Department of Public Health
UNIVERSITY of WEST FLORIDA

Escuela de Salud Pública
Universidad San Francisco de Quito

Utilizing the Caries Risk Assessment Model (CAMBRA) in Ecuador

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Disclosure Statement

Department of Public Health
UNIVERSITY of WEST FLORIDA

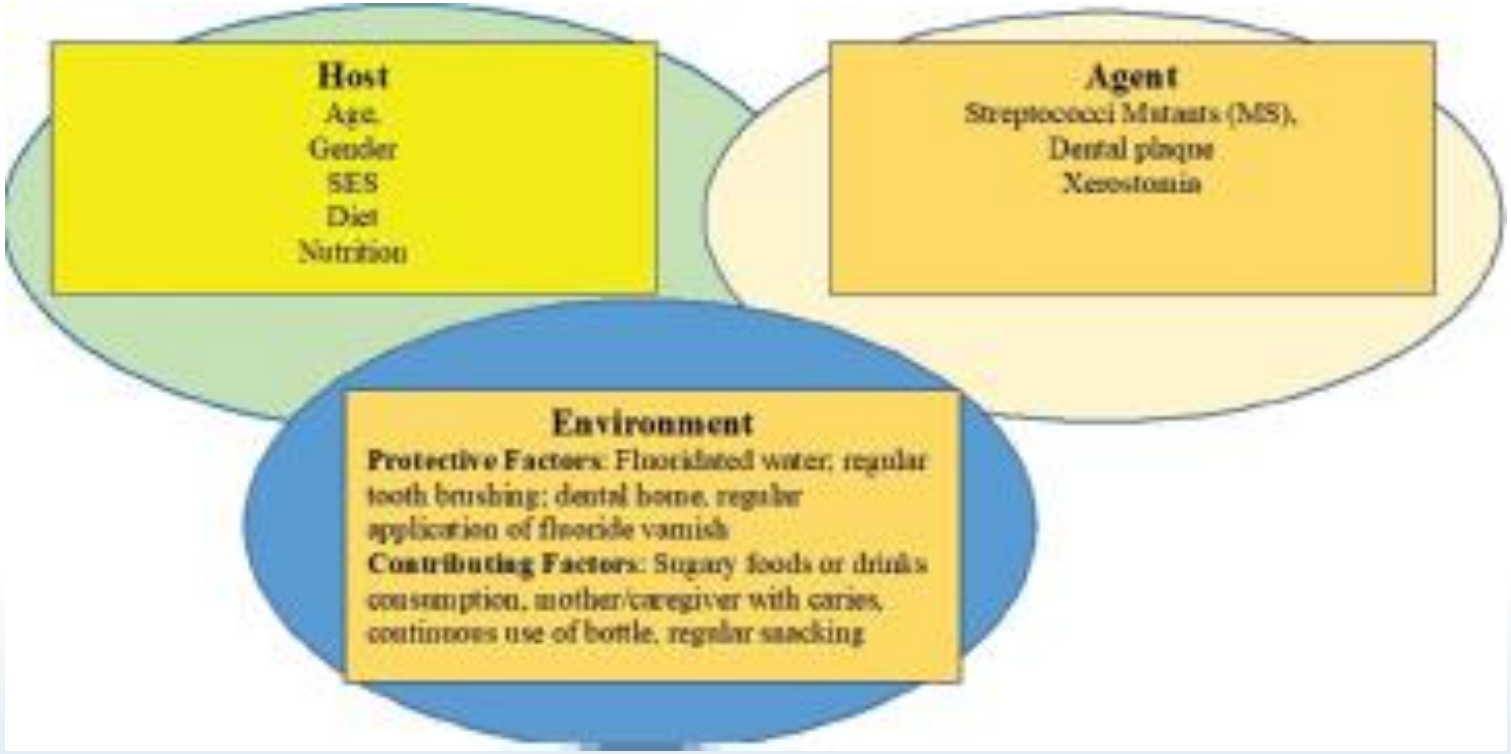
- This study was supported by an internal grant from UWF. Toothbrushes and toothpastes were donated by Colgate and distributed among the participants.

Where “the heck” is Ecuador?

