

# Primer on Pediatric Oral Health

Task Force on Children's Preventive  
Oral Health Services

North Carolina Institute of Medicine  
December 14, 2012



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Department of Pediatric Dentistry  
The University of North Carolina

# Outline

- **Why** is pediatric oral health important?
- **What** are the prevention methods and **ARE** they effective?
- **Who** are the providers for pediatric oral health?

The Herald-Sun  
DURHAM, NORTH CAROLINA

USA  
WEEKEND

JANUARY 6-8, 2006  
usaweekend.com

OUR  
ANNUAL  
REPORT

# Baby Talk!

## 15 things you *must* do for your infant or toddler

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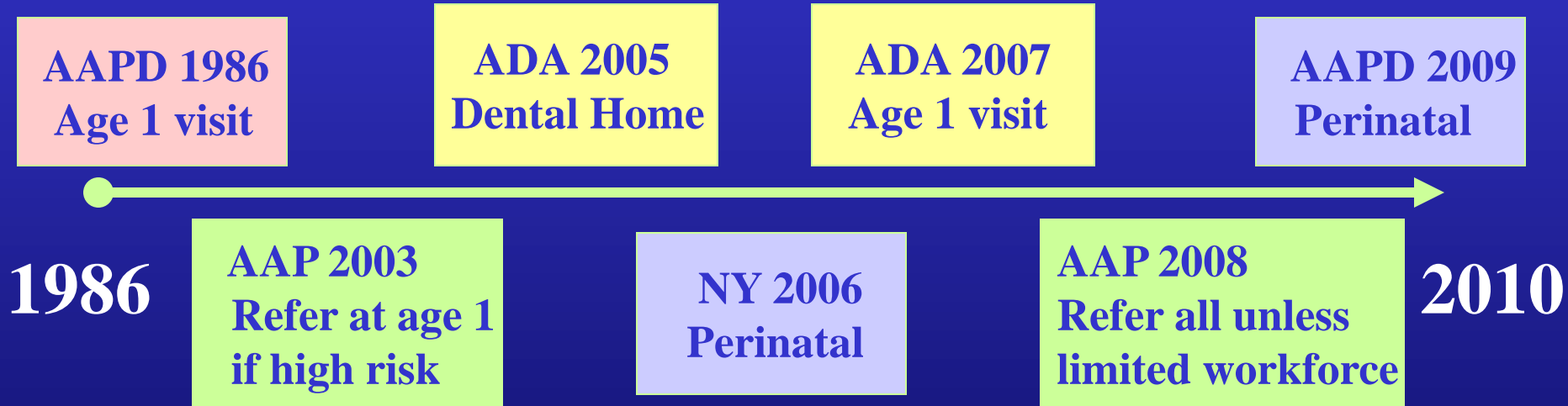
## 15 things you must do for your baby

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- 3** Visit the dentist by age 1. New research from the University of North Carolina reveals that taking your little one to the dentist by his first birthday is a great way to prevent future dental emergencies. "That first visit is more for the parents," says study author Jessica Lee, DDS. "We go over basic guidelines and help them start good dental habits for their baby." Tips: Don't give Baby more than 4 ounces of juice a day, start brushing (gently!) as soon as his first tooth comes in, and wean him off the pacifier or thumb by age 4 to avoid affecting the shape of the arch and how his teeth come in.

# Getting to kids early!

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Why is pediatric oral health  
important?

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# Importance of Oral Health

- Dental caries is the most common chronic disease of children ages 5-17 and is five times more common than asthma.
- Untreated dental caries in children can lead to problems with eating, speaking, attending school, learning, and general health.
- Many reasons explain why preventable oral diseases remain widespread in children and why individuals often do not adopt practices that are effective in maintaining oral health.
  - Finances
  - Access to care
  - Spectrum of other reasons
  - Literacy

# Consequences of Dental Disease

- Significantly more likely to weigh less than 80% of their ideal body weight and suffer from failure to thrive.
- Children's hours lost from school and parents' hours lost from work.
- The lost hours disproportionately burden lower income, minority, and non-insured children.

# ECC: Baby Bottle Tooth Decay





# ECC: Baby Bottle Tooth Decay



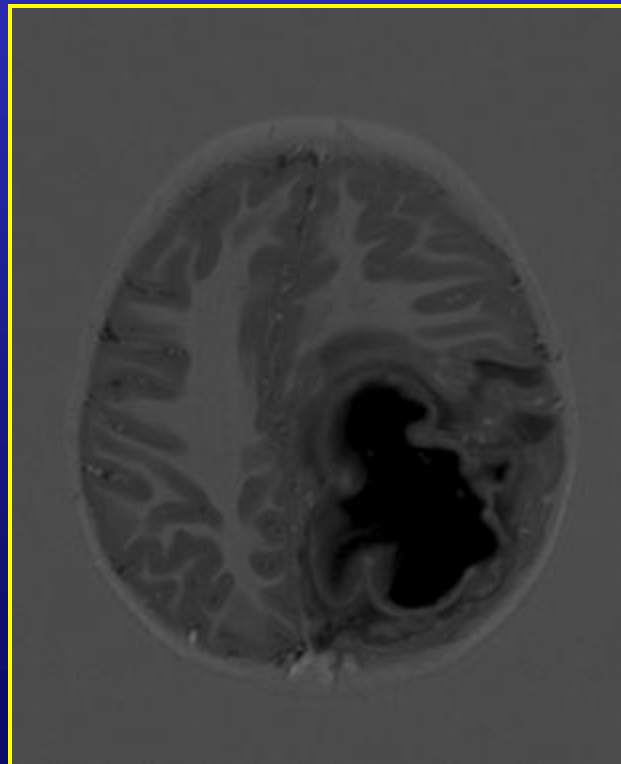
# Dental Caries

- Dental Disease can have systemic effects



# Dental Caries

- Dental Disease can have systemic effects



“We know that children who can’t eat well, can’t sleep, and are constantly hurting will become failures to thrive- becoming underweight, undernourished, and as a consequence, undereducated, underachievers.”

