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Age Differences in the Consequences of Unintended Pregnancy

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M.A.T., University of Georgia, 2012

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Abstract

Age Differences in the Consequences of Unintended Pregnancy

By Kristin Haeger

Background. Intention of pregnancy includes intended, mistimed, and unwanted pregnancies. As of 2008, 51% of all pregnancies among women ages 15–44 years were unintended. Prior studies have shown that the quality of preconception, prenatal, and postpartum care differs between pregnancies that are mistimed or unwanted as compared to intended. However, despite age-differences in health promoting and risk-taking behaviors, existing research has not evaluated whether these behaviors are similarly associated with unintended pregnancy across all maternal age groups.

Methods. This secondary analysis used descriptive statistics and logistic regression to evaluate a cross-sectional population-based sample using the Pregnancy Risk Assessment Monitoring System from eight states from 2010–2011. The prevalence and odds of outcomes related to the quality of preconception, prenatal, and postpartum care by preconception pregnancy intention (i.e., intended, mistimed, or unwanted) were calculated. Behaviors that were analyzed include taking folate/multivitamin supplements; pregnancy recognition; alcohol consumption; smoking; contraception; feelings of depression; infant sleep position; and breastfeeding. Healthcare utilization measures that were evaluated include prophylactic dental care; initiation of prenatal care; and maternal/infant well checkups. Age stratified analyses were conducted for all outcomes.

Results. Women who had given birth in the previous 2–9 months with unwanted pregnancies were uniformly at decreased odds of early initiation of prenatal care relative to those with intended pregnancies. Women with unintended pregnancies were similar to those with intended pregnancies in prenatal alcohol consumption, well-baby checkup, and infant sleep position on back at all age groups. All other maternal behaviors differed in odds by maternal age groups. Women aged 25–34 with unintended pregnancies had the highest prevalence; teenagers with unintended pregnancies were almost indistinguishable from those with intended pregnancies.

Conclusion. Given that the odds of maternal behaviors and healthcare utilization measures differed across age groups, perinatal counseling should be targeted to at-risk age groups in all but four of the outcomes that did not vary by age group.

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BACKGROUND:*Unintended Pregnancy*

National data indicate that, as of 2008, 51% of all pregnancies among women ages 15–44 years were unintended (1). An intended pregnancy is one in which the woman wanted to be pregnant at that time or sooner; unintended pregnancies are subdivided into those that are mistimed (wanted to be pregnant later) or unwanted (did not want to be pregnant then or at any time in the future). The National Survey of Family Growth (NSFG) has determined that the unintended pregnancy rate for women from ages 15–44 has remained steady at 54 per 1,000 women from 1981 to 2008 (1, 2). By the age of 45, 48% of women have had an unintended pregnancy and 30% have had an abortion (2, 3). Combining federal and state expenditures, in 2010, the US government spent \$21.0 billion on unintended pregnancies, including births, abortions, and miscarriages (4). *Healthy People 2020* aims to reduce unintended pregnancies to 44% by 2020 (5).

Research has shown that unintended pregnancies (mistimed or unwanted) are associated with reduced quality of care, including both decreased health-promoting and increased risk-taking behaviors during the preconception, prenatal, and postpartum period. Initially, researchers investigated the associations between pregnancy intentions and outcomes. Low birth weight (<2.5 kg), preterm delivery (<37 weeks gestational age), and small size for gestational age (<10th centile for gestational age) were positively correlated with unintended pregnancies, although results were attenuated in more methodologically rigorous studies controlling for confounders or taking maternal behaviors (*e.g.*, smoking and antenatal care) into account (6-9). This has prompted

researchers to explore possible associations between pregnancy intention and perinatal and parental behaviors that may act as intermediaries in affecting pregnancy outcomes.

Demographic Characteristics Associated with Unintended Pregnancies

Unintended pregnancies occur in all demographic groups across age, socioeconomic status, race/ethnicity, marital status, and education level (10, 11). Certain subgroups, especially minorities, those living below the federal poverty line (FPL), those at the beginning and end of their reproductive years, those with a previous child, and those experiencing intimate partner violence, are at a higher risk for unintended pregnancies (11-14). The greatest risk factors for unintended pregnancy are cohabitation, poverty, age 20–24, and not having earned a high school diploma (1, 10). Across all income levels, minorities have the highest rates of unintended pregnancies (15).

Association of Pregnancy Intendedness and Age

Among those who engage in opposite-sex sexual activity and are thus at risk for unintended pregnancy, teenagers aged 15–17 had the highest proportion of unintended pregnancies. whereas rates of unintended pregnancy were lowest among women of advanced maternal age with only six unintended pregnancies per 1,000 women (16). In spite of this, older women, rather than younger women, have been a major factor in the overall rise in unintended pregnancies (1). In the case when a pregnancy of a woman of advanced maternal age is unintended, it is usually unwanted rather than mistimed; as

women get older, they may not realize they are still fertile and use contraception inconsistently or not at all, thus unintentionally conceiving (17, 18).

In addition to rates and proportions of unintended pregnancies varying across age groups, there are differences by age in maternal behaviors and health care utilization. Older women are at increased odds of use of multivitamins containing folic acid, early pregnancy recognition, early initiation of prenatal care, prenatal alcohol consumption, and initiation of breastfeeding (8, 19-23). This same group has decreased odds of preconception smoking and, among women who experience intimate partner violence, smoking prenatally (24, 25). In contrast, younger women are more likely to change behaviors, including quitting drinking and smoking prenatally; they also have increased odds of taking their infant for a well-baby visit (8).

Health Outcomes Associated with Unintended Pregnancies

Health outcomes potentially associated with unintended pregnancy will be examined in preconception (before pregnancy), prenatally (from conception until birth), and postpartum (after birth). Health-promoting behaviors that will be examined include the use of folic acid; pregnancy recognition; breastfeeding; contraception; infant sleep position; and healthcare utilization measures, including prophylactic dental care, prenatal care, infant well checkups, and maternal postpartum checkups. Risk-taking behaviors include smoking cigarettes, household rules allowing smoking inside, using alcohol, and feelings of postpartum depression.

Folic Acid

Several studies have examined the association between preconception maternal behaviors and unintended pregnancy, specifically using folate/multivitamins. Women of childbearing age are advised to take 400 milligrams of folic acid daily, which has a protective effect against neural tube defects, including anencephaly and spina bifida (26). Studies consistently find associations between pregnancy intention and folic acid supplementation such that women with unintended pregnancies are at decreased odds of taking folic acid supplements before pregnancy, relative to women with intended pregnancies, even after adjusting for confounders (25, 27-29). However, the differences by age in the association between pregnancy intention and folic acid supplementation are unexplored.

Pregnancy Recognition

Initiation of prenatal care is determined in part by how early or late into a pregnancy a woman realizes that she is pregnant. Pregnancy recognition after the 6th week of gestation is associated with adverse perinatal outcomes, including preterm birth, low birth weight, and admission into the neonatal unit (30). All major fetal organ development occurs by the 8th week of gestation, and women are more likely to modify behaviors after pregnancy recognition rather than after conception (20, 25). Studies consistently found differences in which intended pregnancies were recognized by the 6th to 8th week of gestation, whereas unintended pregnancies were at higher odds of being

recognized after this time period, yet it is not known how these associations differ by age. (10, 14, 20, 21, 31).