Sure … it is south of

Introduction

- Dental caries is a multifactorial disease and it adheres to the epidemiological triad.
- It is crucial to understand the impact of structural determinants of health on oral health behaviors to guide our work and enhance our understanding of the role of social determinants on population health and on health inequalities

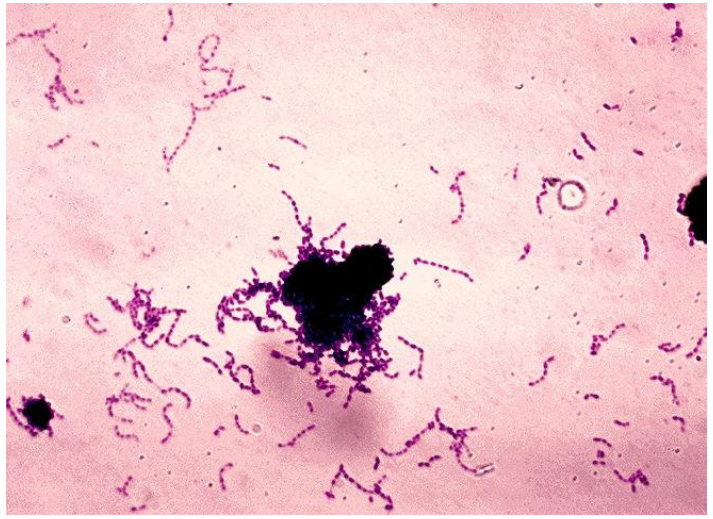


Host

Signed consent was obtained from the participant to share this picture.

- The host is the person and the biological factors intrinsic to that individual.
- Examples of host factors are age, race and ethnicity, diet, nutrition, and socioeconomic status.
- Studies have shown that the prevalence of dental caries increases with age. Males, Black and Hispanic adults, individuals with lower incomes and less education have more untreated decay compared to their counterparts.
- Although the prevalence of dental caries among children appears to be decreasing, particularly in high-income countries, a high proportion of children (60–90 %) in low-and-middle income countries are affected by dental disease which is mostly untreated due to inappropriate, unaffordable, or unavailable oral health care services.

Agent



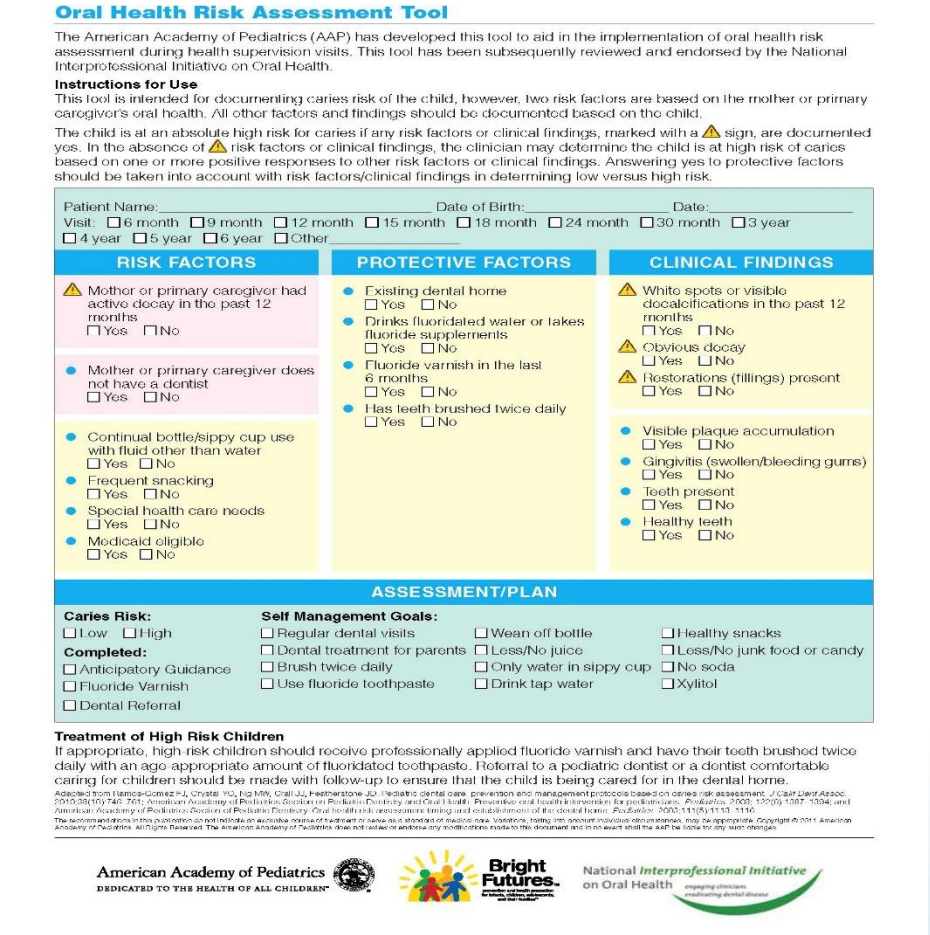
- The agent is a factor that must be present in order for the disease to appear. Mutans streptocci (MS) has been identified as the most common bacteria related to the pathogenesis of dental caries.
- Vertical transmission of MS from the mother to the child, along with the mother's oral hygiene, periodontal disease, and socioeconomic status have been well-documented in the literature as risk factors for dental caries. Horizontal transmission from a sibling or a caregiver to the child has also been documented.
- The frequent ingestion of fermentable carbohydrates is linked to dental caries because it can be acted upon by MS and lactobacilli to create plaque and acid.

