Chapter 7
Worked Example in Cost-Effectiveness Analysis

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7.1 Step 1. Objective of the Economic Evaluation

This chapter presents the findings of an economic evaluation of a community randomized oral health prevention trial in a low-income, underserved population in Brasilia, Brazil. The trial compared two primary oral health strategic approaches to preventing the development of dentine carious lesions on permanent molars. It evaluated the comparative cost-effectiveness of a supervised toothbrushing (STB) education promotion program with that of a clinical intervention program, using two different sealant intervention strategies.

7.2 Step 2. Define the Economic Evaluation Framework

7.2.1 Perspective of the Economic Analysis

Brazil has sought to develop a national oral health policy and integrate oral health into its National Health System [Sistema Único de Saúde (SUS)] (Pucca Jr. et al. 2015; Goldman et al. 2017). The national program's policymakers and program developers, who are interested in identifying the most cost-effective approaches to achieving improved oral health outcomes, were the primary audience for the evaluation. Dental practitioners and other private oral health service providers are interested stakeholders.

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The study adopted a government oral health program perspective. Costs included were those incurred in delivering services such as sealant placement and supervision of toothbrushing in the schools; societal and patient costs were excluded.

7.2.2 Alternatives Being Compared

The approaches compared were two clinical intervention strategies: treatment with composite resin (CR) and atraumatic restorative treatment (ART) high viscosity glass-ionomer sealants (HVGIC) and one health education behavioral change strategy of supervised toothbrushing. Each clinical strategy applied different techniques and materials. The study evaluated the cost-effectiveness of the impact of these two strategies on the prevention of dentine carious lesions.

The study had three objectives: (1) to collect all relevant costs associated with each strategic approach adopted in the process of protecting the developing permanent molars; (2) to estimate the unit cost of each primary care strategy in terms of protecting molar development, e.g., placement of sealant intervention and the health education promotion of supervised toothbrushing; and (3) to evaluate the incremental cost-effectiveness for each prevention strategy in protecting the first permanent molars, given their rates of caries-free survival after 3 years.

7.2.3 Time Horizon

The study's 3-year time frame covers the period when the primary or deciduous teeth exfoliate, and the permanent teeth erupt. During this period it is important, for the normal development of the oral cavity, to protect the deciduous teeth until they are ready to exfoliate to ensure normal eruption of the permanent teeth, particularly the first and second molars. Currently, most cost-effectiveness research considers a minimum of 3–4 years.

7.3 Step 3. Determine Costs and Benefits of Alternatives

7.3.1 Study Activities

Full details of the study and its results, summarized here, were published in Caries Research in 2017 as "Treating High-Caries Risk Occlusal Surfaces in First Permanent Molars Through Sealants and Supervised Toothbrushing: A Three-Year Cost-Effective Analysis" (Goldman et al. 2017).

The effectiveness study was a cluster randomized controlled clinical trial of 6–7-year-old children (de Amorim et al. 2012); it used a parallel group design. The study was implemented in all six public primary schools of Paranoá, a low-income suburban area of Brasilia, Brazil, where the water system was artificially fluoridated (de Amorim et al. 2012). Children who participated were in good general health with at least two cavitated dentine carious lesions in vital, pain-free molars; erupted first permanent molars with the occlusal surface fully visible and accessible; high-caries risk occlusal surfaces in first permanent molars with medium or deep fissures and/or an enamel carious lesion; and a consent form signed by the child's parent or carer.

The study groups reviewed were divided into three categories; one supervised toothbrushing group and two sealant intervention groups, one, CR, for application with conventional methods and rotary equipment group, and the other, ART/HVGIC, for sealants applied with the minimal intervention atraumatic restorative treatment (ART) method and hand instruments group. A dmfs evaluation done at the initiation of the study showed no differences between the three study groups, with respect to dmfs (de Amorim et al. 2013).

Of the six primary schools in Paranoá, the CR intervention strategy group was allocated to the only two equipped with dental units; these had not been used in over 5 years. The remaining ART/HVGIC and STB strategy groups were randomly allocated among the remaining four schools.

In the two clinical intervention strategy groups, before the sealant treatment started, pits and fissures were cleaned with toothbrushes and toothpaste (Goldman et al. 2017), three trained and calibrated pedodontists, aided by trained dental assistants, placed the sealants between May and July 2009, on the school premises.

