Taking a School–Based Child Sexual Abuse Prevention Program to Scale: a Cost Analysis

Stacey L. Shipe[1], **Kate Guastaferro**[1], **Jennie G. Noll**[1], **Christian M. Connell**[1], **Paul L. Morgan**[2], **D. Max Crowley**[1]

[1]Child Maltreatment Solutions Network, Department of Human Development and Family Studies, Pennsylvania State University, University Park, PA, USA

[2]Department of Education Policy Studies, Pennsylvania State University, University Park, PA, USA

Abstract

Cost analyses are used to determine overall costs of implementing evidence-based programming and may help decision makers determine how best to allocate finite resources. Child sexual abuse (CSA), regularly viewed as a human rights violation, is also a public health concern estimated to impact 27% of females and 5% of males by age 18. Universal, school-based CSA programs are one prevailing prevention strategy. However, there are no known cost analyses of school-based CSA prevention programming, thereby limiting potential scalability. Using the ingredients method, this cost analysis presents the findings of implementing *Safe Touches*, an evidence-based universal prevention program, across four sites (i.e., counties) in one mid-Atlantic state. Reaching a total of 14,235 s grade students, results indicate an average cost of $43 per student, an average classroom cost of $859, an average district cost of $10,637, and an average site cost of $154,243. There was a noted decrease in costs when more students were reached, suggesting a need to focus efforts on bolstering the reach of implementation efforts. Sensitivity analyses explored variations in implementation constraints such as personnel and facilities suggesting a range of per-student costs (lower-bound per-student cost = $34; upper-bound per-student cost = $64). Findings presented herein may be used to inform future universal CSA prevention efforts by providing detailed information about the costs of large-scale implementation of an evidence-based program among elementary-aged children.

Keywords

Cost analysis; Child sexual abuse; Prevention; Economic evaluation; Implementation

Child sexual abuse (CSA), a fundamental violation of human rights, is a unique and serious form of child maltreatment. In the USA, 61,000 children were victims of a substantiated report of CSA in 2019 alone (US Department of Health & Human Services Administration for Children and Families, 2021); it is estimated that 27% of females and 5% of males will experience CSA before age 18 (Finkelhor et al., 2014). Those who experience CSA are at particular risk of lifelong adverse psychosocial outcomes (Noll, 2021), including risky sexual behaviors (Skinner et al., 2016), teenage motherhood (Noll & Shenk, 2013; Noll et al., 2019), and increased behavioral health concerns (e.g., depression and substance misuse; Herrenkohl et al., 2013; Hussey et al., 2006), as well as negative physical health outcomes such as early pubertal timing (Noll et al., 2017) and obesity (Noll et al., 2007). All told, the lifetime economic obligation of CSA in the USA is estimated to exceed $9.3 billion (Letourneau et al., 2018). Given the individual and societal impacts of CSA, it is important to reduce the risk for CSA.

Universal psychoeducational programs delivered to school-aged children in classroom settings are a prevailing primary prevention strategy in the USA (Topping & Barron, 2009; Walsh et al., 2018). Indeed, since the 1980s, multiple school-based CSA prevention programs have reached the status of evidence-based, signifying sufficient empirical evidence that children who participate in the program can significantly increase and retain CSA-related knowledge over time (Walsh et al., 2018). Though disseminated widely, there are no known published cost analysis studies that specifically focus on school-based CSA prevention programs. Economic evaluations may be useful in systematically assessing the impact of programs on outcomes and costs (Corso & Lutzker, 2006; Crowley et al., 2018). Cost analyses are one type of economic evaluation that provides critical input to public decision making, including local and state budget making as well as nationally in congressional budget scoring and appropriations decisions (Haskins & Margolis, 2014; National Academies of Sciences, Engineering, & Medicine, 2016). A cost analysis of a school-based CSA prevention program disseminated on a wide scale would benefit local and state budget making to ensure appropriate resources are allocated such that the program is able to reach the greatest number of students. When an evidence-based program is appropriately resourced for dissemination, the public health impact is maximized. The current study fills a gap in the literature by presenting the cost analysis for a universal, school-based CSA prevention program, *Safe Touches* (Pulido et al., 2015).

Cost Analyses

A cost analysis accounts for all costs associated with the implementation of a program. Resulting in costs per participant, cost analyses may be particularly informative in prevention programming by helping decision makers determine whether a program meets organizational goals within budget constraints (Powell et al., 2019). Specifically, findings from cost analyses help policy makers make informed choices about how finite tax dollars should be appropriately allocated. In a time of limited resources, it is crucial that decision and budget makers have information about the cost of implementing programs (Crowley et al., 2018). Findings from a cost analysis provide the basis for other types of economic evaluation, such as cost–benefit or cost-effectiveness analyses. Thus, cost analyses reflect an important first step in prevention science.

One common approach to cost analyses is to use the "ingredients method," which is founded on the principles of opportunity costs (i.e., resources utilized for implementation) and cost accounting (i.e., the total costs of a program where all fixed and variable costs are assessed; Levin et al., 2017). The ingredients method bases costs on three activities: (1) identifying the ingredients; (2) valuing and pricing those ingredients; and (3) calculating and analyzing the results based on the theory of change for the intervention. Identifying the correct ingredients requires accuracy and specificity; however, because all economic evaluations are highly individualized, general categories are typically used and modified as needed. Common input categories include personnel, materials, facilities, and others, including the societal costs such as caregiver inputs (e.g., lost leisure time for caregivers; Levin et al., 2017). Societal costs are a key component of the cost analysis as it is the only time the totality of inputs to the overall economy are considered, whereas the other ingredients consider only the payer perspective (i.e., resource consumption for an individual organization such as the agency or school). The final step in cost analyses is a sensitivity analysis, which seeks to identify "uncertainty" among the cost estimates using confidence intervals to quantify that uncertainty (Crowley et al., 2018; Levin et al., 2017). Sensitivity analyses also allow for the accounting of resources that should be planned for, but perhaps were not used in a given context (e.g., fidelity monitoring). Confidence intervals from a sensitivity analysis provide important utility for decision makers by quantifying the potential higher- and lower-bound estimated resources required for successful implementation, allowing for planful, evidence-based budget making across settings.

