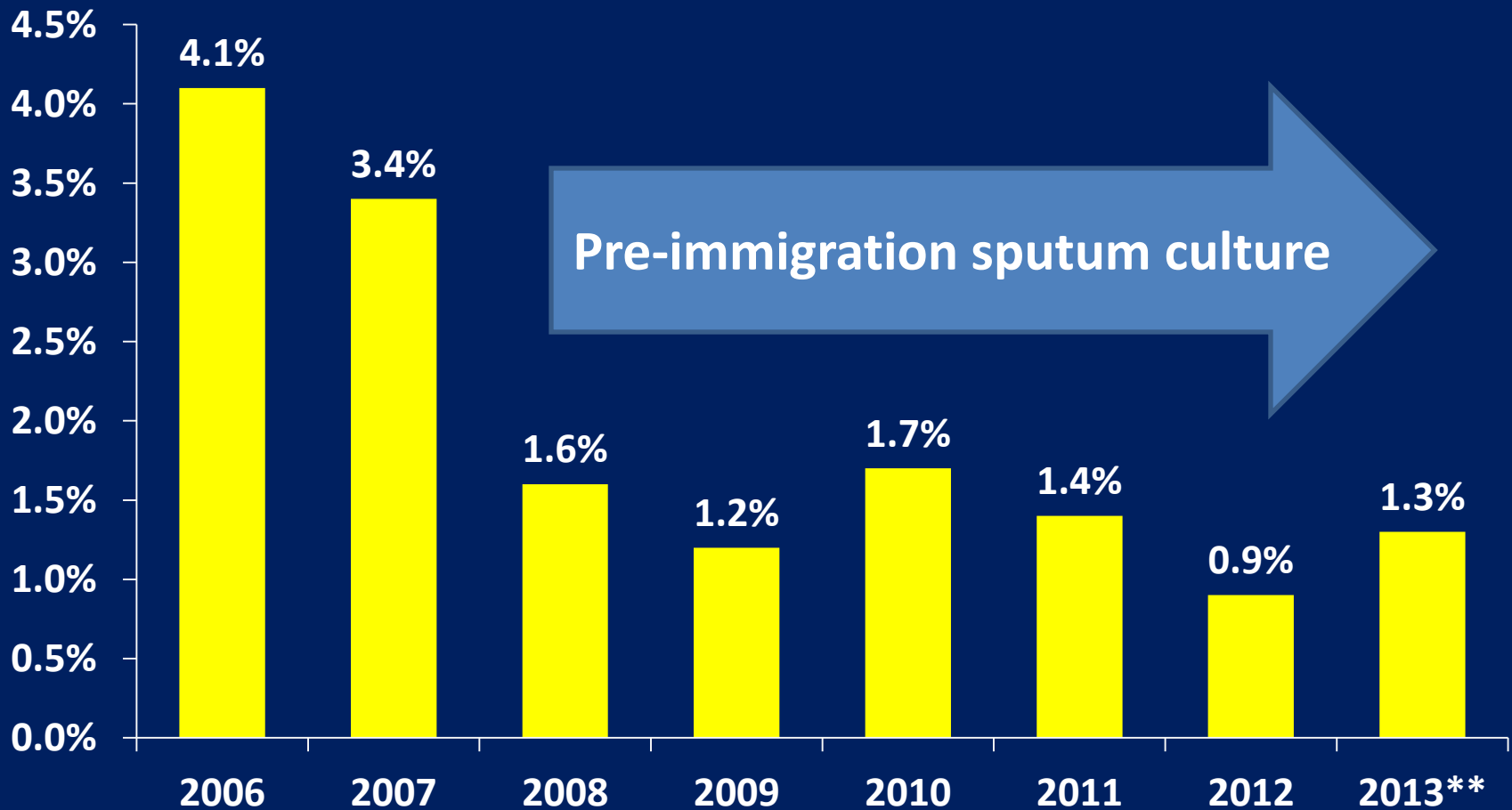
- Apply in US
- N=100,000/year
- Active and latent testing
  - Evaluated by “civil surgeons”
  - TST or IGRA
  - CXR for positives (>5mm)
  - No requirement for treatment or referral if no active TB
  - Is LTBI treatment given?
- Data not available

# Arrivers with abnormal pre-immigration CXR California



\*Jan-June only

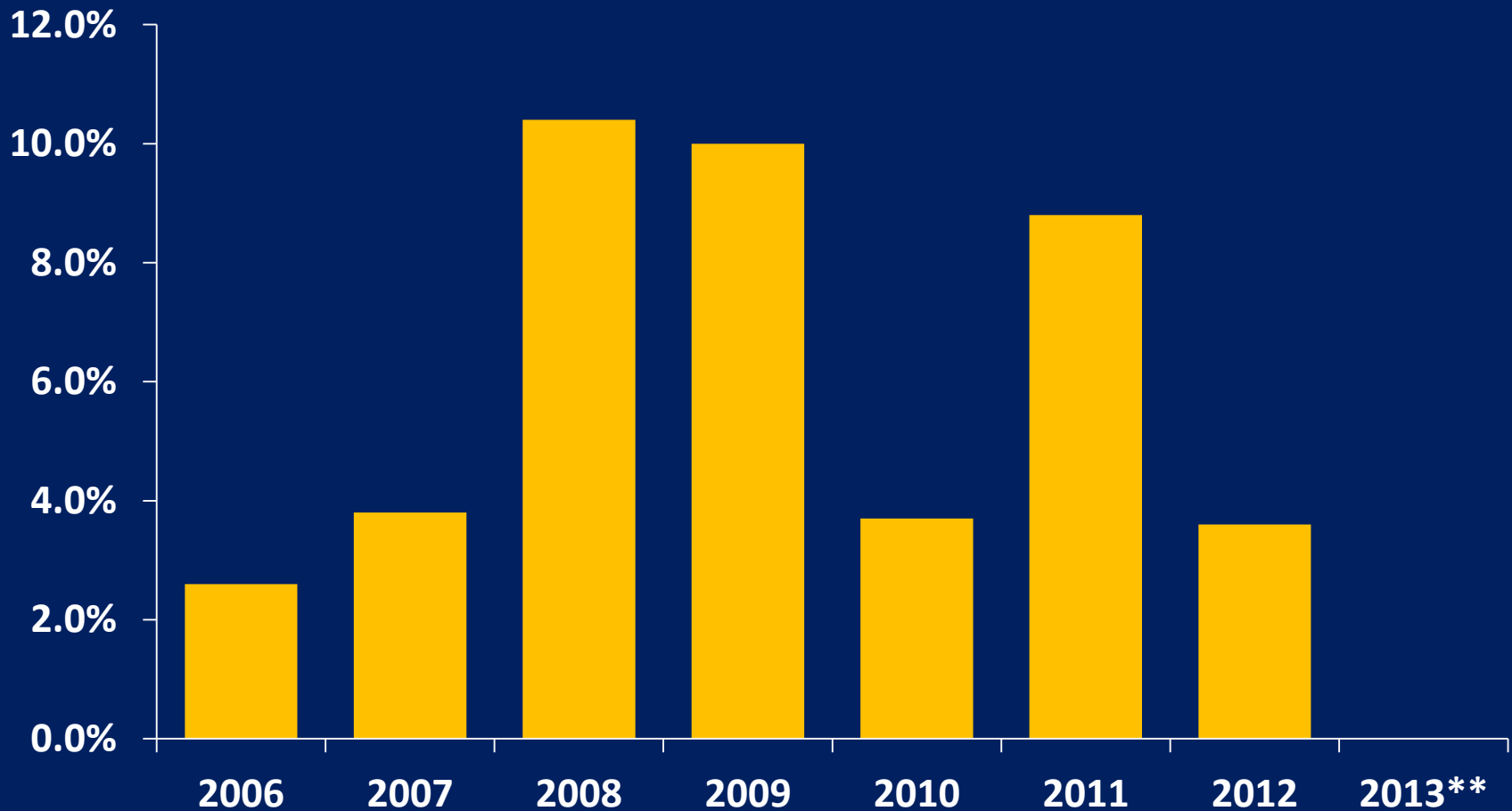
# % of Arrivers\* with active TB within 6 mos of arrival — California