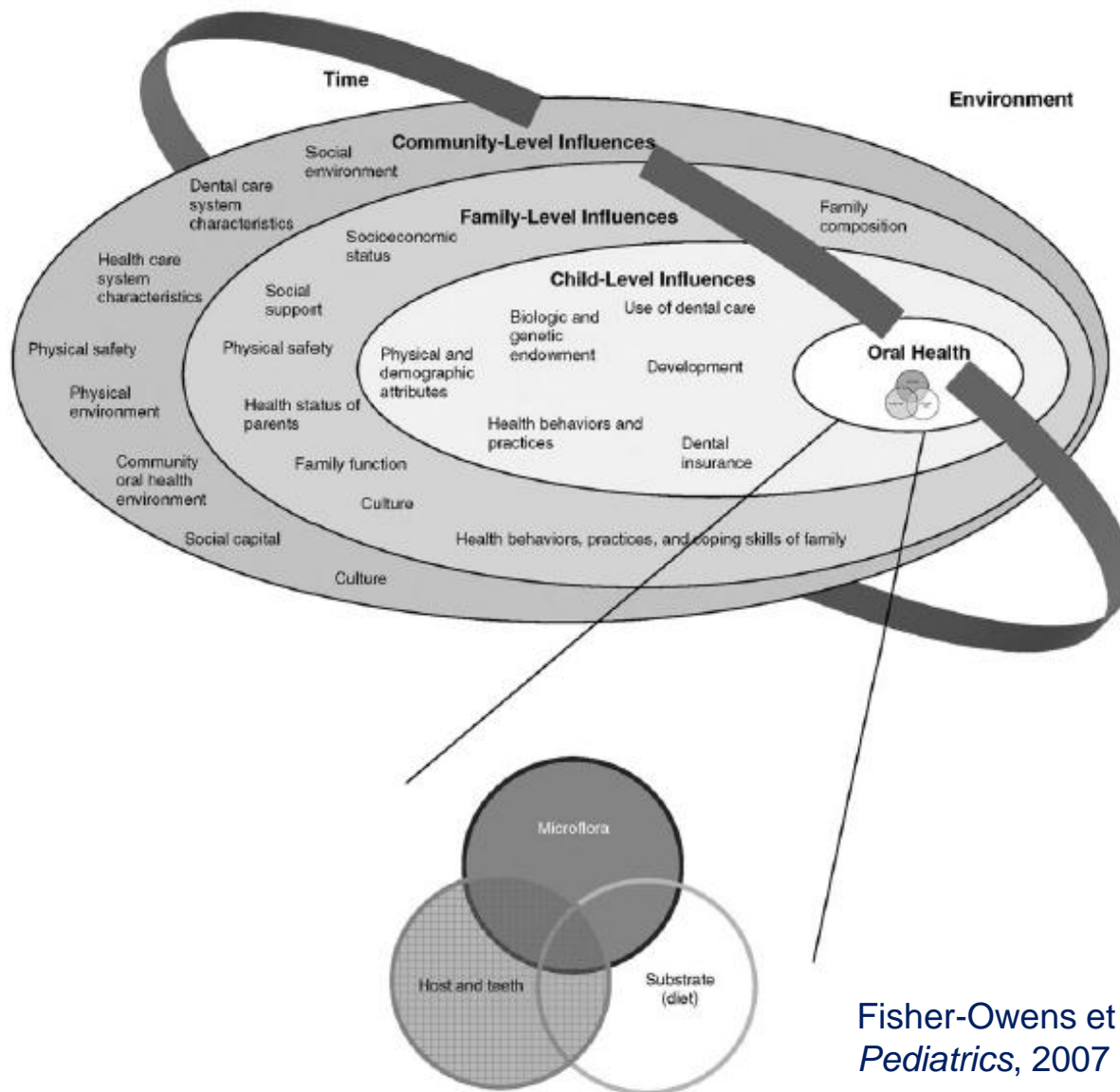
Dr. Antonia Novello, former Surgeon  
General

# School and Dental Problems

- Over **51 million school hours** are lost annually because of dentally-related illness, a statistic emanating from NHIS data (1989).
- Children missing school for dental pain report more Cs and Ds (Jackson et al., AJP 2010)



# Oral Health Determinants



Fisher-Owens et al.,  
*Pediatrics*, 2007

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What are the prevention methods and  
are they effective?

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# Preventive Services

**CMS Goal:** Increase the proportion of Medicaid- or NC Health Choice-eligible children ages 1-20 who receive any preventive dental services by 10 percentage points over 5 years.



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3-6 yrs.	0.5 mg (1 ml)	0.25 mg (1/2 ml)	0
6-16 yrs.	1.0 mg (2 ml)	0.5 mg (1 ml)	0

\*Consult to your ADA guidelines for fluoride supplementation.