The Present Study

To date, there are scant cost analyses for universal, school-based CSA prevention programming. As these programs are a widely used primary prevention strategy, it is important that decision makers understand the cost of implementation to inform choice of program and to adequately resource the implementation to achieve effectiveness of an evidence-based program. The goal of the present study was to provide cost estimates for the implementation of *Safe Touches* when delivered on a wide scale. To that end, the cost analysis presented herein leverages the implementation of *Safe Touches* as part of a state government-initated CSA prevention project (described below). Using the ingredients method approach, retrospetive data were used to provide total average costs by site, district, classroom, and student. Although findings are intended to inform future dissemination and implementation efforts of *Safe Touches*, knowledge gained from this cost analysis will also benefit other universal, evidence-based CSA prevention programs delivered through the school context.

Method

Safe Touches

Developed by the New York Society for The Prevention of Cruelty to Children (NYSPCC), the *Safe Touches* workshop is delivered in one 50-min session by two trained facilitators for students in kindergarten–3rd grade (Holloway & Pulido, 2018; Pulido et al., 2015). The culturally inclusive curriculum uses racially ambiguous puppets to teach body safety

rules and key safety steps (Holloway & Pulido, 2018). Age-appropriate role-play scenarios focus on identifying private parts (i.e., parts covered by a bathing suit), understanding the difference between safe and unsafe touches, and knowing the differences between secrets and surprises. The students receive an activity book to take home and review with adults so concepts from the workshop can be reinforced. Rated as evidence-based, prior research suggests children who receive the *Safe Touches* workshop significantly improve their knowledge of inappropriate (i.e., unsafe) touch from pre-test to post-test (Holloway & Pulido, 2018; Pulido et al., 2015).

The logic model for *Safe Touches* is depicted in Fig. 1. The ultimate goal of *Safe Touches* is to reduce rates of CSA among students who participate in the workshop. To achieve this goal, students are provided accurate information about CSA by developing an awareness of body safety rules, discerning between safe and unsafe touches, and learning when to tell a safe adult and disclose any unsafe touches. When knowledge is retained over time, there is the potential for knowledge to translate into behaviors that ultimately decrease the incidence of CSA. Figure 1 also details the program resources needed to support the implementation of activities that are posited to bring about the outcomes proposed by the theory of change. These program resources are the basis of this cost analysis.

Implementation of Safe Touches

The implementation of *Safe Touches* was part of a state government-initiated CSA prevention trial that sought to design and evaluate a comprehensive CSA prevention strategy. In this large-scale trial, three distinct evidence-based primary prevention programs were delivered to three populations essential in the prevention of CSA. In addition to the school-based *Safe Touches* program, this comprehensive strategy included a parent-focused program targeted to at-risk parents or caregivers (Guastaferro et al., 2020) and a community-based program targeted at the general adult population (Rheingold et al., 2015). Over a 4-year period, the three primary prevention programs (school, caregiver, and community) were implemented in four rural and urban communities (i.e., sites) representing five counties in one mid-Atlantic state. As the prevention trial was a multi-pronged effort, some costs were shared across the three programs, including personnel and indirect costs. For example, each of the four sites included a site coordinator who oversaw the coordination of the three programs. In cases where personnel worked across multiple programs, costs were tracked and allocated proportional to their time spent on each program. Similarly, indirect costs were distributed proportionately to the direct expenditures for each of the three programs at the site level.

Within this large, state-initiated prevention trial, *Safe Touches* was implemented over the course of two academic years (September 2018–March 2020) by 16 facilitators across the four sites. Given the breadth of programming covered, the facilitators were not required to have a specific educational background; however, they all had experience in educational prevention programming. Each site was tasked with the goal of reaching 100% of second grade classrooms in their geographic area (i.e., county). Sites varied in the number of months that *Safe Touches* was implemented, largely due to the proportion of second grade students within each site. The implementation period across sites ranged from 16 to 21

months. Across all sites, *Safe Touches* was delivered to a total of 14,235 2nd grade students in 718 classrooms in 58 school districts during the implementation period. The activities and estimation of costs (described below) are drawn from the total reach of the implementation.

Implementation Costs

Following standardized procedures articulated by Crowley et al. (2018), ingredients for the cost analysis were identified and organized into five input categories: (1) program activities and materials; (2) personnel and travel; (3) indirect costs, including equipment and materials; (4) facilities; and (5) societal costs (i.e., caregiver inputs). These costs are operationalized in the context of the current implementation in the subsequent sections (Table 1).

Program Activities and Materials

Program activities and materials' costs encompass pre-implementation startup costs and ongoing maintenance costs during the implementation period. Pre-implementation costs include the *Safe Touches* facilitator training and associated costs (e.g., trainer fees and travel, training space, video equipment, and fidelity monitoring). The *Safe Touches* facilitator training, conducted by the NYSPCC, occurred over two and a half days and included all workshop materials (i.e., facilitator manual, puppets, and resources for presenting about the curriculum to school staff). Each site sent two *Safe Touches* facilitators and the site coordinator to the in-person training held in a university partner-provided conference room (no fees incurred). Facilitators participating in the training incurred travel expenses (i.e., lodging, per diem). Following training, all facilitators were required to submit practice videos to the NYSPCC. Once these were approved, certification was obtained allowing facilitators to conduct their own trainings, as *Safe Touches* utilizes a train-the-trainer model—once a facilitator is certified, they can train new facilitators. Video equipment (i.e., camcorder) and fidelity monitoring fees provided the opportunity for sites to receive ongoing support by the NYSPCC. Note, while training space, video equipment, and fidelity monitoring resources were not incurred by sites in this implementation, implementation fidelity is a hallmark of evidence-based programming and, thus, these costs are considered within the sensitivity analysis.

