Assessing Cost-Effectiveness of Sealant Placement in Children

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Abstract

***Objective**: The lack of cost-effectiveness information regarding sealant placement strategies is thought to have influenced reimbursement policies and subsequent sealant utilization in dental practice. This study compared three strategies for managing the occlusal surfaces of first permanent molars: seal all (SA), risk-based (RBS), and seal none (SN). **Methods**: A decision tree was developed for various possible outcomes following each of the above strategies. Due to the complexity of the decision tree, a Markov model was used to allow for the construction of a chain of events representing the natural history of sealant retention, caries formation, and their associated health states. The outcome measures were the incremental cost per month gained in a cavity-free state over a ten-year period. **Results**: Our theoretical model showed that RBS strategy improved clinical outcomes, in the form of cavity-free months, and saved money over SN. The strategy of sealing both high and low risk teeth (SA) further improved outcomes but at an additional cost compared to RBS. However, the cost was small, $.08 for each additional cavity-free month gained per tooth. Further, minor changes in the baseline assumptions resulted in the SA strategy being the dominant strategy. **Conclusion**: This study provides evidence that sealing children's first permanent molars can improve outcomes and save money by delaying or avoiding invasive treatment and the destructive cycle of caries. In a time of limited funds for dental services, these results can assist payers in establishing more rational sealant reimbursement policies.*

Key Words: sealant, cost-effectiveness, decision analysis, Markov model

Introduction

Pits and fissures on permanent molar teeth remain the overwhelmingly dominant sites for dental caries. Currently, this accounts for nearly 90% of all lesions in school-age children with two-thirds occurring in the occlusal surface and increasing slowly each year (1).

Sealant placement can optimize the chance of preventing or delaying the development of a carious lesion; increasing the time a tooth spends in a caries-free, non-restored state (2, 3, 4). However, the lack of more compelling cost-effectiveness data and restrictive reimbursement policies have been cited as principal reasons for decreased sealant utilization (5, 6, 7). Recent national statistics indicate that less than 24% of eight-year-old children have one or more sealants on their molar teeth (8, 9). However, this percentage remains below the 50% goal set by Healthy People 2010 for all children by the year 2000 (2,10).

One approach to addressing sealant underutilization is to encourage targeted sealant placement as advocated by the American Academy of Pediatric Dentistry. This "high-risk" strategy is based on the notion that low risk children are less likely to develop disease and therefore resources are being used for children that may not need it. However, the lack of supportive effectiveness data on risk-based strategies is problematic.

With rising health care costs and limited resources, there is increasing need for evaluation of sealant policies. Thus, the purpose of this study was to determine the cost-effectiveness of three different preventive sealant strategies. Strategy #1 was to seal all (SA) children's first permanent molar occlusal surfaces regardless of their caries risk. Strategy #2 was risk-based sealants (RBS) for the teeth of only children who are at high risk for caries. Strategy #3 was seal none (SN) or no sealant to teeth regardless of a child's risk, but waiting to provide a restoration when and if required. We compared these strategies by determining the costs to maintain a cavity-free state per month over a ten-year period.

Materials and Methods

We identified the options and outcomes associated with the choices available for managing an occlusal surface of a first permanent molar. A decision tree was developed for various outcomes possible following each strategy. Due to the complexity of the time dependence of various transitions and factors that influence the outcomes of managing molars, we selected the Markov technique for modeling the natural course of events. Although the use of this economic model has been limited in dentistry, it has been used widely in medicine to model chronic diseases such as cardiovascular disease and diabetes. It is used when a decision problem involves risk that is continuous over time and events may happen more than once (11, 12). For sealant utilization, Markov modeling allows for the

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construction of an arbitrarily complex chain of events that more accurately represents the natural history of sealant retention, caries formation, and their associated health states.

Figure 1 shows a Markov model representing the possible health states that follow the three strategies for managing occlusal surfaces of molar teeth of a child population. The ovals represent health states and arrows transitions between them. Each transition is associated with the probability of movement from one state to another over a one-month cycle. As the model is run, costs are associated with transitions such as replacing a sealant, and effectiveness is represented as time spent in a cavity-free state, allowing cost-minimization and cost-effectiveness analysis.

