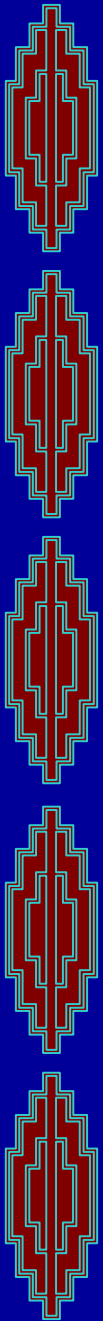


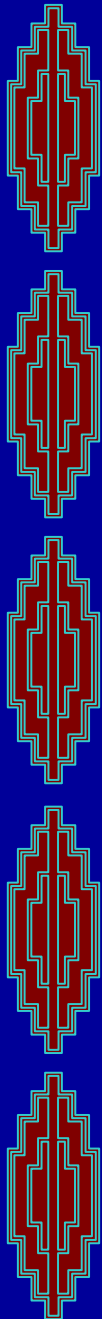
Early Childhood Caries
The Newest Infectious Disease
Epidemic in Native American Children

Steve Holve, MD
IHS Consultant in Pediatrics



Bacterial Meningitis is a serious, preventable, infectious disease of children.

The rate of bacterial meningitis has been reduced over 95% in American Indian/Alaskan Native children in the past two decades.



Hepatitis A is a serious, preventable infectious disease of children.

Hepatitis A infections have been reduced over 99% in American Indian/Alaska Native children in the past 13 years.



Early Childhood Caries (ECC) is a serious, preventable infectious disease of children

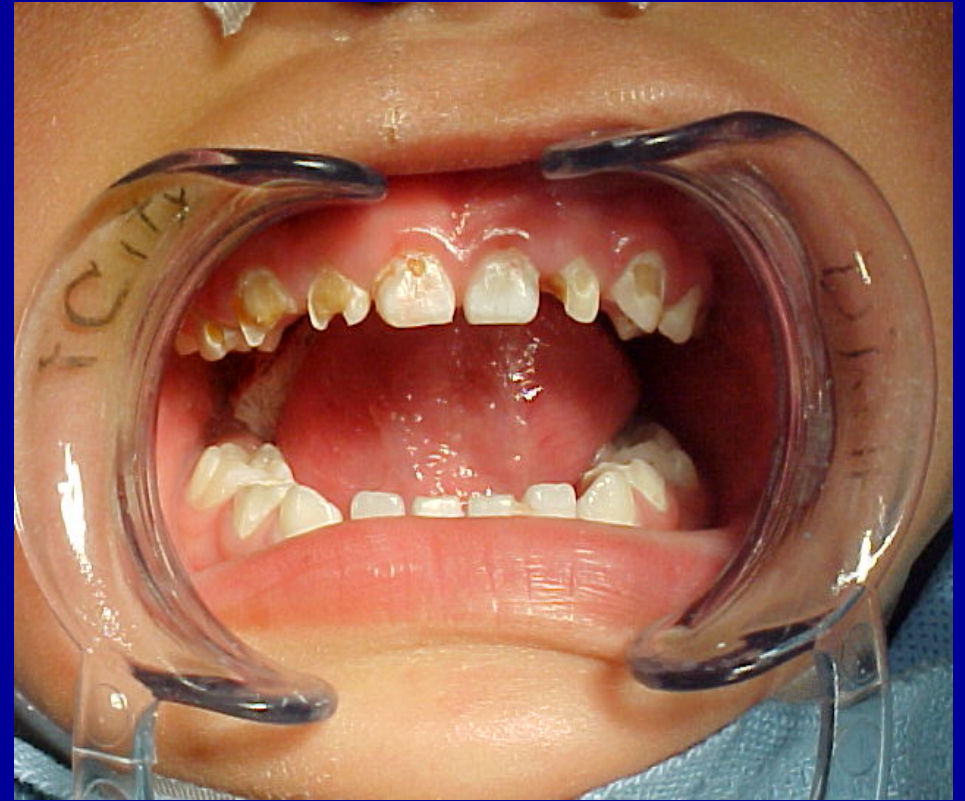
But American Indian/Alaska Native children have 6 times the US rate early childhood caries and the rate has been increasing past 15 years

Objectives

- To convince you that that Early Childhood Caries (ECC) is a pediatric infectious disease that occurs in teeth
- To convince you that we will never decrease ECC in high risk groups until we treat the underlying infection of cariogenic bacteria

Early Childhood Caries

- Tooth decay in the primary teeth; often rapidly progressing
- Newly erupted teeth have softer enamel and are more prone to decay
- Used to be called baby bottle tooth decay



The Cost of Early Childhood Caries

- Pain
- Difficulty chewing and poor weight gain
- Dental infection and abscesses
- Costly dental treatment
- Malocclusion
- Reduced self-esteem





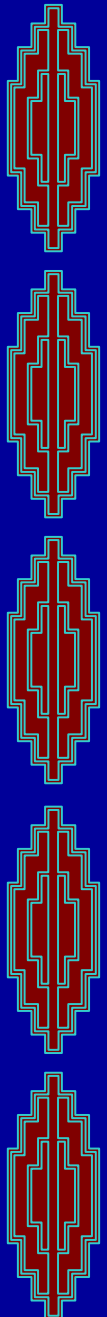
Early Childhood Caries (ECC)