\*B1 notification arrivers: abnormal pre-immigration CXR

\*\*Jan-June only

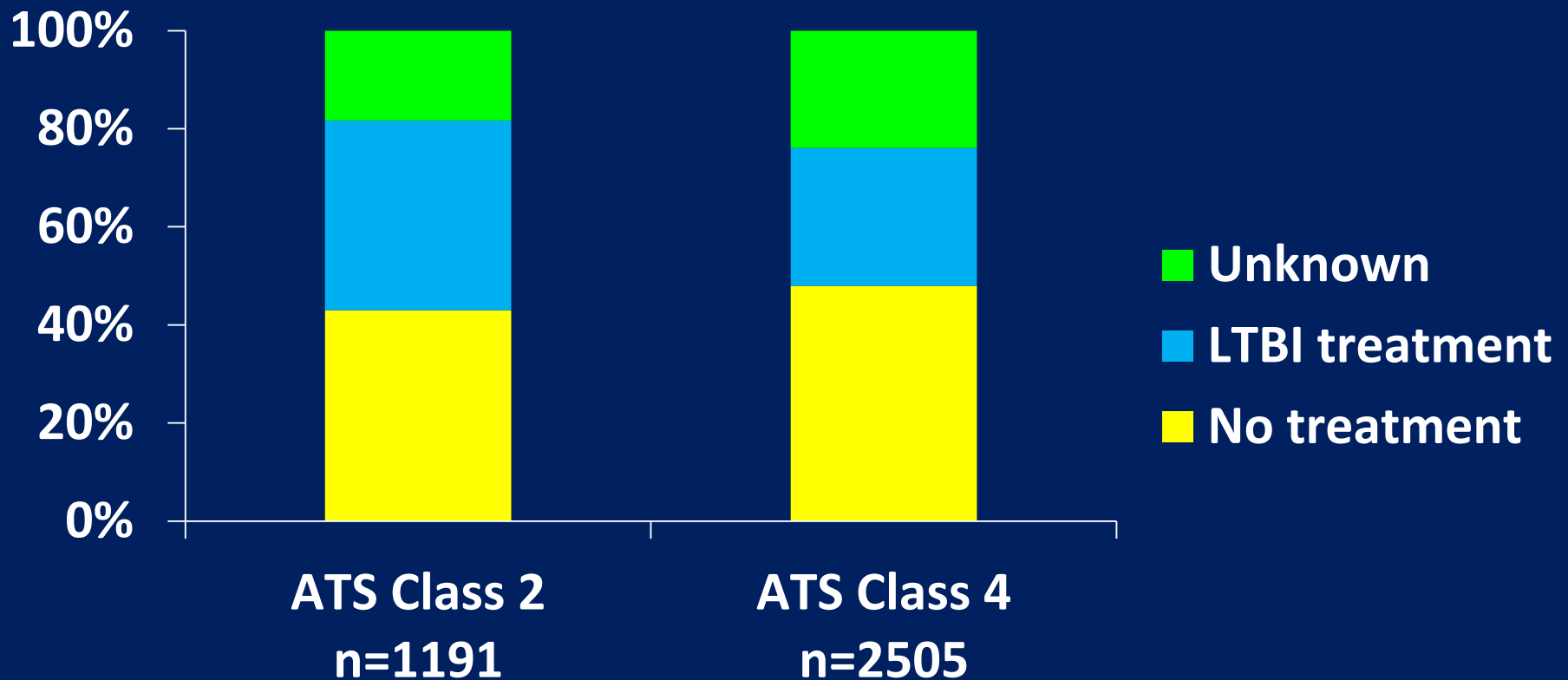
# MDR among Arrivers\* with Active TB within 6 months of US arrival



\*B1 notification arrivers: abnormal pre-immigration CXR

\*\*Jan-June only

# Treatment for arrivers with abnormal pre-immigration CXR California, 2012-2013



Persons evaluated in California including with a CXR

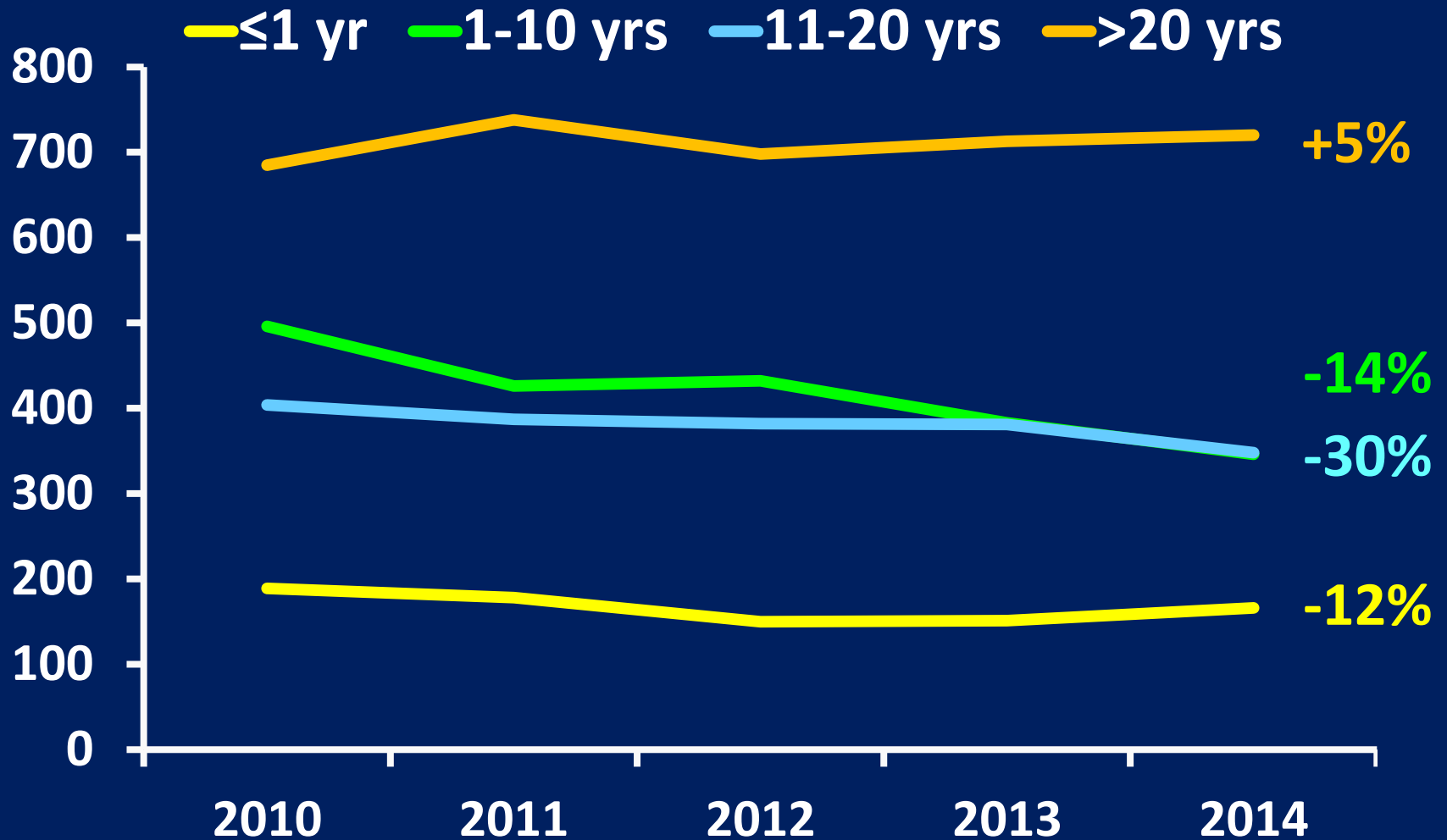
\*Arrivers evaluated to Class 3 have not been matched to RVCT

