Evidence for the Risk-based Prevention of Dental Caries

Virginia Oral Health Summit 2011
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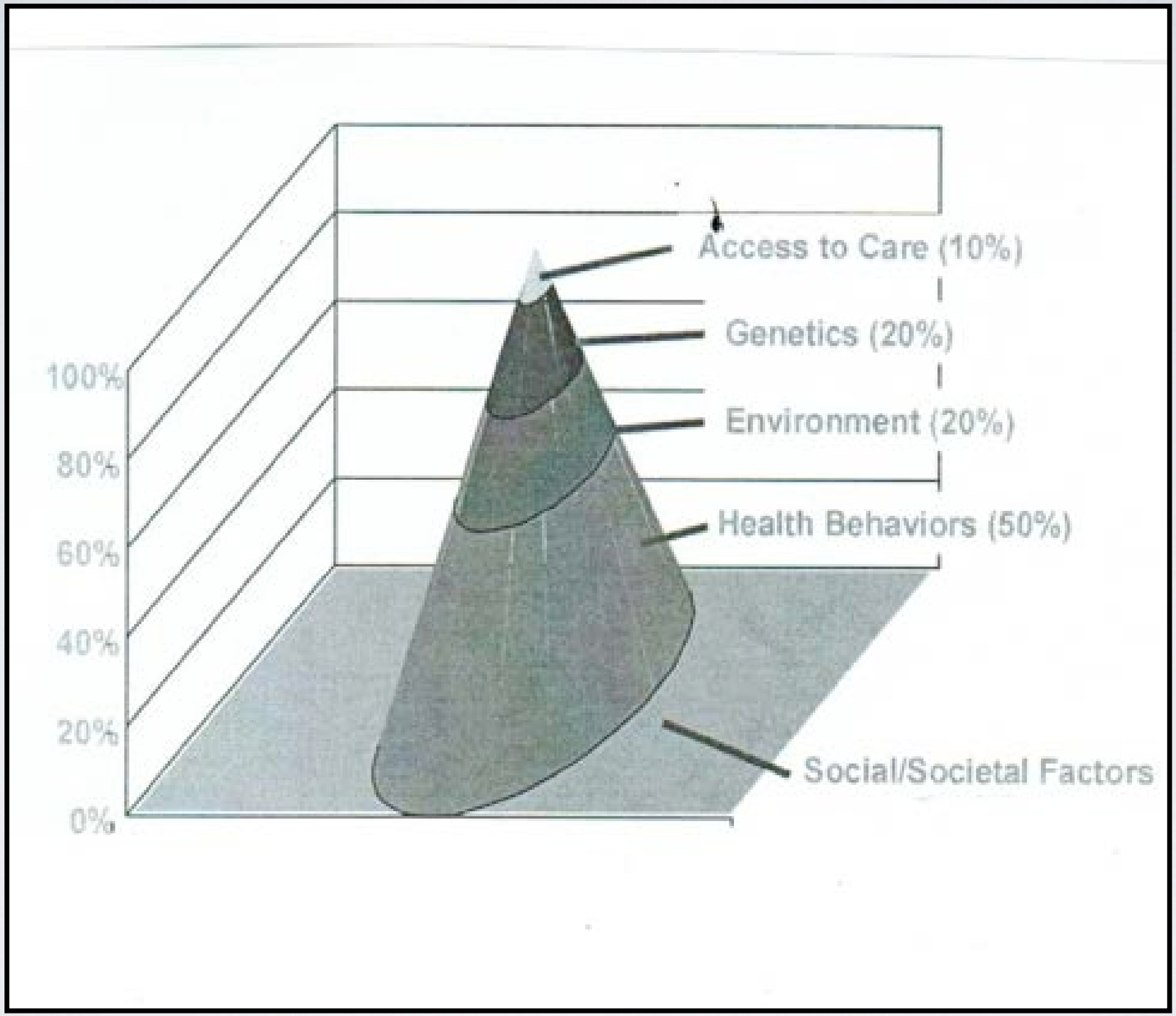