Healthcare Utilization

The CDC recommends that all women of reproductive age receive regular and on-going healthcare across the reproductive lifespan (32, 33). Preventative healthcare utilization allows providers to ask individuals about pregnancy intention and identify risks for maternal and perinatal morbidity and mortality, including preconception dental care and counseling, prenatal care, and postpartum maternal and infant check-ups. Preconception, women are advised to maintain good oral health, which directly impacts periodontal disease and dental caries, risk factors for preterm delivery, preeclampsia, and low birth weight (33-35). Instances of unintended pregnancy preempt the opportunity for preconception counseling.

After conception, women are advised to seek prenatal care to make sure that their vaccinations, including influenza, are up-to-date, and to discuss the management of diabetes, hypertension, or other medications that might be teratogens. Prenatal care has been widely studied; some findings indicate that unadjusted odds of late prenatal care initiation vary by intention status but not after adjusting for confounders (14, 17, 19, 29). However, more recent studies have found that women who intended to become pregnant do initiate prenatal care earlier than those with mistimed or unwanted pregnancies, even after controlling for covariates (10, 27, 28, 31).

Postpartum, the American Academy of Pediatrics (AAP) recommends that parents/guardians take their infants for well-checkups 3–5 days after birth and then at 1, 2, 4, 6, and 9 months during infancy. During these visits, providers weigh and measure the infant; screen for hearing problems, congenital abnormalities, and jaundice; and review feeding schedules (36). Additionally, the American College of Obstetricians and Gynecologists (ACOG) recommends that women who have recently given birth have a postpartum checkup to assess physical health; screen for depression and domestic violence; review breastfeeding technique; manage chronic conditions; and discuss nutrition, exercise, sexual activity, and contraception (37). One study found that the prevalence of mothers taking infants to 2, 4, and 6 month visits varied by intention status, but after controlling for covariates, well baby visits were associated with higher socioeconomic status rather than pregnancy intention (8). The association between prenatal care and pregnancy intention has been widely explored; however, the association between well-baby check-ups has been studied to a lesser extent. There are gaps in the literature related to pregnancy intention and preconception prophylactic dental care and maternal postpartum checkups. Additionally, none of these associations have been examined for variations in healthcare utilization by age group.

Alcohol Use

Like tobacco use, alcohol use is similarly associated with adverse perinatal outcomes. Prenatal alcohol consumption is associated with spontaneous abortions, stillbirth, preterm delivery, fetal growth restriction, SUID, and fetal alcohol spectrum

disorder (44). If a woman does not start modifying alcohol consumption until after she realizes that she is pregnant, she may continue to use alcohol in a pattern similar to her usage preconception (23, 44). In 2009, over half of women who had a live birth had consumed alcohol in the three months before conceiving (43). Studies that have looked at alcohol use have reported mixed findings as to whether the rates of alcohol consumption preconception and prenatally have been found to differ among those with intended, mistimed, and unwanted pregnancies (17, 20, 25, 28). One study indicated that prenatal alcohol consumption among urban black mothers was greatest among those with an unwanted pregnancy (45). Gaps still exist in the literature regarding whether the association between pregnancy intention and perinatal alcohol use differ by age.

Tobacco Use

Perinatal tobacco use is correlated with a range of adverse outcomes for both a mother and her offspring. A woman who smokes may experience difficulty conceiving, premature rupture of membranes, fetal growth restriction, placental complications, and ectopic pregnancy (22, 38, 39). Effects of perinatal smoking on the infant include spontaneous abortion, stillbirth, preterm birth, low birth weight, small for gestational age, orofacial clefts, and sudden unexpected infant death (SUID) (38, 40). In a 29-state population-based sample from the Pregnancy Risk Assessment Monitoring System (PRAMS) conducted by the CDC in 2008, 23% of mothers who had a live birth smoked in the three months prior to conception; the prevalence dropped to 13% in the last three months of pregnancy, but rebounded slightly to 18% postpartum (41).

Studies have also explored the association between smoking and pregnancy intention. In an analysis of the National Birth Defects Prevention Study from 1997–2002, women with unintended pregnancies were more likely to smoke during pregnancy than women with intended pregnancies (28); a study using PRAMS data for 15 states from 1996–1999 found differences in preconception smoking between white but not black women (14). Among a population of non-pregnant women, researchers did not find an association between smoking and pregnancy intention (25).

Household Rules Allowing Smoking

In addition to the risks posed by a mother smoking, there are additional risk factors for non-smokers and their fetuses/infants who are exposed to second-hand smoke. Secondhand smoke is identified as a causal factor in SUID and increases the risk of asthma, ear infections, and acute respiratory infections (38, 42). Research has also found that infants exposed to secondhand smoke experienced neonatal developmental delays in areas of executive functioning and gross motor skills (39). Postpartum, 6% of mothers indicated they had rules allowing for smoking in some or all areas of their home, according to analysis of PRAMS data of 29 states from 2009 (43). The CDC recommends screening, counseling, and interventions for women who use tobacco products and/or have rules permitting smoking inside the home perinatally (43). Considering that tobacco use and household smoking rules are among the most modifiable risk factors in maternal and perinatal morbidity and mortality, the *Healthy People 2020* goal is to lower tobacco

use to 14% preconception and 1% prenatally to ensure healthy maternal and infant outcomes (5, 39).

Studies looking at pregnancy intendedness and household rules allowing smoking inside the home concluded that women with pregnancies that were mistimed by more than two years or unwanted had higher odds of allowing secondhand smoke during pregnancy (28, 31). Stratified by age, women were more likely to have rules forbidding smoking inside the home as they got older: 88% of mothers under the age of 20 did not allow smoking inside, compared with 97% of women over the age of 34 (42). While both the association between pregnancy intention and smoking/household rules allowing smoking has been well explored, and age differences in smoking-behaviors have been examined, as well, it is unknown whether the association between pregnancy intention and smoking behaviors differs by age.

Breastfeeding

The AAP recommends that women exclusively breastfeed their infants for the first six months for complete nutrition, immunological benefits, neurodevelopment, and positive maternal/infant outcomes (46). As of 2011, 79% of infants had ever breastfed and 49% were still breastfeeding at six months, with only 19% of mothers adhering to the recommendation to exclusively breastfeed their offspring for six months (47). Studies that have looked at the relationship between breastfeeding and pregnancy intention report an association between breastfeeding initiation and durations of six and 12 months, but when adjusting for covariates, the findings are no longer significant (8, 10, 17, 27, 31, 48,

49). There is a paucity of research on age differences in the association between pregnancy intention and the initiation of breastfeeding.

