Arizona Department of Health Services

Abstinence Education Program

Birth Rates Comparison Report

July 2007

Prepared by:
LeCroy & Milligan Associates, Inc.
4911 E. Broadway, Suite 100
(520) 326-5154
FAX (520) 326-5155
www.lecroymilligan.com

Prepared for::
Arizona Department of Health Services
Office of Women's & Children's Health
150 N. 18th Avenue, Suite 320
Phoenix, Arizona 85007

Acknowledgements

The LeCroy & Milligan Associates, Inc. evaluation team included Jenifer K. McGuire, PhD, MPH (primary author) (currently Assistant Professor, Department of Human Development, Washington State University), Patricia A. Canterbury, MPH, Jan Wallace, MSW, Martha Trenna Valado, PhD, and Darcy Richardson, BA.

LeCroy & Milligan Associates, Inc. would like to thank Lisa Schamus and Jennifer Jung of the Arizona Department of Health Services Office of Women's and Children's Health for their invaluable assistance throughout the research and writing phases of this report.

Suggested citation: LeCroy & Milligan Associates, Inc. (2007) *Birth Rates Comparison Report*. LeCroy & Milligan Associates, Inc. Tucson, Arizona.

Table of Contents

Report Highlights 1
Context 1
Major Findings 1
Methodology 2
Recommendations 2
Introduction 3
Health Start – Birth Certificate Comparison Study 4
Methodology 5
Procedures 5
Findings and Implications 6
Abstinence Program – Birth Certificate Match 7
Methodology 7
Procedures 8
Analyses 9
Findings 10
Limitations 12
Interpretation 13
References 15

Report Highlights

Context

- Female participants in Abstinence Only Education during the 2000 and 2001 calendar years were matched to the Arizona State Birth Certificate Registry from 2001-2004 to determine which youths experienced a live birth subsequent to program participation. This report marks the fourth and final execution of this methodology for Abstinence participants from the Title V initiative and should supersede any preliminary findings from prior reports.

Major Findings

- The current study developed a procedure to address a methodological concern of prior birth rate matches using abstinence participant data. Matches using an identical procedure to the birth registry with a sample of women known to give birth yielded an 85% match rate, thus prompting a 15% upward correction to the numbers of abstinence participants matched to birth records. Prior studies on this sample have not included such corrections and those findings should be adjusted prior to interpretation to be consistent with the findings of this report.
- In most cases, the error-adjusted birth rates for abstinence participants were not significantly different from the statewide teen birth rates. Given the large sample size, and error adjusted methodological procedures, this finding can be interpreted to suggest that female individuals who had abstinence only education in 2000 and 2001 were not on average significantly more or less likely to have a live birth in the subsequent four years than other individuals in the sate.
- The notable exception to this trend was a cohort of 12 and 13 year olds who received the program in 2000 and subsequently had higher birth rates than the state in 2002, 2003 and 2004. This difference does not appear to be attributable to the over-representation of Hispanic youth or detention center youth in the abstinence education sample.
- To better understand the impact of educational programs on live births using a methodology of matching to the birth registry, a randomized controlled trial is recommended. If participants are randomly placed in treatment conditions, methodological concerns such as in-migration and out-migration inherent with matching procedures would be eliminated.
- The abstinence participants were found to be similar to enrolled students in Arizona, with the exception of a slight over-representation of Hispanic youth and youth residing in detention centers.
- Given the many forms of error inherent in this sort of study, it is important that findings be interpreted with caution.

Methodology

- Abstinence program participants from 2000-2001 were matched to Arizona birth certificate databases from 2001-2004 to determine which youth had live births in the 3 to 4 years following program exposure.
- The match process was complicated by the quality of data in the sources used for matching, such as penmanship of participants, incomplete data, participant name changes and participant emigration out of state.
- Despite non-random sampling strategies, the external validity and hence generalizability were maximized to the greatest extent possible through reduction of selection bias within defined sub-populations, and comparisons of percent of students within each grade, ethnic group, gender and school who received the program.
- ADHS Health Start data from 2001-2004 were used to assess the accuracy of the match process for abstinence participants. The assessment revealed an average match rate of 85% for Health Start participants when using the abstinence match methodology. This prompted a 15% adjustment to the number of matched abstinence participants in order to compensate for the error rate.

