

Cost-effectiveness of Treating Severe Childhood Caries under General Anesthesia versus Conscious Sedation

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APPENDIX

Appendix Table 1. Theoretical Dental Treatment Needs for Severe Early Childhood Caries

Tooth	Dental Treatment
A	Resin (O, Etch, Bond, Filtek Supreme A1 composite, Delton Opaque sealant)
B	Stainless Steel Crown (Dycal, ION D3, Ketac Cement)
D	Resin Crown (Dycal, Etch, Bond, Filtek Supreme A1 composite, D2)
E	Extract (Surgicel Fibrillar, Suture)
F	Extract (Surgicel Fibrillar, Suture)
G	Resin Crown (Dycal, Etch, Bond, Filtek Supreme A1 composite, G2)
I	Pulpotomy & Stainless Steel Crown (Formocresol, Zinc Oxide Eugenol, ION D3, Ketac Cement)
J	Resin (O, Etch, Bond, Filtek Supreme A1 composite, Delton Opaque sealant)
K	Sealant (OF, Etch, Delton Opaque sealant)
L	Sealant (OF, Etch, Delton Opaque sealant)
S	Sealant (OF, Etch, Delton Opaque sealant)
T	Sealant (OF, Etch, Delton Opaque sealant)

Appendix Table 2. Supplement to Table 2: Detailed Micro-costing for the Treatment of Severe Early Childhood Caries under General Anesthesia and Conscious Sedation, 2011.

Description	Cost(\$) ⁺	Source
<i>General Anesthesia Total Costs</i>	<u>9159</u>	
New Patient Exam		
D0140 ^a —Limited Oral Evaluation	40	Graduate Pediatric Clinic ^e
Pre-Operative Medical Appointment ^b	200	UNC Hospitals ^f
Hospital and Anesthesia	6211	
Operating Room	2149	UNC Hospitals
Supplies	700	UNC Hospitals
Anesthesia	800	UNC Hospitals
Anesthesia Support Staff	1310	UNC Hospitals
Recovery Room		
Phase I (30 minutes)	811	UNC Hospitals
Phase I (30 minutes)	441	UNC Hospitals
Treatment	2708	
D0150 – Comprehensive Oral Exam	98	Dental Faculty Practice ^g
D0210 – Intraoral Radiographs, Full Series	117	Dental Faculty Practice
D1120 – Prophylaxis - child	38	Dental Faculty Practice
D1203 – Topical Fluoride	26	Dental Faculty Practice
D9420 – Hospital Call	492	Dental Faculty Practice
D2391 – Resin, 1-surface, posterior, #A(O)	163	Dental Faculty Practice
D2391 – Resin, 1-surface, posterior, #J(O)	163	Dental Faculty Practice
D7140 – Extract, erupted tooth, #E	113	Dental Faculty Practice
D7140 – Extract, erupted tooth, #F	113	Dental Faculty Practice
D2930 – Stainless Steel Crown, #B	282	Dental Faculty Practice
D2930 – Stainless Steel Crown, #I	282	Dental Faculty Practice
D3220 – Therapeutic Pulpotomy, #I	161	Dental Faculty Practice
D2335 – Resin, 4+ surface, anterior, #D(MIDFL)	216	Dental Faculty Practice
D2335 – Resin, 4+ surface, anterior, #G(MIDFL)	216	Dental Faculty Practice
D1351 – Sealant, per tooth, #K	57	Dental Faculty Practice
D1351 – Sealant, per tooth, #L	57	Dental Faculty Practice
D1351 – Sealant, per tooth, #S	57	Dental Faculty Practice
D1351 – Sealant, per tooth, #T	57	Dental Faculty Practice
Complication (laryngospasm)		
Muscle relaxant	100	UNC Hospitals
<i>Conscious Sedation Total Costs</i>	<u>1763</u>	