Sleep Position

Since the AAP recommended in 1992 that infants sleep in a supine position, that is, on their backs, and the CDC subsequently implemented its *Back to Sleep* campaign in 1994, the incidence of sudden unexpected infant death (SUID), including sudden infant death syndrome (SIDS), has decreased (50, 51). Recommendations today have been expanded to include all facets of a safe sleep environment: a firm surface in the same room but a separate bed from parent(s)/guardian(s); removal of all objects from the crib/bassinet, including blankets, pillows, stuffed animals, and loose-fitting linens; implementation of rules forbidding cigarette smoke exposure inside the home; a relatively cool sleep environment; and access to a pacifier at night and during naps (50). An analysis of PRAMS data from 2004–2005 indicated an infant was less likely to sleep on his/her back if he/she was the product of an unintended pregnancy (52). Another concluded that sleep position was associated with pregnancy intention, but the association did not persist after controlling for confounders (27). It is still unknown whether there are differences in the association of pregnancy intention and infant sleep position by maternal age.

Contraception

Consistent and correct contraception use, including hormonal methods, barriers, intrauterine devices (IUDs), and sterilization, is the most reliable way to avoid unintended pregnancy (18). Among women with unintended pregnancies who give birth, about half were not using any form of contraception in the month of conception (15). In a study looking at pregnancy intention and maternal behaviors, women with mistimed and unwanted pregnancies were at higher odds of using contraception postpartum relative to women with intended pregnancies, although odds were attenuated when controlling for covariates (27). There is a paucity of research examining age differences in the association of pregnancy intention and contraception use.

Postpartum Depression

The CDC estimates that between 8–19% of women experience postpartum depression, which can include a mother feeling numb or disconnected from her infant, thinking she will harm her baby, expressing self-doubt about parenting skills, having excessive trouble sleeping, or having negative thoughts about her baby within four weeks of giving birth (53). Postpartum depression is more likely to occur with negative parenting behaviors: deficits in bonding; abbreviated breastfeeding; lower odds of smoke detector use; and increased odds of corporal punishment in the first 12 months postpartum (54-58). A population-based study of one state found increased odds of postpartum depression among mothers with both mistimed (1.34, 95% CI: 1.08–1.68) and unwanted pregnancies (1.98, 95% CI: 1.48–2.64), after adjusting for confounders (27).

Previous literature has yet to explore how this association varies among women of different age groups.

Overall, pregnancy intentions has been analyzed as it is associated with maternal health-promoting and risk-taking behaviors, with a few exceptions, such as prophylactic dental care and maternal postpartum checkups. However, it is not yet known if there are differences in these behaviors across preconception, prenatal, and postpartum periods by age group.

Goal and Objectives

Research has shown that unintended pregnancies (mistimed or unwanted) are associated with reduced quality of care and increased risk-behaviors (10, 27, 29, 59). As the field of public health is moving towards interventions targeted to specific subpopulations (60-62), this study investigates whether the association between pregnancy intention and health-promoting and risk-taking behaviors differs across maternal age groups. The behaviors were examined across three time periods: preconception, prenatal, and postpartum. Health-promoting behaviors that were examined include taking a multivitamin containing folic acid and dental care preconception; early pregnancy recognition and initiation of prenatal care in the prenatal period; and a well-baby checkup, a maternal postpartum checkup, placement of the infant on his/her back to sleep, use of contraception, and breastfeeding postpartum. Risk-behaviors included drinking alcohol preconception and prenatally, smoking across all perinatal periods,

household rules allowing smoking inside the home postpartum, and feelings of postpartum depression. Although the association between pregnancy intention and these behaviors has been variably explored, there is a gap in research looking at how these associations differ by age. This study will investigate the hypothesis that the association between pregnancy intention (intended, mistimed, and unwanted) and behaviors related to preconception, prenatal, and postpartum health will differ across maternal age groups.

MATERIALS AND METHODS:

Study Design and Data Source

This study is a secondary analysis of data from the Pregnancy Risk Assessment Monitoring System (PRAMS) 2010–2011 (Phase 6), an ongoing, cross-sectional surveillance system. The Centers for Disease Control and Prevention (CDC) has been conducting PRAMS in collaboration with state health departments since 1987 to track perinatal maternal behaviors and pregnancy outcomes (Shulman 2006). PRAMS is a mixed-mode survey, meaning that it includes both postal and telephone contact. Within 2–9 months after live birth, there are a series of up to five mailings followed by up to 15 phone calls in staggered succession to optimize responses (63). The survey uses population-based samples of 1,300–3,400 mothers each year who were selected from states' live birth certificates. Underrepresented and at-risk populations are oversampled, such as racial/ethnic minorities, mothers of babies with low-birth weight, and those with less than a high school education. The Institutional Review Board of the CDC approved this study.

Study Population

This study included a sample of eight states (Arkansas, Georgia, Michigan, Minnesota, Missouri, New Jersey, Texas, and Wisconsin) that incorporated additional questions about healthcare utilization, including well-baby checkups and maternal postpartum checkups, in addition to the core questions about preconception through postpartum periods. States were included if they met a threshold of at least 65% response

rate (range 65–81%); the response rate in our analysis was 69% in 2010 and 68% in 2011. The initial sample included 20,363 observations. After excluding participants with multiple births (n=717), and participants who did not complete the question about pregnancy intention (n=345), the final sample included 19,301 respondents.

Data Collection

The survey instrument is a standardized set of core questions asking mothers about their experiences and attitudes in preconception (in the 12 months before pregnancy), prenatal (from conception through the time before birth), and postpartum (typically from birth through 3-6 months) periods. The PRAMS dataset includes information linked from birth certificates, including maternal education, marital status, parity, and race, as well. All other covariates, the exposure, and outcomes were directly obtained from PRAMS.

Data Measures

Outcomes

The 13 outcomes were comprised of behaviors and use of services that may positively or negatively influence maternal and infant health and also may be influenced by pregnancy intentions. Outcomes variables that had previously been cited in the literature and had a negative influence on infant health included the following maternal behaviors: consuming alcohol, smoking, household rules allowing smoking, and feelings

of depression. Consuming alcohol was assessed in the last three months preconception and the last three months prenatally as yes/no. Smoking cigarettes was assessed in the three months preconception, the last three months prenatally, and postpartum (yes/no). Household rules allowing smoking, defined as permitting smoking in some places or anywhere inside the home postpartum (yes);) not allowing smoking anywhere inside the home (no). Feelings of depression were assessed using a five-point Likert scale (64). Those who responded that they felt down, depressed, sad, and/or hopeless postpartum “often” or “always” (yes/no).

Health utilization measures that have a protective effect on infant health included: dental visits, defined as a teeth cleaning by a dentist or dental hygienist in the 12 months preconception (yes/no); prenatal care initiation within the first trimester of pregnancy (yes/no); a well-baby checkup at 2, 4, or 6 months postpartum (yes/no); and a maternal checkup within the first 6 weeks postpartum (yes/no). Other health-promoting behaviors that have a protective effect on outcomes included: any use of a multivitamin, prenatal vitamin, or folic acid during the month prior to conception(yes/no); (yes/no); early pregnancy recognition by the 6th week of gestation (yes/no); initiation of breastfeeding, which included breastfeeding or pumping breast milk to feed to a baby even once (yes/no); sleep position on back (yes or no); and contraception, which includes doing anything to avoid getting pregnant postpartum (yes/no).

