HEARTS AND TEETH
HOW COME??

Gary R. Badger D.D.S., M.S.
Keila Lopez M.D.
November 6, 2014
Objectives

• Understand risk to cardiac patients with dental disease

• Familiarize the participant with Caries risk assessment project with cardiology

• Understand the results of project
RISK

Early detection of congenital heart conditions (CHD) means long-term monitoring to repair, check function and return to normal activities, as possible.

Treatment of dental decay, gum disease, nerve damage and plaque reduction will reduce risk to CHD patients.
Congenital Heart Disease (CHD)

- 4 Million infants born in the US each year, approximately 3% have some type of birth defect
- Most common birth defect is CHD- about 1/110 births or 1%
- US: About 40,000 infants are affected each year
- 25% born with CHD each year require invasive or other potentially lifesaving diagnosis or treatment
- Survival is improving with surgical/medical advances
- 90% of babies born with a heart defect can expect to reach adulthood.

Moller JH. Circulation. 1994;89(2)923-930; Marelli AJ. Circulation. 2007; 115(2): 163-172; www.chphc.org
Relationship of dental conditions and

Children who have heart defects run the risk of developing an infection called Endocarditis. Bacteria at times can enter the bloodstream in excessive quantities, released by natural activities or sometimes medical interventions. In most people, the body's immune system can destroy the bacteria before they cause any harm. However, with CHD, there may be an abnormal flow of blood which allows for such bacteria to escape and settle, ultimately causing serious problems.

Cove Point Foundation 2014
The Why-Risk

- Congenital heart disease (CHD), abnormalities in the structural development of the heart, occurs in approximately 8:1000 live births. The causative microorganism for infective endocarditis in more than 60% of the patients with positive hemoculture of viridans streptococci (s.mutans, s.mitior). This is the same bacteria responsible for dental decay. - *J Clin Pediatr Dent.* 2011 Fall;36(1):93-8.
- Suvarna RM¹, Rai K, Hegde AM
What we know about CHD kids
Cardiology Exam

- Pediatric Cardiologists provide physical examination to prospective pediatric patients with a chief focus on the underlying heart condition; however they face the same behavioral conditions as the pediatric dentist during examination.

- The pediatric dentists examine patients and often encounter highly anxious patients as well.

- Pediatric Cardiology has an opportunity to oral screen and establish risk levels with maternal history input.
The Why-Risk

• A total of 170 children between the age group of 1-16 yrs belonging to both genders, with the history of congenital heart disease from Sree Chitra Tirunal Institute of Medical Science and Technology, Thiruvananthapuram and Narayana Hrudayalaya Institute of Medical Sciences, Bangalore were examined. Oral hygiene of the children with congenital heart disease was found to be poor with tongue coating (50.6%), plaque (41.8%), calculus (35.3%), and caries (42.4%). *J Clin Pediatr Dent.* 2009 Summer;33(4):315-8.

• Oral health status of children with congenital heart disease and the awareness, attitude and knowledge of their parents.

• *Rai K¹, Supriya S, Hegde AM*
Gingivitis
Hx of Decay
Oral Care
White Spot lesions
Plaque in Children
Project

- A lecture on dental caries risk and assessment was given to cardiologists, fellows and residents by Dr. Gary Badger
- A lecture by Dr. Keila Lopez, cardiology was given to dental residents on common CHD conditions

- March – June 2014  Twelve (12) residents from the pediatric Dentistry Residency rotated one at a time to the Department of Cardiology at Texas Children’s Hospital

- Purpose: To train cardiology Fellows and Pediatric Residents to orally screen and evaluate CHD patients above 12 months of age for Caries Risk to age 18 years

- Rate performance of cardiologists in caries risk assessment, guide them during the process and educate them on cause, and referral process
Process

• Each cardiologist Fellow/ Resident examined the CHD patient accompanied by a Dental Resident. The oral assessment was accomplished with the guidance of the dental resident. The nature of the CHD condition was discussed with the patient followed by the Fellow and Cardiologist attending revisiting with the patient and discussing the medical condition.
Caries Risk Assessment

- Relationship between Children and Mothers Dental condition-Transmissable S.M.
- Vertical vs. Horizontal transmission
- Character of disease process
- Basis of character: History of dental care, diet, habits, feeding interval, brushing, frequency, Who is doing?
- Plaque, “whitespot” lesions Medical history, Medical conditions: Asthma, ADHD, Recent immigrant, Appliances,
- Cavity filled within last three years
- Combination of oral exam and history leads to risk level
White spot lesions / Dry Mouth / Appliances
## Caries Risk Assessment