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# Transmission of *Streptococcus mutans*



# The Fidelity of Initial Acquisition of Mutans Streptococci by Infants from Their Mothers

K.L.F. and P.W. Caufield

Department of Oral Biology, School of Dentistry, Box 35, University of Birmingham, Birmingham, Alabama 35294, to whom correspondence and reprint requests should be addressed

**Abstract.** *Prevotella* cross-sectional studies using bacteriocin probes, serotyping, or genotyping suggest that mothers are the principal source of mutans streptococci (MS) to their infants. We strictly determined the commensality of MS genotype between mothers and their infants at the time of maternal acquisition. One hundred mothers and their infants of 3-month-old infants (genotype of MS in approximately 5 years of age) were present in mothers at approximately 5 years of age. Infants acquired MS from mothers at approximately 75% of their mothers' genetic diversity. Infants' genetic diversity was not significantly greater than their mothers' genetic diversity at initial acquisition. This suggests that MS acquisition is not strictly dependent on genetic diversity and that mothers' knowledge of genetic diversity is not sufficient to determine the fidelity of genetic diversity between mothers and infants. Although the prevalence of dental caries was low in this young child population (17/34, 50%), we observed that one family (children who acquired their mothers' strain) was genetically diverse who acquired their mothers' strain. Although we do not know the biological mechanisms governing fidelity of acquisition between a mother and her infant, our data suggest that genetic diversity is not a major determinant of MS acquisition. These findings point to continued genetic, race, and ecology influence on the interindividual transfer of MS from mothers to their infants.

**Key words:** mutans streptococci, acquisition, mother and infant fidelity, DNA fingerprinting

Received April 21, 1994 Accepted October 28, 1994

## Introduction

The mutans streptococci (MS) are considered major etiologic agents in dental caries in humans. Because the presence of both or other non-dominant mutans in a population for stable colonization of MS, infants acquire MS after their birth (Caufield et al., 1979, 1981) or from their mothers (Berkowitz et al., 1985; Davies et al., 1987; Caufield et al., 1993). The question as to how and from whom infants acquire MS has not been definitively answered because most studies showing biological events during the first 2 years of life have not been published. Moreover, the methods used for acquisition and transmission of MS are not well defined. Previous research suggests that children acquire MS from their mothers after birth (Caufield et al., 1979, 1981; Berkowitz and Jones, 1980; Davies et al., 1987; Caufield and Walker, 1989; Kulkarni et al., 1993). Mothers usually acquire MS from their mothers, and usually transmitted it to their first 2 years of life, when MS are first detected (Caufield et al., 1993).

Probes for identifying individual strains of MS and showing that the strains found in the mother are the same as those found in her infant. Previous methods for identifying strains include serotyping and serotyping (Berkowitz and Jones, 1980; Kulkarni et al., 1993), including phage DNA probes and characterization, Caufield and Walker, 1989; Kulkarni et al., 1993; Caufield, 1993). Each method has limitations, but none appears more reliable (Caufield and Walker, 1989). Here we present the results of a longitudinal study aimed at determining the natural history of the

## Initial Acquisition of Mutans Streptococci by Infants: Evidence for a Discrete Window of Infectivity

K.W. CAUFIELD, G.R. CUTLER, and A.P. DASARATHAN  
University of Alabama at Birmingham, School of Dentistry and, P.O. Box 870149, Birmingham, Alabama 35289

Oral bacterial levels of MS in 1-year-old infants were determined from infant swabs up to five years of age in their mothers. The initial acquisition of MS by children was studied. The initial acquisition of MS during the period was designated as the "window of infectivity." Previous cross-sectional studies in which the age of acquisition of the study period (between 1 and 5 years of age) with MS and lactobacilli in saliva of 100 children with MS and without MS were not significantly different between a comparison of children with and without MS. Cross-sectional studies in a community sample of 100 children with and without MS (100 of 100) revealed similar levels of MS in the mothers of the children between 1 and 5 years of age. The acquisition of MS was not significantly different from the mothers of the children during the study period. Data suggest that the initial acquisition of MS by children during the study period is dependent on the mother's MS genotype.

J Dent

Received April 21, 1994 Accepted October 28, 1994

Journal of Dental Research  
The official publication of the International Association for Dental Research

# Sleep-time Practices



# Caries Reductions from Different Professionally Applied Fluorides

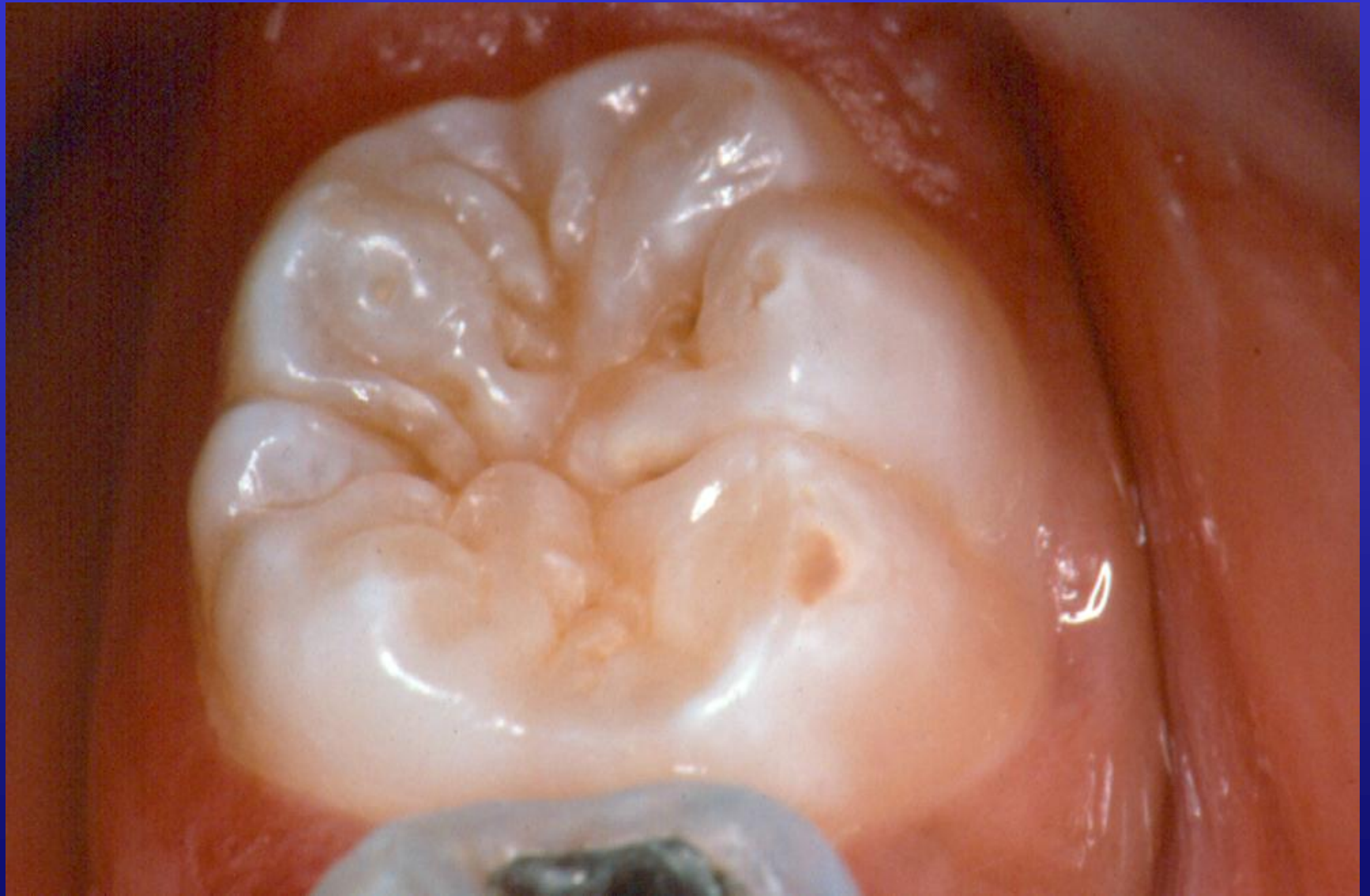
Duration of Study	NaF	SnF <sub>2</sub>	APF
1-3+ Years	29%	32%	28%

