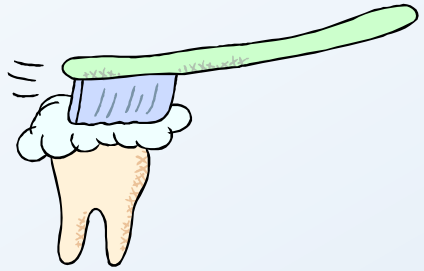

Current Research Activities on Early Childhood Oral Health

Healthy Smile Happy Child's 20th MBTelehealth Presentation Series

RESEARCH

Presenters:

Dr. Bob Schroth

Dr. Cameron Grant

ADVENTURER EXPLORER TRAILBLAZER REBEL PIONEER CREATOR DEFENDER ADVENTURER EXPLORER TRAILBLAZ

Oral-Health Related Quality of Life of Preschoolers with Severe Caries

September 14th, 2017
Cameron Grant BSc, DDS
University of Manitoba

COLLEGE OF DENTISTRY
SCHOOL OF DENTAL HYGIENE
Traditions of Excellence, Horizons of Change

The Children's Hospital Research Institute of Manitoba
a division of the Children's Hospital Foundation of Manitoba

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UNIVERSITY OF MANITOBA

Introduction

Early Childhood Caries (ECC)

1 or more primary teeth affected by decay in infant and preschool children (those < 72 months of age)

Severe Early Childhood Caries (S-ECC)

1 or more cavitated, missing due to caries, or smooth surface caries in maxillary anterior teeth. (In children younger than 3 years of age, any sign of smooth-surface caries.)

or

dmfs score	age
4	3
5	4
6	5

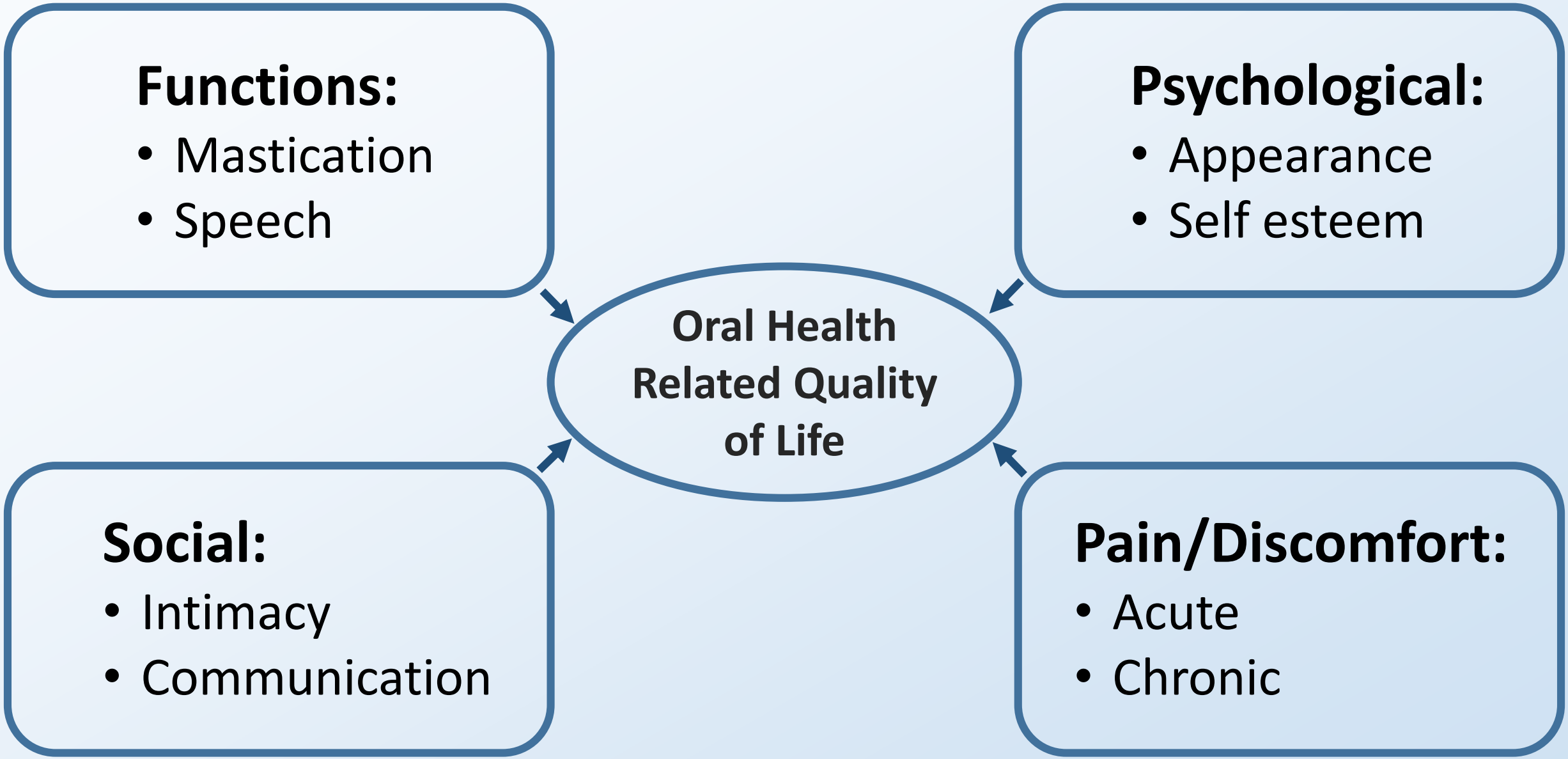
AAPD (2008)

Quality of Life (QoL)

“An individual’s perception of their position in life in the context of the cultural and value systems in which they live and in relation to their goals, expectations, standards and concerns”.