# New Arriver Screening Gaps

- Many not screened at all (visitors, undocumented)
- Of those screened great majority not screened for LTBI
- Even among those screened by health departments >40% don't start treatment
  - No data from civil surgeons

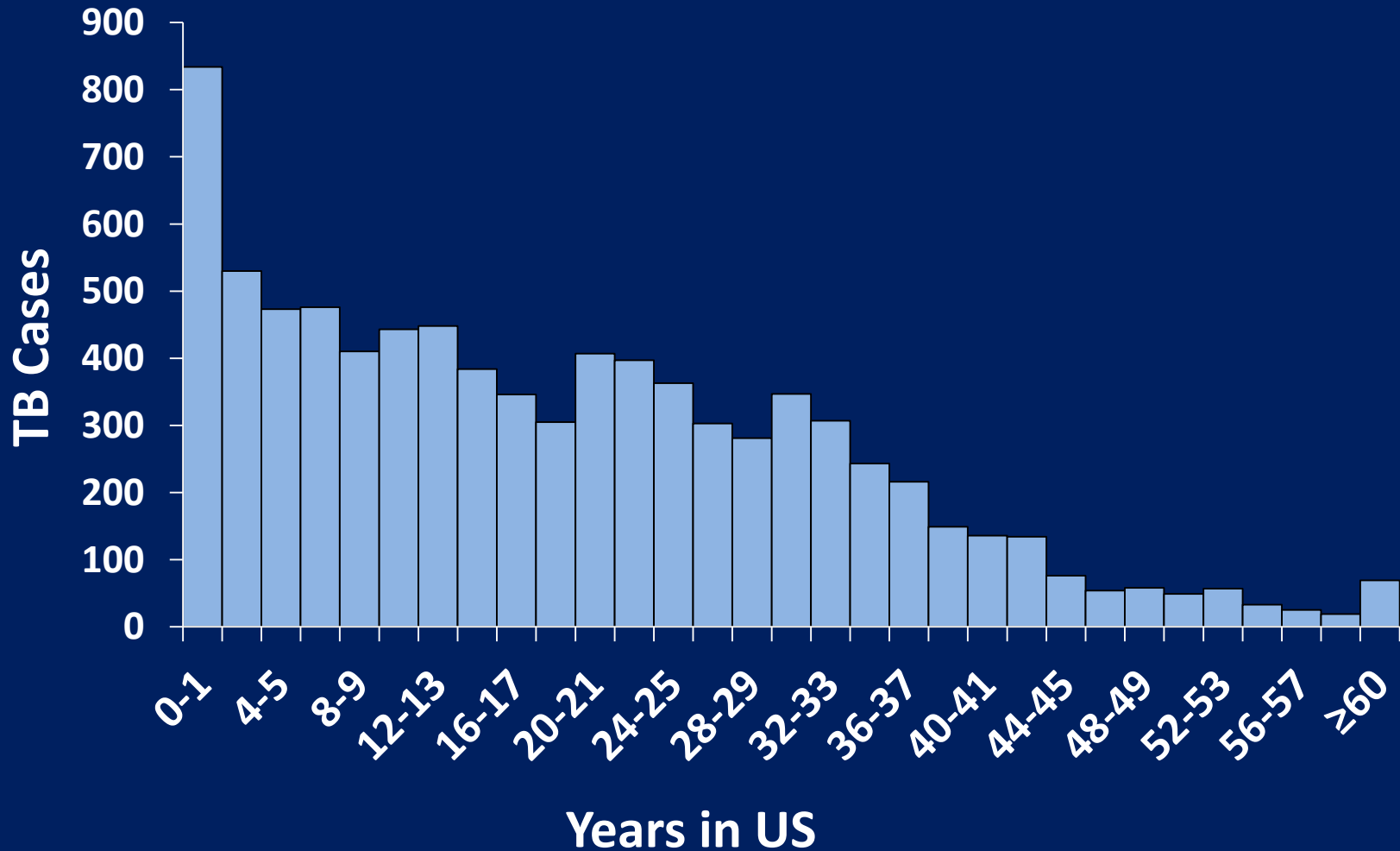
**What about longstanding  
foreign born residents in  
California?**

