



## Contraception and Beyond: The Health Benefits of Services Provided at Family Planning Centers

Megan L. Kavanaugh and Ragnar M. Anderson

### HIGHLIGHTS

- A large and growing body of literature explores the health benefits related to services received at family planning clinics.
- Research indicates that family planning, including planning, delaying and spacing pregnancies, is linked to improved birth outcomes for babies, either directly or through healthy maternal behaviors during pregnancy.
- Contraceptive methods have a range of benefits other than their primary purpose of pregnancy prevention. Contraception reduces pregnancy-related morbidity and mortality, reduces the risk of developing certain reproductive cancers, and can be used to treat many menstrual-related symptoms and disorders.
- In addition to contraception, a range of other beneficial health services are available to clients at family planning clinics. Services to prevent, screen for and treat diseases and conditions such as chlamydia, gonorrhea, HIV, HPV and cervical cancer, as well as to address intimate partner violence, benefit both female and male clients who visit these clinics.
- Because not all women have equal access to the many benefits of contraception and other health services, there is more work to be done in implementing programs and policies that advance contraceptive access and improve health outcomes for all women.



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# Introduction

## Background and History

In 1960, over half a century ago, the United States Food and Drug Administration (FDA) approved the first oral contraceptive, better known as the pill. Approval of the pill was a significant step forward in the advancement of women's rights, granting women agency over the course of their reproductive lives. Access to effective contraception has resulted in far-reaching and profound consequences, changing the landscape of American society, gender dynamics and trends in family formations. Perhaps most notably, it fundamentally altered the way that women were perceived in society at large, as they were now able to pursue more education and participate in the workforce with greater duration and consistency, ultimately leading to greater financial and social equality with their male peers.<sup>1</sup>

In addition to the host of social, economic and professional consequences of using contraception, there are a range of health benefits that being able to manage fertility affords women and their families. Use of contraception provides women and men with the ability to delay, plan and space pregnancies; these practices have positive implications for maternal health behaviors, both during and following pregnancy, and lead to improved birth outcomes and child health. By preventing unintended pregnancy, contraceptive methods help women to avoid pregnancy- and birth-related morbidity and mortality. Some methods also reduce the risk of developing several reproductive cancers, prevent HIV and other sexually transmitted infections (STIs), and help to treat women who experience negative effects of menstruation.

More than seven million women in the United States, and approximately half of all poor women, receive their reproductive health care at publicly funded family planning clinics.<sup>2</sup> Consequently, this network of approximately 8,000 clinics around the country serves an essential role in providing women with necessary contraceptive and health care services.<sup>3</sup> These clinics provide an essential package of family planning services to women who would be unlikely to receive them otherwise.

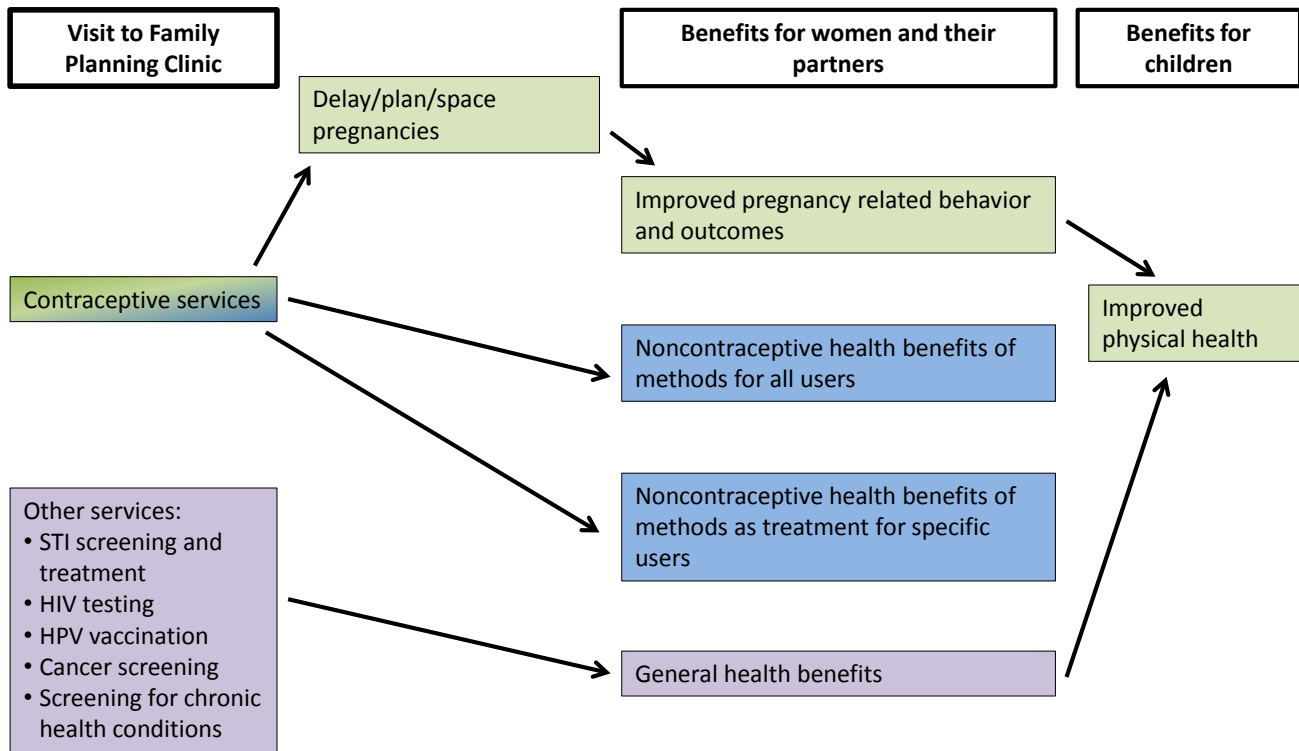
In addition to contraceptive care, patients—both women and men—at publicly funded clinics also receive

