

## Applying an intervention framework to assess North Carolina's adolescent pregnancy prevention efforts

By: Christine D. Chambers and [Alice Ma](#).

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### Abstract:

#### Purpose

We assessed the extent to which implementing adolescent pregnancy prevention programs in conjunction with three level implementation strategies reduces adolescent pregnancy rates at the county-level in North Carolina (NC).

#### Methods

Fixsen and colleagues' (2005) three levels of implementation were used to organize the prevention strategies: core (e.g., training, fidelity monitoring), organizational (e.g., administrative support), and external (e.g., community resources).

#### Results

Counties that had adolescent friendly clinic/services (external) were more likely to report lower adolescent pregnancy rates in comparison to counties that did not have access to such services.

#### Conclusions

Findings suggest external implementation strategies are key to reducing adolescent pregnancy rates.

**Keywords:** Adolescent pregnancy | Teen pregnancy prevention | Intervention frameworks

### Article:

## Introduction

There has been a substantial decline in adolescent pregnancy rates in the United States (US) over the past decade [1]. North Carolina (NC) is ranked 20th, out of 50 states [2]. Although the state's adolescent pregnancy rate has decreased by 11% between 2012 and 2013 alone, adolescent pregnancy rates among NC's 100 counties range from 9.6 to 77.6, averaging 56.9 pregnancies per 1000 females aged 15–19 [2]. The average adolescent pregnancy rate for NC is nearly double that of the US rate of 26.5 [1]. Similar to the US, racial and economic disparities are seen among counties in NC with higher adolescent pregnancy rates compared to those with lower rates [1] and [2].

Evidence-based adolescent pregnancy prevention programs have rendered promising results in delaying sexual debut and decreasing adolescent pregnancy [3]. The purpose of this study was to assess the extent to which implementing adolescent pregnancy prevention programs in conjunction with core, organizational, and external implementation strategies reduces adolescent pregnancy rates at the county-level in NC.

## Methods

Data were compiled from 20 stakeholders' (Partners for Adolescent Sexual Health (PASH) of NC) work and involvement with adolescent pregnancy prevention programs and services (e.g., HiTOPS, Inc.<sup>1</sup>) across the 100 counties of NC. PASH of NC met quarterly to review and update data over the course of one-year (i.e., September 2013–2014). Data consisted of adolescent pregnancy prevention strategies being implemented at the local level and each county's five-year adolescent pregnancy rate. This study was limited to 48 counties implementing evidence-based adolescent pregnancy programs. There were 15 adolescent pregnancy prevention programs implemented throughout NC during 2013–2014.<sup>2</sup> All counties were receiving local, state, and/or federal funding for program implementation.

The researchers used Fixsen and colleagues' [4] three levels of implementation to organize the prevention strategies: (1) core implementation strategies include support programming for staff in obtaining high-fidelity behaviors (e.g., training, fidelity monitoring, coaching); (2) organizational implementation strategies provide the infrastructure, credibility, and support for core implementation strategies (e.g., administrative support, program evaluation); and (3) external implementation strategies refer to the context in which programs are implemented and includes economic (e.g., funding priorities), political (e.g., federal and state laws), and social (e.g., community resources) factors. Fixsen and colleagues [4] posit that these three levels of implementation are interconnected where high-fidelity behaviors are achieved when there is a strong core with supportive organizational and external implementation strategies to provide multilevel approaches to address health issues.

## Measures

*Five-year adolescent pregnancy rate.* The average adolescent pregnancy rate for years 2009–2013 for each county in NC.<sup>3</sup> These are the most current adolescent pregnancy rates publicly available and overlap with the time-frame of interventions.

*Adolescent pregnancy prevention programs.* Counties implementing primary and/or secondary adolescent pregnancy prevention program(s).

*Core implementation strategy.* Educator(s) in the county who are trained to implement the evidence-based curriculum, Making Proud Choices (MPC), <sup>4</sup> in addition to other adolescent pregnancy prevention programs.

