

# Assessment of Parent-Based Interventions for Adolescent Sexual Health

## A Systematic Review and Meta-analysis

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**IMPORTANCE** Parent-based sexual health interventions have received considerable attention as one factor that can increase safer sexual behavior among youth; however, to our knowledge, the evidence linking parent-based interventions to youth sexual behaviors has not been empirically synthesized.

**OBJECTIVE** To examine the association of parent-based sexual health interventions with 3 primary youth outcomes—delayed sexual activity, condom use, and parent-child sexual communication—as well as several secondary outcomes. We also explored potential moderators of intervention effectiveness.

**DATA SOURCES** A systematic search was conducted of studies published through March 2018 using MEDLINE, PsycINFO, Communication Source, and CINAHL databases and relevant review articles.

**STUDY SELECTION** Studies were included if they: (1) sampled adolescents (mean age,  $\leq 18$  years), (2) included parents in a key intervention component, (3) evaluated program effects with experimental/quasi-experimental designs, (4) included an adolescent-reported behavioral outcome, (5) consisted of a US-based sample, and (6) were published in English.

**DATA EXTRACTION AND SYNTHESIS** Standardized mean difference ( $d$ ) and 95% confidence intervals were computed from studies and meta-analyzed using random-effects models. A secondary analysis evaluated potential moderating variables.

**MAIN OUTCOMES AND MEASURES** The primary outcomes were delayed sexual activity, condom use, and sexual communication.

**RESULTS** Independent findings from 31 articles reporting on 12 464 adolescents (mean age = 12.3 years) were synthesized. Across studies, there was a significant association of parent-based interventions with improved condom use ( $d = 0.32$ ; 95% CI, 0.13-0.51;  $P = .001$ ) and parent-child sexual communication ( $d = 0.27$ ; 95% CI, 0.19-0.35;  $P = .001$ ). No significant differences between parent-based interventions and control programs were found for delaying sexual activity ( $d = -0.06$ ; 95% CI,  $-0.14$  to  $0.02$ ;  $P = .16$ ). The associations for condom use were heterogeneous. Moderation analyses revealed larger associations for interventions that focused on younger, compared with older, adolescents; targeted black or Hispanic youth compared with mixed race/ethnicity samples; targeted parents and teens equally compared with emphasizing parents only; and included a program dose of 10 hours or more compared with a lower dose.

**CONCLUSIONS AND RELEVANCE** Parent-based sexual health programs can promote safer sex behavior and cognitions in adolescents, although the findings in this analysis were generally modest. Moderation analyses indicated several areas where future programs could place additional attention to improve potential effectiveness.

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Adolescents disproportionately experience the negative consequences of sexual risk behavior. Young people aged 15 to 24 years constitute half of the 20 million annual cases of sexually transmitted infections (STIs) in the United States even though they make up only 25% of the sexually active population.<sup>1</sup> As many as 1 in 4 sexually active girls has an STI<sup>2</sup>; recent data suggest that 17% of new HIV infections occur among young boys and men younger than 24 years.<sup>3</sup> Youth in the United States are also at heightened risk for unintended pregnancy.<sup>4,5</sup>

To address these risks, for nearly 3 decades researchers and public health professionals have included parents in sexual health education programs with the aim of improving adolescent sexual decision-making. Targeting parents with sexual health programming makes sense for theoretical and practical reasons. According to the ecological systems theory,<sup>6</sup> children develop within a series of nested systems, including the family system, that can directly and indirectly affect decision-making and health behavior. Parents shape the attitudes, norms, values, and sexual decision-making capacity of their children and thus act as particularly important socializing agents.<sup>7-10</sup> Parents are also uniquely positioned to monitor adolescents' behavior; higher parental monitoring has been linked to a higher likelihood of contraceptive use and delayed sexual activity.<sup>9,11,12</sup> Additionally, parent-based interventions may allow parents to tailor the content and delivery of information based on their child's developmental level and interpersonal context.<sup>13,14</sup>

While there are many reasons to expect that parent-based sexual health interventions may affect adolescents' behaviors, the empirical evidence is somewhat mixed on the success of these programs.<sup>15,16</sup> Several studies have shown that parent-based interventions increase (or are associated with an increase in) the likelihood that adolescents will delay sexual activity and use condoms or other contraceptives more consistently when sexually active.<sup>17-19</sup> However, other studies of parent-based interventions have not shown significant findings with regard to adolescent sexual decision-making or behavior.<sup>20-22</sup>

To our knowledge, the literature currently lacks a meta-analytic review that synthesizes the findings of studies of parent-based interventions on adolescent sexual behavior. A few systematic reviews and meta-analyses have examined the association of cross-cutting parent-based interventions that target multiple adolescent risk outcomes (eg, substance use, sexual risk, and violence)<sup>23</sup> and others that target specific components of parent-based interventions, such as those focused exclusively on improving parent-child sexual communication.<sup>14,24,25</sup> However, we are not aware of a comprehensive meta-analysis that exclusively focuses on the overall association of parent-based interventions with adolescent safer sex behaviors, including delayed sexual activity and condom use. Such a review could assess the pooled findings of these interventions and identify specific participant characteristics and/or program components associated with program success.

The purpose of this study is to systematically review the literature on parent-based sexual health interventions for US

## Key Points

**Question** Are parent-based sexual health interventions associated with improved adolescent sexual health outcomes?

**Findings** This meta-analysis synthesized the results of 31 randomized clinical trials comprising 12 464 adolescent participants. Across studies there was a significant association of parent-based interventions with improved condom use and parent-child sexual communication compared with control conditions, but there was no significant mean association of these interventions with delaying adolescents' sexual activity.

