Changes in Caries in Primary Dentition from 1988-1994 to 1999-2004 Among U.S. Children Aged 2-5 Years:
A Closer Look

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Background

➤ A significant increase in prevalence of dental caries among U.S. children aged 2-5 years from 1988-1994 to 1999-2004 (24.2% vs. 27.9%) has been reported by using data from the National Health and Nutrition Examination Survey (NHANES)

➤ This increase contrasts with the decline in prevalence of dental caries in permanent teeth and has not been fully analyzed by a combination of socio-demographic groups to identify disparities

Study Objective

➢ To describe changes in prevalence and severity of caries

  ➢ from 1988-1994 to 1999-2004

  ➢ for specific combinations of race/ethnicity and family poverty status

  ➢ among children aged 2-5 years

3

Data Source and Study Sample

❑ Data source: NHANES 1988-1994 and 1999-2004

❑ Study sample: 5,735 (3,759 from 1988-1994 and 1,976 from 1999-2004) children aged 2-5 years with reported:

➢ Race/ethnicity

- Non-Hispanic White (NHW)

- Non-Hispanic Black(NHB) or

- Mexican-American(MA)

➢ Family poverty status (FPL)

- ≤100% FPL

- 101%-200% FPL or

- >200% FPL

➢ And completed oral health exam

NHW ≤100% FPL	NHW 101%-200%	NHW >200% FPL
NHB ≤100% FPL	NHB 101%-200%	NHB >200% FPL
MA ≤100% FPL	MA 101%-200%	MA >200% FPL

4

Study Outcomes

❑ Dental caries outcomes

➢ Prevalence

  ➢ Prevalence of caries experience: having ≥1 decayed or filled teeth (dft)

  ➢ Prevalence of untreated tooth decay: having ≥ 1 untreated decayed teeth (dt)

➢ Severity:

  ➢ Mean dft

  ➢ Mean dt

  ➢ Mean ft

Statistical Analysis Methods

❑ What: Predicted marginal probabilities and means to estimate adjusted absolute changes (AAC) in each caries outcome from 1988-1994 to 1999-2004 controlling for medical insurance status

❑ Whom: Each of nine groups defined by race/ethnicity and poverty status

❑ How: t-test to examine statistical significance of the changes

❑ Analyses accounted for the complex sampling design of NHANES (SUDAAN v11)

6

RESULTS

Study Sample of Children Aged 2-5 Years by Race/Ethnicity, Poverty Status and Time

1988-1994

Weighted Cell % n	Income as % FPL			
	≤100	101-199	≥200	Row Total
Non-Hispanic White	11.4 177	18.2 318	41.9 665	71.4 1160
Non-Hispanic Black	9.2 677	4.8 337	4.0 251	18.0 1265
Mexican American	5.3 724	3.3 380	1.9 230	10.6 1334
Column Total	25.8 1578	26.4 1035	47.8 1146	100 3759