Oral Health Related Quality of Life (OHRQoL)

“A multidimensional construct that reflects **people's comfort** when eating, sleeping, and engaging in social interaction; their self-esteem; and their satisfaction with respect to their oral health.”



Factors associated with oral health related quality of life

OBJECTIVE

To determine the **oral-health related quality of life** (OHRQoL) of preschool-aged children before dental surgery under general anesthesia (GA) to treat **severe early childhood caries** (S-ECC).

HYPOTHESIS

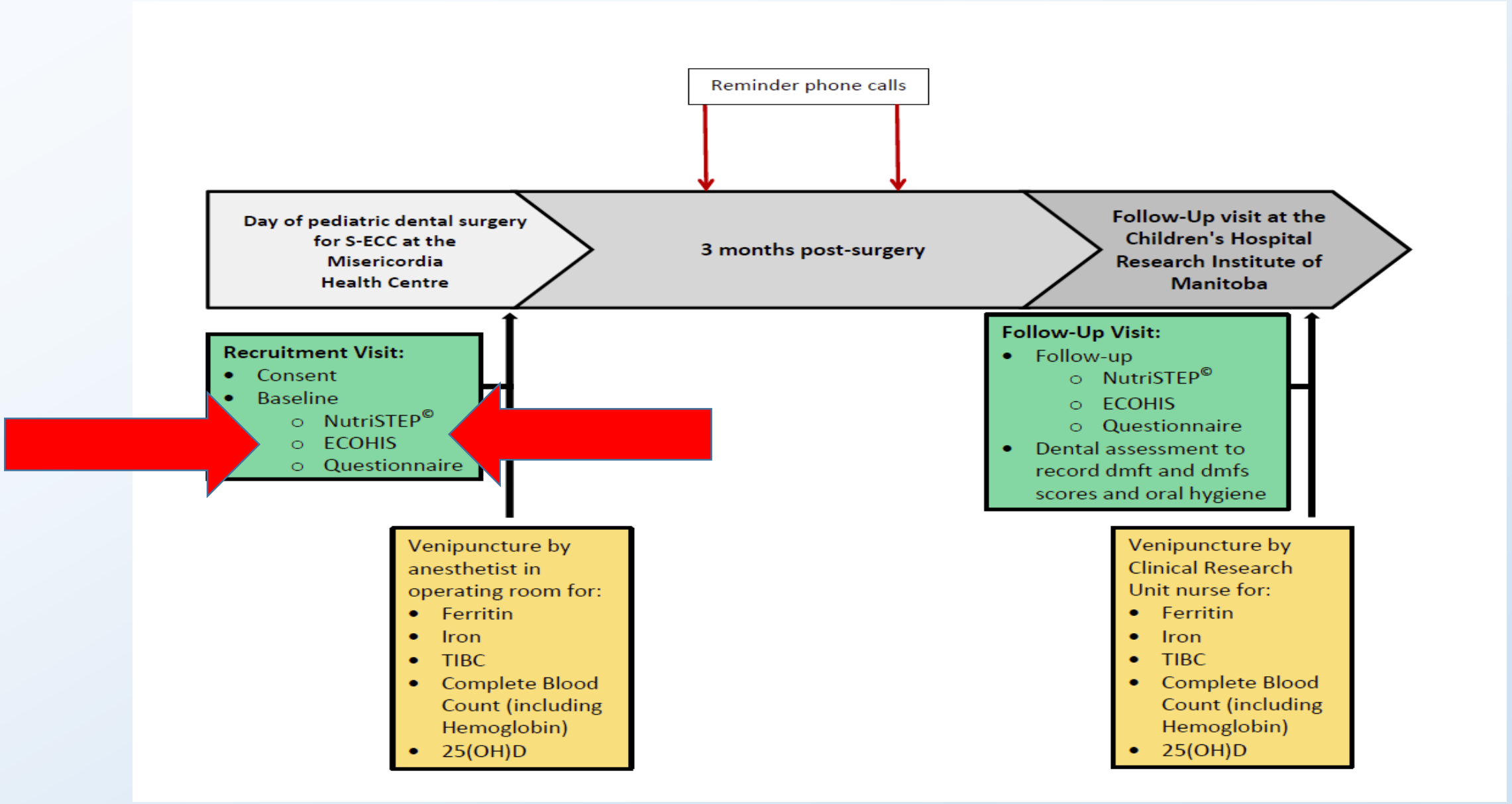
Children with **S-ECC** exhibit low **OHRQoL** prior to dental surgery as measured by the validated **ECOHIS** (Early Childhood Oral Health Impact Scale) questionnaire.