Environment

- The environment is composed of all the external factors that cause or allow the transmission of the disease; the environment can also be composed of protective factors that prevent the development of disease.
- Contributing factors: sugary food or drink consumption, mother/caregiver with caries, continuous use of bottle, and regular snacking.
- Protective factors: optimally fluoridated water; regular tooth brushing; dental home, sealants, and regular application of fluoride varnish.

Caries Management by Risk Assessment

- Because dental caries is a multifactorial disease conducting a caries risk assessment to determine the patient's relative risk for dental caries has been recommended



Oral Health Risk Assessment Tool

The American Academy of Pediatrics (AAP) has developed this tool to aid in the implementation of oral health risk assessment during health supervision visits. This tool has been subsequently reviewed and endorsed by the National Interprofessional Initiative on Oral Health.

Instructions for Use

This tool is intended for documenting caries risk of the child, however, two risk factors are based on the mother or primary caregiver's oral health. All other factors and findings should be documented based on the child.

The child is at an absolute high risk for caries if any risk factors or clinical findings, marked with a ⚠ sign, are documented yes. In the absence of ⚠ risk factors or clinical findings, the clinician may determine the child is at high risk of caries based on one or more positive responses to other risk factors or clinical findings. Answering yes to protective factors should be taken into account with risk factors/clinical findings in determining low versus high risk.

Patient Name:_____ Date of Birth:_____ Date:_____

Visit: ☐6 month ☐9 month ☐12 month ☐15 month ☐18 month ☐24 month ☐30 month ☐3 year ☐4 year ☐5 year ☐6 year ☐Other_____

RISK FACTORS	PROTECTIVE FACTORS	CLINICAL FINDINGS
⚠ Mother or primary caregiver had active decay in the past 12 months ☐Yes ☐No	• Existing dental home ☐Yes ☐No	⚠ White spots or visible decalcifications in the past 12 months ☐Yes ☐No
• Mother or primary caregiver does not have a dentist ☐Yes ☐No	• Drinks fluoridated water or takes fluoride supplements ☐Yes ☐No	⚠ Obvious decay ☐Yes ☐No
• Continual bottle/sippy cup use with fluid other than water ☐Yes ☐No	• Fluoride varnish in the last 6 months ☐Yes ☐No	⚠ Restorations (fillings) present ☐Yes ☐No
• Frequent snacking ☐Yes ☐No	• Has teeth brushed twice daily ☐Yes ☐No	• Visible plaque accumulation ☐Yes ☐No
• Special health care needs ☐Yes ☐No		• Gingivitis (swollen/bleeding gums) ☐Yes ☐No
• Medicaid eligible ☐Yes ☐No		• Teeth present ☐Yes ☐No
		• Healthy teeth ☐Yes ☐No

ASSESSMENT/PLAN

Caries Risk: ☐Low ☐High

Completed:
☐Anticipatory Guidance
☐Fluoride Varnish
☐Dental Referral

Self Management Goals:

☐Regular dental visits	☐Wean off bottle	☐Healthy snacks
☐Dental treatment for parents	☐Less/No juice	☐Less/No junk food or candy
☐Brush twice daily	☐Only water in sippy cup	☐No soda
☐Use fluoride toothpaste	☐Drink tap water	☐Xylitol

Treatment of High Risk Children

If appropriate, high-risk children should receive professionally applied fluoride varnish and have their teeth brushed twice daily with an age appropriate amount of fluoridated toothpaste. Referral to a pediatric dentist or a dentist comfortable caring for children should be made with follow-up to ensure that the child is being cared for in the dental home.