Recommendations

- Projects utilizing similar match techniques should adjust match rates to account for the 15% measurement error.
- To examine potential differences among ethnic groups, future studies should utilize an experimental design that accounts for ethnicity and level of acculturation (e.g. primary spoken language) and the Department of Health Services should publish population estimates and numbers of pregnancies (or pregnancy rates) for each single year of age and racial/ethnic group.

Introduction

The Arizona Department of Health Services (ADHS) began receiving federal funds through Public Law 104-193, Section 510(b) in 1997 to provide sexual abstinence education programs. In May of 1998, ADHS, through its contractors, began delivering abstinence programs throughout Arizona. LeCroy & Milligan Associates, Inc. was contracted to conduct the statewide evaluation for these programs. One goal of the evaluation was to determine if teen birth rates for program participants differed from the Arizona state rate for teen births. The working hypothesis for the birth rate comparisons was that if the participants had lower birth rates than the state, with all reasonable forms of error accounted for, then there would be sufficient evidence to suggest a program effect despite the lack of a formalized experimental design or a randomized selection procedure.

To assess potential birth rate differences, participants from the calendar years 2000-2001 were matched to Arizona birth certificate databases from 2001, 2002, 2003, and 2004 to determine which youth had live births in the 3 to 4 years following program exposure. Preliminary analyses conducted in 2003, using participants from 1998 and 1999, suggested that there may have been lower birth rates among abstinence participants than among teenagers statewide (LeCroy & Milligan Associates, Inc. 2003). Concerns over selection bias of abstinence participants, and potential mismatches due to the matching procedures were not fully addressed by those analyses due to limitations of the study funding. Efforts to better address the non-representative and non-random sample of abstinence education participants were made in the current study.

The methods used to conduct the match in these studies, however, assumed that any participant who did not match to birth certificate data did not have a live birth. The inherent measurement error associated with matching distinct data sets was not taken into account. The primary issues that made this match challenging included the quality of data in the sources used for matching (i.e. participant sign-in sheets and birth certificates) such as poor penmanship of some participants and incomplete data (e.g. missing birth dates), participant use of nick names on sign-in sheets versus legal names on birth certificates (or vice versa), participant name changes, and participant emigration out of state. Significant efforts were made to reduce these forms of error, including asking participants to record their full legal name in several locations that were then compared by evaluation staff, double checking recorded birth dates against reported age on the survey data, and reminding youth not to use a nick name or flip their first and middle names. However, obtaining perfect data is impossible, and although the evaluation team identified most of these

issues as potential problems in conducting the match, many could not be addressed due to a lack of the resources needed to measure the magnitude of the error. Ongoing concerns that the abstinence match methods yielded excessive false negatives led to the decision to conduct a comparison study with a group of women known to have given birth in Arizona, namely women who had been participants in the ADHS-funded Health Start program.

Health Start – Birth Certificate Comparison Study

LeCroy & Milligan Associates, Inc. and ADHS conducted a comparison study with a data set from Health Start participants, who were known to have births, and the same birth certificate data sets using the abstinence match methods. The purpose of the study was to quantify the error due solely to imperfections in the data elements when matching program and birth record datasets. For example, a data error occurred when a student used the name Guadalupe in one database and Lupe in the other.

Through its Health Start program, the Office of Women's and Children's Health at AHDS maintains a database of women known to have given birth in Arizona. The database includes information on demographics and on birth outcomes such as live birth or miscarriage. Using an algorithm that includes demographic data on the mother and the baby, ADHS is able to match 96 percent of mothers in the Health Start database to their babies' birth certificate data. However, applying the abstinence methods to the Health Start databases yielded only 85 percent of the mothers known to have given birth.

