



# Teen pregnancy prevention: current perspectives

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## Purpose of review

Teen pregnancy has been subject of public concern for many years. In the United States, despite nearly 2 decades of declining teen pregnancy and birth rates, the problem persists, with significant disparities present across racial groups and in state-specific rates. This review examines recent trends, pregnancy prevention initiatives and family planning policies that address the special needs of vulnerable youth.

## Recent findings

Unintended teen pregnancies impose potentially serious social and health burdens on teen parents and their children, as well as costs to society. Trends in teen pregnancy and birth rates show continued decline, but state and racial disparities have widened. Demographic factors and policy changes have contributed to these disparities. Research supports comprehensive pregnancy prevention initiatives that are multifaceted and promote consistent and correct use of effective methods of contraception for youth at risk of becoming pregnant.

## Summary

There is strong consensus that effective teen pregnancy prevention strategies should be multifaceted, focusing on delay of sexual activity especially in younger teens while promoting consistent and correct use of effective methods of contraception for those youth who are or plan to be sexually active. There is a need for further research to identify effective interventions for vulnerable populations.

## Keywords

adolescent, pregnancy prevention, teen birth rates, teen pregnancy rates

## INTRODUCTION

Most teen pregnancies in the United States are unplanned and unintended and have far reaching consequences [1]. Teen mothers are at high risk for school failure, low self-esteem and depression [1–3,4<sup>\*</sup>]. Mothers younger than 17 years of age are at higher risk for premature births, low infant birth weights, infant mortality in the first year of life and child abuse. The children of teen mothers are more likely to perform poorly in school and engage in high-risk behaviors in adolescence and are less likely to be economically successful as adults [2,5–9].

Adolescent parenting results in loss of human potential. More than 75% of teen mothers receive public assistance within 5 years of their child's birth [2]. Teen childbearing in the United States cost taxpayers \$10.9 billion dollars in 2008 [10]. Many biological and social factors have been associated with these poor outcomes, including nutrition, poverty (approximately two-thirds of pregnant adolescent women already live below the level of poverty), social disorganization, poor access to prenatal care and stigmatization [1,6,9].

## FRAMING THE ISSUE

The US teen pregnancy rate continues to be one of the highest in the developed world – more than twice the rates in Canada (28 per 1000 women aged 15–19) and Sweden (31 per 1000) [11]. Although the teen pregnancy rates increased in 2006 and 2007, in 2008, the US teen pregnancy rate reached its lowest point in more than 30 years (67.8 per 1000 women aged 15–19 years old) down 42% from its peak in 1990 (116.9 per 1000) [11]. Similarly, the US overall adolescent birth rate reached a nadir of 39.1 per 1000 women aged 15–19 in 2009 [12]. That year, approximately 750 000 women younger than 20 became pregnant and 414 879 gave birth [13]. To understand the trends in teen pregnancy, we have to

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## KEY POINTS

- Teen pregnancy rates in the United States continue to be the highest in the developed world, and significant disparities exist between states and regions.
- Programs that use a comprehensive approach and include correct information about contraceptives in addition to promoting delay of sexual activity are more effective than abstinence-only programs.
- Age and culture of target populations should be considered when developing pregnancy prevention intervention.

look at the factors that influence adolescent sexual behaviors and current demographic and government policies.

Variables that affect teen pregnancy trends include shifts in the racial and ethnic composition of the population, with an increasing Hispanic population as a driving force for high teen birth rates [1,8,14]. There are long-standing disparities in rates by race and by state. The overall prevalence of having ever had sexual intercourse in 9th–12th grade students is 65.2% for blacks, 49.1% for Hispanics and 42% for whites, as reported by the 2009 National Youth Risk Survey [15]. Yet, when controlling for other factors, poverty is strongly associated with risk for teenage pregnancy [1,6,16]. Teen birth rates also vary considerably by state; in Mississippi, 65.7 per 1000 women aged 15–19 years old gave birth in 2008 compared with 19.8 per 1000 in New Hampshire [17]. From another perspective, the decline in teen birth rates from 1991 to 2006 was only 17% in Oklahoma compared with 47% in Vermont [1]. The disparities can be large enough that some of the birth rates in southern states of the United States compare to levels in some developing countries [18].