Exposure

Pregnancy intention was the exposure of interest in this study. In the 2–9 months after mothers gave birth, PRAMS asked participants, “Thinking back to *just before* you got pregnant with your *new* baby, how did you feel about becoming pregnant?” Participants who responded, “I wanted to be pregnant sooner” or “I wanted to be pregnant then” had responses coded as “intended.” Unintended pregnancies were coded as “mistimed” if a woman responded, “I wanted to be pregnant later” or “unwanted” for “I didn’t want to be pregnant then or at any time in the future.”

Covariates

Covariates were selected a priori based on established associations with pregnancy intention and potential associations with the outcomes based on previous literature. Because this study was specifically interested in age differences, it was selected a priori to be treated as a covariate; maternal age groups were coded based as <20 years, 20–24 years, 25–34 years (the reference group), and 35+ years, based on the age of the mother at the time that she gave birth.

Demographic characteristics included maternal education (<12 years, 12 years, >12 years), marital status (married or other), and parity (0, 1–2, 3+). Medicaid status was based on receipt in the month before conception (yes/no) and income was assessed as a percent of the federal poverty line (<100% FPL, 100–400% FPL, >400% FPL).

Additionally, race/ethnicity was categorized as white non-Hispanic, black non-Hispanic, Hispanic, and multiracial/other, inclusive of Asian, Hawaiian/Pacific Islander, and American Indian/Alaska Native).

Statistical Analysis

Characteristics of participants were compared across age groups (<20, 20–24, and 35+ compared to the reference group of 25–34) using Chi-square tests with an adjusted Wald-*F* statistic. Bivariate prevalence estimates of preconception, prenatal, and postpartum outcomes were then calculated by pregnancy intention (intended, mistimed, and unwanted) using Chi-square tests. Next, the frequencies of preconception, prenatal, and postpartum outcomes were calculated as a number and percent, stratified by age and differences were examined using chi-square tests. The PRAMS protocol specifies that in calculating prevalence estimates, cells with a denominator of <30 must be suppressed to maintain confidentiality and cells with 30–59 respondents were reported and footnoted; observations with more than 10% missing are not reported, although no variables in these analyses exceeded that threshold.

Logistic regression models were constructed to examine the associations between pregnancy intentions and outcomes. Given the lack of multicollinearity and previous findings in the literature, the full set of covariates was used. Odds ratios and 95% confidence intervals for the association of between preconception pregnancy intention (*i.e.*, intended, mistimed, or unwanted) and outcomes related to the quality of preconception, prenatal, and postpartum care were calculated by adjusting for all

confounders. Sample weights from the PRAMS dataset were used to account for the complex sample design; analyses were conducted using SAS-callable SUDAAN version 11.0.1.

RESULTS:

Frequencies of maternal characteristics were examined by age (Table 1). Overall, 56% of participants' preconception pregnancy intention was self-reported as intended compared to 44.4% that were unintended: 34% mistimed and 10% unwanted. The study population was primarily white non-Hispanic, educated for more than 12 years, married, not a recipient of Medicaid prior to conception, and evenly divided by tertiles of the federal poverty line.

Demographic characteristics differed by age group. Black non-Hispanic and Hispanic mothers were more likely to be young, while white non-Hispanic and multiracial/other mothers were more likely to be older (Table 1). Intended pregnancies were most common among women 35 and older (72%) and least common among women under the age of 20 (22%). Unintended and mistimed pregnancies were most common among women under 20, 78% and 66% respectively, but unwanted pregnancies were most common among women 35 and older (15%).

Frequencies of maternal health-promoting and risk-taking behaviors and healthcare utilization measures are presented by pregnancy intention (Table 2). Compared to women with unintended pregnancies, women with intended pregnancies

had the highest proportion of health-promoting behaviors (*e.g.*, using folic acid, early pregnancy recognition). Compared to women with intended and mistimed pregnancies, women with unwanted pregnancies had the highest prevalence of most risk-taking behaviors (*e.g.*, perinatal smoking, feelings of depression).

The prevalence of health-promoting and risk-taking perinatal behaviors stratified by age group is shown in Table 3. Younger women under the age of 25 had a higher prevalence of risk-taking behaviors such as perinatal smoking and household rules allowing smoking inside the home postpartum. Women under the age of 20 also had the lowest prevalence of health promoting behaviors; however, they had the highest prevalence of contraception use postpartum. Women aged 25–34 and older had the highest prevalence of using alcohol preconception and adhering to the recommendation for supine sleeping position. Women aged 35 and older had the lowest prevalence of using contraception to avoid future pregnancy, smoking perinatally, and rules allowing smoking inside the home.

The odds of maternal risk-taking and health-promoting behaviors for mistimed compared to intended pregnancies are presented in Tables 4 and 6. Among women under 20, there were no differences between those with mistimed and intended pregnancies, except for postpartum contraception use. Women aged 20–24 with mistimed pregnancies were also very similar to those with intended pregnancies; they had increased odds of using contraception and decreased odds of using folic acid and initiating prenatal care in the first trimester. Women aged 25–34 varied most significantly between those with mistimed versus intended pregnancies. Women aged 25–34 with mistimed pregnancies

had decreased odds of all preconception and prenatal health-promoting behaviors. Postpartum, women aged 25–34 had increased odds of experiencing feelings of depression, smoking, and using contraception.

Tables 5 and 6 present the odds of maternal behaviors among unwanted versus intended pregnancies stratified by age groups. Only for early initiation into prenatal care were women uniformly at decreased odds across all age groups. Additionally, there were no differences by age group between women with unwanted and intended pregnancies in prenatal alcohol consumption, well-baby checkups, or sleep position among any age group. Other than entry into prenatal care, which varied by all age groups, and decreased odds of initiating breastfeeding, women under the age of 20 with unwanted pregnancies were indistinguishable from those with intended pregnancies. Women with unwanted pregnancies aged 25–34 had diminished quality of care across almost all behaviors compared to those with intended pregnancies. Women aged 35 and older with unwanted pregnancies were at decreased odds of all preconception and prenatal health-promoting behaviors relative to those with intended pregnancies. However, postpartum health-promoting behaviors did not differ for any measure except contraception use. In contrast, women aged 35 and older with unwanted pregnancies did differ from women with intended pregnancies in risk-taking behaviors in all perinatal time periods.

DISCUSSION:

This study found that the association between pregnancy intention and most maternal health-promoting and risk-taking behaviors across preconception, prenatal, and postpartum periods differed by age. These differences were more pronounced in comparing unwanted to intended pregnancies than in mistimed versus intended pregnancies. Among all women with unintended pregnancies, those aged 25–34 had more behaviors that differed than any other age group. In particular, women with mistimed pregnancies in this age group were less likely to engage in health-promoting behaviors and more likely to engage in risk-taking behaviors preconception and prenatally compared to those with intended pregnancies. Women aged 20 and younger with unintended pregnancies were almost indistinguishable from their counterparts with intended pregnancies.