Ripa 1981 Int Dent J 32:105

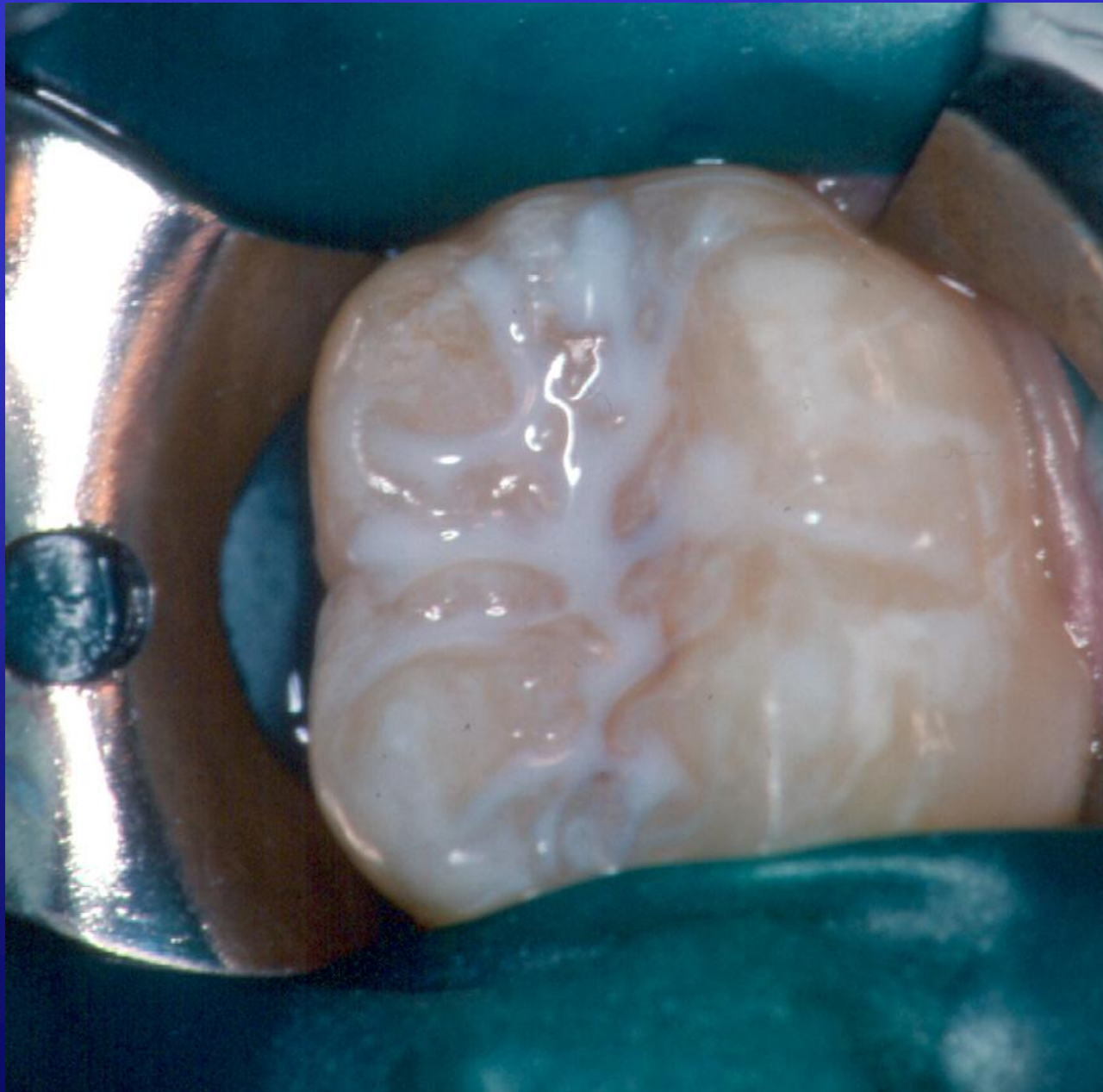


# Sealants

**CMS Goal:** Increase the proportion of Medicaid- or NC Health Choice-eligible children ages 6-9 who receive a dental sealant on at least one permanent molar tooth by 10 percentage points over 5 years.