**Meaning** Overall, parent-based interventions may improve several aspects of adolescents' sexual health and decision-making.

adolescents and meta-analyze their overall association with 3 key behavioral outcomes: delayed sexual activity, condom use, and parent-child sexual communication. These outcomes were selected because of their relevance to preventing unintended pregnancy, HIV, and other STIs.<sup>1</sup> In addition, we examined 3 secondary outcomes identified as important components of safer sexual decision-making within health behavior theories,<sup>26,27</sup> including intentions to delay sex, sexual health knowledge, and safer sex self-efficacy.

A secondary goal was to identify specific components that are likely to make parent-based interventions successful at decreasing adolescent sexual risk behavior. We considered several potential moderating variables, including sample (eg, sex, age, and race/ethnicity), intervention (eg, design and dose), and methodological characteristics (eg, length of follow-up).

## Methods

### Search Strategy

We conducted a comprehensive search of MEDLINE, PsycINFO, Communication Source, and CINAHL databases to extract relevant studies published through March 2018. We used the following combination of key words: *adolescent\* or teen\* or youth; sexual health or safe\* sex or sex\* education or sexually transmitted disease or sexually transmitted infection or STD or STI or HIV or AIDS or pregnancy or reproductive health or condom\* or contraceptive\* or protected sex or unprotected sex or abstinence; intervention or program or education or prevention or promotion or trial; and parent\* or caregiver or family or mom or mother or dad or father*. Additional studies were located by examining prior reviews and meta-analyses<sup>14-16,24,25,28-32</sup> and examining the reference lists of all included articles. This search produced an initial 5268 articles.

### Selection Criteria

Studies were included if they met the following criteria: (1) focused on adolescents (ie, mean sample age,  $\leq 18$  years); (2) included parents in a key intervention component (school-based programs with a minor parent component, such as a worksheet, were excluded<sup>33-35</sup>); (3) evaluated program effects with an experimental or quasi-experimental design;

(4) included at least 1 of 3 behavioral outcome measures reported by youth: delayed sexual activity/abstinence, condom use (effect sizes for unprotected sex were recoded so that the direction of the effect always indicated greater protection), or parent-child sexual communication; (5) included a US-based sample; (6) were published in English; and (7) provided sufficient statistics to calculate effect sizes. For studies with multiple follow-up points, we used the longest-term follow-up with adequate data to calculate effect sizes as the most conservative estimate of treatment effects. For studies with more than 1 intervention group, we selected the parent-based intervention that was most comprehensive. When studies included more than 1 indicator for an outcome (eg, multiple indicators of condom use), we used a random number generator to select 1 outcome. Finally, studies that included only parent-reported outcomes were excluded.<sup>36</sup> These selection criteria resulted in a final sample of 31 articles (eFigure 1 in the [Supplement](#)). From these articles, we calculated 20 independent effect sizes for delayed sexual activity, 16 for condom use, 14 for sexual communication, 6 for intentions to delay sex, 5 for sexual health knowledge, and 4 for safer sex self-efficacy.

### Data Extraction

Two of the authors (R.E. and H.J.) independently coded the primary studies. The following data were abstracted: (1) demographic and sample characteristics, (2) intervention characteristics (eg, *dose intended*, defined as the amount of time parents were intended to be involved in the intervention, and *dose received*, defined as the percentage of parents who completed the full dose intended), and (3) methodological characteristics (eg, length of follow-up). The mean percentage agreement across all coding categories was 92%. Discrepancies between coders were resolved through discussion with the first author (L.W.).

The standardized mean difference (*d*) was used as the indicator of effect size. Effect size *d* can be interpreted as small (0.20), medium (0.50), or large (0.80).<sup>37</sup> When *d*'s were reported in an article, they were directly extracted. If *d*'s were not reported, other statistics that could be converted to *d*'s (eg, summary statistics and odds ratios) were calculated using Comprehensive Meta-Analysis, version 2.0 (Biostat)<sup>38</sup> and the Practical Meta-Analysis Effect Size Calculator.<sup>39</sup> When no statistics in the study could be converted to a *d*, the study authors were contacted and appropriate data were requested. To ensure the consistency and interpretability of effect sizes for all studies, higher values always indicated that the parent-based intervention group performed better than the control group.

We used random-effects meta-analytic procedures for the primary analyses across all independent effect sizes; this procedure allowed for the possibility of differing variances across studies.<sup>40</sup> The *Q* statistic and *I*<sup>2</sup> were used to examine whether significant heterogeneity existed among effect sizes. Effect sizes for hypothesized moderators were calculated along with their 95% confidence intervals, and those effect sizes were compared using the *Q<sub>b</sub>* statistic. For these analyses, mixed-effects models were used to allow for the possibility of differing variances across subgroups. These models use random-

effects assumptions while stratifying the effect sizes by fixed factors, such as age and study dose.<sup>40</sup> Analyses were conducted using Comprehensive Meta-Analysis, version 2.0, and statistical significance was set at  $P < .05$ .<sup>38</sup>

## Results

### Study Characteristics

**Table 1**<sup>17-21,41-66</sup> provides a summary of the studies included in this meta-analysis. A total of 12 464 adolescents (weighted mean age, 12.3 years) were enrolled across 31 parent-based interventions. Most programs targeted boys and girls (29); there was 1 program for only girls<sup>18</sup> and 1 for only boys.<sup>19</sup> The racial/ethnic makeup of participants across studies was diverse, with some focused exclusively or primarily (more than 85%) on black (7), Hispanic (7), and white youth (2), and about half were of mixed race/ethnicity (15).

Regarding the parents in these studies, descriptive characteristics were missing from many studies. From what we could assess, most programs focused exclusively or primarily (more than 85%) on mother/maternal figures (13) or mixed-sex parent samples (7), with only 1 study focused on father/paternal figures and 10 studies that did not report parent sex. The mean parent age among the 11 studies that reported age was 39.8 years.

