Analyzing the Contribution of Community Change to Population Health Outcomes in an Adolescent Pregnancy Prevention Initiative

Adrienne Paine-Andrews, PhD
Jacqueline L. Fisher, MPH, CHES
Jannette Berkely Patton, MA
Stephen B. Fawcett, PhD
Ella L. Williams, MEd
Rhonda K. Lewis, PhD, MPH
Kari Jo Harris, PhD, MPH

Few evaluations of community initiatives have established a link between intermediate outcomes, such as community or systems change, and more distant population-level health outcomes (e.g., estimated rates of employment or adolescent pregnancy). This article describes an analysis of the contribution of community changes facilitated by a community health initiative to prevent adolescent pregnancy to the population-level outcome of birth rates for teens. The authors examine a hypothesis that this link might be expected when community changes are of greater amount, intensity, duration, and exposure. The results showed reductions in birth rates in Target Area A, where there was a greater concentration of community changes and a slight increase where there were far fewer changes. This report provides a method for describing empirically the contribution of environmental change to more distant population-level outcomes.

Community coalitions, partnerships, or initiatives are a prominent strategy for promoting community health and development. They are composed of people with varied experiences from a variety of sectors of the community who come together to build on community strengths; to identify community concerns, such as to prevent adolescent pregnancy or promote youth development; and develop solutions to them.[1-3] To facilitate

---

Adrienne Paine-Andrews is principal investigator, Jacqueline L. Fisher is associate director and principal investigator, Jannette Berkely Patton is project director, and Stephen B. Fawcett is director at the University of Kansas, Lawrence. Ella L. Williams is project director at City Vision Ministries, Kansas City, Kansas. Rhonda K. Lewis is an assistant professor in the Department of Psychology at Wichita State University, Wichita, Kansas. Kari Jo Harris is a research assistant professor in the Department of Preventive Medicine in the School of Medicine at the University of Kansas, Kansas City, Kansas.

Address reprint requests to Adrienne Paine-Andrews, Principal Investigator, 4082 Dole Center, University of Kansas, Lawrence, KS 66045; phone: (785) 864-0533; fax: (785) 864-5281; e-mail: apa@ku.edu.

We thank the staff, partners, and many volunteers of the School/Community Sexual Risk Reduction Initiative in Kansas and South Carolina, Dr. Murray Vincent from the University of South Carolina, the members of the Technical Review Committee, and Mary K. Campuzano and Carolyn Williams from the Kansas Health Foundation (a philanthropic organization whose mission is to improve the health of Kansans) for making this work possible. Finally, we thank Stergios Tsai Russos and Renée Boothroyd for their thoughtful feedback and Kim Leach for assistance with final manuscript preparations.

improvements in health outcomes, staff, partners, and key volunteers associated with community initiatives implement a number of programs, policies, and practices consistent with their mission (i.e., community change).

Few evaluations of community initiatives have established a link between intermediate outcomes, such as community or systems change, and more distant population-level outcomes (e.g., estimated rates of employment or adolescent pregnancy).[4,5] This article describes an analysis of the possible link between intermediate outcomes (i.e., community changes) facilitated by an initiative to prevent adolescent pregnancy) and improvements in population-level health outcomes (i.e., estimated pregnancy or birth rates). First, we describe the context and working hypothesis for understanding conditions under which intermediate and more distant population-level outcomes may be related. Second, the methodology for documenting community change and analyzing its possible contribution is described. Third, data on the distribution of intermediate outcomes along the dimensions of the working hypothesis are presented to examine a possible link between intermediate outcomes and more distant outcomes. Finally, we offer recommendations for research and practice based on this analysis.

CONTEXT FOR EXPLORATION

The context for this exploration is a multisite comprehensive school/community initiative for prevention of adolescent pregnancy in Kansas.[6-8] The broad mission of the initiative was to improve social and health status in the community, related to adolescent pregnancy, through long-term change in environmental factors and personal behavior. This initiative involved a partnership with three different local community-based initiatives (Geary County, Franklin County, and the northeast area of Wichita), the funder (Kansas Health Foundation, whose mission is to improve the health of Kansans), and a support and evaluation team (including the University of Kansas Work Group on Health Promotion and Community Development and the model originator from the University of South Carolina). Kansas Health Foundation funded each initiative for 4 years (1993-1997) as well as the team at the University of Kansas and the model originator, Dr. Murray Vincent, in South Carolina.[6] Together, these partners worked to implement the school/community model[6-9] and provide support and evaluation for local efforts.

