Improving Pediatric Oral Health

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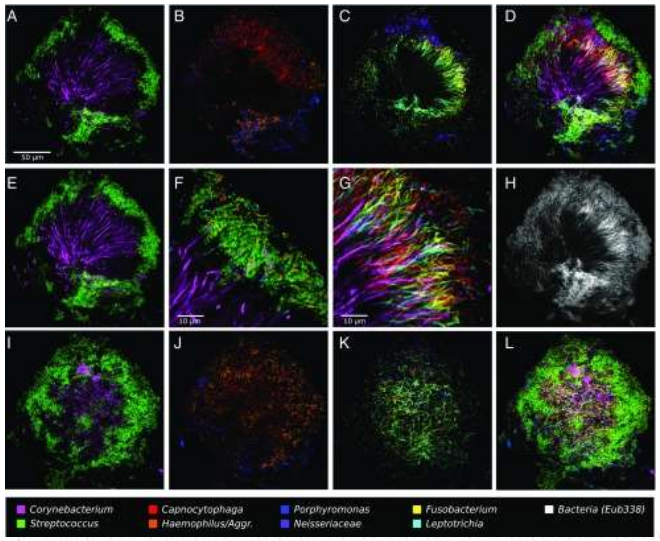
Outline

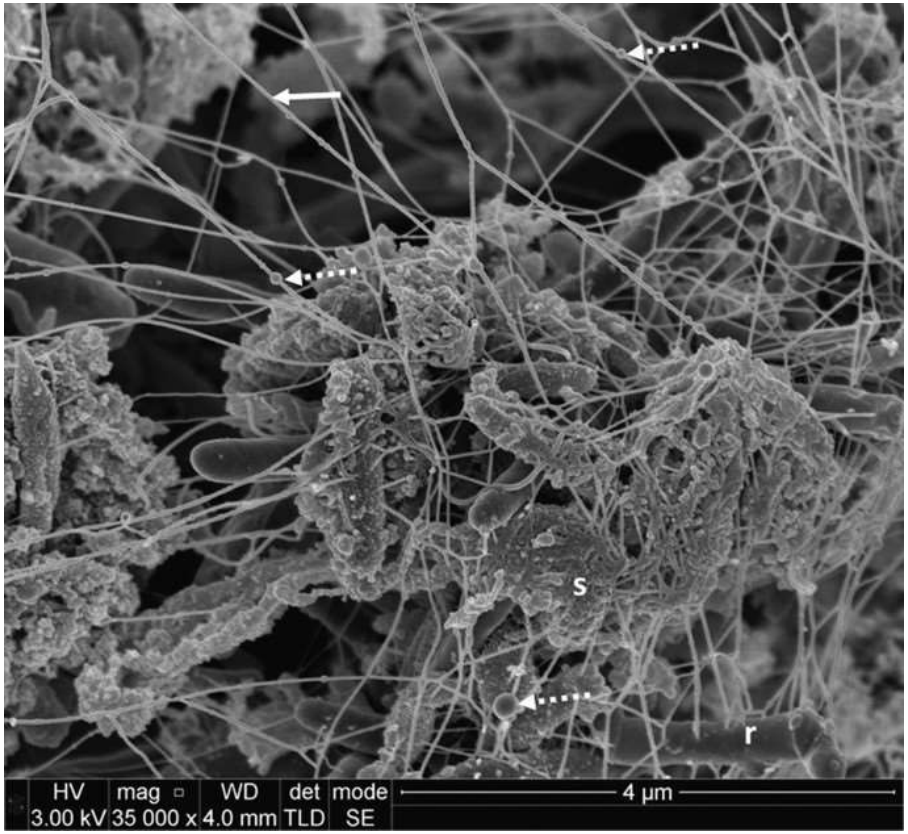
- Describe tooth decay as a preventable chronic disease.
- Describe the role of fluoride in preventing tooth decay.
- Review dietary practices that promote good oral health.
- Discuss rationale for early dental visits.

*Disclaimer: this presentation has pictures of decayed teeth.