Why is it important to measure how S-ECC affects a child's and their parents'/care-givers' quality of life prior to comprehensive dental rehabilitation?

Pediatric dentists should be aware of how S-ECC affects their patients' and their parents'/care-givers' day to day living.

Changes in nutritional status and well-being following dental surgery to treat S-ECC

(Larger Study's Time Line)



Method:

- Participants part of a larger study: **Changes in Nutritional Status and Well-Being Following Dental Surgery to Treat S-ECC**
- 150 Children (living within 1 hour drive of Winnipeg, Manitoba)
- Approved by the University of Manitoba's Health Research Ethics Board and Misericordia Health Centre
- Written informed consent obtained and interviewer lead questionnaire conducted
- **Early Childhood Oral Health Impact Scale** (**ECOHIS**) questionnaire used
- Household income and dental insurance questions included

ECOHIS

The Early Childhood Oral Health Impact Scale (ECOHIS) is a questionnaire created in 2007 to measure the **oral health related quality of life (OHRQoL)** of preschool-aged children and their parents/caregivers.

It consists of **13 questions** grouped into **two sections**:

1. **Child impact** Section
2. **Family impact** Section

Response options: **0=never**, **1=hardly ever**, **2=occasionally**, **3=often**, **4=very often**, **5=don't know**

Pahel et al. (2007)

ECOHIS (13 Question Survey)

Child Impact Section (9 in total):

How often has your child (had) …

Child's Symptoms Domain (1),

1. pain in the teeth, mouth, or jaws?

Child Functions Domain (4),

2. difficulty drinking hot / cold beverages because of dental problems / treatments?
3. difficulty eating some foods because of dental problems / treatments?
4. difficulty pronouncing any words because of dental problems / treatments?
5. missed preschool, daycare, or school because of dental problems / treatments?

Child Psychology Domain (2),

6. trouble sleeping because of dental problems / treatments?
7. been irritable or frustrated because of dental problems / treatments?

Child's Self-Image and Social Interaction Domain (2),

8. avoided smiling or laughing because of dental problems / treatments?
9. avoided talking because of dental problems / treatments?

Family Impact Section (4 in total):

How often have you / another family member…

Parental Distress Domain (2),

10. been upset because of your child's dental problems / treatments?

11. felt guilty because of your child's dental problems / treatments?

Family Function Domain (2),

12. taken time off from work because of your child's dental problems / treatments?

13. How often has your child had dental problems or dental treatments that had a financial impact on your family?

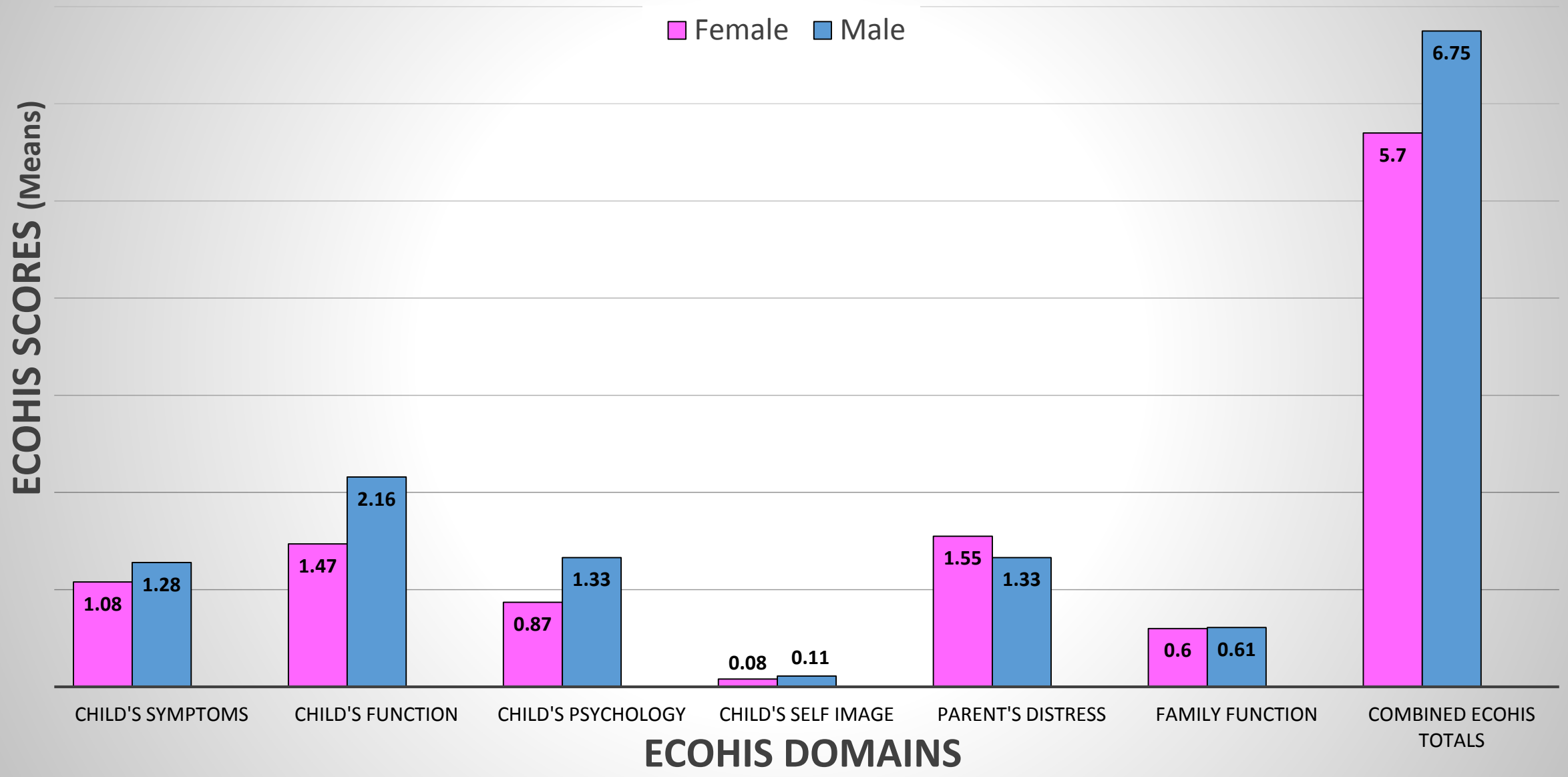
Pahel et al. (2007)