The intervention dose varied widely across studies, from fewer than 3 hours of parent training (6) to 20 hours or longer (6). For most studies, the dose intended did not match the final dose received: only 10 studies actually delivered the full intervention dose to all parents. In addition, most of the programs were delivered to parents in person (28), with only 2 programs delivered online.

### Primary Outcomes

#### Delayed Sexual Activity

Individual study effect sizes for delayed sexual activity ranged from a *d* of -0.75 to 0.36, with an overall weighted mean effect size across studies of a *d* of -0.06 (95% CI, -0.14 to 0.02;  $P = .16$ ) that was not significant. This indicates that, overall, parent-based interventions were not associated with a delay in adolescents' sexual activity (**Table 2**; eFigure 2 in the [Supplement](#)). Further, there was no significant heterogeneity among studies regarding the delayed sexual activity outcome ( $Q = 26.59$ ;  $df = 19$ ;  $P = .12$ ;  $I^2 = 28.54$ ); thus, we did not examine moderators of this outcome.

#### Condom Use

Whereas individual effect sizes of studies ranged from a *d* of -0.18 (95% CI, -0.49 to 0.13) to 1.28 (95% CI, -0.09 to 2.65), the weighted mean effect size for condom use was a *d* of 0.32 (95% CI, 0.13-0.51;  $P = .001$ ), indicating that parent-based interventions have a small but significant association with youth condom use behavior (**Table 2**; eFigure 3 in the [Supplement](#)). To examine whether publication bias may have inflated the effect size, a fail-safe number was calculated. This fail-safe number was 139, suggesting that 139 nonsignificant studies would need to exist to reduce the effect size to a trivial level.

Table 1. Study Characteristics

Source, Year	Youth Sample	Parent Sample <sup>a</sup>	Intervention Descriptions and Study Settings	Outcomes
Anderson et al, <sup>21</sup> 1999	N = 251 children from Los Angeles county, California; mean age, 10.6 y; range, 9–14 y; 150 (60%) female; 32 (13%) white, 52 (21%) black, and 115 (46%) Hispanic	"Parents"	8 In-person sessions in community-based settings (6 with only teens); 1 parent and teen together; 1 parent only; abstinence focus; 38% of parents attended parent-youth session	Parent-child sexual communication
Blake et al, <sup>41</sup> 2001	N = 351 eighth-grade students from middle-class suburban communities; mean age, NR; 168 (48%) female; 298 (85%) white; 20 (6%) had sex	"Parents"	5 1-h In-person, weekly lessons at school (teen-only); 5 homework assignments for teens and parents; abstinence focus; parent-teen homework completion between 38%-65% for each assignment	Delay sex, parent-child sexual communication, intent, knowledge, and safer self-efficacy
Brown et al, <sup>42</sup> 2014	N = 721 youth from inpatient/outpatient mental health settings; mean age, 14.9 y; range, 13–18 y; 410 (57%) female; 238 (33%) white, 429 (60%) black, and 78 (11%) Hispanic; 387 (54%) had sex	"Caregivers"; 721 (100%) English-speaking	8-h In-person workshop in inpatient/outpatient mental health settings (parents and teens attended some lessons separately and some together); comprehensive focus; all parents received the full program dose	Delay sex, condom use, parent-child sexual communication, knowledge, and safer self-efficacy
Dancy et al, <sup>43</sup> 2006	N = 262 low-income, inner city adolescents in Chicago, Illinois; mean age, 12.4 y; range, 11–14 y; 262 (100%) female; 262 (100%) black	Maternal figures; mean age, 40.2 y; range, 22–76 y; 262 (100%) female	12 In-person weeks of training in community-based settings (parents only); 6 weekly, 2-h classes taught in-person by parents to teens; homework assignments; abstinence focus; all parents received the full program dose	Delay sex, intent, knowledge, and safer self-efficacy
Dilorio et al, <sup>18</sup> 2006	N = 582 teens from boys and girls clubs in urban areas; mean age, 12.2 y; range, 11–14 y; 233 (40%) female; 570 (98%) black; 52 (9%) had sex	Mothers; mean age, 37.9 y; 582 (100%) female; 396 (68%) single; 326 (56%) attended some college	7 2-h In-person sessions over 14 weeks in community-based settings (parents and teens attended 3 separately and 4 together); 7 take-home activities; comprehensive focus; all parents received the full program dose	Delay sex, condom use, and intent
Dilorio et al, <sup>19</sup> 2007	N = 277 teens from boys and girls clubs in metropolitan Atlanta, Georgia; mean age, 12.8 y; range, 11–14 y; 277 (100%) male; 266 (96%) black; 67 (24%) had sex	Fathers; mean age, 40.1 y; range, 18–80 y; 277 (100%) male; 112 (40%) biological parents	7 2-h In-person sessions in community-based settings (6 for parents only and 1 attended by parents and teens together); 7 take-home activities; comprehensive focus; fathers attended an average of 45% of sessions	Delay sex, condom use, parent-child sexual communication, and intent
Esposito-Smythers et al, <sup>44</sup> 2017	N = 81 teens in mental health treatment; mean age, 15.4 y; range, 13–18 y; 47 (58%) female; 34 (42%) white, 30 (37%) black, and 15 (19%) Hispanic; 31 (38%) had sex	Caregivers; 73 (90%) female; 60 (74%) biological mothers; 20 (46%) married	12-h In-person workshop split over 2 weekends (parents and teens attended approximately 1/3 of the workshop together and the remaining 2/3 separately); 2-h booster session; comprehensive focus; all parents received the full program dose	Delay sex and parent-child sexual communication
Estrada et al, <sup>45</sup> 2015	N = 160 ninth grade students from Miami-Dade County, Florida; mean age, 15.3 y; 78 (49%) female; 160 (100%) Hispanic; 38 (24%) had sex; 86 (54%) born in the United States	Primary caregivers; median household income, \$10 000–\$15 000; 142 (89%) chose Spanish as preferred language	5 2-h In-person sessions in a school setting (parents only); 3 parent homework assignments; 1 1-h family visit (teens and parents attended together); comprehensive focus; the dose received was unclear	Delay sex and condom use
Estrada et al, <sup>46</sup> 2017	N = 746 middle school students from Miami-Dade County, Florida; mean age, 13.9 y; range, 2–16 y; 357 (48%) female; 746 (100%) Hispanic; 57 (7.6%) had sex	Primary caregiver; mean age, 40.1; 619 (83%) female; 656 (88%) born in Spanish-speaking country from the Americas	12 In-person sessions in a school setting (8 only parents, 4 parents and teens) over 3-mo period; comprehensive focus; parents attended an average of 50% of sessions	Condom use
Evans et al, <sup>47</sup> 2012	N = 394 mostly white children of parents from an online panel study; mean age, NR; range, 13–14 y; 184 (47%) female	Parents; age range, 35–55 y; 227 (58%) mothers	Parents viewed 2 radio advertisements, 2 television advertisements, and 1 print public service announcement all via a personal computer; comprehensive focus; all parents received the full program dose	Parent-child sexual communication
Forehand et al, <sup>20</sup> 2007	N = 1115 preadolescents from Athens and Atlanta, Georgia, and Little Rock, Arkansas; mean age, 10.8 y; range, 9–12 y; 613 (55%) female; 1115 (100%) Black	Parents; 892 (88%) female	5 In-person, 2.5-h sessions for parents in community-based settings (teens attended part of 1 session with parents); homework assignments (parents and teens together); comprehensive focus; 60% of parents received the full program dose	Parent-child sexual communication