At the start of the study, and annually during the evaluation period, all children participating in the study group received an oral hygiene kit with a conventional toothbrush, a 1000-ppm fluoridated toothpaste, plaque-disclosing paste, and dental floss. The children were instructed on how to use these devices and encouraged to brush their teeth twice daily. Each month a dental assistant visited the four schools where the CR and ART/HVGIC sealants were performed to check if there were any complaints.

Toothbrushing supervision took place daily during the school year for the STB group, from May 2009 to December 2012. One dental assistant, trained in identifying plaque, supervised the toothbrushing sessions. When necessary, brushing instructions were repeated. The assistants encouraged the children to maintain the same hygiene practices at home and during school vacations (Goldman et al. 2017).

7.3.2 Study Measurement

Given the study's assumption of a government perspective, the study inputs costed were those that would best reflect a government-level program. These included salaries and per diem for the three pedodontists and their dental assistants, transportation costs to and from the schools, dental equipment, and instruments and supplies utilized in the study. Cost data were collected prospectively for all inputs, whether purchased or donated.

7.3.3 Cost Data Collection

The principal investigators used a Microsoft Excel instrument designed for the study to collect data prospectively from the University of Brasilia and the study participants. Salary data came from the university. Most purchases, especially of instruments and supplies, were made through the university.

Study data were collected prospectively during the community trial, estimating the cost per sealant and comparing the costs per additional outcome averted (cavitated dentine carious lesions) for each intervention group.

7.3.4 Calculate Costs

Costs of instruments and supplies were recorded by group. Transportation and equipment costs were apportioned by group, according to the number of interventions performed in each group. Personnel costs were apportioned by group, and data on dentists' and dental assistants' time was factored into the cost.

In this study, some instruments were donated or purchased outside of the country, and the HVGIC was donated. Two of the schools had dental chairs not acquired for the study; their replacement cost was researched in the local market and their annual cost calculated and attributed to the study. The costs of any instruments and supplies donated or purchased outside the country were also researched, and because they were purchased in a foreign currency, those costs were converted to the national currency and adjusted to the year of the study.

Other costs that might be factored into an analysis like this include facilities costs – the annualized cost of a building or office, annual rent, and/or utilities such as electricity and water. In this study, a decision was made not to collect that cost information since study implementation took place in schools that had similar facilities and costs.

7.3.5 Data Collection

Baseline data for the community randomized control trial were collected by the dental assistants during the intervention. Evaluation was performed by two independent evaluators at 6 months and 1, 2, and 3 years. An experienced epidemiologist trained and calibrated the evaluators before each session. Inter-evaluator consistency was measured; the kappa coefficient was 0.76 in assessing carious lesions at each of the four evaluations; percentage of agreement of scores was 86.7%.

Personnel time data, estimates of the time the pedodontists devoted to the sealants, were collected in two ways. Dental assistants recorded sealant placement times for all sealants on the study data form, "beginning with the moment the pedodontists lifted their instruments until the moment they put them down once finished" (Goldman et al. 2017). The second method, the activity sampling method (Ampt et al. 2007), enabled the evaluation of the reliability of the data collected in the study as well as the collection of data on the entirety of the implementation sessions, thus including treatment and other ancillary activities (Goldman et al. 2017).

A countdown timer was used to collect data sampled in 15-min intervals in approximately 30 4-h intervention sessions. In each session, the timer was set at a different time after the session began at 8:00 am to avoid the bias of sampling the same intervals each day (Goldman et al. 2017). The last digit in the ID number of the first participant determined the amount of time elapsed before the timer was set. Each time the timer went off, the assistant would record the activity the pedodontist engaged in on the session data collection sheet. Activities were categorized as clinical (e.g., performing an examination or a sealant), complementary (e.g., instrument preparation), or nonclinical (e.g., equipment failure, coffee break, patient absent) (Goldman et al. 2017).

7.3.6 *Discounting, Adjustment, Annualization*

The discount rate of 3% (WHO 2003) was applied to study outcomes, including effectiveness data, costs incurred in implementation, and adverse events costs. The value of capital equipment was annualized at a rate of 3%. All costs were recorded in the Brazilian currency, reais (BRL). The World Bank GDP inflation deflator was used to adjust costs to 2012 values (The World Bank 2016). For the purposes of reporting, the costs were later converted to 2012 USD values; this conversion did not account for purchasing power parity (Goldman et al. 2017).

