Effects of a Replication of a Multicomponent Model for Preventing Adolescent Pregnancy In Three Kansas Communities

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Context: *A significant amount of attention has been devoted to the complex issue of teenage pregnancy and to programs for reducing pregnancy among adolescents. Careful evaluations of such programs are needed to ascertain what strategies will be most effective at reducing teenage pregnancy.*

Methods: *A pretest-posttest comparison group design was used to analyze the effects of a comprehensive multicomponent school and community intervention on estimated pregnancy rates and birthrates among young people in three Kansas communities: Geary County, Franklin County and selected neighborhoods of Wichita.*

Results: *There were high levels of program activity in all three communities during the intervention period, including teacher training and sexuality education for students. Survey respondents rated highly such project interventions as the extension of school-linked clinic hours to accommodate student schedules and support groups established in middle schools. Between 1994 and 1997, the proportions of adolescents reporting that they had ever had sex decreased significantly among all ninth and 10th graders in Geary County, from 51% to 38% among females and from 63% to 43% among males. In Franklin County, more males in grades 11 and 12 reported using condoms in 1996 (55%) than had done so in 1994 (39%). Age at first intercourse remained relatively stable in Franklin and Geary counties during the intervention period. The estimated pregnancy rate among adolescents aged 14–17 decreased between 1994 and 1997 in Geary Country, while it increased in comparison areas. The estimated pregnancy rates among 14–17-year-olds decreased in both Franklin County and its comparison communities. The birthrate declined both in one target area of Wichita and in its comparison area from 1991–1993 to 1994–1996. Over the same time period, the birthrate increased in a second target area of Wichita, while it decreased in the comparison community.*

Conclusions: *This evaluation of a comprehensive multicomponent program for adolescent pregnancy prevention contributes to our understanding of this model and its replicability in diverse communities. Ongoing program evaluation is important for developing initiatives and for refining strategies so they respond to local conditions.*

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Annually, more than 800,000 U.S. teenagers become pregnant, one of the highest teenage pregnancy rates of any industrialized country.[1] The majority (53%) of high school students report having had sexual intercourse. Among sexually active adolescents, slightly more than half (54%) report having used condoms and 25% report having used the pill at last intercourse.[2] These behaviors contributed to a birthrate of 56.9 births per 1,000 15–19-year-old females in 1995.[3] The negative outcomes of teenage childbearing for the teenage mother and her offspring include high rates of school dropout, low-birth-weight infants, poor health and poverty.[4] In addition, teenage childbearing results in considerable financial costs to taxpayers and society.[5]

A significant amount of attention and energy has been devoted to the prevention of teenage pregnancy through, for example, school-based programs to increase condom use, sexuality education curricula, peer support and education, and life-option services.[6] Nevertheless, most interventions have not been carefully evaluated, and many studies are limited by methodological constraints and the absence of scientific rigor. A review of existing studies of sex education curricula, contraceptive access programs and multicomponent programs concluded that simple approaches do not markedly reduce adolescent pregnancy, that sexuality education, school clinics and condom availability do not increase sexual activity and that most programs increase knowledge.[7] Although the review found few scientific studies examining the effects of abstinence-only programs, preliminary results suggest that they do not delay the onset of sexual activity or reduce the prevalence of sexual activity. Furthermore, the review concluded that multicomponent community-wide programs show promise in increasing contraceptive use and decreasing pregnancy rates among adolescents.

Adolescent pregnancy is a complex problem with multiple antecedents, and it is not likely that any single intervention will have much effect. In one promising strategy, community members collaborated to deliver multicomponent interventions that address sexual risk-taking behaviors, social influences and group norms about unprotected sex, and that create hope among adolescents through life skills and youth development opportunities.[8] A multicomponent approach that includes improving access to health services for adolescents, increasing the role of schools in improving adolescent health and enhancing collaborative relationships among community partners is consistent with policy goals to prevent adolescent pregnancy outlined elsewhere.[9]

Background

From 1993 through 1997, the School/Community Sexual Risk Reduction Replication Initiative worked in three Kansas com-

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munities[10] to replicate the School/Community Model for preventing adolescent pregnancy. An evaluation of this model reported significant reductions in pregnancy rates among 14–17-year-old females in a rural South Carolina county where the program was in effect.[11] A secondary evaluation funded by the Centers for Disease Control and Prevention (CDC) confirmed that the reductions in pregnancy rates were due to the synergistic effects of multiple interventions.[12]

As replicated in Kansas, this multicomponent school- and community-based model had broad objectives: to reduce teenage pregnancies, to delay the age of first intercourse and to increase contraceptive use among sexually active teenagers. The primary components were enhanced sexuality education for teachers and parents; comprehensive, age-appropriate sexuality education from kindergarten through 12th grade (K–12); increased access to health services; collaboration with school administrators; use of the mass media; increased awareness and involvement of the entire community in teenage pregnancy prevention; peer support and education; alternative activities for young people; and involvement of the faith community.