(continued)

Statistical testing indicated heterogeneity among studies regarding the condom use outcome ( $Q = 55.38$ ;  $df = 15$ ;  $P < .001$ ;  $I^2 = 72.91$ ); thus, we examined several potential moderating variables. As shown in Table 3, adolescent age, sex, and race/

Table 1. Study Characteristics (continued)

Source, Year	Youth Sample	Parent Sample <sup>a</sup>	Intervention Descriptions and Study Settings	Outcomes
Greene et al, <sup>48</sup> 2011	N = 351 inner-city youths in Syracuse, New York; mean age, 11.2 y; range, 9-15 y; 176 (50%) female; 194 (49%) black and 105 (30%) Hispanic; 57 (16%) had sex	"Parents"	24 h of in-person intervention in community centers (teens only); 6 in-person, 1-h training units with written materials provided (parents only); abstinence focus; fewer than 20% of parents completed training	Delay sex and intent
Guilamo-Ramos et al, <sup>49</sup> 2011	N = 264 teens from physicians' offices in New York, New York; mean age, 12.9 y; range, 11-14 y; 138 (52%) female; 41 (16%) black and 223 (85%) Hispanic; 16 (7%) had sex; 187 (71%) born in the United States	Mothers; mean age, 40.7 y; 264 (100%) female; 119 (45%) single; 193 (73%) speak Spanish at home; 61 (23%) US-born	30-min in-person session in physician's office (parents only); take-home activities for parents and teens together; 2 booster phone calls with parents; physician endorsement; comprehensive focus; all parents received the full program dose	Delay sex
Guilamo-Ramos et al, <sup>17</sup> 2011	N = 2016 sixth-grade and seventh-grade students from Bronx and Harlem, New York; mean age, 12.2 y; 1008 (50%) female; 504 (25%) black and 1512 (75%) Hispanic; 139 (7%) had sex	Mothers; mean age, 40.1 y; 2016 (100%) female; 867 (43%) single; 504 (25%) completed high school; 52% speak Spanish at home; 685 (34%) US-born	2 In-person, 2.5-h sessions in a school setting (parents only); manual for parents and teens to complete together with 2 homework assignments; 2 booster calls with parents; abstinence focus; 70% of parents received full program dose	Delay sex and parent-child sexual communication
Hadley et al, <sup>50</sup> 2015	N = 721 youths in mental health treatment from Rhode Island, Georgia, and Illinois; mean age, 14.8 y; range, 13-18 y; 405 (56%) female; 423 (59%) black and 77 (11%) Hispanic	Parents; 636 (88%) female; 424 (59%) household incomes <\$35 000; 585 (78%) did not graduate high school	8 1-h in-person workshop in inpatient/outpatient mental health settings (parents and teens attended some lessons separately and some together); 1-h booster session 2 wk later; 2-h booster session 3 mo later; comprehensive focus; all parents received the full program dose	Parent-child sexual communication
Haggerty et al, <sup>51</sup> 2007	N = 331 eighth-grade students in Seattle Public Schools, Washington; mean age, 13.7 y; 161 (49%) female; 168 (51%) white and 163 (49%) black	Parents who spoke English as their primary language; 132 (40%) single parent; mean per capita income = \$15 042; 126 (38%) graduated from college	7 In-person, 2-2.5-h weekly sessions in a school setting (parents and teens attended two-thirds of sessions together and remaining one-third separately); home workbook activities; videotaped program for parents to keep; comprehensive focus; 22% of families attended no sessions	Delay sex
Kogan et al, <sup>52</sup> 2012	N = 502 16-year-olds from rural, low-income counties in Georgia; mean age, 16 y; 256 (51%) female; 502 (100%) black	Parents; 126 (25%) did not complete high school; median family income = \$17 790; 358 (71%) lived within 150% of the poverty threshold	5 Weekly, in-person sessions for parents and teens together at home; optional condom skills unit; comprehensive focus; 65% of parents received the full program dose	Condom use and safer self-efficacy
Lefkowitz et al, <sup>53</sup> 2000	N = 40 youths from Los Angeles, California; mean age, 12.7 y; range, 11-15 y; 21 (53%) female; 20 (50%) white, 6 (15%) black, and 7 (18%) Hispanic	Mothers; mean age, 42.9 y; 40 (100%) female; 19 (48%) married; 14 (35%) did not graduate from college	2 In-person, 1.5-h training sessions in a university research laboratory (parents only); 2 wk of homework questionnaires; comprehensive focus; all parents received the full program dose	Parent-child sexual communication and knowledge
Letourneau et al, <sup>54</sup> 2013	N = 81 substance-using juvenile offenders; mean age, 15 y; range, 12-17 y; 13 (16%) female; 40 (49%) white, 28 (35%) black, and 27 (33%) Hispanic; 51 (63%) had sex	Parents; 64 (79%) mothers, 12 (15%) fathers, 5 (6%) other primary caregivers; 37 (46%) married; 56 (69%) working; 45 (55%) had some college education	60-90 min in-person sessions for parents and teens together, weekly for 6 mo in outpatient therapy setting; comprehensive focus; caregivers involved in "nearly all" sessions	Condom use
Letourneau et al, <sup>55</sup> 2017	N = 105 youths from juvenile detention centers; mean age, 14.9 y; range, 11-17 y; 17 (16%) female; 35 (33%) white, 31 (30%) black, and 32 (31%) Hispanic; 95 (90%) heterosexual; 37 (35%) had sex	Parents; mean age, 42.5 y; 80 (76%) mothers, 17 (16%) fathers; median household income = \$20 000-\$30 000	24 Weekly, in-person 60-90 min sessions for parents and teens together in an outpatient therapy setting; homework assignments; comprehensive focus; all parents received the full program dose	Delay sex and condom use
Milburn et al, <sup>56</sup> 2012	N = 151 homeless/runaway youth from Los Angeles and San Bernardino Counties, California; mean age, 14.8 y; range, 12-17 y; 100 (66%) female; 17 (11%) white, 31 (21%) black, and 93 (62%) Hispanic; 136 (90%) heterosexual; 139 (92%) born in the United States	Parents; 115 (76%) female	5 Weekly, in-person, 1.5-2 h sessions for parents and teens together, usually at home; comprehensive focus; 76% of parents received the full program dose	Delay sex
Murry et al, <sup>57</sup> 2011	N = 332 11-year-olds from 9 rural counties in Georgia; mean age, 11.2 y; 178 (54%) female; 332 (100%) black	Mothers; mean age, 38.1 y; 332 (100%) female; 156 (46%) lived below federal poverty standards	7 Weekly, 2 h in-person meetings for parents and teens in community-based settings (1 h attended separately and 1 h together); comprehensive focus; 44% of parents received the full program dose	Delay sex and condom use