*Organizational implementation strategies.* (1) Counties whose lesson plans for sexual and reproductive health meet NC's Healthy Youth Act (HYA) requirements and (2) counties that participate in the Working to Institutionalize Sex Education (WISE) project and/or support the Centers for Disease Control and Prevention's (CDC) Division of Adolescent and School Health (DASH) strategies to prevent sexual risk factors among adolescent youth. <sup>5</sup>

*External implementation strategies.* Counties that have a local adolescent pregnancy prevention coalition and provide adolescent friendly clinics/services (community resources) in the area.

*Three level implementation strategies.* “All” were counties implementing at least one strategy from core, organizational and external implementation strategies. “Two” refers to counties that implemented at least one strategy from two of the three levels of implementation strategies. “One” included counties that implemented one strategy. “None” suggest counties were not implementing any strategies.

## **Data analysis**

We calculated descriptive statistics to determine the percentage of counties in NC implementing core, organizational, and external level implementation strategies. Next, we conducted a linear multiple regression analysis to assess the extent to which implementing adolescent pregnancy prevention programs, in conjunction with core, organizational, and external implementation strategies, reduced adolescent pregnancy rates at the county-level. All analyses were performed using IBM SPSS Statistics 22 (Armonk, NY).

## **Results**

All (N = 48) counties were implementing evidence-based adolescent pregnancy prevention programs in NC (see Table 1). The average 5-year adolescent pregnancy rate was 56.9 per 1000 females aged 15–19 (see Table 1). Approximately 44% of the 48 counties trained health educators to implement MPC (core), 33% participated and/or supported WISE or WISE + CDC's DASH (organizational), and 64% of their lesson plans for sexual and reproductive health met HYA's requirements (organizational) (see Table 1). Relatively few counties had local adolescent pregnancy prevention coalitions (14.6%) and adolescent friendly clinic/services (18.8%) (external) (see Table 1). Additionally, only 18.8% of counties were concurrently implementing all three levels of implementation strategies (see Table 1).

**Table 1**

Descriptive statistics for adolescent pregnancy rates and implementation characteristics among counties in North Carolina implementing teen pregnancy prevention programs (N = 48).

	n/mean	Percent/SD
5-Year teen pregnancy rate	56.9	16.9
<i>Core implementation strategy</i>		
Educator(s) trained to implement MPC		
No	27	56.3%
Yes	21	43.8%
<i>Organizational implementation strategies</i>		
WISE or WISE + CDC Division of Adolescent and Health		
No	32	66.7%
Yes	16	33.3%
Lesson plans that meet HYA requirements provided to schools		
No	17	35.4%
Yes	31	64.6%
<i>External implementation strategies</i>		
Local pregnancy prevention coalition		
No	41	85.4%
Yes	7	14.6%
Teen friendly clinic and services		
No	39	81.3%
Yes	9	18.8%
Funding		
No	0	0%
Yes	48	100%
<i>Three-level implementation strategies</i>		
All	9	18.8%
Two	11	22.9%
One	21	43.8%
None	7	14.6%

A significant negative association was found between adolescent pregnancy rates and the availability of local adolescent friendly clinics/services (external) at the county-level ( $\beta = -0.412, p = .003$ ) (see [Table 2](#)). Additionally, a marginally significant positive relationship was found between counties implementing none compared to all three levels of implementation strategies, and adolescent pregnancy rates ( $\beta = 14.956, p = .086$ ) (data not provided).

**Table 2**  
Association between Adolescent pregnancy rates and implementation characteristics among counties in North Carolina implementing teen pregnancy prevention programs (N = 48).

	$\beta$ (95% CI)	SE
<i>Core implementation strategy</i>		
Educator(s) trained to implement MPC	1.18 (-1.19, 11.08)	5.311
<i>Organizational implementation strategies</i>		
WISE or WISE + CDC Division of Adolescent and School Health	3.348 (-1.45, 13.55)	5.243
Lesson plans that meet HYA requirements provided to schools	-1.88 (-11.27, 0.44)	5.28
<i>External implementation strategies</i>		
Local pregnancy prevention coalition	3.997 (-5.20, 16.41)	7.096
Adolescent friendly clinics/services*	-17.607 (-27.25, -5.54)	6.771
Constant***	59.215 (50.96, 60.62)	4.386
<i>Model statistics</i>		
F	1.464	
df	5.42	
Adjusted R <sup>2</sup>	0.085	

\*\*\*p-value < 0.001; \*\*p-value  $\leq$  0.01, \*p-value < 0.05.

