

# Cysticercosis

## Los Angeles County



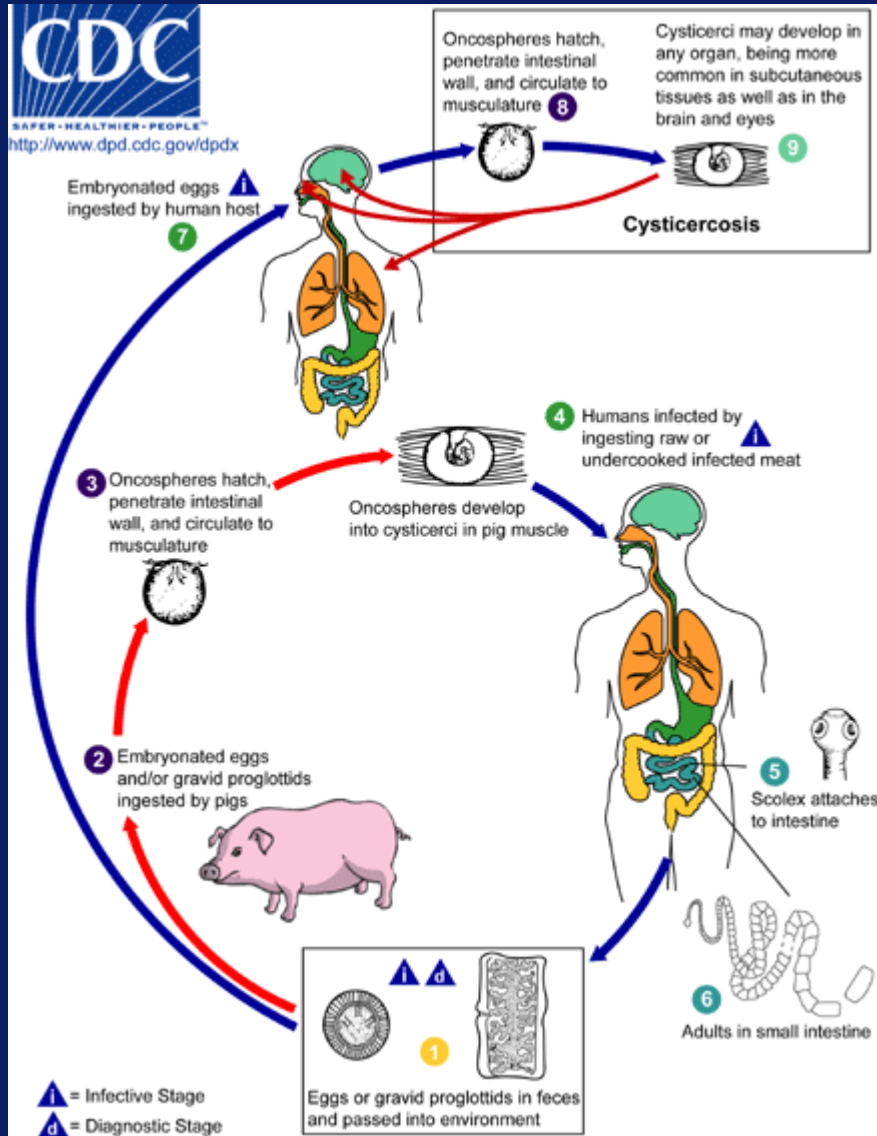
# Public Health Problem Identified

- **LAC Cysticercosis hospitalizations**
  - 10-15 cases in 1970's
  - 80 by early 1980's(F. Richards et. al. 1985, JAMA)
- **Severe Disease**
  - 56% Seizures, 21% hydrocephalus (N=238) among hospitalized cases (D. Scharf 1988, Arch Neurol)
- **Cysticercosis is Preventable !**





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# How to Prevent Cysticercosis

## Review of Life Cycle



# Public Health Opportunity

In 1988 LAC Public Health identified an opportunity for disease prevention:

- Add cysticercosis to the list of reportable diseases for LAC
- Public health nursing to screen close contacts of reported Cysticercosis cases for Taeniasis
- Refer Taeniasis cases for treatment



# Public Health Results

- **This intervention method has been successful in identifying cases**
  - **Taeniasis cases were identified in 7% (5/72) of households tested (1988-1991).**  
F. Sorvillo et. al. 1992. Am. J. Trop. Med. Hyg



# What's Happening With Cysticercosis in LAC Today ?

- Review available data sources:
  - Reported cases
  - Death Certificates
  - Hospital Discharge Data
  - Published Studies