<table>
<thead>
<tr>
<th>Contributing Conditions</th>
<th>Low Risk (0)</th>
<th>Moderate Risk (1)</th>
<th>High Risk (10)</th>
<th>Patient Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Fluoride Exposure (through drinking water, supplements, professional applications, toothpaste)</td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Sugary Foods or Drinks (including juice, carbonated or non-carbonated soft drinks, energy drinks, medicinal syrups)</td>
<td>Primarily at mealtimes</td>
<td>Frequent or prolonged between meal exposures/day</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Caries Experience of Mother, Caregiver and/or other Siblings (for patients ages 6-14)</td>
<td>No carious lesions in last 24 months</td>
<td>Carious lesions in last 7-23 months</td>
<td>Carious lesions in last 6 months</td>
<td></td>
</tr>
<tr>
<td>4. Dental Home: established patient of record, receiving regular dental care in a dental office</td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### General Health Conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Low Risk (0)</th>
<th>Moderate Risk (1)</th>
<th>High Risk (10)</th>
<th>Patient Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Special Health Care Needs*</td>
<td>No</td>
<td>Yes (over age 14)</td>
<td>Yes (ages 6-14)</td>
<td></td>
</tr>
<tr>
<td>2. Chemo/Radiation Therapy</td>
<td>No</td>
<td></td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>3. Eating Disorders</td>
<td>No</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Medications that Reduce Salivary Flow</td>
<td>No</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Drug/Alcohol Abuse</td>
<td>No</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Clinical Conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Low Risk (0)</th>
<th>Moderate Risk (1)</th>
<th>High Risk (10)</th>
<th>Patient Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Cavitated or Non-Cavitated (incipient) Carious Lesions or Restorations (visually or radiographically evident)</td>
<td>No new carious lesions or restorations in last 36 months</td>
<td>1 or 2 new carious lesions or restorations in last 36 months</td>
<td>3 or more carious lesions or restorations in last 36 months</td>
<td></td>
</tr>
<tr>
<td>2. Teeth Missing Due to Caries in past 36 months</td>
<td>No</td>
<td></td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>3. Visible Plaque</td>
<td>No</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Unusual Tooth Morphology that compromises oral hygiene</td>
<td>No</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Interproximal Restorations - 1 or more</td>
<td>No</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Exposed Root Surfaces Present</td>
<td>No</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Restorations with Overhangs and/or Open Margins: Open Contacts with Food Impaction</td>
<td>No</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Dental/Orthodontic Appliances (fixed or removable)</td>
<td>No</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Severe Dry Mouth (Xerostomia)</td>
<td>No</td>
<td></td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

**TOTAL:**
Risk Assessment Form

Self-Assessment Caries Risk

Patient de-identified participation number and trainee type *

Level of CHD *

Type of Congenital Heart Disease *

Dentist information *

Dental contact information *
## Cardiology Evaluation Form

**1. Cardiology fellow or pediatric resident first and last name**

**2. Number of patients seen with fellow/resident in today’s clinic?**
- [ ] 1-2
- [ ] 3-4
- [ ] 5-8
- [ ] 9+

**3. Initial exam skills before dental hands on training session**
- [ ] Excellent: Able to identify cavities and/or gum disease with little or no prompting, knows when to refer to dentist for moderate/high risk patients (unprompted)
- [ ] Good: Able to identify cavities and/or gum disease with prompting: refers to dentist for moderate/high risk patients when prompted
- [ ] Fair: Sometimes able to identify cavities and/or gum disease (needs direction): unsure when to refer to dentist
- [ ] Poor: Unable to identify cavities and/or gum disease: never refers to dentist

**4. Final exam skills (at end of today’s clinic session with dental hands on training)**
- [ ] Excellent: Able to identify cavities and/or gum disease with little or no prompting, knows when to refer to dentist for moderate/high risk patients (unprompted)
- [ ] Good: Able to identify cavities and/or gum disease with prompting: refers to dentist for moderate/high risk patients when prompted
- [ ] Fair: Sometimes able to identify cavities and/or gum disease (needs direction): unsure when to refer to dentist
- [ ] Poor: Unable to identify cavities and/or gum disease: never refers to dentist