Baseline Results

150 children with S-ECC and their primary caregiver/parent completed the ECOHIS questionnaire.

- Mean age 4 years ± 14.1 months
- Sex 78 female (52%) 72 male (48%)
- Household income/year 85 (57.1%) < $28,000
- Dental insurance 136 (90.7%) had some form of dental benefits
- Mean ECOHIS was 6.20 with a standard deviation of ± 5.17 (range 0-30)
- Mean ECOHIS for female 6.24 ± 4.8 and for male 7.30 ± 6.0

Male / Female ECOHIS Scores (Means) by Domain



Discussion and Conclusions:

- Baseline data reveals that some children with S-ECC and their families experience lower OHRQoL prior to dental treatment under general anesthetic.
- There was no differences in the ECOHIS overall score, impact sections, domains, or individual questions between sexes.
- Lower household income (closer to the Basic Needs Poverty Line) is associated with severe early childhood caries and possibly lower OHRQoL.
- Even though over 90% of the children in the study had some form of dental benefits severe early childhood caries still occurred.
- Progression of this study will involve evaluation and comparison of Pre-GA dental rehabilitation ECOHIS with Post-GA ECOHIS

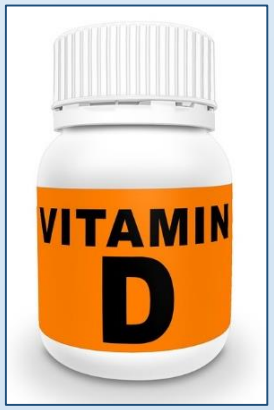
Questions?

Nutritional Status of Children With Severe Early Childhood Caries

Schroth RJ, Pierce A, Daymont CB, Rodd C, Mittermuller B, Letellier A, Gusmini M, Singh S, Grant C, Moffatt ME

Objective of Study

- To look at changes in nutritional status, health and well-being following dental surgery for children with Severe Early Childhood Caries (**S-ECC**).

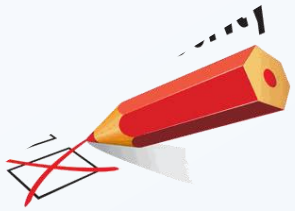


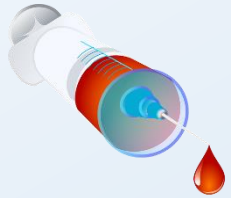
Background

- Early Childhood Caries (**ECC**)
  - Defined as the presence of any dental decay involving the primary dentition of children < 72 months of age.
- Severe Early Childhood Caries (**S-ECC**)
  - A rampant type of ECC that frequentl requires dental surgery under general anesthesia (**GA**)

Children with S-ECC have been reported more likely to have iron deficiency and iron deficiency anemia, lower vitamin D status, and a higher body mass index (**BMI**) than cavity-free children.

Methods





Reminder phone calls

Day of pediatric dental surgery for S-ECC at the Misericordia Health Centre

3 months post-surgery

Follow-Up visit at the Children's Hospital Research Institute of Manitoba

Recruitment Visit:
- Consent
- Baseline
  - NutriSTEP©
  - ECOHIS
  - Questionnaire

Venipuncture by anesthetist in operating room for:
- Ferritin
- Iron
- TIBC
- Complete Blood Count (including Hemoglobin)
- 25(OH)D

Follow-Up Visit:
- Follow-up
  - NutriSTEP©
  - ECOHIS
  - Questionnaire
- Dental assessment to record dmft and dmfs scores and oral hygiene