The model represents six nodes or health states of the child's tooth: low-risk sealed, low-risk not sealed, high-risk sealed, high-risk not sealed, carious, and restored. The lines with arrows represent transitions from one state to the next. A sealed tooth may lose its seal and remain sound or transition to a carious and restored state. An unsealed tooth may become carious and ultimately restored. A restored tooth may develop another occlusal lesion. The probabilities of the transitions vary depending on the strategy chosen and the risk stratum of the tooth. For example, in the SN strategy, the transition probabilities from the SN states to the sealed states are zero (represented by the dotted lines). The transition probability from SN to "caries" is higher for the high-risk tooth. Table 1 lists our study assumptions.

FIGURE 1
Markov model of sealants

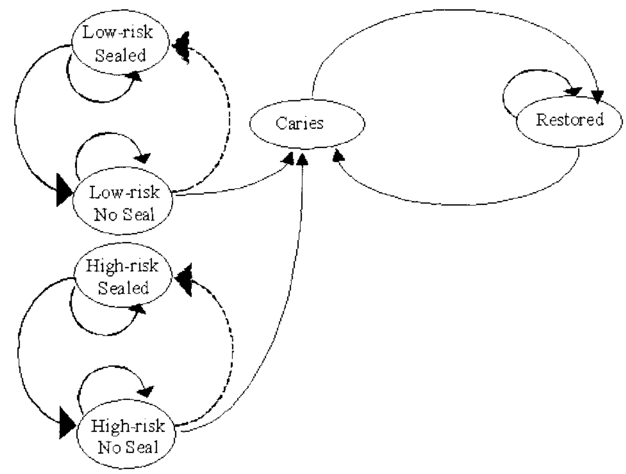


TABLE 1
Study assumptions

- A sound tooth: Valued equally to a sealed tooth and better than a restored tooth
- Unit of analysis: Occlusal surface of a first permanent molars tooth
- Low and high risk children: 80% and 20% respectively, with equal loss of sealant rates
- Rate of sealant loss: Ten to twelve percent rate of loss at one year and fifty to sixty percent retention at five years with very little change at ten years. The Markov cycle rather than the actual age of the sealant determine the rate of sealant loss
- Risk of experiencing caries on permanent molar teeth: Constant through childhood and early adolescence
- Carious lesions: All will be restored.
- Restoration material: Amalgam
- Teeth resealed: Annual rate of 3.91%
- Cost: Class 1 amalgam restoration = $101.79, Sealant = $33.19
- Simulation time: Ten years or 120 months
- Discount rate: 3.0%

Review of the literature for transitional probabilities. Transition probabilities of the likelihood that a tooth will move from one health-state to another during a (one-month) cycle were derived from a review of longitudinal studies of sealant outcomes. The search included articles published prior to January, 2002 and were selected by a single reviewer using Medline. The following criteria were applied: (a) availability of data on sealant retention/failure and caries outcomes, (b) human clinical studies in pediatric populations, (c) availability of manuscripts in English, (d) data including permanent first and/or second molar teeth only, (e) traditional etching technique of sealant placement with no additional preparation, (f) occlusal pit and fissure surfaces of the teeth, and (g) review articles that summarized the literature. Based on these criteria, 20 articles were selected (13-32).

Transition probabilities were obtained and averaged by placing equal weight on each study. The use of sensitivity analysis precluded the need for standard errors. Because these studies had variable lengths, transitional probabilities were converted to an annual rate by assuming that the rate of the event was constant overtime and could happen any number of times during the observation period (Table 2). Furthermore, the probability of the event happening once was independent of it happening subsequently. Thus, *Observed probability* = $1-(1-rate)^y$, where the observed probability is the probability an event was observed over y years as reported in the literature. *Rate* refers to the annual rate at which the event happens. We adjusted the rate until the formula yielded the probability observed in the study.

