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## Examining the Role of the Pediatric Emergency Department in Reducing Unintended Adolescent Pregnancy

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### Abstract

**Objectives**—To determine pregnancy risk and receptiveness to emergency department (ED)-based pregnancy prevention interventions among adolescents accessing care in the ED.

**Study design**—Cross-sectional electronic survey of adolescent females in a pediatric ED used to calculate the pregnancy risk index (PRI), a validated measure estimating the annual risk of becoming pregnant based upon recent sexual activity, contraceptive method(s), and method-specific contraceptive failure rates) and interest in receipt of ED-based contraceptive services.

**Results**—Of 229 participants, 219 were non-pregnant, and 129 reported sexual experience. 72.4% (n=166) endorsed negative pregnancy intentions. The overall PRI for the 219 non-pregnant participants was 9.6 (95% CI 6.8, 12.4), and was 17.5 (95% CI 12.8, 22.2) for the 129 sexually experienced participants. A PRI above the national average of 5 was associated with older age (aOR 3.0; 95% CI 1.5, 5.85), non-private insurance (aOR 7.1; 95% CI 1.6, 32.1), prior pregnancy (aOR 2.7; 95% CI 1.2, 6.0), and chief complaint potentially related to a reproductive health concern (aOR 2.6; 95% CI 1.4, 5.1). 85.1% (n=194) believed that the ED should provide information about pregnancy prevention, the majority of whom (64.9%; n=148) believed that pregnancy prevention services should be offered at all ED visits.

**Conclusion**—This study demonstrates a high unintended pregnancy risk among adolescents accessing care in the ED. Adolescents report interest in receiving pregnancy prevention information and services in the ED, regardless of reason for visit. Strategies to successfully incorporate the provision of reproductive health services into ED care should be explored.

Approximately 615,000 adolescents become pregnant in the US annually, translating to a national pregnancy rate of 5.9 per 100 adolescent women.<sup>1</sup> More than 75% of adolescent

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pregnancies are unintended,<sup>2</sup> and 84% of sexually active adolescent women report that they would be upset if they became pregnant.<sup>3</sup> However, only one-third of adolescent women report the use of condoms at last sex and only 20% report use of dual method (eg, condom and hormonal contraceptive or intrauterine device) at last sex.<sup>4</sup> Low uptake of contraceptive use may, in part, be explained by limited use of preventive care services by adolescents. More than one-third of adolescents report no source of primary care<sup>5-8</sup> and less than one-third have received contraceptive counseling.<sup>9</sup>

The emergency department (ED) may serve as a strategic venue for pregnancy prevention. EDs are a key point of access to care for many adolescents, who account for 16% of the 130 million ED visits made annually.<sup>10-13</sup> Furthermore, adolescents seeking care in the ED are more likely to engage in high risk sexual behaviors compared with those who access primary care services.<sup>7, 14</sup> A prior study conducted in New York City noted adolescents seeking care in the ED to be at high risk for pregnancy.<sup>15</sup> Furthermore, previous studies suggest that adolescents may be receptive to ED-based pregnancy prevention interventions.<sup>15-19</sup> The goal of this study was to validate the previous finding of high pregnancy risk in an adolescent ED population and to characterize associated risk factors. A secondary objective was to assess receptiveness to ED-based contraceptive care services. We hypothesized that adolescents seeking care in the ED would be at higher risk for pregnancy than a nationally representative sample of adolescent females.

## Methods

We conducted a cross-sectional survey using a computerized web-based questionnaire with a convenience sample of female adolescents aged 14–21 who presented to an urban tertiary care pediatric ED (annual volume 90,000 visits, with approximately 10% by adolescent females) from May 2015 to November 2015. This study was approved by our institution's Institutional Review Board (IRB) with a waiver of parental consent for participation. All study subjects provided verbal informed consent prior to participation.

We developed our questionnaire by adapting survey items from previously validated surveys, including the Youth Risk Behavior Surveillance System,<sup>20</sup> Child and Adolescent Health Measurement Initiative's Young Adult Health Care Survey,<sup>21</sup> and National Survey of Family Growth.<sup>22</sup> Once developed, we then performed cognitive interviews<sup>23</sup> with 5 adolescent patients in the ED to pilot test the questionnaire for understanding and acceptability. All items were assessed as acceptable and understandable in pilot testing, requiring no further modifications to the questionnaire. Survey items were designed to assess risk of pregnancy, pregnancy intentions, receptivity to pregnancy prevention resources and interventions in the ED, and to collect sociodemographic information. The questionnaire, created through LimeSurvey software (LimeSurvey: An Open Source Survey Tool, version 2; Hamburg, Germany), used branching logic for customized items based on respondents' prior responses.