A schematic representation of the major factors that influence personal health. The percentages of health attributed to each factor are based on estimates of McGinnis e al and others. Health behaviors are the largest contributor, while the medical care system contributes relatively little to overall health.
(*A Closer Look at the Social Determinants of Child Health*, The Urban Child Institute, 2006)

Early Childhood Caries

“the presence of one or more decayed noncavitated or cavitated, missing due to caries, or filled tooth surfaces in any primary tooth” in children under 6 years of age

Epidemiology of caries

<u>Severity of Disease</u>

•Single most common disease of early childhood

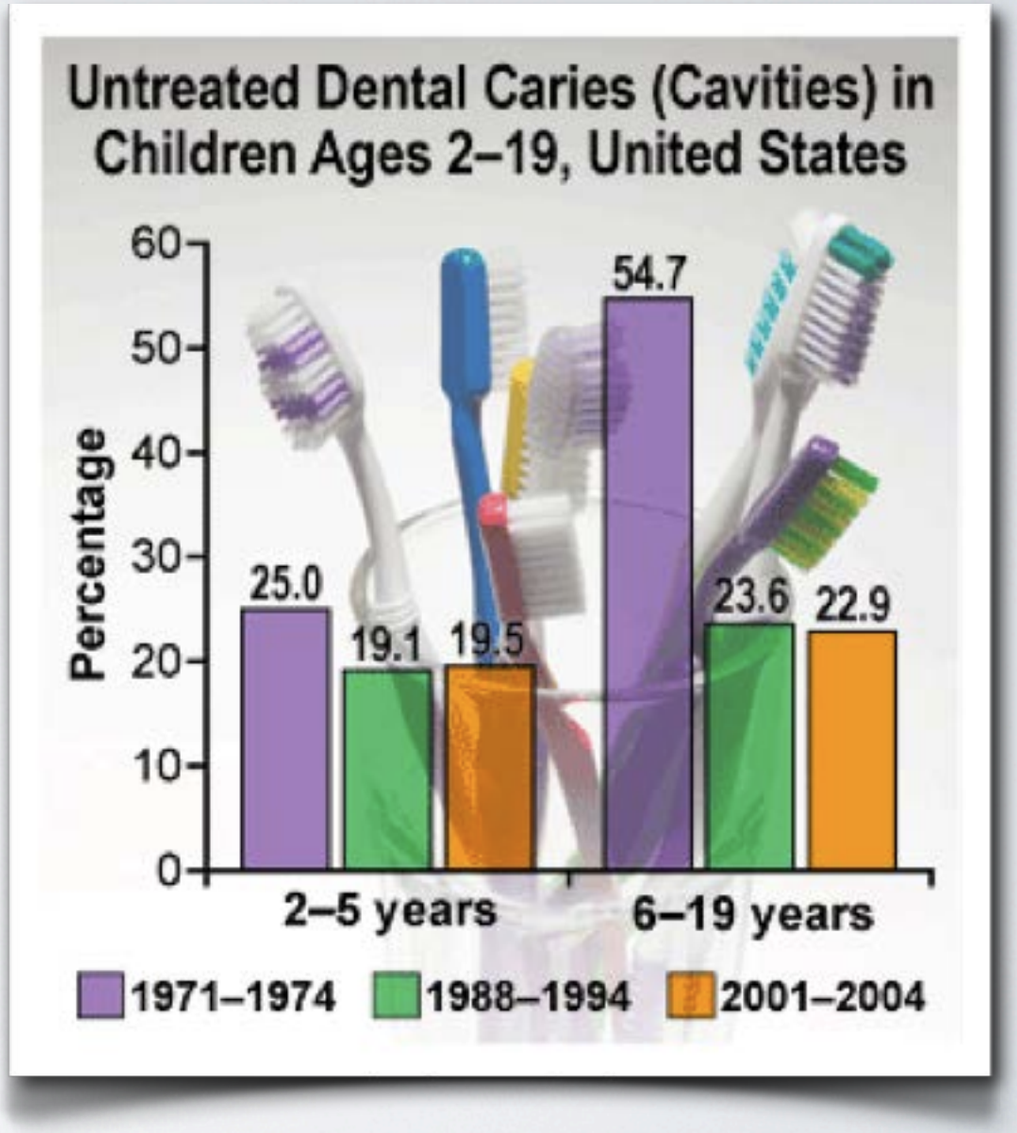
•5X more common than asthma

•NHANES III (CDC, 2007) - 2-5 year-old U.S. children

- 27.9% have experienced cavities ***= 4.5 million***
- of these, 73.4% have unrepaired cavities ***= 3 million***