7.3.7 *Definition of Outcomes*

The presence of cavitated dentine carious lesions on the first permanent molars after 3 years was the prevention effectiveness outcome measured.

The cost outcome evaluated was the net cost per cavitated dentine carious lesion prevented over 3 years; this included sealant placement costs, supervised toothbrushing costs, and adverse event costs. Adverse events costs were defined as the cost to restore cavitated dentine carious lesions on the first permanent molars that developed after the intervention. Adding adverse event costs to sealant placement costs or toothbrushing supervision costs results in net costs. The pedodontists restored the first permanent molars that developed dentine carious lesions in keeping with each protocol; the restoration costs were added to the costs of the corresponding program (Goldman et al. 2017).

7.3.8 Evaluation Design

An incremental cost-effectiveness ratio (ICER), which measures the additional cost associated with preventing an additional adverse outcome (in this study, cavitated dentine carious lesion) for each intervention strategy, was employed to analyze the cost-effectiveness of the three strategies. The reference group was the CR sealant group, chosen as the comparator because it is considered the standard of care for sealants (Goldman et al. 2017).

7.3.9 Data Analysis

With the ICER, the intervention strategy with the worst effectiveness outcome is used as the base against which the other strategies are compared (Haddix et al. 2003; Gold et al. 1996). Thus, the results are ranked by effectiveness outcome, starting with the worst outcome first. For example, to calculate the ICER calculation for the study sample, the difference in the costs between the 2 sealant methods was first obtained by subtracting the total cost of the CR (reference group) which had the largest number of cavitated dentine carious lesions, from the total cost of ART/HVGIC. Next, the number of cavitated dentine carious lesions that developed for ART/HVGIC was subtracted from those for CR. Finally, ART/HVGIC and CR were compared in a ratio where the difference in the costs of the interventions was divided by the difference in the effectiveness of the interventions. This process was repeated for the STB-ART/HVGIC comparison (Goldman et al. 2017)

Because of interest in how the parameters of the study findings would hold in a larger population, the study results were applied to a projection of 1000 sealants/high-risk molars per group. The projection was created by increasing project inputs (such as personnel time, instruments and supplies, and transportation) proportionally, at the same rate as they occurred in the study sample. In addition, the sizes of the groups were uneven, so creating the projection standardized all of the groups. Annualized equipment costs were applied according to the proportion of time it took to create the number of sealants in the sample (4.5% per year) and the projection (25% per year for 1000 sealants) (Goldman et al. 2017). The assumption here is that there will not be economies or diseconomies of scale.

7.4 Step 4. Relate Costs to Outcomes

7.4.1 Effectiveness Results

At baseline, a total of 169 sealants were performed on 70 children in the CR group, 69 sealants were performed in 37 children in the ART/HVGIC group (Table 7.1), and 71 permanent molars in 38 children were identified and kept under observation in the STB group. After 3 years, the cumulative effectiveness of preventing dentine carious lesions in the molars was 95.6% in the STB group, 91.4% in the CR group, and 90.2% for the ART/HVGIC group. The effectiveness of the interventions, in terms of the number of dentine carious lesions that developed in the molars over the 3 years in the CR group, was 12, 6 in the ART/HVGIC group, and 3 in the STB group (Hilgert et al. 2015; Goldman et al. 2017).

7.4.2 Cost Results

Treatment time for performing ART/HVGIC sealants in the sample and the activity sampling data was close to 50% more at 6 min and 9.58 min than CR at 4.50 min and 6.77 min. The cost (USD 7.22) and net cost (USD 8.02) of performing the ART/HVGIC sealant were almost twice as high as for the CR application (cost, USD 3.74; and net cost, USD 6.96) in the sample data. In the activity sampling data, the

Table 7.1 Characteristics for the sample of children for high risk molars at baseline and at year 3 after the intervention

		Intervention[a]	
	Composite resin (CR)	ART/HVGIC	STB
Baseline			
Schools (n)	2	2	2
Children (n)	70	37	38
Sealants (n)	169	69	71
D_3MFT (SE)	0.27 (0.56)	0.27 (0.51)	0.23 (0.42)
$d_3$mft	6.11 (3.12)	5.78 (3.94)	5.18 (2.51)
Year 3			
Children (n)	47	27	28
Sealants (n)	120	51	50
Dentine carious lesion increment (n) [cumulative]	12	6	3
Effectiveness [cumulative] SE	**91.4% (2.9)**	**90.2% (5.0)**	**95.6% (2.5)**

