

# Reducing the Risk for Adolescent Pregnancy: Evaluation of a School/Community Partnership in a Midwestern Military Community

This article describes a comprehensive evaluation used to examine the effects of a school/community partnership to reduce risk of adolescent pregnancy in a Midwestern military community. The overall initiative is described, followed by the evaluation system and key evaluation questions. The findings suggest that the school/community initiative changed the environment by implementing more than 139 community changes related to the mission (such as new programs, policies, and practices), influenced youth behaviors according to reported sexual activity, and may have influenced a modest reduction in average estimated pregnancy rate. Key words: *adolescent pregnancy, community, community development, evaluation, prevention*

**A**PPROXIMATELY 1 MILLION girls—19 years of age or younger—become pregnant each year in the United States.<sup>1,2</sup> Of the 2,740 adolescents impregnated each day,<sup>3</sup> nearly half give birth and only about 4 percent use adoption,<sup>4</sup> 14 percent of the pregnancies end in miscarriages, and 35 percent end in abortions.<sup>5</sup> Thus, many newborns are born to unmarried teens who have little or no means of economic support.<sup>6</sup>

The literature describes a variety of programs to prevent adolescent pregnancy.<sup>7-9</sup> However, outcome data of actual births are seldom reported and demonstrated effects with these more distal outcomes are even more rare. In an exception, Vincent, Clearie, and Schlacter,<sup>10</sup> showed a reduction in the estimated pregnancy rate (EPR) in Bamberg County, South Carolina, using a school-community model that included sexuality education, media, and access to contraceptives. For this experimental commu-

nity in rural South Carolina, EPR showed a dramatic decrease from 54/1,000 females in 1983 to 25/1,000 females in 1984, while the three comparison counties showed constant or increased EPRs. Although a follow-up analysis concluded that the decreased EPR was due to the intervention,<sup>11</sup> no replication of the findings has appeared yet in the literature.

Some limitations of the original application of the school-community model suggested areas for future contribution. First, the independent variable was not described fully in the original South Carolina study.<sup>11</sup> How many community changes (for example, changes in programs, policies, and practices) took place in the environment, and how these changes were associated with a reduction

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*Note:* At the time of writing, Carolyn Custard was the Director and Marche Fleming-Randle was the Outreach Worker at the School Community Sexual Risk Reduction Replication Initiative, USD 475 School District.

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in EPR was unclear. Further, the sustainability of changes in the environment—presumably important in estimating the dose of the intervention—was not documented.

This article describes a longitudinal case study of a comprehensive school-community initiative to reduce the risk for adolescent pregnancy in a Midwestern military community. This study extends earlier research by examining the changes in the community related to adolescent pregnancy, their durability, and possible relationships between community change and the EPR. The context of this research is described, followed by a description of the measurement system and evaluation questions. Third, the results including intermediate and more distal outcomes are presented, followed by a discussion of challenges and limitations of evaluating community initiatives to prevent adolescent pregnancy.

## METHOD

### Context and framework

The Geary County/Fort Riley School/Community Sexual Risk Reduction Replication Initiative was formed in August 1993 following grant funding from the Kansas Health Foundation, a philanthropic organization whose mission is to improve the quality of health in Kansas. The local school district (USD 475) served as the lead agency. The School/Community Initiative was made up of staff and community members who represented various sectors of the community including schools, youth organizations, religious organizations, social

services, military, and recreation services.

The mission of the school/community initiative was to replicate a successful project for preventing pregnancy among adolescents and to improve social and health status through long-term changes in health behavior and school and community support. The broad objectives were to (1) increase sexual abstinence, (2) postpone the age of initial sexual intercourse, and (3) increase use of contraception among teens who choose to be sexually active.

The population of Geary County is 30,453 (1990 U.S. Census). The county is adjacent to Fort Riley, an Army installation facility. Sixty-six percent of the population is Caucasian, 23 percent African American, 6 percent Hispanic American, 4 percent Asian American, and 0.6 percent Native American. In 1993, the county had the second highest estimated pregnancy rate in Kansas for females age 14-17; 69.04/1,000 compared with 36.6/1,000 for the state of Kansas.