Sites purchased the activity booklets to be sent home with each student following the *Safe Touches* workshop. Therefore, the cost of the activity booklets is based on the total number of students reached. A bulk rate of $1.61 was available for orders of 101–1500 books (for orders < 100, the cost was $1.99 per booklet). Additional ongoing implementation costs of materials varied across sites, such as purchasing additional puppets and a carrying bag, over time.

Personnel and Travel

Personnel costs included both the wage and fringe benefits for two part-time *Safe Touches* facilitators and one full-time site coordinator. The two facilitators were responsible for the *Safe Touches* implementation, whereas site coordinators were responsible for scheduling workshops and assisting the facilitators with the workshop delivery, as needed. All personnel had a base salary of $50,000 set by the state-led initiative (note, salaries would likely vary in

other sites based on local labor market conditions). To account for the entire implementation period, these salaries were divided by 12 months and multiplied for the total number of months each site implemented *Safe Touches*. Because there was staff turnover at some sites and *Safe Touches* requires two facilitators to conduct each workshop, there were occasional instances where a site coordinator stepped into the role of a facilitator for prolonged periods of time. Though the site coordinator's annual salary did not change, their increased effort allocated to the delivery of the workshop was accounted for in this analysis. Fringe benefits for all personnel were calculated at 30% of the base salary.

Travel costs to deliver the *Safe Touches* workshops were determined by the total number of schools in a site's service region and the distance between the facilitators' office location and the schools. Travel costs were site specific and based on the number of schools per district multiplied by the average distance to those schools at the federal travel reimbursement rate at the time of implementation (0.535 per mile).

Indirect Costs

Indirect or overhead costs include the overall space required to maintain *Safe Touches* programming as well as administrative and general costs (e.g., printing materials, office supplies). For this study, we allocated indirect cost consumption proportionate to direct budgetary expenditures for *Safe Touches* at the site level. Equipment and materials used by facilitators were site specific, but included computers for scheduling, software, and cell phones.

Facilities

Facilities include the physical space needed to train facilitators as well as space required to conduct *Safe Touches* workshops. Space for the facilitator training was contributed through the university-program partnership. Because space is required in any implementation effort, this cost must be detailed and described even if it is offered "in kind" (Levin et al., 2017). The assumed space costs for training were calculated based on the non-affiliated price on university grounds for 2.5 days, accounting for setup and breakdown as well as the space for up to 20 participants.

Similarly, though *Safe Touches* is implemented in the classroom and does not require additional space, it is important to estimate the cost of the space used during workshop implementation. Classroom space costs were estimated using leasing rates for auxiliary classroom space (ranging from $250 to $3500 a month). The mid-Atlantic state where the prevention trial was conducted legally requires approximately 58 ft^2 per student in a classroom. Assuming a total of 30 students, the space needed for a comparable auxiliary classroom was estimated at approximately 1740 ft^2. Although facility costs were not an explicit budgetary expenditure, access to adequate facilities are essential to implementation to the program for fidelity. In this context, while there were no budgetary costs within this implementation, the provision of adequate facilities is included in the sensitivity analyses.

Societal Costs

Distinct from implementation costs, societal costs consider not only the budgeted expenditures to implement that program, but the total societal costs for implementing the program. These costs are variable due to nature of skills or materials offered but must be accounted for as part of the implementation process (Levin et al., 2017). Specifically for *Safe Touches*, the societal costs included the effort caregivers exerted for their child to take part in the workshop. At a minimum, caregivers read the informational flyer about the *Safe Touches* workshop and agreed to have their child participate. In the event they did not want their child to participate, caregivers needed to notify the school. Thus, to determine the estimated cost for the caregiver's time, the median income for the given site was determined and divided by the total number of annual work hours for full-time employment (i.e., 2080). This number was further divided into 15-min increments with the assumption that the permission process would not exceed 15 min. Caregivers' time was also accounted for in the sensitivity analyses with the assumption they would review the activity booklet with their child following the workshop.

Analytic Plan

Outcomes of interest were the average cost per site, district, school, and student. To calculate these costs, the total costs were divided by the total number of sites; total number of districts; total number of classrooms; and total number of students, respectively. Analytically, using budgets (projected and actual) from individual sites, unit prices were assigned to each ingredient category for each site. Costs were then summed to provide the total costs.

Sensitivity Analyses

In addition to calculating the costs for the ingredients categories, an extreme scenario analysis was conducted to assess the impact of variation in analytic assumptions on final estimates. The confidence intervals provided by a sensitivity analysis may be especially informative to decision makers in different contexts with varied resources. Specifically, the sensitivity analyses considered how future implementations might vary from the current implementation when *Safe Touches* is implemented in additional sites with differing characteristics and conditions. For the upper-bound costs, personnel included one full-time facilitator and one half-time facilitator with an inclusion of the summer months during the implementation period. The upper-bound estimates also included the initial program material fees and the facility costs, as future replication efforts may not have this space provided in-kind. Fidelity monitoring (and video equipment) was included, as the option for additional oversight may be desired by other entities. To further understand the full societal costs, variation in caregiver inputs was considered by accounting for caregivers who choose to do the activity book with their child in addition to reviewing the *Safe Touches* handout (increasing caregiver inputs from 15 to 60 min).