- The most common chronic illness of childhood
- The most common chronic infection of childhood
- The greatest unmet health need in childhood in the US
- 80% of ECC are in 20% of children



Health Disparities for AI/AN compared to US white children

- Infant mortality – 50% higher
- MVA death rates – 250% higher
- Childhood overweight – 300% higher
- Childhood DM – 350% higher
- Early Childhood Caries – 600% higher

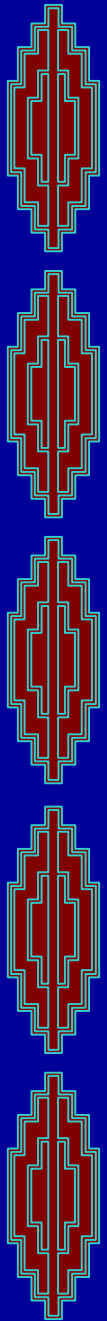
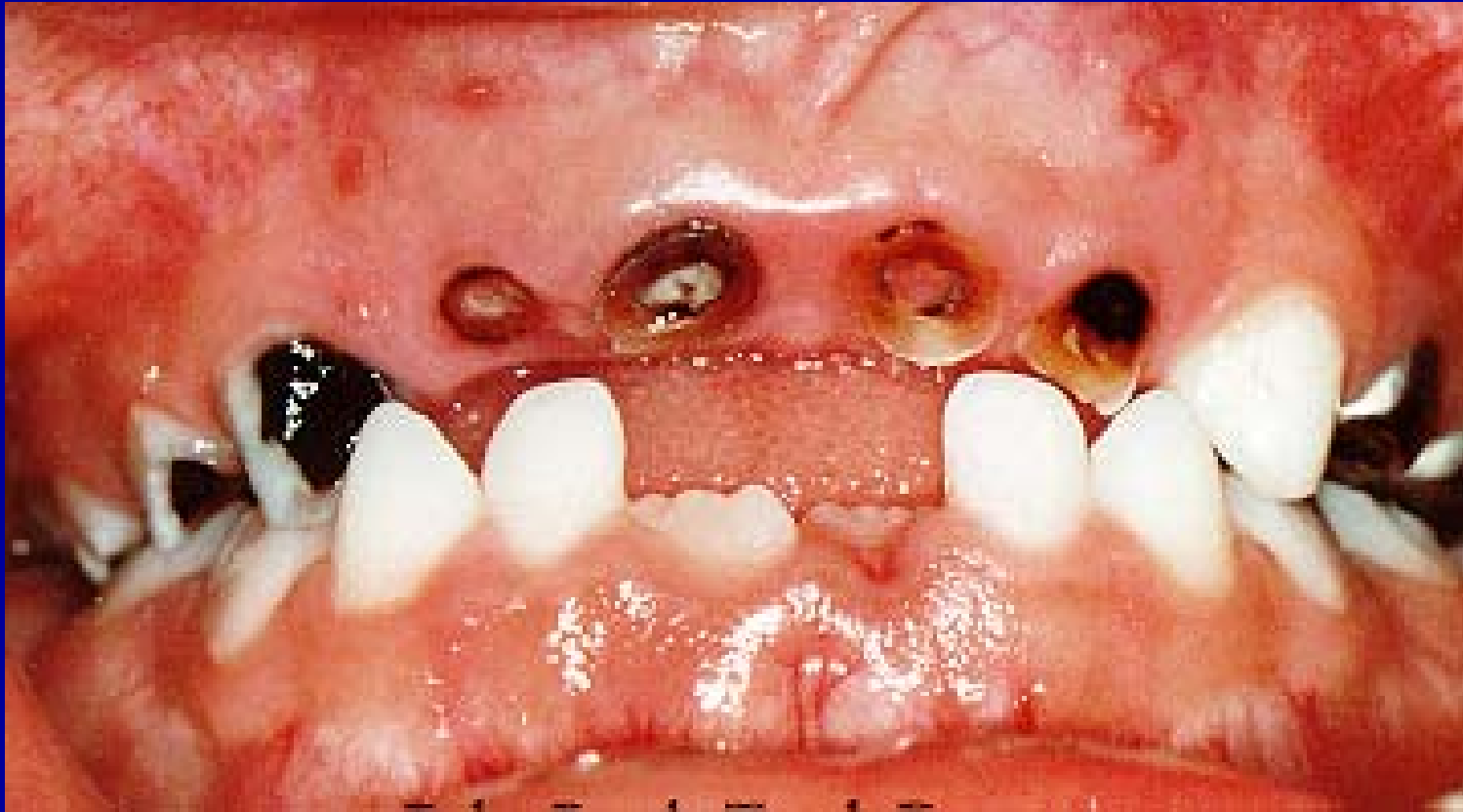


Caries Prevalence in Children 3-4 years of age

- White 11%
- African American 22%
- Hispanic 24%
- Native American 68%
- Navajo Area 93%

Surgeon General's Report on Oral
Health, 2000

How Bad Is It?



It's Real Bad

- By first grade 30% of AI/AN children in many communities meet criteria for full mouth restorations
- The rate of in hospital full mouth restorations in AI/AN children is 5000% the rate in US white children



Epidemiology of ECC in Native Americans

- there has been an **INCREASE** in ECC in NA children 2-5 years old since 1991
- This increase has occurred despite fluoridation of water
- This increase has occurred despite educational efforts

Oral Health Survey of AI/AN
dental patients, 1999

Education Has Not been Effective

- US Preventive Task Force found “little evidence that counseling of parents reduced caries or dental disease”

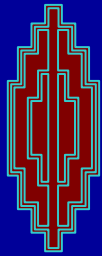
Am J Prev Med 2004; 26(4)326-329

The Final Common Pathway

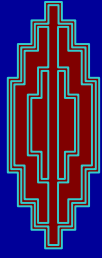
There are multiple pathways that lead to caries in children.

