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**Risk Profile for Pregnancy in Adolescent Patients in the Blackstone Valley**

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**Background:** Adolescent pregnancy, while declining steadily over the last decade, continues to be an important issue for primary care providers. The 2005 national teen birth rate<sup>1</sup> was 40.4/1000<sup>2</sup>, while in Massachusetts it was 21.7/1000<sup>3</sup>. In 2002 the Milford teen birth rate was 27.7/1000<sup>4</sup>. Over 80% of adolescent pregnancies are unintended<sup>5</sup>, and present increased risk of morbidity and mortality to mother and child, including low birth weight, intra-uterine growth retardation, pre-term birth, peri-natal complications, and infant mortality<sup>6</sup>. Adolescent pregnancy is also associated with significant negative social outcomes. Adolescent mothers are less likely than their peers to receive a high school diploma, and are more likely to live in poverty and receive public assistance<sup>7</sup>. A child born to an adolescent mother is more likely to have health problems, developmental delays, and academic difficulties, as well as live in poverty and have a child in their teens<sup>8</sup>. Many risk factors are thought to contribute to adolescent pregnancy, including risk-taking social behaviors (alcohol, drugs, tobacco)<sup>9</sup>; risk-taking sexual behaviors (early intercourse, multiple partners, lower birth control use)<sup>10</sup>; poor academic performance<sup>11</sup>; poverty<sup>12</sup>; lower family connectedness<sup>13,14</sup>; having a parent, sibling, or friend who was a teen parent<sup>15,16,17</sup>; physical and/or sexual abuse<sup>18,19</sup>; and early psychiatric diagnosis<sup>20</sup>. Given the high teen birth rate in Milford, MA, we were curious about the particular factors in the greater Blackstone Valley community that may be contributing to the elevated teen birth rate statistic there.

**Objectives:** This study sought to identify medical and social factors associated with the outcome of adolescent pregnancy in the Blackstone Valley. In determining the risk factors that are associated with Blackstone Valley teens becoming pregnant, we expect to identify further areas of study that may lead to more effective strategies for adolescent pregnancy prevention in this community.

**Methods:** A retrospective review of patients who became pregnant during the course of their care at the Center for Adolescent Health (CAH), an outpatient primary care clinic for adolescents at Milford Hospital, was conducted. Patients with birth dates prior to 1/1/80, patients who became pregnant after 12/31/06, or patients whose residence is located outside of the Blackstone Valley as noted by zip code, were excluded from the study. A control group was randomly selected from the CAH adolescent women patient population, matching for age and zip code. A chart review was conducted to evaluate 35 factors in the patients' medical and social histories. Information was collected on the patient's age, psychiatric diagnoses, family structure, age of mother's first pregnancy, high school attended, graduation from high school, school performance, work, religion, substance use, age of menarche, age of first intercourse, birth control use, STD diagnoses, and domestic violence history. The data was collected in an Access database, and

patients were assigned a random identifier for confidentiality purposes. Descriptive and multivariate analyses were conducted using SPSS statistical software. A p value of < 0.05 was used to identify relationships deemed to be statistically significant.

**Results:** Sixty-eight patients became pregnant at least once during their care at the CAH. All 68 patients (100%) were included as cases in the study, and 68 controls were selected. A total of 136 patient charts were reviewed. The average age of the study participants as of 12/31/06 was 21.2 years. The average age of pregnancy for the case group was 18.5 years. Statistical differences were found between the pregnant and non-pregnant group for the following factors: positive psychiatric history ( $p=0.028$ ), diagnosis of depression ( $p=0.017$ ), diagnosis of bipolar disorder ( $p=0.029$ ); family structure ( $p=0.032$ ), tobacco use ( $p<0.001$ ), any drug use ( $p=0.015$ ), cocaine use ( $p=0.016$ ), and positive domestic violence history (ie. rape, sexual abuse, or physical abuse) ( $p=0.009$ ). No statistical differences between the two groups existed with regard to the number of psychiatric diagnoses, diagnosis of anxiety, ADD/ADHD, suicide attempts, suicidal ideation, self-harming behaviors (ie. cutting), diagnosis of substance abuse, eating disorders, alcohol use, marijuana use, positive STD diagnosis, age of menarche, number of birth control methods attempted, use of condoms, use of oral contraceptives, and use of Plan B. Insufficient data could be collected on several factors including high school graduation, school performance, age of mother's first pregnancy, work, religion, age of first intercourse, and number of lifetime partners, and were thus excluded from the analysis. Patients who became pregnant during their adolescence were more likely to have at least one psychiatric diagnosis (OR 2.275, CI 95%, 1.086-4.767), be diagnosed with depression (OR 2.640, CI 95%, 1.337-5.212) or bipolar disorder (OR 7.689, CI 95%, 0.919-64.298), grow up in a household of divorce or separation (OR 2.170, CI 95%, 1.064-4.440), use tobacco (OR=6.667, CI 95%, 3.030-14.669), use drugs (OR=2.540, CI 95%, 1.185-5.445), particularly cocaine (OR=8.933, CI 95%, 1.085-73.525), and experience some form of domestic violence during their adolescence (OR=6.368, CI 95%, 1.355-29.937).