Eligible patients were identified by research assistants (RAs) using the ED electronic - tracking system between 8 a.m. and 11 p.m. daily. Patients were eligible for study participation if they were female and between the ages of 14 and 21, inclusive. Patients were

excluded if they had not been medically cleared by the attending physician, had a history of developmental or neurocognitive delay, presented with altered mental status, or were non-English speaking (more than 95% of the adolescent population served by our ED is fluent in English). We excluded patients who presented for care related to sexual trauma to minimize bias and distress. This group of patients routinely receives pregnancy prevention resources as a part of standard ED care and we were concerned about distress associated with study participation.

The RA approached potentially eligible patients, inquiring about their interest in participating in a brief “anonymous health survey for teen girls.” If the patient was interested in learning more about the study, anyone who had accompanied the patient to the ED was asked to step out of the room. The RA then discussed the study details in private and obtained verbal informed consent for study participation. Participants were then provided with a computer tablet to complete the web-based questionnaire. RAs remained in the participants’ treatment rooms to be available to provide clarifications to questions if needed. No incentives for study participation were provided. Basic demographic information, including age and race/ethnicity of patients who declined study participation, was abstracted from the electronic health record by the RAs.

Our primary outcome was pregnancy risk. Based on a previously developed and validated measure,<sup>24–26</sup> we calculated the Pregnancy Risk Index (PRI) for each study participant to estimate the annual risk of becoming pregnant based upon: (1) recent sexual activity (vaginal-penile sexual intercourse within the last 3 months), (2) contraceptive method(s) used at last sexual intercourse, and (3) method-specific contraceptive failure rates (CFRs). Nonuse of contraception was assigned a CFR of 85, the 1 year risk of pregnancy with no contraception. The PRI score for a woman who was not sexually active in the past 3 months or who was sexually inexperienced was set to zero.<sup>25, 27–29</sup> The overall PRI serves as the mean of individual PRI scores and summarizes the risk of pregnancy at the population level. A PRI of 5, for example, equates to 5 expected pregnancies per 100 adolescent females per year.

### Statistical Analyses

We calculated the overall PRI of our entire non-pregnant population. Participants were categorized as pregnant if they responded affirmatively to the question, “Are you pregnant now?” We used self-report of pregnancy rather than pregnancy test results because not all enrolled patients underwent pregnancy testing as part of their routine care. Furthermore, we performed a subgroup analysis to assess overall PRI among participants disclosing sexual experience (eg, ever engaging in sexual intercourse). For the purposes of these analyses, which were focused on behavior increasing pregnancy risk, we defined sexual intercourse as penis in vagina.

We performed bivariate and multivariate logistic regression analyses to identify sociodemographic factors associated with having an individual PRI above the national PRI of 5.<sup>29</sup> For the sexually experienced subgroup, we conducted similar analyses to identify sociodemographic factors associated with having an individual PRI above the PRI of 18 found in a nationally representative sample of sexually active adolescents.<sup>29</sup> Co-variables of

interest included race/ethnicity, age category (14-17 vs 18-21), insurance type, prior pregnancy, and presentation for a potential reproductive-health concern. Chief complaints categorized as presentation for a potential reproductive health concern included: pregnancy test request, concern for sexually transmitted infection, dysuria, vaginal bleeding, vaginal discharge, lower abdominal/pelvic pain. Covariables with  $P$  values  $<0.2$  in bivariable analyses were included in multivariable analyses. We used STATA 12.1 (College Station, Texas) to perform all analyses.

## Results

Three hundred twenty-two eligible participants were approached for study participation, of which, 229 (71.1%) agreed. There was no difference with regard to race/ethnicity or age between patients who participated and those who declined study participation. The mean age of study participants was 17.0 (SD  $\pm 1.9$ ) years, the majority were non-Hispanic Black race/ethnicity (69%,  $n=158$ ) and publically insured (67.3%,  $n=154$ ). One-third ( $n=81$ ) of participants presented with a chief complaint potentially related to a reproductive health concern (Table 1).

More than one-half ( $n=129$ ; 56.3%) of the participants were sexually experienced (eg, had engaged in sexual intercourse), of whom the majority ( $n=94$ ; 76.0%) reported sexual activity within the 3 months prior to completing the survey (Table 1). Eighty-five percent reported first sexual intercourse (eg, penile-vaginal intercourse) by age 16 ( $n=109$ ); 94.5% by age 17 ( $n=122$ ). Almost 20% ( $n=23$ ) reported having 5 or more lifetime sexual partners. One-third of sexually experienced study participants reported prior pregnancy, of which 33.3% had been pregnant more than once. The majority (79.1%,  $n=102$ ) of the sexually active participants reported the use of at least one form of contraception at last intercourse; however, over 60% ( $n=77$ ) were non-hormonal methods (eg, condoms and withdrawal). The majority (72.4%,  $n=166$ ) of study participants agreed or strongly agreed with the statement “I am trying to *avoid* getting pregnant now” and 3.1% ( $n=7$ ) agreed or strongly agreed with the statement “I am trying to get pregnant now.”