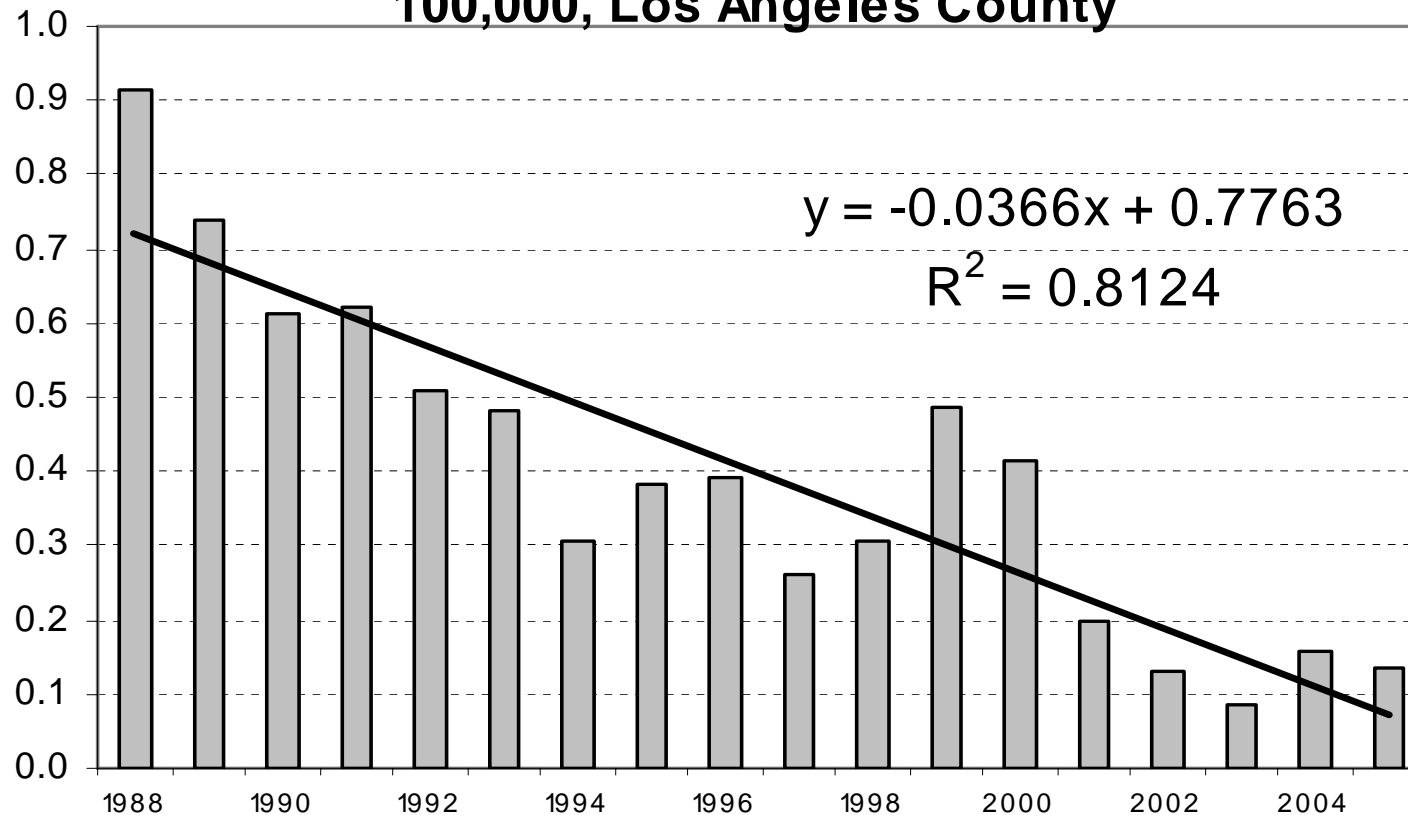


# Reported Cases LAC



# Reported Cases, LAC

Figure 1 Cysticercosis Incidence Rates per 100,000, Los Angeles County





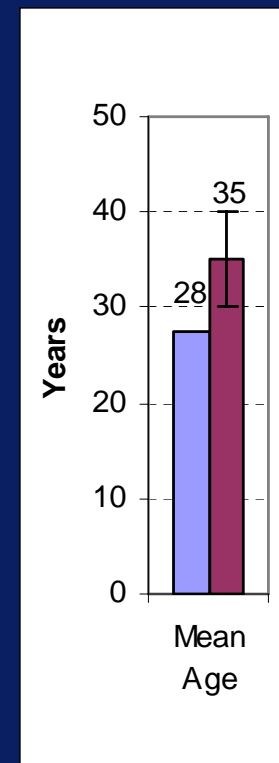
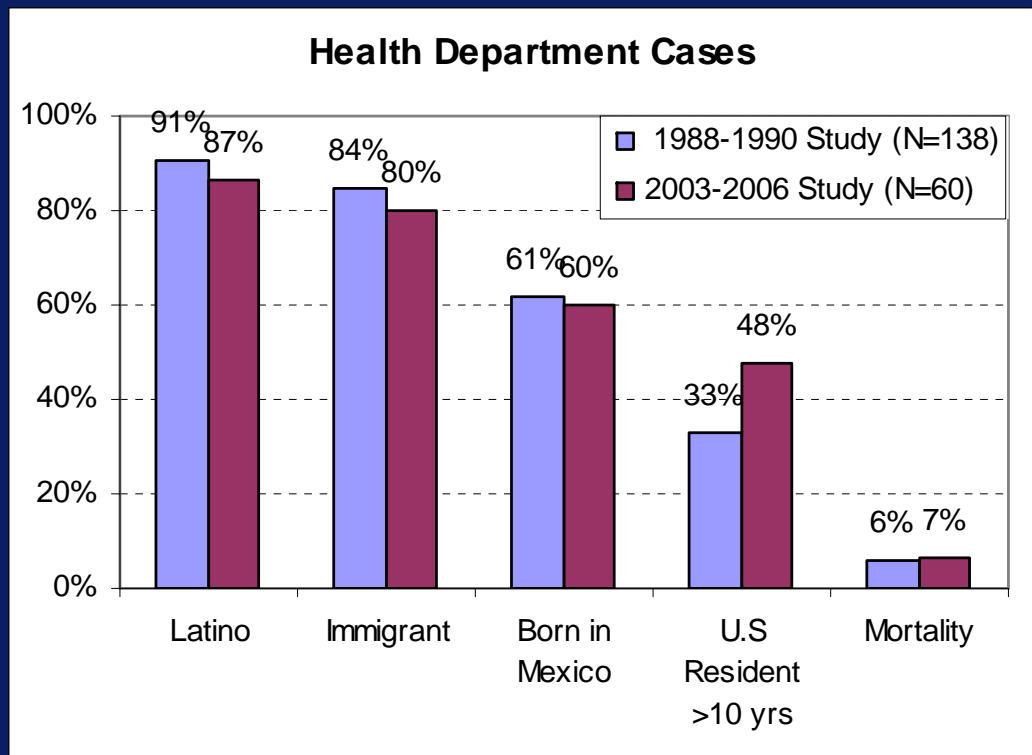
# Reported Cases, LAC 1993-2006 (N=411)