Visit 1

New Patient Exam

D0150 – Comprehensive Oral Exam **47** Graduate Pediatric Clinic

Physician Physical Evaluation^c **120** UNC Hospitals

Treatment **532**

D0210 – Intraoral Radiographs, Full Series 76 Graduate Pediatric Clinic

D1120 – Prophylaxis - child 34 Graduate Pediatric Clinic

D1206 – Topical Fluoride Varnish 19 Graduate Pediatric Clinic

D2930 – Stainless Steel Crown, #I 152 Graduate Pediatric Clinic

D3220 – Therapeutic Pulpotomy, #I 98 Graduate Pediatric Clinic

D2391 – Resin, 1-surface, posterior, #J(O) 93 Graduate Pediatric Clinic

D1351 – Sealant, per tooth, #K 30 Graduate Pediatric Clinic

D1351 – Sealant, per tooth, #L 30 Graduate Pediatric Clinic

Conscious Sedation

D9248 – Non-Intravenous Conscious Sedation^d **75** Graduate Pediatric Clinic

Visit 2

Treatment **534**

D2390 – Resin-based crown, anterior, #D 182 Graduate Pediatric Clinic

D7140 – Extract, erupted tooth, #E 85 Graduate Pediatric Clinic

D7140 – Extract, erupted tooth, #F 85 Graduate Pediatric Clinic

D2390 – Resin-based crown, anterior, #G 182 Graduate Pediatric Clinic

Conscious Sedation

D9248 – Non-Intravenous Conscious Sedation **75** Graduate Pediatric Clinic

Visit 3

Treatment **305**

D2391 – Resin, 1-surface, posterior, #A(O) 93 Graduate Pediatric Clinic

D2930 – Stainless Steel Crown, #B 152 Graduate Pediatric Clinic

D1351 – Sealant, per tooth, #S 30 Graduate Pediatric Clinic

D1351 – Sealant, per tooth, #T 30 Graduate Pediatric Clinic

Conscious Sedation

D9248 – Non-Intravenous Conscious Sedation **75** Graduate Pediatric Clinic

Follow-up 1 (3-month) **80**

D0120 – Periodic Oral Evaluation 27 Graduate Pediatric Clinic

D1120 – Prophylaxis – child 34 Graduate Pediatric Clinic

D1206 – Topical Fluoride Varnish 19 Graduate Pediatric Clinic

Follow-up 2 (6-month) **80**

D0120 – Periodic Oral Evaluation 27 Graduate Pediatric Clinic

D1120 – Prophylaxis – child 34 Graduate Pediatric Clinic

D1206 – Topical Fluoride Varnish 19 Graduate Pediatric Clinic

Follow-up 3 (12-month)	103	
D0120 – Periodic Oral Evaluation	27	Graduate Pediatric Clinic
D0272 – Bitewings, Two Films (one year)	23	Graduate Pediatric Clinic
D1120 – Prophylaxis – child	34	Graduate Pediatric Clinic
D1206 – Topical Fluoride Varnish	19	Graduate Pediatric Clinic
Follow-up 4 (18-month)	80	
D0120 – Periodic Oral Evaluation	27	Graduate Pediatric Clinic
D1120 – Prophylaxis – child	34	Graduate Pediatric Clinic
D1206 – Topical Fluoride Varnish	19	Graduate Pediatric Clinic
Follow-up 5 (24-month)	103	
D0120 – Periodic Oral Evaluation	27	Graduate Pediatric Clinic
D0272 – Bitewings, Two Films (one year)	23	Graduate Pediatric Clinic
D1120 – Prophylaxis – child	34	Graduate Pediatric Clinic
D1206 – Topical Fluoride Varnish	19	Graduate Pediatric Clinic
Recurrent Caries	186	
D2391 – Resin, 1-surface, posterior	93	Graduate Pediatric Clinic
D2391 – Resin, 1-surface, posterior	93	Graduate Pediatric Clinic

Note: ^aAll costs are presented in 2011 US dollars. ^aAmerican Dental Association CDT Codes. ^bPre-Operative Medical Appointment includes a medical exam and anesthesia work-up. ^cPhysician Physical Evaluation includes a medical exam. ^dNon-Intravenous Conscious Sedation includes medical monitoring and sedation medication. ^eGraduate Pediatric Clinic= Dental treatment performed under conscious sedation and traditional chair-side dentistry at the University of North Carolina is billed according to the School of Dentistry 2011-2012 Graduate Pediatric Dentistry Program Fee Schedule. ^fUNC Hospitals=University of North Carolina Hospitals typical Medicaid reimbursement for dental patients undergoing general anesthesia. ^gFaculty Dental Practice=Dental treatment performed under general anesthesia at the University of North Carolina is billed according to the School of Dentistry 2011-2012 Faculty Dental Practice Fee Schedule.