# TB cases by years in US at TB report California, 2010–2014

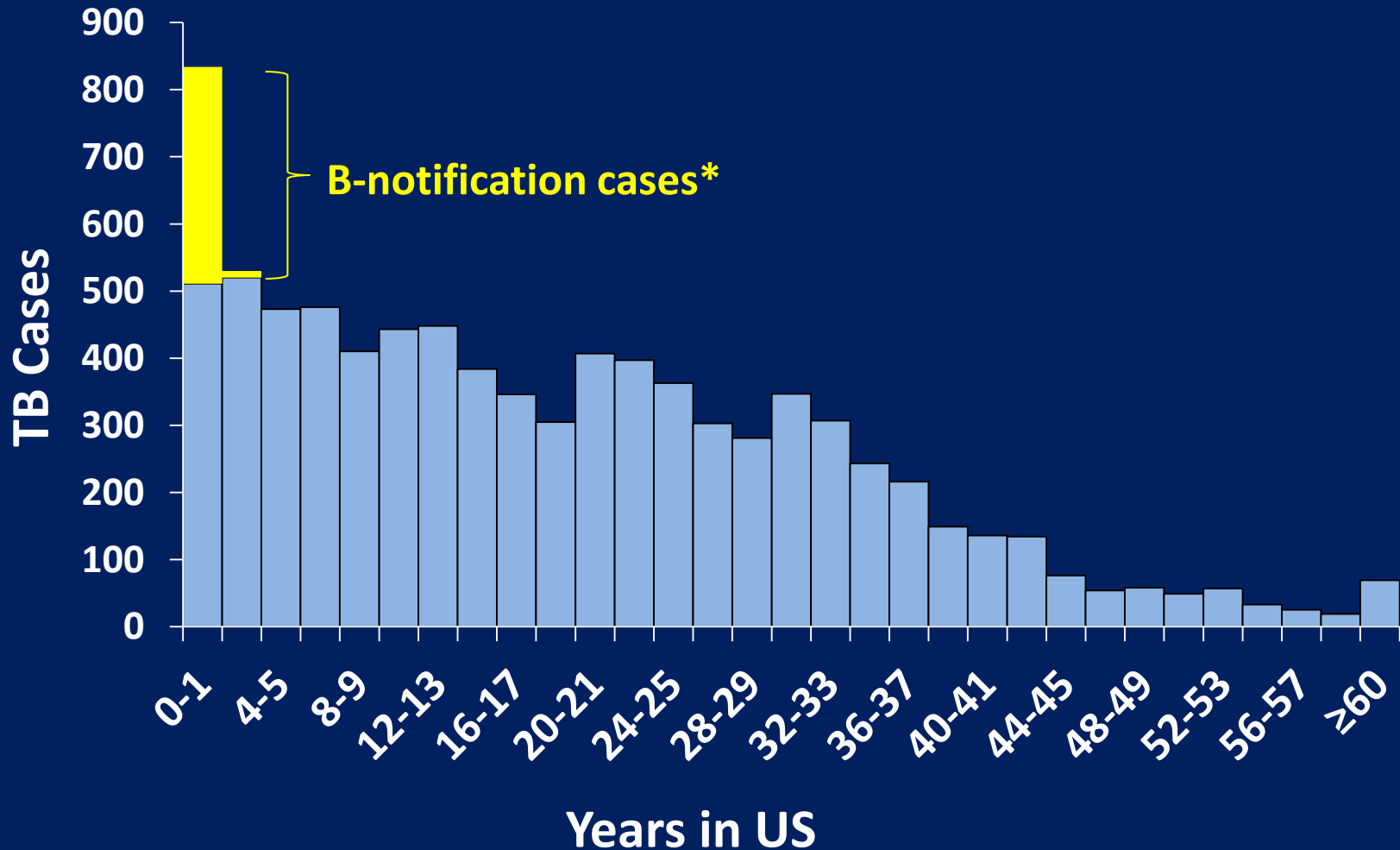




# Years in US at TB Diagnosis California, 2010-2014

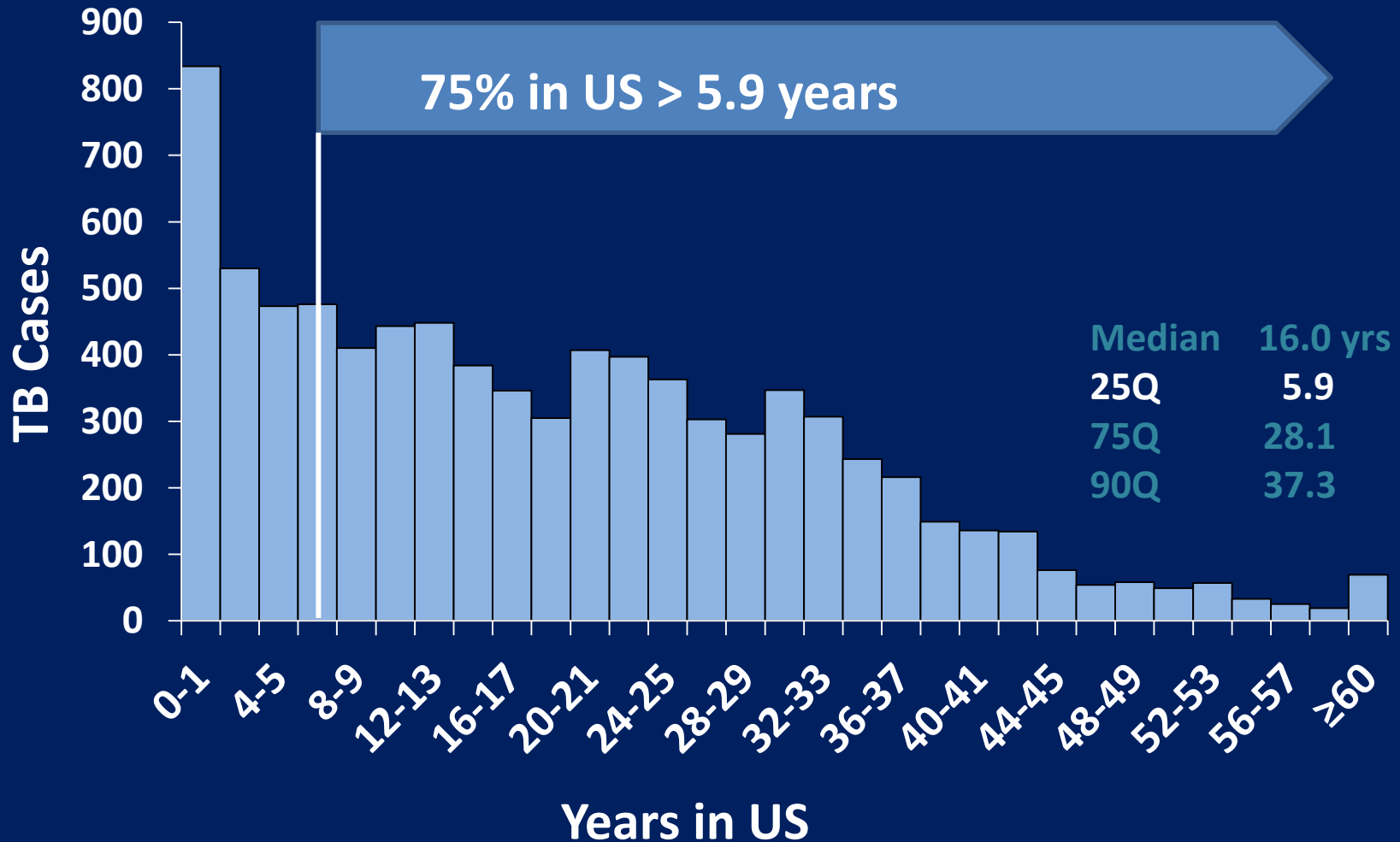


# Years in US at TB Diagnosis California, 2010-2014

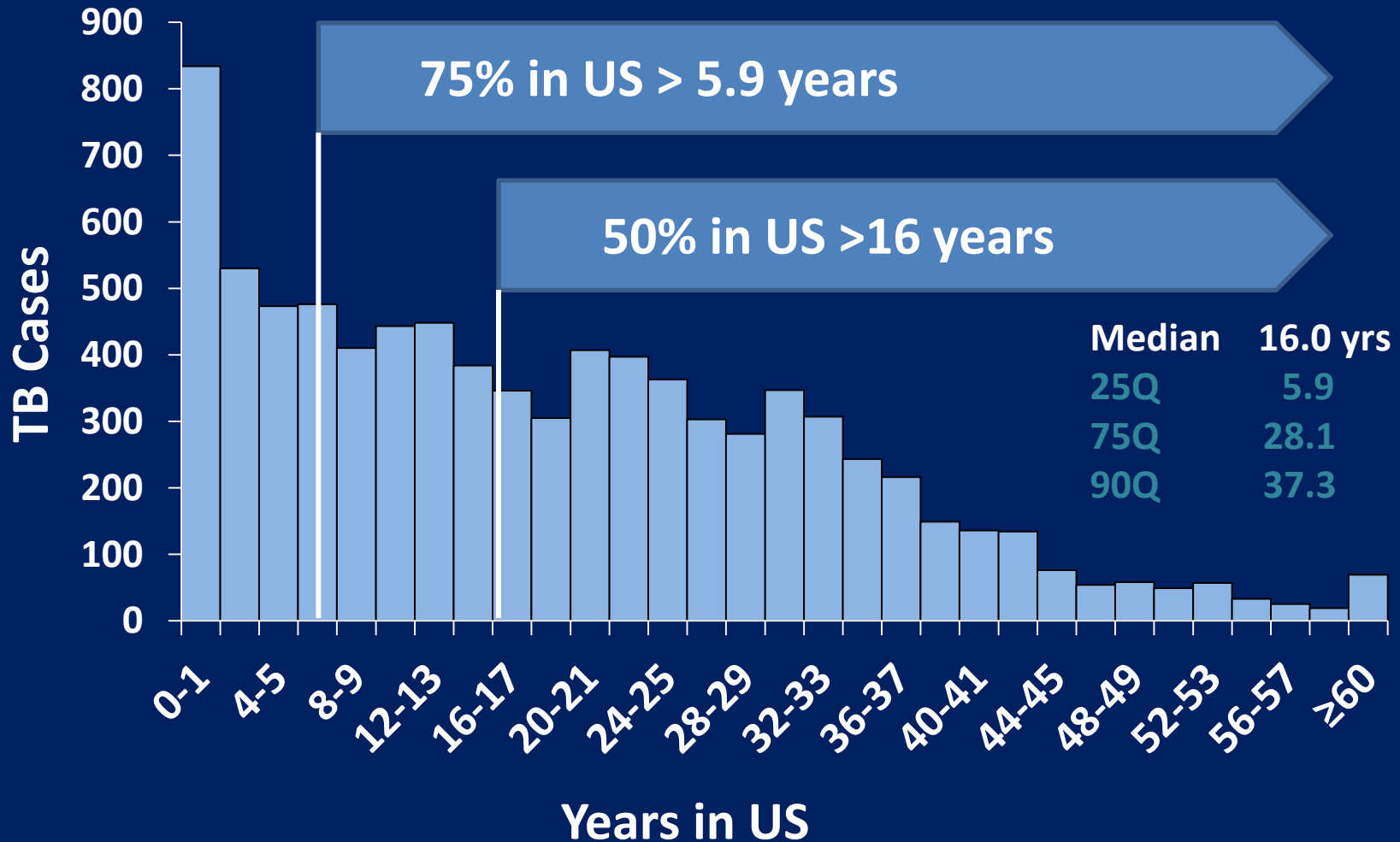


\*Cases diagnosed in domestic evaluation of abnormal preimmigration CXR

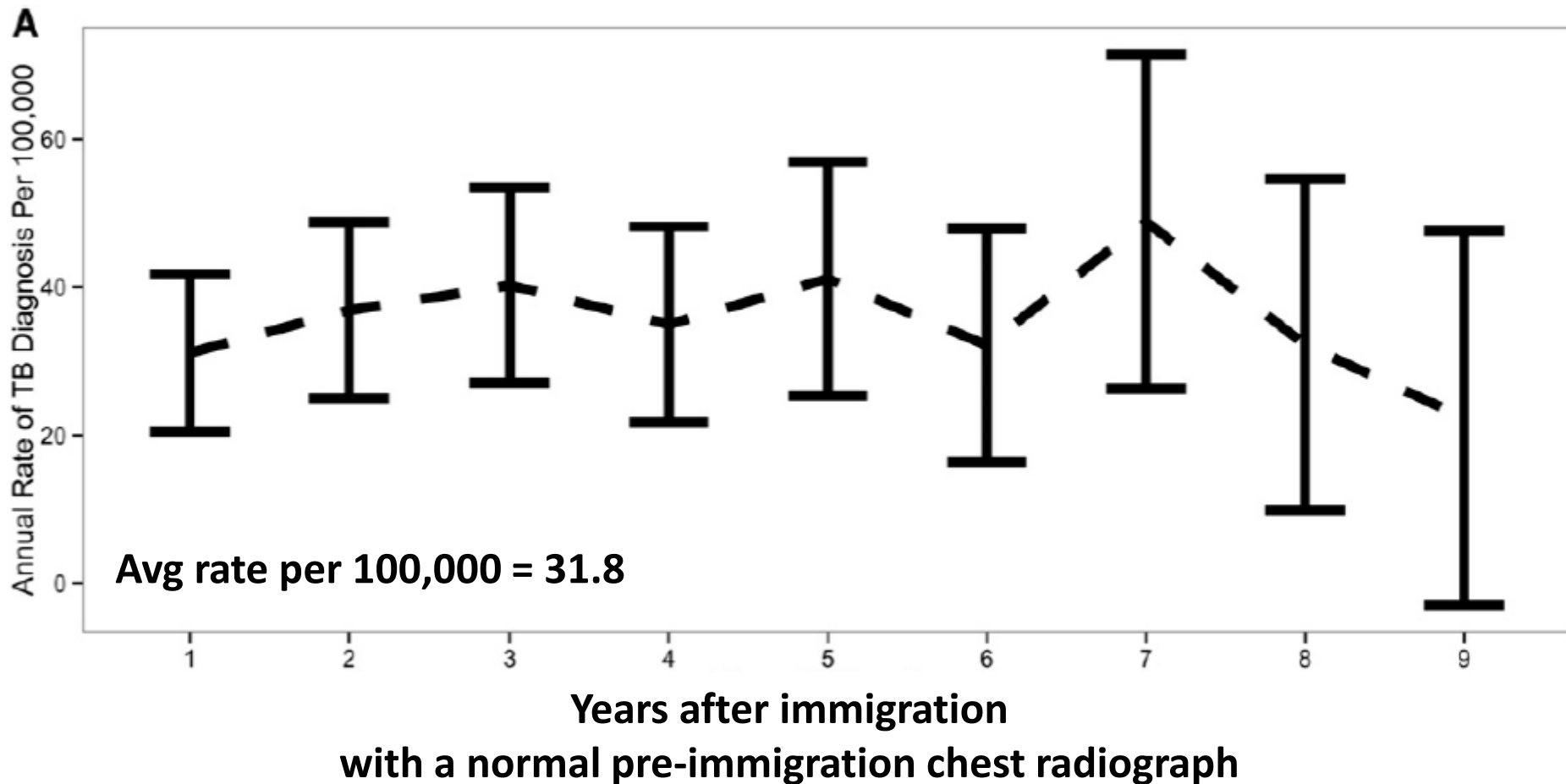
# Years in US at TB Diagnosis California, 2010-2014



# Years in US at TB Diagnosis