To implement the initiative, project staff forged alliances among a variety of community sectors, including school and health department officials, the faith community, the media and local businesses. These connections helped to establish or to modify numerous programs, policies and practices to be consistent with the mission.

Participants and Context

Kansas Health Foundation provided three Kansas communities with approximately $400,000 over four years to reduce the risks associated with adolescent pregnancy. The overall efforts of these three community partnerships are the focus of this report.

•*Geary County*. Geary County, Kansas, which is adjacent to a large military base, has a population of 30,353; it is 66% white, 23% black, 6% Hispanic and 4% Asian American, with small numbers of Native American residents as well. The median income in 1990 was $24,000. In 1993, Geary County had the second highest estimated teenage pregnancy rate in Kansas (69 pregnancies per 1,000 females aged 14–17).

The lead agency in the program was the county school district. The project was staffed full-time by a project director, a community mobilizer and an office assistant, and by student interns from a nearby university. An advisory board provided direction to the staff, and a financial sustainability committee helped secure resources to support staff salaries and operating costs for the project during the last two years of foundation funding. The primary focus of the project was to promote healthy choices for middle school and high school youth. Staff and volunteers provided alternative activities for young people, mentor programs, sexuality education, peer-support groups and contraceptive access at the school-linked clinic.

•*Franklin County.* Franklin County, Kansas, is a rural, primarily agrarian community. Its 22,000 residents are 97% white, 2% Hispanic and 1% black. The county has 10 distinct towns, four school districts and more than 55 churches. The median income in 1990 was $30,000. The five-year (1989–1993) estimated pregnancy rate of 80 pregnancies per 1,000 females aged 15–19 was higher than the state average.

The lead agency for the project in Franklin County was a satellite office of a regional drug and alcohol prevention center. The project was staffed by a full-time project director, two full-time community mobilizers and a part-time office assistant. An advisory board provided staff with overall project support and with assistance in working with groups that opposed some of the project's goals. The primary focus of the project was on the development of healthy children and families. Staff and volunteers placed great emphasis on sexuality education for youth and parents, peer-support programs for males and females, family communication and alternative activities for youth, especially after-school and summer programs.

•*Wichita*. The third project site was located in a low-income neighborhood of Wichita, Kansas, the largest city in the state, with a population of 304,000. In 1991, Wichita had an adolescent birthrate of 65 births per 1,000 females aged 14–17.

The lead agency, a grassroots community organization, targeted its efforts in two zip code areas in northeast Wichita. These areas were selected due to their high teenage birthrates and their proximity to the agency. Agency staff also considered the population size of the target areas as compared to that of the South Carolina community where the program model originated and the limited resources that were available to address teenage pregnancy in each area. Staff worked primarily through the agency, four target high schools and two middle schools to involve youth and community members in the project. The project was staffed by an executive director, a full-time coordinator, one full-time community mobilizer and a part-time office assistant. Additional agency staff also supported specific program activities. The agency's advisory board provided overall support for project staff. The primary focus of the project was on healthy choices for youth and families. Staff and volunteers placed great emphasis on alternative activities (especially after school and during summer breaks and school holidays), peer-support groups for both males and females, sexuality education in the community for youth and parents, life-options programs (such as mentoring, tutoring and peer leadership), and media attention to problems and solutions associated with adolescent pregnancy.

•*Support and evaluation team.* Kansas Health Foundation also funded research and evaluation teams at the University of Kansas and the University of South Carolina to support and evaluate the initiative. The Kansas University Work Group on Health Promotion and Community Development provided on-site technical assistance in such areas as program planning, implementation of program components, community development and institutionalization. Researchers in this group designed and implemented the evaluation to provide ongoing feedback on the process and on intermediate outcomes of the initiative, as well as to track more distant (i.e., long-term) outcomes.[13] Evaluation and technical assistance teams met regularly with site staff and leadership to discuss progress, to provide assistance and to help celebrate accomplishments. The University of South Carolina provided overall guidance and support for model implementation.

Theory of Change

The theory of change, which provided the context for the community evaluation and intervention, hypothesizes that there is a relationship between the environment and both the program's process (how it functions, for example) and intermediate and more distant outcomes.[14] That is, changes in the estimated pregnancy rate and associated risks and protective factors are associated with implementation of community actions and interventions, such as adjusting clinic hours for students. Finally, appropriate interventions can only occur with an understanding of the community context and with local planning.

Methodology

Dependent Variables

We used several dependent variables to evaluate the initiative's process and its intermediate outcomes and more distant

outcomes. Three process measures were tracked—the importance of project goals, member satisfaction and project implementation (Table 1).

