Case Study of the ECC Initiative:
General Data Mart Workload Analysis for Site A and Site B Service Units

Renita Washburn
Program Analyst (Program Evaluator)
IHS, Office of Public Health Support
Division of Planning, Evaluation & Research
March 21, 2016
Study Design

Primary Purpose
Inform decision making aimed at improvement of oral public health initiatives, while contributing to broader evidence base on successes/best practices for program implementation.

Program: IHS Early Childhood Caries Collaborative is a multi-faceted program designed to enhance knowledge about early childhood caries prevention and early intervention for all healthcare providers and the community.

Type of Evaluation: Program Effects Case Study
- A comparative study of the implementation of the ECC Initiative at two Indian Health Service (IHS) facilities’ to assess impacts of ‘best practices’ in implementation, context and other factors on program outcomes.

Objectives:
- Examine the causal links between the program and observed effects/outcomes by review of two sites
- Identify implementation best practices which can be leveraged in future ECC initiatives
- Generate hypotheses for later studies

Evaluation Questions:
- What aspects of identified best practices of increased access, sealants and fluoride applications contributed to achieving goals in decreased decay prevalence?
Despite oral public health efforts starting in the 1980’s, high prevalence of dental decay in young AI/AN children persisted in 2009/2010

Problem Statement
Implement an oral public health initiative which addresses the multifactorial nature of rampant decay to decrease the prevalence

Goal
Inputs
- Patient Care Staff
- Community Partnerships
- IHS ECC Collaborative Committee

Activities
- Developed an educational kit for staff
- Developed educational material for community/patients
- Developed fluoridation and sealant treatment programs implementation guides
- Developed guides on increasing access to care for preventative and treatment/interventions
- Implemented targeted fluoride, sealant, & ITR interventions
- Virtual Learning Community Program (VLVP)
- Implemented performance surveillance system with key measures

Products
- Best Practices for increasing access & treatment via local innovation
- Greater community awareness of problem
- Enhanced referral networks
- Regular performance reviews at multiple levels of organization

Outcomes
Short/Intermediate-Term
- Increase # of 0-5 yo with a least one dental encounter/year by 25%
- Increase # of sealants placed on 0-5 yo by 25%
- Increase # of 0-5 yo receiving at least one topical fluoride treatment by at least 25%
- Increase # ITRs in 0-5 yo by 50%

Long-Term
- Decrease prevalence of ECC in AI/AN children ages 0-5 by at least 25%
The case study examined best practices in implementation. To assist in identifying sites with strong implementation, measures such as Access for 0-5 years olds were weighed heavily. Site A and Site B Service Units were selected.

<table>
<thead>
<tr>
<th>Site</th>
<th>Area</th>
<th>IHS Area</th>
<th>Number of dental operatories</th>
<th>Total Dental Clinic Staffing</th>
<th>Hygienist &amp; Dental Assistant Per Dentist</th>
<th>% with Decay Experience FY10 to FY14 Delta</th>
<th>% with Untreated Decay FY10 to FY14 Delta</th>
<th>% with Sealants FY14</th>
<th>Prevalance Rate FY10 to FY15 Delta</th>
<th>FY14 Visits</th>
<th>Sealants Per Patient FY14 (Ages 0-5)</th>
<th>ECC Access (Ages 0-5) FY14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site A</td>
<td>Area N</td>
<td>14</td>
<td>31</td>
<td>1.7</td>
<td>6.9</td>
<td>-17.8</td>
<td>9</td>
<td>-0.12%</td>
<td>9,682</td>
<td>3.2</td>
<td>1.105</td>
<td></td>
</tr>
<tr>
<td>Site B</td>
<td>Area O</td>
<td>14</td>
<td>21</td>
<td>3.25</td>
<td>-16.8</td>
<td>-26.8</td>
<td>16.6</td>
<td>0.00%</td>
<td>6,371</td>
<td>5.5</td>
<td>4.40</td>
<td></td>
</tr>
<tr>
<td>Site D</td>
<td>Area N</td>
<td>14</td>
<td>20</td>
<td>3.25</td>
<td>5.3</td>
<td>0.09%</td>
<td>5,658</td>
<td>3.3</td>
<td>182</td>
<td>3.9</td>
<td>182</td>
<td></td>
</tr>
<tr>
<td>Site E</td>
<td>Area N</td>
<td>26</td>
<td>37</td>
<td>4.8</td>
<td>0.24%</td>
<td>16,074</td>
<td>4.9</td>
<td>539</td>
<td>5.2</td>
<td>4.4</td>
<td>539</td>
<td></td>
</tr>
<tr>
<td>Site F</td>
<td>Area N</td>
<td>24</td>
<td>48</td>
<td>6.4</td>
<td>-4.5</td>
<td>6.1</td>
<td>0</td>
<td>-2.52%</td>
<td>10,921</td>
<td>3.7</td>
<td>383</td>
<td></td>
</tr>
<tr>
<td>Site G</td>
<td>Area O</td>
<td>10</td>
<td>16</td>
<td>4.5</td>
<td>0</td>
<td>0</td>
<td>5.9</td>
<td>0.14%</td>
<td>4,843</td>
<td>4.4</td>
<td>308</td>
<td></td>
</tr>
<tr>
<td>Site H</td>
<td>Area P</td>
<td>17</td>
<td>13</td>
<td>4.5</td>
<td>-6.96%</td>
<td>7,898</td>
<td>5.3</td>
<td>412</td>
<td>7.3</td>
<td>6.1</td>
<td>227</td>
<td></td>
</tr>
<tr>
<td>Site I</td>
<td>Area P</td>
<td>15</td>
<td>22</td>
<td>4</td>
<td>0.1</td>
<td>-16</td>
<td>2</td>
<td>-0.16%</td>
<td>6,767</td>
<td>6.1</td>
<td>227</td>
<td></td>
</tr>
<tr>
<td>Site J</td>
<td>Area P</td>
<td>16</td>
<td>14</td>
<td>4.5</td>
<td>-4.8</td>
<td>8.8</td>
<td>21.8</td>
<td>0.00%</td>
<td>6,242</td>
<td>5.5</td>
<td>296</td>
<td></td>
</tr>
<tr>
<td>Site K</td>
<td>Area R</td>
<td>6</td>
<td>12</td>
<td>2</td>
<td>13.2</td>
<td>0.00%</td>
<td>5,865</td>
<td>3.3</td>
<td>373</td>
<td>3.3</td>
<td>373</td>
<td></td>
</tr>
</tbody>
</table>
The Oral Health Survey (OHS) of American Indian/Alaska Native Preschool Children is a report of the nationwide Basic Screening Survey of AI/AN children 0-5 year-old. This survey assessed caries prevalence and untreated decay rates in this age group.