Adapted from Llamas-Gomez FJ, Crystal YO, Ng MW, Crall JJ, Featherstone JD. Pediatric dental care: prevention and management protocols based on caries risk assessment. *J Calif Dent Assoc.* 2010;38(10):745-761; American Academy of Pediatrics Section on Pediatric Dentistry and Oral Health. Preventive oral health intervention for pediatricians. *Pediatrics.* 2008; 122(6):1387-1394; and American Academy of Pediatrics Section on Pediatric Dentistry. Oral health risk assessment timing and establishment of the dental home. *Pediatrics.* 2003;111(5):1113-1116.

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Methods

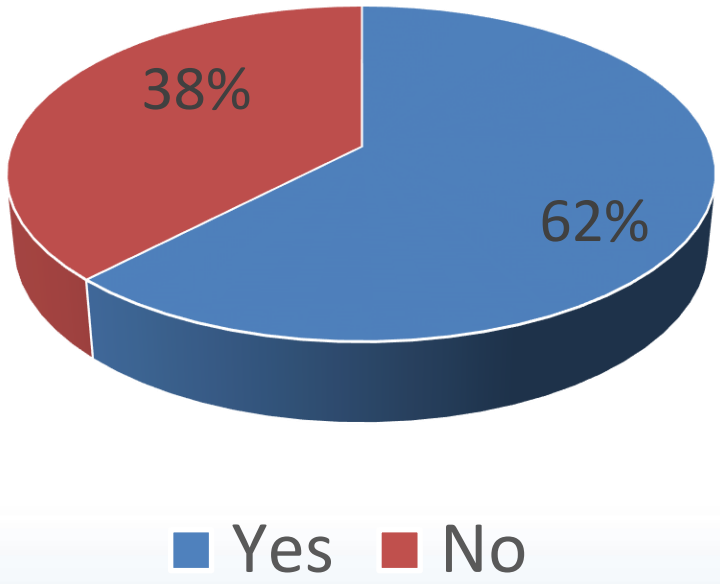
- We invited parents and their school age children (6-12 years) of three rural communities in Ecuador to participate in the study.
- Calibrated dental professionals from four dental schools in Quito used a slightly modified CAMBRA tool to interview the parents or caregivers, conduct a visual clinical oral exam of the children and collect information about caries risk indicators.
- Data for the following areas was collected Caries Risk Indicators (Parent Interview), Protective Factors (Parent Interview) and Caries Risk Indicators/Factors (Clinical Exam of Child).
- Data were analyzed using SPSS software (version 24). This study received approval from the Institutional Review Board and Bioethics Committee at one university in Ecuador and another university in the U.S. [Ethical Approval Numbers: 2016012IN (Ecuador IRB) and IRB 2016-141 (USA IRB)].

Results

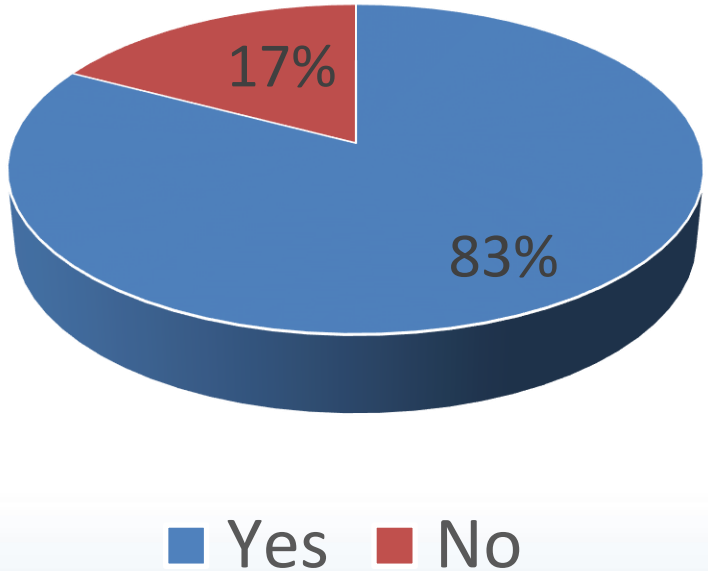
- One hundred and thirty-one children and their parents participated in the study. The three communities selected were at high altitude (7000- 12000 feet above sea level) and experienced high levels of poverty (80% -90%).
- The sample was composed of school age children. The age of the participants ranged from 6 to 12 years (M = 8.5, SD = 1.8). There were slightly more females (58%) than males. Nearly 25% of the children (N=31) had not seen a dentist within the last year.