These findings can be used to identify areas where counseling and policies are most applicable to women of all age groups and where counseling and interventions can be targeted towards more specific age groups. The CDC, Institute of Medicine, and ACOG recommend that health care providers target all women of reproductive age when discussing health-promoting and risk-reducing behaviors (32, 33, 43, 65). This study found that women with intended and unintended pregnancies were equally likely to avoid drinking alcohol while pregnant, go in for infant well checkups, and put their infants on their back to sleep. Furthermore, this study found that these behaviors were consistent across age groups. It supports the current recommendations prescribed for perinatal behaviors to target all women regardless of pregnancy intention or age group.

Another important finding of the study was that in a several outcomes, women of all age groups were equally likely to participate in maternal health-promoting and risk-promoting behaviors. In these instances, following the recommendations described above is supported by this study. Women with unwanted pregnancies at all age groups were uniformly less likely to adhere to recommendations to start prenatal care within the first trimester. Additionally, in comparing women with mistimed versus intended pregnancies, there were no differences in age or intention in the initiation of breastfeeding, maternal postpartum checkups, or rules allowing smoking inside the home. All of these findings support the currently prescribed recommendations.

Yet many of the findings of this study did indicate that maternal behaviors and health utilization measures do differ by age group. In these cases, targeting interventions for at-risk populations and reallocating resources may be one way to more effectively reach subgroups at risk for unintended pregnancy. Women aged 25 and older with unwanted pregnancies were twice as likely to smoke prenatally and postpartum relative to those with intended pregnancies. Previous research has found that older women are less likely to modify long-established behaviors such as smoking than younger women, so smoking cessation programs and counseling should be targeted towards older women and messages should be used that resonate with the specific audience (25). Also, findings indicate that older women are less likely to use contraception; more intensive counseling can be targeted towards women aged 35 and older to emphasize the possibility of residual fertility and the need to use contraception through the perimenopausal period (18).

Because women aged 25–34 with unwanted pregnancies were more likely to engage in every risk-taking behavior, except prenatal alcohol consumption, and less likely to engage in health-promoting behaviors in preconception and prenatal periods, health care providers may focus on this group for counseling as well. In contrast, women under the age of 20 with mistimed and unwanted pregnancies did not differ from those with intended pregnancies in any risk-taking behaviors; only in the initiation of breast-feeding and prenatal care were they less likely relative to teenagers with intended pregnancies. Because the results from teenagers were so similar to one another, regardless of pregnancy intention, counseling can be targeted consistently across all teenagers, for example, discussing multivitamins containing folic acid and screening for depression. Overall, this is important in showing which populations could benefit most from counseling across perinatal periods, and how to reallocate resources to target at-risk populations.

This study has at least two strengths. First, the study analyzed a large population-size with oversampling for underrepresented and at-risk populations, including racial minorities, women with less than a high school education, and women who gave birth to low birth-weight infants. Second, the study was able to tap into a wealth of information about preconception, prenatal, and postpartum time periods, as well as information linked into PRAMS from the birth certificate.

Despite these strengths, there were at least four limitations in this study. First, in classifying preconception pregnancy intention, the exposure was collected retrospectively, so that it was subject to recall bias, and is treated as a static variable. If

the woman's attitude towards her pregnancy changes over the course of her pregnancy and after the baby is born, this may have obscured her views on pregnancy intention before pregnancy recognition, which could have led to exposure misclassification. Pregnancy is a complex construct that is influenced by a range of factors included SES, education, family and community support, moral beliefs, age/stage of life, intimate partner violence, and the feelings of intention by the woman's partner. Additionally, the pregnancy intention may have changed over time so that an unintended pregnancy may have resulted in a wanted birth or vice versa. However, a study comparing prospective versus retrospective assessment of self-reported pregnancy intention found that the timing of assessment of pregnancy intention did not differ significantly (67); also, because the pregnancy intention changes in both directions, it is not systematically biasing results either way from the null (49).

Second, this study included only two categories of unintended pregnancy: mistimed and unwanted. Other studies have further subdivided mistimed pregnancies into those in which the parents wanted to get pregnant within the next two years compared with those who wanted to get pregnant in excess of two years, which this study did not address because data was not collected at this level. Studies that have looked at length of mistiming have found that younger women have a higher prevalence of severely mistimed pregnancies, defined as more than two years, relative to older women. When mistimed pregnancies are dichotomized, the differences in behaviors and adverse pregnancy outcomes persist among those with severely mistimed pregnancies but not those with pregnancies mistimed by less than two years (68).

Third, PRAMS uses a population of live births, which does not take into account the counterfactual experiences of women whose pregnancies ended in miscarriage, abortion, or stillbirth. Additionally, women who have had a live birth but whose baby died in infancy might also be more hesitant to respond to the PRAMS survey. This may reduce the sample of mistimed and unwanted pregnancies, because women who drink or smoke prenatally are at higher risk of spontaneous abortions and stillbirths. Also, the very youngest and older women have the highest proportion of abortions, so the population of women who choose to carry their pregnancies to term differs from those who choose to end an unintended pregnancy. Moreover, women at the beginning and the end of their reproductive life span are more likely to give birth to a baby with a birth defect or developmental delay, which could interfere with feelings of attachment towards their child and/or diminish the quality of maternal behaviors (6, 9).

Finally, responses to the survey were self-reported. Because of this, outcomes were likely subject to social desirability bias in instances when women may be hesitant to disclose engaging in risk-taking behaviors, such as smoking cigarettes and drinking alcohol. This may have biased results towards the null. Participants with intended versus unintended pregnancies may differentially recall health-promoting behaviors, such as the timing of pregnancy recognition or prenatal care initiation. Estimating gestational age is an imprecise science based on either the timing of the last menstrual period or crown-to-rump length. Women with intended pregnancies are more likely to be attuned to the timing of their last menstrual period than those with unintended pregnancies, which may bias findings either towards or away from the null.

Additional areas need to be explored in relation to pregnancy intention across a range of demographics. Childbearing practices are changing as parents are putting off having children until later in life and outside of nuclear families (69, 70). As the stigma of pregnancy outside of marriage decreases, more couples are choosing to forgo marriage altogether (69). Additionally, as of the beginning of 2015, same-sex partnerships are recognized in 37 states and at the federal level; these couples are still considered unmarried in surveys such as PRAMS and NSFG (71). Future studies should first look at a wider range of family arrangements, including cohabitation, marriage/civil unions/domestic partnerships, as well as the pregnancy intentions and paternal/partner behaviors of the non-biological parent in two-parent households. Second, associations between pregnancy intention and health-care utilization measures, including preconception dental care and maternal postpartum checkups, have yet to be fully explored. Third, across age groups, more attention needs to be paid to the heterogeneity of maternal behaviors. Finally, future studies should explore gaps related to mental health care across perinatal periods and interventions that increase healthcare utilization. There is a paucity of research on clinically significant depression, and studies using PRAMS only address one aspect of depression, validated as a measure used in screenings in primary care settings (64).

These results provide several important pieces of information to inform behavioral interventions across perinatal time periods to improve the quality of care in women and infants. Healthcare providers have increasing demands in the number of biological and behavioral screenings to administer during routine checkups, with

increasingly less time to counsel patients and dwindling compensation for behavioral counseling. However, discussing pregnancy intention in all women prior to conception is vital to reducing the unintended pregnancy rate in the US, so that mistimed pregnancies can be delayed until a woman is physically and emotionally ready to conceive; most unwanted pregnancies could be averted. Certain interventions could be targeted to at-risk populations, such as smoking cessation for older women, while other messages can be addressed towards women of all age groups, such as the importance of early initiation of prenatal care. Meanwhile, additional interventions and more intensive counseling could be targeted towards women with unwanted pregnancies to address the initiation of breastfeeding and screenings of postpartum depression, for example.