This article focuses on an analysis of data from one site, the northeast area of Wichita. Two target areas (distinct neighborhoods and different zip codes) in northeast Wichita, the largest city in Kansas, comprised the Wichita site. Combined, the two target areas in Wichita had about 30,000 people (Wichita total population, about 300,000 according to 1990 census). The 5-year birth rate for both target areas combined for females 15 to 19 years was 141.9 per 1,000 compared with less than 70 per 1,000 for Kansas. A grassroots, nonprofit community organization in Target Area A, known as the Wichita Metropolitan Family Preservation, Inc., served as the lead agency for the project.

EXPLORING A WORKING HYPOTHESIS ABOUT DIMENSIONS OF CONTRIBUTION

This analysis focused specifically on understanding the link between community change (i.e., new or modified programs, policies, and practices facilitated by and consistent with the mission of the initiative) and population-level health outcomes (i.e., birth

rates) associated with adolescent pregnancy.[2,5] Community change is a metric reflecting changing conditions in the environment that help support widespread behavior change to improve a particular health outcome. The working hypothesis proposes that improvements in population-level health outcomes might be expected when community changes are of greater (a) amount (i.e., the number of community changes reported), (b) intensity (use of behavior change strategies beyond information and skills training, attention to risk/protective factors and model components), (c) duration (length of time the changes remain in place), and (d) exposure (i.e., delivery to/through relevant community sectors to reach target groups in a particular locale). We predict that the contribution of community change (an intermediate outcome) to reducing teen birth rates (a more distant population-level outcome) will be more significant when there is a sufficient number of programs, policies, or practices that target salient risk and protective factors for adolescent pregnancy; use more intensive behavior change strategies; are in place long enough to have an impact; and are widely distributed throughout the entire target area.

METHOD

Several dependent measures and corresponding measurement instruments were used in this analysis. Each is described briefly below and in more detail in other publications.[7,10,11]

Dependent Measures and Measurement Instruments

The primary dependent measure was *community change*—new or modified programs, policies, and practices facilitated by the initiative and consistent with its mission.[10,11] The term *community change* was chosen to reflect changes in the usual ways of "doing business" in a community. Community changes include activities and services (in the form of new or modified programs) but go beyond service provision to include changes in practice (such as making a referral to new or existing programs) and policies (such as adopting a new sexuality education curriculum). Additional examples of community change documented in this study include establishing an after-school program (modifying a program), extending clinic hours to provide greater access to health services (policy change), and involving health department nurses in school health presentations (new practice).

Local initiative staff recorded community changes on monthly logs that were sent to evaluators. Evaluators coded (using standard definitions and scoring instructions) and summarized the data and shared graphic presentations and summaries with initiative staff regularly. Prior reports of this document and evaluation system have appeared in research articles[7,12] and on the Community Tool Box (http://ctb.ukans.edu/).[13]

In this article, community changes were also coded in accordance with the working hypothesis to analyze their potential contribution to more distant population-level health outcomes. Each community change was coded by the number of community changes in each target area (place or locale), the specific risk and/or protective factor addressed (related to adolescent pregnancy), the behavior change strategy used, the program component addressed, the sector and target of the change, and the intended duration of the change. Table 1 provides brief definitions developed for each of the categories. Evaluators coded each community change using definitions and coding instructions. Kappa reliability was used to determine interobserver agreement between two university observers. Interobserver agreement was 85% across all categories.