1999-2004

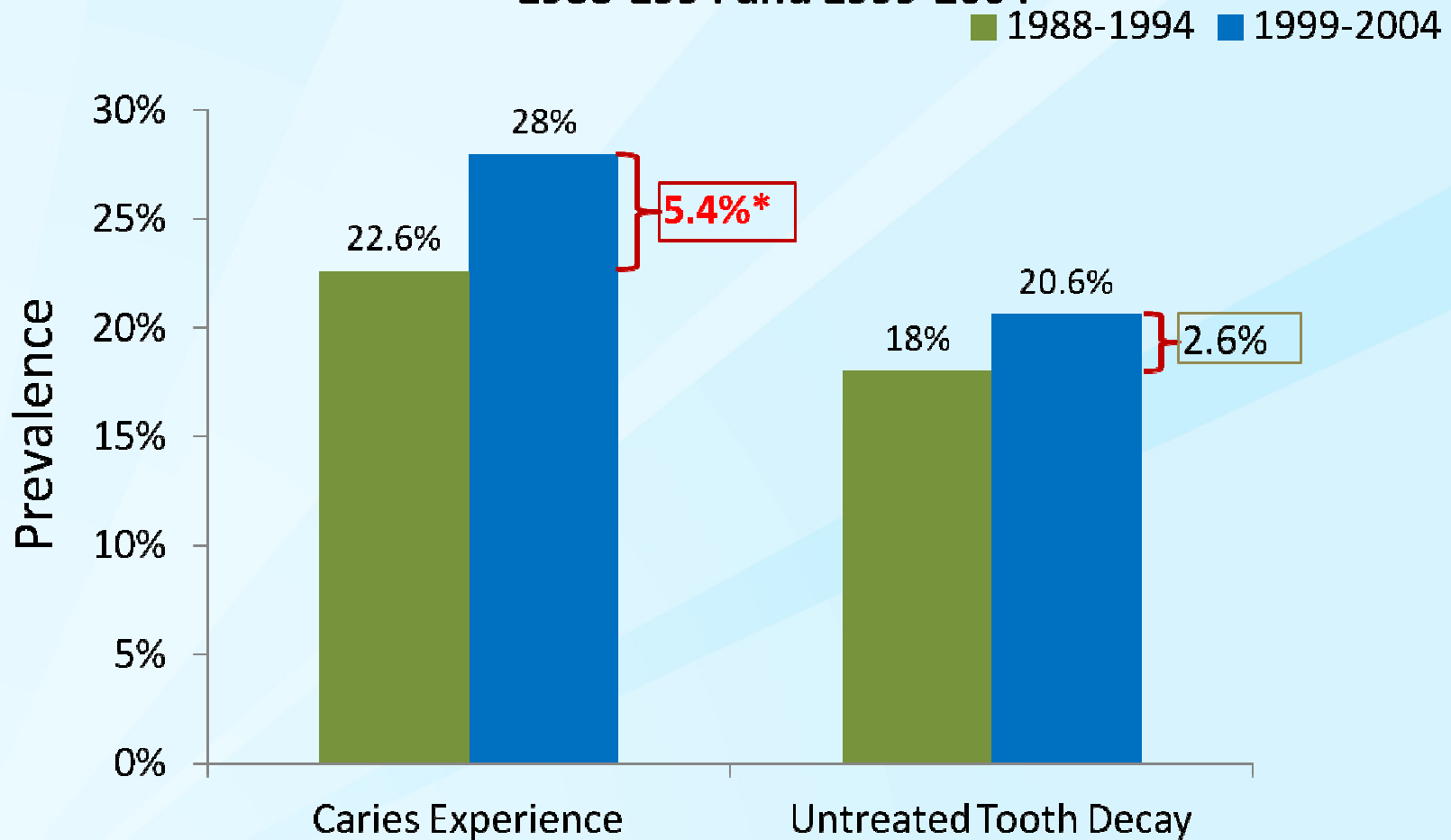|	Income as % FPL			
	≤100	101-199	≥200	Row Total
	12.3 172	17.0 178	38.8 328	68.0 678
	8.0 323	4.4 175	4.1 168	16.6 666
	6.6 278	4.9 204	3.9 150	15.4 632
	26.9 773	26.3 557	46.8 646	100 1976