To examine this issue, a prospective cohort study examined teen birth rates in 24 states for girls 15–17 years old from 1997 through 2005 and found significant evidence that increased sexuality education within school was associated with lower birth rates. However, when controlling for demographic characteristics, religiosity and abortion laws, states with greater conservatism and religiosity had significantly higher teen birth rates despite sexuality education curriculums [19\*\*]. Possible explanations of these findings are public policies related to access to contraception, abortion and sexual education. Recent research concluded that a significant decline in pregnancy rates between 1995 and 2002 among 15–19-year-olds was mainly attributed to an increase in contraceptive use and, to a lesser extent,

to reduced sexual activity [20]. But the federal mandate for funding abstinence-only programs after 2002 and lack of comprehensive programs that address contraceptive promotion and condom use may contribute to states' disparities in teen pregnancy rates [21\*] and has been attributed to the recent increase in STIs, including the number of young men infected with HIV [22]. Although other industrialized countries use abstinence in their programs, they also include contraceptive use promotion and sexual education programs [23].

## CURRENT TEEN PREGNANCY PREVENTION MODELS

Evaluating the effect of evidence-based teen pregnancy prevention interventions is important in order to frame national and state policies. Multiple interventions have been developed over the years to address teen pregnancy. The most effective teen programs that incorporate evidence-based approaches can be placed into one of three categories: clinic-based interventions, school-based and school-linked interventions (community programs). These interventions share common characteristics, including longer appointments and individual counseling, educational programs, confidential services, contraceptives (although, due to policy funding barriers, many of the interventions do not specify whether contraceptives or prescriptions were offered on site), free-cost or low-cost services, referrals and active outreach [24].

The evaluations of most of these programs focusing on sexual behaviors, HIV/STI and pregnancy prevention have been rigorously analyzed by The National Campaign to Prevent Teen Pregnancy. The 2010 'What Works' report reviewed evidence-based experimental designs that are effective in preventing teen pregnancy and STIs [24]. In 2002, the CDC's Division of Reproductive Health funded the national project, promoting science-based approaches in teen HIV and STI prevention with the goal to decrease STI and HIV rates and teen pregnancy [25]. Curriculums for these programs are available at the ETR associates website [24] and the CDC's Reproductive Health website [25]. Some of these programs are difficult to replicate and expensive, or may not work outside the setting in which they were implemented. However, other programs are less expensive and easy to implement. Nevertheless, due to funding restrictive policies, many did not measure their effects on teen pregnancy, although they reported significant positive effects on sexual behaviors, such as increased condom use, use of contraceptives and decreased number of partners. For the purpose of this review, we will