	n	%
<b>Race/ Ethnicity</b>		
Latino	371	93%
Caucasian	17	4%
Asian	6	2%
African American	3	1%
Pacific Islander	2	1%
Unknown	12	
<b>Gender</b>		
Male	216	53%
Female	192	47%



# Trends in Reported Cases, LAC

## Early vs. Later Cases



# Reported Cases by Health District

LAC, 2004-09 (n=59)

HEALTH DISTRICT IMPACTED	n	%
EL MONTE HD/ Pomona HC (23)	8	14%
SAN ANTONIO HD/ Compton HC (58)	6	10%
ANTELOPE VALLEY HD/Antelope Valley HC (5)	4	7%
POMONA HD/ Pomona HC (54)	4	7%
EAST VALLEY HD/ North Hollywood HC (19)	4	7%
SAN FERNANDO HD/ Pacoima HC (62)	3	5%
SOUTH HD/ South HC (69)	3	5%
SOUTHEAST HD/Humphrey HC (72)	3	5%
WEST VALLEY HD (86)	3	5%
BELLFLOWER HD/Bellflower HC (6)	3	5%
CENTRAL HD/ Central HC (9)	3	5%
Other Health Districts (2 or fewer cases)	15	3%



# Mortality



# Cysticercosis Mortality

- **National Mortality**
  - 221 Deaths 1990-2002 (17 per year)
    - 60% occurred in CA
    - 32% occurred in LAC

F. Sorvillo et. al. 2004, EID

- **LAC Mortality**
  - Slight decrease over time
  - Demographics
    - 96% Latino
    - Mean age 41.2 years
    - 62% male



# Hospitalizations



# Hospitalizations

## Hospitalizations 1991-2008 (18 years)

- 7,169 Cysticercosis hospitalizations (398 per year)
- 3,937 NC\* Hospitalization (218 per year)
- 1,488 NC\* Hospitalization  
with primary Dx cysticercosis (82 per year)

\*NC=neurocysticercosis



# Hospitalization Demographics

LAC, 1991-2008 (n=3937)

- 91.6 % Latino
- Male: Female = 1.1:1
- Mean age 38.4 years
  - 31.3 years in 1991
  - 43.1 years in 2008





# Hospitalizations

- Economic Burden over 18 years
  - \$136.2 million total hospitalization charges
    - Averaging \$7.9 million per year
  - Average charge per patient was \$37.6 thousand
  - Most common payment method
    - Medicaid (43.9%)
    - Private insurance (24.5%)
- The average length of stay was 7.2 days.