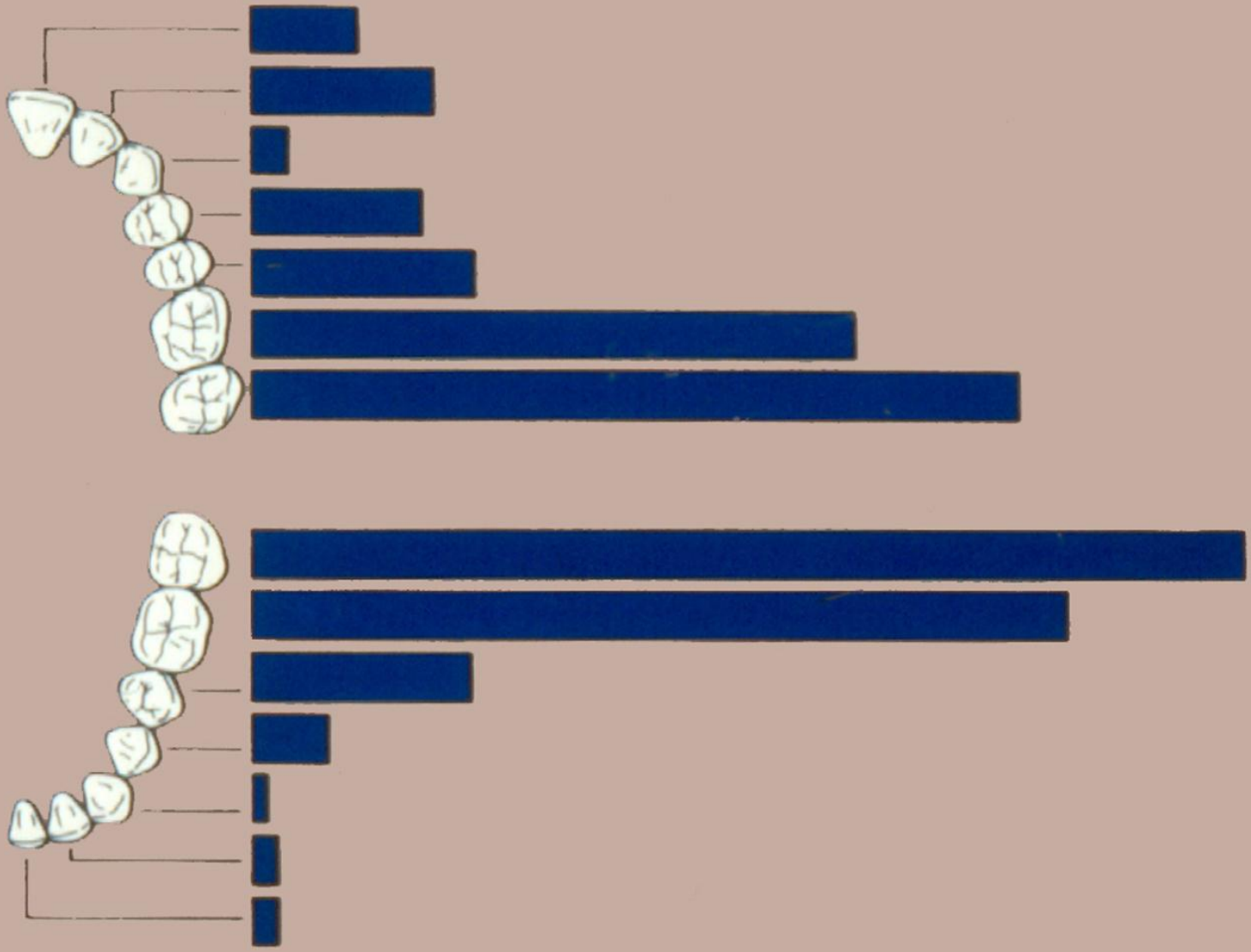


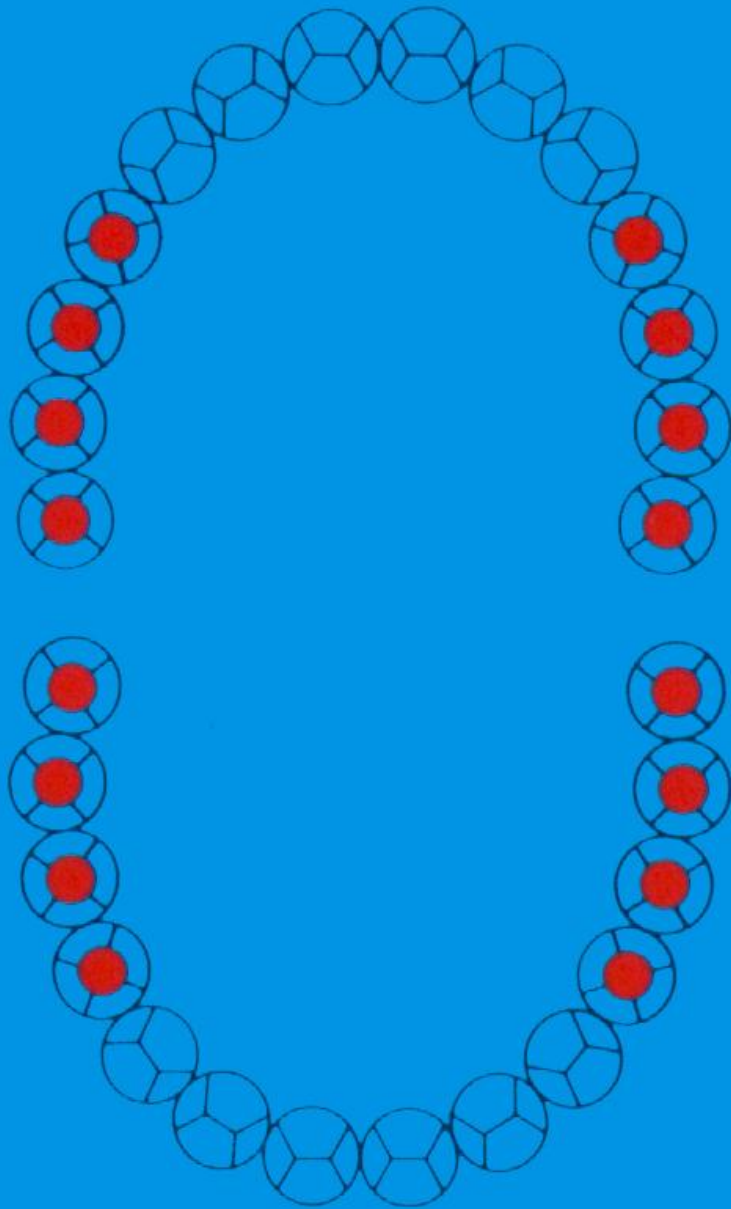




Opaque Delton Sealant # 19—immediately after placement

# Tooth Susceptibility to Caries





Occlusal Surfaces  
account for only 12.5%  
all tooth surfaces,  
but contain more than  
50% of all caries.

When we analyze pit and fissure caries carefully,  
we find that two thirds of this decay is found on  
**occlusal** surfaces.

Brown et al. *J Public Health Dent* 1995; 55:274-91.

# Expected Pit and Fissure Caries Decay In First Molars of Children Aged 6-13

Age 6	~10%
Age 8	~30-44%
Age 10	~47-58%
Age 13	~58-76%

Brown et al. *J Public Health Dent* 1995; 55:274-91.

# Sealants

- Occlusal surfaces account for only 12.5% of total tooth surface area but include 50-80% of caries in 5-17 year olds
- Fluoride less effective in the prevention of pit and fissure caries
- Effectiveness
  - After 2 years: 80-100% reduction
  - After 5 years: 37-60% reduction



C O V E R

S T O R Y

Executive summary  
follows page 356

# Evidence-based clinical recommendations for the use of pit-and-fissure sealants

A report of the American Dental Association Council  
on Scientific Affairs

**Jean Beauchamp, DDS; Page W. Caufield, DDS, PhD; James J. Crall, DDS, ScD; Kevin Donly, DDS, MS; Robert Feigal, DDS, PhD; Barbara Gooch, DMD, MPH; Amid Ismail, BDS, MPH, MBA, DrPH; William Kohn, DDS; Mark Siegal, DDS, MPH; Richard Simonsen, DDS, MS**

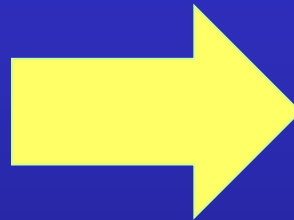
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Who are the providers for pediatric  