**5. Identify cavities Identify gum disease Know when to refer to dentist and in what time frame? Understand how to interpret patient self-assessment risk survey**

**6. Feedback given to fellow/resident (please mention for fellows what number training session this was) (e.g. if the fellow has worked with a dentist one previous clinics, today’s clinic would be training session #2)**
Cardiology Evaluation Form

Patient Oral Health Assessment Follow-up

Patient de-identified participation number and trainee type*

First

Last

Patient overall dental caries risk *

Low

Information sharing with dental contact

☐ No dental contact provided- f/u with patient for contact information in 1 week and faxed oral assessment to that dentist

☐ No dental contact provided- f/u with patient for contact information - cannot get a hold of patient for this information

☐ Dental contact provided but no fax number- contacted dental office for fax number and faxed oral assessment to that dentist

☐ Dental contact provided but no fax number- cannot reach dental office

☐ Dental contact provided and faxed oral assessment to that dentist

☐ Dental contact provided- could not locate dentist fax or contact information

☐ No dentist identified- provided dental dental provider list- f/u with patient in 1 week for provider name and faxed oral assessment to that dentist

Place de-identified participation number in “first” space. Put FELLOW or RESIDENT in “last” space.

Patient compliance (based on assigned risk level and determined patient disposition in dental screening)

☐ Patient followed up in suggested timeframe

☐ Patient did not follow up in suggested timeframe due to forgot to make appointment with dentist

☐ Patient did not follow up in suggested timeframe due to inability to contact dentist to make appointment

☐ Patient did not follow up in suggested timeframe due to lack of choosing a new dentist for appointment

☐ Patient did not follow up in suggested timeframe due to inability of new dentist to accommodate a new patient appointment in suggested timeframe

☐ Patient did not follow up in suggested timeframe due to inability of dentist to accommodate an appointment in suggested timeframe

☐ Patient did not follow up in suggested timeframe due to inability to pay for appointment with dentist

☐ Patient did not follow up in suggested timeframe due to lackom of insurance for appointment with dentist

☐ Could not contact dentist or patient to obtain compliance information

Submit
**1. What is the patient participation number?**

2. Parent/caregiver insurance type
   - American
   - Blue Cross/Blue Shield
   - Cigna
   - Humana
   - United Healthcare
   - CHIP
   - Medicaid
   - Texas Children’s Health Plan
   - Military Insurance
   - No insurance (self-pay)
   - Don’t know
   - Decline to answer
   - Other

   Other (please specify)

3. Mother/primary caretaker has active (current) dental cavities (dentist has informed you that you currently have cavities, you have tooth pain when eating, etc)
   - Yes
   - No
   - Don’t know
   - Decline to answer

4. Child has >3 between meal (not breakfast, lunch, or dinner) sugar containing snack or beverages per day
   - Yes
   - No
   - Don’t know
   - Decline to answer

5. Child is put to bed (put to sleep) with a bottle containing natural or added sugar (juice, sweetened beverage)
   - Yes
   - No
   - Don’t know
   - Decline to answer

6. Child has special health care needs (wheelchair bound, tracheostomy/ventilator dependent, Down syndrome, severe developmental delay, severe motor disability, complex congenital heart disease, asthma, ADHD)
   - Yes
7. Child/Parent is a recent immigrant (in the United States < 3 years)
   - Yes
   - No
   - Don't know
   - Decline to answer

8. Child has a dental home/regular dental care (Have a dentist that you visit at least every 6-12 months)
   - Yes, REGULAR dental care (at least 2X/year)
   - Yes, IRREGULAR dental care (at least 2X/year)
   - No
   - Don't know
   - Decline to answer

9. Child has a history of dental cavities
   - Yes
   - No
   - Don't know
   - Decline to answer

10. Child's teeth are brushed with fluoridated toothpaste (Colgate, Aim, Crest, Aquafresh, Close-up, Sensodyne, etc)
    - Yes
    - No
    - Don't know
    - Decline to answer

11. Teeth/gums brushed how many times per day:
    - <1
    - 1
    - 2-3
    - Don't know
    - Decline to answer

12. Child receives topical fluoride treatment from dental professional (this may be in dental office or in school dental program)
    - Yes
    - No
    - Don't know
    - Decline to answer
Project Questions

• Questions:
• Did the cardiologists learn about caries risk assessment?
• Would they use this information?
• Was it useful to have a pediatric dentist there?
• Did the pediatric dental residents learn about cardiology?
• Would they use this information in their practice?
• Is there a better way of doing this? What? How?
• Do the professions feel more comfortable with referrals?
### Self-Assessment Results

1. **Self-assessment caries risk level**
   - Low - 55.77%
   - Moderate - 28.84%
   - High - 15.38%
   - 29 pts. - 15 pts. - 8 pts.