**Table 1. Teen Pregnancy Prevention Programs**

| Reference  | Year | Study type                                     | Population                                  | N   | Intervention   | Follow-up | Results   | Comments  |
|--|------|--|---|---|--|-----------|---|---|
| <b>Programs focusing on sexual factors</b>                           |      |  |   |   |  |           |   |   |
| Jemmott <i>et al.</i> [26]<br>'Theory-Based Abstinence-Only Program' | 2010 | RCT, abstinence-only study                     | F and M, grades 6-7, AA                     | Comprehensive intervention long n = 131, comprehensive short n = 134, safer sex n = 129, abstinence only n = 134, control n = 134 | Eight 1-h modules during two sessions or 12 1-h modules over three sessions  | 24 months | The abstinence-only intervention significantly reduced sexual initiation, but no significant changes in other sexual behaviors, compared with other groups or control                                       | The middle school-based study found significant effects of comprehensive interventions on HIV/STD-related behaviors. Pregnancy prevention NM. The abstinence program did not meet the Federal criteria for abstinence programs and did not criticize the use of condoms |
| Villarruel <i>et al.</i> [27]<br>'Cuidate!                           | 2006 | RCT, STD/HIV and pregnancy prevention          | F and M, grades 8-11, Hispanic, urban       | Total 553   | Six 1-h modules; group discussions, role play, video, interactive games and skillbuilding activities used                          | 12 months | Significantly reduced the number of partners and frequency of sex and increased condom use consistently, compared with controls   | Culturally based school program ↑ HIV knowledge and vulnerability, and safer sex. Pregnancy and delay initiation NM. Mueller <i>et al.</i> [28] started a pilot program in Denver   |
| Tortolero <i>et al.</i> [29] 'It's Your Game. Keep It Real'          | 2010 | RCT, STD/HIV and pregnancy prevention          | F and M, grades 7-8, AA and Hispanic, urban | Control 558, intervention 349   | Twelve 45-min lessons, group based, individual computer activities   | 24 months | Twenty-three percent of teens initiated sex vs. 30% in the control group. Significantly, increase in condom knowledge and use, STIs knowledge and self-efficacy to refuse sex vs. controls                  | School-based program, showed evidence strongest in Latino teens. Pregnancy rates NM   |
| Graves <i>et al.</i> [30]<br>'Smart Girls Way'                       | 2011 | RCT, STD/HIV, pregnancy, violence, self-esteem | F, grade 7, mixed, urban                    | Control 221, intervention 633   | Eight weekly 45-min sessions   | 6 months  | No significant differences on sexuality expectations (such as dating violence) and perceived susceptibility. Significant changes of personal sexuality expectations and parental communication vs. controls | School-based program developed in response to the Healthy People 2010 objectives. Pregnancy rates NM  |
| Coyle <i>et al.</i> [31]<br>'All4You!'                               | 2006 | RCT, STD/HIV and pregnancy prevention          | F and M, 14-18 yo, mixed, urban             | Control 597, intervention 391   | Fourteen 26 total-hour sessions  | 18 months | Significant increase of condom use with steady and nonsteady partners and decreased frequency of sex at 6 months. Effects did not hold at 12 and 18 months  | Study performed in alternative high schools, results were modest and short term. Pregnancy rates: no statistically significant differences between intervention vs. controls. 25% lost at 1/2 (jail time, death and lack of address)                                    |
| Sikkema <i>et al.</i> [32]<br>'Teen Health Project'                  | 2005 | RCT, STD/HIV, pregnancy prevention             | F and M, 12-17 yo, mixed, urban             | CU n = 392, WI n = 428, AIDS standard community education n = 352   | Two 3-h workshops with two 1/2 sessions. Community intervention had four program activities, two events and 90-min parent workshop | 18 months | Teens in the CU group were significantly more likely to remain abstinent and more likely to use condoms compared with the WI group (control) and better than the standard AIDS community intervention group | Program performed in low-income community settings  |
| DiClemente <i>et al.</i> [33] 'S!TE!'                                | 2004 | RCT, HIV                                       | F, high school, AA, urban                   | Control 271, intervention 251   | Four 4-h sessions  | 12 months | Girls in the intervention group significantly reported more condom use, decreased frequency of sex partners, decreased pregnancy rates at 6 months 1/2 only, decreased STD incidence                        | After school program in urban high schools. Initiation delay NM   |