oral health?

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Children



Providers

Physicians

General Dentists

Pediatric Dentists

Safety Net Clinics

# Medical Providers and Oral Health

- Physician visits outnumber dental visits 250 to 1 for infants and 1-year-olds
- Pediatrician's office provides an opportunity to provide preventive oral health services to young children.

## Recommended Medical Screening — Infancy

UNIVERSAL	ACTION	NB	1W	1M	2M	4M	6M	9M	
Metabolic and hemoglobinopathy	Done according to state law	•	•	•	•				
Development	Structured developmental screen							•	
Oral health	Administer OH risk assessment						•	•	
Hearing	All NB before discharge; if not by discharge, in 1st month; verify documentation of screening results and appropriate rescreening by 2M		•	•	•	•			
SELECTIVE	RISK ASSESSMENT (RA)	ACTION IF RA +	NB	1W	1M	2M	4M	6M	9M
Blood pressure	Children with specific risk conditions or change in risk	Blood pressure	•	•	•	•	•	•	•
Vision	Prematurity with risk conditions, abnormal fundoscopic exam, parental concern (all visits); abnormal eye alignment (4M and 6M); abnormal cover/uncover test (9M)	Ophthalmology referral	•	•	•	•	•	•	•
Hearing	+ on risk screening questions	Referral for diagnostic audiologic assessment					•	•	•
Anemia	Preterm/LBW; not on iron-fortified formula	Hemoglobin or hematocrit					•		
Lead	+ on risk screening questions	Lead screen						•	•
Tuberculosis	+ on risk screening questions	Tuberculin skin test			•			•	