Methods for recording names in the Health Start program and the Abstinence programs were not completely identical. In Health Start, the lay health worker solicits the name and birth date from the mother. The mother verbally provides her name and birth date and the lay health worker writes it on the form. The form is then sent to the Arizona Department of Health Services office where data entry staff input the name into the health start database. In the Abstinence program, participants are asked to record their full legal name and birth date in five locations over time (pretest assent, post test assent, attendance and consent forms, and initials and birth date on the survey itself). An evaluation staff person reviews all recording of a name side by side to ensure that the name and date are recorded properly in the data base. The procedures for the abstinence evaluation provided a more stringent reliability check to ensure the accurate recording of the names and birth date; however, it may be argued that, given the younger age of the abstinence participants, the information they provided was less reliable than the information obtained from Health Start. The likely end result is that the health Start data provide a reasonable or conservative estimate of the quality of the Abstinence data.

Methodology

Data

Health Start data from years 2001-2004, which corresponds to birth certificate data targeted for the abstinence matches, were examined. Individuals in Health Start who had more than one child in a year, or who had twins, were included only once per year in order to be consistent with the abstinence data. Processes for the abstinence data eliminated duplicate matches because it was not possible to determine which participants had multiple births or twins, and participants who received the program more than once were eliminated as duplicates. The final numbers of non-duplicated participants per year from Health Start are presented in Table 1. Birth certificate data for 2001-2004 were obtained from ADHS. All available database members were included in each match.

Table 1. Health Start Sample Sizes

Year	Sample Size
2001	1,134
2002	1,007
2003	752
2004	808

Procedures

Variables

The following Health Start variables were used: mother first and last name, and date of birth. Only the variables available in both the Health Start and abstinence data were used for the match in order to yield rates that were as comparable as possible. A variable for matching was created by truncating to the first letter of the first and last name, i.e. their first and last initials.

The following birth certificate variables were used: mother first, last, and middle names, mother maiden name, and date of birth. Two variables were created for matching: 1. first and last initial (truncated from the first letter of the first and last name) and 2. first and maiden name initial (truncated from the first letter of the first and maiden name).

Process

Six passes to match the data were conducted for each year of Health Start (HS) data.

1. Birth date and first and last initial from HS and birth certificate (BC)
2. Birth date and first and maiden initial from BC; Birth date and first and last initial from HS
3. First name and last name from HS and BC
4. First name and maiden name from BC; First name and last name from HS
5. Birth date and last name from HS and BC
6. Birth date and maiden name from BC; Birth date and last name from HS

After each pass, names were hand checked to confirm or eliminate apparent matches. Close matches were coded as matches, and questionable but likely matches were coded as questionable. A final number of definite matches and a second number of definite plus questionable matches were computed.

Findings and Implications

The number of definite and questionable matches found, together with the percentage of participants for each year, are presented in Table 2.

It is known that each of the participants in the Health Start program had a live birth in Arizona during the respective program year. Thus, if there were no methodological or reporting errors, 100 percent of Health Start participants would match to a birth certificate using the available variables. However, the average match rate was 85 percent for this group, indicating substantial methodological and reporting/recording bias in the names and birth dates of participants in the Health Start data and/or on the birth certificates. Therefore, projects utilizing this technique should adjust match rates to account for this 15 percent bias. If we assume that younger participants would be more likely to misspell a name, use a nickname, or give an incorrect birth date, then the adjustment of 15 percent provides a conservative estimate of the likely error among abstinence participants. The 15 percent adjustment was applied to the number of matched abstinence participants for all ages.

Table 2. Health Start Birth Match Rates Using Abstinence Match Rate Methods

Year	# of Participants	Definite Matches		Questionable Matches	
		Number	% of Participants[a]	Number	% of Participants[b]
2001	1,134	968	85.4	7	86.0
2002	1,007	854	84.8	5	85.3
2003	752	650	86.4	4	87.0
2004	808	680	84.2	8	85.1

[a] Calculated by dividing number of definite matches by number of participants (e.g. 968/1134)

[b] Calculated by dividing number of definite *and* questionable matches by number of participants (e.g. 968+7/1134)

Abstinence Program – Birth Certificate Match

Methodology

Participants

The current analyses included two years of data collected from participants in the abstinence programs during 2000 and 2001. Data from the state birth certificate registry from 2001 through 2004 were matched to the data from the abstinence participants. For participants in 2000, birth data from all four years were included. For participants in 2001, only data for 2002 through 2004 were included, as births in 2001 would likely have been conceived prior to program participation. Birth rate comparisons were made for participants who were 18 or younger at the time of giving birth.