### **School/community intervention**

The school/community model included several components: (1) enhanced sexuality education to teachers and students, (2) an age-appropriate, comprehensive kindergarten through twelfth grade sexuality education curriculum, (3) increased access to health services and contraceptives for young people, (4) media efforts to increase awareness of the initiative, (5) peer education and support, (6) supervised activities for youth, (7) programs in the faith community, and (8) community linkages.<sup>10-12</sup> The compo-

nents and elements in the model are consistent with the literature and focus on reducing risk factors (such as lack of knowledge) and enhancing protective factors (such as access to contraceptives) associated with adolescent pregnancy.

### **Evaluation system**

The comprehensive evaluation system was developed by researchers at the University of Kansas and drew on conceptual frameworks and related evaluation strategies for promoting health and community development.<sup>13,14</sup> Process measures, such as instances of community health education, were collected to track how the initiative was implemented. Intermediate outcomes, such as community or system changes facilitated by the partnership, refer to the results of implementation and are the focus of this article. More distal outcome measures report on the initiative's ability to have an impact on the bottom line or community-level indicators (for example, estimated rate of adolescent pregnancy).

Key evaluation questions of interest to the initiative's leadership, community, and primary funder were: (1) What changes in the community resulted from the initiative? (intermediate outcome), (2) Were community changes sustained over time? (more distal outcome), (3) What critical events were associated with the rate of community changes? (intermediate outcome), (4) Was there a change in reported sexual behaviors among youth? (more distal outcome), and (5) Was there a change in community-level indicators of adolescent pregnancy? (more distal outcome). Several measurement instru-

ments used in data collection included: (1) a monitoring system, (2) structured interviews, (3) behavioral surveys, and (4) archival records. In the following sections, each instrument is described.

### ***Monitoring system: community change***

The monitoring system is an observational method used to assess process and intermediate outcome and to permit regular feedback on performance to program leadership, funding partners, and other interested audiences.<sup>15,16</sup> The monitoring system was implemented prospectively at the beginning of the initiative (August 1993), with retrospective reporting of accomplishments that began after the announcement of the request for proposals (RFP) in January 1993.

Staff filled out monthly event logs to record initiative activities and accomplishments. Logs included information about: (1) the event, (2) what was done, (3) when the event occurred, (4) with whom the event was completed, (5) by whom the event was completed, (6) where the event took place, (7) what happened as a result of the event, and (8) whether it was the first time the event happened.<sup>17</sup> When logs for the previous month were received, information was

clarified with the staff. The primary observer (the first author) scored each item using existing definitions,<sup>17</sup> and an independent (secondary) observer also scored the logs.<sup>17</sup> Reliability was calculated using Cohen's Kappa,<sup>18</sup> whereby the percentage agreement was calculated by dividing the total number of agreements by the total number of observations and multiplied by 100. On average, reliability percentages were from 90 to 95 percent, with reliability assessed for approximately 95 percent of the scored logs. After logs were scored and reliability was recorded, data were graphed and presented to initiative leadership each month. Graphs and lists of accomplishments were used to review progress, celebrate successes, and shift staff attentions as needed.

Community changes were measured using the log system because they are of particular importance to the implementation of the initiative. They refer to new or modified programs, policies, and practices in a community related to the mission. For example, establishing a new mentoring program is an instance of a community change.

### ***Sustained changes over time***

To determine whether community changes were sustained over time, the director and first author reviewed whether a program, policy, or practice was still in place at a specified time. Community changes that were regarded as relatively brief events (such as a summer youth program) were reported only in the months they occurred and not as ongoing. If a change was more enduring, for instance, changes in the hours of op-

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***Community changes were measured using the log system because they are of particular importance to the implementation of the initiative.***

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eration in the local youth clinic, that change was considered as ongoing.

### **Structured interviews: interviews with key informants**

Structured interviews were held with nine active members of the partnership to identify information about critical events that might have contributed to rates of change in the community. Staff recommended individuals who had substantial involvement with the partnership. Participants were asked to identify critical events and comment on the context, barriers, key people involved, resources, lessons learned from the partnership, and future directions of the partnership.

### **Behavioral surveys: self report of sexual behavior among adolescents**

To assess a student's knowledge, attitudes, and behavior related to sexual activity, the Adolescent Curriculum Evaluation (ACE)<sup>19</sup> was used in 1994 and the Youth Risk Behavior Survey (YRBS)<sup>20</sup> was used from 1995–1997. The ACE was used in the original study and is an 80-item paper and pencil survey<sup>10</sup> consisting of questions about sexual behavior, sexual knowledge and attitudes, and contraceptive behavior. In January 1994, the project collected 1,004 out of 1,777 completed surveys from students attending the high school.