For the lower-bound costs, personnel included using the program fidelity standard of two part-time facilitators for the same number of months that each site originally implemented the program. In recognizing that indirect rates vary across community settings and agency contexts, the indirect rate was decreased to 10% (Department of Labor, 2020). The training

space, facility costs, and fidelity monitoring remained excluded. The baseline of 15 min was reduced to 5 min to account for minimal questions from caregivers.

Results

The outcomes of interest were the average costs broken down by each individual site, as well as the average costs per district, classroom, and student (Table 2). The average implementation cost for all sites reaching a total of 14,235 children was $154,243. The average per-district cost was $10,637 with a per-student cost of $43. The average cost per student was largely dependent on how many students were reached; thus, some sites had lower total implementation costs but higher per-student costs due to a lower student body population (e.g., site C, where the average site cost was $138,432 and the average per-student cost was $87). Site B had a lower cost per student due to a larger student body ($28), but the average site cost was much higher ($162,256).

Overall Costs for Safe Touches Implementation

The average costs across all sites for all implementation activities are included in Table 1. Because implementation characteristics varied across the sites, actual implementation costs, both overall and by site, also differed. Additional cost information including the individual costs per ingredient per site and a breakdown of the implementation costs by each ingredient category are available in Appendix A and B, respectively. With regard to the marginal costs, the average county costs reflect the increase from one county to two (or more) counties. In general, the marginal costs, within the limits of the data for this study, are linear across scale. This is based on the highly compartmentalized nature of the intervention where children and youth are county-administered.

Program Activity Costs

Training expenses for NYSPCC staff to conduct the *Safe Touches* training averaged $6518 per site. The average travel fees, which included travel, hotels, and per diem meals totaled $1245. Each site required a different number of activity books based on the size of the site, with an average cost across all sites of $4045. Specific to the maintenance of the program, additional materials including extra puppets averaged $476 across all sites.

Personnel and Travel Costs

Each site was allocated the same amount for personnel (one full-time site coordinator and two part-time facilitators) and fringe (30% of total salary). However, personnel costs varied depending on needs and the total number of months the site implemented *Safe Touches*. The average costs for the site coordinator were $13,208 (equating to approximately 10% effort), whereas the average cost for the two part-time facilitators was $71,875. The average cost of benefits was $25,525. Travel costs were estimated based on a round trip to each school within the site at the federal rate (0.535 per mile) with an average cost of $3189.

Indirect Costs

The proportion of indirect costs consumed by *Safe Touches* was estimated as a proportion of the full implementation direct costs for each site. The average indirect costs across all sites

were $24,717. Equipment and other materials were purchased at the discretion of the site, based on need, with an average cost of $3961.

Caregiver Inputs/Societal Costs

Societal costs were based on the estimated caregiver time to review the *Safe Touches* workshop flyer, ask questions, and, if necessary, alert the school if they did not want their child to participate in the workshop. It was estimated each caregiver would need to dedicate 15 min of their time to this process, which resulted in an average site cost of $17,327. The average societal costs at the district, classroom, and student levels add the average required caregiver inputs to direct costs at each level, respectively (Table 2).

Sensitivity Analyses

To model the uncertainty in the resource consumption and ultimate costs of *Safe Touches*, sensitivity analyses were conducted on the varying costs of specific key assumptions at the per-student level (Fig. 2). Additionally, these costs as compared to the average per-student cost can be found in Appendix C. For the lower-bound sensitivity analyses, video equipment, fidelity monitoring, and training space costs remained excluded because these costs were provided in-kind; however, these costs were added to the upper-bound analyses to account for future implementation efforts that may not be university affiliated. The upper-bound estimates also included the original indirect cost estimates, as well as increased personnel and societal input resulting in an overall average of $64 per student. In contrast, for the lower-bound estimate, where personnel and indirect costs were reduced, the average cost per student lowered to $34.

Discussion

Given the need and evidence behind universal, school-based CSA prevention programs, a cost analysis is a crucial element toward providing evidence on the affordability of a widescale implementation effort (Eisman et al., 2020). Leveraging a widescale dissemination of *Safe Touches* across four sites in which 14,235 2nd grade grade students received the workshop, findings presented here suggest that *Safe Touches* was provided for an average cost of $43 per student (or $154,243 per site). Letourneau et al. (2018) suggest that the total lifetime cost of an estimated 40,000 new CSA victims is $9.3 billion dollars. Using the average cost of $43 per student, the cost to implement *Safe Touches* to the same number of new victims (40,000) is slightly more than $1.7 million dollars—a fraction of the lifetime costs. Given the losses in productivity and costs associated with CSA, results presented here demonstrate it is prudent to invest in prevention.

Universal, school-based CSA prevention programs are effective (Pulido et al., 2015; Topping & Barron, 2009; Walsh et al., 2018); however, programs vary widely in pedagogical approach and program duration. For example, some programs use videos and didactic instruction (Tutty, 1997), whereas other programs use puppets and role-playing scenarios (Pulido et al., 2015). Some programs provide instruction over the course of several classroom sessions (e.g., two to three sessions; Tutty, 1997; Wurtele & Owens, 1997) and other programs are completed in a one-time classroom session (Pulido et al., 2015).

These differences in implementation features, specifically, have important implications for estimating the cost of implementation. For example, whereas *Safe Touches* is a single 50-min workshop requiring one round trip for the facilitators, a program with three sessions would require three round trips in addition to personnel time to complete the delivery of the program.

Further impacting the implementation of an evidence-based program are the challenges and costs associated with specific contexts. For example, the implementation of evidence-based programs in rural areas is challenging and more costly due to high travel costs and fewer students to provide programming to (Barrett & Pas, 2020). Less populous, rural sites, such as site C, have fewer students available ($N = 1,586$), and the cost per student ($87) is inflated. In contrast, more populous, urban sites, such as site B, have more students ($N = 5615$), and the cost per student ($29) is comparatively much lower. Despite site context variability, overall, the implementation costs per site remain within a margin < $25,000 (Table 2).