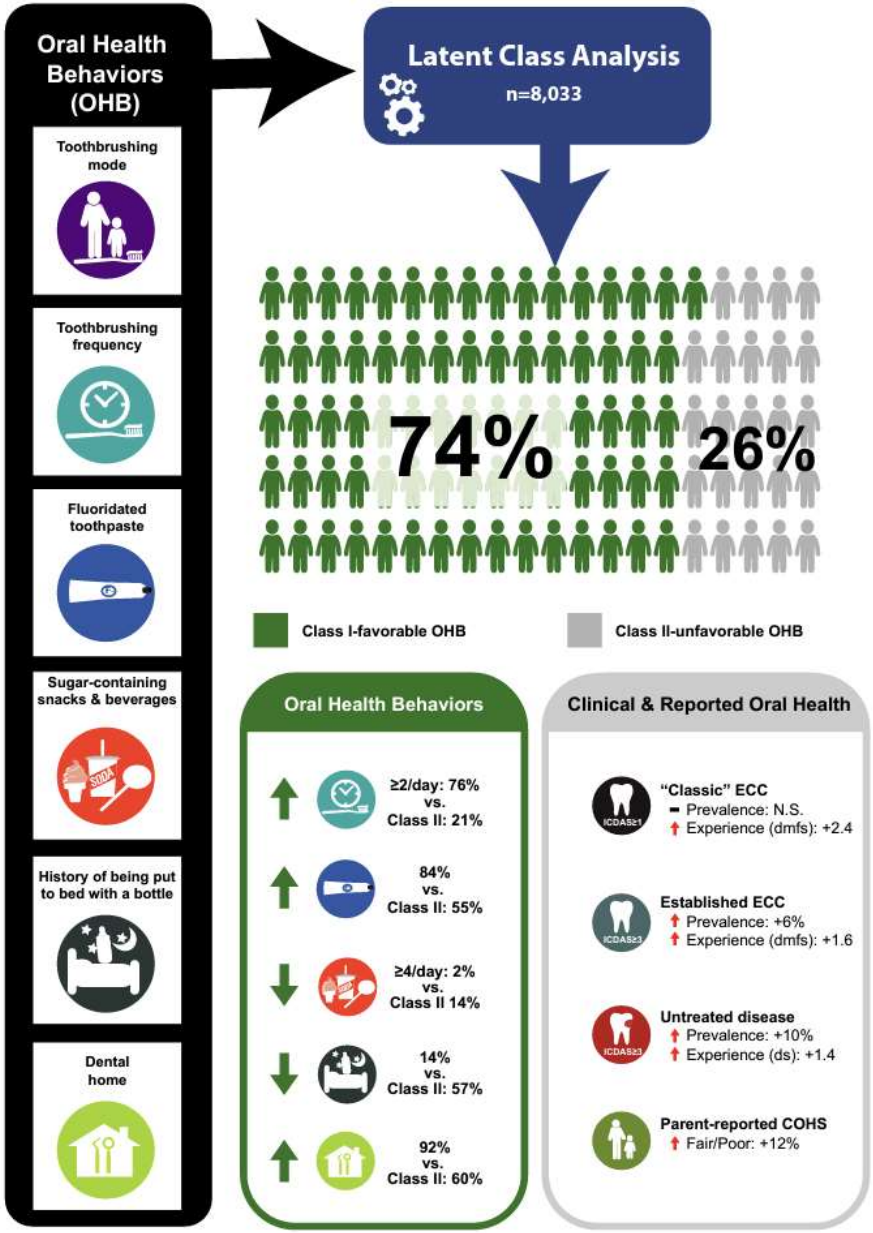
Dental caries

- What is it?
  - Plaque-biofilm induced, behavior mediated disease





Holliday *et al. BDJ Open*. 2015. (above)
Welch et al. *PNAS*. 2016. (left)



Oral health behaviors associated with dental caries in children

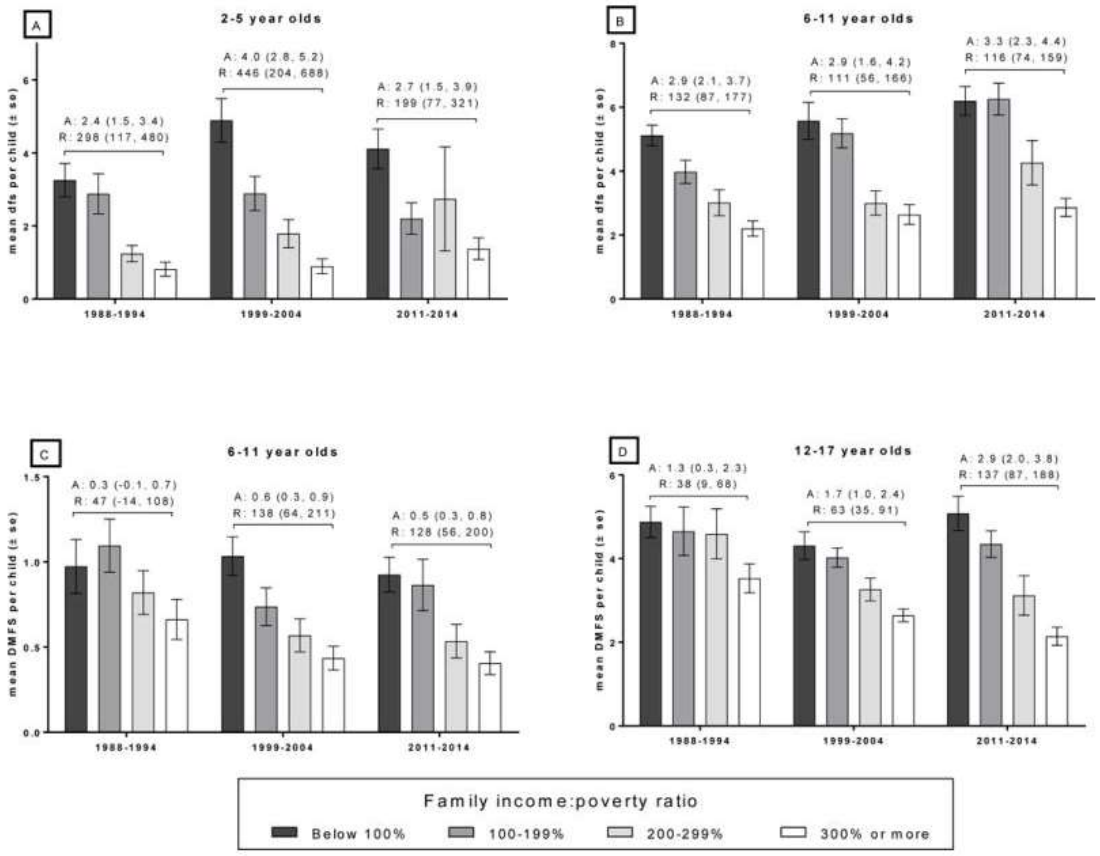
- Simancas-Pallares et al. *Community Dent Oral Epidemiol*. 2022;50(3):147-155.

Dental caries—time trends

We stink at preventing this disease at scale.

No real change in prevalence over time. Income disparities persist.