•*Importance of project goals*. To build consensus on and to set priorities for changes outlined in the project action plan, community members involved in the initiative completed a paper-and-pencil survey about the project goals.[15] Those surveyed were community members who had participated in project activities or who had served on the project board or a committee, and individuals who project staff wanted to keep informed or who were supportive of the project's goals. The survey listed the potential community and systems changes to be sought by the project. Members were asked to rate the importance of each proposed change as it related to the mission of the initiative—reducing adolescent pregnancy. A five-point Likert scale (with one representing "very unimportant" and five "very important") was used to rate each proposed change.

•*Community member satisfaction*. Researchers used a mailed member satisfaction survey to assess community members'satisfaction with the development and functioning of the projects.[16] The survey contained specific questions related to the day-to-day functioning of the project, including leadership, planning, services, community involvement and progress toward accomplishing project goals. Community members rated their satisfaction using a five-point Likert scale (with one representing "very unsatisfied" and five "very satisfied").

•*Project implementation*. Several measures were associated with project implementation and replication, including community actions, media coverage, services provided, community health education, sexuality education provided to students and teachers, and resources generated. A monitoring and feedback system was used to track these measures.[17] Project staff reported events and services to evaluators on monthly log forms, which were then coded and summarized. Evaluators clarified log entries by conducting semistructured interviews with project staff. Archival records, such as meeting minutes and newspaper articles, were also used to help verify log entries. For 95% of instances of community services and changes, there was an interobserver agreement of 91.4% (Kappa = .893).

We also measured three intermediate outcomes of the initiative—community change, the importance of intermediate outcomes and critical events.

•*Community change*. Community and systems changes (new or modified programs, policies or practices that were consistent with the mission) were tracked to assess implementation of interventions that might reduce the risk of adolescent pregnancy. Project staff completed and sent monthly event logs to evaluators.[18] Evaluators coded log entries and summarized and graphed the data. Semistructured interviews and archival records (e.g., meeting minutes) were used to clarify and verify information reported in the logs.

•*Importance of intermediate outcomes*. Community members and experts in the field of teenage pregnancy used a paper-and-pencil survey of outcomes to assess the importance of community changes facilitated by the project.[19] Evaluators created a survey listing each community change that had been measured using the monitoring system. Respondents rated the importance of each community change in reducing the risk for adolescent pregnancy. Respon-

Table 1. Selected measures used in evaluation of the School/Community Sexual Risk Reduction Initiative, by definition and measurement instrument, Kansas, 1993–1997

Evaluation measure	Definition	Instrument
Process measures		
Importance of project goals	Constituent ratings of the importance of project goals to the mission	Paper-and-pencil survey
Member satisfaction	Member satisfaction with the project functioning, including the leadership, the planning, the implementation and the use of resources	Paper-and-pencil survey
Project implementation		Monthly log forms, semistructured interviews and archival records
Community actions	Actions taken by program staff or others acting on behalf of the initiative to bring about new or modified programs, policies or practices within the community	
Media coverage	Coverage of the initiative or its projects in newspapers, on radio and television, and in newsletters	
Services provided	Events that are designed to provide information and instruction or to develop the skills of people within the community	
Community health education	Services provided to adults to educate them about the risk factors associated with adolescent pregnancy	
Sexuality education	Sexuality education delivered to persons under age 20 and to teachers	
Resources generated	Acquisition of funding through grants, donations or in-kind gifts	
Intermediate outcome measures		
Community change	New or modified programs, policies or practices consistent with the mission	Monthly log forms, semistructured interviews and archival records
Importance	Constituent ratings of the importance of community changes to the mission of the project	Paper and pencil survey
Critical events	Events identified by participants as critical to the initiative's development, its strengths, its challenges and its future directions	Semi-structured interviews
More distant outcome measures		
Reported behavior change	Changes in reported health behaviors, including sexual activity, contraceptive use and age at first intercourse	The Youth Risk Behavior Survey and the Adolescent Curriculum Evaluation
Estimated pregnancy rates for females aged 14–17	The number of births plus fetal deaths plus abortions divided by the population of females aged 14–17 multiplied by 1,000	Archival records available from the state health department
Estimated birthrates for females aged 14–17	The number of births plus fetal deaths divided by the population of females aged 14–17 multiplied by 1,000	Archival records available from the state health department

dents also were asked to rate the combined contribution of all changes on a five-point Likert scale (one representing "very unimportant" to five "very important"), and to include comments when appropriate.

• *Critical events*. Evaluators conducted 25 semistructured interviews with key informants in the community to identify events associated with the project that had occurred (such as a presentation on adolescent pregnancy prevention by an internationally recognized expert, and a community-wide event focused on adolescent health issues), to document a history of the initiative and to discern the value of the initiative to the community.[20] The informants were community members identified by project staff as being involved in the initiative. Interviews, done by telephone or in person, were approximately 1.5 hours in length and were conducted 2–3 years after the project received its initial funding. The interviewers asked questions about critical events that occurred during the history of the initiative, about the strengths of and challenges faced by the project, about lessons learned and about their future hopes for the effort.