The YRBS was an 84-item paper and pencil test developed by the Centers for Disease Control and Prevention (CDC) in Atlanta, Georgia. Broader adolescent health behaviors were outlined in this survey including: seat belt and helmet

use, violence in school, suicide, tobacco use, alcohol use, and sexual behavior. The 1993 version of the YRBS was administered in the spring of 1995, 1996, and 1997. Approximately 1,013 students completed the survey in 1995, 848 in 1996, and 952 in 1997.

Both surveys included similar core questions about sexual behavior, including: (1) Have you ever had sexual intercourse (making love, having sex, going all the way?), and (2) The last time you had sexual intercourse, what method did you or your partner (the person you had sex with) use to prevent pregnancy?

### **Archival records: EPR**

EPR was collected annually from archival records provided by the Kansas Department of Health and Environment (KDHE). EPR was calculated using the number of reported live births, stillbirths, and abortion estimates divided by the population of adolescent females age 14–17 multiplied by 1,000. Population estimates for girls age 14–17 were based on the 1990 U.S. Census, which was used as the population base for years 1991–1996.

### **Case study/comparison design**

This evaluation used a longitudinal case study design<sup>21</sup> to examine the pattern of community change and its associated factors. An interrupted time series design with experimental and comparison communities was used to examine the effects of the school/community initiative on the EPR.<sup>21</sup> A principal components analysis<sup>11</sup> was used to select comparison sites in Kansas. Sites were

selected based on how similar they were to the experimental county using a number of variables including the county's five-year EPR (1987–1991), nonwhite population, population per square mile, per capita personal income, and unemployment rate. One contiguous county and three noncontiguous counties were selected as comparisons. For the experimental county only, qualitative and quantitative information also were collected regarding the process, intermediate outcome, and more distal outcomes.

### Statistical Methods

Chi-square analysis was used to test the significance of the 1994 through 1997 trend in student reported sexual activity among high school students in Geary County, and the pre-intervention period (1991–1993) EPR compared to the intervention period (1994–1996) EPR for Geary County and the comparison counties. Statistical significance was set at  $p < .05$ .

## RESULTS

This case study examined five key evaluation questions concerning the functioning and efforts of the community-based initiative. The results of each question are described below.

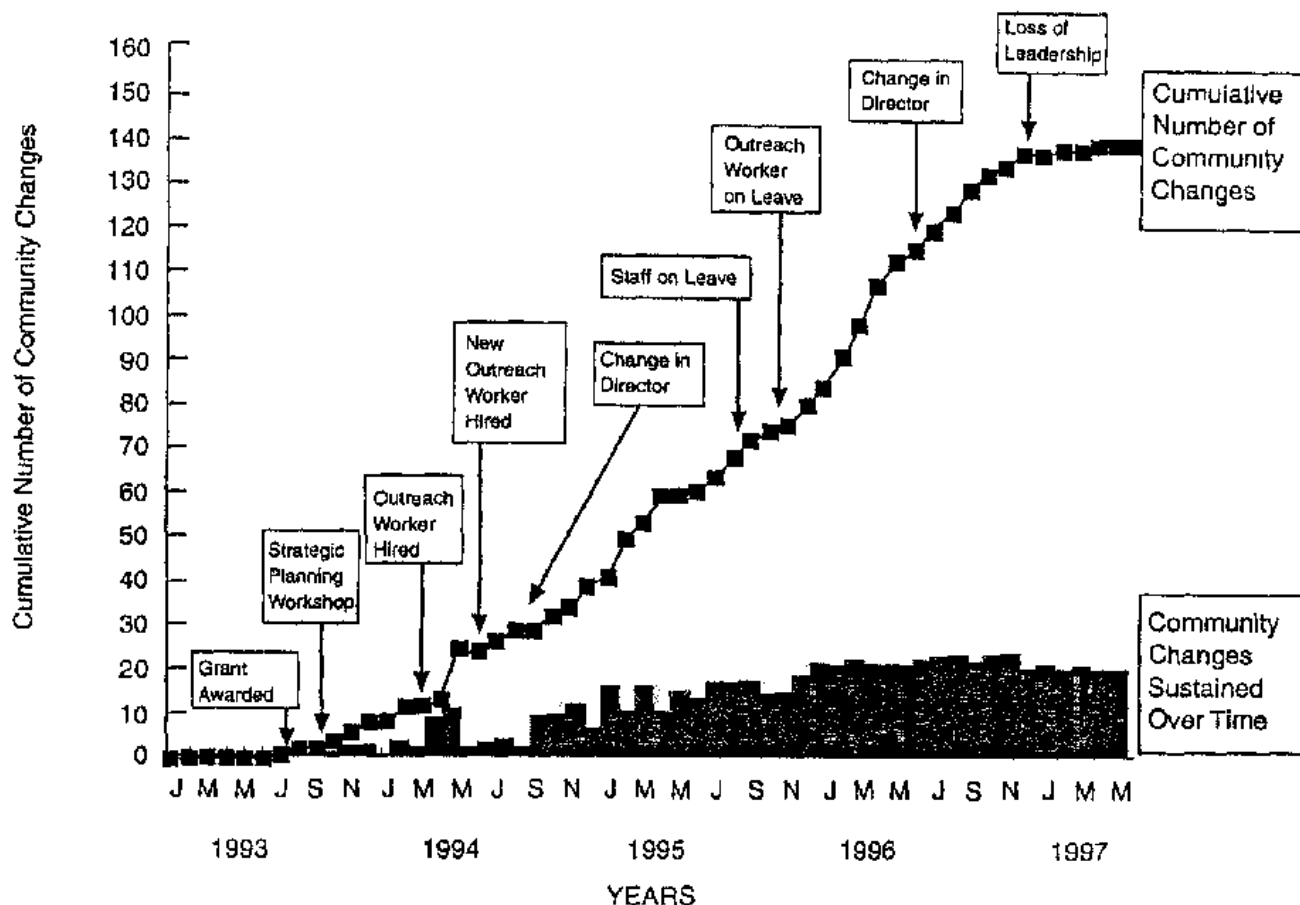
### What changes in the community resulted from the initiative?