Table 1. Analysis of Contribution of Community Change to Population-Level Health Outcome

Dimension of the Working Hypothesis	Coding Category
Amount: How much change was reported?	Total number of community changes
Intensity: What components and risk and/or protective factors were addressed? What behavior change strategies were used?	A. Component addressed by the change • Community alliances • Sexuality education • Health services • Mass media • Peer support and education • Alternative activities and/or life options B. Risk and/or projective factor targeted by the change • Knowledge and skills • Contraceptive access • Unsupervised activities • Life options • School performance • Peer support C. Behavior change strategy implemented by the change • Providing information/enhancing skills, providing feedback on goal progress • Facilitating support, creating or providing opportunities • Providing incentives • Changing the physical design of the environment • Modifying access to contraceptives and related health services
Duration. How long were they in place?	Intended duration of the change • Onetime event • More than once, but not ongoing • Ongoing
Exposure: Were changes distributed through different sectors of the community? Were target groups reached? In what places were the changes concentrated?	A. Sector where the change took place • Business • Health • Schools/education • Religious • Social services, community and youth • Government/law enforcement • Community • Media • Family and caregiver B. Target of change • Youth • Parents and caregivers • Families • Community leaders • General community C. Location of the community change • Target area or zip code

Some examples of community changes and their resulting codes may help illustrate the measurement system. For instance, one community change involved the local health department increasing accessibility of health services for young people. This change was coded as taking place in the health sector (exposure through sectors), addressing the health services component (intensity), targeting community leaders (exposure to target), addressing the risk factor of contraceptive access (intensity), using the strategy of modifying access (intensity), and was intended to be ongoing (duration). This change also took place in Target Area A (exposure to place). Another community change involved the adoption of human sexuality educational materials for seventh- and eighth-grade classes. This change was coded as taking place in the school sector, addressing the sexuality education component, targeting youth, addressing the knowledge and skills risk factor, using the strategy of providing information, and was intended to be ongoing. This change also reached Target Areas A and B in addition to other zip codes throughout Wichita.

To explore the working hypothesis about the conditions under which community change might be associated with population-level health outcomes, measures of community change were compared to changes in community-level health indicators associated with adolescent pregnancy. Specifically, the birth rate among girls aged 14 to 17 years (number of live births, fetal deaths, divided by the total number of girls aged 14 to 17) was the community-level (or population-level) health indicator used in this analysis. Birth rates (as opposed to pregnancy rates) were used because abortion estimates (included in a pregnancy rate) are not available at the zip code level. The state health department provided the data. Data for the 14- to 17-year-olds were summarized for this analysis because this group was the primary target group for the initiative. Changes in the average annual birth rate from a preintervention period (1991-1993) were compared to an intervention period (1994-1998). Average birth rates across multiple years were computed because annual birth rates can be influenced by random variation and can fluctuate from year to year. A z-statistic was calculated to assess the statistical significance. More detailed descriptions of the analyses are provided elsewhere.[7]

RESULTS

This section describes the distribution of community changes across the dimensions of the working hypothesis—amount, intensity, duration, and exposure. The results are summarized by locale or place of change (Target Areas A and B) along the other dimensions of the hypothesis.

What Was the Amount of Community Change?

The Wichita site accomplished 131 changes (the actual number of changes was 139, but 8 changes were not able to be coded across the dimensions of the working hypothesis due to missing information) during the grant period, an average of 2.9 per month or 41 per year. As shown in Table 2, the majority of the community changes (59%) occurred in Target Area A, with 11% reaching Target Area B and several changes reaching both Target Areas A and B or several other zip code areas (multiple areas). The amount of community change may differ as the initiative evolves over time. For example, more community changes tended to occur during special-events weeks such as Teen Pregnancy Prevention Month, spring break, or holidays to provide activities for young people.

Table 2. An Analysis of the Contribution of Community Changes ($N = 131$) to a Population-Level Health Outcome in Wichita