The final common pathway is demineralization of the enamel from acid produced by cariogenic bacteria.

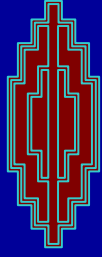




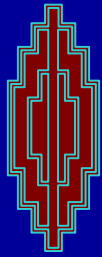
Why do AI/AN children have more ECC?



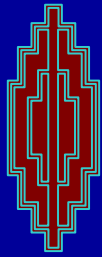
- Early Childhood Caries is an infectious disease caused by *S mutans*



- All infectious diseases are more common in communities that are poor and crowded



- In AI/AN communities *S mutans* is acquired at an early age and in high colony counts

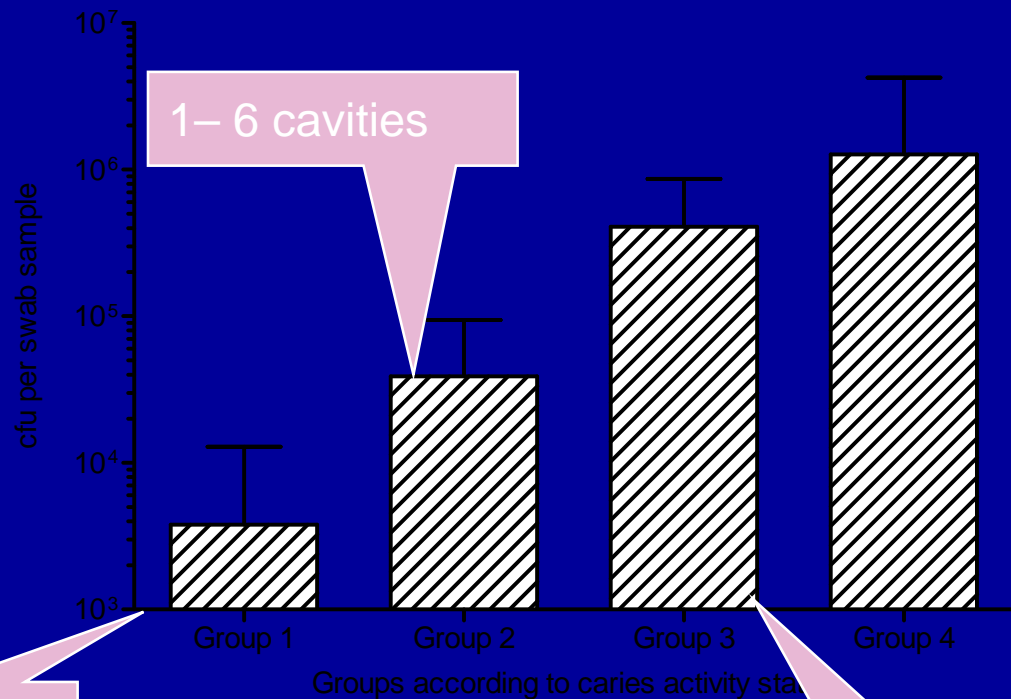


- Dietary habits increase *S mutans* counts

- There is no vaccine for *S mutans*

Strep mutans study results from a Northwest Tribe

Streptococcus mutans counts in children by caries activity status

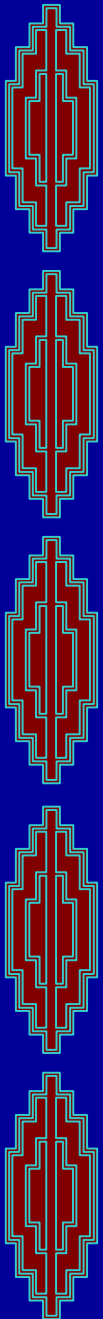


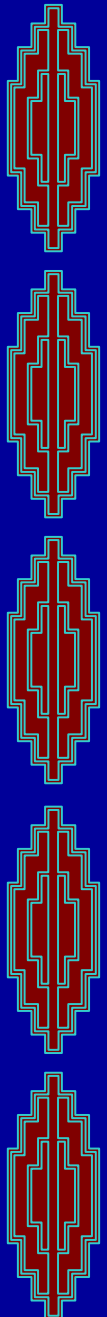
No cavities

1– 6 cavities

7+ cavities

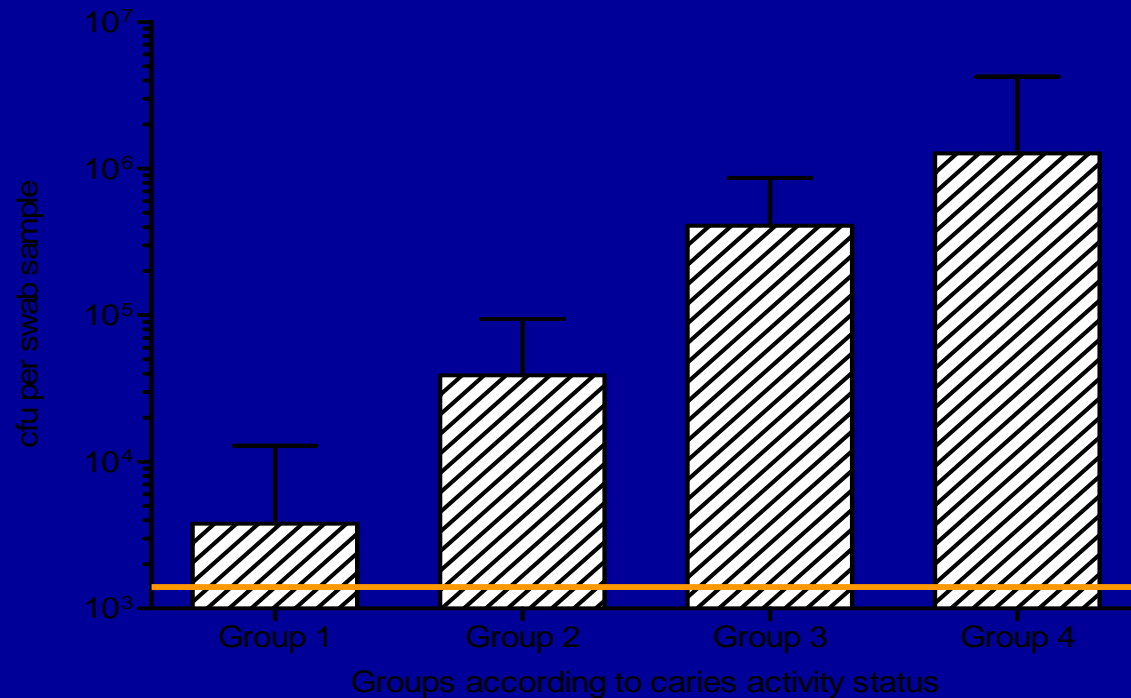
Previous surgery for tooth decay





How does these levels compare to other children in the U.S.?

Streptococcus mutans counts in children by caries activity status



S. mutans levels for low risk U.S. children

“Effect of Restorative Treatments on *mutans streptococci*”

Pediatr Dent. 1998;20(4):273-7