Participants provided active parental consent and subject assent prior to participation in the program, evaluation and birth match. A small proportion of schools allowed passive parental consent (about 6% of total participants). Participants could opt out of the birth match or survey while participating in the program by not checking the box indicating consent for those two elements of the program evaluation. If a participant opted out, their name was never forwarded to the evaluation team and was blacked out of all attendance records. Few participants (estimated much less than 5%) opted out of the birth match or evaluation. One entire school district opted out of the birth match as a district and were not included in the following analyses.

The abstinence programs served a higher proportion of youth from detention centers and Hispanic youth than occurred in the statewide population of the same age range (Table 3). To mitigate possible bias in the sample, rates among Hispanics were calculated for abstinence participants and compared to state rates among Hispanics of the same age. Additionally, percentages of youth in the sample and

among the matched participants (those who had births) who were in detention facilities were compared to assess whether detention youth accounted for a larger proportion of the matched teens than the sample as a whole. Birth rates specific to teens in detention were not available.

Table 3. Hispanic and Detention Participants

	Participants in 2000	Participants in 2001	State Average for Females
In detention	4.3%	3.9%	1.7%
Hispanic	47%	46%	32%

Procedures

Variables

The following abstinence data variables were used: participants' first, middle and last names and dates of birth. Ethnicity and city of residence were used when needed to confirm questionable matches. A variable for matching was created from the first and last initial and birth date by truncating the first letter of the first and last name. For individuals who were recorded in the abstinence data more than once (i.e. who received the program multiple times in one year), only one record per individual was retained for analyses.

The following variables from the birth certificate data were used: mother's first, middle, and last name, mother's maiden name, and mother's date of birth. A variable for matching was created from the first and last initial by truncating the first letter of the first and last name. A variable for first and maiden name initial was also created from truncating the first letter of the first and maiden name. Ethnicity and city of residence were used when needed to confirm questionable matches.

Process

Six passes to match the data were conducted for each year of abstinence data.

1. Birth date and first and last initial from abstinence and birth certificate
2. Birth date and first and maiden initial from birth certificate; Birth date and first and last initial from abstinence
3. First name and last name from abstinence and birth certificates
4. First name and maiden name from birth certificates; First name and last name from abstinence
5. Birth date and last name from abstinence and birth certificates
6. Birth date and maiden name from birth certificates; Birth date and last name from abstinence

After each pass, names were hand checked to confirm or eliminate apparent matches. Close matches were coded as matches, and questionable but likely matches were coded as questionable. A final number of definite matches, and a second number of definite plus questionable matches, were computed. Only definite matches are included in the tables below.

The mother's age at the child's birth was computed by subtracting the birth date of the child from the birth date of the mother. To determine the number of participants of each age, mothers' birth years were split from June 30th of one year to June 29th of the next year. This process most closely matches the state calculations that use mother's age at the child's birth and age of the population at the time of census collections that occurred in the spring of 2000.

Analyses

The formulas presented in Table 4 were used to compare the birth rates of abstinence participants to the teen birth rates for the state. To be included in the analyses, age-level groups had to include at least 1,000 people. This ensured that a single birth did not affect the rate by more than one point. This statistical methodology was adopted as the best way to compare actual rates from a sample to the population it represents (Pennsylvania Department of Health, 2007).