Chi square tests of independence

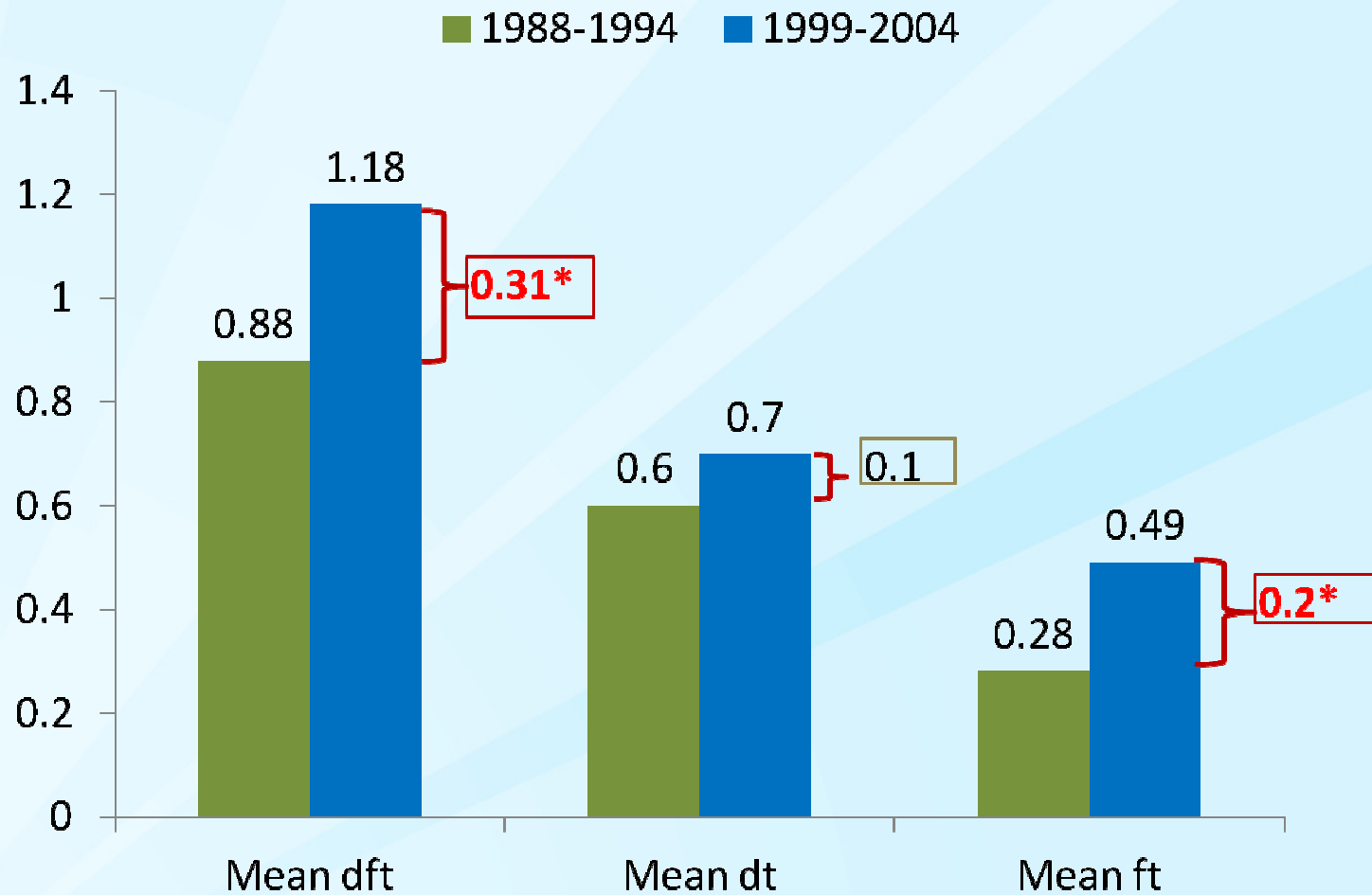Income by time p=0.88   Race/ethnicity by time p=0.03