**Table 1 (Continued)**

| Reference   | Year      | Study type   | Population                                | N   | Intervention  | Follow-up                               | Results   | Comments  |
|---|-----------|--|---|---|---|---|---|---|
| Kerr <i>et al.</i> [34]   | 2009      | RCT, pregnancy prevention                                  | F, 13–17 yo, mixed, urban                 | Control 85, intervention 81   | MIFC and trained foster parents, daily phone calls, weekly support meetings   | 24 months                               | Girls in control group were 2.4 times more likely to become pregnant than girls in MIFC group ( $P < 0.01$ ) and 27% became pregnant in the MIFC group compared with 47% in the control group       | Case management program for girls in the juvenile system placed in out of home care   |
| DiClemente <i>et al.</i> [35]<br>'HORIZONS HIV'   | 2009      | RCT, STD/HIV   | F, 15–21 yo, AA, urban                    | Control 367, intervention 348   | Two 4-h sessions and four 15-min phone calls for 9 months   | 3 months after last call, approximately | Significantly reduced the number of new and recurrent chlamydia infections and increased condom use, compared with controls   | Performed in clinic setting. Pregnancy and frequency of sex NM  |
| Gruchow and Brown [36]<br>'Wise Guys Male Responsibility Curriculum'                                | 2011      | RCT, sex knowledge and attitudes (including violence), STD | M, grade 7, mixed, urban                  | Control 106, intervention 124   | Questionnaires, pre/post and f/u 6 months. True/false or fivepoint Likert scale items. Curriculum delivered 8–10 weekly 45-min sessions | 6 months                                | Significantly greater post and f/u knowledge of sex, reproductive biology, STD transmission and attitudes toward sex and appropriate behavior in sexual relationships                               | This is a cohort of the Wise Guys school-based program. The results indicate the curriculum may promote greater condom use and contraception among sexually active men  |
| Dilorio <i>et al.</i> [37]<br>'REAL Men'  | 2007      | RCT, STD/HIV   | M, 11–14 yo, AA, urban                    | Control 277, intervention 277   | 14-h contact  | 12 months                               | Thirtyone percent of intervention group reported ever having sex without a condom compared with 60% in the control group. Fathers were more likely to talk about sex-related topics with their sons | Boys and girls after school programs. Teens with fathers. Pregnancy rates NM  |
| <b>Programs focusing on both sexual and nonsexual factors (includes youth development programs)</b> |           |  |   |   |   |   |   |   |
| Carrera <i>et al.</i><br>'Children's Aid Society (CAS)-Carrera'                                     | 2002      | RCT, pregnancy and youth development program               | F and M, 13–15 yo, AA and Hispanic, urban | Control 600, intervention 600   | 5 days a week for 3-h each day activities   | 3 years                                 | Girls in the intervention group were significantly less likely to have had sex and become pregnant (by half), and more likely to use dual methods of contraception (including condoms)              | This after school program requires significant financial and staff resources. Men did not change sexual behaviors significantly   |
| Stiving <i>et al.</i> [39]<br>'Prime Time'  | 2010      | RCT, pregnancy prevention                                  | F, 13–17 yo, mixed, urban                 | Intervention 125, control 127   | Intervention included SCT, resilience paradigm through case management and peer leaders. Monthly visits                                 | 12-month interim study                  | Significantly more consistent use of condoms and contraception than controls. Better stress management skills and social connectedness with school and family                                       | Clinic-based, multicomponent program for adolescent girls at high risk of pregnancy. Peer leadership model included. Pregnancy rates NM   |
| Salihu <i>et al.</i> [40]<br>Federal Healthy Start Program, 'Prime Time'                            | 1998–2007 | Ecologic study, on primary and repeat pregnancy            | F and M, 10–19 yo, AA, urban              | Total 3155 community intervention, county 12589 and state 190397 as comparisons | 4–5-h session on a monthly basis. Preconception and interconception care, youth developmental skills provided                           | Trend over a decade                     | The decline in primary teen pregnancy in the catchment area was 60 and 80% greater than the reduction at the county and state level, respectively. No success in repeat pregnancy levels            | Community Program. The main program goal is the improvement of knowledge, attitudes and behaviors of teenagers regarding preconception, encouraged use of condoms, use of family planning methods including abstinence and avoidance of multiple partners |

AA, African American; CLI, community level intervention; F, female; f/u, follow up; LSX, life skills program; M, male; MIFC, multidimensional treatment foster care; NM, not measured; RCT, randomized controlled trial; SCT, social cognitive theory; WJ, workshop intervention.

include only the most recent or up-to-date studies. Table 1 [26–38,39\*,40] summarizes programs by type, design, strength of evidence and outcomes.

## COMPREHENSIVE REVIEW OF EVIDENCE-BASED PROGRAMS

Strategies used in evidence-based programs vary. Some use an abstinence-only approach with no discussion of contraception. Comprehensive programs focus on educating teens about healthy relationships, safe sex and contraception. Multicomponent programs often recommend abstinence as one approach but include information about contraception.

### Abstinence programs

The US government, through the Adolescent Family Life Act, Community Based Abstinence Education, Title V and welfare reform, supported abstinence only as a teen pregnancy reduction strategy with delay of sexual activity until marriage. Under 2002 federal funding regulations, abstinence policies became so restrictive that most of these programs could not include information about contraception or safe sex practices [20]. The most recent national data (2005) shows the diversity of abstinence-only programs, and recent evidence suggests that abstinence-only education is positively correlated with increased teenage pregnancy, birth rates and STIs, even when adjusting for socioeconomic status, educational attainment, race and family planning services [19\*\*,20,21\*,22,41]. In 2008, the ‘Labor, Health and Human Services, Education and Other Agencies’ bill provided 114 million dollars for new evidence-based teen prevention initiatives in 2010 [21\*]. This will provide opportunity for studying a wider range of teen pregnancy prevention interventions.

