

A COST EFFECTIVENESS ANALYSIS OF TRADITIONAL DENTAL CARE VERSUS TELEDENTISTRY

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Children Enrolled in Brantley County, GA Elementary
Schools, 2010-2011 School Year

Teledentistry

- 2009 pilot; Head Start partnership
- 3-year HRSA (OAT) grant
- Brantley, Charlton & Clinch counties
- School-based dental clinic provides cleaning, sealants, x-rays & education
- Referrals & case management for follow-up



What is Important?



□ Health Outcomes

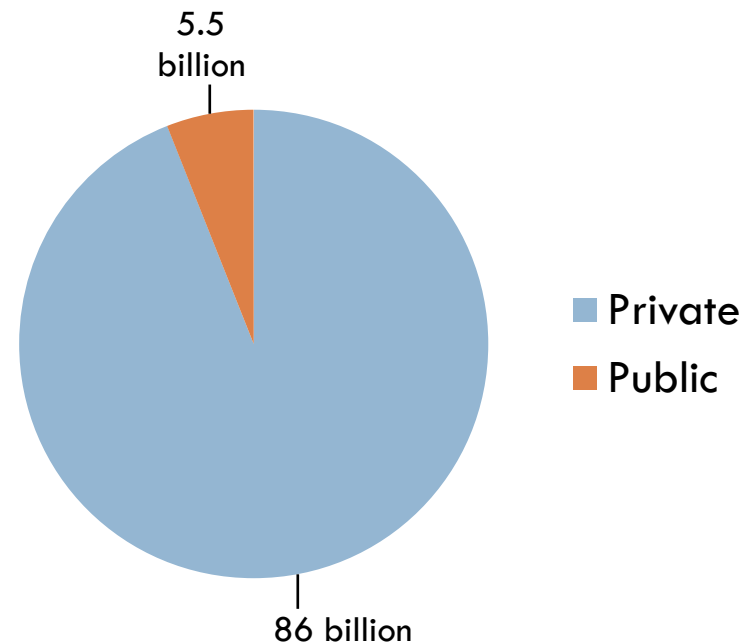
- ▣ One quarter of children ages 2-5 are affected by tooth decay
- ▣ One half of children ages 12-19 are affected by tooth decay

<http://www.cdc.gov/chronicdisease/resources/publications/AAG/doh.htm>

What is Important?

- Economic Burden
 - ▣ Children miss approximately 51 million hours per year of school due to dental related illness
 - ▣ An average of 3.1 days/100 students in a school calendar year
 - ▣ In 2006, \$91.5 billion was spent on dental procedures

2006 Dental Expenditures



What is Important?



<http://www.colchesterdentalgroup.com/images/child.jpg>

- Social Determinants
 - ▣ Lower incomes
 - ▣ Racial and ethnic backgrounds

<http://www.cdc.gov/chronicdisease/resources/publications/AAG/doh.htm>

What is Important?

- Behavioral Risk Factors
 - ▣ No adult supervised, regular brushing after meals
 - ▣ No flossing
 - ▣ No fluoride treatments
 - ▣ Prolonged exposure to simple sugars



<http://srisridentalclinic.com/images/service-fluoride-treatment.jpg>

What Works?



<http://www.sweettoothcare.com/img/services/sealant.jpg>

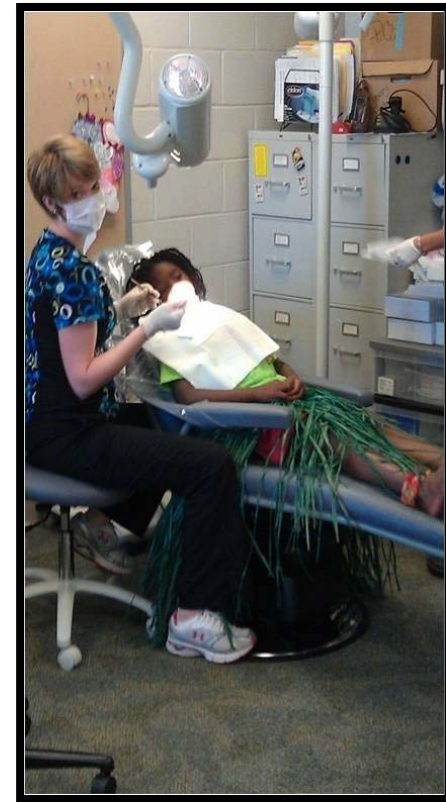
- Community Guide to Preventive Services
- School-based sealant programs
- Only one-third of children ages six to nineteen have this procedure

<http://www.thecommunityguide.org/oral/schoolsealants.html>

<http://www.cdc.gov/chronicdisease/resources/publications/AAG/doh.htm>

What Offers the Best Value?

- Two options
 - ▣ Traditional Dentistry
 - ▣ Teledentistry
- Perform Cost Effectiveness Analysis (CEA)



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Key Questions

- How much does it cost to provide routine dental services for children in a dental office?
 - How much does it cost to provide *routine dental services for children at school via teledentistry?
 - Is it more cost-effective to provide routine dental services in dental offices versus schools?
- *Routine dental services are X-rays, cleaning, fluoride treatment and sealants.