Race/ethnicity and income combined by time p=0.04

8

Overall Prevalence of Caries Experience (%) and Prevalence of Untreated Tooth Decay (%) among Children Aged 2-5 Years, 1988-1994 and 1999-2004
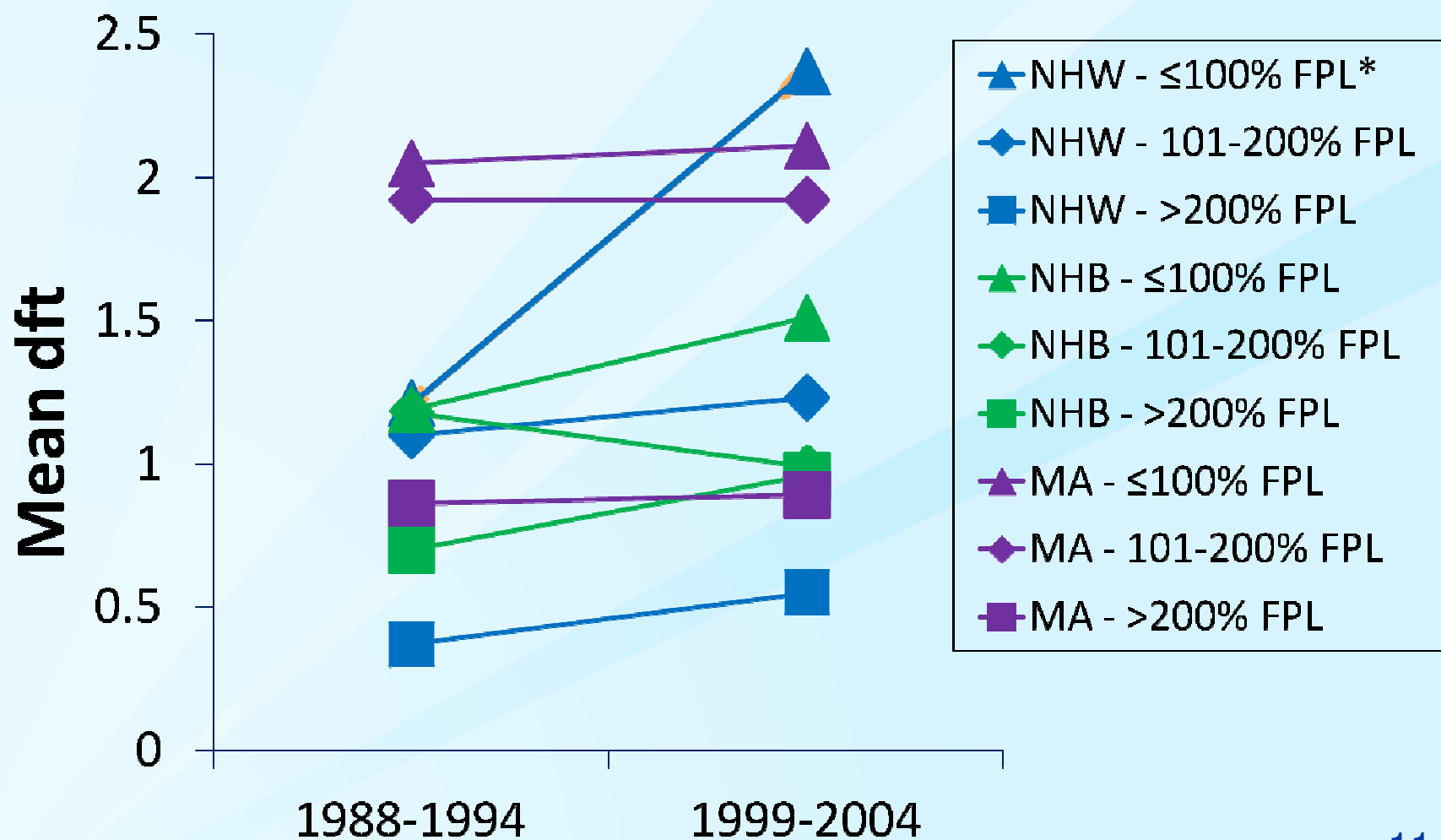
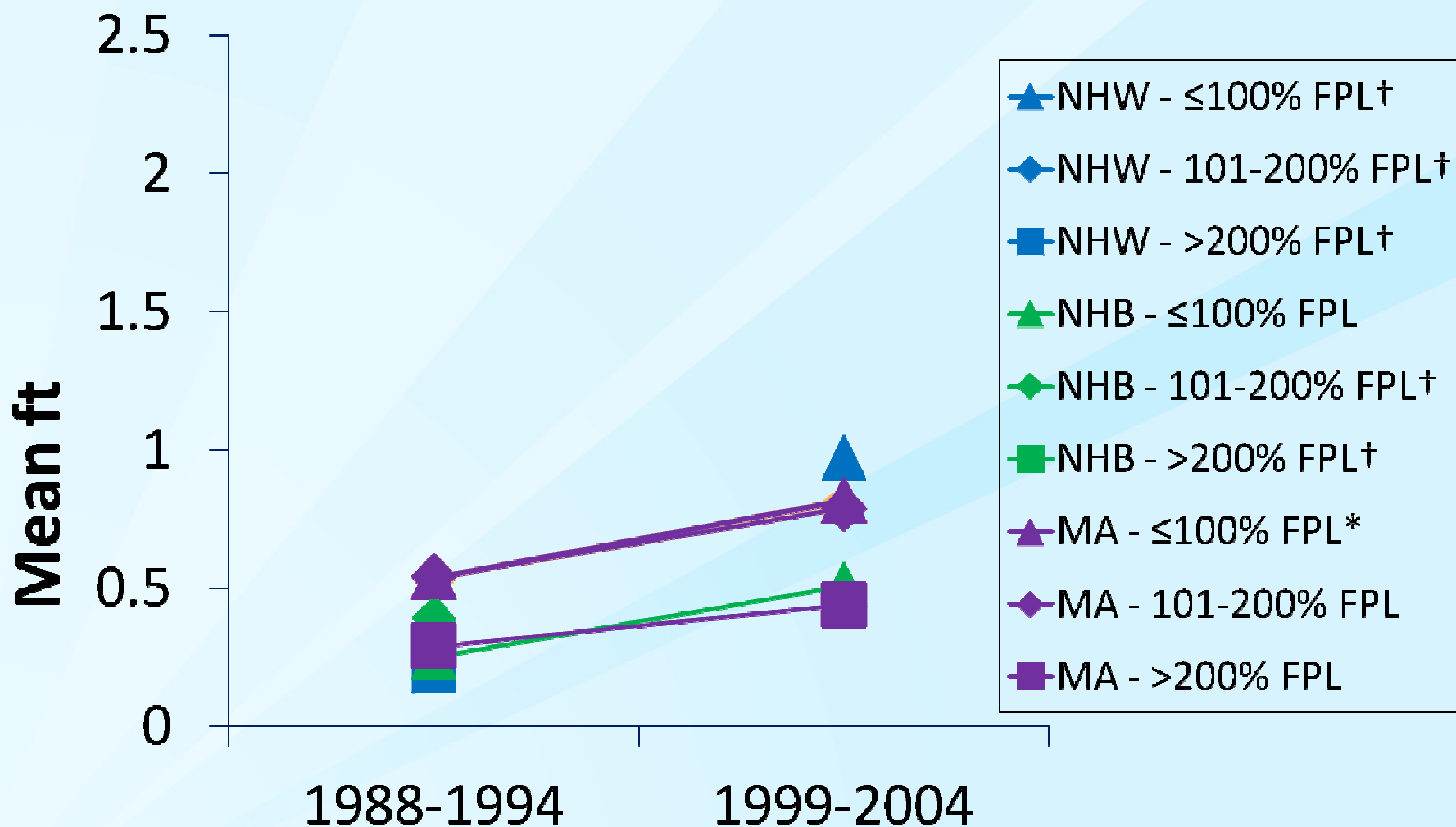Overall Mean dft, dt, and ft among Children Aged 2-5 Year, 1988-1994 and 1999-2004