Variations in implementation context may be explored using sensitivity analyses. Though model fidelity requires two facilitators to deliver the workshop, sites may be able to adjust effort if budget constraints impact widescale implementation. The sensitivity analysis indicated the lower-bound cost per student was $34 when personnel included two part-time facilitators and the facilities and training space were provided through partnerships. The costs increased to $64 at the upper-bound level when a full-time site coordinator and overall training spaces were included. Estimated costs per site, district, classroom, and student may fluctuate depending on components of the program and context. For this reason, a direct comparison to other universal, school-based prevention programs should be approached with caution. Overall, the implementation costs of *Safe Touches* are in line with other universal prevention, school-based programming focused on other public health priorities. For example, Life Skills Training (LST), an evidence-based universal substance use prevention program, reported a per-student cost of $34 (adjusting for 2013 dollars; WSIPP, 2013). Importantly, the LST cost analysis did not use the ingredients method and only reflected the initial training costs for 20 teachers and classrooms, required student materials, and teacher delivery time (i.e., 7.5 h of the intervention over 10 sessions per year for 3 years) for 600 students. Taking this into consideration, it is likely the per-student cost for LST is an underestimate; thus, a direct comparison of the findings described herein for *Safe Touches* to a program like LST is not feasible due to the variability in audience, purpose, and select cost ingredients.

This cost analysis, the first of a universal, school-based CSA prevention program, is not without limitations. First, cost estimates were limited to estimated and actual budgets. Ideally, a cost analysis would include precise documentation of itemized pre-implementation activities (e.g., school recruitment), preparation and instruction time (e.g., time sheets), and indirect cost expenditures. Without precise documentation, the information used in the calculation of implementation costs here, such as including preparation time and school recruitment in overall personnel budgets, likely overestimates some costs and underestimates others. Future research should plan cost data collection prospectively, as this ensures the program activities best representing the required resources are chosen (Crowley et al.,

2018). Second, some costs were excluded in this implementation of *Safe Touches* that should be included in future implementation efforts. These include facility costs and fidelity monitoring, in addition to certain societal costs such as the loss of teaching time or other potential contributions classroom teachers may have made; all of which should be considered within the context of a full benefit–cost analysis. Lastly, in this prevention trial, the implementation of *Safe Touches* used a train-the-trainer model. Facilitators certified by the NYSPCC were able to subsequently train additional facilitators at their site; however, the personnel effort allocated to execute additional trainings was not available for inclusion in the analyses as this was considered part of their daily responsibilities. The train-the-trainer approach, however, reduces pre-implementation costs for new facilitators in the event of staff turnover or increase in personnel to cover demand. Time sheets and precise documentation would provide the required level of detail and would be important to understand for future implementation efforts.

Future Directions

Universal, school-based CSA prevention programs such as *Safe Touches* are an important step in effectively increasing students' knowledge and ultimately use of protective behaviors to prevent victimization. Current research suggests these programs have greater reach and impact when offered comprehensively to include not only students, but parents and community members (Guastaferro et al., 2019; Letourneau et al., 2014; Mendelson & Letourneau, 2015; Rudolph et al., 2018). Cost analyses of these programs provide the necessary foundation for decision makers to advocate for resources to support implementation on a wide scale. As found in our analyses, per-student costs at the site level were largely dependent on total students reached—when more students are reached, available resources go further. Greater reach, however, is not without potential setbacks. Although the impact of *Safe Touches* grows with greater reach, other areas that support implementation (e.g., fidelity) need attention so that both the effectiveness of the model and the impact are balanced. Nonetheless, increasing the reach of programs must be a priority for implementation efforts. For sites where there are fewer students or counties with fewer districts, costs could be reduced accordingly. For example, our sensitivity analysis found that the chief drivers of implementation costs were personnel and indirect costs. For smaller counties or sites with lower overall reach potential, decreasing the number of full-time employees (FTEs) and negotiating lower indirect rates could substantially reduce the implementation costs and make the cost per student more acceptable to policy makers. Moreover, sites could consider partnering together to share implementation costs. One approach is for agencies to consider shared space or FTEs and continuous counties could consider shared providers. Although the current study provides initial program costs for implementation, future studies should use other economic approaches, such as benefit–cost studies, to compare intended intervention benefits against cost (Levin et al., 2017). Moving toward robust economic evaluation of evidence-based, universal prevention programs that are widely disseminated ensures a sustainable commitment to addressing child health and safety while also working toward reducing CSA rates.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Funding

References

Barrett CA, & Pas ET (2020). A cost analysis of traditional professional development and coaching structures in schools. Prevention Science, 21, 604–614. 10.1007/s11121-020-01115-5 [PubMed: 32303895]

Corso PS, & Lutzker JR (2006). The need for economic analysis in research on child maltreatment. Child Abuse & Neglect, 30, 727–738. 10.1016/j.chiabu.2005.12.006 [PubMed: 16854463]

Crowley DM, Dodge KA, Barnett WS, Corso P, Duffy S, Graham P, Greenberg M, Haskins R, Hill L, Jones DE, Karoly LA, Kuklinski MR, & Plotnick R. (2018). Standards of evidence for conducting and reporting economic evaluations in prevention science. Prevention Science, 19, 366–390. 10.1007/s11121-017-0858-1 [PubMed: 29435786]

Department of Labor (2020). A guide for indirect cost determination. https://www.dol.gov/sites/dolgov/files/OASAM/legacy/files/DCD-2-CFR-Guide.pdf

Eisman AB, Kilbourne AM, Dopp AR, Saldana L, & Eisenberg D. (2020). Economic evaluation in implementation science: making the business case for implementation strategies. Psychiatry Research, 283, S0165–1781(19)30752–8. 10.1016/j.psychres.2019.06.008