Appendix Table 3. Supplement to Table 2: Detailed Micro-costing for the Treatment of Severe Early Childhood Caries under General Anesthesia and Conscious Sedation, 2015.

Description	Cost(\$) ⁺	Source
<i>General Anesthesia Total Costs</i>	<u>12531</u>	
New Patient Exam		
D0140 ^a —Limited Oral Evaluation	40	Graduate Pediatric Clinic ^e
Pre-Operative Medical Appointment ^b	300	UNC Hospitals ^f
Hospital and Anesthesia	9145	
Operating Room	3094	UNC Hospitals
Supplies	700	UNC Hospitals
Anesthesia	1996	UNC Hospitals
Anesthesia Support Staff	1959	UNC Hospitals
Recovery Room		
Phase I (30 min)	1235	UNC Hospitals
Phase II (30 min)	161	UNC Hospitals
Treatment	3046	
D0150 – Comprehensive Oral Exam	108	Dental Faculty Practice ^g
D0210 – Intraoral Radiographs, Full Series	127	Dental Faculty Practice
D1120 – Prophylaxis - child	42	Dental Faculty Practice
D1203 – Topical Fluoride	43	Dental Faculty Practice
D9420 – Hospital Call	538	Dental Faculty Practice
D2391 – Resin, 1-surface, posterior, #A(O)	179	Dental Faculty Practice
D2391 – Resin, 1-surface, posterior, #J(O)	179	Dental Faculty Practice
D7140 – Extract, erupted tooth, #E	159	Dental Faculty Practice
D7140 – Extract, erupted tooth, #F	159	Dental Faculty Practice
D2930 – Stainless Steel Crown, #B	308	Dental Faculty Practice
D2930 – Stainless Steel Crown, #I	308	Dental Faculty Practice
D3220 – Therapeutic Pulpotomy, #I	174	Dental Faculty Practice
D2335 – Resin, 4+ surface, anterior, #D(MIDFL)	235	Dental Faculty Practice
D2335 – Resin, 4+ surface, anterior, #G(MIDFL)	235	Dental Faculty Practice
D1351 – Sealant, per tooth, #K	63	Dental Faculty Practice
D1351 – Sealant, per tooth, #L	63	Dental Faculty Practice
D1351 – Sealant, per tooth, #S	63	Dental Faculty Practice
D1351 – Sealant, per tooth, #T	63	Dental Faculty Practice
Complication (laryngospasm)		
Muscle relaxant	100	UNC Hospitals
<i>Conscious Sedation Total Costs</i>	<u>1842</u>	

Visit 1

New Patient Exam

D0150 – Comprehensive Oral Exam	50	Graduate Pediatric Clinic
Physician Physical Evaluation ^c	120	UNC Hospitals
Treatment	562	
D0210 – Intraoral Radiographs, Full Series	80	Graduate Pediatric Clinic
D1120 – Prophylaxis - child	36	Graduate Pediatric Clinic
D1206 – Topical Fluoride Varnish	24	Graduate Pediatric Clinic
D2391 – Resin, 1-surface, posterior, #J(O)	102	Graduate Pediatric Clinic
D2930 – Stainless Steel Crown, #I	160	Graduate Pediatric Clinic
D3220 – Therapeutic Pulpotomy, #I	98	Graduate Pediatric Clinic
D1351 – Sealant, per tooth, #K	31	Graduate Pediatric Clinic
D1351 – Sealant, per tooth, #L	31	Graduate Pediatric Clinic
Conscious Sedation		
D9248 – Non-Intravenous Conscious Sedation ^d	80	Graduate Pediatric Clinic

Visit 2

Treatment	546	
D2390 – Resin-based crown, anterior, #D	182	Graduate Pediatric Clinic
D7140 – Extract, erupted tooth, #E	91	Graduate Pediatric Clinic
D7140 – Extract, erupted tooth, #F	91	Graduate Pediatric Clinic
D2390 – Resin-based crown, anterior, #G	182	Graduate Pediatric Clinic
Conscious Sedation		
D9248 – Non-Intravenous Conscious Sedation	80	Graduate Pediatric Clinic