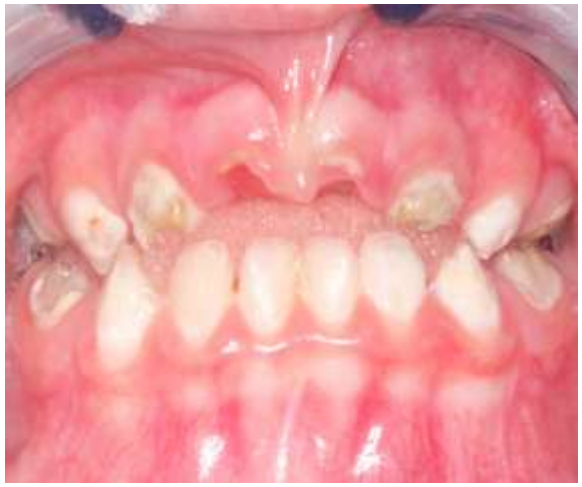
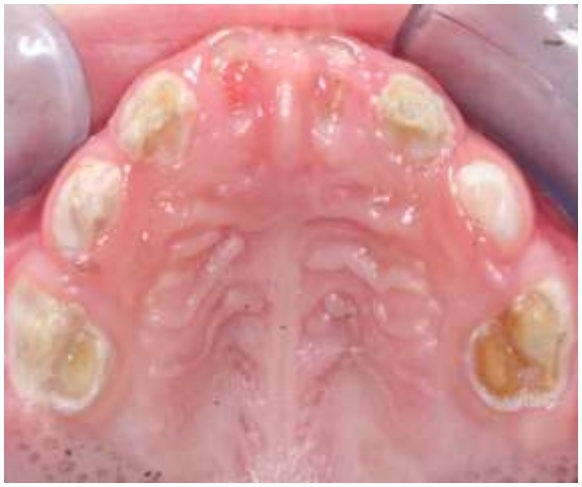
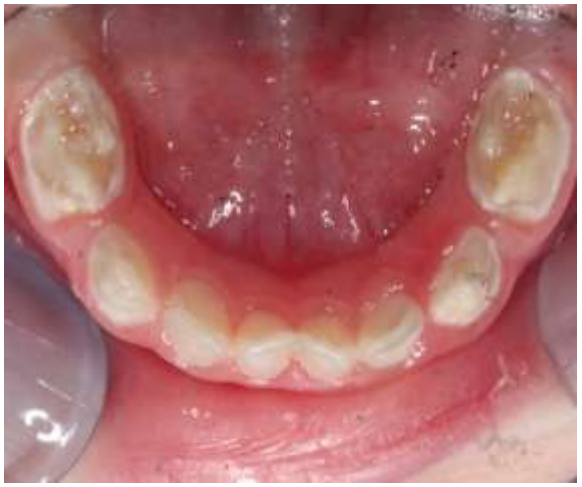
Only better at treating it (untreated decay is decreasing)



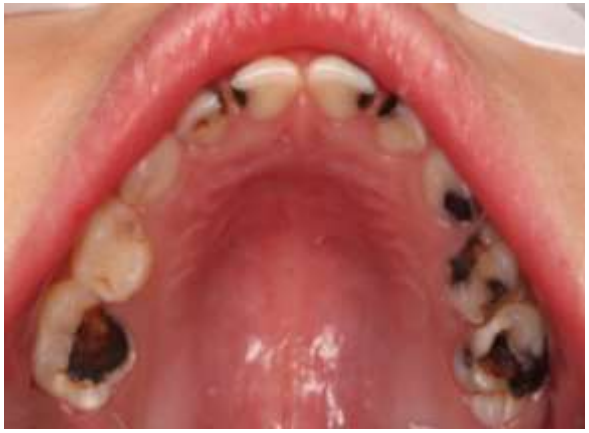
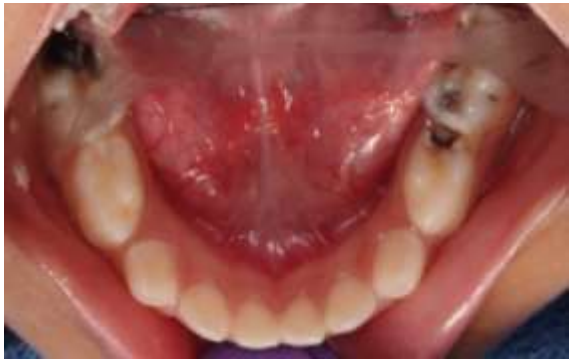
Slade and Sanders. 2018. JPHD.

The hidden ‘costs’ of tooth decay

Casamassimo et al. JADA. 2009.

20-month-old female; healthy, 2-hour travel

4-year-old male; healthy, language barrier

How do we prevent it?

Prevention Strategies

Specific treatments (Classical)

- Fluorides*
- Sealants
- Diet modification

Population Health

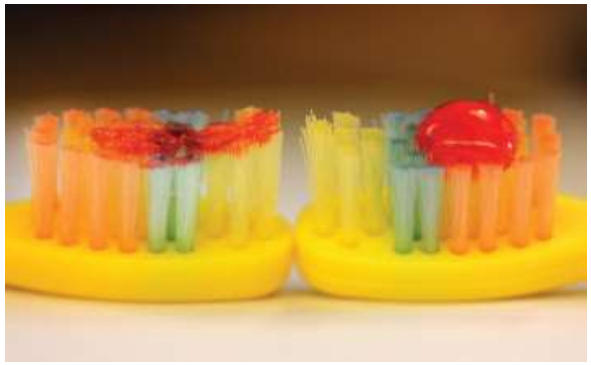
- Dental Home*
- School-based programs
- Oral health policies

1. Fluorides

At what age should you start using fluoride toothpaste?