Finkelhor D, Shattuck A, Turner HA, & Hamby SL (2014). The lifetime prevalence of child sexual abuse and sexual assault assessed in late adolescence. Journal of Adolescent Health, 55, 329–333. 10.1016/j.jadohealth.2013.12.026

Guastaferro K, Zadzora KM, Reader JM, Shanley J, & Noll JG (2019). A parent-focused child sexual abuse prevention program: Development, acceptability, and feasibility. Journal of Child and Family Studies, 28(7), 1862–1877. [PubMed: 31662600]

Guastaferro K, Felt JM, Font SA, Connell CM, Miyamoto S, Zadzora KM, Noll JG (2020) Parent-focused sexual abuse prevention: Results from a cluster randomized trial. Child Maltreatment, 27(1), 114–25. 10.1177/1077559520963870 [PubMed: 33025835]

Haskins R. & Margolis G. (2014). Show me the evidence: Obama's fight for rigor and results in social policy. Brookings Institution Press.

Herrenkohl TI, Hong S, Klika JB, Herrenkohl RC, & Russo MJ (2013). Developmental impacts of child abuse and neglect related to adult mental health, substance use, and physical health. Journal of Family Violence, 28, 191–199. 10.1007/s10896-012-9474-9

Holloway JL, & Pulido ML (2018). Sexual abuse prevention concept knowledge: Low income children are learning but still lagging. Journal of Child Sexual Abuse, 27, 642–662. 10.1080/10538712.2018.1496506 [PubMed: 30071184]

Hussey JM, Chang JJ, & Kotch JB (2006). Child maltreatment in the United States: Prevalence, risk factors, and adolescent health consequences. Pediatrics, 118, 933–942. 10.1542/peds.2005-2452 [PubMed: 16950983]

Letourneau EJ, Brown DS, Fang X, Hassan A, & Mercy JA (2018). The economic burden of child sexual abuse in the United States. Child Abuse & Neglect, 79, 413–422. 10.1016/j.chiabu.2018.02.020 [PubMed: 29533869]

Letourneau EJ, Eaton WW, Bass J, Berlin FS, & Moore SG (2014). The need for a comprehensive public health approach to preventing child sexual abuse. Public Health Reports (1974-), 129(3), 222–228.

Levin HM, McEwan PJ, Belfield C, Bowden AB, & Shand R. (2017). Economic evaluation in education: Cost-effectiveness and benefit-cost analysis. SAGE Publications.

Mendelson T, & Letourneau EJ (2015). Parent-focused prevention of child sexual abuse. Prevention Science, 16, 844–852. 10.1007/s11121-015-0553-z [PubMed: 25757528]

National Academies of Sciences, Engineering, and Medicine. (2016). Advancing the power of economic evidence to inform investments in children, youth, and families. Washington, DC: The National Academies Press. 10.17226/23481

Noll JG (2021). Child sexual abuse as a unique risk factor for the development of psychopathology: The compounded convergence of mechanisms. Annual Review of Clinical Psychology, 17, 439–464.

Noll JG, Guastaferro K, Beal SJ, Schreier HMC, Barnes J, Reader JM, & Font SA (2019). Is sexual abuse a unique predictor of sexual risk behaviors, pregnancy, and motherhood in adolescence? Journal of Research on Adolescence, 29, 967–983. 10.1111/jora.12436 [PubMed: 30019514]

Noll JG, & Shenk CE (2013). Teen birth rates in sexually abused and neglected females. Pediatrics, 131, e1181–e1187. 10.1542/peds.2012-3072 [PubMed: 23530173]

Noll JG, Trickett PK, Long JD, Negriff S, Susman EJ, Shalev I, Li JC, & Putnam FW (2017). Childhood sexual abuse and early timing of puberty. Journal of Adolescent Health, 60, 65–71. 10.1016/j.jadohealth.2016.09.008

Noll JG, Zeller MH, Trickett PK, & Putnam FW (2007). Obesity risk for female victims of childhood sexual abuse: A prospective study. Pediatrics, 120, e61–e67. 10.1542/peds.2006-3058 [PubMed: 17606550]

Powell BJ, Fernandez ME, Williams NJ, Aarons GA, Beidas RS, Lewis CC, McHugh SM, & Weiner BJ (2019). Enhancing the impact of implementation strategies in healthcare: A research agenda. Frontiers in Public Health, 7, 3. 10.3389/fpubh.2019.00003 [PubMed: 30723713]

Pulido ML, Dauber S, Tully BA, Hamilton P, Smith MJ, & Freeman K. (2015). Knowledge gains following a child sexual abuse prevention program among urban students: A cluster-randomized evaluation. American Journal of Public Health, 105, 1344–1350. 10.2105/AJPH.2015.302594 [PubMed: 25973809]

Rheingold AA, Zajac K, Chapman JE, Patton M, de Arellano M, Saunders B, & Kilpatrick D. (2015). Child sexual abuse prevention training for childcare professionals: An independent multi-site randomized controlled trial of stewards of children. Prevention Science, 16, 374–385. 10.1007/s11121-014-0499-6 [PubMed: 25015782]

Rudolph J, Zimmer-Gembeck MJ, Shanley DC, & Hawkins R. (2018). Child sexual abuse prevention opportunities: Parenting, programs, and the reduction of risk. Child Maltreatment, 23, 96–106. 10.1177/1077559517729479 [PubMed: 28920456]

Skinner ML, Hong S, Herrenkohl TI, Brown EC, Lee JO, & Jung H. (2016). Longitudinal effects of early childhood maltreatment on co-occurring substance misuse and mental health problems in adulthood: The role of adolescent alcohol use and depression. Journal of Studies on Alcohol and Drugs, 77(3), 464–472. 10.15288/jsad.2016.77.464 [PubMed: 27172579]

Topping KJ, & Barron IG (2009). School-based child sexual abuse prevention programs: A review of effectiveness. Review of Educational Research, 79, 431–463. 10.3102/0034654308325582

Tutty LM (1997). Child sexual abuse prevention programs: Evaluating who do you tell. Child Abuse & Neglect, 21, 869–881. 10.1016/S0145-2134(97)00048-3 [PubMed: 9298264]

US Department of Health & Human Services Administration for Children and Families. (2021). Child maltreatment 2019. https://www.acf.hhs.gov/sites/default/files/documents/cb/cm2019.pdf.