Caries Risk Indicators — Parent Interview

Mother or primary caregiver has a dentist

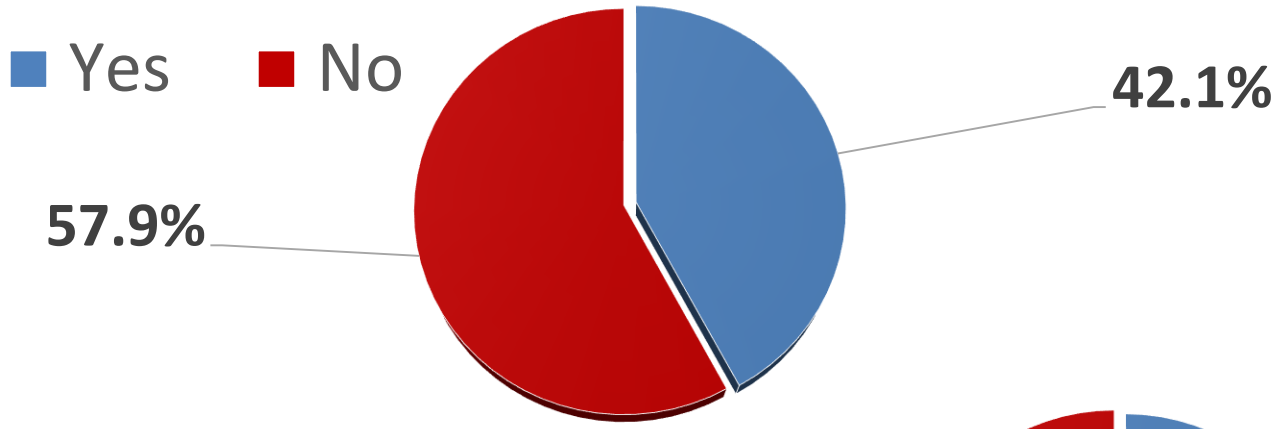


Mother or primary caregiver had active decay in the past 12 months

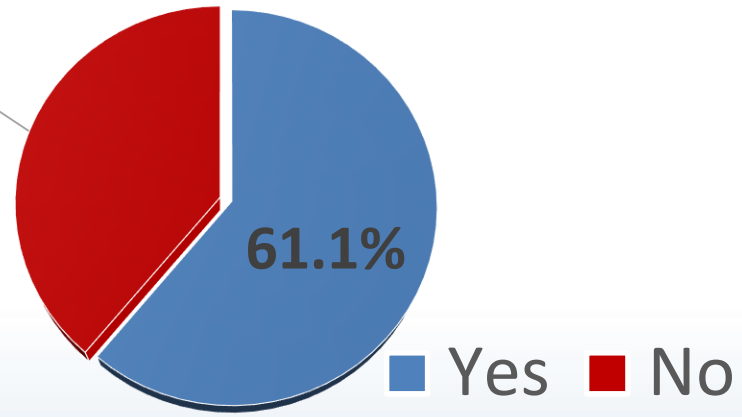


Caries Risk Indicators — Parent Interview

Continual bottle/sippy cup use with fluid other than water



Frequent snacking



Protective Factors

*Wamaloma and Guangaje had a health center within 2 miles; however, dental care was not always available. Itulcachi had a health center within 10 miles.

*None of the water systems had been treated with fluoride; however, one of the community water systems had a fluoride level of 4.86 mg/L (normal value= 0.7 mg/L).

*Eighty three percent of the caregivers reported their children brush their teeth at least twice a day.