2. **Patient has low saliva flow**
   - Low saliva flow - 3.84%
   - Normal saliva - 96.16%
   - 2 pts. - 50 pts.

3. **Patient has active white spot lesions or enamel defects**
   - White spot lesions or enamel defects - 19.23%
   - No white spots or defects - 80.77%
   - 10 pts. - 42 pts.

4. **Patient has plaque on teeth**
   - Plaque on teeth - 48.07%
   - No plaque - 51.93%
   - 25 pts. - 27 pts.

5. **Patient has gingivitis**
   - Gingivitis on teeth - 23.07%
   - No gingivitis - 76.93%
   - 12 pts. - 40 pts.

6. **Patient has defective restorations**
   - Defective restorations - 9.61%
   - No defective restorations - 90.39%
   - 5 pts. - 47 pts.

7. **Patient has >1 decayed/missing/filled surfaces**
   - >1 decayed/missing/filled surfaces - 36.53%
   - <1 decayed/missing/filled surfaces - 63.47%
   - 19 pts. - 33 pts.

8. **Patient has no cavities or intraoral concerns**
   - No cavities or concerns - 48.07%
   - Has cavities or concerns - 51.92%
   - 25 pts. - 27 pts.

9. **Patient overall dental caries risk (self-assessment + dental exam)**
   - Low - 48.08%
   - Moderate - 26.92%
   - High - 23.08%
   - Urgent - 1.92%

10. **Patient disposition**
    - Low risk - routine dental care (6-12 month check-up) - 39.54%
      - 19 pts.
    - Moderate risk - F/U 6 months - 30.77%
      - 16 pts.
    - High risk - F/U 3 months - 26.92%
      - 14 pts.
    - Urgent risk - F/U within 1-2 weeks - 5.77%
      - 3 pts.
## Self-Assessment Results

### Patient overall caries risk (self-assess + dental exam)

<table>
<thead>
<tr>
<th></th>
<th>Referral to current dentist</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>11.</td>
<td><strong>Yes, low risk patient</strong> – 21.15%</td>
<td>11 pts.</td>
</tr>
<tr>
<td></td>
<td><strong>Yes, moderate risk patient</strong> – 23.08%</td>
<td>12 pts.</td>
</tr>
<tr>
<td></td>
<td><strong>Yes, high risk patient</strong> – 15.38%</td>
<td>8 pts.</td>
</tr>
<tr>
<td></td>
<td><strong>Yes, urgent risk patient</strong> – 1.92%</td>
<td>1 pt.</td>
</tr>
<tr>
<td></td>
<td><strong>No, patient does not have a current dentist</strong> – 21.15%</td>
<td>11 pts.</td>
</tr>
<tr>
<td></td>
<td><strong>No, patient has current dentist but wants new dentist</strong> – 17.31%</td>
<td>9 pts.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Referral to new dentist</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>12.</td>
<td><strong>Yes, low risk patient</strong> – 7.69%</td>
<td>4 pts.</td>
</tr>
<tr>
<td></td>
<td><strong>Yes, moderate risk patient</strong> – 25%</td>
<td>13 pts.</td>
</tr>
<tr>
<td></td>
<td><strong>Yes, high risk patient</strong> – 9.62%</td>
<td>5 pts.</td>
</tr>
<tr>
<td></td>
<td><strong>Yes, urgent risk patient</strong> – 3.85%</td>
<td>2 pt.</td>
</tr>
<tr>
<td></td>
<td><strong>No, patient does not want a dentist</strong> – 3.85%</td>
<td>11 pts.</td>
</tr>
<tr>
<td></td>
<td><strong>No, patient has current dentist</strong> – 50%</td>
<td>26 pts.</td>
</tr>
</tbody>
</table>
Aetna – 0%
BCBS – 16.21%
Cigna – 5.40%
Humana – 5.40%
United Healthcare – 10.81%
CHIP – 5.40%
Medicaid – 45.94%
Texas Children’s Health Plan – 5.40%
Military Insurance – 0%
Self-pay – 0%
I don’t know – 0%
Decline to answer – 0%
Other – 5.40%
Yes - 10.52%
No - 68.42%
I don’t know - 21.05%
Decline to answer - 0%
Yes - 42.10%
No - 57.90%
I don’t know
Decline to answer
Yes - 5.26%
No - 94.73%
I don’t know - 0%
Decline to answer - 0%
Yes - 31.58%
No - 65.79%
I don’t know - 2.63%
Decline to answer - 0%
Yes, REGULAR dental care (at least 2X/year) - 55.26%
No, IRREGULAR dental care (at least 2X/year) - 13.16%
No - 28.95%
I don't know - 0%
Decline to answer - 0%
Yes - 81.58%
No - 10.53%
I don’t know - 5.26%
Decline to answer - 0%
Discussion Points