OH = oral health; NB = newborn; LBW = low birth weight

# Medical Providers and Toddlers

## Recommended Medical Screening — Early Childhood

UNIVERSAL	ACTION		12M	15M	18M	2Y	2½Y	3Y	4Y
Development	Structured developmental screen				•		•		
Autism	Autism Specific Screen				•	•			
Vision	Objective measure with age-appropriate visual acuity measurement (using HOTV; tumbling E tests; Snellen letters; Snellen numbers; or Picture tests, such as Allen figures or LEA symbols)							•	•
Hearing	Audiometry								•
Anemia	Hematocrit or hemoglobin		•						
Lead*	Lead screen		•			•			
SELECTIVE	RISK ASSESSMENT (RA)	ACTION IF RA +	12M	15M	18M	2Y	2½Y	3Y	4Y
Oral health	No dental home	Referral to dental home; if not available, oral health risk assessment (12M, 18M, 2Y, 2½Y). Referral to dental home (3Y).	•		•	•	•	•	
	Primary water source is deficient in fluoride	Oral fluoride supplementation	•		•	•	•	•	
Blood pressure†	Specific risk conditions or change in risk	Blood pressure	•	•	•	•	•		
Vision	Parental concern or abnormal fundoscopic exam or cover/uncover test	Ophthalmology referral	•	•	•	•	•		
Hearing	+ on risk screening questions	Referral for diagnostic audiologic assessment	•	•	•	•	•	•	
Anemia	+ on risk screening questions	Hematocrit or hemoglobin			•	•		•	•
Lead‡	+ on risk screening questions	Lead screen	•			•			
Lead	No previous screen or change in risk	Lead screen			•				
	No previous screen and + on risk screening questions or change in risk	Lead screen						•	•
Tuberculosis	+ on risk screening questions	Tuberculin skin test	•		•	•		•	•
Dyslipidemia	+ on risk screening questions; not previously screened with normal results (4Y)	Fasting lipid profile				•			•

\*Universal lead screen = high prevalence area or on Medicaid; †Beginning at age 3, blood pressure becomes part of the physical examination; ‡Selective lead screen = low prevalence area and not on Medicaid.

# Medical Providers and School Age Children

## Recommended Medical Screening — Middle Childhood

UNIVERSAL	ACTION	5Y	6Y	7Y	8Y	9Y	10Y	
Vision	Objective measure with age-appropriate visual acuity measurement (using HOTV; tumbling E tests; Snellen letters; Snellen numbers; or Picture tests, such as Allen figures or LEA symbols)	•	•					
	Snellen test				•		•	
Hearing	Audiometry	•	•		•		•	
SELECTIVE	RISK ASSESSMENT (RA)	ACTION IF RA +	5Y	6Y	7Y	8Y	9Y	10Y
Oral health	No dental home	Referral to dental home		•				
	Primary water source deficient in fluoride	Oral fluoride supplementation		•				
Vision	+ on risk screening questions	Snellen test			•		•	
Hearing	+ on risk screening questions	Audiometry			•		•	
Anemia	+ on risk screening questions	Hemoglobin or hematocrit	•	•	•	•	•	
Lead	No previous screen and + on risk screening questions or change in risk	Lead screen	•	•				
Tuberculosis	+ on risk screening questions	Tuberculin skin test	•	•	•	•	•	
Dyslipidemia	+ on risk screening questions and not previously screened with normal results	Fasting lipid profile		•		•	•	

# Medical Providers and Adolescents

## Recommended Medical Screening — Adolescence

UNIVERSAL	ACTION		EARLY (11-14Y)	MIDDLE (15-17Y)	LATE (18-21Y)
Vision (once during each age stage)	Snellen test		•	•	•
Dyslipidemia (once during Late Adolescence)	A fasting lipoprotein profile (total cholesterol, LDL cholesterol high density lipoprotein [hDL], cholesterol and triglyceride). If the testing opportunity is non-fasting, only total cholesterol and HDL cholesterol will be usable.				•
SELECTIVE	RISK ASSESSMENT (RA)	ACTION IF RA +	EARLY (11-14Y)	MIDDLE (15-17Y)	LATE (18-21Y)
Vision (when universal screening not performed)	+ on risk screening questions	Snellen test	•	•	•
Hearing	+ on risk screening questions	Audiometry	•	•	•
Anemia	+ on risk screening questions	Hemoglobin or hematocrit	•	•	•
Tuberculosis	+ on risk screening questions	Tuberculin skin test	•	•	•
Dyslipidemia (when universal screening not performed)	+ on risk screening questions and not previously screened with normal results	Lipid screen	•	•	•
STIs	Sexually active	Chlamydia and gonorrhea screen; use tests appropriate to the patient population and clinical setting	•	•	•
	Sexually active and + on risk screening questions	Syphilis blood test HIV*	•	•	•
Pregnancy	Sexually active without contraception, late menses, amenorrhea, or heavy or irregular bleeding	Urine hCG	•	•	•
Cervical dysplasia	Sexually active, within 3 years of onset of sexual activity or no later than age 21	Pap smear, conventional slide or liquid-based	•	•	•
Alcohol or drug use	+ on risk screening questions	Administer alcohol- and drug-screening tool	•	•	•

\*The CDC has recently recommended universal voluntary HIV screening for all sexually active people, beginning at age 13. At the time of publication, the AAP and other groups had not yet commented on the CDC recommendation, nor recommended screening criteria or techniques. The health care professional's attention is drawn to the voluntary nature of screening and that the CDC allows an opt out in communities where the HIV rate is <0.1%. The management of positives and false positives must be considered before testing.