Yellow, brown or black teeth
due to high fluoride concentrations in water

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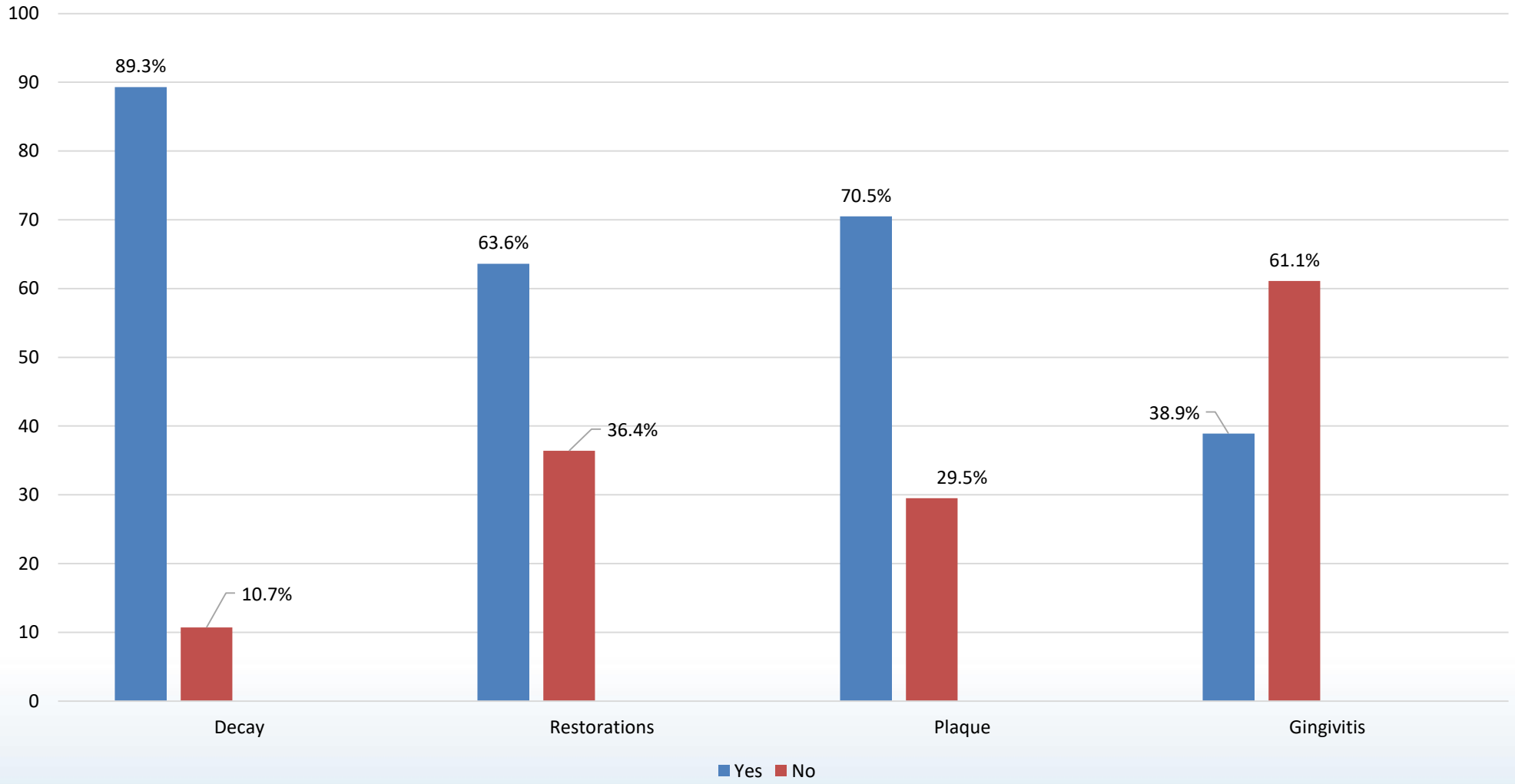
Clinical Factors



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Discussion

- Low level of education, inadequate hygiene practices and lack of access to oral health services.
- Poor prevention practices (dental visits only in response to pain; no fluoride varnish and sealants)
- Diet seems to be high in fermentable carbohydrates
- High prevalence of caries among parents/caregivers and children
- Poor feeding practices to children
- Although at least two of the communities have a close health center, it is not routinely staffed by a dentist. The third health center is far away from the community.