	Area A		Area B		A and B		Other		Multiple		
	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	Total
Amount of change	59	77	11	14	5	6	15	19	11	15	131
What was the intensity of change?											
Program component											
Community alliances	9	7	7	1	17	1	21	4	20	3	12 16
Sexuality education	19	15	14	2	67	4	21	4	20	3	21 28
Health services	6	5		0		0		0	7	1	5 6
Mass media	1	1		0		0	5	1	33	5	5 7
Peer support	19	15	21	3	17	1	37	7	13	2	21 28
Alternative activities	29	22	29	4		0	5	1		0	21 27
Other	16	12	29	4		0	11	2	7	1	15 19
Risk factors											
Knowledge and skills	43	33	14	2	67	4	42	8	60	9	43 56
Contraceptive access	5	4		0		0		0	7	1	4 5
Unsupervised activities	10	8	14	2		0		0		0	8 10
Life options/opportunities	12	9	14	2		0	11	2		0	10 13
School performance	1	1		0		0		0	7	1	2 2
Peer support	10	8	14	2		0	21	4		0	11 14
Other	18	14	43	6	33	2	26	5	27	4	24 31
Change strategy											
Providing information	39	30	21	3	83	5	42	8	53	8	41 54
Facilitating support	34	26	71	10	17	1	53	10	27	4	39 51
Incentives	13	10	7	1		0	5	1		0	9 12
Physical design	3	2		0		0		0		0	2 2
Modifying access	5	4		0		0		0	7	1	4 5
Other	6	5		0		0		0	13	2	5 7
What was the intended duration of community change?											
One time	28	22	21	3	17	1	37	7	7	1	26 34
More than once	17	13		0	33	2	11	2	40	6	18 23
Ongoing	55	42	79	11	50	3	53	10	53	8	56 74
Other		0		0		0		0		0	0
What was the exposure to community change?											
Sector											
Business	6	5		0		0		0	7	1	5 6
Health	8	6		0		0	5	1	7	1	6 8
Schools/education	36	28	100	14	67	4	16	3	20	3	40 52
Religious	4	3		0		0	5	1	7	1	4 5
Social services/youth	21	16		0		0	42	8	13	2	20 26
Government/law	4	3		0		0	5	1	27	4	6 8
Community	16	12		0	33	2	21	4	13	2	15 20
Media	1	1		0		0		0	7	1	2 2
Family	4	3		0		0	5	1		0	3 4
Other		0		0		0		0		0	0
Target of change											
Youth	43	33	50	7	50	3	32	6	13	2	39 51
Parents	4	3		0		0		0		0	2 3
Families	10	8		0		0	16	3	7	1	9 12
Community leaders	39	30	50	7	50	3	42	8	40	6	41 54
General community	4	3		0		0	11	2	40	6	8 11
Other		0		0		0		0		0	0

NOTE: "Other" refers to other nearby zip code areas and "multiple" refers to zip codes in addition to Target Areas A and/or B.

What Was the Intensity of Community Change?

Community change was also examined by analyzing the distribution of community changes by component, risk factor, and behavior change strategy. These categories were chosen to help reflect the intensity of the community change. That is, were model program components adequately addressed? Were key risk factors targeted? and Were significant behavior change strategies used? Data are described below and shown in Table 2.

Component. Since the site was replicating a model originally tested in South Carolina, we analyzed the distribution of community changes by program component. The model consisted of six main components: community alliances, sexuality education, health services, mass media, peer support and education, and alternative activities and life options.[6,8] Overall, the Wichita site implemented community changes for all model components with some variability in focus across target areas. The community changes tended to primarily address the alternative activities (29%), sexuality education (19%), and peer support (19%) components, with the fewest changes targeting the health services (6%) and mass media (1%) components. The health services component was primarily addressed within Target Area A.

Risk Factor. The risk and/or protective factors used in this analysis were knowledge and skills, contraceptive access, unsupervised activities, life options, school performance, and peer support. The greatest number of community changes addressed knowledge and skills (43% for Wichita overall and 43% for Target Area A). A few changes also addressed life options and opportunities (10%), unsupervised activities (8%), and contraceptive access (4%). Community changes within Target Area A addressed all of the risk factors; community changes in Target Area B addressed several.

Behavior Change Strategy. The behavior change strategies used in this analysis included providing information and skills building, facilitating support (such as creating opportunities to support people or participate in activities, making referrals to services, mentoring or advocacy), providing incentives, changing the physical design of the environment, and modifying access. Target Areas A and B primarily used providing information (39% in Target Area A; 21% in Target Area B) and facilitating support (34% in Target Area A; 71% in Target Area B). Target Area A also used modifying access (5%) and physical design (3%) strategies primarily involving referrals for services and creating a safe haven for young people. Several changes occurring within Target Area A also used the strategy of providing incentives (13%) such as securing reduced rates for youth activities or donated space and refreshments to make youth participation in activities more likely.

What Was the (Intended) Duration of Community Change?