Visit 3

Treatment	324	
D2391 – Resin, 1-surface, posterior, #A(O)	102	Graduate Pediatric Clinic
D2930 – Stainless Steel Crown, #B	160	Graduate Pediatric Clinic
D1351 – Sealant, per tooth, #S	31	Graduate Pediatric Clinic
D1351 – Sealant, per tooth, #T	31	Graduate Pediatric Clinic
Conscious Sedation		
D9248 – Non-Intravenous Conscious Sedation	80	Graduate Pediatric Clinic

Follow-up 1 (3-month)

	89	
D0120 – Periodic Oral Evaluation	29	Graduate Pediatric Clinic
D1120 – Prophylaxis – child	36	Graduate Pediatric Clinic
D1206 – Topical Fluoride Varnish	24	Graduate Pediatric Clinic

Follow-up 2 (6-month)

	89	
D0120 – Periodic Oral Evaluation	29	Graduate Pediatric Clinic
D1120 – Prophylaxis – child	36	Graduate Pediatric Clinic
D1206 – Topical Fluoride Varnish	24	Graduate Pediatric Clinic

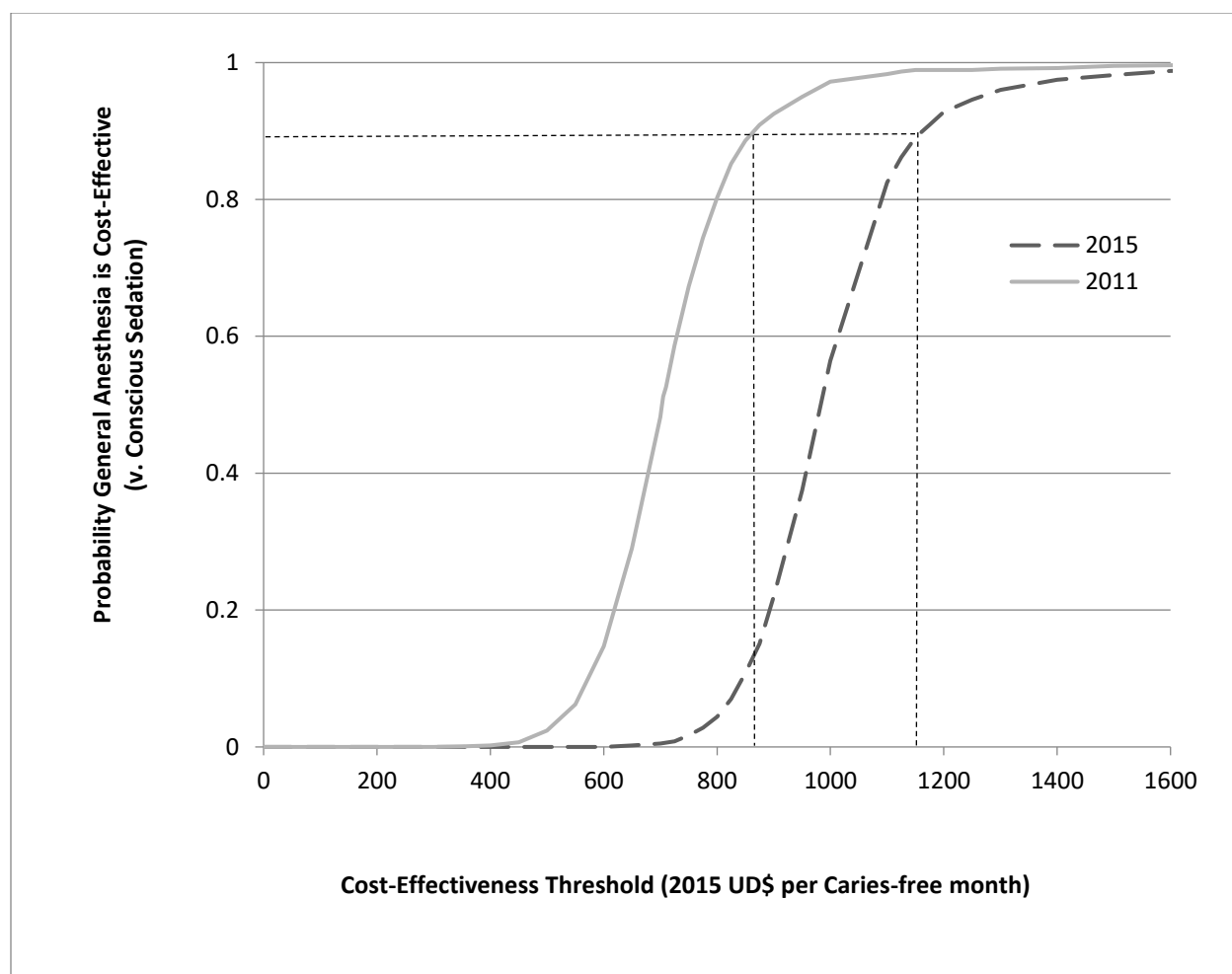
Follow-up 3 (12-month)	112	
D0120 – Periodic Oral Evaluation	29	Graduate Pediatric Clinic
D0272 – Bitewings, Two Films (one year)	23	Graduate Pediatric Clinic
D1120 – Prophylaxis – child	36	Graduate Pediatric Clinic
D1206 – Topical Fluoride Varnish	24	Graduate Pediatric Clinic
Follow-up 4 (18-month)	89	
D0120 – Periodic Oral Evaluation	29	Graduate Pediatric Clinic
D1120 – Prophylaxis – child	36	Graduate Pediatric Clinic
D1206 – Topical Fluoride Varnish	24	Graduate Pediatric Clinic
Follow-up 5 (24-month)	112	
D0120 – Periodic Oral Evaluation	29	Graduate Pediatric Clinic
D0272 – Bitewings, Two Films (one year)	23	Graduate Pediatric Clinic
D1120 – Prophylaxis – child	36	Graduate Pediatric Clinic
D1206 – Topical Fluoride Varnish	24	Graduate Pediatric Clinic
Recurrent Caries	204	
D2391 – Resin, 1-surface, posterior	102	Graduate Pediatric Clinic
D2391 – Resin, 1-surface, posterior	102	Graduate Pediatric Clinic