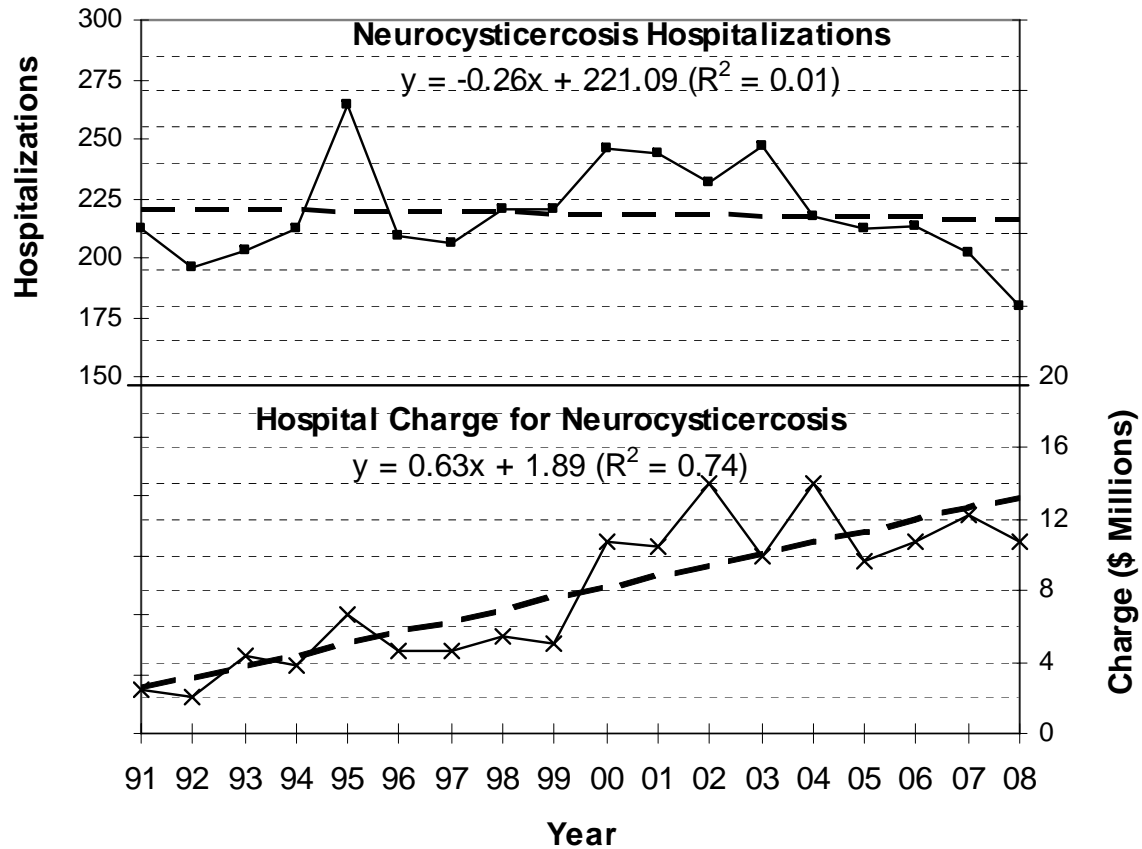


# Hospitalizations 1991-2008

- 3,937 neurocysticercosis hospitalizations identified
  - 72.8% seizure or convulsion (2,866)
  - 30.9% hydrocephalus (1,217)
  - 6.2% cerebral cyst (244)
  - 2.2% cerebral edema (866)
  - 2.0% death (77)



**Figure 1. Neurocysticercosis Hospitalizations and Hospital Charge by Year Los Angeles County 1991-2008**



## Hospitalizations Procedures

Los Angeles County 1991-2008 (N=3937)

Procedure	n	percent
CNS Procedure	1273	32.3%
Lumbar Puncture	472	12.0%
Brain Procedure	842	21.4%
Any Ventricular Shunt	564	14.3%
Shunt Removal / Replace	217	5.5%
Ventriculostomy	155	3.9%
Brain Excision	131	3.3%
Craniotomy	23	0.6%
MRI or CT Scan of Brain	1256	31.9%