(continued)

Table 1. Study Characteristics (continued)

Source, Year	Youth Sample	Parent Sample <sup>a</sup>	Intervention Descriptions and Study Settings	Outcomes
Pantin et al, <sup>58</sup> 2009	N = 213 Hispanic, eighth-grade students with minor behavior problems from a low-income school district in Miami-Dade County, Florida; mean age, 13.8 y; 77 (36%) female; 119 (56%) born in the United States	Primary caregivers; mean age, 40 y; 185 (87%) female; 28 (13%) with household income of >\$30 000/y	9 In-person, 2 h group sessions (parents only); 10 1-h family visits for parents and teens together; 4 1-h booster sessions; comprehensive focus; the dose received was unclear	Delay sex and condom use
Prado et al, <sup>59</sup> 2007	N = 266 eighth-grade students from Miami, Florida; mean age, 13.4 y; 138 (52%) female; 266 (100%) Hispanic; 106 (40%) born in the United States	Primary caregivers; 231 (87%) female; 51 (19%) with a household income greater than \$30 000/y	49 h of In-person sessions (15 parent-only sessions and 8 family visits and 2 parent-adolescent circles for parents and teens together); comprehensive focus; the dose received was unclear	Condom use
Prado et al, <sup>60</sup> 2012	N = 242 Hispanic youths from Miami-Dade county, Florida, juvenile services and public school system; mean age, 14.7 y; range = 12-17 y; 86 (36%) female; 218 (90%) heterosexual; 123 (51%) had sex	Primary caregivers; 191 (79%) have a family income of <\$30 000	8 In-person, 2-h group sessions (parents only); 4 1-h family visits over 3 mo for parents and teens together; comprehensive focus; parents attended 88% of sessions, on average	Condom use
Rowe et al, <sup>61</sup> 2016	N = 154 drug-involved youths who were incarcerated in Miami, Florida; mean age, 15 y; range, 13-17 y; 28 (18%) female; 29 (19%) white, 94 (61%) black, and 26 (17%) Hispanic	Parents; average annual family income = \$18 000	1-h In-person session in detention center (teens only); ongoing individual and family therapy in outpatient therapy setting; 2-h interactive family group for parents and teens together; homework; comprehensive focus; 84% of participants attended group sessions	Delay sex and condom use
Schuster et al, <sup>62</sup> 2008	N = 683 youths from California; mean age, NR; most age, 11-13 y; 348 (51%) female; 321 (47%) white, 116 (17%) black, and 109 (16%) Hispanic	Parents; most aged 35-54 y; 492 (72%) female; recruited from worksites; 649 (95%) attended at least some college; 96 (14%) with household income less than \$50 000/y	8 Weekly, in-person 1-2 h sessions at parent worksites (parents only); home assignments; comprehensive focus; parents attended a median of 7 sessions	Parent-child sexual communication
Sieving et al, <sup>63</sup> 2017	N = 65 youths from community organizations serving Latinx families in Minneapolis and St Paul, Minnesota; mean age, 12.2 y; range, 11-14 y; 29 (44%) female; 65 (100%) Hispanic; 1 (2%) had sex; 55 (85%) born in the United States	Parents; 60 (92%) mothers; 62 (96%) not born in the United States; 60 (92%) speak Spanish at home	32 In-person, 2-h biweekly sessions in community organization settings (teens only); 8 in-person, 2-h weekly sessions (parents only); 8 in-person 2-h sessions for parents and teens together; comprehensive focus; 61% of parents attended at least 2/3 of sessions	Parent-child sexual communication and intent
Stanton et al, <sup>64</sup> 2004	N = 817 black youths from low-income, urban community sites in Baltimore, Maryland; mean age, 14 y; range, 13-16 y; 474 (58%) female; 340 (42%) had sex	"Parents"	8 In-person 1.5-h sessions in urban community settings (teens only); 1 60-90-min session with video and roleplay for parents and teens together; 4 90-min booster sessions for teens; comprehensive focus; the dose received was unclear	Delay sex, condom use, and parent-child sexual communication
Tolou-Shams et al, <sup>65</sup> 2017	N = 60 youths from juvenile drug court programs in the Northeast; mean age, 15.7 y; range, 12-18 y; 15 (25%) female; 39 (65%) white, 6 (10%) black, and 10 (17%) Hispanic; 50 (83%) had sex; 51 (85%) born in the United States	Parents; mean age, 42 y; 52 (87%) female; 13 (22%) single; 32 (53%) attended at least some college	4 In-person, 2-h sessions (weekly) for parents and teens (1 h attended separately and 1 h together); 4 homework sessions; 1 2-h booster session for parents and teens; comprehensive focus; 22% of families did not complete any sessions	Delay sex and condom use
Villarruel et al, <sup>66</sup> 2010	N = 130 youths from Latinx communities in southwest Detroit, Michigan; mean age, 14 y; range, 13-18 y; 70 (54%) female; 130 (100%) Hispanic; 8 (6%) had sex	Parents; mean age, 39.3 y; 108 (83%) female; 91 (70%) had high school education or less; 107 (82%) from Mexico; 101 (78%) spoke Spanish nearly all or all the time; lived in the United States for an average of 19.37 y	2 Computer-based sessions (60 min total) for parents; 1 homework assignment for parents and teens; list of potential resources; comprehensive focus; all parents received the full program dose	Parent-child sexual communication