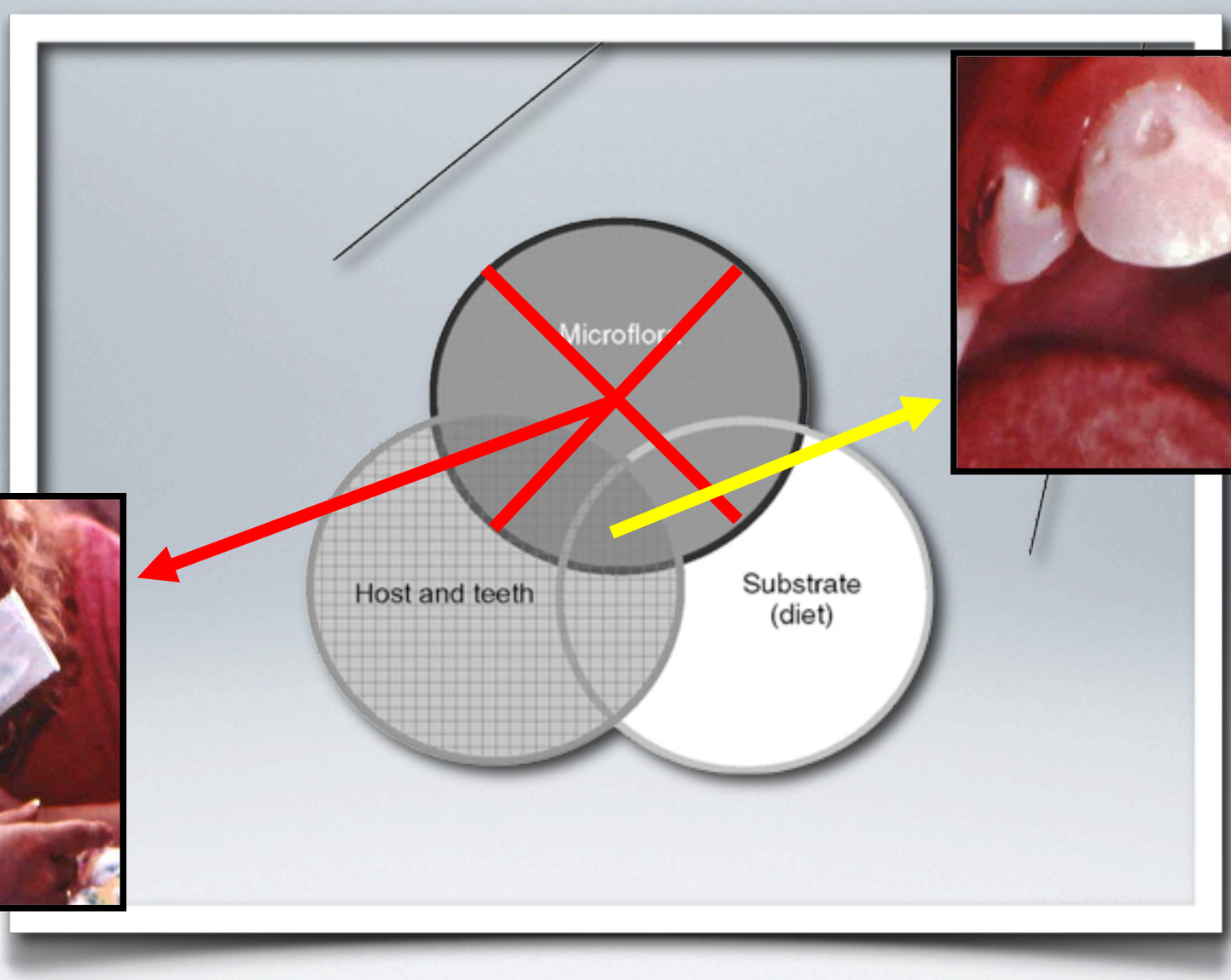
<u>Consequences to the Child</u>

- delayed physical growth and development
- loss of school days and decreased activity
- diminished ability to learn
- increased treatment costs and time
- increased hospitalizations and ER visits