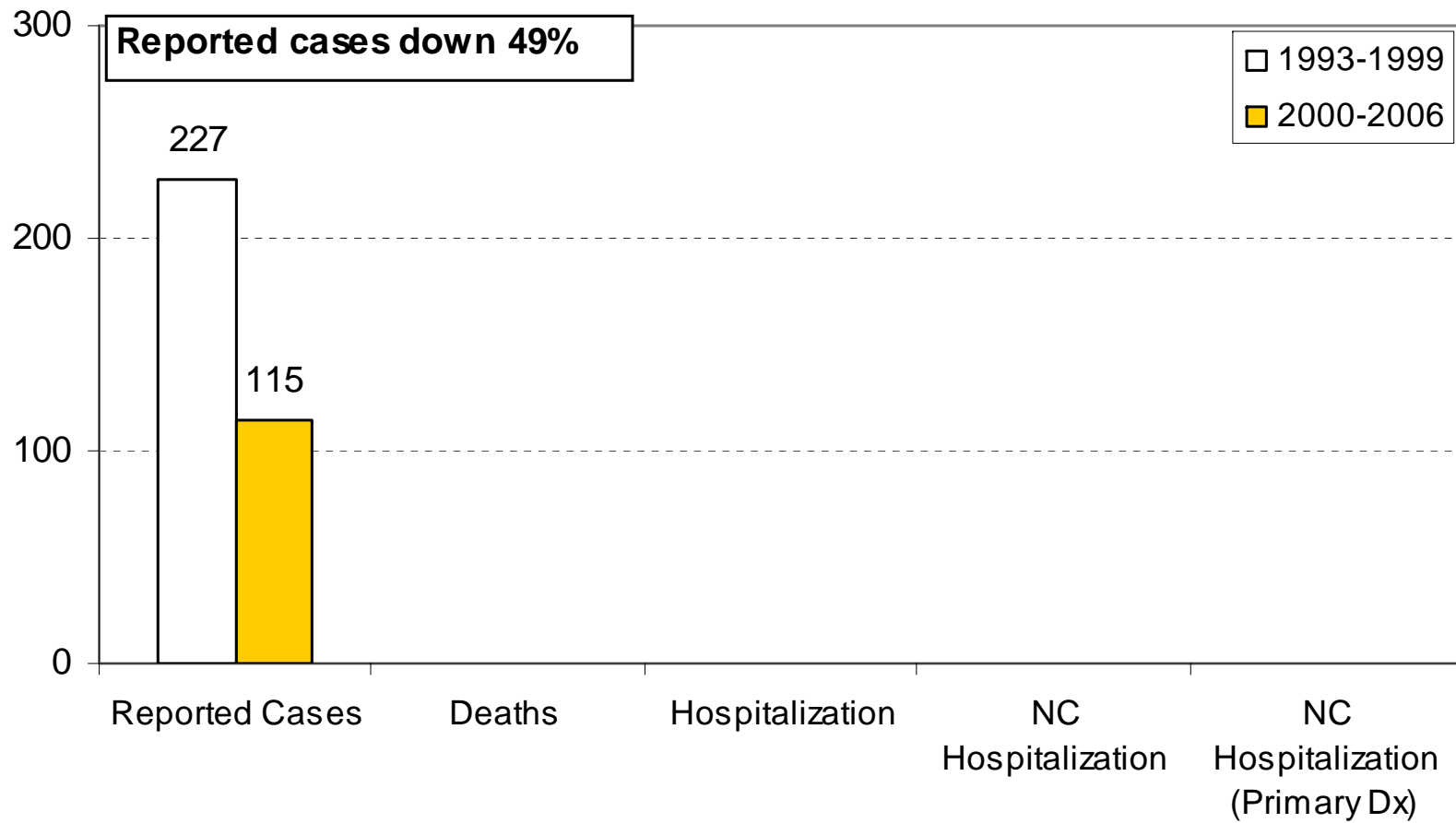


# Cysticercosis Trends

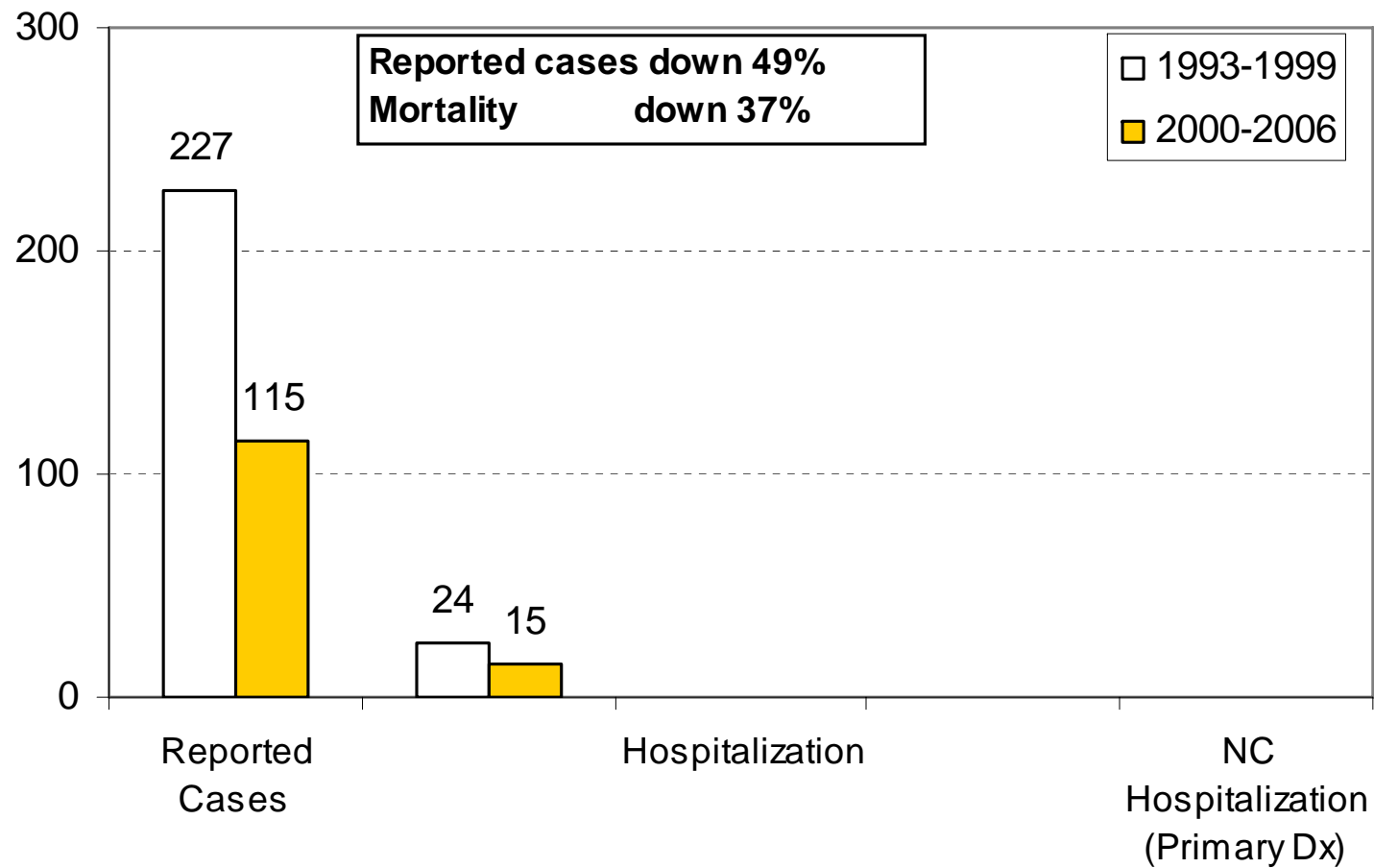
1993-2006 (16 years)