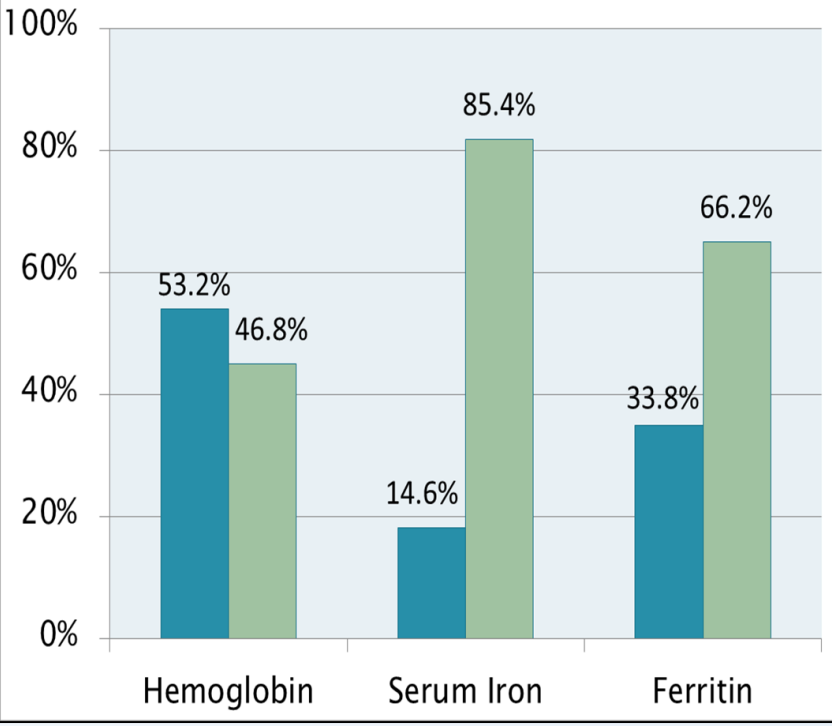
Venipuncture by Clinical Research Unit nurse for:
- Ferritin
- Iron
- TIBC
- Complete Blood Count (including Hemoglobin)
- 25(OH)D

Characteristics of Study Participants

- 150 children with S-ECC and their primary caregiver/ parent completed the ECOHIS questionnaire the day of dental surgery for comprehensive rehabilitation.

Variable		N (%)
SEX	FEMALE	78 (52%)
	MALE	72 (48%)
Mean age (months)		47.8 +/-14.1
Reside in Winnipeg	YES	96 (64.0%)
	NO	54 (36.0%)
Household Income	<$28K	88 (58.3%)
	>28K	45 (32.0%)
	NOT SURE	17 (9.7%)
Government/ Social Assistance	YES	88 (58.7%)
	NO	62 (41.3%)
Dental Insurance	YES	136 (91.0%)
	NO	5 (3.0%)
	DON'T KNOW	9 (6.0%)
Medical Problems	YES	28 (18.6%)
	NO	122 (81.4%)
Child's Height (cm)		104.7
Child's Weight (kg)		18.6