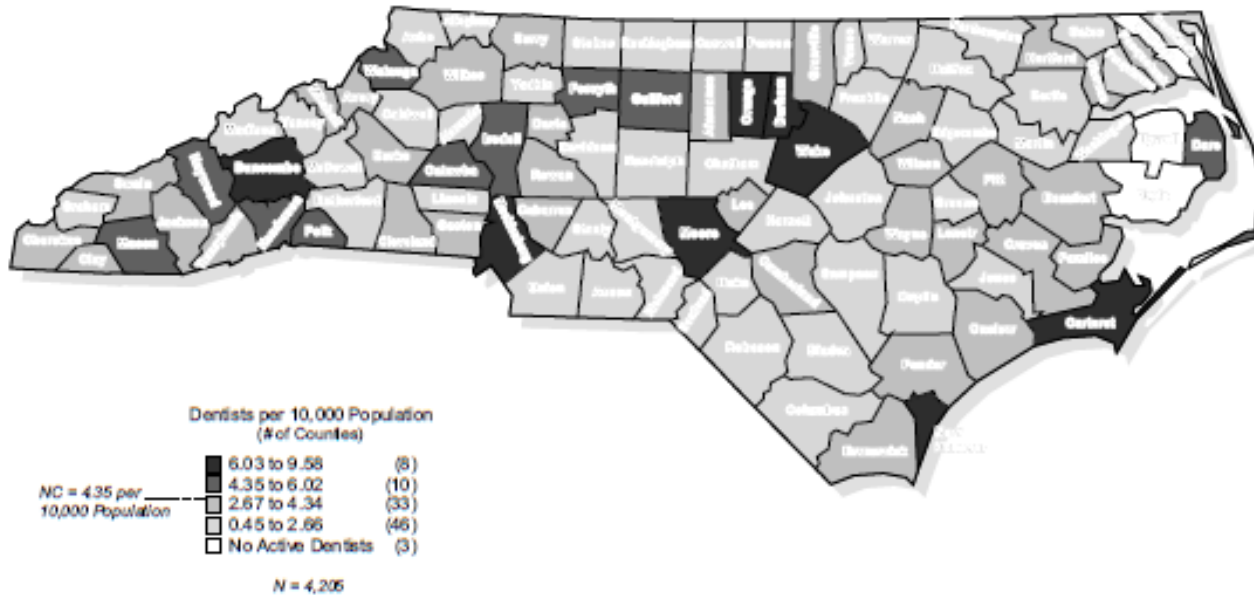
# Dentists and Pediatric Oral Health

- Nationally, 28% of general dentists do not treat infants and toddlers ages 18 months to 3 years in their practices.
- State variation 25%-50%
- Reasons
  - children were too young to cooperate (55%)
  - referral available (42%)
  - not adequately trained to see children <2 years (40%)
  - children this young did not need to see a dentist (26%)

Seale et al., 2003  
Santos et al., 2008  
Brickhouse et al., 2008

# Dentists Distribution

**Dentists per 10,000 Population  
North Carolina, 2011**



Note: Data include active, in-state dentists licensed in North Carolina as of October 31, 2011.

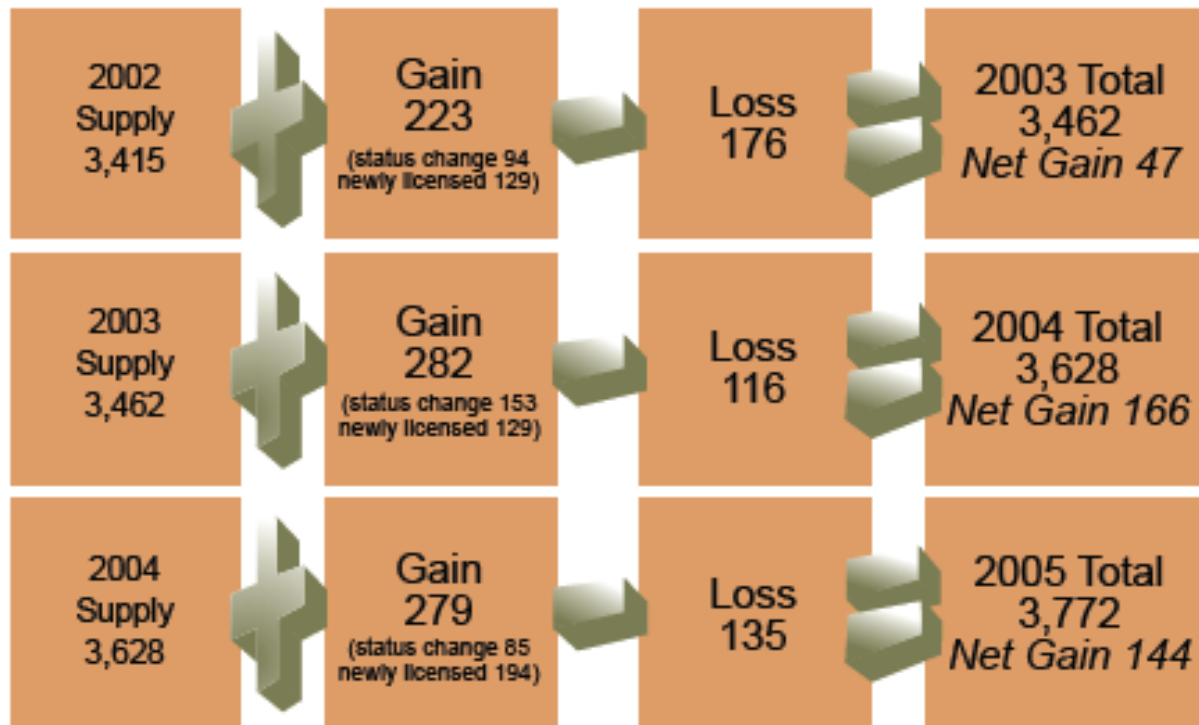
Source: North Carolina Health Professions Data System, with data derived from the North Carolina State Board of Dental Examiners, 2011.

Produced by: North Carolina Health Professions Data System, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.



# Dentists Distribution

Figure 3: Components of Change, 2002-2005



# Specialists Dentists

**Table 1.  
Primary Specialty, 2005**

General Practice	77.8% (2,934)
Orthodontics	6.2% (235)
Oral Surgery	3.7% (140)
Pediatric Dentistry	3.3% (125)
Periodontics	2.6% (99)
Endodontics	2.8% (105)
Public Health	1.8% (66)
Prosthodontics	1.4% (55)
Oral/Maxillofacial Radiology	<1% (12)
Unknown	<1% (2)



Thank You