## Cysticercosis in Los Angeles County Early Cases (1993-1999) vs. Later Cases (2000-2006)

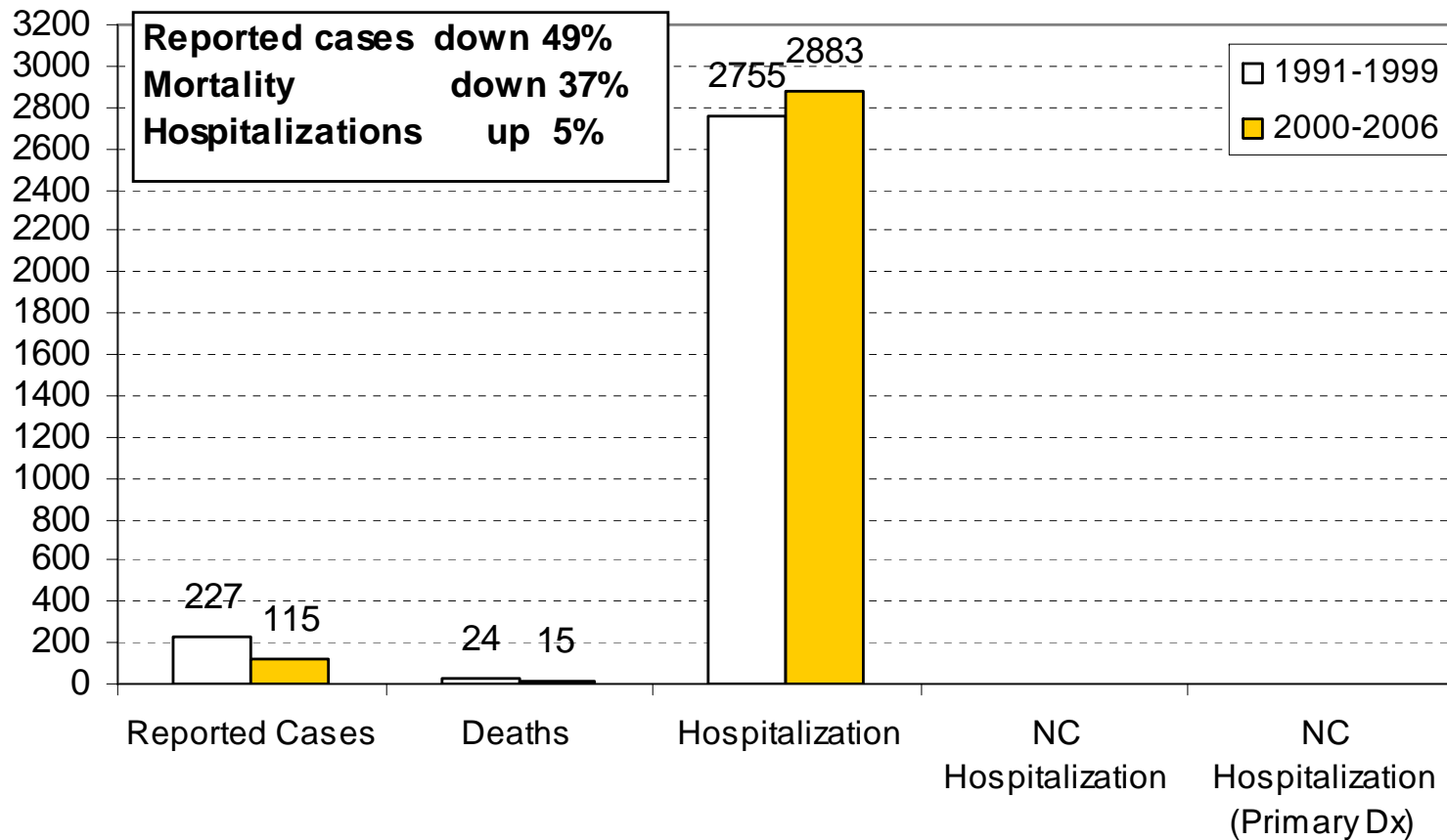


## Cysticercosis in Los Angeles County Early Cases (1993-1999) vs. Later Cases (2000-2006)



## Cysticercosis in Los