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[a] *CR* composite resin, *STB* supervised toothbrushing, *ART/HVGIC* a traumatic restorative treatment/high-viscosity glass-ionomer cement, *SE* standard error

differences in the costs between the two groups were slightly lower. As the number of sealant applications reached 1000, the differences continued to narrow. The cost for ART/HVGIC from USD 7.22 in the sample decreased to USD 4.86 in the projection, while the cost of placing CR sealants rose from USD 3.74 to USD 4.81. For the STB initiative, the costs of supervising the brushing of molars in the STB group (180 days per year for 3 years for the study sample) were USD 18.56, at least 2.5 times higher than the sealant application method in the sample and activity sampling data and USD 9.14 in the projection.

7.4.3 Inputs

The analysis of intervention inputs revealed personnel was the major cost driver, consuming the most resources for all groups; the STB group led with 95% of the intervention costs, followed by CR with 54% and ART/HVGIC with 42%. Materials and supplies consumed by the CR and ART/HVGIC groups represented 38% and 56% of the costs, respectively, while STB consumed only 5% (Goldman et al. 2017).

7.4.4 Incremental Cost-Effectiveness Ratio

When the outcomes were ranked for the sample data for calculating the incremental cost-effectiveness ratios, the first ratio compared the ART/HVGIC and CR approaches and the result was a savings of USD 37 per new cavitated dentine carious lesion prevented in favor of ART/ HVGIC (Table 7.2). When STB (180 STB visits took place each year over 3 years) was compared to ART/HVGIC, the outcome was a cost of USD 264 per cavitated dentine carious lesion prevented. ART/HVGIC was cost-effective for the sample data, and CR was cost-effective for the projection of 1000 sealants/molars treated. When evaluated against STB, both sealant methods were cost-effective (Goldman et al. 2017). CR had a better outcome than ART/HVGIC with cost savings of USD 17. In the ratio comparing CR and STB, the result was that STB cost USD 140 per cavitated dentine carious lesion prevented for every 1000 sealants/molars treated.

Table 7.2 Results of the incremental cost-effectiveness ratios for the sample and projection of 1000 sealants by treatment group at year 3 (USD 2012)

Treatment	Effectiveness[a], new cavitated dentine carious lesions	Cost	New cavitated dentine carious lesions prevented	Incremental cost	Cost per new cavitated dentine carious lesion prevented
Sample					
CR	11	738			DOMINATED
ART-HVGIC	6	553	6	−185	−37
STB[b]	3	1346	3	793	264
Projection, 1000 sealants/group					
ART-HVGIC	84	5506			DOMINATED
CR	69	5322	16	−184	−17
STB	41	9138	27	3816	140

[a] Effectiveness outcomes are discounted by 3%.
[b] For the STB study, the toothbrushing supervisor went to the schools 180 days per year to supervise the children. Reprinted from Goldman et al. 2017, with permission from S. Karger AG, Basel.
CR composite resin, *STB* supervised toothbrushing, *ART-HVGIC* atraumatic restorative treatment/high-viscosity glass-ionomer cement

7.5 Step 5. Adjust for Uncertainties

7.5.1 Sensitivity Analysis

Sensitivity analyses were conducted to evaluate how variations in the incidence of cavitated dentine lesions would affect the ICER. The impact of changes in the number of STB visits on the cost per lesion averted was explored. The daily supervision by dental assistants in the schools (180 days/year) was highly labor-intensive, and the expectation that the resulting cost might not be sustainable for a government program prompted the development of two alternative scenarios to evaluate the impact of fewer STB visits on costs.

In these scenarios the dental assistants would visit the children during the school year to ensure the habit of toothbrushing is adopted. The parameters for the first scenario were 36 visits per school year and an increase of 33% in the number of cavitated dentine carious lesions. In the second scenario, dental assistants visited the schools nine times a year, and caries increased by 52%. These analyses assumed that effectiveness in both scenarios over 3 years would be similar to that in the study. This assumption requires further investigation (Goldman et al. 2017).

7.5.2 Sensitivity Analysis Results

The sensitivity analysis focused on STB supervision because supervision costs accounted for 95% of the cost of the intervention. And, although STB was dominated by the sealant intervention approaches in the analysis, exploration of supervision in terms of the number of visits and the incidence of cavitated carious lesions would provide information about how the comparison of STB, and the sealant approaches might be affected.