a range of other health services, including screening and treatment for STIs, HPV vaccinations and Pap tests for cervical cancer screening. Patients also often receive a range of other tests, including those to detect high blood pressure, anemia and diabetes. These tests can lead to early detection, preventative behavior change and treatment. For many attending publicly funded clinics, this is the only opportunity to receive medical care.

## Purpose of This Report

This report summarizes research on the health benefits associated with services provided at facilities that provide family planning, both those directly related to contraceptive care and those benefits resulting from other services received during a family planning visit (Figure 1). Throughout this report, we use the term “family planning services” to refer to the package of direct patient care services provided through family planning programs to clients receiving reversible contraceptives. Family planning services include client counseling and education, contraceptive drugs and devices, related diagnostic tests (including Pap tests and those for HIV and other STIs) and treatment after diagnosis (such as for urinary tract infections and STIs other than HIV). The findings are organized into three chapters, each representing a different domain of benefits conferred. The first chapter identifies benefits that arise from using contraception to delay, plan and space the birth of children, and is primarily focused on health benefits afforded to women and their children. The second chapter pertains to the noncontraceptive health benefits of using contraception. This chapter covers benefits for all users, as well as benefits for those whose contraceptive use serves as treatment for certain disorders. The evidence in this chapter is primarily focused on the effects of oral contraceptives and, to a lesser extent, the IUD and condom; other methods, such as the patch, the vaginal ring and the implant, likely also confer noncontraceptive benefits, but evidence for this is limited. The final chapter reviews the range of other health services that women and men who visit family planning clinics are likely to receive and describes the benefits of these services.

**FIGURE 1: A wide array of benefits are associated with visiting a family planning clinic.**



This diverse body of evidence demonstrates the myriad benefits—for women, their partners and their children—of broad access to contraceptive methods and other health services provided at publicly funded family planning centers. Several literature reviews on distinct components of this work have already been published, namely in the areas of noncontraceptive benefits of oral contraception and regarding the effects of unintended pregnancy on the health of women and children. However, by compiling all of these benefits into one document and acknowledging the full scope of services offered by family planning centers, we aim to show the importance of a comprehensive package of reproductive and preventive health care.

# Methods

This paper draws on an extensive literature review conducted during May through August 2012, along with a preliminary review conducted in 2010. We identified published research on the health impacts of family planning—broadly defined to include access to contraceptive methods and services; access to other services that are part of a family planning visit, such as STI testing, Pap tests, etc.; and behaviors associated with contraception, such as delaying, spacing or planning a pregnancy—using the following search engines: PubMed, JSTOR, SocIndex and ISI Web of Knowledge. We also identified unpublished research on this topic, in the form of working papers, using the EconLit database, along with Google and other general-purpose search engines.