- No decrease in colony counts despite successful treatment
- It's a foreign body in an infected space



Clinical outcomes for early childhood caries: influence of aggressive dental surgery

J Dent Child (Chic). 2004;71(2):114-7



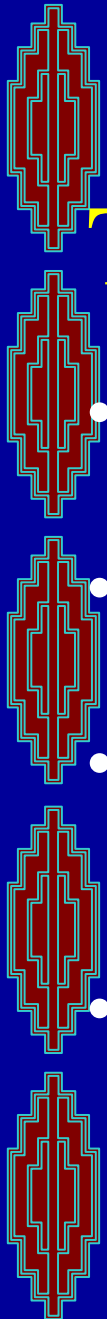
- 37-52% of children had further severe caries despite dental restorations



The Moment of Zen

- “When I first came to Pine Ridge as a family dentist I thought...
- What we need is a pediatric dentist...
- 15 Years later I am one of two pediatric dentists at Pine Ridge but...
- We will never drill or fill our way out of this problem”

John Zimmer, DDS

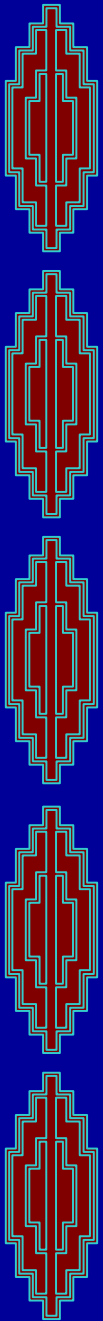


There is a window of infectivity

- Children are not born with caries bacteria
- Bacteria are spread from mother to child
- The greatest risk for transmission is from the eruption of the 1st primary tooth until age 2 years
- The intervention has to occur by age 2 years

The window of infectivity is also a window of opportunity

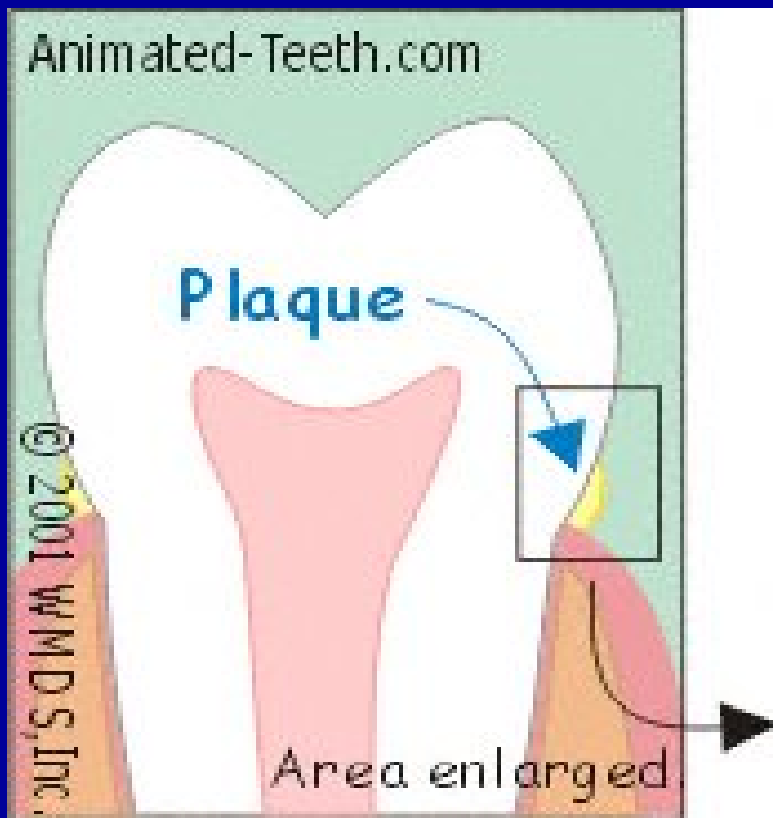
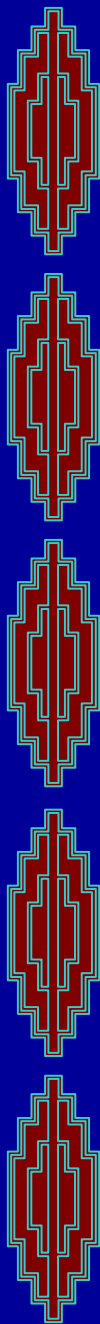
- Fluoride varnish can safely be applied to toddlers
- 25 years experience in Europe
- Caries reduction of 30%-70% in permanent teeth
- Licensed in US in 1994