California, 2010-2014



# Constant rate of reactivation from TB infection after immigration

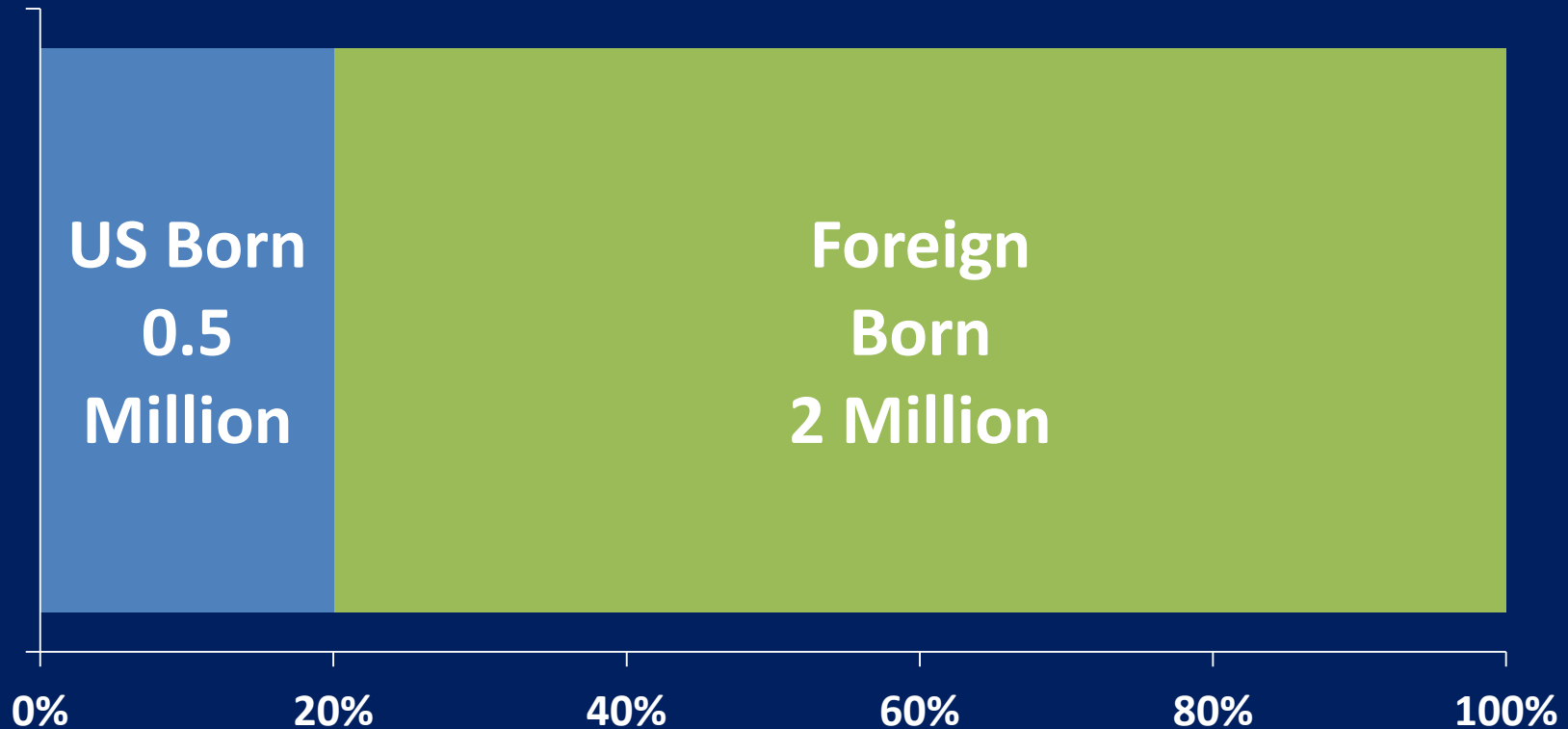


Filipino immigrants to California

Walter et al *AJRCC* 2014

# How to reach long standing foreign-born residents of California?

# 2.5 Million Estimated TB Infections California



TBI infections estimated by applying nativity and race/ethnicity-specific TB infection rates from NHANES (Bennett et al 2008 and Shea et al 2014) to the California population