Finally, three distant outcome measures were tracked—reported behavior change, and pregnancy rates and birthrates.

• *Reported behavior change*. Students' self-reports of abstinence or sexual intercourse, age at first intercourse and contraceptive use were assessed using the Adolescent Curriculum Evaluation[21] (ACE) and the Youth Risk Behavior Survey[22] (YRBS). The ACE focuses on knowledge, attitudes and behaviors associated with adolescent pregnancy and sexually transmitted diseases. It was administered in Geary Country in 1994. The ACE consisted of 65 multiple-choice items at a seventh-grade reading level and took approximately 35 minutes to complete. The YRBS is used to track leading health risk behaviors reported by young people; the 1993 school-based version of the survey was administered in Franklin County in 1994 and 1996 and in Geary County in 1997. The YRBS consisted of 84 multiple-choice items at a seventh-grade reading level, and was designed to be completed in 45 minutes. Because the sexual behavior questions in the ACE and YRBS either are the same or are similarly worded, we could make preintervention and postintervention comparisons. Since permission to implement the survey was denied in Wichita, data for this area were unavailable.

• *Estimated pregnancy rates and birthrates*. A more distant outcome measure was the estimated pregnancy rate per 1,000 females aged 14–17.* Data were secured from the state health department. Because Kansas abortion providers are not required to report the abortions they perform to the state health department, the occurrence of abortion in the state may be underreported. Census data from 1990 were used for subsequent population estimates. Since abortion data were not available at the zip code level, the birthrate was used for each target area in Wichita and the respective comparison areas.

Design

A pretest-posttest comparison group design[23] was used to assess the overall impact of the project in each of the three communities. A case study design[24] was used to track process and intermediate outcome measures.

We used a process outlined by Koo and colleagues[25] to select comparison sites. For each target area, we selected counties or zip codes that had similar estimated pregnancy rates or birthrates for 15–19-year-old female adolescents, using the five-year estimated pregnancy rate (1987–1991) for Geary and Franklin counties and the four-year birthrate for the Wichita target areas. For Franklin County, 14 Kansas counties had similar rates. For Geary County, six counties were selected. For the target areas in Wichita, six and seven zip code areas were selected for target areas A and B, respectively.

We compared the target and comparison areas on several demographic and socioeconomic variables. For Franklin and Geary counties, the variables were the five-year estimated pregnancy rate for females aged 15–19 (1987–1991), the proportion of nonwhite residents, the population per square mile, the per capita personal income and the unemployment rate. For the target areas in Wichita, the variables examined were the four-year birthrate for 15–19-year-old females (1989–1992), the total female population aged 10–19, the proportion of nonwhite residents, the median household income and the proportion of persons with an income below the federal poverty level.† To facilitate comparisons, we conducted a principal components analysis of five socioeconomic variables.[26] After rotation of the principal components, analysis yielded two interpretative factors that explained the variance among the comparison and target areas. The variance explained by the factors ranged from 73% to 89%.

We plotted the scores for each target and comparison area that resulted from the principal component analysis and calculated the distance in the principal components space between the target county (or zip code) and each of the other potential comparison areas. We selected comparison areas with the shortest distances from the target areas. These analyses resulted in five comparison counties for Franklin County, three for Geary County, two comparison areas for Wichita Target Area A and four comparison areas for Wichita Target Area B. None of the comparison areas was contiguous to the intervention areas.

Statistical Analyses

We calculated the change in the average annual estimated pregnancy rates or birthrates in the target and nonintervention areas from before the intervention (1991–1993) to during the intervention (1994–1996). To assess the statistical significance of the differences in the rates, we calculated a z-statistic, adjusted using methods outlined elsewhere.[27] Because we had three-year time periods, we assumed a design effect of 1.66 (the value by which we divided the unadjusted z-statistic to obtain the adjusted z-statistic).

To assess the statistical significance of the change in reported sexual activity and condom use, we stratified the data by gender and grade and calculated a two-tailed Pearson chi-square.

Research Findings

Process Measures

• *Importance of goals*. Response rates for the project goals surveys of community members ranged from 23% to 50%. (The survey was long, which may have caused the response rates to vary among communities.) The respondents' highest-rated items included: forming new programs and providing services related to the mission, such as support groups and parent networks at the Geary County site (4.9 on the scale); adopting effective sexuality education curricula in Franklin County (4.4); and developing public service announcements to discourage youth participation in risky behavior in Wichita (4.4). In Geary County, project members tended to give the lowest ratings to items related to enhancing access to contraceptives, such as increasing the number of supermarkets that

*The estimated pregnancy rate is the number of births, fetal deaths and abortions divided by the population of females aged 14–17 multiplied by 1,000. We targeted 14–17-year-olds because our focus was primarily on younger teenagers who were more likely to be uninsured.