Table 4. Formulas Used to Compare Abstinence Participants Birth Rates & State Teen Birth Rates

Comparison of Crude Rates Based on 10 to 99 Births per Age-Year
A modified χ^2 statistic **(μ)** was utilized to determine if the rate among abstinence participants was different than would be expected based on the rate for the state in that age group. Because the numbers of births are smaller in some age groups, the modified χ^2 allows corrections to account for the unequal cell counts in the data. The test statistic is: $\mu = (o - e) \div \sqrt{e}$ where: **o** = the actual number of births for abstinence program participants **e** = the expected number of births for abstinence program participants (calculated by multiplying the number of abstinence program participants, **n,** with the state crude birth rate) If $\lvert\mu\rvert > 1.96$, then there is a statistically significant difference between the birth rates of abstinence program participants and the statewide teen birth rates.

Table 4. Formulas Used to Compare Abstinence Participants Birth Rates & State Teen Birth Rates (continued)

Comparison of Crude Rates Based on ≥ 100 Births per Age-Year
With larger cell sizes, a rate comparison is appropriate between abstinence participants and the state. The larger cell sizes mean that corrections for non-representativeness of the sample are not necessary. Abstinence participants were not randomly sampled from the state, but prior analyses have shown the sample to be reasonably representative of the state's teenagers. Controls were attempted to correct for known forms of selection bias. The test statistic is: $\mu = (b - a) \div \sqrt{(n/(a - a^2))}$ where: **b** = rate of births per person for abstinence program participants (crude rate ÷ 1000) **a** = rate of births per person for the state (crude rate ÷ 1000) **n** = number of abstinence program participants If $\lvert\mu\rvert > 1.96$, then there is a statistically significant difference between the birth rates of abstinence program participants and the statewide teen birth rates.

Findings

Tables 5 and 6 below provide comparisons of abstinence participants' birth rates with statewide teen birth rates. Abstinence rates were adjusted upwards by 15 percent based on findings from the Health Start comparison study discussed earlier in this report. In most cases, the error-adjusted birth rates for abstinence participants were not significantly different from the statewide teen birth rates.

The notable exception is a cohort of 12 and 13 year olds who received the program in 2000 and subsequently had higher birth rates than the state in 2002, 2003 and 2004 (see shaded portion of Table 5). Data from this cohort was examined to determine if known selection biases such as over-representation of Hispanic or detention center youth could account for the trend. First, ethnicity was examined and determined not to be a factor. Hispanics accounted for 46 percent of this cohort, which was much higher than the state percentage but similar to the larger abstinence population and therefore would not explain a difference across the two years.

Second, being in detention facilities at the time of the program was ruled out as a primary factor in the increased birth rates for this cohort. Overall, the percentage of 2000 participants in detention facilities was only slightly higher than the cohort that received programming in 2001 (see Table 3). Therefore, the likelihood of being in a detention center and being among the group of youth who had higher births was similar in 2000 and 2001. For the 2000 cohort, 3.1 percent of youth born in fiscal year 1987 and 1.5 percent of youth born in fiscal year 1988 were in detention facilities, which is similar to the 2001 cohort.

Table 5. Comparison of Birth Rates for Abstinence Participants Who Received Program in 2000 & Teen Birth Rates from 2001 to 2004

	2001				2002				2003				2004			
	ABR[a]		SBR[b]		ABR[a]		SBR[b]		ABR[a]		SBR[b]		ABR[a]		SBR[b]	
Age	#	Rate	Rate	CS[c]	#	Rate	Rate	CS[c]	#	Rate	Rate	CS[c]	#	Rate	Rate	CS[c]
17	881	57.40	58.3	-0.11	1418	49.76	56.3	-1.04	1951	75.95	57.7	3.46 *	1886	90.41	66.4	6.16 *
16	1418	34.00	38.3	-0.83	1951	43.40	36.7	1.54	1886	47.39	35.1	2.85 *	1810	51.98	42.1	3.58 *
15	1951	17.48	17.0	0.16	1886	24.94	13.6	4.22 *	1810	23.39	15.2	2.83 *	1179	19.95	17.6	1.66
14	1886	5.61	4.5	0.72	1810	8.45	4.6	2.41 *	1179	15.96	4.6	5.75 *				
13	1810	0.65	0.75	-0.16	1179	1.00	0.57	0.61								
12	1179	----	0.08	----												