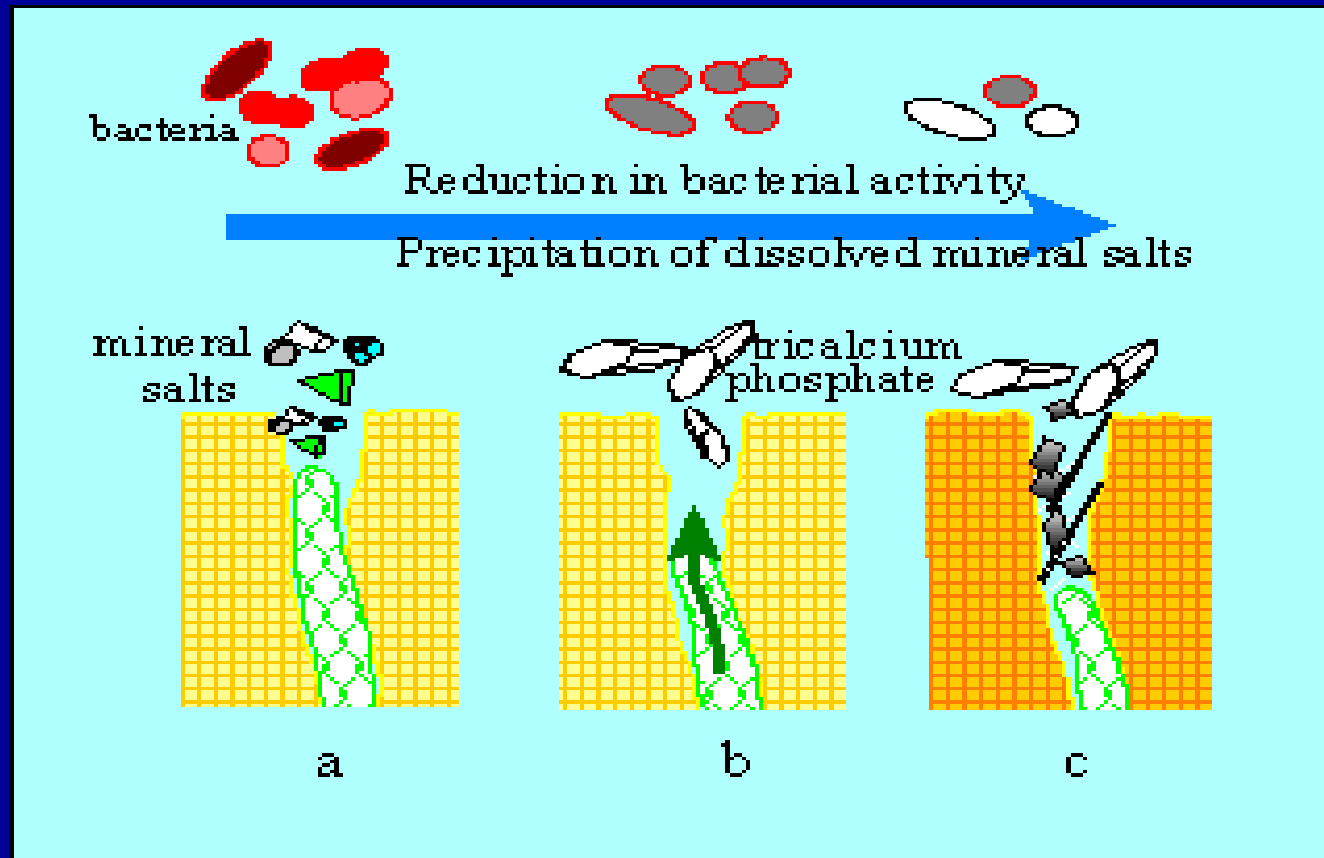


Fluoride Varnish: mechanisms of action

- inhibits demineralization
- Encourages remineralization
- inhibits bacterial growth in plaque



Fluoride inhibits MS and promotes remineralization





Fluoride Varnish

- must be applied at least 2 times per year
 - Probably increased benefit up to 4 times a year
- advantages
 - easy to apply
 - don't need professional cleaning before application
 - cheap (<\$1 per application)