TABLE 2
Annualized transition probabilities derived from the literature (%)

Percent (%)	*Sealant→ Failure (13-28)*	*Failed sealant→ Reseal (13,17,23)*	*No sealant → Cavity/ Restoration (14,15,27,29, 30)*	*Failed sealant→ Cavity/ Restoration (13,15,22,26)*	*Restore→ Restore (20,31,32)*
Mean	9.83	3.91	8.07	1.84	11.22
Median	8.80	3.90	5.60	1.00	13.00
Min-Max	0.60-34.55	1.0-7.6	2.64-18.5	0.46-8.3	4.65-16.0

Costs were calculated from the payer's perspective, using charges from the ADA Survey of Dental Fees and Claims Data from the early 90's (35,36) for general dentists. This cost information was adjusted by 5% annual inflation to estimate year 2002 fees. Only direct health care costs were included in the model.

Panel of experts to review probabilities and costs of treatments. We recruited a seven-member expert panel with diverse clinical and research backgrounds ranging from 5-30 years. Three were dentists in private practice, three in academic settings and one a public health dentist. The 20 articles from the literature review and the derived transitional probabilities were sent to each panel member prior to convening. A trained facilitator (a physician) with expertise in decision theory and no experience in clinical dentistry led the meeting. This group process involved discussions of the readings and consensus building of the mean, median, and ranges of transitional probabilities to be used in the Markov modeling process. When panel consensus was not reached, a nominal group method and majority vote approach was used. We used parameter estimates from this panel when the literature was ambiguous or incomplete.

There was unanimous agreement that most sealant loss happened early following initial placement of sealants with a progressive decay over time. Group consensus was a ten to twelve percent rate of loss at one year and 40-50% loss at five years with very little additional loss up to ten years (13). The panel also reached consensus on the prevalence of high-risk children at 20% based on evidence indicating that 20% of children have 80% of disease (33,34). Once a high-risk tooth was sealed it was assumed that this would not automatically change the risk of the child and if the child were at high risk, this would remain true for the time of the simulation. Similarly, consensus was reached that the range of treatment costs (i.e. sealant, one surface permanent amalgam and one surface permanent resin on a permanent molar) from the ADA Survey of Dental Fees and Claims Data from the early 90's (35,36) for general dentists was appropriate.

Developing the decision model. Prior to initiating the Markov model, the annual probabilities were converted to monthly probabilities using the formula $P_{\text{Annual}}=1-(1-P_{\text{Monthly}})^{12}$ (Table 3). This formula assumed that there can be more than one lesion per tooth in a given year and that any number of cavities in a year is counted as one in the annual estimates.

There was no specific probability used for a sealed tooth loosing its sealant because it changes over time. The monthly risk of losing a tooth's sealant, R, was modeled by an exponential formula, $R = a \times e^{(-b \times M)}$, where R is the monthly probability of losing the sealant, M is the number of months the sealant remained in place, and a and b are constants. The baseline values for the constants were $a = 0.01$ and $b = 0.012$. These values were selected empirically to create a curve that matched the behavior the expert panel described. This model also explains why the average rate of sealant loss is lower for longer studies. To illustrate: the model predicts that a study following children for 24, 60 and 120 months would see an average annual sealant failure of 9%, 7% and 5%, respectively, similar to what is described in the literature.

Transition probabilities were used to distribute a hypothetical cohort, according to the strategy chosen, into "High-Risk Sealed," "Low-Risk Sealed," "High-Risk No Seal" or "Low-Risk No Seal." With each cycle the cohort was redistributed according to the transition probabilities. The cycles were one month in duration with 120 cycles (10 years) in the simulation. We chose a 10-year simulation because the relative benefit would play out over this time period. Sensitivity analysis was used to test the effects of this assumption.