The results of the sensitivity analysis, shown in Table 7.3, revealed that the net cost per STB molar decreased considerably as the number of days of supervision decreased. For Scenario 1, with 36 days the net cost ranged between USD 2.71 for the sample and USD 1.50 per caries free STB molar, while for Scenario 2 the range was USD 2.15 to USD 1.21 per caries free STB molar.

With respect to cost-effectiveness, Table 7.4 shows that despite increased incidence of cavitated dentine lesions in both scenarios, the cost of STB decreased markedly in comparison to both sealant interventions. STB produced savings of USD 180 in Scenario 1 and USD 395 in Scenario 2 compared to ART/HVGIC in the sample data. The comparison of STB to CR in the projection results showed savings of USD 273 and USD 686 for Scenarios 1 and 2, respectively, per 1000 STB molars.

7.6 Step 6. Summary and Interpretation

A major struggle in the field of successful primary care prevention efforts is demonstrating their true value in the act of preventing the occurrence of adverse health outcomes. Economic evaluation of primary oral healthcare curative and preventive services provides us the opportunity to attach a price to the prevention of one additional bad outcome – in this case a cavitated dental caries lesion in the study population. The two key contributory elements that enable the capacity to conduct

Table 7.3 Sensitivity analysis: costs and net costs per STB molar for the sample, activity sampling data, and a projection of 1000 STB caries free molars, by STB Scenario

Sensitivity analyses	STB S1 36d/yr	STB S2 9d/yr
Cost per STB molar		
Sample	2.17	0.77
Activity sampling	2.17	1.55
Projection of 1000 sealants	1.07	0.72
Net cost[a] STB molar		
Sample	2.71	2.15
Activity sampling	2.57	1.95
Projection of 1000 sealants	1.50	1.21

Table 7.4 Sensitivity analysis: incremental cost effectiveness results by STB Scenario for the sample and a projection of 1000 STB caries-free molars

	Effectiveness[b], new cavitated dentine carious lesions	Cost	New cavitated dentine carious lesions prevented	Incremental cost	Cost per new cavitated dentine carious lesion prevented
STB scenario 1					
Sample					
CR	11	738			DOMINATED
ART-HVGIC	6	553	5	−185	−37
STB	4	193	2	−361	−180
Projection, 1000 sealants/group					
ART-HVGIC	84	5506			DOMINATED
CR	69	5322	16	−184	−12
STB	55	1499	14	−3823	−273
STB scenario 2					
Sample					
CR	11	738			DOMINATED
ART-HVGIC	6	553	5	−185	−37
STB	5	159	1	−395	−395
Projection, 1000 sealants/group					
ART-HVGIC	84	5506			DOMINATED
CR	69	5322	16	- 184	−12
STB	63	1209	6	−4113	−686

STB S1, scenario where toothbrushing supervision takes place weekly or 36 days over one school year; STB S2, toothbrushing supervision takes place monthly or 9 days over one school year. CR, composite resin; STB, supervised toothbrushing; ART/HVGIC, atraumatic restorative treatment/high-viscosity glass-ionomer sealants.

[a] Net costs include the cost of STB supervision per molar and restoration if cavitated dentine carious lesions developed.

[b] Effectiveness outcomes are discounted by 3%. Reprinted from Goldman et al. 2017, with permission from S. Karger AG, Basel.

cost-effectiveness analyses of oral health intervention and promotion efforts are (i) the ability to cost all the inputs that went into achieving the strategic prevention outcome and (ii) the ability to generate the unit cost of the occurrence of an additional bad outcome per intervention strategy – its incremental cost effectiveness ratio (ICER) value which represents the incremental cost per adverse event prevented.

This project analyzes the cost of adopting a health education promotion effectiveness approach versus an early clinical intervention approach. The early intervention clinical approach involves the application of two kinds of sealants. The study presents and analyzes its findings, first, in terms of the costs per molar per group and a breakdown of the inputs that contributed to the interventions, providing information about basic costs and cost drivers. Next, the two sealant intervention methods are compared, and finally, the more cost-effective sealant intervention is compared to the STB education promotion program approach. It generates an ICER value that compares the cost of having to treat one additional bad outcome for each comparison.