Figure 1 shows the cumulative number of 139 community changes facilitated by the initiative from January 1993 through July 1997. Table 1 provides examples of

the types of community changes produced and categorized by program, policy, or practice. The onset of each event is scored as a community change during the month it first occurred.

In a cumulative graph, each new event is added to all prior events; for example, when two new community changes for a given month are added to 12 prior changes, the new cumulative total for the next month is 14. The graph shows a steady climb of community changes (with the exception of the first and last six months of the initiative). Marked increases in community change were noted following strategic (action) planning, hiring outreach workers, and a change in leadership (to an African American woman with strong ties to the community). The data were fed back regularly and helped staff celebrate accomplishments and redirect efforts, if needed.

Lower rates of community changes occurred during school breaks and while staff was on leave. In April 1994 and April 1995, the cumulative number of community changes increased greatly due to activities associated with the national Teen Pregnancy Prevention Week. In summer 1993, the initiative had a summer youth learning program that produced a number of community changes (such as discount tickets for movies and skating). However, the program was not continued in summer 1994 due to lack of funding and did not result in high levels of community change. The absence of the outreach worker and the office coordinator also could have contributed to a flattened rate of community change in summer 1994.



**Fig 1.** Geary County community changes over time: School Sexual Risk Reduction Replication Initiative.

In fall 1994, the rate of community changes increased markedly, perhaps due to back-to-school activities for parents and students. In 1996, the initiative continued to produce a high, steady rate of community changes. July 1996 was marked by a change in director; however, the new director stayed on the job only a few months. This was a vulnerable time for the initiative due to unclear plans for sustainability of staff positions. Despite the continued efforts of the remaining staff, the initiative could no longer keep up the high steady rate of change after the last director was hired in Janu-

ary 1997 and the outreach worker left for another position.

### **Were community changes sustained over time?**

Because the dose of the intervention presumably is related to the duration of community changes, the sustainability of such changes over time must be examined. Figure 1 shows the cumulative number of community changes (line graph) along with those community changes still in place (bars) through July 1997, the end of the grant. At any one

point in time, at least three community changes were in place. Most of the more durable community changes were related to policy changes, such as the change in the local youth clinic to accommodate students' schedules. The bars show a number of peaks and valleys of community changes occurring from 1993 through 1996. These peaks may be related to the number of short-term events that were initiated (such as a summer youth program designed for kids that was held only during June, July, and August 1994). If an event occurred during one

month and ended during that month, it was no longer counted as occurring in the next month. This does not suggest one-day events were limited in their effects, only that the event no longer was present in the community.