Safety features of fluoride varnish

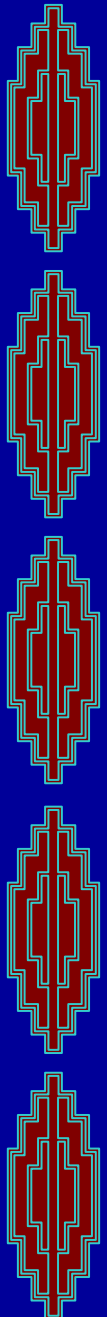
- Non-allergenic
- It will not cause fluorosis



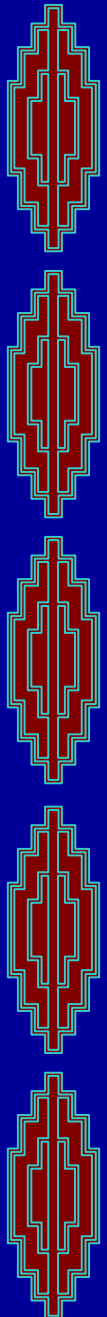
What We Did in Tuba City

- All children seen at well child checks are offered varnish once primary teeth erupt: from 9 months to 30 months
- Providers apply varnish at the conclusion of the visit but before vaccinations
- Oral health examination and education occurs as we apply varnish
- Takes about three minutes

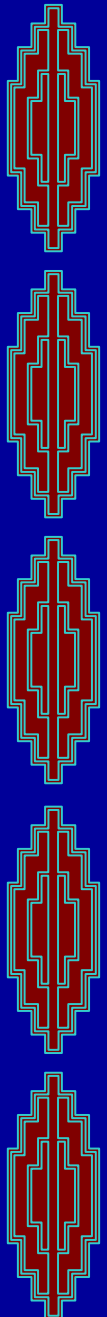
Check for Normal Healthy Teeth



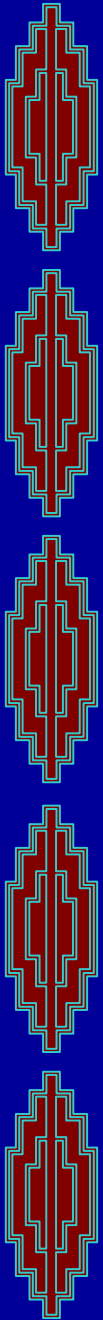
Check for Early Signs of Decay: White Spots

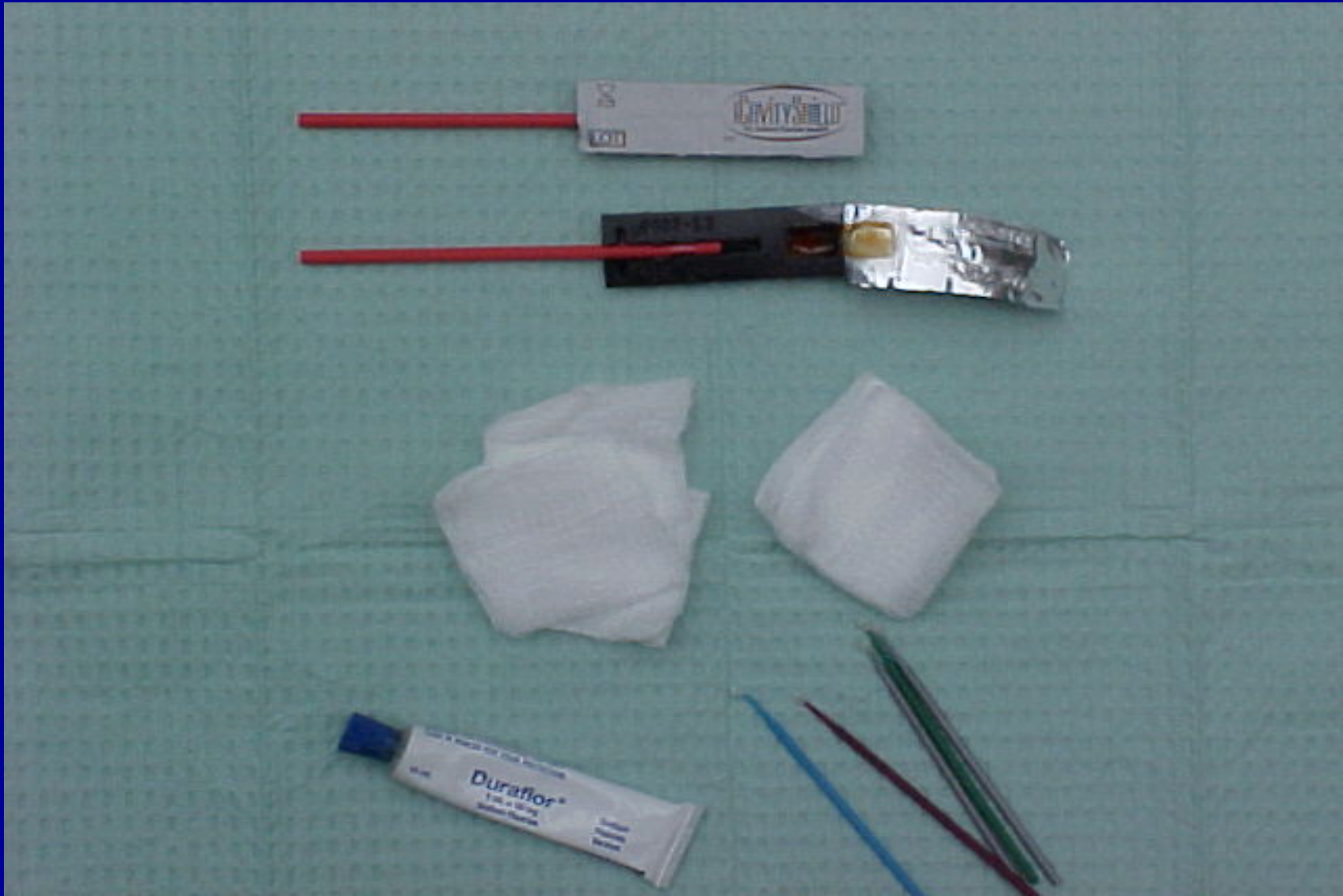
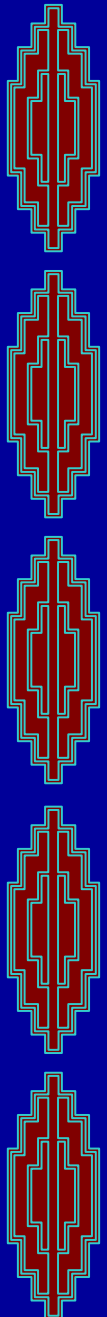