Iron Status of Children

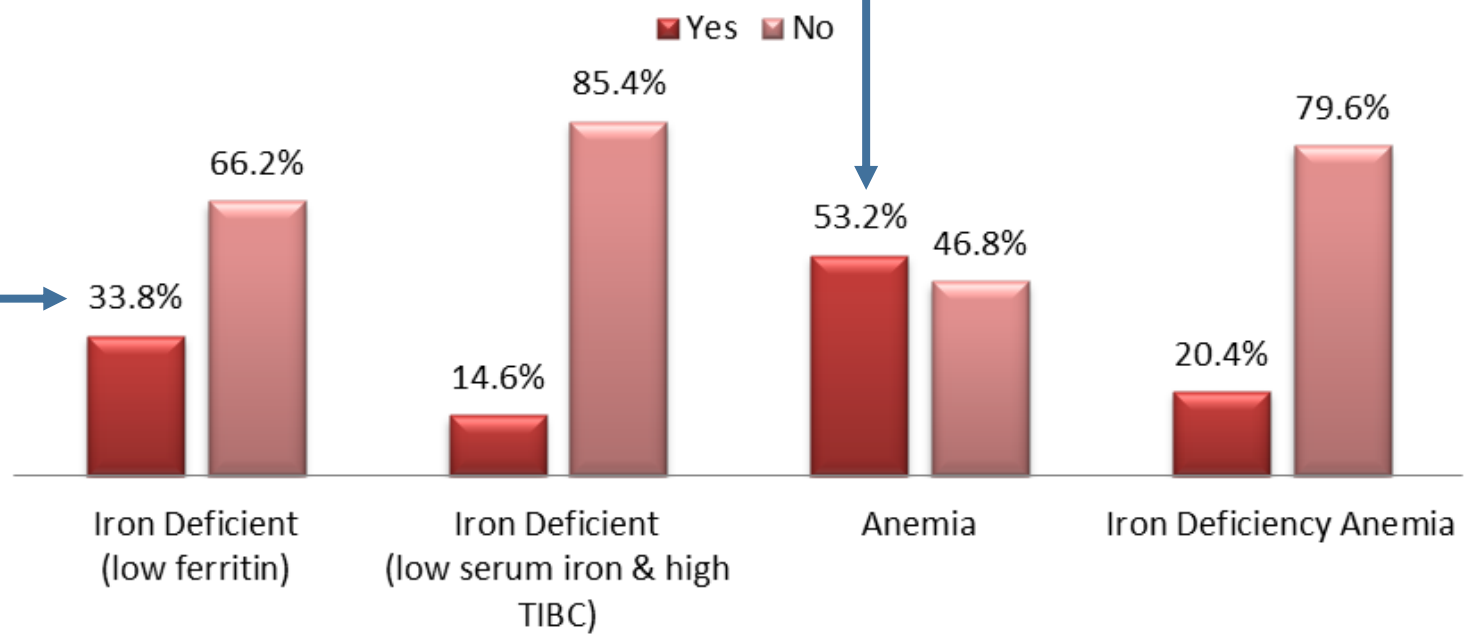


Iron Indicators	$\bar{x} \pm SD$
Hemoglobin	107.5 ± 9.2 (g/L) Reference value: (110 g/L) Past study: 109.8 ± 8.7 (μmol/L)
Serum Iron	12.3 ± 4.3 (μmol/L) Reference range: 7.0–27.0 μmol/L
Ferritin	27.9 ± 19.2 (g/L) Reference range: 20–140 g/L Past study: 29.1 ± 18.4 (g/L)

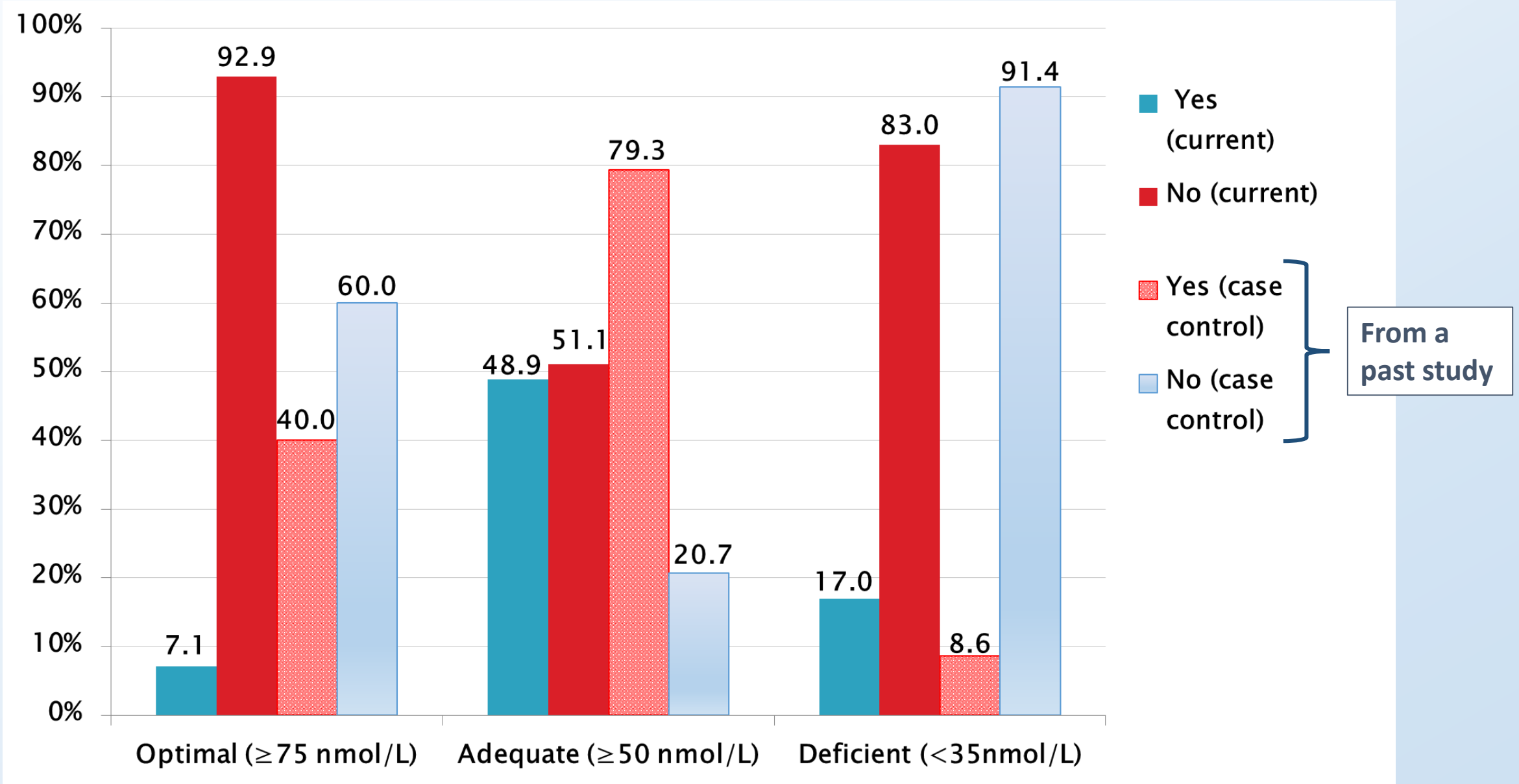
53.2% of the study participants were Anemic, which is defined as having hemoglobin <110 g/L

33.8% of participants suffered from Iron deficiency, which is defined as having either low ferritin OR low serum iron AND high total iron binding capacity

Prevalence of Iron Related Conditions



Vitamin D 25(OH)D) Status of Participants



Conclusions

- Nutritional problems are common among children with S-ECC.
- Children with S-ECC appear to have low levels of Vitamin D and hemoglobin
- Baseline results suggest that S-ECC may be associated with iron deficiency and iron deficiency anemia.
- This study is one of the first to compare the iron status of Canadian preschool children before and after dental surgery for S-ECC.
- This study will provide important information as to how the nutritional status of children with S-ECC undergoing dental surgery is changing.