Intended duration was measured using three categories: The event occurred only once (e.g., a 1-day health fair), the event occurred more than once but was not ongoing (e.g., a graduate education course for teachers), and ongoing (e.g., a policy change to extend clinic hours). The majority (56%) of the community changes facilitated by the Wichita site were intended to remain ongoing, whereas 18% were to occur more than once and 26% one time only. These findings were similar for Target Area A. For Target Area B, 79% of the community changes were intended to be ongoing.

What Was the Exposure Through Sectors to Targets and Places?

Data on community changes by sector (i.e., business, health, schools/education, religious, social service/youth organizations, government/law, community, media, family), target (i.e., youth, parents, families, community leaders, general community), and locale (i.e., zip code) were used to examine the exposure to initiative-facilitated community changes. Data for sector and target are described below.

Sector. Forty percent of the community changes took pace in the schools/education sector, with 20% in the social services and youth organizations sector and 15% in the general community sector. Community changes taking place in Target Area A involved all of the sectors. Target Area B had the most limited reach with all of the changes focused on the school sector.

Target of Change. The targets of change were primarily community leaders (41%) and youth (39%). Target Area A also reached parents (4%), families (10%), and the general community (4%).

Link With Population-Level Health Outcomes

To further explore the hypothesis, we tracked the average birth rate for girls aged 14 to 17 years in Wichita target areas for the time periods of preintervention (1991-1993) and intervention (1994-1998). Figure 1 displays changes in birth rates in Wichita Target Areas A and B and respective comparison areas. We found decreases in birth rates in Target Area A and increases in Target Area B. Closer analysis of the annual birth rates also shows a decreasing trend during the intervention period when compared with the preintervention period for Target Area A and not Target Area B. As reported in the section above, the majority of the changes (59%) took place in Target Area A, where the lead agency was housed. The effort was also more comprehensive in terms of attention to program component and risk factor, and distribution by sector and target in Target Area A as opposed to Target Area B. These findings suggest a possible link between improvement in the population-level health outcome of birth rate and the amount, intensity, and exposure to community change by place.

DISCUSSION

This article described an analysis of the contribution of community changes facilitated by a multicomponent school and community initiative for the prevention of adolescent pregnancy to the population-level health outcome of birth rate. This analysis helped to further our understanding about the conditions under which community change may be related to improvement in more distant health outcomes. The amount and attributes of community changes in Target Area A where decreased birth rates were found were different from the community changes in Target Area B where increases in birth rates were found. Positive changes in birth rates were found in the area with the greatest number of community changes and with the most varied distributions of community change across program component, risk factor, behavior change strategy, and sector. These findings