Because women have a harder time modifying behaviors such as smoking as they get older, policy-level changes tied to economic incentives and disincentives sometimes provide an additional impetus to change with higher rates of success than individual behavioral interventions. At a systemic level, policy changes in smoking taxation laws and smoke-free work places have been shown to have significant impact in reducing smoking prevalence. A combination of excise and ad valorem taxes decrease the rate of sales of cigarettes (72-74). Banning smoking in the work place has similarly positively impacted behaviors related to smoking (73, 74). A combination of taxes and smoking bans in public places could influence both maternal smoking perinatally as well as second-hand exposure to women and infants.

Another example of a policy-level change that influenced unintended pregnancy is Colorado's passage of a law providing funding for long-acting reversible

contraceptives for at-risk populations in 2009 (75). In the years following its implementation, use of LARCs among low-income women increased from 5% to 19%; the state witnessed concomitant decreases in pregnancy rates; abortion; and enrollment in the Special Supplemental Nutrition Program for Women, Infants, and Children (75).

Going forward, public health policy should focus on counseling that specifically targets at-risk groups that differ by pregnancy intention or age, while also targeting all reproductive age groups and pregnancy intentions. This could be conducted in tandem with lobbying for and implementing large-scale policy and structural changes, which have shown the greatest impact in modifying behaviors to improve the health behaviors and outcomes of both parents and infants.

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Table 1. Characteristics of Mothers by Age Group, Pregnancy Risk Assessment Monitoring System, 2010-2011.

Maternal Characteristics	Total [¥] N=19,301 [‡] (% [§])	Age Group								
		<20 N=2,279 (%)	20-24 N=4,710 (%)	25-34 N=9,956 (%)	35+ N=2,356 (%)					
Intention[§]										
Intended	10,273	(55.6)	527 (22.3)	1,811 (39.5)	6,300 (64.3)	1,635 (71.5)				
Unintended	9,028	(44.4)	1,752 (77.7)	2,899 (60.5)	3,656 (35.7)	721 (28.5)				
Mistimed	6,623	(34.2)	1,449 (66.4)	2,301 (50.0)	2,573 (26.9)	300 (13.6)				
Unwanted	2,405	(10.2)	303 (11.3)	598 (10.5)	1,083 (8.7)	421 (14.9)				
Race/Ethnicity[§]										
White Non-Hispanic	9,733	(54.3)	819 (37.8)	2,107 (48.6)	5,554 (59.2)	1,253 (55.9)				
Black Non-Hispanic	5,166	(16.7)	951 (25.9)	1,678 (23.2)	2,067 (13.2)	470 (13.1)				
Hispanic	2,525	(22.1)	360 (31.0)	592 (23.6)	1,246 (20.0)	327 (21.6)				
Multiracial/Other	1,834	(6.9)	145 (5.2)	322 (4.6)	1,064 (7.6)	303 (9.4)				
Parity[§]										
None	8,116	(40.0)	1,864 (81.0)	2,408 (50.9)	3,309 (32.3)	535 (22.7)				
1 to 2	8,917	(49.0)	395 (18.9)	2,057 (44.9)	5,242 (54.5)	1,223 (55.1)				
3+	2,170	(11.1)	-- [†] (0.1)	232 (4.2)	1,347 (13.2)	586 (22.2)				
Medicaid Recipient, prior to conception[§]										
Yes	4,324	(17.1)	1,032 (45.2)	1,462 (25.1)	1,573 (11.3)	257 (6.9)				
No	14,960	(82.9)	1,240 (54.8)	3,247 (74.9)	8,375 (88.7)	2,098 (93.1)				
Income[§]										
<100% FPL	6,972	(36.1)	1,356 (76.4)	2,628 (58.7)	2,551 (25.4)	437 (17.7)				
100-400% FPL	5,577	(31.9)	341 (21.3)	1,396 (35.0)	3,151 (32.7)	689 (29.9)				
>400% FPL	4,981	(32.1)	40 [¶] (2.3)	220 (6.4)	3,647 (41.9)	1,074 (52.4)				
Education[§]										
Less than 12 years	3,186	(17.4)	1,099 (50.7)	861 (20.1)	1,020 (12.2)	206 (10.0)				

12 years	5,591	(27.4)	902	(38.7)	2,011	(41.7)	2,254	(21.8)	424	(17.2)
More than 12 years	10,356	(55.3)	249	(10.6)	1,797	(38.2)	6,601	(66.0)	1,709	(72.8)
Marital Status[§]										
Married	10,468	(40.7)	226	(10.7)	1,514	(37.3)	6,905	(71.7)	1,823	(81.5)
Other ^{**}	8,825	(59.3)	2,051	(89.3)	3,192	(62.7)	3,049	(28.3)	533	(18.5)

Abbreviations:

FPL – Federal Poverty Line; N – Number.

¥ Totals for each characteristic may differ due to missing values.

‡ Unweighted.

§ Weighted.

\$ Significant at $P < 0.0001$; Chi-square test based on adjusted Wald- F statistic.

† Cells with dashes are suppressed due to low cell counts.

⌘ Cells with low cell counts noted.

**Other – Not legally married (only opposite-sex marriage).

Table 2. Health-Promoting and Risk-Taking Behaviors by Pregnancy Intention, Pregnancy Risk Assessment Monitoring System, 2010-2011.

Maternal Outcomes	Pregnancy Intention		
	Intended % [§] (N [‡] =10,222)	Mistimed % (N=6,594)	Unwanted % (N=2,392)
Preconception			
Multivitamin/Folic acid [§]	56.4	28.2	26.0
Dental Visit [§]	57.0	43.3	39.4
Consumed Alcohol [§]	54.4	48.7	51.2
Smoking [§]	18.7	27.6	34.0
Prenatal			
Early recognition by 6 weeks [§]	80.7	61.7	53.7
Early prenatal care (1st trimester) [§]	87.1	73.3	67.3
Consumed alcohol [¥]	7.2	5.1	6.4
Smoking [§]	7.5	12.7	19.5
Postpartum			
Infant checkup [¥]	98.5	97.4	97.8
Maternal well check-up [§]	91.6	88.1	84.8
Breastfeeding Ever [§]	85.1	76.2	65.5
Sleep position on back [§]	73.5	63.6	62.0
Contraception [§]	81.4	86.2	87.0
Smoking [§]	11.6	20.1	26.0
Rules allow smoking inside home [§]	4.1	8.7	11.4
Feelings of Depression [§]	9.5	15.4	19.1

[§] Weighted.

[‡] Unweighted.

[§] Significant at $P < 0.0001$; Chi-square test based on adjusted Wald- F statistic.

[¥] Significant at $P < 0.05$; Chi-square test based on adjusted Wald- F statistic.