Abbreviations: delay sex, delayed sexual activity; intent, intentions to delay sexual activity; knowledge, sexual health knowledge; NR, not reported.

<sup>a</sup> Basic demographic information for parents (ie, sex, age, marital status, education, income, and primary language) are reported for all studies that

included this information. Many studies were missing demographic information on the parent sample. The label the authors used to describe the parents/caregivers involved is listed when no other information was available.

ethnicity moderated the association of interventions with condom use as well as intervention design and the extent of parental involvement. Intervention associations were stronger for samples

with adolescents younger than 14 years ( $d = 0.64$ ;  $P < .001$ ) compared with older samples ( $d = 0.15$ ;  $P = .10$ ). Intervention associations were stronger for samples with black teens ( $d = 0.29$ ;

**Table 2. Main Associations of Parent-Based Interventions With Adolescent Sexual Health Outcomes**

Variable	Weighted Mean Effect Size		P Value
	k	d (95% CI)	
Primary outcomes			
Delayed sexual activity	20	-0.06 (-0.14 to 0.02)	.16
Condom use	16	0.32 (0.13 to 0.51)	.001
Sexual communication	14	0.27 (0.19 to 0.35)	.001
Secondary outcomes			
Intentions to delay sexual activity	6	0.24 (0.10 to 0.38)	.001
Sexual health knowledge	5	0.40 (0.06 to 0.75)	.02
Safer sex self-efficacy	4	0.26 (0.16 to 0.36)	<.001

**Table 3. Test of Moderators of Condom Use Outcomes Across Interventions**

Characteristic <sup>a</sup>	k	d (95% CI)	P Value	Between Groups	
				Q <sub>B</sub>	P Value
Adolescent age, y					
Sample mean age <14	6	0.64 (0.34 to 0.93)	<.001	7.88	.01
Sample mean age ≥14	10	0.15 (-0.03 to 0.32)	.096		
Adolescent race/ethnicity					
Mostly/all black	5	0.29 (-0.02 to 0.59)	.07	5.73	.06
Mostly/all Hispanic	5	0.54 (0.27 to 0.81)	<.001		
Mixed race/ethnicity	6	0.09 (-0.17 to 0.34)	.51		
Adolescent sex					
Girls only	0	NA	NA	3.42	.06
Boys only	1	0.82 (0.29 to 10.35)	.002		
Mixed sex	15	0.29 (0.10 to 0.48)	.003		
Parent sex					
Mostly/all mothers	5	0.34 (0.12 to 0.57)	.003	4.28	.12
Mostly/all fathers	1	0.82 (0.29 to 10.35)	.002		
Mixed sex	3	0.79 (0.26 to 10.33)	.004		
Intervention design					
Parent only	2	0.09 (-0.44 to 0.62)	.74	11.58	.01
Mostly parent	7	0.07 (-0.12 to 0.25)	.50		
Parent and teen combined	6	0.58 (0.33 to 0.82)	<.001		
Mostly teen	1	0.12 (-0.15 to 0.38)	.39		
Extent of parental involvement, h					
≤2	1	0.12 (-0.15 to 0.38)	.39	16.91	.001
3-9	2	-0.03 (-0.18 to 0.13)	.73		
10-19	8	0.41 (0.06 to 0.77)	.02		
≥20	5	0.44 (0.26 to 0.62)	<.001		
Intervention dose completion					
All parents completed	3	0.16 (-0.29 to 0.56)	.49	0.82	.37
All parents did not complete	11	0.39 (0.14 to 0.64)	.002		
Follow-up duration, mo					
<6	5	0.18 (-0.13 to 0.48)	.26	1.83	.40
6-12	2	0.59 (0.03 to 10.14)	.04		
>12	9	0.36 (0.10 to 0.62)	.007		

Abbreviation: NA, not applicable.  
<sup>a</sup> For race/ethnicity and parent sex, "mostly/all" indicates 85% to 100% of the sample fit that category. There was no variability on 2 moderator variables that we had intended to examine: all studies with condom use as an outcome were comprehensive (not abstinence only) and delivered in person (not online). Thus, these variables are not reported in the Table.