The overall PRI for the 219 non-pregnant participants was 9.6 (95% CI 6.8, 12.4). This was significantly higher than the national PRI of 5 ( $p<0.01$ ). The PRI among the 120 sexually experienced non-pregnant study participants was 17.5 (95% CI 12.8, 22.2), which was similar to the PRI of 18 among a national sample of sexually active adolescents. The PRI of the 83 sexually experienced participants who agreed or strongly agreed with the statement of “trying to avoid getting pregnant now” was significantly lower compared with the 37 sexually experienced participants who responded with no opinion, disagree, or strongly disagree (PRI 13.0 vs 28.0, respectively,  $p=0.003$ ).

Approximately one-third (32.8%) of the non-pregnant study population ( $n=72$ ) had a PRI above the national average of 5 for all adolescents. In adjusted analysis, sociodemographic factors associated with having a PRI above the national average among the entire non-pregnant study sample were older age, non-private insurance, prior pregnancy, and chief complaint related to a potential reproductive health concern (Table 2). Among the non-pregnant, sexually active population, 16.7% ( $n=20$ ) had a PRI above the national average of

18 for a sexually active adolescent population. In multivariable analysis, there were no demographic factors (e.g. age, race/ethnicity, insurance status, prior pregnancy, reproductive health-related chief complaint) associated with having a PRI above 18 in this subpopulation.

Sixty-seven percent (n=153) reported receiving some form of pregnancy prevention counseling within the last year, and 81.1% (n=124) found it helpful. Twenty-one percent (n=45) reported having wanted to obtain birth control, but didn't. Reasons for not obtaining birth control included lack of knowledge on where to go (33.3%, n=15), too embarrassed to ask (28.9%, n=13), and worried that family members would find out (24.4%, n=11).

Almost all participants (85.1%, n=194) believed that the ED should provide information about pregnancy prevention and contraception, the majority of whom (64.9%, n=148) believed that pregnancy prevention services should be offered at all ED visits. The majority (66.8%, n=153) of participants stated that either they or their friends would be likely to use an ED-based clinic for contraceptive care.

## Discussion

This study demonstrates a high prevalence of unintended pregnancy risk among adolescents seeking care in an urban pediatric ED. Despite the majority of participants reporting nonuse of hormonal contraceptives, most expressed interest in receiving reproductive health education and contraceptive services in the ED. Our findings support a potential role for the ED in reducing high rates of unintended teenage pregnancy.

The PRI provides a validated method to integrate sexual behavior risk factors to estimate pregnancy risk.<sup>25, 27–29</sup> Participants in our study had an estimated pregnancy risk rate that was almost double the national rate. A prior study conducted in a New York City pediatric ED also demonstrated a PRI of 19.5 among the study population, which was significantly higher than the national PRI for all adolescents.<sup>15</sup> These findings may be attributed to the use of the urban ED by adolescents who may be at disproportionately higher risk for pregnancy.<sup>7, 30</sup> Study participants reported higher rates of sexual activity within the past 3 months of survey response in comparison with rates reported in the Youth Risk Behavior Survey (43% vs 30%).<sup>31</sup> Additionally, study participants had higher rates of reporting no method to prevent pregnancy at last intercourse compared with national rates (20% vs 14%).<sup>31</sup>

Despite sexually active participants having an annual risk of pregnancy of over 15%, the majority of sexually active participants reported negative pregnancy intentions. Although sexually active participants who endorsed negative pregnancy intentions had a lower PRI than those who were ambivalent or who reported positive pregnancy intentions, the PRI among the participants endorsing negative pregnancy intentions was still high. Other literature has also demonstrated high rates of risk for unintended pregnancy, among adolescents committed to not getting pregnant.<sup>19, 32</sup>

Our study also demonstrated that higher PRI is associated with non-private insurance. Insurance status often serves as a proxy for health care access,<sup>33</sup> with publicly insured or uninsured patients more likely to rely on the ED for care than privately insured patients.<sup>34</sup>

Therefore, adolescents at greatest risk for pregnancy may identify the ED as their only, or most accessible, form of health care. Therefore, strategies to expand pregnancy prevention service to the ED setting may be helpful in providing needed healthcare.

Most study participants were interested in receiving pregnancy prevention education and services in the ED. Furthermore, the majority believed pregnancy prevention services should be offered at all visits, regardless of reason for presentation. Our findings are consistent with prior studies that demonstrate adolescent receptiveness towards receipt contraceptive services in the ED.<sup>15, 18,16, 17, 19</sup> Furthermore, our study was unique in its inquiry regarding adolescent interest in using an ED-based reproductive health clinic, a concept supported by the majority of study participants.