Table 3. Health-Promoting and Risk-Taking Behaviors by Age Group, Pregnancy Risk Assessment Monitoring System, 2010-2011.

	Age Group							
	<20 N=2,279‡ (%)§		20-24 N=4,710 (%)		25-34 N=9,956(%)		35+ N=2,356 (%)	
Preconception								
Multivitamin/Folic acid [§]	490	(21.3)	1,252	(26.5)	4,915	(50.2)	1,397	(62.2)
Dental Visit [§]	1,109	(49.4)	1,745	(35.7)	5,438	(53.9)	1,443	(62.9)
Consumed Alcohol [§]	695	(33.5)	2,356	(49.8)	5,611	(56.2)	1,221	(52.7)
Smoking [§]	686	(31.1)	1,682	(32.9)	2,419	(20.5)	386	(12.9)
Prenatal								
Early recognition by 6 weeks [§]	988	(48.2)	2,746	(62.2)	7,360	(77.9)	1,699	(77.8)
Early prenatal care (1st trimester) [§]	1,430	(66.7)	3,387	(72.1)	8,322	(85.0)	1,948	(85.3)
Consumed alcohol [¥]	56	(1.4)	230	(4.3)	661	(7.4)	198	(9.8)
Smoking [§]	333	(13.4)	948	(17.1)	1,208	(8.7)	193	(4.7)
Postpartum								
Infant checkup [¥]	2,075	(96.1)	4,389	(97.8)	9,494	(98.4)	2,235	(98.5)
Maternal well check-up [§]	1,878	(85.7)	4,006	(86.2)	8,949	(91.4)	2,119	(91.8)
Breastfeeding Ever [§]	1,350	(68.5)	3,136	(72.4)	7,769	(83.6)	1,883	(86.9)
Sleep position on back [§]	1,131	(55.2)	2,793	(64.5)	7,014	(72.6)	1,635	(71.7)
Contraception [§]	1,908	(84.1)	3,904	(84.5)	8,180	(84.1)	1,839	(80.0)
Smoking [§]	550	(23.0)	1,329	(24.8)	1,692	(13.2)	253	(7.2)
Rules allow smoking inside home [§]	349	(14.0)	568	(10.6)	561	(4.2)	90	(3.2)
Feelings of Depression [§]	453	(18.2)	785	(15.5)	1,166	(11.0)	239	(9.2)

‡ Unweighted.

§ Weighted.

§ Significant at $P < 0.0001$; Chi-square test based on adjusted Wald- F statistic.

¥ Significant at $P < 0.05$; Chi-square test based on adjusted Wald- F statistic.

Table 4. Odds of Health-Promoting and Risk-Taking Behaviors Among Mistimed Versus Intended Pregnancies by Age Group, Pregnancy Risk Assessment Monitoring System, 2010-2011.

	Age Group							
	aOR ^{¥§}	<20 (95% CI [§])	aOR	20-24 (95% CI)	aOR	25-34 (95% CI)	aOR	35+ (95% CI)
Preconception								
Folic acid	0.85	(0.52–1.36)	0.49	(0.38–0.63)	0.47	(0.39–0.55)	0.63	(0.41–0.97)
Dental Visit	1.40	(0.93–2.10)	0.95	(0.74–1.20)	0.78	(0.66–0.92)	0.71	(0.45–1.12)
Alcohol	1.05	(0.68–1.63)	1.20	(0.94–1.54)	1.35	(1.14–1.61)	1.00	(0.64–1.57)
Smoking	0.84	(0.56–1.27)	1.19	(0.91–1.55)	1.25	(1.04–1.51)	0.95	(0.52–1.74)
Prenatal								
Early Recognition (6 weeks)	1.13	(0.74–1.73)	0.78	(0.61–1.01)	0.50	(0.41–0.61)	0.49	(0.31–0.78)
Early Prenatal care (1st trimester)	0.80	(0.50–1.26)	0.69	(0.52–0.90)	0.63	(0.50–0.79)	0.56	(0.31–1.02)
Consumed alcohol	0.53	(0.17–1.67)	0.66	(0.39–1.11)	1.32	(0.98–1.78)	1.08	(0.60–1.92)
Smoking	0.94	(0.55–1.62)	1.26	(0.92–1.73)	1.10	(0.84–1.42)	0.82	(0.42–1.61)
Postpartum								
Infant checkup	0.96	(0.36–2.61)	1.12	(0.50–2.50)	0.65	(0.35–1.18)	0.55	(0.12–2.63)
Maternal well check-up	1.04	(0.63–1.72)	1.15	(0.81–1.63)	0.99	(0.74–1.32)	0.66	(0.30–1.43)
Breastfeeding ever	0.88	(0.57–1.37)	0.81	(0.62–1.07)	0.83	(0.68–1.02)	1.19	(0.63–2.27)
Sleep position on back	1.00	(0.64–1.56)	0.81	(0.63–1.04)	0.98	(0.81–1.18)	0.77	(0.48–1.23)
Contraception	2.70	(1.54–4.73)	1.69	(1.24–2.29)	1.30	(1.04–1.62)	1.10	(0.68–1.78)
Smoking	0.83	(0.54–1.28)	1.22	(0.91–1.62)	1.30	(1.05–1.62)	1.19	(0.59–2.41)
Rules allow smoking inside home	0.85	(0.48–1.52)	1.03	(0.70–1.51)	1.37	(0.97–1.96)	0.31	(0.09–1.04)
Feelings of Depression	1.14	(0.72–1.79)	1.30	(0.93–1.82)	1.38	(1.07–1.78)	2.01	(1.03–3.93)

Abbreviations: aOR – Adjusted odds ratio; CI – Confidence interval.

[§] All models adjusted for race/ethnicity, income as percent of the federal poverty line, Medicaid status, parity, education, and marital status.

[¥] Significant findings in bold.

Table 5. Odds of Perinatal Behaviors Among Unwanted Versus Intended Pregnancies by Age Group, Pregnancy Risk Assessment Monitoring System, 2010-2011.