### Was there a change in sexual behaviors among youth?

The results show that from 1994 to 1997, sexual activity decreased among high school students from 63% in 1994 to 47% in 1997 in Geary County

**Table 1.** Illustrative community changes facilitated by the Geary County, Fort Riley School/Community Sexual Risk Reduction Replication Initiative

Programs	Community changes
	<ul style="list-style-type: none"> <li>• Supervised alternative activities for youth were held during holiday break for the first time.</li> <li>• School/community project established an "abstinence club" at Junction City High School.</li> <li>• Parent support network group established through the government and businesses task force of the initiative.</li> <li>• Established a male mentoring program: "Operation MACHO" (Males Advocating Careful Healthy Choices).</li> </ul>
Policies	<ul style="list-style-type: none"> <li>• The Junction City Youth Clinic changed its policy so that students could in without others knowing why they were visiting the clinic.</li> <li>• As a result of the school/community project, clinic hours at the Junction City Youth Clinic were changed to accommodate (such as hours offered before school) students' schedules.</li> <li>• In collaboration with the Junction City Youth Clinic staff, the clinic began to track the number of condoms and contraceptives distributed each month.</li> </ul>
Practices	<ul style="list-style-type: none"> <li>• High-level military official gave permission for the school/community project to have access to physicians at Fort Riley.</li> <li>• Local teachers enrolled in the graduate human sexuality course developed, in collaboration with school/community, a system for monitoring and recording sexuality education being taught to students.</li> </ul>



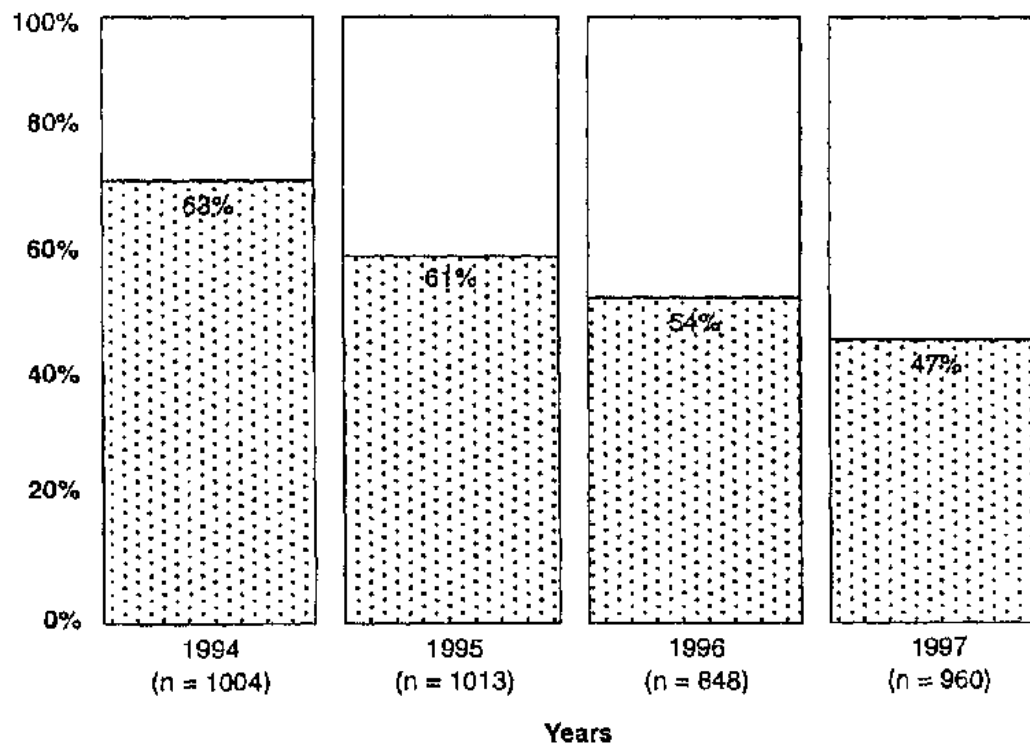
( $\chi^2(3)=51.609$ ,  $p.<.01$ ). Figure 2 shows the percentage of students who reported being sexually active and abstinent each year. Table 2 shows the contraceptive method used by students reporting sexual activity. Overall, for each year the condom is the contraceptive students used most to protect themselves against pregnancy and sexually transmitted diseases.