• Largest percentage of these patients had Medicaid insurance

• Many were not English speaking—Could they have misunderstood the questions?

• Not what was expected when data recorded

• Is it possible that this group of patients were exceptionally careful with their risk factors?
Cardiologist Response to Training

• Learning about Importance of Oral Health:
  - Yes: 75%
  - No: 0%
  - Maybe: 25%
• Medical school Training in Oral Health:
  - Yes, several lectures-17%
  - Yes, one lecture to ID -33% But not how to perform them
  - Yes, one lecture to Perform: 8% but not ID
  - No: no lecture or internet links: 42%
• Thoughts/feelings learning in cardiology clinic
  - Important: 58%
  - Do not know feeling but important: 25%
  - Important, but to learn on own time-17%
• Hands-on training helpful learning about relationship between oral health and CHD:
  - Yes: 67%
  - Maybe: 8%
  - No: 25%
Cardiologist Response (cont.)

• Hand-on Training helpful in learning how to perform Oral Health Exam?
  • Yes: 82%
  • No: 9%
  • Maybe: 9%
• Hands-on Self-assessment helpful training?
  • Yes: 67%
  • No: 25%
  • Maybe: 8%
• Oral health referral, how to find a dentist?
  • Yes, if have private: 33%
  • No regardless of Ins.: 67%
Cardiologist Response (cont.)

- What is most important in improving oral health knowledge?
  - Didactic lecture: 17%
  - Internet learning: 25%
  - Hands-on: 75%
  - Booklet with text and pictures: 17%
- Sufficient information given?
  - Yes: 67%
  - Ask questions? Not enough: 8%
  - Asked questions but not enough information: 25%

- Plan for Oral Health Screening in practice?
  - Yes, always: 25%
  - Yes sometimes: 50%
  - Maybe depends on CHD type: 25%
Pediatric Dentist Response

- **Pediatric Dentists**
- **Training:**
  - First year: 55%
  - Second Year: 45%
- **Important to learn about CHD?**
  - Yes: 100%
- **Any dedicated training for CHD in dental school/residency?**
  - Yes, several: 18%
  - Yes one: 27%
  - Yes one, no assessment: 18%
  - No: 36%
- **How best to assess CHD?**
  - Important and learn in cardiology: 91%
  - Learn on own: 9%
- **Cardiology Training helpful?**
  - Yes: 40%
  - Somewhat: 50%
  - No: 10%
Pediatric Dentist Response (Cont.)

- Training to learn about OH and CHD?
  - Yes: 91%
  - Maybe: 9%
- Helpful training about CHD?
  - Yes: 64%
  - Yes but did not learn about OH assessment: 18%
  - Yes learned OH assessment but not CHD: 9%
    - Somewhat: 9%
- Cardio-dental training helpful for risk profiles of CHD types?
  - Yes 55%
  - Somewhat: 36%
  - Maybe: 9%
Pediatric Dentist Response (Cont.)

- What is most helpful to improve CHD knowledge?
  - Didactic lecture of CHD: 82%
  - Hands-on in cardiology: 27%
  - Booklet with text and pictures: 36%

- Given time to ask questions in cardiology?
  - Yes: 54%
  - Yes but not enough time to ask CHD questions: 27%
  - Somewhat: 18%

- Plan to incorporate CHD screening in practice?
  - Yes: 82%
  - Yes sometimes: 9%
  - Maybe: 9%

- Do you enjoy teaching Cardiology?
  - Yes: 55%
  - Somewhat: 45%
Questions?
The end

So, I'm just sitting here and the whole dang thing explodes!
I'm just as surprised as you are.
References