Discussion
Strengths

- CAMBRA has been shown to be a critical tool not only to educate the parents on caries risk factors but also to motivate and encourage them to develop self-management goals that will help them address potential caries risk factors with their children.
- Another strength of this tool is the ability to incorporate nondentist practitioners in caries prevention strategies. Allowing the medical staff to conduct motivational interviewing sessions with the parents, apply topical fluoride in children, or discuss nutrition issues with the parents and/or caregivers will promote a holistic approach to caries prevention and control.
- Our findings bring to light areas for future research. Studies that assess the impact of socioeconomic and cultural factors on dental caries in these rural communities are needed to improve the understanding of the root causes for dental caries risk.

Discussion
Limitations

- Cross-sectional study
- Self-reported data (recall and social desirability bias)
- We were not able to collect saliva from children and their mothers and culture it for MS
- Only a visual dental examination of the participants with the use of an explorer, a dental mirror, and a battery-powered headlamp was conducted in community centers or school settings provided by the communities.
- The sample used in this study was one of convenience and was small; thus, the results of the study cannot be generalized .

Conclusion

- This study provides first-hand evidence of the impact of multiple risks and protective factors on the oral health of children in Ecuador.
- We hope to motivate national health authorities to provide ongoing education for adults and children about oral hygiene practices and consider the application of fluoride varnish and sealants as the pillars of a prevention and control strategy to improve the oral health in the communities.
- We also hope to encourage the training of dental and nondental providers on the use of CAMBRA as a prevention and risk management strategy in order to reduce patient risk of developing advanced disease and hopefully, arresting the disease process.
- We hope the results of this study will offer clinicians, researchers, and policymakers helpful information that will allow them to identify the level of risk of communities in terms of oral disease development so that they can alter their future preventive and treatment strategies with the goal of decreasing the rate of oral disease in our communities.

Evidence of fluorosis
in a Salasaca 10 years old girl (July 2016)

Sampling underground contaminated water in Salasaca (July 2016)

Many thanks to the following individuals who contributed to the study with their time and experience:
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Dra. Carla Ximena Travez Villalba
Dr. Vicente Luna Chonata
Dr. Fernando Mancero
Dra. Valeria Ochoa

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RISK FACTORS

⚠ Mother or primary caregiver had active decay in the past 12 months
☐ Yes ☐ No

- Mother or primary caregiver does not have a dentist
  ☐ Yes ☐ No
- Continual bottle/sippy cup use with fluid other than water
  ☐ Yes ☐ No
- Frequent snacking
  ☐ Yes ☐ No
- Special health care needs
  ☐ Yes ☐ No
- Medicaid eligible
  ☐ Yes ☐ No

PROTECTIVE FACTORS

- Existing dental home
  ☐ Yes ☐ No
- Drinks fluoridated water or takes fluoride supplements
  ☐ Yes ☐ No
- Fluoride varnish in the last 6 months
  ☐ Yes ☐ No
- Has teeth brushed twice daily
  ☐ Yes ☐ No

CLINICAL FINDINGS

⚠ White spots or visible decalcifications in the past 12 months
☐ Yes ☐ No

⚠ Obvious decay
☐ Yes ☐ No

⚠ Restorations (fillings) present
☐ Yes ☐ No

- Visible plaque accumulation
  ☐ Yes ☐ No
- Gingivitis (swollen/bleeding gums)
  ☐ Yes ☐ No
- Teeth present
  ☐ Yes ☐ No
- Healthy teeth
  ☐ Yes ☐ No

ASSESSMENT/PLAN

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Oral Health Risk Assessment Tool Guidance

Timing of Risk Assessment

The Bright Futures/AAP "Recommendations for Preventive Pediatric Health Care," (ie, Periodicity Schedule) recommends all children receive a risk assessment at the 6- and 9-month visits. For the 12-, 18-, 24-, 30-month, and the 3- and 6-year visits, risk assessment should continue if a dental home has not been established. View the Bright Futures/AAP Periodicity Schedule—http://brightfutures.aap.org/clinical_practice.html.

Risk Factors

⚠ Maternal Oral Health

Studies have shown that children with mothers or primary caregivers who have had active decay in the past 12 months are at greater risk to develop caries. **This child is high risk.**

Maternal Access to Dental Care

Studies have shown that children with mothers or primary caregivers who do not have a regular source of dental care are at a greater risk to develop caries. A follow-up question may be if the child has a dentist.