Walsh K, Zwi K, Woolfenden S, & Shlonsky A. (2018). School-based education programs for the prevention of child sexual abuse: A Cochrane systematic review and meta-analysis. Research on Social Work Practice, 28, 33–55. 10.1177/1049731515619705

Washington State Institute for Public Policy (WSIPP). (2013). Life Skills Training. https://www.wsipp.wa.gov/BenefitCost/Program/37

Wurtele SK, & Owens JS (1997). Teaching personal safety skills to young children: An investigation of age and gender across five studies. Child Abuse & Neglect, 21, 805–814. 10.1016/S0145-2134(97)00040-9 [PubMed: 9280384]
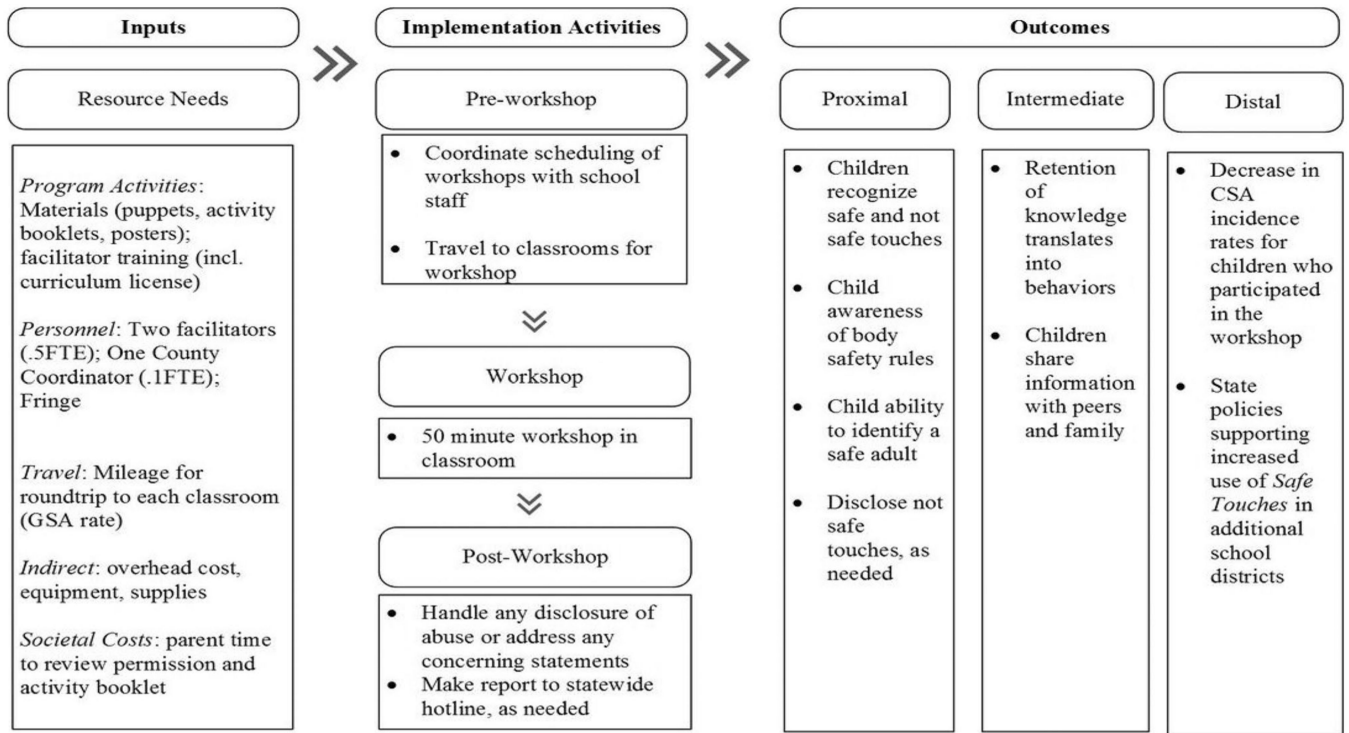
Fig. 1.
Safe Touches implementation logic model