†The variables for the Wichita target areas and Geary and Franklin counties differed due to the availability of data by zip code areas versus by county.

Table 2. Number of activities associated with project implementation, by selected process and intermediate outcome evaluation measures, according to project site

Evaluation measure	Franklin County (pop. 22,000)	Geary County (pop. 30,353)	Wichita (pop. 304,000)
Process measures			
Community actions	307	219	263
Community health education	105	84	127
Sexuality education for students			
No. of contacts with students	7,000	45,000	13,000
No. of hours of instruction	700	2,700	400
Sexuality education for teachers*			
No. of teachers	109	100	92
No. of courses	5	4	6
Instances of media coverage	210	305	270
No. of resources generated†	80	65	380
Intermediate outcome measures			
Instances of community change	106	139	138
No. of services provided	653	279	434

*Some teachers in each community took more than one course. †Such as grants and in-kind contributions.

sell contraceptives (3.0) and installing condom vending machines in gas stations and convenience stores (3.2).

•*Member satisfaction*. Satisfaction surveys were distributed approximately one-and-one-half to three years after the projects were initiated. Response rates ranged from 35% to 58%. The items with the highest ratings tended to be in areas associated with staff, leadership and program development, such as the strength and competence of staff in Franklin County (4.7) and leadership in Geary County (4.5), graduate training for teachers in Franklin (4.6), and sensitivity to cultural issues in Wichita (4.0). Lower-rated items, although still reasonably positive, included participation of people from diverse backgrounds and use of the media in Franklin (3.9 each), facilitation of sexuality education in the schools in Geary (3.6) and fairness with which funds and opportunities were distributedin Wichita (3.4).

•*Project implementation*. The data used to track project implementation and replication indicate that each site demonstrated high levels of community activities (219–307 instances), media coverage (210–305 instances) and services provided (279–653), as shown in Table 2. Community actions included calling the local supermarket to solicit support for a Family Movie Night, meeting with peer leaders to develop rap sessions for educational presentations and contacting local pharmacies to develop a program to address the social consequences sometimes associated with purchasing contraceptives in small rural areas.* Staff and leadership also identified media interventions, such as radio call-in shows, billboards and public service announcements, as important.

Services, including health screenings for children, job fairs and meetings of support groups, tended to be among the first steps toward program implementation. There were high levels of project activity initially, although some tapered off over time; this suggests that project staff may have been successful in "handing off" some services to appropriate agencies and individuals in the community, to allow more time for facilitation of community change. Additionally, early services were linked to building credibility in the community.

Each site also provided high levels of community health education activities (84–127 instances) and sexuality education programs to students (7,000–45,000 contacts with students and 400–2,700 hours of instruction). Community health education activities included workshops for parents about talking to their children about sex. Teacher sexuality education also was strong, with university-sponsored graduate-level classes (4–6 semester-long classes) and training sessions (8–13 training sessions per site, varying in length from one-half day to two days.). Approximately 100 teachers were trained at each site. Each site implemented weekly educational sessions for students in schools, biannual graduate courses for teachers and numerous workshops for community members. Some teachers participated in more than once course.

Intermediate Outcomes

•*Community change*. During the four-year grant period, each of the three sites facilitated more than 100 community changes (106–139). These included a variety of programs, policies and practices, such as establishing support groups, extending the hours of the school-linked clinic and making referrals to agencies. Increased rates of community change tended to be associated with the hiring of staff, leadership transitions and the completion of action planning. The numbers of community changes shown in Table 2 include all community changes, regardless of whether they were a one-day event or an ongoing policy change.

•*Importance of intermediate outcomes*. Community response rates to the outcome survey ranged from 48% to 58% (not shown). Items that received the highest importance ratings included extending clinic hours to accommodate student schedules in Geary County (4.6), establishing support groups in middle schools in Franklin County (4.7) and creating a referral system for adjudicated teenage fathers to participate in project activities in Wichita (4.1). The least important changes from the perspective of respondents were placing condom vending machines in fast-food restaurants in Geary County (3.7) and preparing billboards in Wichita (3.1).

•*Critical events interviews*. Some of the critical events described by participants were the receipt of the grant award, the development of the sexuality education curriculum, the hiring of staff and the holding of high-profile events (e.g., a sexuality education training workshop). Rated as strengths of the projects were collaboration among initiative partners, the establishment of programs for males and females, strong and committed leadership and staff, open and positive communication, and teacher training. Continuing challenges noted by participants included securing financial sustainability, maintaining active community involvement, gaining more media attention and reducing staff turnover.