Continual Bottle/Sippy Cup Use

Children who drink juice, soda, and other liquids that are not water, from a bottle or sippy cup continually throughout the day or at night are at an increased risk of caries. The frequent intake of sugar does not allow for the acid it produces to be neutralized or washed away by saliva. Parents of children with this risk factor need to be counseled on how to reduce the frequency of sugar-containing beverages in the child's diet.

Frequent Snacking

Children who snack frequently are at an increased risk of caries. The frequent intake of sugar/refined carbohydrates does not allow for the acid it produces to be neutralized or washed away by saliva. Parents of children with this risk factor need to be counseled on how to reduce frequent snacking and choose healthy snacks such as cheese, vegetables, and fruit.

Special Health Care Needs

Children with special health care needs are at an increased risk for caries due to their diet, xerostomia (dryness of the mouth, sometimes due to asthma or allergy medication use), difficulty performing oral hygiene, seizures, gastroesophageal reflux disease and vomiting, attention deficit hyperactivity disorder, and gingival hyperplasia or overcrowding of teeth. Premature babies also may experience enamel hypoplasia.

Protective Factors

Dental Home

According to the American Academy of Pediatric Dentistry (AAPD), the dental home is oral health care for the child that is delivered in a comprehensive, continuously accessible, coordinated and family-centered way by a licensed dentist. The AAP and the AAPD recommend that a dental home be established by age 1. Communication between the dental and medical homes should be ongoing to appropriately coordinate care for the child. If a dental home is not available, the primary care clinician should continue to do oral health risk assessment at every well-child visit.

Fluoridated Water/Supplements

Drinking fluoridated water provides a child with systemic and topical fluoride exposure, a proven caries reduction intervention. Fluoride supplements may be prescribed by the primary care clinician or dentist if needed. View fluoride resources on the Oral Health Practice Tools Web Page http://aap.org/oralhealth/PracticeTools.html.

Fluoride Varnish in the Last 6 Months

Applying fluoride varnish provides a child with highly concentrated fluoride to protect against caries. Fluoride varnish may be professionally applied and is now recommended by the United States Preventive Services Task Force as a preventive service in the primary care setting for all children through age 5 http://www.uspreventiveservicestaskforce.org/Page/Topic/recommendation-summary/dental-caries-in-children-from-birth-through-age-5-years-screening. For online fluoride varnish training, access the Caries Risk Assessment, Fluoride Varnish, and Counseling Module in the Smiles for Life National Oral Health Curriculum, www.smilesforlifeoralhealth.org.

Tooth Brushing and Oral Hygiene

Primary care clinicians can reinforce good oral hygiene by teaching parents and children simple practices. Infants should have their mouths cleaned after feedings with a wet soft washcloth. Once teeth erupt it is recommended that children have their teeth brushed twice a day. For children under the age of 3 (until 3rd birthday) it is appropriate to recommend brushing with a smear (grain of rice amount) of fluoridated toothpaste twice per day. Children 3 years of age and older should use a pea-sized amount of fluoridated toothpaste twice a day. View the AAP Clinical Report on the use of fluoride in the primary care setting for more information http://pediatrics.aappublications.org/content/early/2014/08/19/peds.2014-1699.

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Clinical Findings

⚠ **White Spots/Decalcifications**
This child is high risk.
White spot decalcifications present—immediately place the child in the high-risk category.

⚠ **Obvious Decay**
This child is high risk.
Obvious decay present—immediately place the child in the high-risk category.

⚠ **Restorations (Fillings) Present**
This child is high risk.
Restorations (Fillings) present—immediately place the child in the high-risk category.

Visible Plaque Accumulation
Plaque is the soft and sticky substance that accumulates on the teeth from food debris and bacteria. Primary care clinicians can teach parents how to remove plaque from the child's teeth by brushing and flossing.

Gingivitis
Gingivitis is the inflamation of the gums. Primary care clinicians can teach parents good oral hygiene skills to reduce the inflammation.

Healthy Teeth
Children with healthy teeth have no signs of early childhood caries and no other clinical findings. They are also experiencing normal tooth and mouth development and spacing.

For more information about the AAP's oral health activities email oralhealth@aap.org or visit www.aap.org/oralhealth.

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