### What critical events were associated with the rate of community changes?

Active participants in the initiative outlined several events that influenced the rate of change in the community. Figure

1 shows the cumulative number of community changes overlaid with identified critical events. Obtaining the grant (August 1993) and action planning (September 1993) may have prompted the first series of community changes. A change in director (September 1994) and the hiring of the outreach worker (June 1994) also increased the rate of community changes produced by the initiative. In the summer of 1995, the outreach worker was on leave, and the rate of community change leveled off. Strategic planning and hiring of staff appeared to be critical events in the life of this partnership.

Partnership members listed a number of other events they thought were critical to the initiative's success, including: (1)



Note: The Adolescent Curriculum Evaluation was used in 1994 and the Youth Risk Behavior Survey was used in 1995, 1996, 1997.

**Fig 2.** Percentage of high school students (grades 9–12) reporting sexual activity: Geary County, 1994–1997.

**Table 2.** Contraceptive method used by those students reporting sexual activity

Type of contraceptive method	1994* (N = 636)**	1995 (N = 584)**	1996 (N = 378)**	1997 (N = 366)**
Condom	48%	46%	48%	47%
Birth control pill	13%	14%	15%	12%
No method	20%	21%	19%	18%
Withdrawal	9%	9%	9%	14%
Could not remember	2%	NA	NA	NA
Some other method	NA	5%	5%	7%
Not sure	NA	5%	4%	2%

\*In 1994, the Adolescent Curriculum Evaluation (ACE) survey was used and the survey included different contraceptive categories than those used on the Youth Risk Behavior Survey used in 1995–1997.

\*\*Number reflects those students reporting “yes” whether they ever had sexual intercourse.

developing the human sexuality curriculum, (2) receiving the grant from the Kansas Health Foundation (August 1993), (3) creating awareness about adolescent pregnancy (October 1993), (4) conducting a telephone survey to assess community member’s satisfaction with the sexuality education being taught in school (February 1994), (5) establishing a relationship with the military base, (6) separating the partnership from the substance abuse coalition also located in the city (August 1994), (7) forming the steering committee (August 1994), (8) collaborating with the community and the local youth clinic to create activities for youth, (9) establishing an abstinence club for teens, and (10) creating a male mentoring program, Operation Males Advocating Careful Healthy Outcomes (MACHO). Lessons learned as noted by members of the partnership included: not recreating the wheel, getting parents involved, and having a strong vision, mission, and direction. Members also noted the value of collaborating, finding sincere

people to work on the project, and valuing other people’s opinions. Future directions include sustaining the project, keeping the issue of adolescent pregnancy on the public agenda, instituting more effective sex education at all grade levels, and encouraging youth who choose to be sexually active to use contraceptives.

**Was there a change in community-level indicators of adolescent pregnancy?**

As shown in Table 3 the estimated pregnancy rate between 1991 and 1996 for Geary County females aged 14–17 years decreased while rates increased in comparison counties and in the state of Kansas overall. Because the rates of EPR were so variable, the authors averaged the three years before the intervention was implemented (1991–1993) in Geary and the three years during the intervention (1994–1996). Figure 3 shows the averaged estimated pregnancy rate