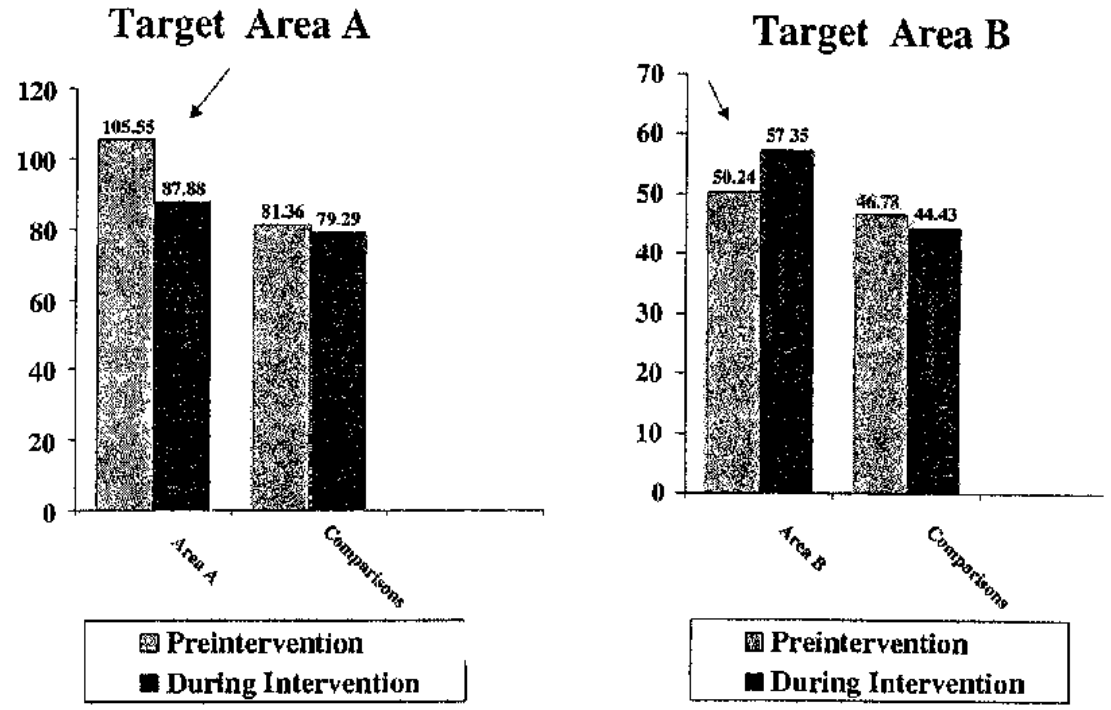

Figure 1. Birth rates for girls aged 14 to 17 years in Wichita Target Areas A and B.
NOTE: The arrows call attention to the changes in birth rates for the two areas. The preintervention period included 1991-1993, and during intervention included 1994-1998.

help inform the conditions in which community change may be associated with improvements in population-level health outcomes.

This analysis of contribution also raises many questions about the link between community change (and multifaceted community interventions) and health outcome. For example, what is the optimal distribution of community change across all the dimensions of this hypothesis? Would a more equally distributed effort across the different categories in a given community result in larger improvements in population-level health outcomes, or is a relatively small amount of very intense community changes enough to facilitate improvements in health outcomes? For example, a few key community changes that address contraceptive access may be all that is needed, whereas ongoing attention is given to sexuality education. Although this analysis helps to address these questions, additional research is needed to further explore the possible link between community change (an intermediate outcome) and (more distant) population-level health outcome.

This analysis also has a number of limitations. First, the primary data of community change are self-reported by site staff. For the secondary analysis of contribution, the specific wording of the community change, and what point in time it was reported, influenced how it was coded. This occurred most often with the target-of-change category. For example, a community change involving approval to implement a modified sexuality curriculum that was reported after meeting with the school board would be coded differently than if it was reported after implementation of the curriculum was taking place. The first entry would be coded as targeting community leaders, whereas the second entry would be coded as targeting youth. Second, although the improvements in birth rates are encouraging, one would not expect large changes in health outcome after only a 4- to 5-year period with approximately 3 years of active implementation. Additional limitations of these data are described elsewhere.[7] Third, since there is a significant lag in time between the imple-

mentation of community interventions (or community changes) and changes in population-level health outcome, it is very difficult to make assumptions about what combinations of changes occurring at a particular time may have contributed to the changes in this population-level health outcome. In addition, single-year birth rates can fluctuate from year to year, making determinations about impact more difficult. Finally, in this case study design, events external to the efforts of the community initiatives may also have contributed to changes in health outcome.

Comprehensive and community-controlled initiatives, such as this school-community effort, might be seen as a complex adaptive system.[14,15] With complex systems, the independent variable (combination of environmental changes) unfolds over time in a dynamic relationship with the local context. In such dynamic contexts, the proper goal is to understand the contribution of local efforts, not the attribution of observed effects to causes (properly beyond the control of outside experimenters).

IMPLICATIONS FOR PRACTICE

A number of recommendations flow from this analysis. First, ongoing information on the contribution of local efforts (e.g., community changes) can reflect the theory of change and categories of interest for initiative partners. For example, information on the distribution of community change by risk and/or protective factors, behavior change strategy, and sectors allows for early and optimal decisions about how staff and volunteers spend their time. Second, future research should analyze the optimal distribution of community changes across these categories of contribution. For example, we might address such questions as how many community changes of each type are needed and how long each change should be in place to most effectively improve population-level health outcomes. Third, because comprehensive approaches are more likely to address complex and multidimensional ("wicked") health concerns such as adolescent pregnancy, community initiatives should consider facilitating community change across the varied dimensions of the working hypothesis outlined in this article. Finally, this approach offers community initiatives a way to develop empirical legitimacy for their efforts by showing a beginning link between the environmental change they facilitate (an intermediate outcome) and improvement in (more distant) population-level health outcomes.