	Age Group							
	aOR ^{\$}	<20 (95% CI)	aOR	20-24 (95% CI)	aOR	25-34 (95% CI)	aOR	35+ (95% CI)
Preconception								
Folic acid	0.80	(0.35–1.80)	0.33	(0.21–0.50)	0.42	(0.32–0.54)	0.47	(0.31–0.71)
Dental Visit	0.63	(0.36–1.10)	0.91	(0.62–1.33)	0.69	(0.54–0.89)	0.95	(0.63–1.43)
Alcohol	1.16	(0.62–2.18)	2.16	(1.45–3.21)	1.45	(1.13–1.86)	1.72	(1.20–2.49)
Smoking	0.71	(0.40–1.25)	1.56	(1.06–2.27)	2.06	(1.59–2.67)	1.45	(0.95–2.19)
Prenatal								
Early recognition (6 weeks)	0.66	(0.37–1.18)	0.51	(0.35–0.75)	0.42	(0.32–0.55)	0.30	(0.20–0.45)
Early prenatal care (1st trimester)	0.41	(0.22–0.79)	0.55	(0.37–0.81)	0.56	(0.42–0.75)	0.37	(0.23–0.60)
Consumed alcohol	0.76	(0.20–2.86)	1.47	(0.77–2.82)	1.33	(0.84–2.09)	1.19	(0.70–2.04)
Smoking	0.77	(0.37–1.60)	1.65	(1.08–2.52)	2.24	(1.62–3.10)	2.08	(1.26–3.42)
Postpartum								
Infant checkup	1.98	(0.47–8.35)	0.68	(0.23–1.97)	0.91	(0.46–1.81)	1.86	(0.44–7.93)
Maternal well check-up	0.57	(0.28–1.14)	1.57	(0.97–2.56)	0.64	(0.45–0.92)	0.61	(0.32–1.15)
Breastfeeding Ever	0.36	(0.19–0.68)	0.47	(0.30–0.73)	0.71	(0.55–0.92)	0.66	(0.44–1.01)
Sleep position on back	0.99	(0.54–1.81)	0.69	(0.47–1.02)	1.08	(0.83–1.40)	0.75	(0.49–1.16)
Contraception	1.46	(0.61–3.47)	1.69	(1.00–2.84)	1.58	(1.14–2.19)	2.24	(1.22–4.09)
Smoking	0.78	(0.44–1.40)	1.35	(0.91–2.02)	2.00	(1.50–2.67)	2.10	(1.35–3.27)
Rules allow smoking inside home	1.70	(0.75–3.82)	1.17	(0.65–2.10)	1.73	(1.16–2.57)	1.75	(0.81–3.78)
Feelings of depression	1.78	(0.93–3.41)	1.40	(0.89–2.19)	1.72	(1.26–2.35)	2.35	(1.33–4.16)

Abbreviations: aOR – Adjusted odds ratio; CI – Confidence interval.

^{\$} All models adjusted for race/ethnicity, income as percent of the federal poverty line, Medicaid status, parity, education, and marital status.

[¥] Significant findings in bold.

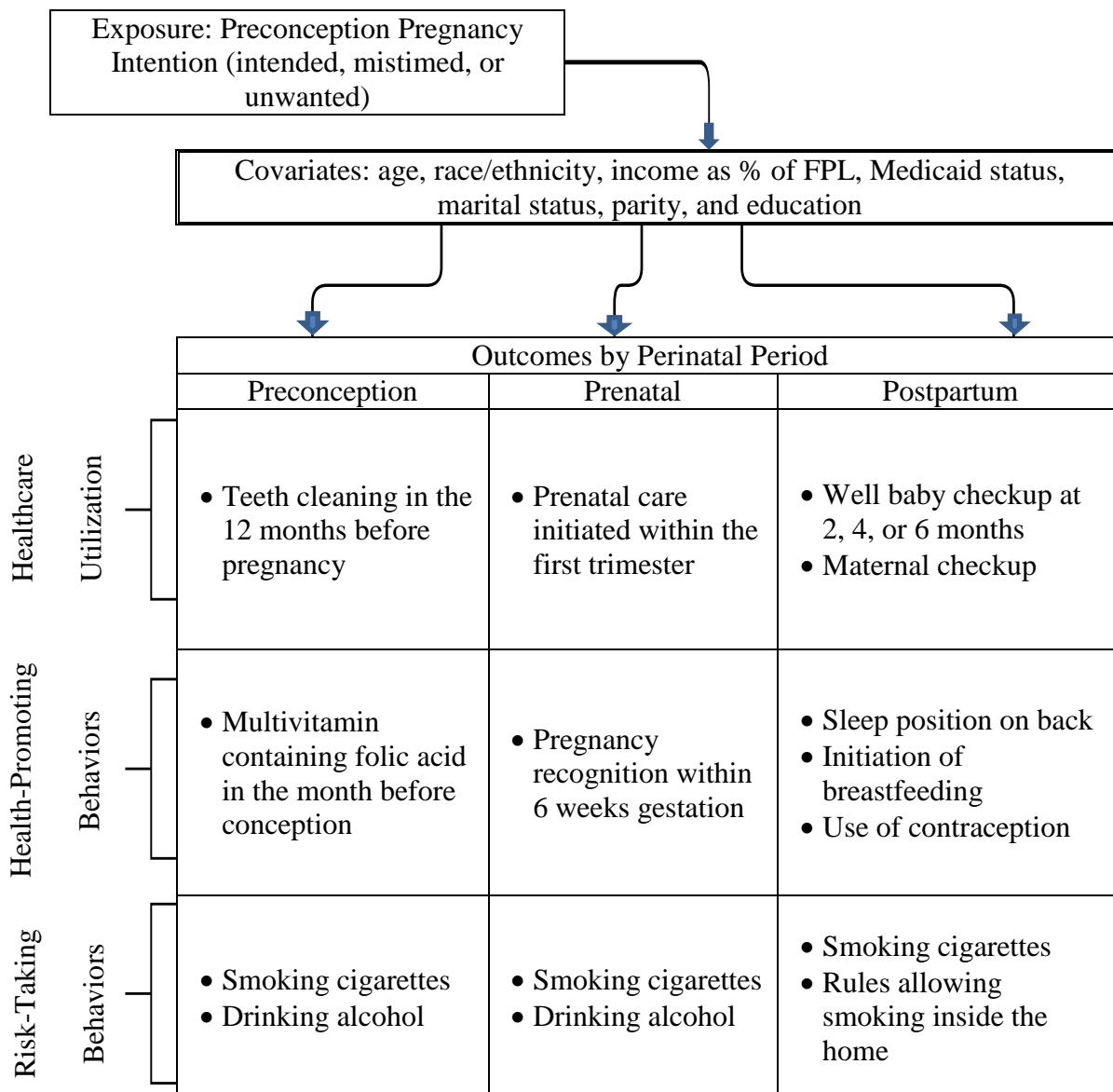
Table 6. Perinatal Behaviors Among Unwanted/Mistimed Versus Intended Pregnancies by Age Group, Pregnancy Risk Assessment Monitoring System, 2010-2011.

	Mistimed					Unwanted			
	<20	20-24	25-34	35+		<20	20-24	25-34	35+
Preconception									
Folic acid		Grey	Grey	Grey			Grey	Grey	Grey
Dental Visit			Grey				Grey		
Alcohol			Black			Black	Black	Black	
Smoking			Black			Black	Black	Black	
Prenatal									
Early Recognition (6 weeks)			Grey	Grey			Grey	Grey	
Early Prenatal care (1st trimester)		Grey	Grey			Grey	Grey	Grey	
Consumed alcohol									
Smoking						Black	Black	Black	
Postpartum									
Infant checkup									
Maternal well check-up							Grey		
Breastfeeding Ever						Grey	Grey		
Depression			Black	Black					
Sleep position			Black				Black	Black	
Smoking			Black				Black	Black	
Smoking Rules								Black	
Contraception	Black	Black	Black				Black	Black	

[§] All models adjusted for race/ethnicity, income as percent of the federal poverty line, Medicaid status, parity, education, and marital status.

[¥] Significant findings have filled boxes. Grey indicates decreased odds; solid black indicates increased odds.

Figure 1. Analysis Framework, Pregnancy Risk Assessment Monitoring System, 2010–2011.



APPENDICES

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