Check for Later Signs of Decay: Brown Spots



Check for Advanced/Severe Decay

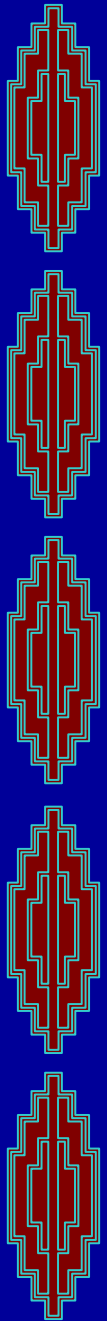




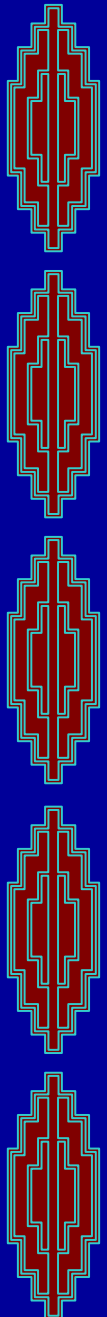


Fluoride Varnish Brands

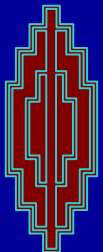
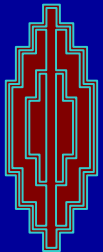
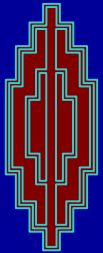
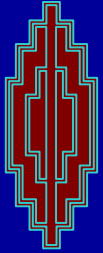
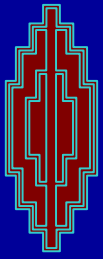
- 1. Duraphat®
www.colgateprofessional.com/app/cop/jsp/products/productHome.jsp?prodcode=011400100
- 2. Duraflor®:
<http://www.medicom.com/faq.ch2>
- 3. CavityShield®
<http://www.omniipharma.com/cavityshield.asp>
(unit-dose package)
- 4. VarnishAmerica®:
<http://www.medicalproductslaboratories.com/products/varnishamerica/varnishamerica.html>
(unit-dose package)

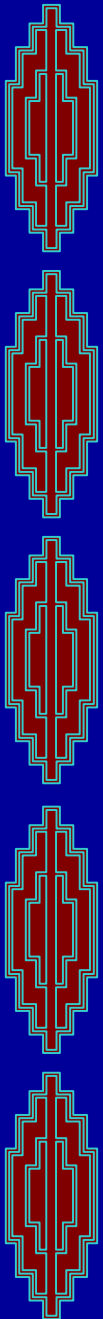






Video





Will Fluoride Varnish Decrease ECC in AI/AN children?