[a] ABR = Abstinence participants' birth rate
[b] SBR = State teen birth rate
[c] CS = Comparison significance
* Statistically significant at $p \leq .05$

Table 6. Comparison of Birth Rates for Abstinence Participants Who Received Program in 2001 & Teen Birth Rates from 2002 to 2004

	2002				2003				2004			
	ABR[a]		SBR[b]		ABR[a]		SBR[b]		ABR[a]		SBR[b]	
Age	#	Rate	Rate	CS[c]	#	Rate	Rate	CS[c]	#	Rate	Rate	CS[c]
17	1113	71.85	56.3	-0.93	1939	49.13	57.7	-1.57	2253	52.72	57.4	-0.96
16	1939	9.70	36.7	1.04	2253	36.02	35.1	0.23	2551	36.88	36.0	0.23
15	2253	5.22	13.6	-2.14 *	2551	19.82	15.2	1.89	2125	11.07	14.2	-1.21
14	2551	0.46	4.6	0.01	2125	6.09	4.6	1.01	1384	3.40	3.8	-0.24
13	2125	0.55	0.57	-0.03	1384	----	0.67	0.26				

[a] ABR = Abstinence participants' birth rate
[b] SBR = State teen birth rate
[c] CS = Comparison significance
* Statistically significant at $p \leq .05$

To determine if detention youth disproportionately accounted for the increased births, the percentages from each age group that had a birth in 2002, 2003 or 2004 were calculated. In all but one case, the percentage of births within that age group who were in detention facilities was similar to or smaller than the percentage of detention youth in the initial population of abstinence participants. Given these two indicators, it is unlikely that a temporary increase in detention youth would explain the higher births in this cohort.

Limitations

The most significant limitation of this study exists in the design of the initial sample. The data from the abstinence programs was not from a random sample. That is, parents and youth "chose" to be in the program. Program contractors selected which schools to target, and the schools made the choice whether or not to participate. Therefore, selection bias is prevalent throughout.

Despite non-random sampling strategies, the external validity and hence generalizability were maximized to the greatest extent possible through reduction of selection bias within defined sub-populations, and comparisons of percent of students within each grade, ethnic group, gender and school who received the program. First, programs were offered in schools in such a way as to make participation and informed consent as unobtrusive as possible. For instance in many schools permission slips were included in the initial packet for the school year so that an extra paper didn't need to be sent home for signatures at the time of the program. Second, analyses were conducted to determine the similarity of the sample to the state of Arizona by matching school data for each school in the study to reported numbers from the department of education for numbers of male and female students by ethnicity within each grade, and percent of students receiving free lunch (Adam, et al. 2004). Those findings indicated that the abstinence sample was reasonably similar to enrolled students in the state with the exception of a slight over-representation of Hispanic and detention center youth. Efforts to account for the over-representation of Hispanic youth were made by calculating ethnicity-standardized rates. However, given the measurement error of 15%, the other forms of selection bias and the small cell sizes of births when ethnicity and age are separated out, it was impossible to generate reliable estimates. The substantial limitation created by the non-randomized sample cannot be overemphasized, because randomization is particularly important when comparisons to population level rates are involved.

Finally a limitation exists due to the rapidly growing population in Arizona from 2000-2005. In Arizona, individuals migrate into the state more quickly than they migrate out of the state yielding a net increase in the population each year. If population estimates do a good job of accounting for in migration, then in migration

is not too much of a concern. However, if more young women are moving into the state then are accounted for in population estimates, this will increase the state birth rate because they will not be in the denominator, but will be in the numerator. This is more of a concern as you move away from the decennial census. In terms of out-migration, women who have taken the program move out of state and give birth elsewhere will not be counted in the abstinence participant birth rate. Both of these potentially create a situation where the abstinence birth rates erroneously appear lower than the state birth rate.