**Discussion:** Our study was limited by a small patient population, which may have underpowered any potential association between medical and social history factors and pregnancy status outcomes. An attempt was made to reduce selection bias by matching cases and controls by age and zip code. All participants were patients of the Center for Adolescent Health throughout their adolescence. The data was collected from a record review, and it is possible that several biases occurred due to the subjective nature of record interpretation. It is possible that several data point may have been underreported given that the data may not have been recorded in the chart, the data may have been recorded in a different manner depending on provider type, or the data may have been present and may have been missed at the time of review. The source of our patient population, a community hospital based outpatient clinic that serves over 25 suburban communities, and the relative homogeneity of the population in terms of age, race, education, socioeconomic level, and providers, do not allow us to make these study results generalizable for all adolescents. However, this study provides important descriptive data regarding some of the risk factors for adolescent pregnancy in the Blackstone Valley community.

**Conclusions:** Our study found significant differences between the pregnant and non-pregnant study populations at the Center for Adolescent Health with regard to certain medical and social history factors, including psychiatric history, depression, bipolar disorder, divorced/separated family structure, tobacco use, any drug use, cocaine use, and domestic violence. Particularly with regard to domestic violence, we suspect that it may be underreported in both the pregnant and non-pregnant groups, and requires further investigation to explore the incidence, type, and timing of adolescence violence exposure. In the future it would also be beneficial to examine the data that was incomplete in the CAH charts (high school graduation, school performance, mother's age of first pregnancy, work, religion, age of first intercourse, and number lifetime partners) in order to develop a more complete understanding of the risk factors for adolescent pregnancy in the Blackstone Valley community.

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<sup>1</sup> *Teen birth rate is defined for girls ages 15-19.*

<sup>2</sup> Hamilton BE, Martin JA, Ventura SJ, et al. Births: Preliminary Data for 2005. National Vital Statistics Report. 2006. 55(11).

<sup>3</sup> West JK, Hood MO, Caceres I, et al. Massachusetts Births 2005. Massachusetts Department of Public Health. 2007.

<sup>4</sup> MetroWest Health Data Book 2005.

<sup>5</sup> Abma JC, Martinez GM, Mosher WD, et al. Teenagers in the United States: Sexual activity, contraceptive use, and childbearing, 2002. National Center for Health Statistics. Vital and Health Statistics 2004. 23(24).

<sup>6</sup> Gilbert WM, Jandial D, Field NT, et al. Birth outcomes in teenage pregnancies. Journal of Maternal Fetal Medicine. 2004. 16:265-70.

<sup>7</sup> Maynard RA, ed. Kids having kids: Economic costs and social consequences of teen pregnancy. Urban Institute Press, Washington, DC. 1997.

<sup>8</sup> Klein JD, et al. Adolescent Pregnancy: Current trends and issues. Pediatrics. 2005. 116: 281-286.

<sup>9</sup> Kirby D. Emerging answers: Research findings on programs to reduce teen pregnancy (Summary). Washington DC. National Campaign to Prevent Teen Pregnancy. 2001.

<sup>10</sup> Kirby D. 2001.

<sup>11</sup> Kirby D. 2001.

<sup>12</sup> Kirby D. 2001.

<sup>13</sup> Sieving RE, McNeely CS, and Blum RW. Maternal expectations, mother-child connectedness, and adolescent sexual debut. Archives of Pediatric and Adolescent Medicine. 2000. 154: 809-816.

<sup>14</sup> Dittus P and Jaccard J. Adolescents' perceptions of maternal disapproval of sex: Relationship to sexual outcomes. Journal of Adolescent Health. 2000. 26(4):268-278.

<sup>15</sup> Bearman PS and Bruckner H. Power in numbers: Peer effects on adolescent girls' sexual debut and pregnancy. Washington DC. National Campaign to Prevent Teen Pregnancy. 1999.

<sup>16</sup> East PL. The younger sisters of childbearing adolescents: Their attitudes, expectations, and behaviors. Child Development. 1996. 67:267-282.

<sup>17</sup> Holden GW, Nelson PV, et al. Cognitive, psychosocial, and reported sexual behavior differences between pregnant and non-pregnant adolescents. Adolescence. 1993. 28:557-572.

<sup>18</sup> Smith CA. The link between childhood maltreatment and teenage pregnancy. Social Work Research. 1996. 20:131-141.

<sup>19</sup> Hillis, SD, Anda RF, et al. The association between adverse childhood experiences and adolescent pregnancy, long-term psychosocial consequences, and fetal death. Pediatrics. 2004. 113(2):320-327.

<sup>20</sup> Kessler RC, Berglund PA, et al. Social consequences of psychiatric disorders, II: Teenage parenthood. American Journal of Psychiatry. 1997. 154(10):1405-1411.