TABLE 3
Baseline values for monthly transition probabilities and costs used for Markov model

Name	Description	Value
Probabilities(P)		
P-getReSealed	The probability of getting a lost sealant replaced	0.0035
P-hiRisk	Prevalence of high risk children	0.2
P-hiRiskCav	Probability high risk tooth will have cavity	0.023
P-loRiskCav	Probability of a low risk tooth getting a cavity	0.0034
P-restoredCav	Probability of a restored tooth getting a cavity	0.00985
Costs (c)		
C-get_Sealed	The cost of getting a sealant placed	$33.19
C-restore	The cost of restoring a tooth with amalgam	$101.79

For each cycle, our model "credited" the proportion of the cohort in the "High-Risk Sealed," "Low-Risk Sealed," "High-Risk No Seal" and "Low-Risk No Seal" with one cavity-free month. Also during each cycle, the proportion of the cohort that transitioned from an unsealed state to a sealed state incurred the cost of sealing, and the proportion of the cohort that transitioned from caries to restored incurred the cost of restoration. Thus, with each cycle, the cohort incurred both costs (in dollars) and benefits (in cavity-free months). In other words, the measured effect was the number of months before the first cavity. Costs (dollars) and effect (cavity free months) were discounted at a baseline annualized discount rate of 3% (37).

We used sensitivity analysis to test the robustness of the model and to identify important areas of uncertainty around our assumptions. The primary outcomes of the analysis were the average overall cost of each strategy and the incremental cost per cavity free month gained moving from one strategy to the next. The incremental cost per cavity free month was calculated as the ratio of the difference in costs between alternatives to the difference in effectiveness between the alternatives, also called incremental cost effectiveness ratio (ICER). The decision model was developed using DATA 4.0 software (38).

TABLE 4
Results of the baseline cost effectiveness analysis

Strategy	Cost	Incr Cost	Eff	Incr Eff	C/E	Incr C/E
Risk Based	$53.8		86.4		0.62	
Seal All	$54.6	$0.9	97.4	11.1	0.56	0.08
No Seal	$68.1	$13.5	76.3	-21.1	0.89	(Dominated)

Results

Baseline analysis. The results of the baseline cost-effectiveness analysis are shown in Table 4. The rows represent the three strategies analyzed in order of increasing average cost (per tooth). The Cost column represents the average of the modeled costs incurred per tooth over 120 cycles, or ten years. The incremental cost (Incr Cost) is the difference between the average cost of a strategy and the next most expensive strategy. The effect (Eff) is the average number of cavity-free months expected per tooth or the average number of months before the first cavity. The incremental effect (Incr Eff) is the difference between the average effect of the strategy and the one above it. The cost-effectiveness (C/E) ratio is the ratio of the average cost to the average effect of each strategy. The ICER is the additional cost per unit increase in effect that can be achieved by moving from the less expensive to the more expensive strategy.

The analysis indicated that SN strategy was dominated, meaning it was both more costly and less effective than the other two strategies. The least expensive strategy was RBS; however, the most effective strategy was SA. Over a ten-year period, the SN strategy cost $13.50 and $14.30 per tooth more than SA and RBS strategies, respectively. The SA strategy cost an additional $.08 per tooth for each cavity-free month gained (i.e., for every month the first cavity would be delayed in the average tooth), when compared to RBS. This implies that when compared to RBS, SA children's teeth irrespective of risk would cost about $.96 cents for every year a cavity was delayed. Furthermore, SA would provide protection from developing a carious lesion for 97.4 months (8.12 years), an additional 21 months over not sealing a tooth at all and 11.1 cavity-free months over choosing to RBS.

Sensitivity analysis. We conducted sensitivity analysis on discount rate, length of simulation and proportion of children at high-risk. Similar analysis on the likelihood of a high-risk child, low-risk child, and restored tooth having a carious lesion, sealant loss, and costs of sealant and restorations were performed.

Discount rate. The results of the analysis were sensitive to the discount rate chosen. With a zero discount rate, SA was the dominant strategy, offering both lower cost and better outcomes. Because the SA strategy involves up-front costs (sealants) with downstream effectiveness (cavity-free months) and cost savings (from restorations), higher discount rates favor the other strategies. As we discounted future costs and effects, SA became more costly but more effective than RBS. Even at a 12% discount rate, the SN strategy was the most costly and least effective strategy. Moreover, SA was only $1.32 per cavity-free month gained.