# Medical Risk Factors among persons with TB by nativity — California, 2014

	Total n (%)	US-born %	Foreign-born %
Diabetes	508 (24.7)	13.9%	27.3%
ESRD	82 (4.0)	2.9%	4.2%
HIV positive	86 (4.2)	9.9%	3.5%
Other immuno-suppression	124 (6.0)	5.0%	6.3%
Post-organ transplantation	23 (1.0)	0.5%	1.3%
TNF-antagonist rx	20 (1.0)	0.5%	1.1%
1+ co-morbidity	723 (35.2)	30.2%	36.5%

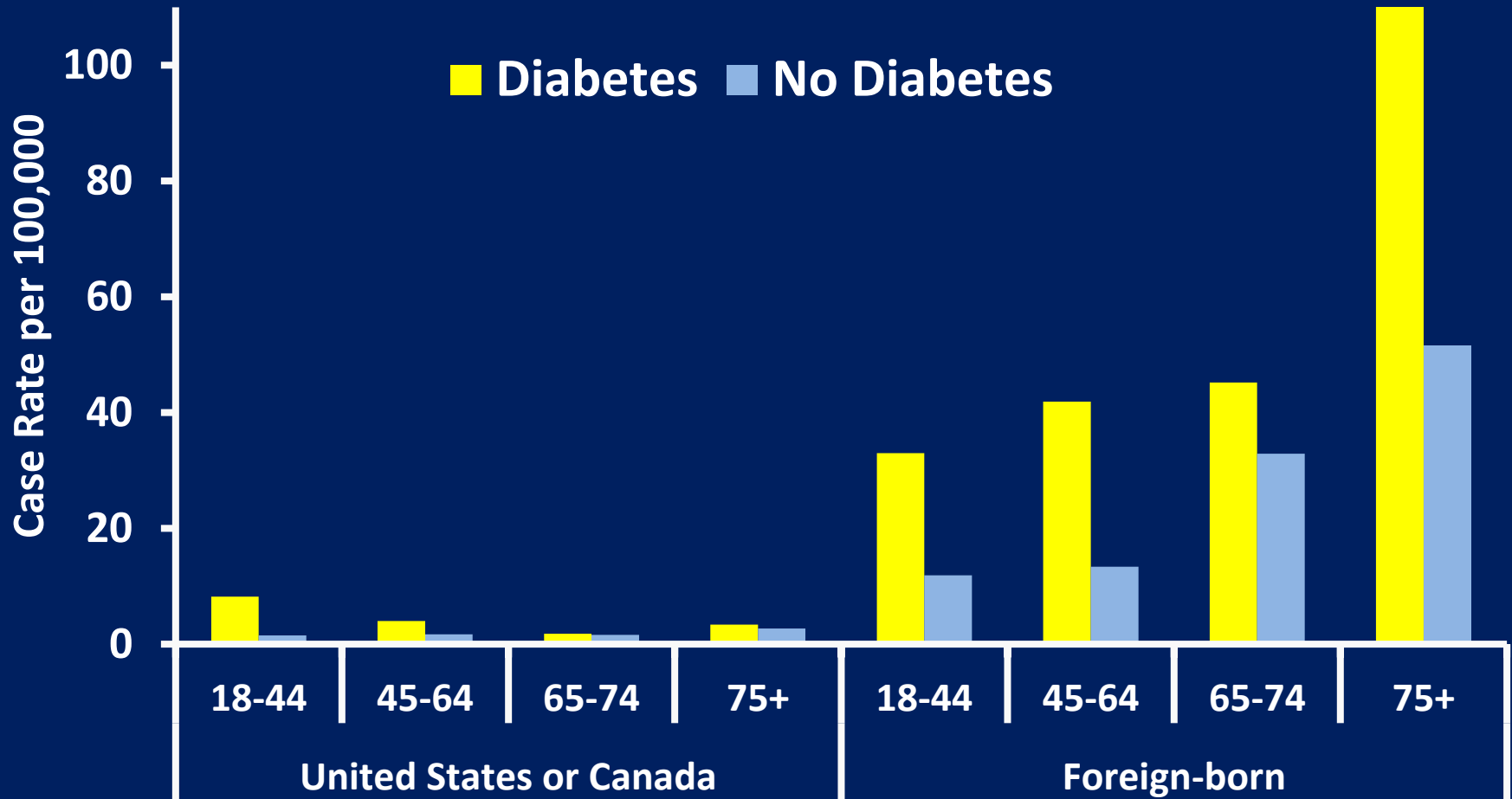
Persons aged ≥15



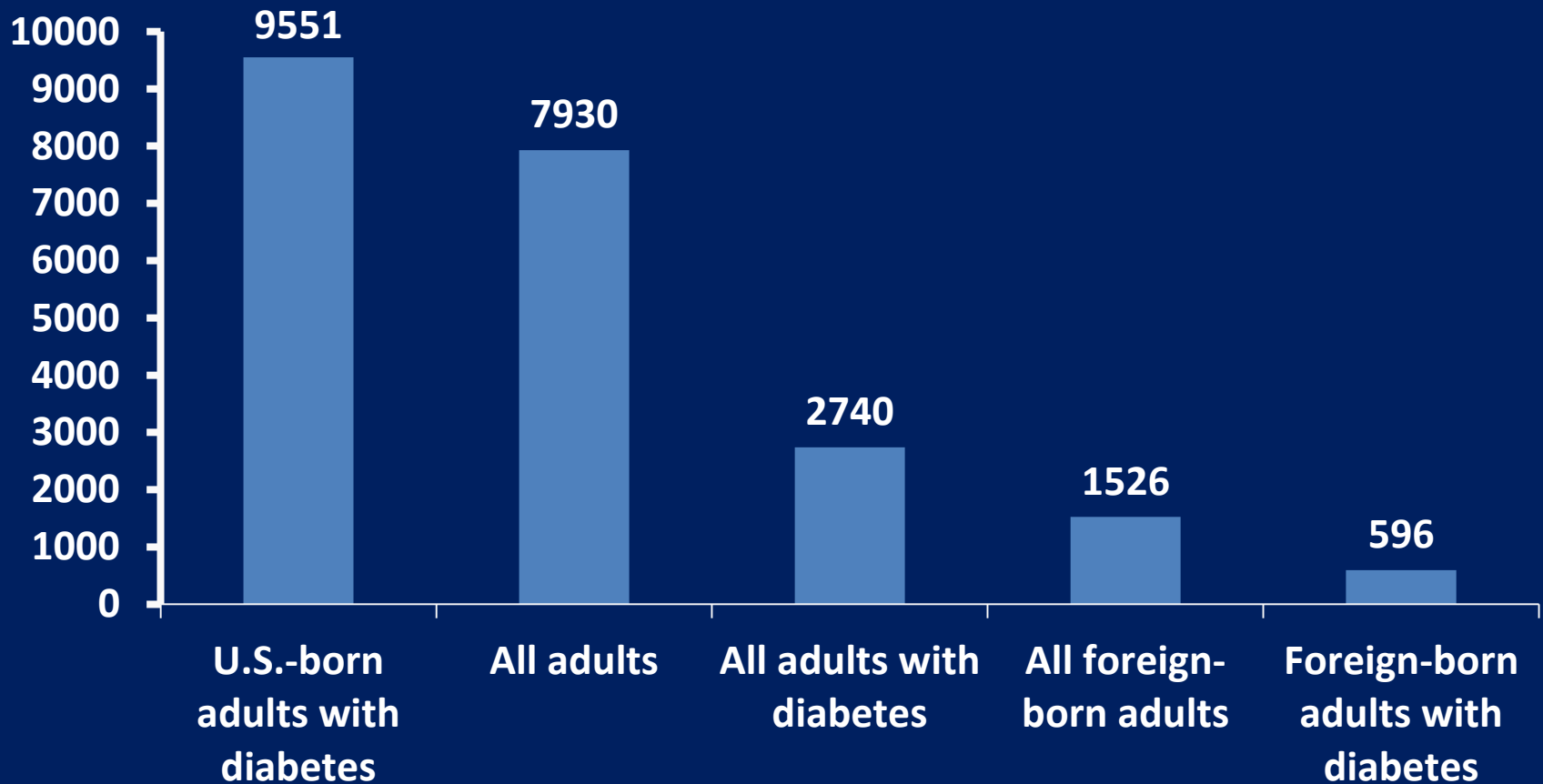
# TB Rate by Diabetes, Age, and Nativity