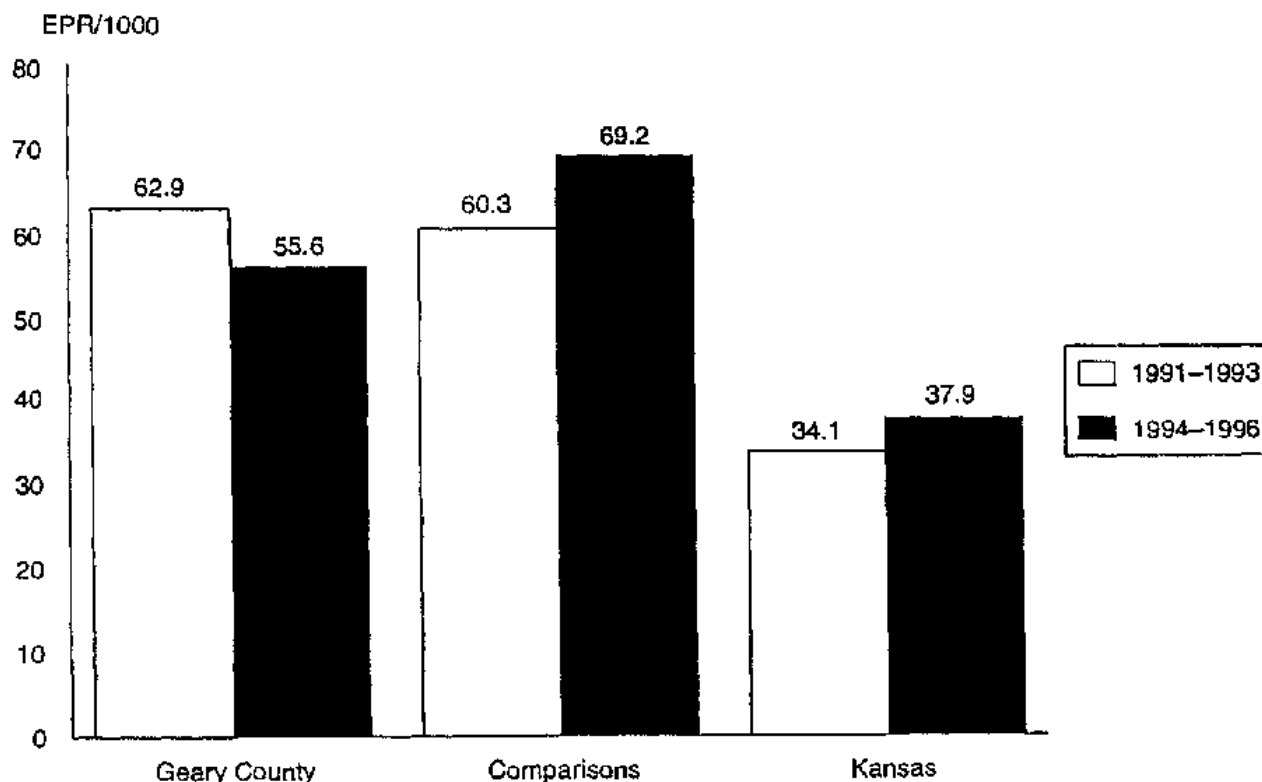
**Table 3.** Estimated pregnancy rate (EPR)\*

Years	Target community Geary County (female population 14-17) 869**		Comparison counties (female population 14-17) 2,326		Kansas (female population 14-17) 63,710	
	EPR	Total pregnancies	EPR	Total pregnancies	EPR	Total pregnancies
1991	64.44/1,000	56	52.43/1,000	122	31.02	1,976
1992	55.24/1,000	48	65.86/1,000	150	34.5	2,198
1993	69.04/1,000	60	62.56/1,000	142	36.67	2,336
1994	55.24/1,000	48	60.59/1,000	137	37.64	2,398
1995	62.14/1,000	54	72.45/1,000	164	38.52	2,454
1996	49.48/1,000	43	74.44/1,000	172	37.42	2,384

\*EPR is the number of live births, stillbirths, and estimated abortions divided by the total female population age 14 to 17 multiplied by 1,000.

\*\*Population is based on the 1990 U.S. Census.

Note: The reductions in EPR for Geary County were not statistically significant when compared with the comparison counties.



**Fig 3.** Estimated pregnancy rate for 14- to 17-year-old females: Geary County and comparisons.

dropped from 62.9 before the intervention to 55.62 during the intervention for Geary County females age 14–17 years; this 13% relative decrease was not statistically significant. However, similar relative increases in rates were found for the comparison counties (60.2 to 69.1,  $p=.048$ ) and Kansas (34.1 to 37.8,  $p<.001$ ). During the intervention period the EPR was significantly greater ( $p=.035$ ) in the comparison counties than in Geary. Table 3 also shows the EPR and total pregnancies for Geary, comparison counties, and Kansas for each year along with population estimates for females aged 14 to 17 years.

## Discussion

This article describes a case study of a school/community initiative to reduce risks for adolescent pregnancy. The results suggest that the school/community initiative changed the environment by implementing more than 139 programs, policies, and practices related to the mission of reducing adolescent pregnancy. Further, while the initiative was in place the results show a significant reduction in the percentage of students reporting sexual activity during the intervention.

There was a trend towards reduction in EPR observed in Geary County that was not statistically significant, but the comparison counties showed a significant increase in EPR during the intervention period. EPR at baseline for Geary and comparison counties did not differ significantly, suggesting that the comparison counties were a good match for Geary. The state of Kansas also showed a significant increase in EPR during the interven-

tion period similar to that of the comparison counties. Therefore, the reduction in Geary County's EPR did not follow the trends of the comparison counties nor the state, thus the results are encouraging that the initiative may have had a positive impact on EPR in Geary.