Note: ^aAll costs are presented in 2015 US dollars. ^aAmerican Dental Association CDT Codes. ^bPre-Operative Medical Appointment includes a medical exam and anesthesia work-up. ^cPhysician Physical Evaluation includes a medical exam. ^dNon-Intravenous Conscious Sedation includes medical monitoring and sedation medication. ^eGraduate Pediatric Clinic= Dental treatment performed under conscious sedation and traditional chair-side dentistry at the University of North Carolina is billed according to the School of Dentistry 2015-2016 Graduate Pediatric Dentistry Program Fee Schedule. ^fUNC Hospitals=University of North Carolina Hospitals typical Medicaid reimbursement for dental patients undergoing general anesthesia. ^gFaculty Dental Practice=Dental treatment performed under general anesthesia at the University of North Carolina is billed according to the School of Dentistry 2015-2016 Faculty Dental Practice Fee Schedule.

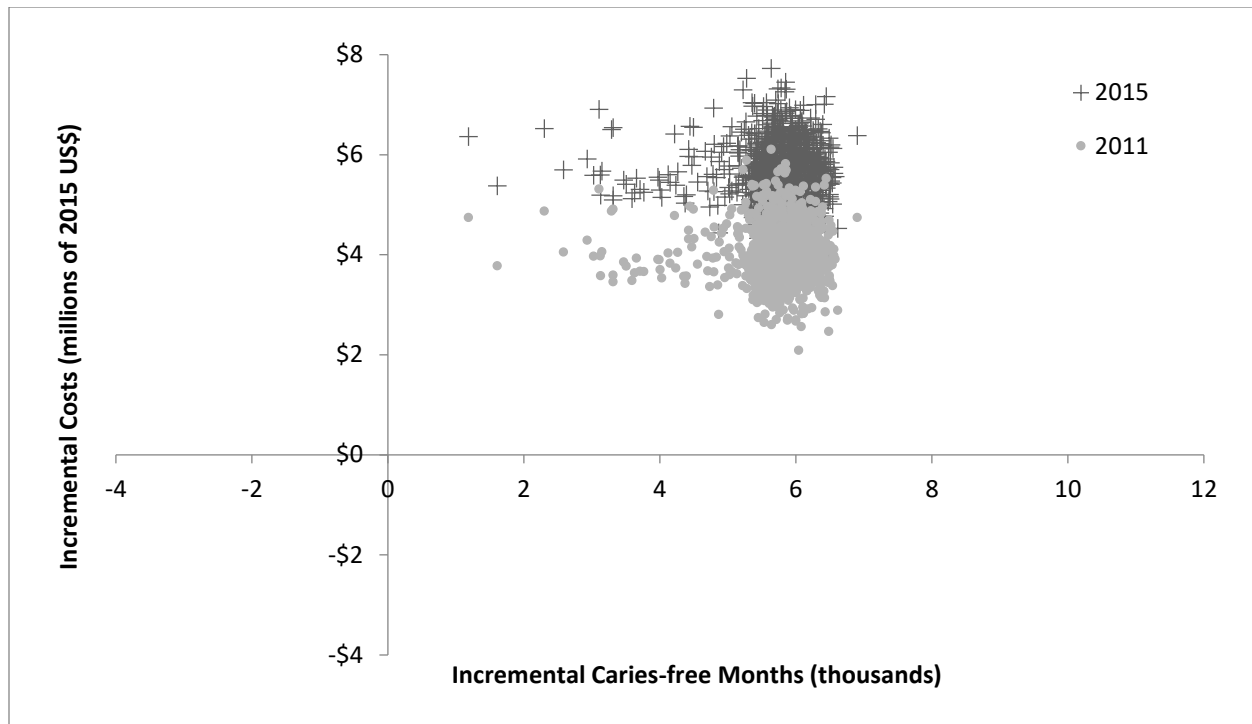
Appendix Table 4. Outcomes of Treating Severe Early Childhood Caries using General Anesthesia (GA) and Conscious Sedation (CS)

Description	CF months	Range
Outcomes – Caries Free Months		
Successful treatment without additional caries-related treatment needs ⁺	21	19-23 ^a
Successful treatment with additional caries-related treatment needs	19	11-20 ^b
Partial Treatment	0	0
No treatment	0	0
Unsuccessful CS visit 1 followed by successful GA without additional caries-related treatment needs	20	18-22
Unsuccessful CS visit 1 with successful GA with caries-related treatment needs	18	9-22
Unsuccessful CS visit 2 with successful GA without caries-related treatment needs	19	17-21
Unsuccessful CS visit 2 with successful GA with caries-related treatment needs	17	8-21