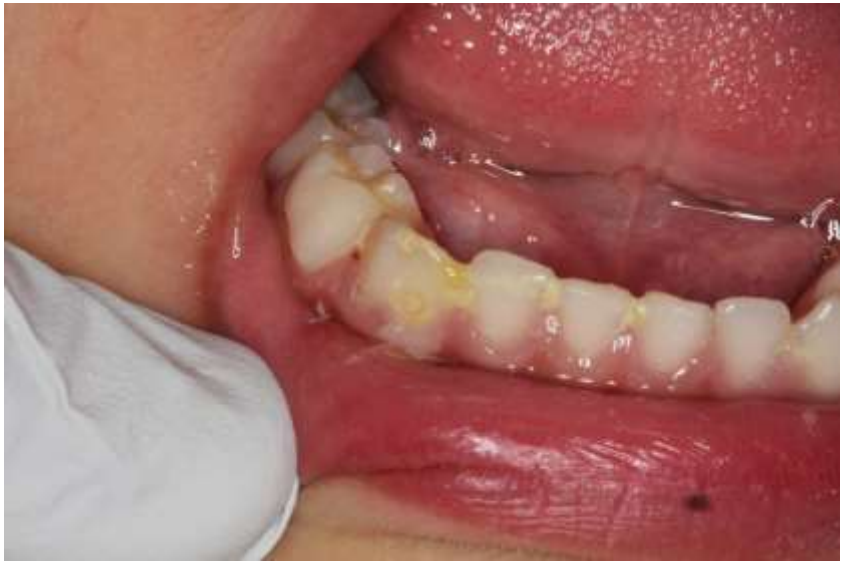
Fluoride Toothpaste

- The toothbrush is the vehicle for fluoride toothpaste to get to the teeth
  - *Brushing alone is ineffective* in preventing caries
  - **Fluoride** toothpaste is **key**: 30-50% reduction in caries incidence
- ADA recommends using fluoride toothpaste for all children with teeth
  - For those younger than 3-years-old, a smear or grain of rice (0.1mg fluoride)
  - For children older than 3, a pea-sized amount (0.25mg fluoride)



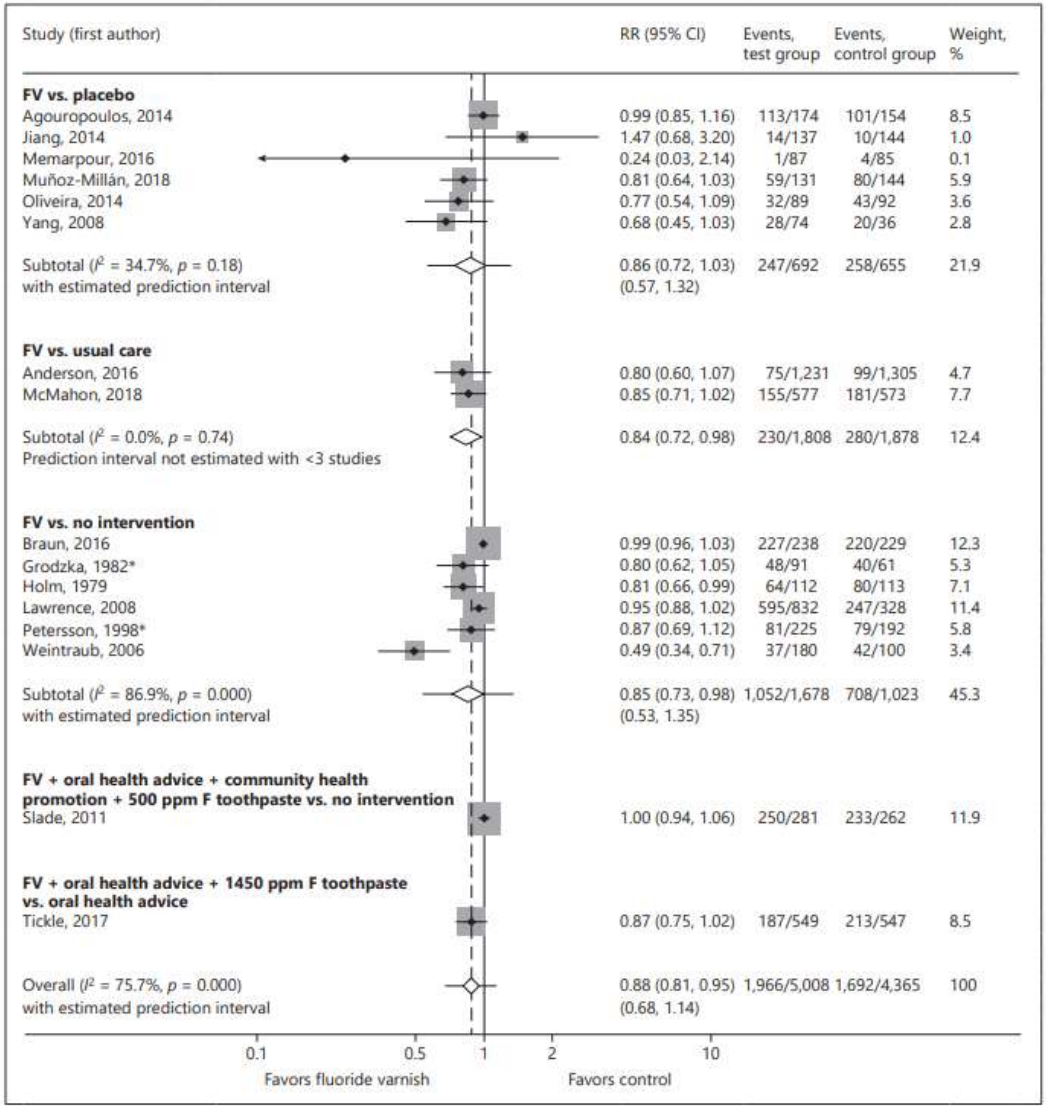
Fluoride Varnish

- US Preventive Services Task Force
  - Grade “B” recommendation
- Primary ingredient: 5% NaF
  - 22.6mg/mL or 22600ppm Fluoride
  - Typical dose = 0.5mL = 11.3mg