Angeles County

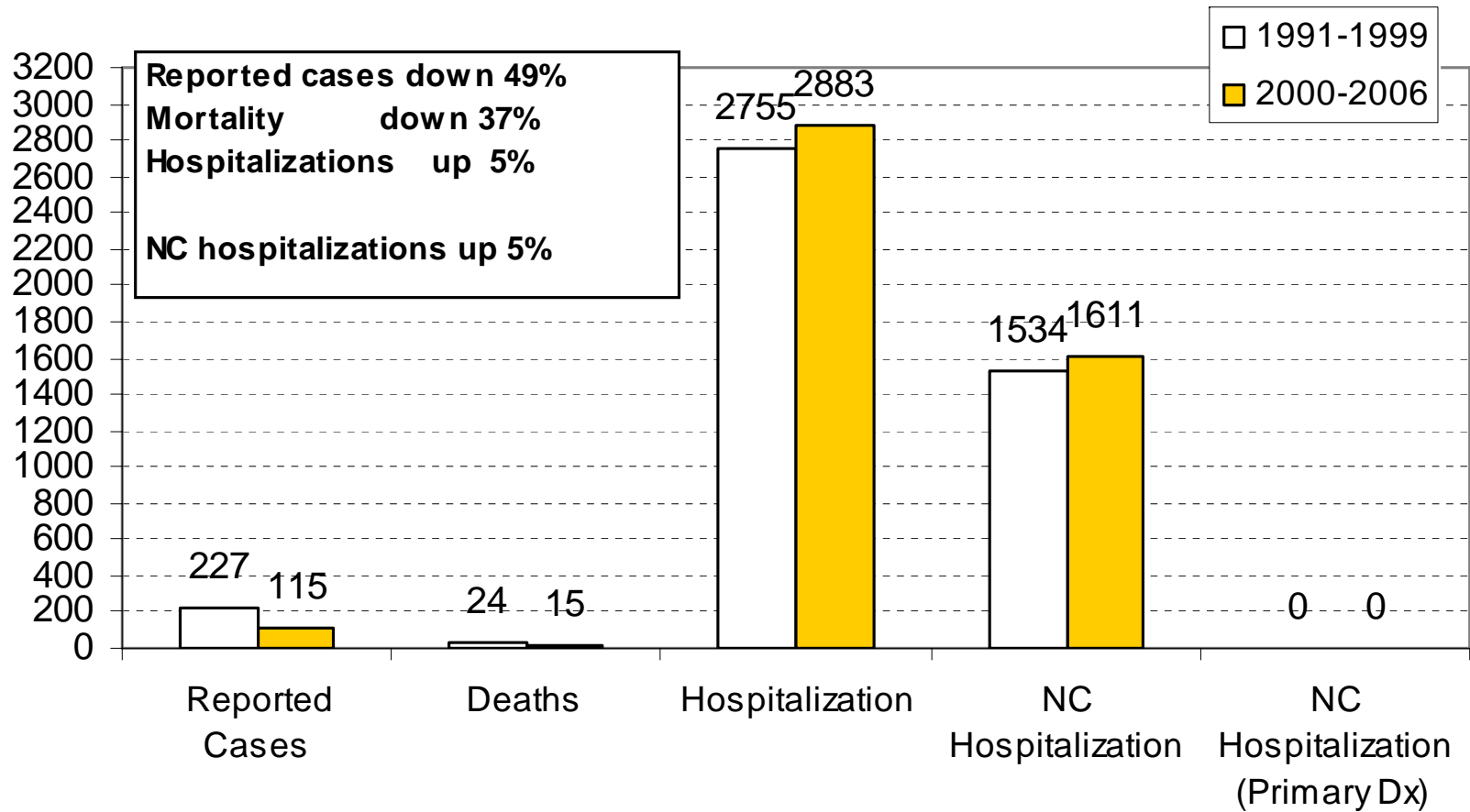
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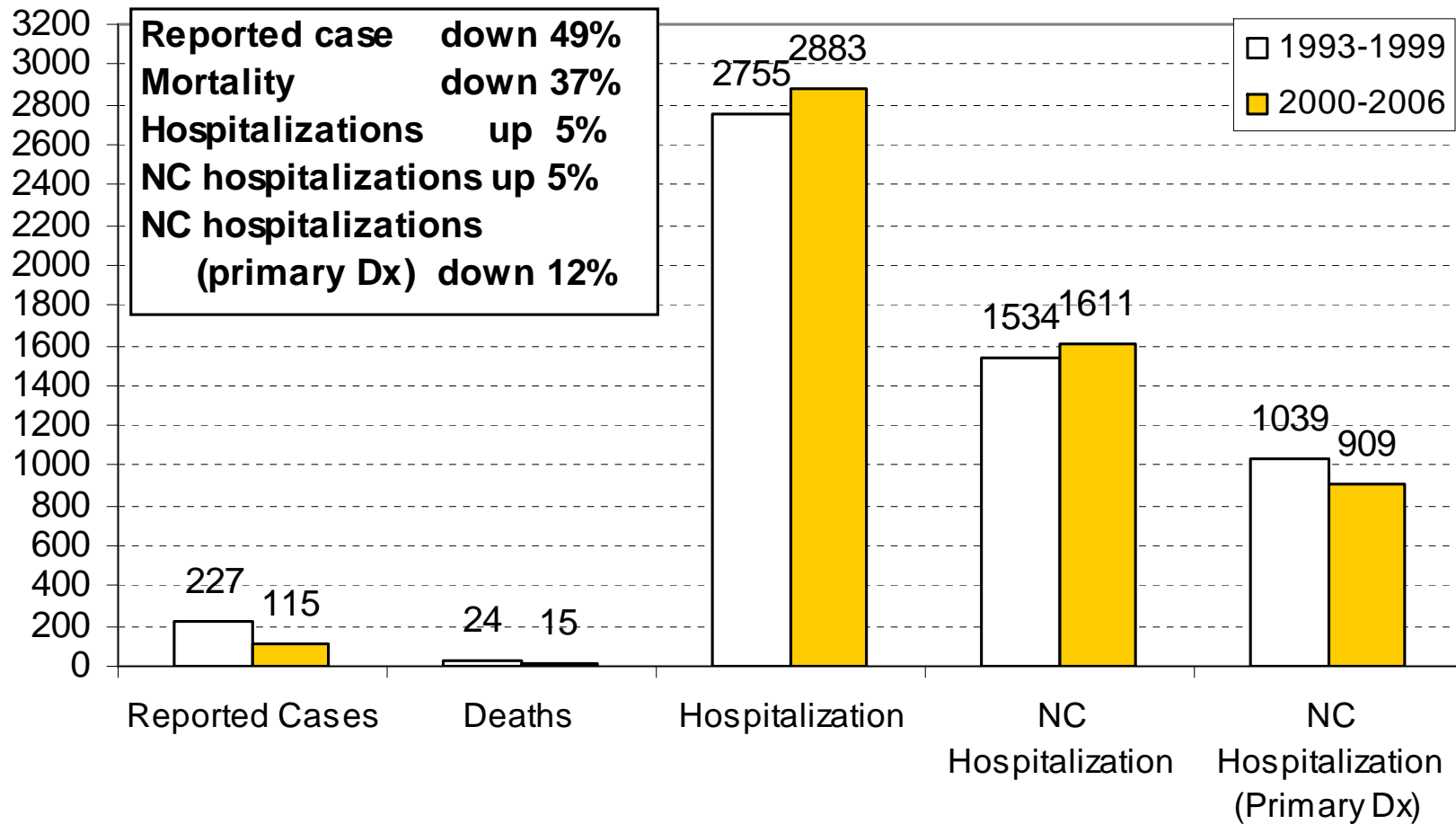
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### Early Cases (1993-1999) vs. Later Cases (2000-2006)