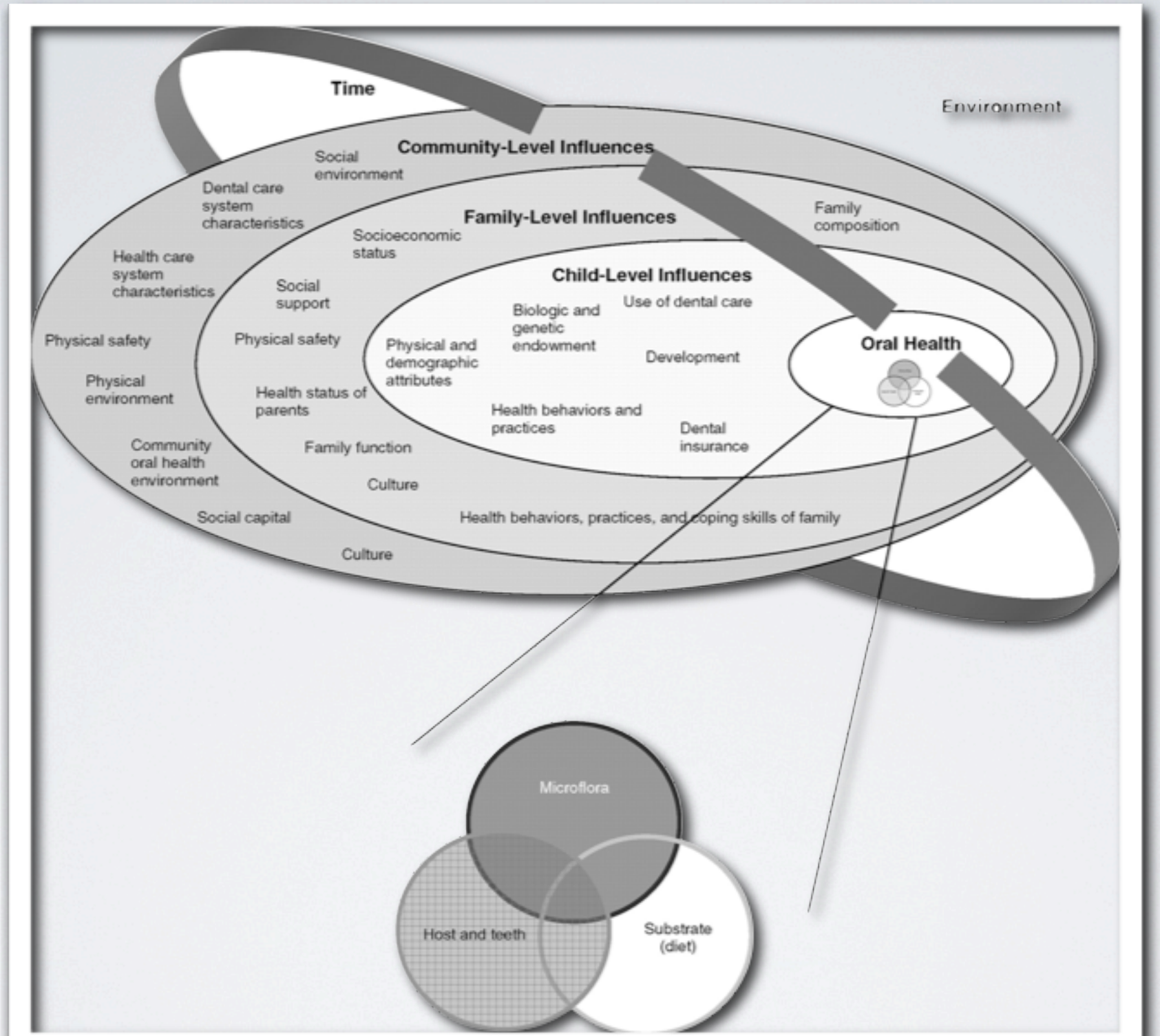


National Center for Health Statistics. Health, United States, 2009,

Caries as a disease



Child, family, and community influences on oral health outcomes of children.