## California, 2010–2012

(Persons aged ≥18)

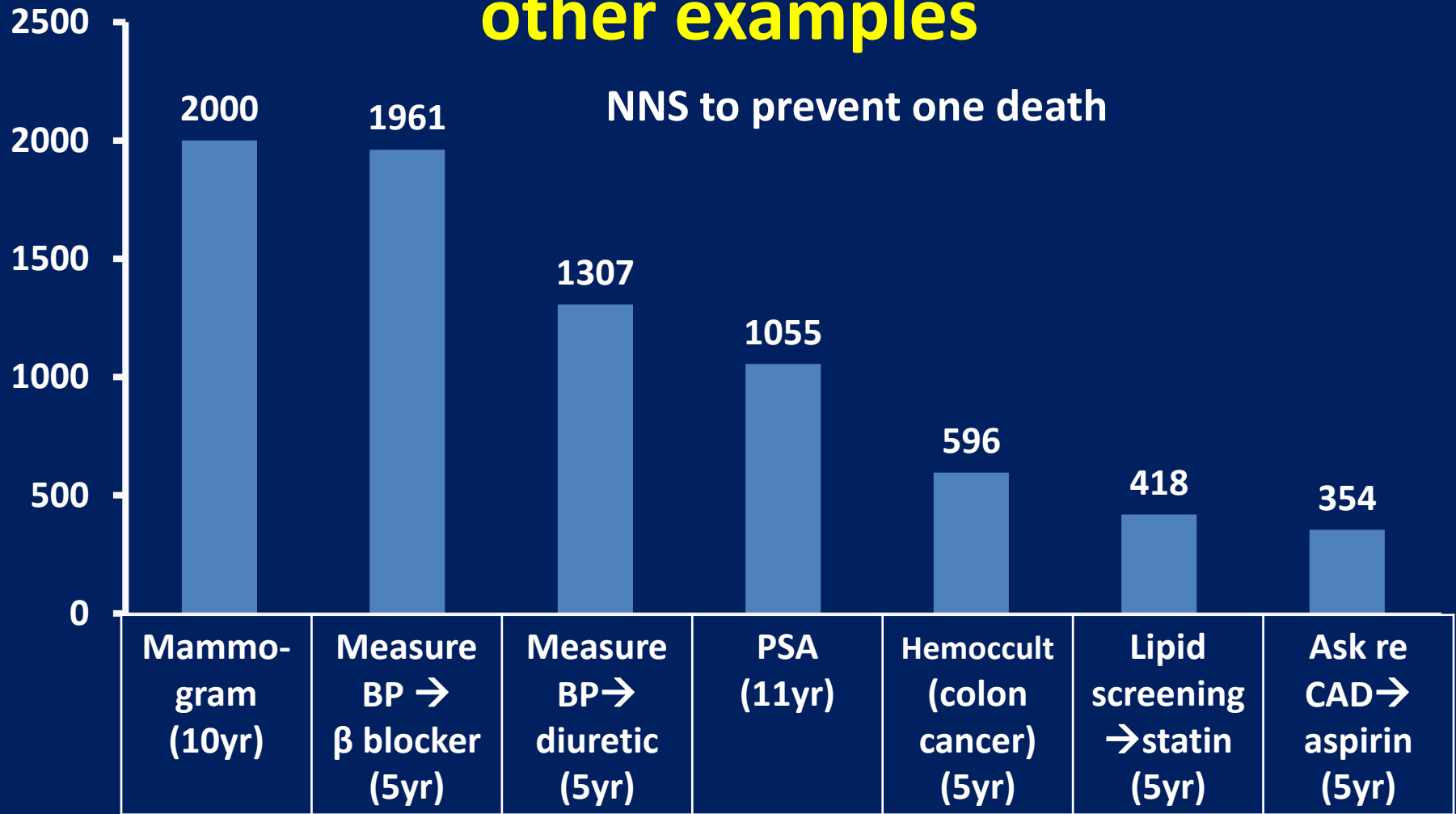


# Number Needed to Screen (and treat) to prevent one case of TB in next 5 years



Calculated using increased risk of TB conferred by diabetes and published estimates for LTBI prevalence, risk of progression, test sensitivity, LTBI treatment efficacy, and proportion of persons starting and completing treatment.

# Number Needed to Screen other examples



Sources: Rembold 1998 *BMJ* | Cochrane <http://summaries.cochrane.org/CD001877/screening-for-breast-cancer-with-mammography>; <http://summaries.cochrane.org/CD004720/screening-for-prostate-cancer>

# Estimated LTBI burdens by selected TB medical risk population and nativity, California

	Diabetes	Rheumatoid arthritis	HIV/AIDS	Renal dialysis	Crohn's Disease	Organ transplant
Population size	2,330,000	201,300	111,100	53,000	35,900	26,700
Foreign-born with LTBI*	177,300	6,400	4,200	2,900	1,000	1,200
U.S.-born with LTBI*	25,000	3,000	1,600	700	600	400
Total with LTBI	202,300	9,400	5,800	3,600	1,600	1,600

**~ 193,000 Foreign born with LTBI**

\* Assuming 18.7% of foreign-born and 1.8% of U.S.-born persons have LTBI.  
(Bennett et al, Am J Respir Crit Care Med 2008;177:348-55)