* p≤0.05

10

Mean dft by Race/Ethnicity and Poverty Status, Children Aged 2-5 Years, 1988-1994 and 1999-2004

* p≤0.05

11

Mean ft by Race/Ethnicity and Poverty Status, Children Aged 2-5 Years, 1988-1994 and 1999-2004

Legend:
- NHW - ≤100% FPL†
- NHW - 101-200% FPL†
- NHW - >200% FPL†
- NHB - ≤100% FPL
- NHB - 101-200% FPL†
- NHB - >200% FPL†
- MA - ≤100% FPL*
- MA - 101-200% FPL
- MA - >200% FPL

* p≤0.05

† Data suppressed if relative standard error for the caries outcome >30%

12

Adjusted Absolute Changes in Caries Outcome from 1988-1994 to 1999-2004 by Race/Ethnicity and Poverty Status Among Children Aged 2-5 Years

	Prevalence		Mean		
	Caries Experience	Untreated Tooth Decay	dft	dt	ft
	Crude Absolute Change				
Total	*5.4%**	2.6%	*0.31**	0.1	*0.2***
	Adjusted Absolute Change				
Non-Hispanic White					
≤100% FPL	10.3%	4.7%	*1.18**	0.49	†
101-200% FPL	1.3%	-2.2%	-0.02	†	†
>200% FPL	4.7%	*4.4%**	0.16	*0.11**	†
Non-Hispanic Black					
≤100% FPL	7.2%	2.8%	0.37	0.09	*0.27**
101-200% FPL	-6.6%	-5.4%	-0.26	-0.19	†
>200% FPL	5.6%	3.2%	0.25	0.11	†
Mexican American					
≤100% FPL	4.8%	0	0.06	-0.2	0.26
101-200% FPL	-1.7%	-6.2%	-0.06	-0.25	0.2
>200% FPL	2.1%	-0.6%	0.01	-0.13	0.14

Adjusted for medical insurance status

* p≤0.05; † Data not reported if relative standard error for the caries outcome >30%

Study Limitations

❑ Medical insurance:

  ▪ Control for medical insurance may not fully adjust for the effect of SCHIP implementation (1997-2000) on changes in caries over the two time periods

  ▪ The SCHIP implementation time and expansion eligibility varied by states

❑ Unstable estimates in some groups limit identification of patterns of changes by socio-demographic factors combined

❑ Primary teeth that were missing due to caries were not recorded in NHANES protocol

Conclusions

Changes in caries prevalence and severity between 1988-1994 and 1999-2004 among U.S. children aged 2-5 years varied in pattern, degree, and directionality for groups categorized by a combination of race/ethnicity and poverty status.

Future analysis of changes in dental caries over time will need to consider the combined impact of multiple socio-demographic factors, if estimates are stable.

Both measures of dental caries prevalence and severity including overall, untreated and treated decay, are needed to comprehensively assess changes over time.