More Distant Outcomes

In Geary County, students in grades 9–12 completed the ACE in 1994 (N=1,004) and the YRBS in 1997 (N=952); the respective response rates were 73% and 68%. In Franklin County, students in grades 9–12 completed the YRBS in November 1994 (N=710) and in November 1996 (N=817), with response rates of 68% and 79%. Demographic characteristics of survey respondents remained relatively stable across the assessments in both Geary and Franklin counties.

•*Sexual intercourse*. In Geary County, students' reports of ever having had sex decreased significantly among females and males in ninth and 10th grades between 1994 and 1997 (Table 3). Among female adolescents, the proportion who had ever had sex decreased from 51% to 38% ($\chi^2(1)=8.781$, p=.003); among males, it declined from 63% to 43% ($\chi^2(1)=16.479$, p=.0001). In Franklin County, students' reports of ever having had sex did not

*In a rural community, adolescents may feel uncomfortable purchasing contraceptives at a pharmacy where he or she may be known. Providing a more discrete way to buy them may increase purchases.

Table 3. Percentage of students who ever had sex and percentage of sexually active students who used a condom at last intercourse, by gender and grade, according to county and year

Measure	Geary County		Franklin County	
	1994	1997	1994	1996
EVER HAD SEX				
Females				
Grades 9–10	50.6	38.4*	33.3	40.2
Grades 11–12	73.1	72.5	54.1	68.2*
Males				
Grades 9–10	63.2	43.3*	29.9	31.1
Grades 11–12	66.7	56.6	56.9	64.1
CONDOM USED AT LAST INTERCOURSE				
Females				
Grades 9–10	44.7	46.2	46.5	53.5
Grades 11–12	37.6	39.4	36.0	43.0
Males				
Grades 9–10	58.2	54.3	56.6	52.8
Grades 11–12	49.1	48.1	39.2	54.6*

*p<.05.

change significantly from 1994 to 1996, except that female adolescents in grades 11 and 12 reported a significant increase in sexual activity, from 54% to 68% ($\chi^2(1)=7.132$, p=.0075). This increase in reported sexual activity was unexpected, especially since 10th graders reported a higher level of sexual activity than 11th graders (not shown). These changes may have been due to the small number of participants and to an increase in gang activity before the 1996 survey. (Sexual activity with a certain number of partners was part of the initiation into female gangs.)

•*Condom use*. In Franklin County, more males in the upper grades reported using condoms in 1996 (55%) than in 1994 (39%) ($\chi^2(1)=4.656$, p=.031). No other changes in condom use in Franklin or Geary County were statistically significant.

•*Age at first intercourse*. Age at first intercourse remained relatively stable for both Geary and Franklin counties from 1994 to 1996. In Geary County, the proportions who reported that first intercourse took place either at age 14 or at 15 increased slightly among males (from 34% to 36%) and among females (from 55% to 56%). In Franklin County, this proportion decreased slightly among males (from 40% to 34%) and among females (from 57% to 52%).

•*Estimated pregnancy rates and birthrates*. The pregnancy rates and birthrates estimated for young women aged 14–17 decreased slightly (Table 4). For Geary County, the estimated pregnancy rate decreased from 63 pregnancies per 1,000 females aged 14–17 during 1991–1993 (preintervention) to an average of about 56 per 1,000 from 1994–1996 (during the intervention). During the same time period, the estimated pregnancy rate for Geary County comparison areas increased, from 60 pregnancies per 1,000 to 69 per 1,000.

For Franklin County, the estimated pregnancy rate decreased from an average of 41 pregnancies per 1,000 females aged 14–17 to 37 per 1,000. During the same time period, the estimated pregnancy rate for Franklin County's comparison areas also decreased slightly, from 39 per 1,000 to 37 per 1,000. Compared with changes in the respective comparison counties, the decreases in Franklin and Geary counties were in the expected direction, but were not statistically significant.

Changes in birthrates were mixed for the two target areas in Wichita. The birthrate in Target Area A decreased from an average of nearly 106 births per 1,000 during 1991–1993 to 92 per 1,000 during 1994–1996. The comparison areas for Target Area A also showed a decrease during the same time period, from 81 per 1,000 to 80 per 1,000. The birthrate in Target Area B increased from 50 per 1,000 to 55 per 1,000 during the same time period, while the birthrate in the comparison areas decreased from 47 per 1,000 to 46 per 1,000. Estimated pregnancy rates for all of Kansas increased from 34 pregnancies per 1,000 females aged 14–17 to 38 per 1,000 between the two periods.