Questions?

The Oral Health of Preschool Children from Refugee and Immigrant Families to Manitoba

Mohamed El Azrak, Alice Huang, Khalida Hai-Santiago, Mary Bertone, Daniella DeMaré, Robert J Schroth

Objective of Study

- To investigate the oral health of preschool children from newcomer (refugee and immigrant) families in Winnipeg, Canada

Background

- Several groups in Canada are at a high risk of Early Childhood Tooth Decay (ECC) including:
  - Indigenous children
  - ***Refugees and other newcomers***
  - Those experiencing poverty
  - Those living in rural regions of the country where there is reduced access to care
- The term “Newcomer” encompasses both refugees and immigrants.
- Newcomers face many unique challenges concerning health care, putting Newcomer children at higher risk for dental caries. These factors include:
  - Language barriers
  - Cultural differences
  - Lack of awareness
  - Limited family finances
  - Restrictive government policy

Methods

- Children less than 72 months of age and their parent or primary caregiver were recreated from several newcomer settlement agencies, dental clinics, and community programs.
- Parents and caregivers completed a short questionnaire with the assistance of a team member.
- Children underwent a dental examination
- Results of questionnaire and clinical exam were combined and statistically analyzed

Results

- A total of 211 children were recruited
- The mean age was 40.2 ± 15.4, 54% were male
- Overall, 45.5% of children had ECC while 31.8% had severe ECC (S-ECC)
- The mean dmft score was 2.2 ± 3.8 (range 0 – 19)
- The mean dmfs score was 4.8 ± 11.0 (range 0 – 63)
- Infant dental enucleation was observed in six children

A child with a history of dental enucleation

The following were significantly and independently associated with ECC and S-ECC:

- Increasing age
- The presence of debris on teeth
- Parents believing their child has dental problems
- The presence of enamel hypoplasia

Conclusions

- ECC is prevalent in children from newcomer families to Manitoba
- This data will inform advocacy efforts to improve access to dental care and tailor **early childhood oral health promotion** and ECC prevention activities for refugees and recent immigrants.

Healthy Child Happy Smile Webpage Link:
http://www.wrha.mb.ca/healthinfo/preventill/oral_child.php

Questions?

Silver Diamine Fluoride

Acceptability and feasibility of Silver Diamine Fluoride to arrest dental caries

Silver Diamine Fluoride – Renewed Interest

THE OFFICIAL NEWSMAGAZINE OF THE AMERICAN ACADEMY OF PEDIATRICS

AAP News

Dentistry/Oral Health

Silver diamine fluoride arrests untreated dental caries but has drawbacks

by Elise Sarvas D.D.S., M.S.D., M.P.H.; Jeffrey M. Karp D.M.D., M.S.

Untreated dental caries are a significant pediatric public health problem. One in every seven U.S. children ages 2 to 8 years has untreated dental caries in primary teeth, according to National Health and Nutrition Examination Survey data (Dye BA, et al. NCHS data brief, no 191. Hyattsville, Md.; National Center for Health Statistics, 2015).

One in every seven U.S. children ages 2 to 8 years has untreated dental caries in primary teeth.

While fluoride varnish application is a well-established primary intervention for preventing dental caries, it does not restore deeper cavitated lesions. Untreated dental decay extending through the tooth's enamel layer requires mechanical removal of decayed tissue with hand instruments or powered dental drills. Tooth structure lost during removal of the decayed lesion is restored with dental fillings or full coverage crowns.

Non-invasive, interim interventions for arresting untreated dental caries have been needed, especially in underserved populations lacking timely access to restorative dental services. Such an intervention - silver diamine fluoride (SDF) - recently was introduced in the U.S.

What is SDF?

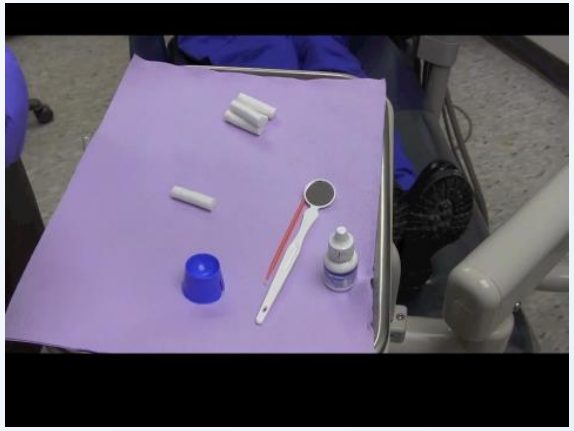
SDF is an inexpensive, non-invasive medicament that is applied topically. It is 38% SDF, a silver fluoride salt made soluble in water through the addition of ammonia. SDF received Food and Drug Administration approval in 2014 as a device for treating dental hypersensitivity. Similar to its predecessor fluoride varnish, SDF has not been approved as a dental caries arrest medicament and is administered in children and adults as an off-label use.