There are several potential limitations to consider. Although we used a convenience sampling strategy, research assistants were present in the ED 7 days per week from 8 am to 11 pm, minimizing the risk of missed patients. We used self-reported survey response to classify sexual activity, pregnancy, and contraceptive methods, but used a web-based questionnaire to decrease social desirability and reporting bias, because adolescents report greater comfort sharing sensitive health information via electronic surveys in comparison with face-to-face interviews.<sup>35–38</sup> However, there may have been differences in participation rates between sexually active and non-sexually active patients that we were unable to account for. We used insurance status as a proxy for health care access. Furthermore, this study was performed at a single center pediatric ED and therefore, our results may only be generalizable to other urban ED populations of predominantly non-privately insured, minority youth.

The ED may serve as a strategic location for the provision of reproductive health services. Future work should explore how reproductive health services can successfully be integrated into ED care and whether the ED can contribute to reducing unintended adolescent pregnancy rates.

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## Abbreviations

|            |                      |
|------------|----------------------|
| <b>ED</b>  | Emergency department |
| <b>PRI</b> | Pregnancy risk index |
| <b>RA</b>  | Research assistants  |

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**Table 1**

## Characteristics of Study Population

| Characteristic  | N (%)   |             |
|---|---|-------------|
| Age Categories  | 14–17 years                                       | 141 (61.6%) |
|   | 18–21 years                                       | 88 (38.4%)  |
| Race/Ethnicity  | White, NH   | 14 (6.1%)   |
|   | Black, NH   | 158 (69.0%) |
|   | Hispanic  | 44 (19.2%)  |
|   | Other, NH   | 13 (5.7%)   |
| Insurance Status                                      | Private   | 38 (16.6%)  |
|   | Public  | 154 (67.3%) |
|   | Uninsured   | 37 (16.1%)  |
| Potential reproductive health-related chief complaint | Yes   | 81 (35.4%)  |
|   | No  | 148 (64.6%) |
| Sexually Experienced                                  | Yes   | 129 (56.3%) |
|   | No  | 100 (43.7%) |
| Sexual Intercourse in Past 3 months                   | Yes   | 94 (41.0%)  |
|   | No  | 135(59.0%)  |
| Contraceptive Method (n=129)                          | Denied Sexual Experience                          | 100 (43.7%) |
|   | None  | 28 (21.7%)  |
|   | Withdrawal Method                                 | 6 (4.7%)    |
|   | Condoms Only                                      | 51 (39.5%)  |
|   | Short-acting hormonal contraceptive <sup>*</sup>  | 32 (24.8%)  |
|   | Long-acting reversible contraceptive <sup>#</sup> | 12 (59.3%)  |

\* Short-acting hormonal contraceptive: contraceptive pill, injection, patch, vaginal ring

# Long-acting reversible contraceptive: intrauterine device, implant

**Table 2**

Sociodemographics Associated with PRI above National Average

|  | Proportion with PRI >5 | Odds Ratio (95% CI) | Adjusted Odds Ratio (95% CI)* |
|--|------------------------|---------------------|-------------------------------|
| <b>Age Category</b>  |                        |                     |                               |
| 14–17  | 20.2%                  | Referent            | Referent                      |
| 18–21  | 52.9%                  | 4.5 (2.4, 8.1)      | 3.0 (1.5, 5.8)                |
| <b>Race/Ethnicity</b>  |                        |                     |                               |
| Non-Hispanic White   | 16.7%                  | Referent            | Referent                      |
| Non-Hispanic Black   | 34.9%                  | 2.7 (0.6, 12.7)     | 1.3 (0.2, 7.4)                |
| Hispanic   | 33.3%                  | 2.5 (0.5, 13.0)     | 1.4 (0.2, 8.6)                |
| Other  | 23.1%                  | 1.5 (0.2, 11.0)     | 0.4 (0.4, 4.1)                |
| <b>Insurance Type</b>  |                        |                     |                               |
| Private  | 5.4%                   | Referent            | Referent                      |
| Non-Private  | 38.5%                  | 10.9 (2.6, 46.9)    | 7.1 (1.6, 32.1)               |
| <b>Prior Pregnancy</b>                                       |                        |                     |                               |
| No   | 26.0%                  | Referent            | Referent                      |
| Yes  | 58.7%                  | 4.0 (2.1, 8.0)      | 2.7 (1.2, 6.0)                |
| <b>Potential Reproductive Health-Related Chief Complaint</b> |                        |                     |                               |
| No   | 23.6%                  | Referent            | Referent                      |
| Yes  | 49.4%                  | 3.2 (1.8, 5.7)      | 2.6 (1.4, 5.1)                |

\* Adjusted for

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