Weintraub et al. J Dent Res. 2006

Fluoride Varnish Data

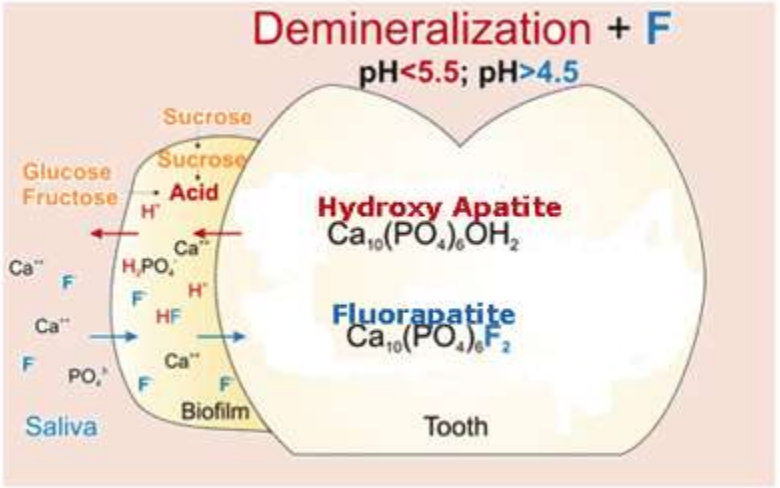


de Sousa et al. Caries Res. 2019;53(5):502-513.

Fig. 3. Meta-analysis of the global RR and according to the comparisons in each subgroup. Weights are from random-effects analysis. * Effective sample size. CI, confidence interval; FV, fluoride varnish; RR, relative risk.

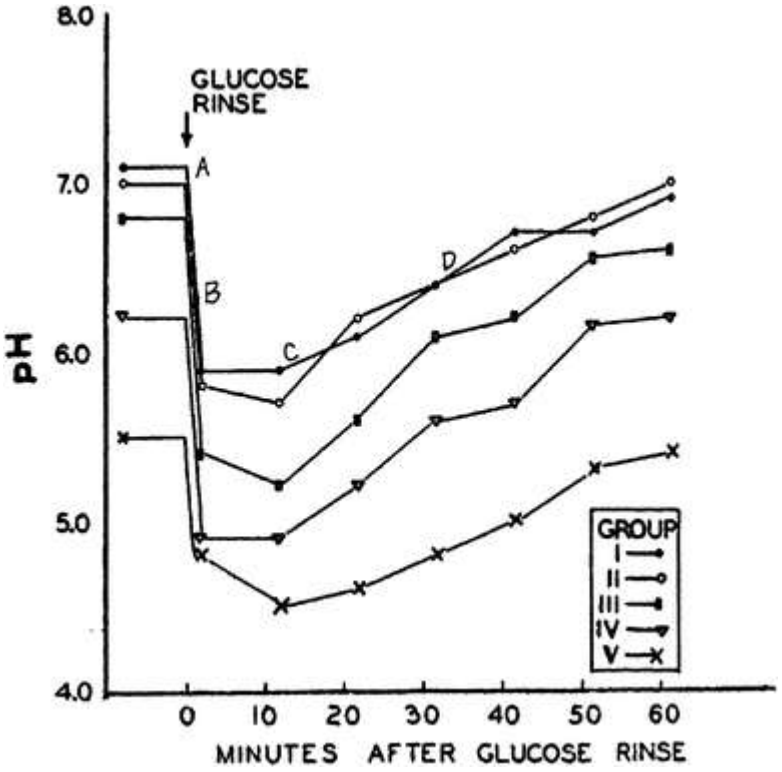
Role of fluoride in preventing dental disease

- At a biochemical level, replaces the hydroxyl group in enamel crystals
  - Lowers the pH at which demineralization occurs
  - Enhances the process of remineralization
  - May inhibit glycolytic pathway in bacterial metabolism



US Public Health Service 1979
Slade et al. J Dent Res. 2018

Visualizing the pH effects of fluoride



Bowman. *Odontology*. 2013;101:2–8

Group I: Fluoride exposure
Group V: No fluoride exposure

Any time we eat/drink, our salivary pH dips, making enamel more prone to breakdown. Fluoride lessens that pH dip.

It takes about an hour for salivary pH to recover.

This is why A) fluoride is beneficial, and B) we should avoid a 'grazing' dietary habit.

Dietary Counseling

- Dietary counseling to promote oral health
  - Limit juice and milk intake
    - Total amounts
    - Frequency: mealtime only
  - Tap water generally preferred (check community fluoridation status)

Suggested Daily Water & Milk Intake for Infants & Young Children

	6-12 months	12-24 months	2-5 years
Water	4-8 oz/day 0.5-1 cup/day	8-32 oz/day 1-4 cups/day	8-40oz/day 1-5 cups/day
Milk*	None	16-24 oz/day 2-3 cups/day	16-20oz/day 2-2.5 cups/day

*Children ages 12-24 months are advised to drink whole milk and children 2 and older nonfat (skim) or low-fat (1%) milk.