Interpretation

An identical match using a sample of women known to have given birth yielded only an 85% match rate indicating that 15% of participants will be unlikely to match to the birth certificates due to methodological errors inherent in this type of study (incorrect recording of name or birth date, poor transcription of hand-written data, etc.). Findings were adjusted 15% to account for this error. Once adjusted, there were not differences in birth rates between abstinence participants and the rest of the state.

Given the many forms of error inherent in this sort of study, it is important that findings be interpreted with caution. The first major "finding" when examining the data, is that overall, there appear to be few if any differences between abstinence participants and other youth in the state with regards to likelihood of a live birth. The few cells that are statistically significant are mostly in the direction indicating higher rates among participants. However, with a closer examination, we create significant doubt in this finding as an indicator of program effect.

A second consideration, which is not so much a finding as a direction for future studies, has to do with the ethnic distribution of the sample and state. While our initial analyses suggested there may be different rate variation within Hispanic and white youth in the sample, it was impossible to do ethnicity specific rate comparisons while controlling for age on this sample. To examine potential differences among ethnic groups, future studies should utilize an experimental design that accounts for ethnicity and level of acculturation (e.g. primary spoken language) and the Department of Health Services should publish population estimates and numbers of pregnancies (or pregnancy rates) for each single year of age and racial/ethnic group.

To better understand the impact of educational programs on live births using a methodology of matching to the birth registry, a randomized controlled trial is recommended. If participants are randomly placed in treatment conditions, methodological concerns such as in-migration and out-migration inherent with matching procedures would be eliminated.

Finally, the experiences of those individuals in the abstinence sample varied considerably and, overall, may not have been very different from other individuals in the state in terms of sexuality education exposure. Most of the youth in this sample received sex education prior to participation in the abstinence program and may have received other sexual education in the years following the program. In addition, youth in the state who were not in the current sample may have received abstinence education via another provider or funding stream. Thus, it is difficult to assess program effects given that the comparison population may have received similar abstinence education. Additionally, youth in the abstinence programs received a broad range of curricula with many variations on content, approach and tone. In these analyses, no attempts were made to link content of the program received to likelihood of a later live birth.

References

Adam, M. B., McGuire, J. K., Walsh, M., Basta, J. & LeCroy, C. W. (2005) Acculturation as a Predictor of the Onset of Sexual Intercourse among Hispanic Teens and White Teens. *Archives of Pediatric and Adolescent Medicine,* 159:261-265.

Arizona Department of Health Services (2001) Table 1A-7: Pregnancy rates and number of live births, fetal deaths and abortions to teens by individual age, 2001. Accessed April 13, 2007 http://www.azdhs.gov/plan/report/ahs/ahs2001/pdf/015.pdf

Arizona Department of Health Services (2002) Table 1A-7: Pregnancy rates and number of live births, fetal deaths and abortions to teens by individual age, 2002. Accessed April 13, 2007 http://www.azdhs.gov/plan/report/ahs/ahs2002/pdf/015.pdf

Arizona Department of Health Services (2003) Table 1A-7: Pregnancy rates and number of live births, fetal deaths and abortions to teens by individual age, 2003. Accessed April 13, 2007 http://www.azdhs.gov/plan/report/ahs/ahs2003/pdf/015.pdf

Arizona Department of Health Services (2004) Table 1A-7: Pregnancy rates and number of live births, fetal deaths and abortions to teens by individual age, 2004. Accessed April 13, 2007 http://www.azdhs.gov/plan/report/ahs/ahs2004/t1a.htm

Arizona Supreme Court (2002) Juveniles processed in the Arizona Court System FY02. Arizona Supreme Court, Administrative Office of the Courts, Juvenile Justice Services Division.

LeCroy & Milligan Associates, Inc. (June 2003). *The Final Arizona Abstinence Only Education Program Evaluation Report (1998-2003).* Tucson, AZ.

Pennsylvania Department of Health (2007) Comparing Rates and Percentages: Testing for significant differences. Health Statistics – Technical Assistance: Small Area Analyses. Accessed January 9, 2007 http://www.health.state.pa.us/hpa/stats/techassist/flow1b.htm