Discussion

Overall, the findings from the replication of the school and community model in Kansas were encouraging. We detected slight (though often not statistically significant) decreases in estimated pregnancy rates and birthrates, there were some positive changes in reported behavior, and rates of community and systems change were strong and steady. Further, community satisfaction with project functioning was high, and changes facilitated by each project were considered important. Each site faithfully addressed model implementation and facilitated positive change on a number of levels. Overall, the projects were well received in their respective communities. Project staff and volunteers introduced programs, practices and policies that had previously not been present in the community.

Project staff used evaluation data to build consensus on a place to begin the intervention, to identify strengths and challenges with project functioning, to set the agenda for future directions of the project and to track implementation and replication of the school and community model. The data helped project staff and leadership to keep steering committees and advisory groups informed of project activities, to respond to community criticism (such as complaints that the sole focus of the project was on sex) and to garner public support for sustaining project efforts once grant funding had ended. The data also showed that the project focused more on a holistic approach to sexuality and youth development and not just on "mechanics."

The data helped redirect efforts, when needed. For example, when they broke out community change data by risk factor, the staff at one site realized that they were not implementing many changes related to school performance and began targeting efforts in this area. Data also were used to enhance information that teachers and parents received about the sexuality education provided to students. One site used the Sexuality Information and Education Council of the United States topic areas[28] to show that the majority of sexuality education provided was in the areas of personal skills and relationships and not in the more controversial areas of sexual behavior that the community resisted.

Although each context was unique, project areas exhibited similar patterns of activity. Each had high, steady rates of community change and services provided. Every site implemented sexuality education for teachers, using a variety of meth-

Table 4. Average estimated pregnancy rates and birthrates (and ranges) for females aged 14–17, by intervention and comparison area, according to time period

Area	Preintervention (1991–1993)	Intervention (1994–1996)
Average estimated pregnancy rate		
Kansas	34.1 (31.0–36.8)	37.9 (37.4–38.5)
Geary County		
Program area	62.9 (55.2–69.0)	55.6 (49.5–62.1)
Comparison area	60.3 (52.4–65.9)	69.2 (60.6–74.4)
Franklin County		
Program area	40.7 (29.7–57.8)	36.9 (33.0–39.6)
Comparison area	38.8 (33.4–42.8)	36.5 (32.9–43.6)
Birthrate		
Wichita Target Area A		
Program area	105.5 (96.9–117.9)	91.6 (74.3–113.1)
Comparison area	81.4 (73.7–90.7)	79.5 (66.5–90.7)
Wichita Target Area B		
Program area	50.3 (33.1–77.2)	55.2 (36.8–66.2)
Comparison area	46.8 (45.4–49.3)	45.7 (41.8–48.9)

Note: See Table 1 for the definition of estimated pregnancy rate and birthrate.

ods, and experienced similar difficulties with groups opposed to some of the project's goals.

Replicating the school and community model presented several challenges. Although communities had accepted grant funds for this purpose, there was some resistance to the idea of rote replication, since each community was quite different from the rural community where the model was first implemented. This resulted in many conversations about the core components of the model, the rationale for implementing particular components and strategies for doing so.

Because each community was different, it was important to recognize and acknowledge that some minor adaptations of the model were necessary. For example, in South Carolina, the originator of the model taught most of the graduate education courses. Since the same instructor could not teach the graduate courses in the replicating communities, the course content, topics and emphases differed, both between Kansas and South Carolina and among the three Kansas communities.

Differences among lead agencies also complicated program implementation. For example, where the school district was the lead agency, it was easier for project staff, who were employees of the school district, to facilitate the administration of the youth surveys than it was for them to increase access to contraceptives. In contrast, where the grassroots organization was the lead agency, staff found it easier to arrange culturally appropriate workshops and activity sessions in an inner-city neighborhood than to arrange annual surveys of youth sexual activity in the public schools.

In addition, Kansas represented a different political and social climate at the time of program replication than that which existed when the model was developed. In the political and social conditions of the early 1980s, staff could seek Medicaid funding for health services and, initially, worked with the schools to increase sexuality education. Currently, it is more acceptable to work with families and with varied sectors of the community than it is to place the sole burden of sex education with the schools. In addition, with the new focus on managed care and on containing rising health care costs, seeking Medicaid funding was not a viable option.

The controversial nature of some strategies for preventing adolescent pregnancy (e.g., increasing access to contraceptives for young people and providing comprehensive sexuality education) also made implementation and replication of some components of the model particularly difficult. While experience in working with organized opposition was required, people with such experience were not always on hand at both the community and support-team levels.

Evaluating multicomponent school- and community-based projects is a complex task.[29] First, the effects of comprehensive interventions that seek to address broad health outcomes (such as adolescent pregnancy) are often delayed; thus, it may be difficult to establish a causal link between interventions and changes in health outcomes. Because of this, it is important to identify and track intermediate outcomes, such as community change. Continued analysis of community changes facilitated by similar initiatives will help inform the working hypothesis or theory of action: Community changes that are of sufficient amount, intensity and duration and that reach at-risk groups are related to positive changes in more distant outcomes.