B = unstandardized regression coefficient; CI = confidence interval; SE = standard error; MPC = Making Proud Choices Curriculum; WISE = Working to Institutionalize Sex Education project; HYA = NC's Healthy Youth Act.

## Discussion

This study describes both barriers to implementing adolescent pregnancy prevention programs in NC, as well as key factors associated with reducing adolescent pregnancy rates on the county-level.

Only 48 out of 100 counties in NC implemented evidence-based adolescent pregnancy prevention programs. Among the 48 counties, all were receiving local, state, and/or federal funds to implement these programs. Only one external implementation strategy, access to adolescent friendly clinics/services, was associated with program implementation and reducing adolescent pregnancy rates. This indicates that external strategies (i.e., community resources) are important factors in reducing adolescent pregnancy rates. Furthermore, these results suggest there is not an interconnection between the three levels of implementation strategies.

The strengths of this study include the following: data were compiled by key stakeholders in pregnancy prevention, information on multilevel strategies was collected, and inferences were able to be made on the county-level. However, our findings should be evaluated in the geographically-specific context of NC.

Future research should explore whether locating adolescent friendly clinics or services in high-risk communities, or near institutions serving teens (e.g., high schools), impacts adolescent pregnancy rates [5]. Additionally, it would be useful to investigate what factors are associated with counties that implement adolescent pregnancy prevention programs.

## Implications and contributions

Adolescent pregnancy rates are decreasing in the US, due in part to multiple implementation strategies. Findings suggest that external implementation strategies, in conjunction with adolescent pregnancy prevention programs, are key to reducing adolescent pregnancy rates. Funding mechanisms to support external implementation strategies are needed.

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Corresponding author. The Department of Public Health Education, The University of North Carolina, 1408 Walker Avenue, 437 Coleman Building, Greensboro, NC 27412, USA. Tel.: +336 334 5532.

1. HiTOPS, Inc. works in collaboration with two other organizations to implement the Teen Prevention and Education Program (Teen PEP) in North Carolina and New Jersey. Teen PEP is a comprehensive peer-led sexual health education program geared toward increasing adolescents' knowledge, skills, attitudes and behaviors to make healthy, informed-decisions. More information can be found at <http://www.teenpep.org/index.cfm>.

2. Adolescent pregnancy prevention programs being implemented in NC included Be Proud! Be Responsible, Becoming a Responsible Teen, ¡Cuídate!, Draw the Line/Respect the Line, Making Proud Choices, Media Awareness, Reducing the Risk, Safer Choices, Smart Girls, Teen Outreach Program, Teen Prevention Education Program, Wise Guys, Adolescent Parenting Program, Be Proud! Be Responsible! Be Protective!, and Good Beginnings.

3. The average five-year adolescent pregnancy rate was calculated using the following equation: (Number of Births + Number of Abortions + Number of Fetal Deaths)/Population. More information about calculating adolescent pregnancy rates for NC can be found at <http://www.shiftnc.org/data/about-our-data>.

4. The NC School Health Training Center (NCSHTC) recommends that counties implement a curriculum which addresses reducing risk-taking behaviors related to adolescent pregnancy, HIV and STIs. NCSHTC and PASH of NC have identified MPC as an evidence-based sexual health curriculum meeting such standards.

5. WISE and DASH are aligned with NC's HYA of 2009 by supporting counties to work with local school systems to create an environment which provides effective sexual health education. More information on WISE and DASH can be found at <http://www.cdc.gov/healthyouth/about/index.htm>. Information pertaining to NC's HYA of 2009 can be found at <http://www.shiftnc.org/initiatives/working-to-institutionalize-sex-education>.