- The IHS ECC set a long-term goal to reduce prevalence by 25%
  - Of the sites selected, Site A was the only one to see improvements in prevalence
- For Site A, the OHS showed a 17% improvement in decay experience for children ages 0-5 between 2010 to 2014. Over this time, Site A had a 27% improvement in untreated decay.
- For Site B, the OHS showed no progress on reducing decay experience between 2010 - 2014. Over this time, Site B had a 16% improvement in untreated decay.

### Question for Analysis: How do trends in workload data for short-term outcomes explain improvements in prevalence and untreated decay?

**Data Source: GDM March 11, 2016**

#### Site A

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>% with Decay Experience</td>
<td>83.90%</td>
<td></td>
<td></td>
<td></td>
<td>67.10%</td>
<td>↓ -17%</td>
</tr>
<tr>
<td>% with Untreated Decay</td>
<td>74.20%</td>
<td></td>
<td></td>
<td></td>
<td>47.40%</td>
<td>↓ -27%</td>
</tr>
<tr>
<td>% with Sealants</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Site B**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>% with Decay Experience</td>
<td>79.50%</td>
<td></td>
<td></td>
<td></td>
<td>79.60%</td>
<td>0%</td>
</tr>
<tr>
<td>% with Untreated Decay</td>
<td>60.90%</td>
<td></td>
<td></td>
<td></td>
<td>44.90%</td>
<td>↓ -16%</td>
</tr>
<tr>
<td>% with Sealants</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>17%</td>
</tr>
</tbody>
</table>
Access

Measure Description

- ECC Access data from the IHS Oral Health Data Mart monitors dental encounters with ADA Codes for First Visit of the Fiscal Year By Patient (0000) and Screening of Patient (0190)
- Data from the GDM includes all ECC Access codes and Assessment of Patient (0191)
- Both aim to measure number of children ages 0-5 seen by an IHS dentist

Observations

- Site A increased the number of children ages 0-5 seen from 2010-2015 by 29%. Meeting ECC’s target of 25%
- Site A’s increased access was the greatest for ages 0-2
- The cause of the Site B decreased access is unknown at this time

Data source: GDM March 11, 2016
Sealants

Measure Description

- Sealants are part of the ECC’s caries stabilization strategy. The IHS Oral Health Data Mart tracks ADA Codes 1351 to identify sealant patients.
- ECC Set a goal to increase the number of sealant recipients by 25%

Observations

- Both sites exceeded the ECC goal of increasing number of sealants by 25%
- Site A increased the number of sealants on children ages 0-5 by 90% from 2010-2014
- Site B increased the number of sealant on children ages 0-5 by 102% from 2010-2014

Data source: GDM March 11, 2016
Fluoride

Measure Description

- The ECC Initiative leveraged findings from research that prove the application of fluoride varnish to be an effective method of reducing early childhood caries. ECC set a goal to increase the number of fluoride recipients by 25%.
- The IHS Oral Health Data Mart tracks ADA Code 1203, 1206 or ICD9 Code V07.31 for fluoride varnish application.
- Both aim to measure the number of children ages 0-5 receiving a fluoride application.