SDF has a high LD_{50} value indicative of low toxicity. To date, no toxic adverse events have been reported (Horst JA, et al. *J Calif Dent Assoc.* 2016;44:16-28.).

- Recently introduced in the U.S. as a non-invasive, interim intervention to arrest caries, especially in underserved populations lacking access to restorative dental services.
- SDF is an inexpensive, non-invasive medicament that is applied topically.
- SDF has been used internationally for decades to arrest dental caries in primary and permanent teeth.
- A recently published meta-analysis reported that two-thirds of all dentinal caries lesions studied (those that had progressed into the dentin) were found to be arrested after treatment with SDF

Gao SS, et al. *BMC Oral Health*. 2016;16:12.

Silver Diamine Fluoride (SDF)



- Topical fluoride applied to teeth by health professional
- Research shows that it can stop decay in 81% of active lesions
- 38% SDF is approved by FDA in USA and Health Canada
- Safe to use in children
- Useful in high-risk populations
- Need for preliminary data to measure feasibility, effectiveness, acceptability, and establish protocol for dental health professionals to stop caries in young children

Objectives of SDF

- Determine feasibility of SDF to arrest caries in young children
- Determine parent and caregiver acceptability of the process

Source: AAP News - The Official Newsmagagzine of the American Academy of Pediatrics
Volume 37, Number 9, September 2016
This photo demonstrates the permanent black staining that develops in carious tooth structure treated with 38% silver diamine fluoride. A single application was provided to a 3-year-old.
Photo courtesy: Daniel Raether, D.D.S.

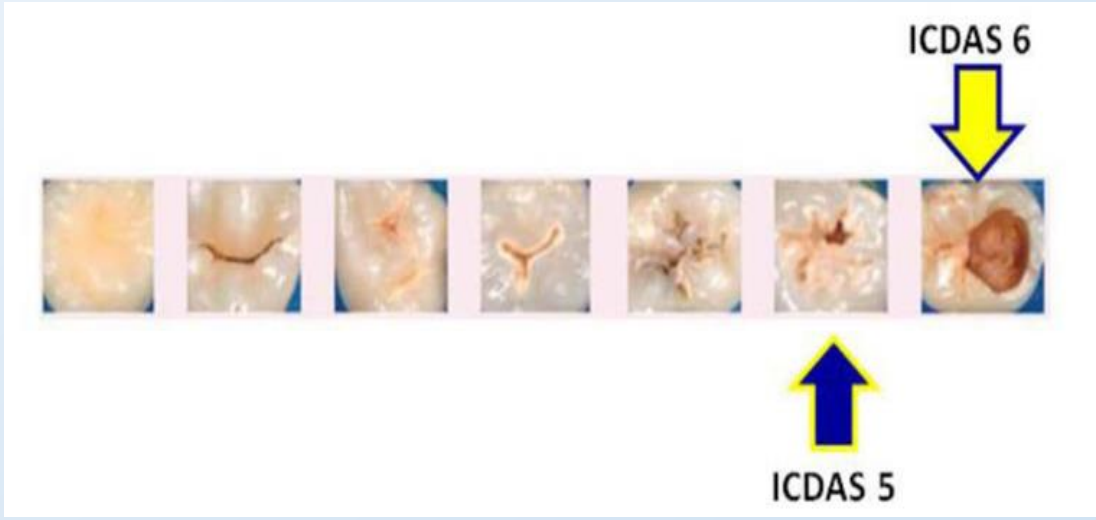
Mix of quantitative and qualitative method to study topical application of SDF to caries and primary teeth

Study Population

Goal: 40 children and parent or caregiver

Inclusion criteria

- children < 72 months with cavities and need treatment
- At least 1 primary tooth with caries that is eligible for SDF
  - Soft lesions into the dentin
  - Teeth meet PUFA criteria
  - Cooperative for examination and SDF treatment



Exclusion criteria

- Allergy or sensitivity to silver or other metals
- Hereditary defect of enamel
- Medical problems that limit participation
- Immediate need of treatment

Methods

- **Questionnaire**- demographic info, arrest rate, any arrested teeth, morbidity, rate of children needing surgery under GA
- **Clinical visit**
  - Decayed, missing, filled teeth due to decay (dmft)
  - Decayed, missing, filled score (dmfs)
  - Caries activity by hardness and colour of caries
  - Colour of lesion
- **Focus group and informant interviews** with parents, caregivers to gather information on acceptability of SDF
- **Data analysis** using descriptive statistics, bivariate measures for clinical and survey data, McNemar's test to compare arrest rate and dichotomous data in questionnaires. Paired t-test to compare normally distributed data. A p-value of ≤0.05 will be significant

Figure 6 – Clinical images to assist with determination of colour of caries lesions (courtesy of Dr. M Fontana)

Baseline Characteristics Update

As of August 1st, 2017

- 9 boys (64.3%) and 5 girls (35.7%)
- Mean Age: 3.1 (SD 1.4)
- 3 of 14 participants are refugees (21.4%)
- 11 of 14 (78.6%) said child brushes 2 times/day

Questions?

Thank you!