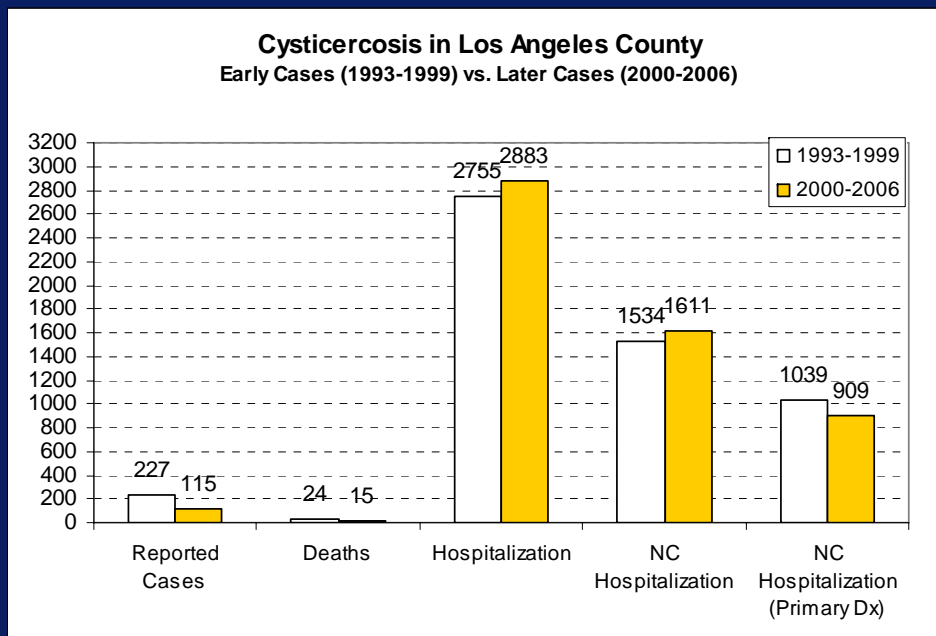


## Cysticercosis in Los Angeles County

### Early Cases (1993-1999) vs. Later Cases (2000-2006)



# Cysticercosis in LAC



## Early Cases vs. Later Cases

49% decrease in reported case

37% decrease in mortality

5% increase in hospitalizations

5% increase in NC hospitalizations

12% decrease in NC hospitalizations  
(primary diagnosis)

NC= neurocysticercosis



# Other Published Studies



# Cysticercosis and Taeniasis are Still Prevalent In and Around LAC

The sero-prevalence in a mostly Hispanic immigrant population in Ventura County approximates the prevalence in some endemic areas of Latin America.

(DeGiorgio C, et al, Acta Neurol Scand. 2005)



# DeGiorgio C, et al 2005

## METHOD

- Obtain finger pick blood samples from 1) Select persons living in a federally funded, predominantly Hispanic residential community 2) and in two migrant farm worker camps in rural Ventura County, California
- Test serum immunoblots for both cysticercosis and taeniasis.



# DeGiorgio C, et al 2005

## RESULTS (N=449)

- 1.8% positive for *T. solium* cysticercosis
- 1.1%. Positive for *T. solium* taeniasis



# Conclusion

- Cysticercosis remains a public health problem in LAC
- The disease is severe and represents a significant economic burden to LAC
- The disease can be prevented through detection and treatment of taeniasis cases
- Implementing improved testing methods for taeniasis will increase the likelihood of detection





# Questions ?



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