AAP recommends 2-3 snacks per day for infants and toddlers

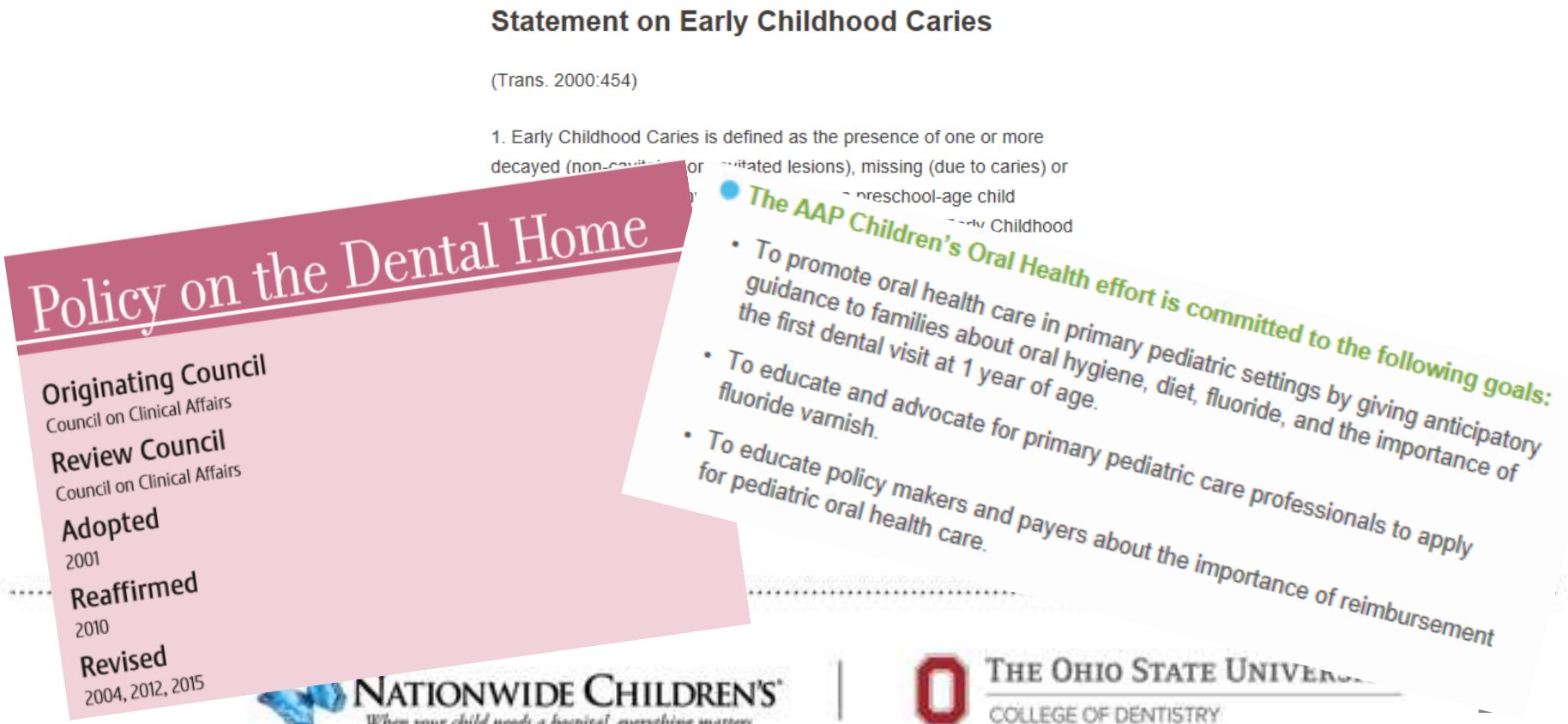
Breakfast
AM snack
Lunch
PM snack
Dinner

2. Dental Home

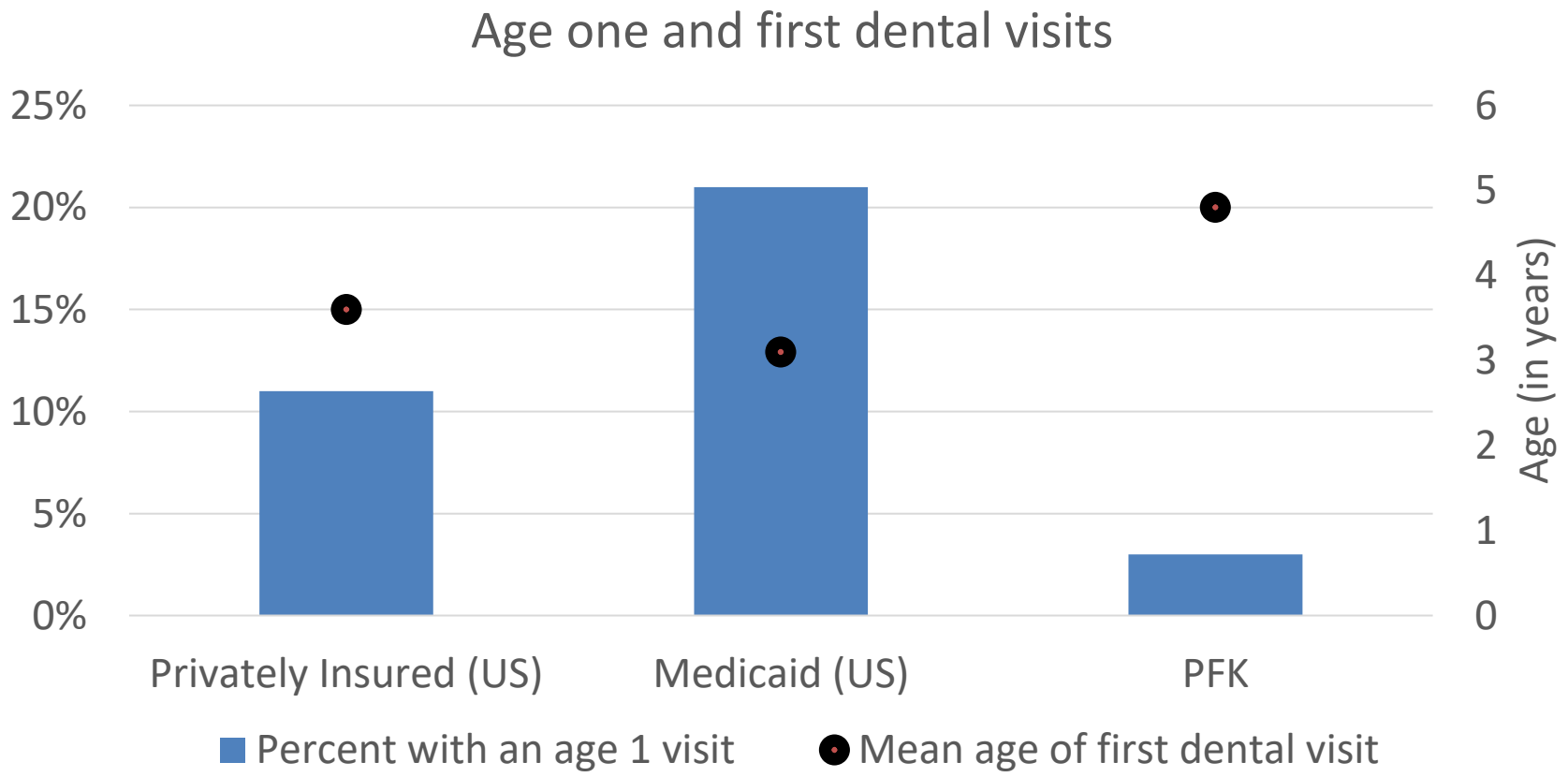
At what age should you take your child for their first visit to the dentist?