$P = .07$ ) and for samples with Hispanic teens ( $d = 0.54$ ;  $P < .001$ ) compared with interventions with mixed race/ethnicity samples ( $d = 0.09$ ;  $P = .51$ ). Intervention associations were stronger for programs that involved parents and teens equally ( $d = 0.58$ ;  $P < .001$ ) than for programs that were parent-only ( $d = 0.09$ ;  $P = .74$ ), mostly parent ( $d = 0.07$ ;  $P = .50$ ), or mostly teen

( $d = 0.12$ ;  $P = .39$ ). Lastly, intervention associations were stronger for programs including 10 to 19 hours ( $d = 0.41$ ;  $P = .02$ ) or 20 hours or more of parent training ( $d = 0.44$ ;  $P < .001$ ) compared with shorter programs (ie, 3-9 hours of parent training;  $d = -0.03$ ;  $P = .73$ ). No significant differences were found by parent sex, intervention dose completion, or follow-up duration. All

16 studies that included condom use as a primary outcome were delivered in-person; thus, we could not examine the associations of in-person vs online programs with condom use. Also, because there was only 1 intervention specifically for adolescent boys and none specifically for adolescent girls that examined condom use as an outcome, the sex moderation finding should be interpreted with caution.

#### Sexual Communication

Individual study effect sizes for parent-child sexual communication ranged from a  $d$  of  $-0.03$  (95% CI,  $-0.27$  to  $0.21$ ) to  $1.03$  (95% CI,  $0.38$ - $1.67$ ), with an overall weighted mean effect size of a  $d$  of  $0.27$  (95% CI,  $0.19$ - $0.35$ ;  $P = .001$ ). This indicates that parent-based interventions were significantly associated with increased parent-child communication compared with control programs (Table 2; eFigure 4 in the Supplement). The fail-safe number was 257, suggesting that 257 non-significant studies would need to exist to reduce the effect size to a trivial level. There was no statistically significant heterogeneity among the studies in the communication outcome ( $Q = 21.02$ ;  $df = 13$ ;  $P = .07$ ;  $I^2 = 38.13$ ), so we did not consider moderators for this outcome.

#### Secondary Outcomes

The results for all secondary outcomes are shown in Table 2. Parent-based interventions were associated with all 3 secondary outcomes—intentions to delay sexual activity ( $d = 0.24$ ; 95% CI,  $0.10$ - $0.38$ ;  $P = .001$ ), sexual health knowledge ( $d = 0.40$ ; 95% CI,  $0.06$ - $0.75$ ;  $P = .02$ ), and safer sex self-efficacy ( $d = 0.26$ ; 95% CI,  $0.16$ - $0.36$ ;  $P < .001$ )—with small to medium-sized effects.

## Discussion

This meta-analysis synthesized nearly 3 decades of research on the development and evaluation of parent-adolescent sexual health interventions. These results highlight the potential of these programs to improve adolescents' safer sex behaviors. Pooling data from 31 studies with 12 464 adolescent participants, we found a significant positive association of parent-based sexual health interventions with condom use and parent-child communication about sexuality. There was no significant association with delayed sexual activity. Parent-based interventions were also associated with increases in 3 secondary outcomes: intentions to delay sexual activity, sexual health knowledge, and safer sex self-efficacy. These findings suggest that parent-based interventions have an overall protective association with several aspects of adolescents' sexual health and are not associated with sexual activity at earlier ages.

There was significant variability in the findings regarding parent-based interventions and adolescents' condom use. Thus, we examined several potential moderator variables. These revealed that adolescents' age and race/ethnicity, as well as the intervention design and extent of parental involvement, were all important factors associated with condom use. Regarding age, intervention associations were stronger among studies with younger compared with older adolescents. Early

adolescence is a key period for developing sexual attitudes and norms<sup>67,68</sup> that go on to shape adolescents' sexual behavior.<sup>69</sup> Researchers and sex educators should consider these developmental factors, as an earlier delivery of parent-based interventions could increase their potential for success.

Regarding race/ethnicity, intervention associations were stronger for samples with predominantly black or Hispanic individuals compared with those of mixed race/ethnicity. These findings align with other work that demonstrates the power of tailoring interventions to increase relevance, adherence, and cultural appropriateness.<sup>70-72</sup> There are marked health disparities in the rates of HIV/STIs and unintended pregnancy among minority youth; thus, interventions that target these groups are high-priority.<sup>73,74</sup> It is encouraging that parent-based interventions show success when specifically focusing on black and Hispanic families. Future studies could examine whether it is the cultural tailoring or some other aspect of programs that make them most effective at improving condom use (for example, by changing communication patterns, parental monitoring, or other aspects of family functioning and youth development).<sup>25,75</sup>

Findings from moderation analyses also demonstrate the potential importance of the intervention dosage and level of parent and teen involvement. Specifically, interventions with a dose of 10 hours or more were associated with stronger improvements in adolescent condom use than shorter programs. Associations were also stronger when programs included parents and teens equally as opposed to targeting parents independently or holding mostly parent-only sessions.<sup>25</sup> Increased time and contact between parents and adolescents may be necessary to produce the kind of family-level change needed to improve adolescent sexual decision-making.