Fisher-Owens S A et al. Pediatrics 2007;120:e510-e520

PIEDMONT

REGIONAL DENTAL CLINIC

http://www.vaprdc.org/Flowplayer/NBC29_201108/

Caries-Risk Assessment

- “Determination of the likelihood of the incidence of caries during a certain time period or the likelihood that there will be a change in the size or activity of lesions already present” (AAPD)

- Caries-risk factors:
  - Biological: cariogenic bacteria levels and time of colonization, active caries of the mother
  - Clinical: special healthcare needs, plaque presence, decalcified areas (white spots), enamel defects, previous history of caries
  - Behavioral: sugar consumption and dietary practices, fluoride (professionally applied, at-home use), night time use of the bottle, frequent breastfeeding
  - Socio-economic: income, parental education, insurance, minority status

Caries Risk Factors in the Dental Literature

<u>*Strep mutans* Levels</u>

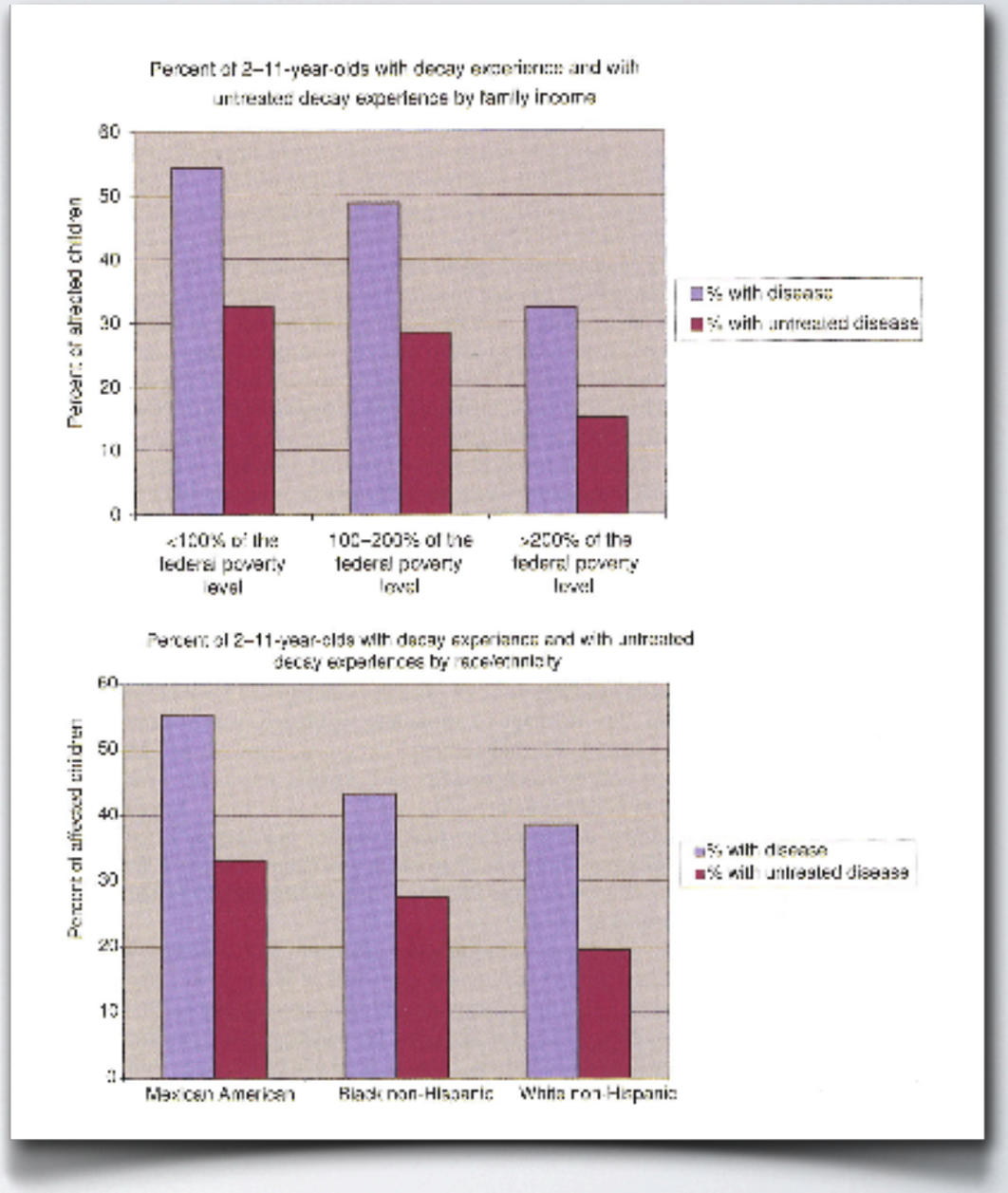
- In children with ECC, *Strep mutans* exceeded 30% of cultivable plaque flora (compared to 0.1% in children with no caries activity)
- *Strep mutans* at a young age = greater risk for early caries initiation
- 71% of mother-infant pairs exhibited exact genotype matches