Although, no definitive conclusion can be drawn concerning the relationship between community change—an intermediate outcome—and EPR, EPR shows a downward trend as community changes increase.

## Limitations

This study has several limitations. First, the results could reflect a regression to the mean because of the high adolescent pregnancy rate in Geary County. However, the EPR did not differ substantially between the comparison counties and Geary. Thus, the reduction may have more to do with the intervention than regression. Second, the relationship between community change and EPR could be spurious in that a particular event not captured by the evaluation system may have produced the slight change in EPR. For example, since the community population associated with the military base is somewhat mobile, inaccuracies in population estimates may account for modest reductions in the EPR. Further research is needed to determine the conditions under which changes in the environment are associated with reductions in estimated pregnancy rates. Third, the evaluation system (community changes) is highly reactive and relied on self-reported information from the staff. Therefore, to minimize inflated activities, news-

paper articles and meeting minutes were used to verify a sample of the logs. Fourth, due to the complexity and comprehensiveness of the intervention the evaluation system did not measure how much of the program was experienced by individual adolescents.

### Challenges of Replication

Several challenges were experienced regarding replicating this community-based initiative. First, the comprehensive age-appropriate, K-12 sex education curriculum in the schools was not fully implemented before the end of the grant period as in the original study. Although students received sexuality education in some of their classes, the School Board did not pass the comprehensive curriculum until fall 1996.

Second, conversations among staff and students about contraceptives was limited on school grounds. However, the staff established a partnership with the school-linked youth clinic to provide access to information and services associated with contraceptives. Third, the religious community was never fully engaged in the project as was demonstrated in the original study, but several collaborations were established with the clergy on the military base to implement abstinence-based programs for youth.

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***Although students received sexuality education in some of their classes, the school board did not pass the comprehensive curriculum until fall 1996.***

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### Contributions to the Field

This study contributes to the existing literature on community-based initiatives for prevention of adolescent pregnancy in several ways. First, very few studies measure both intermediate outcomes (i.e., community change) and more distal outcomes (behavior change, estimated pregnancy rate) to examine the possible relationships between EPR and community change. Most studies focus on knowledge gained and self-reported intentions to engage in sexual activity. This study extends that literature by adopting and adapting many of the components of the School/Community model<sup>10,11</sup> for a Midwestern military community. Second, even though we cannot attribute the observed changes to specific components of the program, this community-based initiative was able to implement widespread community change and may have influenced positive changes in adolescent sexual behavior and moved more distal outcomes (i.e., EPR). This is evident by the funder agreeing to support another round of adolescent pregnancy initiatives in the state. These results are encouraging that two important outcomes, such as, self-reported sexual activity and EPR show positive changes. Third, this study used community evaluation to help understand (and improve) a comprehensive adolescent pregnancy prevention initiative.<sup>22</sup> The evaluation team provided regular feedback on the intermediate outcome of community change, which permitted the initiative to be accountable to the community and to funders throughout its lifespan.

Fourth, this case study also contributes to an initial understanding of community

change as an intermediate marker for changes in more distal outcomes. One current hypothesis is that the amount, intensity, duration, and exposure (including for at-risk subgroups) of community change offer positive changes in the health outcome, EPR<sup>23,24</sup>. By studying which community changes were in place through the lifespan of the partnership, we provided descriptive information on both amount and duration. In addition, those changes that were sustained might have lasting impact, such as extending the hours of the local youth clinic to accommodate students' schedules. This information may be used to encourage partnerships to put in place changes of greater duration and intensity.

Fifth, this study provides a practical methodology for community evaluation that has applicability to a wide range of community health initiatives.<sup>25-28</sup> Adaptations of this methodology have been used to evaluate initiatives to reduce risk for cardiovascular disease<sup>27</sup> and substance

abuse.<sup>28</sup> The evaluation system outlines a framework by which communities can collaborate with different sectors of the community, document the changes they make in the community related to the mission, and evaluate their progress by asking a number of key evaluation questions related to community goals.

## CONCLUSION

This study describes a process of studying collaborative partnerships for reducing risks for adolescent pregnancy. Adolescent pregnancy is a complicated problem that requires a comprehensive approach. Community-based interventions attempt to target a number of risk and protective factors such as knowledge, school performance, and access to contraceptives that are believed to be associated with adolescent pregnancy. This research will help us understand and improve comprehensive approaches to reduce risk for adolescent pregnancy.

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