Duration of simulation. The baseline analysis covered a 10-year time period. In our sensitivity analysis, we extended the timeline to 240 months. We found that at 125 months (just 5 months over our baseline value) the SA strategy became dominant, less expensive and more effective than RBS and SN. In other words, after 125 months, SA strategy pays for itself in restorations prevented. It is important to note that when using lower simulation periods cost-effectiveness of sealing a first permanent molar is less favorable because benefits have not had time to accrue. However, some caution in the interpretation should be considered for the lengthier time periods given that transition probabilities may change over time.

Proportion of patients who are high risk. At baseline, we assumed 20% of teeth would be classified as "high risk." The analysis was almost completely insensitive to this estimate. The cost and effectiveness of the SA and RBS were almost identical, regardless of the prevalence of high risk. This was because both the incremental cost and the incremental effect of going from RBS to SA decrease as the prevalence of high risk increases. Thus, the ICER remains $0.08 per cavity-free month gained regardless of the prevalence of high risk. (Table 5).

Probability of a high risk tooth developing a lesion. High-risk teeth at baseline had a 0.023 monthly probability of developing a lesion, corresponding to an annual risk of 24%. When we varied this between the baseline risk for low-risk teeth and 100%, we found that RBS was always slightly less expensive and slightly less effective than SA. SN was always the most expensive and least effective strategy. ICER was minimally affected by the probability of a high-risk tooth developing a lesion except for very low values where RBS becomes very expensive per cavity free-month.

Probability of a low risk tooth having a cavity. Low-risk teeth at baseline had a 0.0034 monthly probability of developing a lesion, corresponding to an annual risk of 4%. In our sensitivity analysis, we found that the threshold value for switching from the RBS strategy to the SA strategy was only slightly above this (at 0.0035), corresponding to a 4.1% annual risk. This means that sealing low risk teeth is at the break-even point on cost. In other words, if a tooth is above a 4% annual risk of developing a cavity, sealing it will save money on average. If it is less than 4%, it will cost more than it saves; however, sealing it will always be more effective in terms of cavity-free months.

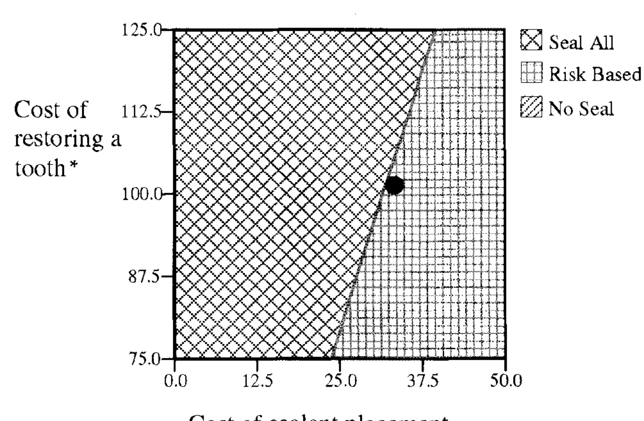
Probability of a restored tooth having a cavity. At baseline, based on expert opinion we assumed that a restored tooth had an increased risk of developing a cavity. We used the annual "restored-to-restored" transition value of 11.2% for all teeth that had been restored, corresponding to a monthly rate of 0.01. Testing this assumption with sensitivity analysis, we found that if the risk of caries following restoration were greater than 0.011 per month (about 12% per year), then SA was both more effective and saved cost.

Sealant loss. One assumption that this model makes is that the Markov cycle rather than the actual age of the sealant determine the rate of sealant loss. This is a result of the Markov property, which does not distinguish between a tooth that has been sealed one month ago from one that has been sealed several months ago. This assumption creates a slight bias toward sealing teeth. To test whether this assumption affects the results of the analysis, we ran the model assuming a constant annual rate of sealant loss of 8.7%, based on pooled data from the literature. We found that using this constant rate of sealant loss had no effect on the results of the model. RBS was still the least expensive strategy and dominated SN. The SA strategy cost $.18 more for each cavity-free month gained. Sensitivity analysis showed that if the constant annual rate of sealant loss was below 7%, the SA became dominant. SN would save money only if the annual rate of sealant loss exceeded 35%.