Audience, Perspective & Health Outcome

- Audience: HRSA, Southeast Health District, Georgia Public Health
- Perspective: Societal
 - ▣ Using societal resources allocated to HRSA by the legislature
- Health Outcome
 - ▣ The Number of children seen by the Teledentistry Program in Brantley County Elementary Schools for 2010-2011 school year
 - ▣ The number of children seen in a local dental office during the same timeframe

Time Frame

- Applications distributed July 2010
- Program conducted August 2010 – May 2011
- Dental referrals (3 levels)
 - ▣ Local dentist
 - ▣ Pediatric dentist
 - ▣ Georgia Life Sciences University (formerly MCG)
- Limited dental providers
- Distance to provider & socioeconomic barriers
- Timeframe = application period (1 month) + school year (9 months) + referral time (1 year) = 1 year and 10 months

Analytic Horizon

- Time line for tooth loss
- Benefits of teledentistry last through the time when the child has all permanent teeth in place
- Research indicates the relationship between poor oral health and chronic diseases
- Local barriers imply a more conservative approach
- 10 years

Age of Child	Time Horizon
Four	Ten years
Five	Nine years
Six	Eight years
Seven	Seven years
Eight	Six years
Nine	Five years
Ten	Four years

<http://www.webmd.com/oral-health/dental-health-your-childs-teeth>

Cost Analysis- Teledentistry Direct Costs

Type of Cost	Description	Data Source
Direct Cost-Non-Medical (TD)	Telehealth Equipment (General)	Invoices from Vendor, Telehealth Coord.
Direct Cost-Non-Medical (TD)	T1 lines for data transmission	Monthly Invoice to SEHD, reimbursed 90% through Universal Service Funds program
Direct Cost-Non-Medical (TD)	Clinic space donated by school (in-kind)	School superintendent for info on facility cost/funding
Direct Cost-Non-Medical (TD)	Administrative Staff Time: -Telehealth Coordinator (30% of time, in-kind)	Southeast Health District HR

Cost Analysis- Traditional Dentistry

Direct Costs

Type of Cost	Description	Data Source
Direct Cost-Non-Medical (TdD)	Dental clinic space (cost for same time period)	Will attempt to obtain from Local Dental Supervisor, if unable will utilize an on-line resource for area commercial real estate http://www.loopnet.com/Georgia/Waycross-Commercial-Real-Estate/
Direct Cost-Medical (TdD)	Dental office employee wages/salaries: - Dentist - Dental Hygienist - Dental Assistant - Office Manager	Will attempt to obtain from Local Dental Supervisor, if unable will utilize an on-line resource for are dental salaries http://www.indeed.com/salary/q-Dental-Assistant-I-Savannah,-GA.html
Direct Cost-Medical (TdD)	Dental visit charge for same services provided at Teledentistry dental clinic	Local Practice Dental Records Medical Expenditure Panel Survey http://www.meps.ahrq.gov/mepsweb/data_stats/data_overview.jsp Centers for Medicare and Medicaid Services http://www.cms.gov/home/medicaid.asp

Cost Analysis- Indirect Costs

Type of Cost	Description	Data Source
Indirect Cost-Prod. Losses	Travel costs for parents associated with a dental visit.	Will be calculated based on travel distance from Brantley county to closest Medicaid accepting dentist at the state mileage reimbursement rate of .51 cents
Indirect Cost-Prod. Losses	Parent wages lost as a result of child's dental visit	Due to lack of dental providers and rural status wages for an eight hour day will be calculated. Ga Dept. of Labor will be utilized to ascertain the average hourly wage in Brantley County http://www.dol.state.ga.us/ Additional documentation may be obtained from U.S. Bureau of Labor Statistics http://www.stats.bls.gov/

Costs Analysis: Intangible Costs

Parent Survey

- Attempt to quantify self-esteem as it relates to dental problems
- Survey included in Teledentistry application packet
- Modification of a question from the “Early Childhood Oral Health Impact Scale”
 - How often has your child, because of dental problems (pain in teeth, mouth or jaws), experienced the following:
 - a) Avoided smiling or laughing when around other children
___Never ___Hardly ever ___Sometimes ___Often ___Very Often
 - b) Avoided talking with other children
___Never ___Hardly ever ___Sometimes ___Often ___Very Often

Costs Analysis: Intangible Costs

Parent Survey

- Self-esteem quantified as the average wage for an individual with a high school diploma
- Caregivers who responded to top 2 tiers of Likert scale (Often/Very Often)
- Caregivers who responded to lower 2 tiers of Likert scale (Never/Hardly Ever)

Cost Adjustment

- Majority of expenses associated with the cost of the equipment (dental and telehealth)
- Costs must be annuitized
- Inflation of costs for program time line
- Research indicates an average life of five years before telehealth equipment needs to be replaced or upgraded

Cost Evaluation (ICER)

□ Incremental Cost Effectiveness Ratio (ICER)

$$\text{ICER} = \frac{\text{Cost of Teledentistry Program} - \text{Cost of traditional dental services}}{\text{\# of children seen during 2010-2011 school year} - \text{\# of children seen at the Teledentistry Dental Supervisor's practice during the 2010-2011 school year}}$$

□ ICER Interpretation

□ ICER results will be used...

Cost Evaluation (MCER)

□ Marginal Cost Effectiveness Ratio (MCER)

$$\text{MCER} = \frac{\text{Cost of Teledentistry Program Expansion}}{\text{\# of children seen at expanded Teledentistry Program}} - \frac{\text{Cost of Teledentistry program}}{\text{\# of children seen at original Teledentistry Program}}$$

□ MCER Interpretation

□ MCER Results will be used...

Sensitivity Analysis

- Sampling bias
- Traditional dental charges obtained from dental records
- Average wage data
- Analytic horizon
- Focus: future cost of telehealth equipment
- How will the Sensitivity Analysis be presented?

Questions?



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