Routine and Early Preventive Care

- Recommended first visit: first tooth eruption or Age 1

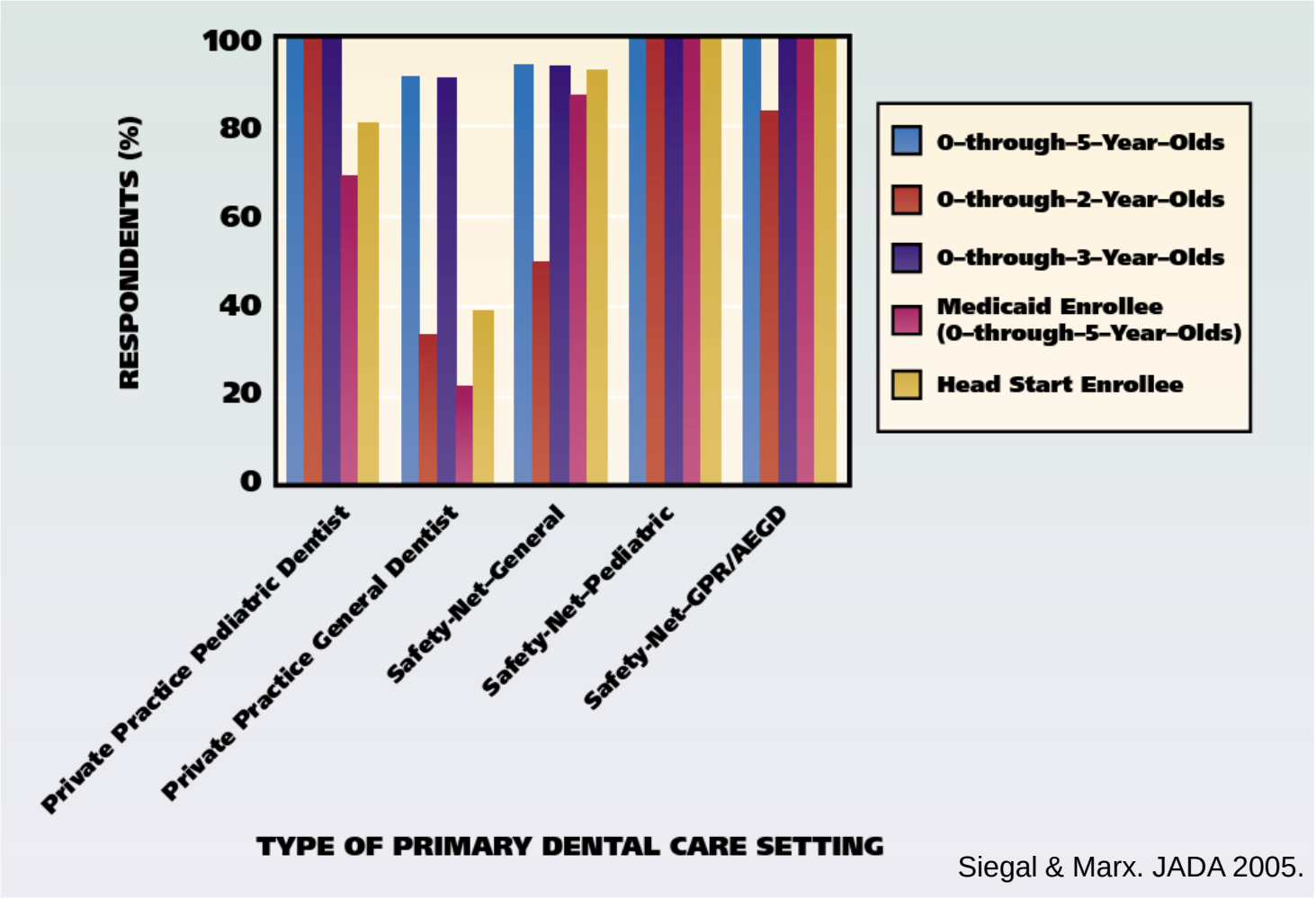


How do we compare across PFK?