Second, the monitoring system used to track the intermediate outcomes captures only events that were facilitated and reported by key informants (usually paid project staff). In addition, completing monthly logs takes time, and sometimes staff members are too busy implementing programs to complete logs as thoroughly as needed. Also, mobilization and change that occur as a result of earlier community efforts may not be captured. For example, a number of new programs were created at all three sites, and some programs that were then taken on by others in the community may have resulted in additional community changes. For example, a support group for teenage mothers initiated by the project evolved into a mentoring program for teenage mothers and a preschool program for their children supported by local hospital staff.

Further, having staff complete logs may influence the level of activity and accomplishment at each site. It is unclear how well the effects of the projects would generalize to a project not collecting monthly monitoring information. Finally, community changes were not weighted; one-day events and ongoing activities were reported in the same manner on graphs and charts. However, during site consultation, staff were encouraged to seek longer term and potentially more powerful changes in communities and systems. Future research with community initiatives will explore strategies for weighting community changes and presenting data to assist with local decision-making.

Third, although this evaluation monitored an independent variable, it is difficult to determine the intensity and reach of the intervention. The dose-response relationship is unclear. We do not know how many students came into contact with each component or community change. The monitoring system did not identify the number of people affected or mobilized by an event. Although the "dose" of the independent variable is not possible to estimate at this time, reanalysis of the monitoring data suggests that about one-third to one-half of the community changes facilitated in each community are ongoing.

Fourth, although the surveys of goals, member satisfaction and importance provided key information to project staff and leadership, the surveys were not sent to random samples of respondents; they were sent to community members identified by staff as active in the initiative. The results, therefore, may have been more positive than if the surveys had been sent to random samples of community members.

Our findings are also limited by a lack of comparisons for intermediate outcome and behavior measures. Because of the intensive nature of the log monitoring, we could not get comparison communities measures for intermediate outcomes. Further, not all Kansas communities collect data on youth-reported sexual behavior, knowledge and attitudes. Consequently, the Kansas youth data could not be disaggregated, and there were no comparison communities for the self-reported behavior.

Annual estimated pregnancy rates and birthrates did not account for annual changes in population. In addition, behavior data on sexual activity were self-reported. However, CDC-recommended consistency checks for the YRBS were conducted to eliminate inconsistent responders. Moreover, two different behavior surveys were used in Geary County to gather information about reported sexual activity and contraceptive use. However, the data analyzed in this report were taken from almost identical questions on each survey. And because it was not possible to track individual students who participated in the survey, we do not know the extent to which survey respondents participated in the intervention.

Finally, with a short time period (four years) in which to establish and implement a comprehensive multicomponent school- and community-based effort, any positive change in reported sexual behavior and the estimated pregnancy rate would be encouraging. Large changes in behavior and the estimated pregnancy

rate would not be anticipated with such a short time period for intervention. However, by the end of the four-year period, the capacity for addressing adolescent health concerns, particularly adolescent pregnancy, was improved. For example, partnerships among important community sectors, such as the local health department and the schools, were nurtured and strengthened. This led to expanded financial and personal commitments to the projects, and to greater attention and commitment to facilitating community and systems changes that could help reduce the risk of adolescent pregnancy.

Despite these limitations, our evaluation of a replication of the school and community model for reducing risk for adolescent pregnancy has a number of positive aspects.[30] First, the comprehensive community evaluation was participatory in nature. The evaluation was designed to track a complex intervention, and the evaluators sought to understand local issues and contexts to best meet the evaluation needs both of the initiative and of key stakeholders.

Second, the evaluation started early in the development of the initiative, to maximize its ability to gather information to enhance understanding and improvement of the initiative. The evaluation was designed around key questions of interest to community members, to initiative leadership and to funders.

Third, the evaluation data were used to help sustain the local initiatives. Specifically, data on the cumulative number of community and systems changes helped communities to garner resources (time and material) to continue the initiatives.

Finally, the evaluation was part of a larger support system that couples technical assistance and evaluation. This support system was designed to help build local capacity for reducing risks for adolescent pregnancy, in part, through enhancing the effectiveness of the initiative.

In summary, this research contributes to an understanding about the impact of multicomponent school- and community-based interventions on adolescent pregnancy rates. The research used a comprehensive evaluation designed to support and assess the process, intermediate outcome and more distant outcomes of three multicomponent school and community-based projects. The results of this work and additional case studies[31] and analyses will help inform future community initiatives for prevention of adolescent pregnancy. In this particular initiative, the intermediate and more distant outcomes of the project were promising, prompting the Kansas Health Foundation to provide additional funds to continue to explore whether such a multicomponent program model is effective and can be transferred to other areas.

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