TABLE 5
Calculation of ICER for three dental sealant strategies with different disease prevalence

Probability of High Risk	Strategy	Cost	Incr Cost	Eff	Incr Eff	C/E	Incr C/E
0	No Seal	$47.00		86.14		0.55	
	Risk Based	$47.00		86.14		0.55	(Ext Dom)
	Seal All	$48.10	$1.10	99.98	13.84	0.48	0.08
0.167	Risk Based	$52.63		86.33		0.61	
	Seal All	$53.55	$0.92	97.87	11.53	0.55	0.08
	No Seal	$64.62		77.96		0.83	(Dominated)
0.333	Risk Based	$58.27		86.53		0.67	
	Seal All	$59.00	$0.73	95.75	9.23	0.62	0.08
	No Seal	$82.23		69.79		1.18	(Dominated)
0.50	Risk Based	$63.91		86.72		0.74	
	Seal All	$64.46	$0.55	93.64	6.92	0.69	0.08
	No Seal	$99.85		61.62		1.62	(Dominated)
0.667	Risk Based	$69.54		86.92		0.80	
	Seal All	$69.91	$0.37	91.53	4.61	0.76	0.08
	No Seal	$117.47		53.44		2.20	(Dominated)
0.833	Risk Based	$75.18		87.11		0.86	
	Seal All	$75.36	$0.18	89.42	2.31	0.84	0.08
	No Seal	$135.09		45.27		2.98	(Dominated)
1.00	Risk Based	$80.82		87.30		0.93	
	Seal All	$80.82	$0.00	87.30	0.00	0.93	(Undefined)
	No Seal	$152.71		37.09		4.12	(Dominated)

FIGURE 2
Sensitivity analysis on the cost of obtaining a sealant and cost of restoring a tooth



* Cost in US dollars

Costs of sealants and restoration. The costs of each strategy are driven by the cost of sealing a tooth (baseline estimate = $33.19) and the cost of restoring a tooth with a cavity on the occlusal surface (baseline estimate = $101.79). Figure 2 shows a two-way sensitivity analysis that varies the cost of sealants (x-axis) and cost of restoration (y-axis) together. This figure is particularly useful given the variation in fee schedules between the public and private dental delivery sectors (i.e.: Medicaid *vs.* private fee schedules). The "dot" represents the baseline values used in the model. Any combination of costs of sealants and restorations that falls in the upper left region would favor SA; combinations falling in the lower right area favor RBS. Thus, if the cost of placing the sealant were reduced to less than $32.20, SA teeth would be the dominant strategy, saving costs and improving outcomes relative to the other two strategies. Similarly, when the cost of restoring a carious tooth was increased, the cost of the RBS strategy increased faster than the SA strategy. When the cost of restoration is above $114.00, SA was the dominant strategy.

As the cost of getting a sealant placed increased, the ICER of all strategies increased. At values below the baseline, SA became more expensive than RBS, but remained more effective. Similarly, as the cost of restoring a tooth increases, the ICER for all three strategies goes down. At our baseline value and below, SA is more effective and more expensive. At a point slightly above our baseline, SA becomes the dominant strategy. SN was always dominated.

Discussion

We investigated the cost-effectiveness of three sealant strategies. Under baseline assumptions, we found that the delivery of RBS improves clinical outcomes in the form of cavity-free months and saves money over SN. However, SA further improves outcomes but at a small incremental cost relative to RBS.

Sensitivity analysis showed that the SA strategy was less costly and more effective with lower discount rates, when risk of caries following restoration exceeded 12% per year, and when the simulation period was greater than 125 months. Also, if sealants were slightly less expensive or restorations slightly more expensive than our baseline costs, the SA strategy would save costs relative to the alternatives. The decision was essentially insensitive to the proportion of children at high risk. The increased cost with increasing prevalence was proportionately offset by the increase in effectiveness. However, if low risk children were at just slightly higher risk of cavities, SA was cost saving. This suggests that the risk assessment needs to be accurate and the onus is on dentists to be sure a child is at low risk of cavities before withholding sealants.