Supply-related barriers

Ohio data



Siegal & Marx. JADA 2005.

Figure 1. Ohio primary dental care providers' treatment of young children during preceding 12 months. Reprinted with permission of the American Public Health Association from Siegal and colleagues.[8] GPR/AEGD: General Practice Residency/Advanced Education in General Dentistry.

Dated study, but results still hold

TABLE 3

FACTORS LIMITING OHIO DENTAL CARE PROVIDERS' TREATMENT OF YOUNG CHILDREN, BY TYPE OF PROVIDER.

FACTOR	% PEDIATRIC DENTIST (n = 38-52*)	% GENERAL DENTIST (n = 309-337*)	% SAFETY-NET CLINIC–GENERAL (n = 45-52*)	% SAFETY-NET CLINIC–PEDIATRIC (n = 11)	% SAFETY-NET CLINIC–GPR/AEGD† (n = 6)
Office Not Well-equipped for 0-through-2-Year-Olds	4	85	87	0	17
Office Not Well-equipped for 3-through-5-Year-Olds	2	34	50	0	0
Not Necessary to Treat Children Younger Than 3 Years	2	11	13	0	0
Not Appropriate for General Practitioner to Treat 0-through-2-Year-Olds	39	32	—‡	—‡	—‡
Not Appropriate for General Practitioner to Treat 3-through-5-Year-Olds	20	6	—‡	—‡	—‡
Behavioral Problems Are Disruptive	12	66	40	0	83
Do Not Enjoy Treating Young Children	6	34	8	0	0
Do Not Feel Adequately Trained	6	22	14	0	17
Not Financially Rewarding to Treat Young Children	8	26	—‡	—‡	—‡
Practice at Capacity for New Patients	27	26	36	82	67
Practice at Capacity for New Medicaid Patients	58	67	30	25	33

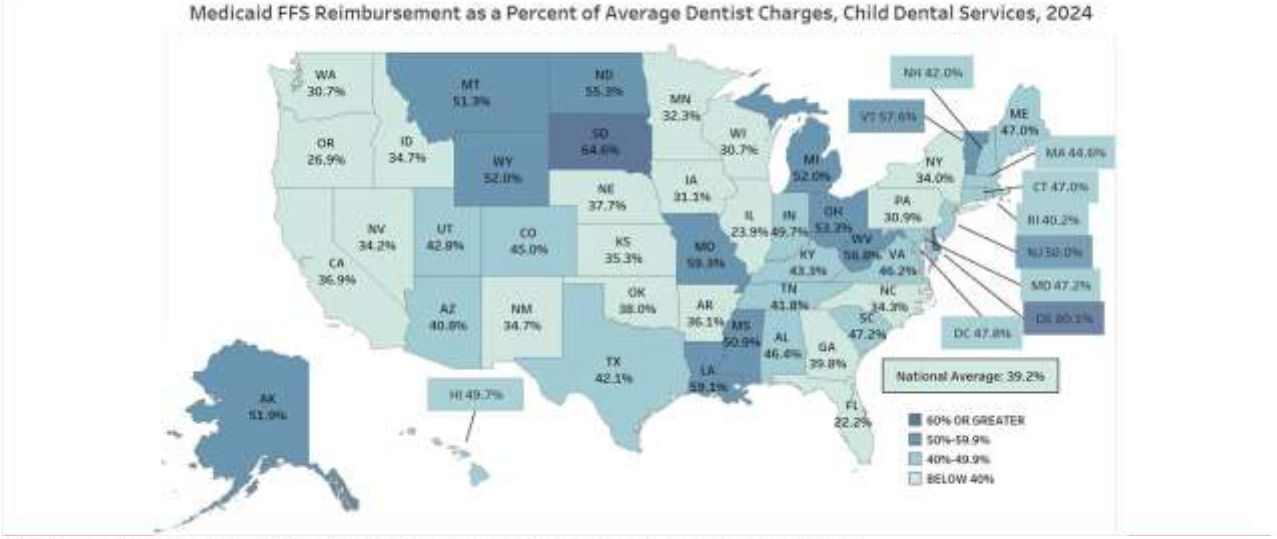
* Different numbers of respondents gave answers to each question.
† GPR/AEGD: General Practice Residency/Advanced Education in General Dentistry.
‡ Was not asked about on the safety-net clinic survey.

- Office design
- Provider attitudes/beliefs
- Child's behavior
- Joy
- Training
- Business case
- Medicaid

Siegal & Marx. JADA 2005.

Dentist Reimbursement

Results



DENTAL CARE UTILIZATION RATE FOR CHILDREN

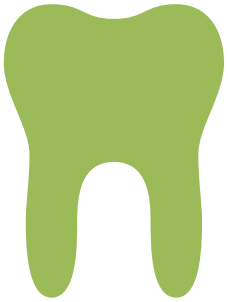
Percentage of children who saw a dentist in the last 12 months.

MEDICAID INSURED CHILDREN		PRIVATE INSURED CHILDREN	
47% United States		**66%** United States	

ALL STATES, 2021

Opportunities

PFK Oral Health Project
Opportunities within Primary Care



Fluoride Varnish

Dental Hygiene Integration*

Wrap-up

Things you can do now

- Limit exposure to refined carbohydrates
- Adjust eating patterns to 5 well-defined periods of time rather than “grazing” throughout the day
- Start using fluoride toothpaste when the child gets his/her first tooth
- Recommend age 1 dental visit

Discussion

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