Although there is still a great deal to be learned about the link between intermediate markers and more distant health outcomes, these findings provide an empirical strategy for exploring this relationship. Data in this analysis of contribution may provide funders, community leaders, and support organizations with information about the conditions under which environmental changes may yield population-level health improvement. Such analyses may help us better understand what is necessary and sufficient for the work of public health improvement.

References

1. Fawcett SB, Paine-Andrews A, Francisco VT, Schultz J, Richter KP, Berkley-Patton J, Fisher JL, Lewis RK, Lopez CM, Russos S, Williams E, Harris KJ, Evensen P: Evaluating community initiatives for health and development, in Rootman I, Goodstadt M, Hyndman B, McQueen DV, Potvin L, Springett J, Ziglio E (eds.): *Evaluation in Health Promotion: Principles and Perspectives*. Copenhagen, Denmark, World Health Organization–Europe, 2001.

2. Fawcett SB, Francisco VT, Hyra D, Paine-Andrews A, Schultz J, Russos S, Fisher J, Evensen P: Building healthy communities, in Tarlov AR, St.Peter RF (eds.). *The Society and Population Health Reader: A State and Community Perspective.* New York, New Press, 2000, pp. 75-93.
3. Himmelman AT: *Communities Working Collaboratively for a Change.* Minneapolis, University of Minnesota, Humphrey Institute for Public Affairs, 1992.
4. Kreuter MW, Lezin NA, Young LA: Evaluation community-based collaborative mechanisms: Implications for practitioners. *Health Promotion Practice* 1(1):49-63, 2000.
5. Roussos ST, Fawcett SB: A review of collaborative partnerships as a strategy for improving community health. *Annu Rev Public Health* 21:369-402, 2000.
6. Paine-Andrews A, Vincent ML, Fawcett SB, Campuzano MK, Harris K, Lewis R, Williams E, Fisher J: Replicating a community-based initiative for the prevention of adolescent pregnancy: From South Carolina to Kansas. *Fam Community Health* 19(1):14-30, 1996.
7. Paine-Andrews A, Harris KJ, Fisher JL, Lewis RK, Williams EL, Fawcett SB, Vincent ML: Effects of a replication of a school/community model for preventing adolescent pregnancy in three Kansas communities. *Fam Plann Perspect* 31(4):182-189, 1999.
8. Vincent ML, Clearie A, Schluchter M: Reducing adolescent pregnancy through school and community-based education. *JAMA* 257(24):3382-3386, 1987.
9. Koo H, Dunteman G, George C, Green Y, Vincent M: Reducing adolescent pregnancy through a school and community-based intervention: Denmark, South Carolina, revisited. *Fam Plann Perspect* 26(5):206-211, 1994
10. Francisco VT, Paine AL, Fawcett SB: A methodology for monitoring and evaluating community health coalitions. *Health Educ Research: Theory and Practice* 8(3):403-416, 1993.
11. Fawcett SB, Francisco VT, Paine-Andrews A, Lewis RK, Richter KP, Harris KJ, Williams EL, Berkley JY, Schultz JA, Fisher JL, Lopez CM: *Work Group Evaluation Handbook: Evaluating and Supporting Community Initiatives for Health and Development.* Lawrence, University of Kansas, Work Group on Health Promotion and Community Development, 1994.
12. Lewis RK, Paine-Andrews A, Fisher JL, Custard C, Fleming-Randle M, Fawcett SB: Reducing the risk for adolescent pregnancy: Evaluation of a school/community partnership in a military community. *Fam Community Health* 22(2):16-30, 1999.
13. Fawcett SB, Francisco VT, Schultz JA, Berkowitz B, Wolff TJ, Nagy G: The Community Tool Box: A Web-based resource for building healthier communities. *Public Health Rep* 115:274-278, 2000.
14. Eoyang GH: *Coping With Chaos: Seven Simple Tools.* Cheyenne, WY, Lagumo, 1997.
15. Milstein RL, Wetterhall SF: Framework for program evaluation in public health. *MMWR* 48:1-40, 1991.