Acknowledgements

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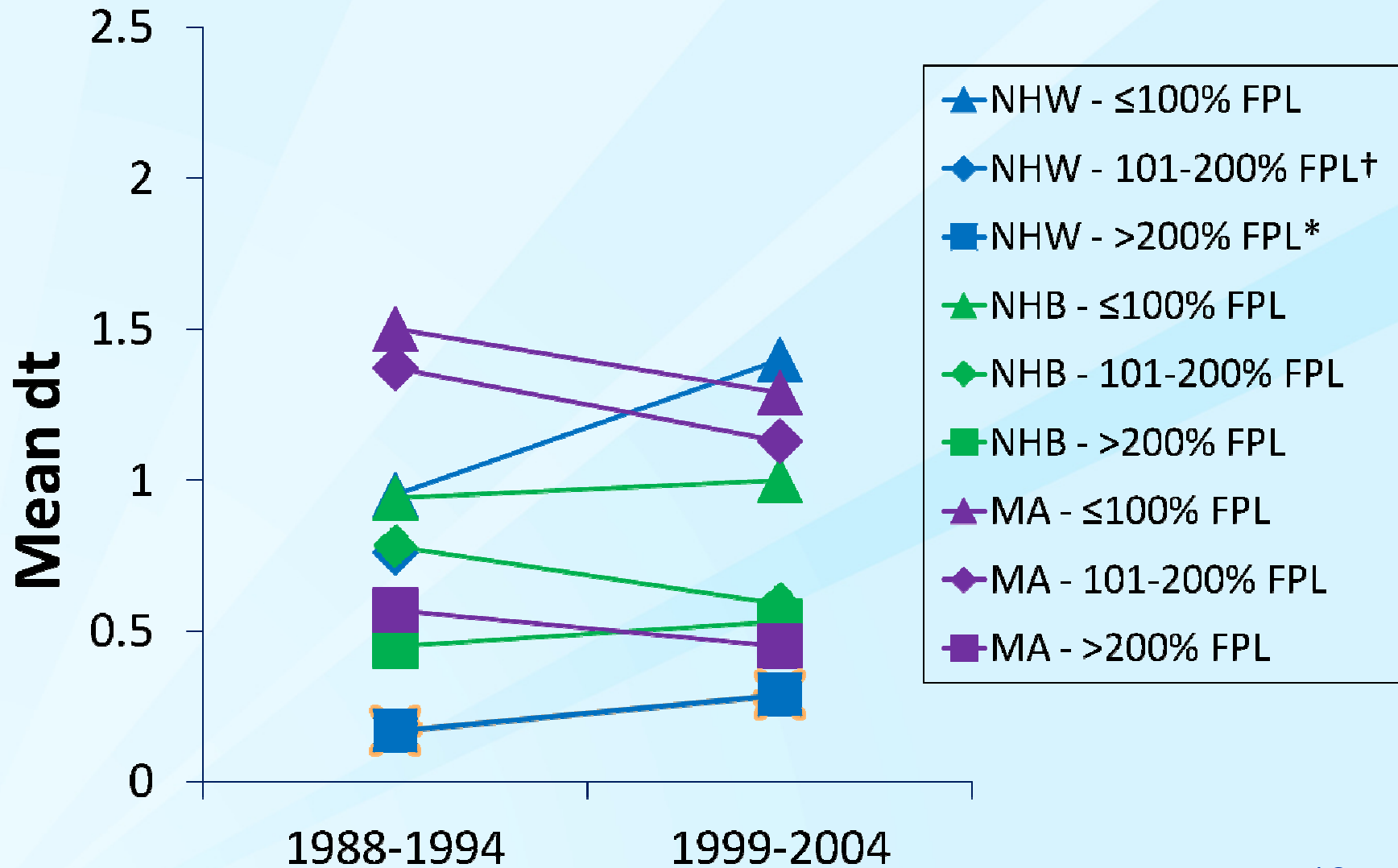
Thanks!

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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.

Mean dt by Race/Ethnicity and Poverty Status, Children Aged 2-5 Years, 1988-1994 and 1999-2004

Legend:
- NHW - ≤100% FPL
- NHW - 101-200% FPL†
- NHW - >200% FPL*
- NHB - ≤100% FPL
- NHB - 101-200% FPL
- NHB - >200% FPL
- MA - ≤100% FPL
- MA - 101-200% FPL
- MA - >200% FPL

y-axis: Mean dt (0, 0.5, 1, 1.5, 2, 2.5)

x-axis: 1988-1994, 1999-2004

18

* p≤0.05
† Data suppressed if relative standard error for the caries outcome >30%