Unsuccessful CS visit 3 with successful GA without caries-related treatment needs	18	16-20
Unsuccessful CS visit 3 with successful GA with caries-related treatment needs	16	8-20

Note: ⁺Caries-related treatment needs are the presence of dental caries that require treatment and are detected at a follow-up dental visit after successful dental rehabilitation under general anesthesia or conscious sedation. ^aAssumption: comprehensive treatment occurs by three months of the new patient intake. ^bAssumption: caries-related treatment needs are detected and treated within two months.



Appendix Figure 1. Cost-Effectiveness Acceptability Curve of Treating Severe Early Childhood Caries under General Anesthesia (GA) Compared to Conscious Sedation (CS) for 2011 and 2015. *In 2011, there was a 90 percent probability that GA was more cost-effective than CS if Medicaid was willing to pay \$878 more per caries-free month (Figure 2). Similarly, if Medicaid was willing to pay \$1,162 more per caries-free month, there was a 90 percent chance that GA was more cost-effective than CS in 2015 (Figure 2).*



Appendix Figure 2. Incremental Costs and Benefits of Treating Severe Early Childhood Caries (S-ECC) under General Anesthesia (GA) Compared to Conscious Sedation in 2011 (circles) and 2015 (pluses). Each data point in the cost-effectiveness plane represents one of a 1,000 simulations, each of which models a cohort of 1,000 healthy three year-old children with S-ECC. The slope of each data point is the ICER, which is the ratio of incremental costs over incremental caries-free months. *The cost-effectiveness plane illustrates that GA results in higher incremental costs and more incremental caries-free months compared to CS in 100 percent of the simulations for both 2011 and 2015 (Northeast quadrant).*