While we have highlighted several of the key significant findings, we did not find a significant association across studies between parent-based interventions and delaying sexual activity among youth. There are powerful, normative increases in sexual activity over the course of adolescence<sup>76,77</sup> and factors more proximal than parents may influence sexual initiation. For example, biological factors (eg, pubertal hormones) are strongly associated with adolescents' sexual initiation,<sup>78</sup> and peer-related factors (eg, peer norms and popularity) also have strong associations, especially among girls.<sup>79</sup> This meta-analysis demonstrates that interventions can help parents communicate sexual knowledge and shape some of adolescents' sexual choices, such as using condoms, once they become sexually active, but abstinence may be more challenging to address. However, while these programs were not associated with delayed sexual activity, they also were not associated with an earlier initiation of sexual activity. This should be reassuring for parents who are concerned that talking about sex with their children may somehow result in their children initiating sex. This meta-analysis shows that across the dozens of interventions for parents, youth were no more or less likely to initiate sex at the conclusion of the interventions.

#### Methodological Considerations, Limitations, and Future Directions

In conducting this meta-analysis, several issues associated with intervention design and execution of the included studies be-

came apparent, providing important directions for future research. First, there was substantial variation in the way that the outcome measures were defined across studies. For example, for abstinence and condom use, some investigators focused exclusively on acts of vaginal sex,<sup>17,57</sup> whereas others included acts of vaginal, anal, and/or oral sex<sup>18,42,45,56</sup> or referred only to “sex” or “intercourse.”<sup>19,52</sup> For sexual communication, some studies focused on communication frequency,<sup>47,53,63</sup> whereas others assessed communication quality.<sup>44,50</sup> The timeline for measuring behaviors also differed. For example, some studies focused on whether youth had ever initiated sexual activity, used condoms, or communicated about sex,<sup>17,19,57</sup> whereas others focused on a specified timeframe for these behaviors.<sup>42,44,52,56</sup> It is clear that the sexual health intervention literature lacks a criterion standard for measuring sexual risk and protective behavior and associated attitudes.<sup>80-82</sup> The measurement variation across studies could be obscuring the ability to detect the most precise estimates of intervention efficacy.

Second, most parent-based interventions in this meta-analysis were delivered in person. Only 2 studies (6.5%) used newer technology-based strategies,<sup>47,66</sup> and neither of these programs measured condom use as an outcome. Recent systematic reviews and meta-analyses of eHealth and mobile health interventions for youth show that online programs are associated with increased condom use, delayed sexual activity, and an increased uptake of HIV/STI testing.<sup>82-84</sup> Programs delivered to parents and youth online could benefit from the known advantages of technology-based programs, including an increased reach, customization, and fidelity to treatment delivery.<sup>85-87</sup> There are several of these new programs in development.<sup>88-90</sup>

A third methodological issue involves the parents included in each study. It was notable how little information was provided about parents in some study descriptions. Demographic information on parent sex was missing in 10 of the 31 studies. Of the studies that reported sex, participation by mothers substantially outpaced participation by fathers. Only 1 study focused specifically on fathers<sup>19</sup> and none of the studies with mixed-sex samples included more fathers than mothers. Although parent sex was not a significant moderator among the programs that included this information, it is possible that these findings may have changed had there been more studies on fathers. Fathers can play a key role in contributing to adolescents' sex education and influencing the sexual behavior of their children,<sup>91</sup> although they often feel unprepared to have conversations about sex.<sup>92</sup> Investigating sex-specific interventions remains an important avenue for future research, given that fathers may need additional training in sexual communication skills<sup>14</sup> and that parent and adolescent sex can affect communication about sexual health.<sup>28,32,93</sup>

A fourth issue associated with intervention delivery and execution is that the full dose intended did not match the final dose received in many studies, which may have reduced the overall effects of these programs. For example, some stud-

ies included extensive parent components, but few families actually completed all activities.<sup>21,33,41</sup> In fact, only in 10 studies did all parents complete the full intervention. Engagement and retention, especially of the most at-risk families and youth, remains an ongoing challenge for health interventionists and health care professionals.<sup>94</sup>

An additional concern is that none of the interventions we identified specifically addressed the needs of sexual minority youth and most studies did not report the sexual identity of participants. Sexual minority youth experience disproportionate rates of sexual risk<sup>95</sup> and unique psychosocial challenges associated with sexual development.<sup>79</sup> Few sexual minority youth receive comprehensive, inclusive sexual education in schools that addresses these unique concerns.<sup>96,97</sup> Thus, parents of sexual minority adolescents could play a critical role in providing sexual health information.<sup>98</sup> Parent-based interventions focused specifically on sexual minority youth remain a critically important area for future research.

A final issue worth considering is that we focused this meta-analysis exclusively on randomized clinical trials because they provide the most rigorous test of the efficacy of parent-based interventions. However, randomized clinical trials also likely provide a conservative test; a pooled analysis of quasirandomized and pre-and-post studies may produce stronger associations than an analysis limited only to randomized clinical trials. As the field moves more toward implementation science and additional studies are added to the literature that move beyond efficacy and into effectiveness in real-world settings, a new review should be conducted.

## Conclusions

This meta-analysis addresses an important gap in knowledge about parent-based sexual health interventions and adolescent sexual health. Results pooled from 31 studies and 12 464 adolescents indicate a small but significant positive association of parent-based interventions with improved parent-child sexual communication as well as adolescents' reports of condom use, safer sex intentions, sexual health knowledge, and sexual self-efficacy. However, there was no association between the intervention and delayed sexual activity. Taken together, these results indicate that parent-based programs can promote safer sex behavior; however, the findings were generally modest, and moderation analyses indicate a few areas where future programs could place additional attention to boost program effectiveness (eg, focus on younger adolescents, increase cultural tailoring, and ensure a sufficient dose). The findings of this meta-analysis highlight areas for future research, including increasing the focus on online programs, conducting additional father-based interventions, attending to the dose received as well as the dose intended, and focusing attention on sexual minority youth. Such changes may increase the efficacy of sexual health programs and demonstrate their potential for the long-term health of youth.

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