The objective of this chapter is to present the cost-effectiveness outcome findings in a practical and applicable manner so that they may be of value to oral health policymakers, program developers, and dental care service providers. Adding the additional information on costing associated with one primary care intervention approach versus the other serves to further inform their decision-making process. Possessing this level of costing detail gives the decision-maker the power to use the information to implement effective primary care programs that best fit their available technical and administrative resources. In applying these methods, researchers, policymakers, program managers, and practitioners are able to determine the most cost-effective oral health primary care program in terms of protecting the pits and fissures in permanent molars to prevent the development of dentine carious lesions in children whose permanent teeth are beginning to erupt.

7.6.1 Report on the Study and Its Findings

The data used in the cost-effectiveness study presented here were collected prospectively. Costs of supplies, instruments, and equipment unique to each approach were allocated directly or according to the estimated amount used per intervention. Transportation was allocated similarly, since each time the pedodontists and their assistants went to a school all children were treated through the same approach. Other supplies used in common by all groups were allocated according to personnel time. Sampling of treatment sessions through activity sampling captured information about the amount of time it took to perform the interventions. The cost analysis included the oral hygiene kits given to each of the children in all six schools, the time devoted to teaching them how to take care of their teeth, as well as the time spent by the one assistant who visited the schools to supervise toothbrushing.

Cost data were evaluated using incremental cost-effectiveness ratios (ICER) to generate the additional cost associated with preventing an additional adverse outcome (in this study, the cost per additional cavitated dentine carious lesion) for each of the three primary care prevention strategies used. Study results showed both CR and ART/HVGIC sealants for the sample and the projection of 1000 sealants per group were more cost-effective than supervised toothbrushing. Nonetheless, although CR had the lowest cost, the difference between the two was minimal. Thus, the choice of sealant approach used might be related to other factors.

Although supervised toothbrushing promotion had the best outcome after 3 years, the two different clinical intervention strategies cost less and were therefore more cost-effective compared to STB promotion. The study results of the incremental cost-effectiveness analysis for the sample data and the projection show that STB, as administered for 180 days per year, had the highest costs and was too expensive to be viewed as affordable.

Consequently, policymakers and program managers might consider the lower costing CR as an alternative if costs are a priority. In efforts to reach larger segments of the population under conditions where dental clinics and equipment are scarce, ART/HVGIC, given its portability, might be the preferred alternative (Goldman et al. 2017).

7.6.2 Implications of Findings

A closer examination of the study data, specifically, the role of personnel as a major cost driver in the supervised toothbrushing intervention, prompted tests of the frequency of supervisory personnel in the intervention in the sensitivity analyses. The results of this analysis suggest an STB program in the schools could be cost-effective. The results from reducing supervisory personnel time point to the potential feasibility and affordability of STB. Further research could inform researchers, policymakers, and program managers in how such a program could be structured to function within Brazil's community-based oral healthcare policies. Key questions include: How much supervision will produce a good result? Who needs to do the supervision?

With such a program, in Brazil oral health professionals could examine children and provide them with oral health education in schools. These professionals could also train teachers and parents to replace the assistants and implement daily STB, developing a community-based preventive approach which would contribute to furthering national progress in oral health and lowering costs. If, in Brazil, teachers and parents could not perform STB, another option would be assigning the task to the country's national health program primary care family health team members, such as the oral health assistant or community health worker in areas where oral health teams are not available.

The effectiveness of STB and the sensitivity analysis, conducted on toothbrushing supervision, indicate there would be value in further research on the benefits of developing STB programs for school-age children in other countries, as well as in Brazil. Longitudinal research could investigate the conditions under which the children solidly adopt toothbrushing with fluoridated toothpaste – the number of annual visits by educators and supervisory personnel and the impact on the incidence of new cavitated dentine carious lesions – making the program cost-effective. Program managers could evaluate their administrative and technical resources and deploy them for country-appropriate programs.

This study demonstrates the basic elements of designing and implementing a cost-effective analysis. It highlights the importance of understanding the context of a cost-effectiveness analysis and who the principal audiences for this are likely to be. These techniques can be applied in other areas of oral health, covering both oral health promotion and clinical intervention programs.

Oral health policymakers, program managers, and practitioners can utilize the results of this and other cost-effectiveness studies to design programs that make the best use of the available resources and address the urgent need for effective oral health prevention strategies. In turn, this will help to address inequalities by adopting measures to increase health gain among the most vulnerable populations (Granham 2004; Moysés 2012; Goldman et al. 2017).

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