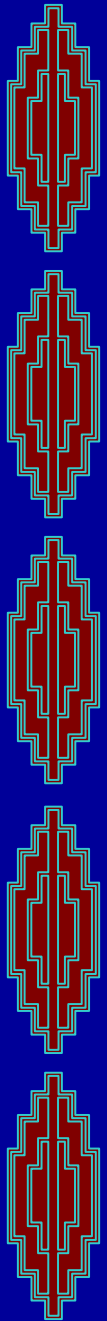
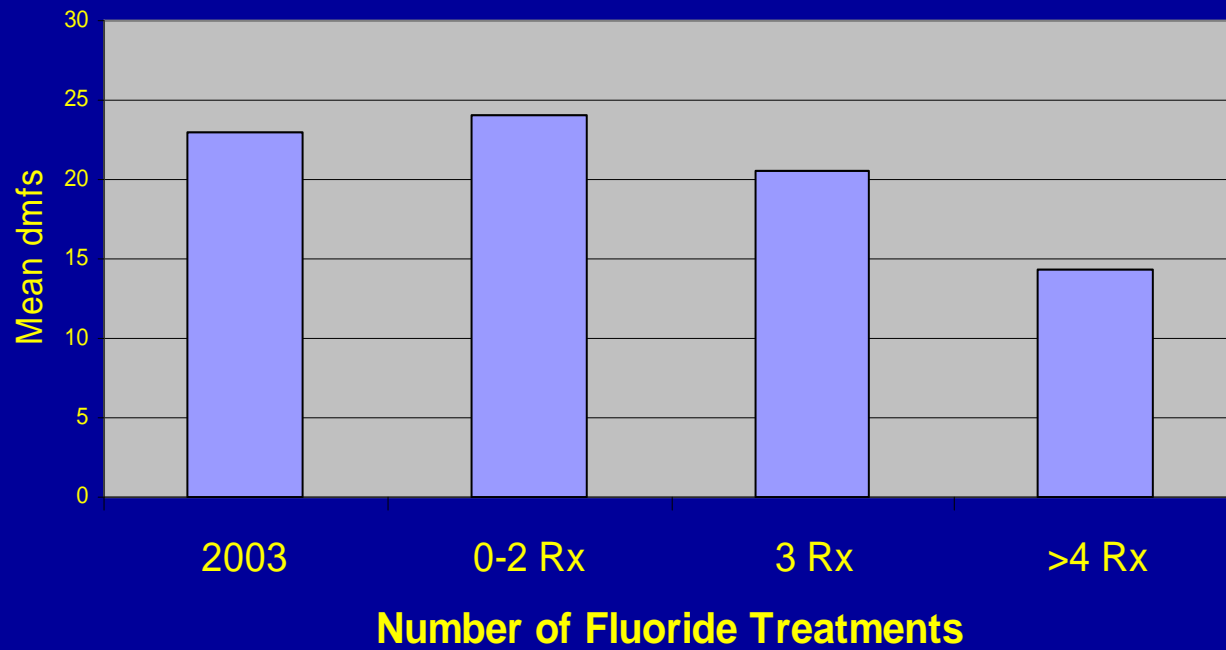
- Would cariogenic factors outweigh the benefits
- Native Americans have a lot of risk factors
 - - High *S. mutans* levels
 - - Poverty and Crowding
 - - Nutritional risks - soda pop and juice



Tuba City Fluoride Varnish Program 2003- 2006

- Examined all Headstart Children
- 133 as controls in 2003
- 128 in 2004
- 96 in 2005
- Total N = 357
- Achieved statistically significant 35% reduction of caries for 4+ fluoride treatments versus historical controls

Mean dmfs by Number of Fluoride Varnish Treatments





Canada Leads the Way

- *2444 Randomized Fluoride Varnish Trial for Preventing ECC in Aboriginal Communities* **H.P. LAWRENCE**¹, D. BINGUIS², B. SWITZER², L. MCKEOWN³, R. FIGUEIREDO¹, A. LAPORTE¹, and J.B. ROGERS⁴, ¹University of Toronto, Canada, ²Sioux Lookout Zone Dental Program, Canada, ³Thunder Bay, Canada, ⁴First Nations and Inuit Health Branch, Health Canada, Canada
- 34% caries decrement in 1 year



American Dental Association Recommendations 2006

- High risk category includes all groups of "low socio-economic Status" (< 200% of FPL)
- High risk children ages 0- 60 months should receive professionally applied topical fluoride every 3 months
- Recommendation based on systematic review of scientific literature

JADA 2006;137(8) 1151-9

Who Is Going To Apply Fluoride Varnish?

Low-Income Children Are Less Likely to Receive Dental Care

FIGURE 3
Proportion of Children with a Preventive Dental Visit in the Past Year, by Poverty Level



NOTE: Poor is defined as at or below 100 percent of the Federal poverty line (FPL); near-poor is between 101 percent and 200 percent of the FPL; and middle- to high-income is above 200 percent of the FPL.

SOURCE: M. Stanton (2003). "Dental Care: Improving Access and Quality," *Research in Action Issue # 13*. Rockville, MD: Agency for Healthcare Research and Quality.



Age Is Also A Barrier

- Dental access is difficult for young children
- Most general dentists won't see children < 5 years
- In the US there is only one pediatric dentist for every 6,000 children < 5 years of age
- For children < 2 years of age only 1 in 40 children see a dentist once in a year where the usual child has 4 visits/year to a doctor

Pediatricians Need to Do It

- Pediatrics has reduced or eliminated most serious infectious diseases in this country
- We need to approach ECC not as a dental disease but a pediatric infectious disease that occurs in teeth



Pediatricians Need to do it

- Access to dentists is problematic for young children
- But everyone gets WCC
- fluoride varnish application is quick, easy



The Near Future for Caries Prevention

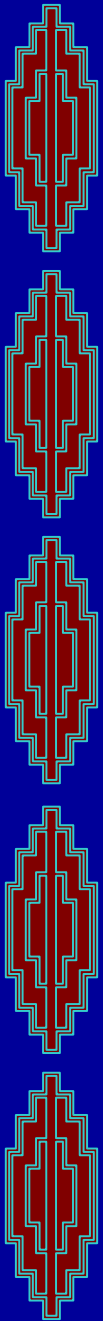
- Antimicrobial treatment
chlorhexidine varnish for
mother and child
- Mineralization treatment
fluoride varnish
- Both done every three months
in pediatricians' offices



Other groups are at risk for ECC

- Caries are a disease of poverty
- 80% of caries are in 20% of the population
- Ethnic minorities
- Immigrants
- Rural





“Our capability to prevent and treat disease seems to exceed our willingness to apply our interventions.”

C. Everett Koop, MD
Former Surgeon General

Acknowledgements

- Dee Robertson, MD
- Kathy Phipps, PhD
- Chris Halliday, DDS