Sensitivity Analysis
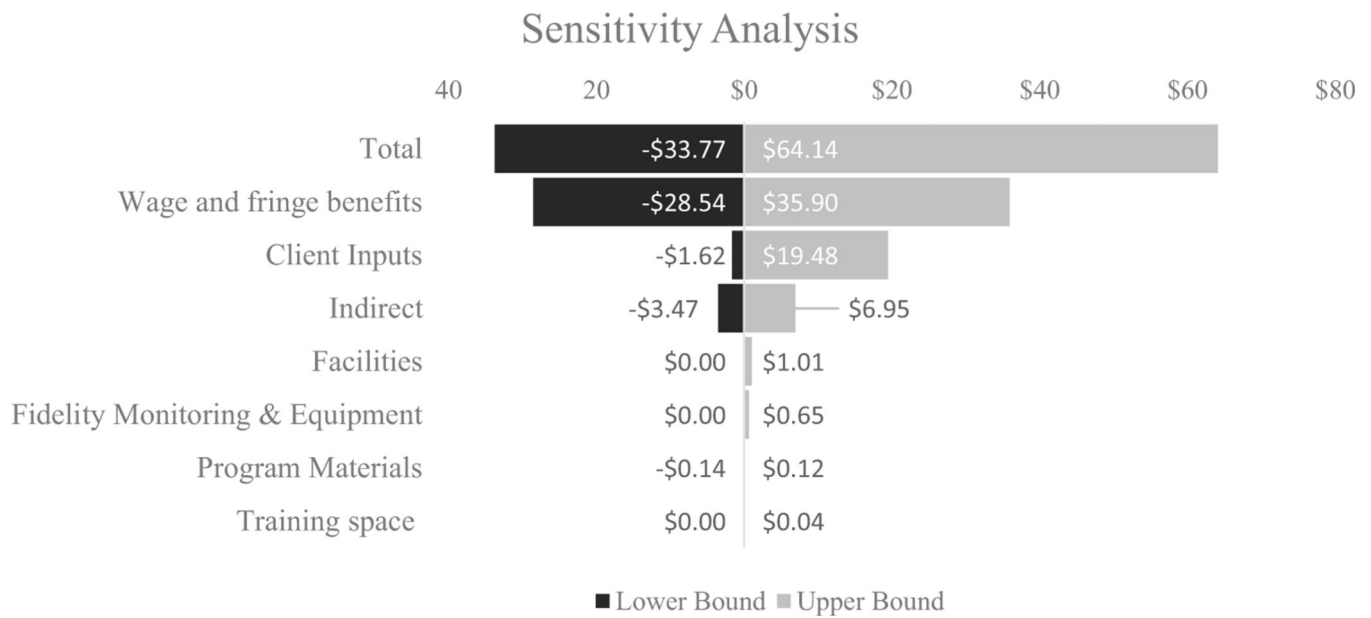
Fig. 2.

Sensitivity analysis for implementing *Safe Touches* per student *Note*: Figure indicates the results of single- and multi-way sensitivity analysis testing major assumptions underlying the cost analysis. Each row indicates variation in tested assumption in isolation. The first row (total) indicates the sum of the lower bound and upper bound of each tested assumption and provides a confidence interval around the average total costs. The remaining rows are the confidence intervals around per student cost. Lower-bound assumptions were not tested for those rows with $0.00

Table 1

Description and average site costs of *Safe Touches* implementation activities by cost category

Cost category	Implementation activity	Avg. site cost	Description
Program activities and materials	Facilitator training	$6518	Total cost; split between sites. Training includes the NYSPCC-led *Safe Touches* facilitator workshop, trainer expenses (i.e., travel, lodging, per diem), and facilitator certification
	Trainee expenses	$1245	Lodging and per diem for program developers to train new facilitators
	Video equipment[a]	–	Required by program developer to purchase a video camera for fidelity monitoring
	Fidelity monitoring[a]	–	Videotaped sessions are sent to *Safe Touches* trainers and reviewed
	Activity booklets	$4045	Required for each student after program concludes
	Extra materials	$476	Additional puppets and/or carrying case for ongoing implementation (maintenance)
Personnel and travel	Facilitator	$71,875	*Safe Touches* facilitators' effort to schools to deliver the workshop
	Site coordinator	$13,208	Site coordinators' effort for scheduling workshops and assisting with the workshop, as needed
	Fringe	$25,525	Covered at 30% of each annual salary
	Travel	$3189	*Safe Touches* facilitator travel between districts within site (includes travel by site coordinator); number of schools/2 × average distance × (.535 × number of visits)
Indirect costs	Indirect costs	$24,717	Site overhead (allocated and spent at site discretion); site and school space
	Equipment and materials	$3961	Computers, cell phone reimbursement, software (at site discretion)
Facilities	Physical space[a]	–	Space for facilitator training and/or for delivering the *Safe Touches* workshop; equivalent to providing auxiliary classroom space
Societal	Required caregiver inputs	$17,327	Cost per caregiver for filling out permission forms and answering questions (median income of county/2080 (hours in work year)) total/4 for an estimate of 15 min of time per caregiver

[a] No costs were incurred by sites in this implementation for fidelity monitoring, video equipment, or physical training space

Table 2

Average costs for implementing *Safe Touches* by site

	All sites	Site A[a] (districts = 11; classrooms = 245; students = 4225)	Site B (districts = 13; classrooms = 253; students = 5615)	Site C (districts = 24; classrooms = 92; students = 1586)	Site D (districts = 11; classrooms = 128; students = 2809)
Average implementation costs					
Average site cost (*N* = 4)	$154,243.25	$161,126.28	$162,255.67	$138,432.06	$155,158.99
Average district cost (*N* = 58)	$10,637.47	$14,647.84	$12,481.21	$5768.00	$14,105.36
Average classroom cost (*N* = 718)	$859.29	$657.66	$641.33	$1504.70	$1212.18
Average student cost (*N* = 14,235)	$43.34	$38.14	$28.90	$87.28	$55.24
Average societal costs [b]					
Average site cost (*N* = 4)	$171,570.11	$181,659.78	$191,509.82	$143,316.94	$169,793.88
Average district cost (*N* = 58)	$11,832.42	$16,514.53	$14,731.52	$5971.54	$15,435.81
Average classroom cost (*N* = 718)	$955.82	$741.47	$756.96	$1557.79	$1326.51
Average student cost (*N* = 14,235)	$48.21	$43.00	$34.11	$90.36	$60.45

[a] Average site costs are depicted at the district, classroom, and student level using site-specific numbers of districts, classrooms, and students. For example, the per-district cost for site A is calculated by taking the total direct costs ($161,126.28) and dividing by the number of districts within that site (11), producing a per-district cost of $12,481.21

[b] Societal costs add estimated caregiver inputs to the total implementation costs