An example of a well-developed randomized controlled trial (RCT) on abstinence-only intervention is the ‘Efficacy of a Theory-Based Abstinence-Only Intervention Over 24 Months’ by Jemmott *et al.* [26]. The study was performed in an urban public school of predominantly African–American students in grades 6 and 7. The self-reported outcomes showed a significant decrease in ever having sexual intercourse in the abstinence-only intervention compared with the school’s health promotion group over the 24-month period. However, there were no differences in other sexual behaviors, such as condom use or multiple partners [26]. One of the limitations of this study is that a 24-month follow-up was relatively short for middle school students with low baseline rates of sexual activity, questioning how effective this program would be in maintaining abstinence for the long term.

### Comprehensive education programs

Sexuality and HIV education programs that include discussion of condoms and contraception do not increase sexual intercourse and do not increase the number of sexual partners. In fact, there is evidence that they decrease the number of partners. HIV programs that included sexual education had a positive impact on sexual behavior for up to 31 months [9]. In school-based models, providing contraceptives and condoms did not hasten the onset of sexual intercourse or increase its frequency. These programs also increase the opportunity for one-on-one counseling and aim to delay initiation of sex using abstinence prevention techniques [9].

Programs that fall in this category are very diverse. Examples of the most up-to-date evidence-based programs are as follows: school-based programs: all are comprehensive RCTs, and, even though most of them showed increases in condom use and other safer sex practices, pregnancy rates were not measured. Examples are ‘Cuidate!’ [27], ‘It’s Your Game. Keep It Real’ [29], ‘Smart Girls Way’ [30] and ‘All4You!’ [31]. Community programs that have experimental designs include ‘Teen Health Project’ [32], ‘Keepin’It R.E.A.L.’ (Dilorio *et al.*, unpublished observation) and ‘SiHLE’ [33]. Again pregnancy rates were not measured; however, condom use increased significantly compared with controls and the number of partners at follow-up decreased. In a program for very high-risk teens out of the juvenile system, Kerr *et al.* [34] used an intense multidimensional treatment foster care (MTFC). Women in the control group were 2.5 more likely to become pregnant than women in the MTFC group. Clinic-based programs include ‘Horizons HIV’, a RCT [35]. The study, based on social cognitive theory and the theory of gender and power, did not measure pregnancy rates, but found significantly higher rates of condom use and fewer chlamydial infections. Despite progress in the experimental quality of the majority of these interventions, there is still need for more rigorous research with wider reporting of results and demonstration of reproducible results [9].

Although men are often the initiators of teen sexual activity, most pregnancy prevention programs target women. In this review, we found two current experimental design studies that address pregnancy prevention in men. The first is ‘The Wise Guys Male Responsibility Curriculum’ [36] and the second ‘REAL Men’ [37]. The former demonstrated significant increases in knowledge of sex, reproductive biology and STD transmission with more desirable attitudes toward sexual relationships and promoted greater condom and contraceptive use among participants. The latter involved fathers in

the intervention, and results included significantly more use of condoms and an increase in fathers' likeliness to talk about sex and related topics with their sons. These programs are a great resource for schools and parents and they have shown great educational outreach for this population.

### Multicomponent programs

These programs address motivation and skills building along with comprehensive sexual education programs. One of the most effective RCTs is the 'Children's Aid Society (CAS) Carrera' [38]. This is an extensive urban New York city intervention that provides strong results showing a 50% decline in teenage pregnancy, and increases in both condom and contraceptive use through 3 years of follow-up. However, the program was only successful in women, but had no significant impact on men's sexual behavior. The CAS-Carrera curriculum has been replicated partially in other states with little success, mostly because CAS program staff educators were not utilized for training and not all parts of the program were implemented [42]. The program is expensive to implement and maintain. However, in a recent economic evaluation of the CAS-Carrera program, the results showed that, whereas the economic benefits of the short-term intervention may seem to be overshadowed by the operating costs, extrapolation analysis showed that the total benefit to society exceeded operating costs by on average \$10 474.77 per adolescent per year by age 30 [43].