Few studies have examined the question of sealant cost-effectiveness (39,40), with Griffin *et al.*, (41) the first to compare RBS strategy to SN and SA. Over a nine-year horizon and 3% discount, they found RBS to be less costly and more effective relative to the SN and SA strategies. SN strategy was always more costly than RBS and SA. When plotting their baseline costs of sealants and one surface amalgam restorations, $27.00 and $73.77 respectively, against our two-way sensitivity analysis varying the cost of sealants and restoration together (Figure 2), their cost results are consistent with our findings. However, although Griffin (41) examined the ordinal relationship of sealant effectiveness, our effectiveness results were different and can be explained by the use of a more elaborate and flexible modeling process and assumptions.

Some of the variation in assumptions between Griffin (41) and our study included the use of annual incremental caries as a constant and aggregate value. Griffin (41) used a constant caries rate and applied sensitivity and specificity assumption to distinguish between high and low risk children. In contrast, we used differential rates for children that fell into these risk categories. Accordingly, we had an increased rate of caries among high-risk children. In addition, we chose the use of "caries-free months" as our effectiveness measure over annual incremental caries due to its greater applicability in clinical care, relevance to third-party payers and reflection of the intrinsic value of retaining an intact tooth and delaying the formation of the first carious lesion. Also, our amalgam failure was twice as high and our costs for sealants and amalgams were greater.

Previous analyses of this problem have used simple decision models with fixed average outcomes (41,42). We chose a more elaborate Markov model to account for the complex nature of sealant retention and caries development. The Markov model allowed individuals entering the model to progress from one health state to another according to a set of transition probabilities, creating a more realistic account of events affecting the outcome. However, Markov modeling has limitations including its "memoryless" feature (43). This implies that the probability of moving out of a health state is not dependent on the state a patient may have experienced before entering. This characteristic of Markov models, often referred to as the "Markovian Assumption," could bias results towards sealant delivery.

There are several considerations requiring further discussion. First, our unit of analysis was a first permanent molar. In a few situations, the literature did not differentiate between first and second molars. The inclusion of older children requiring sealants in second molars and anticipated improved behavior could skew sealant retention. And it was also difficult with any certainty to differentiate between possibly fluoridated and non-fluoridated communities.

Second, amalgam was chosen over resin material given the lack of long-term clinical trials of resin in young children. If we extrapolate longevity of Class 1 resins in adults as being equal or less than that of amalgams, this would bias our results in favor of sealing. The use of composite would only add to the cost because the average longevity of this material on permanent molars is at best two years less than an amalgam restoration (44,45). Third, we recognize that each tooth is not independent and that clustering occurs within a child. However, in order to make the model tractable, a more simplistic approach was taken by considering each tooth as an independent unit. This biased our analysis in that the cost of sealing one tooth is not the same as sealing multiple teeth. Furthermore, high- risk teeth that cluster in the mouth of a high-risk child are not mutually exclusive, underscoring the complexity of the system and inherent limitations in doing such analyses. And finally, following the guidance of our expert panel, we assumed that all carious teeth would be restored. This assumption may be optimistic and increases costs associated with the SN strategy.

Despite these shortcomings, from a payer perspective, our findings suggest that covering the cost of RBS saves money over the long run, assuming the payer will incur the cost of subsequent restorations. SA teeth appears to add caries-free time but at an increased cost $0.08 per cavity-free month. Increasing cavity-free months benefits children by delaying or avoiding invasive treatment and the destructive cycle of caries. Our two - way sensitivity analysis on costs of amalgam and sealants provides a basis for policy makers and third party payers to evaluate the impact of regional variations in costs. These data can help address the current policy and the continued efforts of the AAPD to work with dental organizations, insurance industry and consumer groups in making the advantages of dental sealants understood in a cost-effectiveness framework.

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