<u>Sugar Consumption</u>

- Caries incidence: soft drink > juice > milk/water

<u>Bottle-feeding Practices</u>

- 1.5 times more likely to develop ECC when sleeping with the bottle at night



Evidence-based Prevention Modalities

Fluoride

- Supplements: 20-30% reduction in caries
- Dentifrices: 25% DMFS prevented fraction (adult dentition
- Mouthrinses: 26% DMFS prevented fraction (adult dentitic
- Gels: 20% DMFS prevented fractions (not clinically signifi
- Varnishes: 38% reduction in caries (adult dentition)

Evidence-based Prevention Modalities

<u>Sealants</u>

- 74% of 6-year molars remained caries-free (Simonson, et. al.)
- 71% reduction in caries (Lodra JC, et. al.)
- 71% reduction in caries progression (Griffin SO, et. al.)

<u>Xylitol</u>

- reduction in Strep mutans levels in saliva and plaque
- decrease in caries rates and onset

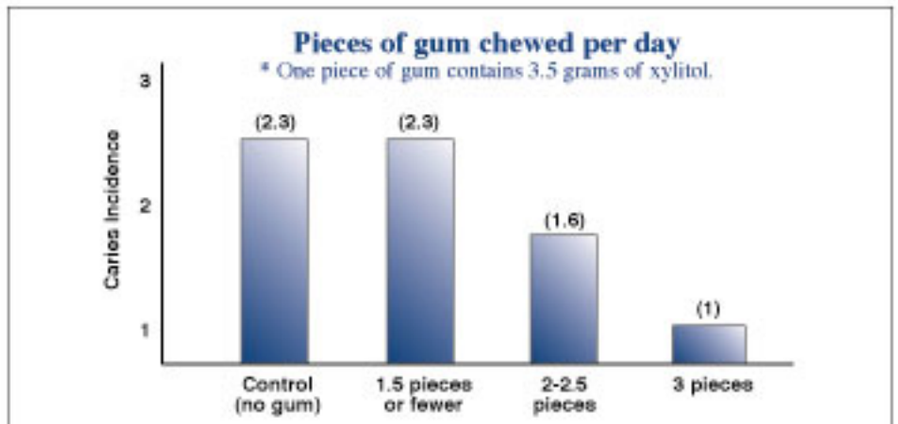


Fig. 2. A two-year study measuring the development of new cavities in children chewing xylitol-sweetened gum (One piece of gum contains 3.5 grams of xylitol), and a control group not chewing gum. (Isokangas P, Alanen P, Tiekso J, Makinen KK. Xylitol chewing gum in cavity prevention. A field study in children at caries-active ages. *J Am Dent Assoc* 1988.)