# Transmission of TB Among Foreign Born

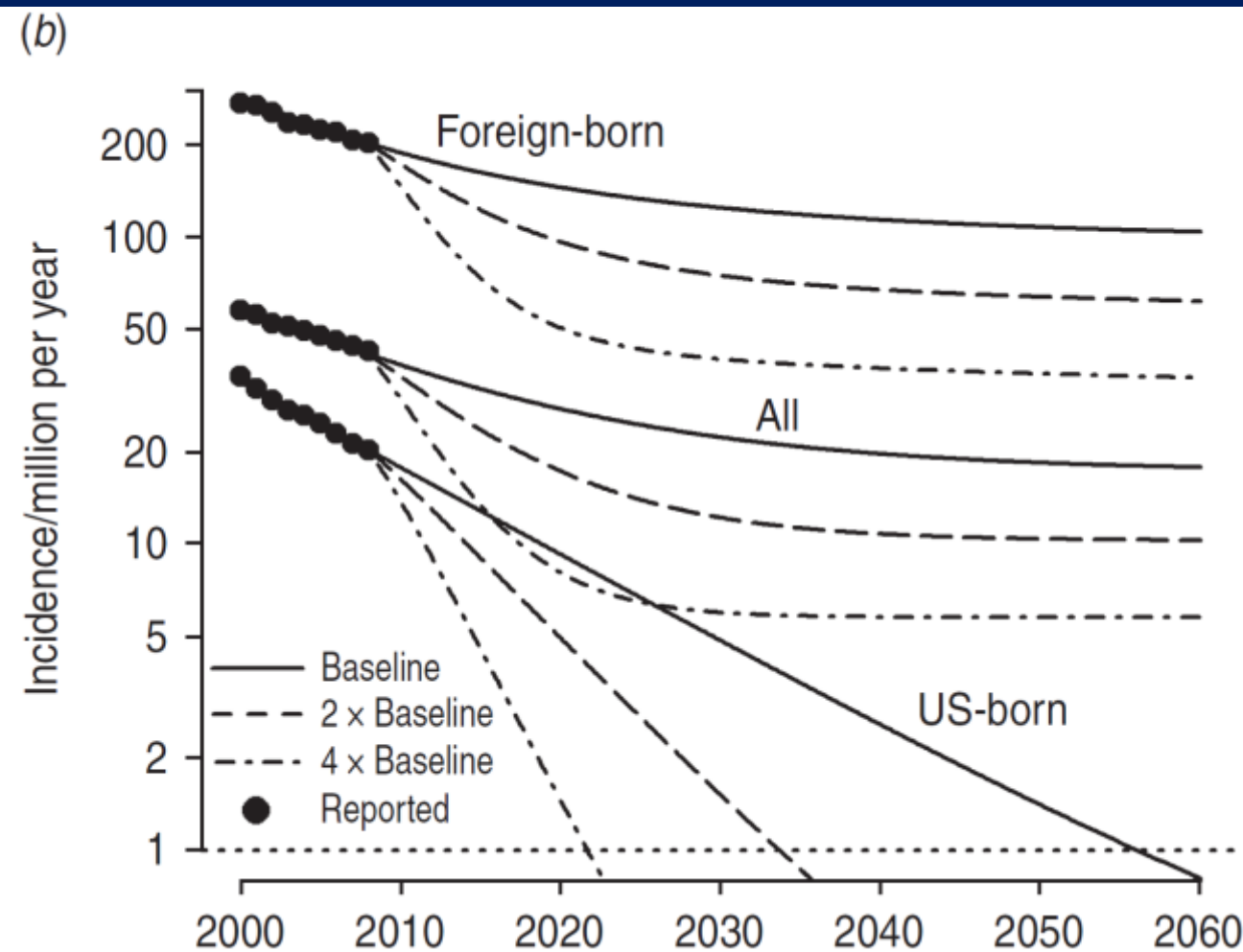
- Likely at least 20% of cases
- Importance often overlooked
- In 2013, 62% of patients in new California outbreaks were foreign born

# **Opportunities to reduce TB in foreign born**

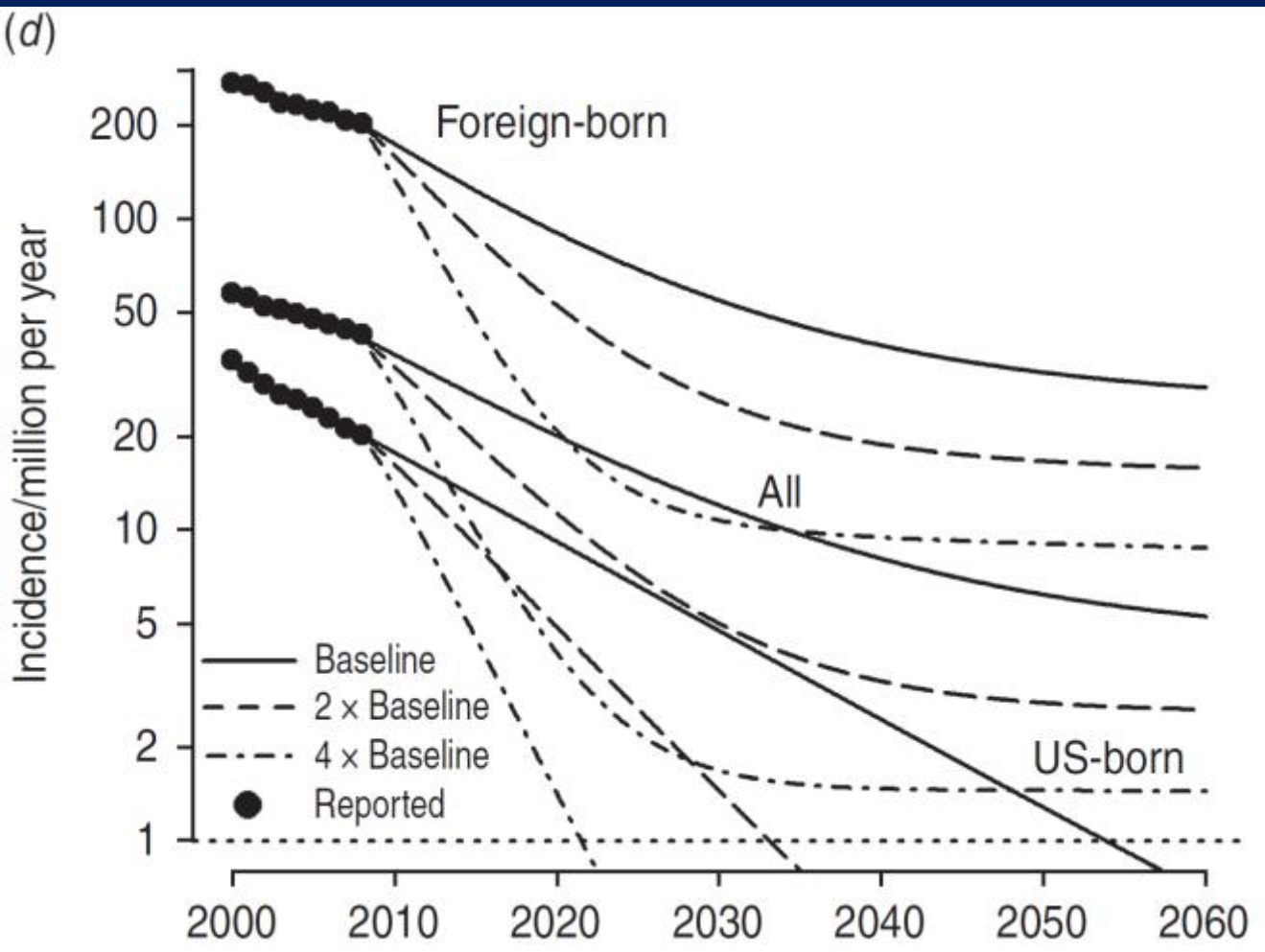
- **Alter new arriver screening?**
  - Identify TB infection for overseas evaluations
  - Expand to other types of arrivers
  - Linkage to TB infection treatment for domestic evaluation
- **Alter longterm resident screening?**
  - Use risk assessments and clinical reminders
  - Prioritize persons with medical risks
  - Screen beyond 5 years after arrival
- **Ensure treatment started and completed**
- **Make latent TB infection reportable?**

# Modeling TB in the U.S.

Increasing proportion of TB Infection that is treated (baseline=5%)



# Modeling TB in the U.S.



Increase proportion of TB Infection that is treated (baseline=5%)  
AND  
Reduce proportion of foreign born with TB Infection to 25% of baseline



# Acknowledgements

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