Observations

- Site A increased the number of children ages 0-5 receiving fluoride application from 2010-2015 by 88%, exceeding the ECC goal.
- Site A's increased fluoride was the greatest for ages 0-2.
- Site A averaged 1.4 fluoride applications per patient. And 72% of children seen received fluoride.
- The cause of the Site B decreased fluoride patients may be due to decreased access.
- Site B averaged 3.3 fluoride applications per patient. And 96% of children seen received fluoride.

Data source: GDM March 11, 2016
Site A: ECC Outcomes Analysis

Measure Description
- Correlation measures linear association between two variables on a scale of -1 to 1
- Positive correlation means that high values of x are associated with high values of y. Negative correlation means that high values with x are associated with low values of y
- The analysis summarized trends in ECC activities and Severe Patients (ADA Codes 7111 and 7140 Extraction) from 2010-2014
- The desired outcome is a negative correlation between the interventions and severe patients

Observations
- From 2010 to 2014, Site A had a 4% reduction in Severe Patients
- Site A’s workload data shows a large negative correlation between ITRs and severe patients --- As number of ITRs increased the number of severe patients decreased
- Site A’s workload data shows a small negative correlation between number of children with sealants and severe patients --- As the number of children with sealants increased the number of severe patients decreased
- For Site A, Ages 0-2 responded desirably to all interventions. Ages 3-5 had the desired response just for ITR.

Data source: GDM March 11, 2016
Site B: ECC Outcomes Analysis

Measure Description
- Correlation measures linear association between two variables on a scale of -1 to 1
- Positive correlation means that high values of x are associated with high values of y. Negative correlation means that high values with x are associated with low values of y
- The analysis summarized trends in ECC activities and Severe Patients from 2010-2014
- The desired outcome is a negative correlation between the interventions and severe patients

Observations
- From 2010 to 2014, Site B had a 18% reduction in Severe Patients age 0-5
- Site B workload data shows a small negative correlation between ITRs and severe patients --- As number of ITRs increased the number of severe patients decreased
- For Site B, Ages 0-2 had the greatest desired response to sealants, with a small response to ITRs. Ages 3-5 had the greatest response to ITRs.
- Because Site B experienced a drop in access and fluorides, correlations between severe patients and those interventions are difficult to explain

Site B Correlation Analysis

<table>
<thead>
<tr>
<th></th>
<th>Access Patients Total</th>
<th>Sealants Total</th>
<th>Fluoride Patients Total</th>
<th>ITRs Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severe Total</td>
<td>0.98</td>
<td>0.04</td>
<td>0.97</td>
<td>-0.17</td>
</tr>
<tr>
<td>Age 0-2</td>
<td>0.82</td>
<td>-0.11</td>
<td>0.85</td>
<td>-0.04</td>
</tr>
<tr>
<td>Age 3-5</td>
<td>0.91</td>
<td>0.09</td>
<td>0.91</td>
<td>-0.23</td>
</tr>
</tbody>
</table>
Summary

• Analysis of the GDM workload data for Site A and Site B Service Unit reveal that ITRs had the greatest impact on reducing the number of severe patients ages 0-5

Outcomes

<table>
<thead>
<tr>
<th>Short/Intermediate-Term</th>
<th>Site A</th>
<th>Site B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase # of 0-5 yo with at least one dental encounter/year by 25%</td>
<td>29%</td>
<td>17%</td>
</tr>
<tr>
<td>Increase # of sealants placed on 0-5 yo by 25%</td>
<td>25%</td>
<td>52%</td>
</tr>
<tr>
<td>Increase # of 0-5 yo receiving at least one topical fluoride treatment by at least 25%</td>
<td>63%</td>
<td>15%</td>
</tr>
<tr>
<td>Increase # ITRs in 0-5 yo by 50%</td>
<td>3675%</td>
<td>220%</td>
</tr>
</tbody>
</table>

Long-Term

| Decrease prevalence of ECC in AI/AN children ages 0-5 by at least 25% | 17% | - |

IHS OPHS Division of Planning, Evaluation & Research (DPER)
Next Steps

• Closeout ECC Evaluation
  • Provide raw data files and analysis to the program
  • Finalize Findings Brief

• Cohort Study on children born in 2010
  • Have GDM workload for 2010-2015 for all children born during FY 2015
    • 17,273 unique Registration IDs
    • 72,599 encounters
  • Time to Event Analysis with events as Restoration or Extraction