Another recent example is the 'Prime Time' study [39<sup>\*</sup>]. Preliminary 12-month outcomes have been reported. This is a clinic program that includes female teens aged 13–17 years meeting specific high-risk criteria. The program uses case management and peer leadership support. At 12 months, the intervention group reported more consistent use of condoms and/or hormonal contraception compared with the control group. Other benefits reported include better stress management skills and more social connectedness with school and family compared with controls, suggesting that youth development interventions along with sexual education and contraceptive promotion in a clinic setting are promising in preventing teen pregnancy in high-risk youth.

Of publicly supported programs, the Healthy Start Program is uniquely positioned in the community to address the needs of youth at risk of becoming pregnant or repeat pregnancy. In Tampa, Florida, the Federal-Funded Healthy Start in Hillsborough community developed the 'REACHUP' program [40] with community-based organizations

that targeted an underserved, African-American population aged 10–19 years. The intervention consisted of offering sex education, family planning, drug and violence prevention and communication and negotiation skills. Some of the participating community organizations had interactive forums for youth to enhance physical, mental and professional development. Over a decade, primary teen pregnancy decreased by 27%, which was 60 and 80% better, respectively, than county and state rate reductions. Efforts to reduce repeat pregnancy were not statistically different among the community, county and state levels.

In a recent meta-analysis, teen pregnancy interventions that appear to be most effective include a multifaceted or multicomponent approach. Individual and clustered trial analysis of these interventions reports that the concurrent use of multiple interventions such as education, skills building, abstinence and contraception promotion significantly reduces the risk of unintended teenage pregnancy [44].

### Other strategies

A controversial strategy to prevent teen pregnancy includes programs with infant simulators targeting teens' perceptions of pregnancy and parenting using the model of virtual infant parenting classes. Most of the studies have shown mixed results. A majority have small sample sizes and short follow-up intervals [45]. In 2012, the largest school-based RCT of this kind, with 1267 female participants and 1567 matching controls, aged 13–15 years on entry, will be completed. Data through age 19 years will be obtained via data linkage to hospital medical records, abortion clinics and education records from 2003 to 2012. The study will evaluate the influence of infant simulators on teens' behavior, reduction in rates of teenage births, abortion rates, self-efficacy to make informed decisions and increased knowledge of/or use of services relating to having a child and child and maternal outcomes, if any [46].

Medicaid waivers for family planning have funded access to contraceptives and have been shown to decrease the incidence of unplanned pregnancy, especially in low-income women and teens [6,16,21<sup>\*</sup>]. The cost of one Medicaid-covered birth in the United States, including prenatal care, delivery, postpartum care and infant care for the first year of life, was \$12 613 in 2008. During the same year, the cost of contraception per client was \$257. During 2008, an estimated 1.9 billion dollars were spent in public funding for family planning programs. The investment resulted in 7 billion dollars of savings for Medicaid for the cost of unplanned pregnancies.

This national family planning program prevents 1.94 million unintended pregnancies, including 400 000 teen pregnancies, each year [47,48,49]. Ongoing programs that overcome barriers to contraception use in teenagers are key toward reaching the goals of healthy people of 2020, which include decreased unintended pregnancies and teen birth rates [50].

**CONCLUSION**

Unintended teen pregnancy and teen birth rates are the lowest in 30 years in the United States. However, they are the highest among developed nations, and there are significant disparities within geographic regions of the country. Because the human costs and economic impact of teen pregnancy are high, teen pregnancy should be considered a national health priority. Some teens are at much greater risk than others of becoming pregnant unintentionally. Understanding the biological, social and psychological factors of the teenagers at risk is very important. Some of these antecedents are measurable and they can be used to create intense interventions for the most vulnerable. Future comprehensive pregnancy prevention initiatives should be multifaceted and promote consistent and correct use of effective methods of contraception for those youth who have sex. New family planning policies are required to address the special needs of teens from different cultural backgrounds and promote behavioral interventions that delay or promote healthy and responsible behaviors with easy and affordable access to contraceptive use.

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**Conflicts of interest**

*There are no conflicts of interest.*

**REFERENCES AND RECOMMENDED READING**

Papers of particular interest, published within the annual period of review, have been highlighted as:

- of special interest
- of outstanding interest

Additional references related to this topic can also be found in the Current World Literature section in this issue (pp. 548–549).

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