The Dental Home

- Age 1 dental visit and early risk assessment
- Anticipatory guidance and motivational interviewing
- Ongoing relationship and close followup
- Multi-team approach and communication
- Individualized care and risk-based disease management

Caries-risk Assessment Tool (CAT)

Caries-risk Assessment Form for 0-5 Year Olds
(For Dental Providers)

Factors	High Risk	Moderate Risk	Protective
Biological			
Mother/primary caregiver has active caries	Yes		
Parent/caregiver has low socioeconomic status	Yes		
Child has >3 between meal sugar-containing snacks or beverages per day	Yes		
Child is put to bed with a bottle containing natural or added sugar	Yes		
Child has special health care needs		Yes	
Child is a recent immigrant		Yes	
Protective			
Child receives optimally-fluoridated drinking water or fluoride supplements			Yes
Child has teeth brushed daily with fluoridated toothpaste			Yes
Child receives topical fluoride from health professional			Yes
Child has dental home/regular dental care			Yes
Clinical Findings			
Child has >1 decayed/missing/filled surfaces	Yes		
Child has active white spot lesions or enamel defects	Yes		
Child has elevated mutans streptococci levels	Yes		
Child has plaque on teeth		Yes	

Circling those conditions that apply to a specific patient helps the practitioner and parent understand the factors that contribute to or protect from caries. Risk assessment categorization of low, moderate, or high is based on preponderance of factors for the individual. However, clinical judgment may justify the use of one factor (eg, frequent exposure to sugar-containing snacks or beverages, more than one dmfs) in determining overall risk.

Overall assessment of the child's dental caries risk: High ☐ Moderate ☐ Low ☐

AAPD, Reference Manual 2011

- preventive: likelihood of the incidence of caries
- snapshot: caries risk at a point in time
- dynamic: changes in the risk status
- functional: used by dental and non-dental personnel

caries-risk assessment

“The ultimate value of any ~~classification system~~... will be determined by it’s ability to provide the user with information that will assist in understanding or solving ~~clinical problems~~.”

caries as a disease

-DP Jacques, quoted in Casamassimo PS et. al., JADA 2009;140;650-657.

Caries Management Protocol for 3-5 year olds

Risk Category	Diagnostics	Interventions			Restorative
		Fluoride	Diet	Sealants[λ]	
Low risk	– Recall every 6-12 months – Radiographs every 12-24 months – Baseline MS[α]	– Twice daily brushing with fluoridated toothpaste[γ]	No	Yes	– Surveillance[ζ]
Moderate risk parent engaged	– Recall every 6 months – Radiographs every 6-12 months – Baseline MS[α]	– Twice daily brushing with fluoridated toothpaste[γ] – Fluoride supplements[δ] – Professional topical treatment every 6 months	Counseling	Yes	– Active surveillance[ε] of incipient lesions – Restoration of cavitated or enlarging lesions
Moderate risk parent not engaged	– Recall every 6 months – Radiographs every 6-12 months – Baseline MS[α]	– Twice daily brushing with fluoridated toothpaste[γ] – Professional topical treatment every 6 months	Counseling, with limited expectations	Yes	– Active surveillance[ε] of incipient lesions – Restoration of cavitated or enlarging lesions
High risk parent engaged	– Recall every 3 months – Radiographs every 6 months – Baseline and follow up MS[α]	– Brushing with 0.5% fluoride (with caution) – Fluoride supplements[δ] – Professional topical treatment every 3 months	Counseling	Yes	– Active surveillance[ε] of incipient lesions – Restoration of cavitated or enlarging lesions
High risk parent not engaged	– Recall every 3 months – Radiographs every 6 months – Baseline and follow up MS[α]	– Brushing with 0.5% fluoride (with caution) – Professional topical treatment every 3 months	Counseling, with limited expectations	Yes	– Restore incipient, cavitated, or enlarging lesions

AAPD, Reference Manual 2011

Recommendations

- **Policy**--address “common risk factors” and risk-based approaches that are relevant to both oral and general health
- **Research**--further elucidate the complex interaction of biological and social determinants as related to dental caries
- **Non-dental sector**--explore caries-risk assessments and prevention models within various multi-sector approaches
- **Education**--educate students on the importance of caries prevention, in addition to disease treatment
- **Third-party organizations**--consider reimbursements of more frequent prevention modalities based on “high risk” caries groups
- **Clinical management**--implement caries risk assessment protocols within practice settings

“Children get used to feeling constant pain. They go to sleep with it. They go to school with it...Children live for months with pain that grown ups would find unendurable. The gradual attrition of accepted pain erodes their energy and aspiration.”

-Jonathan Kozol, educational sociologist,
in his landmark study of children in poverty