To find relevant research, we used the following search terms: “contraception,” “the pill,” “family planning,” “fertility,” “birth spacing,” “birth intervals,” “child spacing,” “unintended pregnancy,” “intention status and pregnancy,” “pregnancy wantedness,” “planning status and pregnancy,” “unintended birth,” “cost,” “cost analysis,” “cost benefit,” “cost savings” and “cost-effectiveness,” in combination with “birth outcome,” “prenatal health,” “prenatal care,” “birth weight,” “child development,” “maternal health,” “infant health,” “child health,” “cancer,” “blood pressure,” “diabetes,” “postpartum,” “STI screening,” “STD screening,” “Pap tests,” “HPV vaccination,” “intimate partner violence,” “consequences,” “maternal behavior,” “parental health,” “breastfed” and “breastfeeding.” Several of the terms in the latter half of the list were also searched in isolation; that is, not in combination with any of the terms in the first portion of the list.

We searched for all articles published or presented in working paper form between 1980 and March 2012, eliminating those titles that were obviously not relevant. We then collected and reviewed abstracts of the remaining articles to identify those that were eligible for inclusion in the review. To be eligible, articles had to be written in English and had to present or summarize original research and provide details on the health impact of contraception and related services among women, their partners or their children. Except for one white paper and one online literature summary, all articles had undergone peer

review. We focused primarily on U.S. studies but included a few studies from other developed countries, along with literature reviews that summarized both domestic and international research. We examined the citations in each article to identify additional papers to consider for inclusion. We also gathered articles that received media attention during the time of our review and analysis or that were suggested by our reviewers. In all, 48 studies were selected; they are reviewed below and summarized in the Appendix (page 21).

At the end of the first two chapters, we summarize key findings in three groups: strong evidence, somewhat less evidence and inconclusive evidence. These categorizations were determined based on our assessment of the level of evidence supporting each point; findings for which there is “strong evidence” are those that have several studies supporting a similar association or causal relationship between predictors and outcomes, while findings with “somewhat less evidence” are those for which there were few studies documenting a relationship. “Inconclusive evidence” designates findings for which a relationship is uncertain because of conflicting evidence across studies.

For the most current statistics, information and national screening guidelines for diseases and disorders discussed in the chapter “Health Benefits of Receiving Noncontraceptive Services at Family Planning Clinics,” we primarily cite the condition-specific links on the Centers for Disease Control and Prevention (CDC) and the U.S. Preventive Services Task Force (USPSTF) Web sites. These foundation pieces were not found through the same search process used to identify the main studies that make up the full literature review; thus, they are not reflected in the appendix. The two organizations from which we obtained most of these pieces are widely acknowledged as go-to sources for public health issues in the United States: The CDC is the federal agency that tracks disease prevention and wellness promotion, and the USPSTF is an independent panel of national experts in prevention and medicine that releases evidence-based recommendations about clinical preventive services.

# Health Benefits Associated with Delaying, Planning and Spacing Pregnancies

The typical American woman wants only two children; to achieve this goal, she must use contraceptives for roughly three decades of her life.<sup>4</sup> Without contraception, women would have many more pregnancies than desired. The primary function of contraceptive methods and services is to allow women and couples to control their fertility so that they are able to delay, space, limit and plan pregnancies. Given the ubiquity of contraception today and its range of applications, this primary function of fertility management is sometimes overlooked or taken for granted. Approximately half of all pregnancies in the United States each year are unintended (either unwanted or mistimed);<sup>5</sup> of these, about half are due to a lack of contraceptive use and almost all the rest are a result of inconsistent or incorrect contraceptive use.<sup>6</sup> Pregnancies that occur too early or too close together are common: In 2006, 82% of pregnancies among 15–19-year-old women and 64% of pregnancies among 20–24-year-olds were unintended, compared with fewer than 50% among all older age-groups of women; 29% of all pregnancies were mistimed.<sup>5</sup> When adolescents are surveyed, nearly all indicate that it is important for them to avoid pregnancy.<sup>7</sup> These statistics serve as a sharp reminder of the persistent gap between intentions and behavior that exists among reproductive-aged women and men in the United States.

Given the high rates of unintended pregnancy, much of the literature has focused on the negative health impacts on women and their children when women and couples are not able to plan, delay, space or limit births. Two recent literature reviews have documented much of the evidence regarding the impact of unintended pregnancy<sup>8</sup> and unplanned birth<sup>9</sup> on the health of women, their families and their children. These literature reviews, along with a few more recent studies that largely support this body of evidence, will be highlighted in the discussions of planning pregnancies. However, research centered on pregnancy intention has several limitations. For example, questions about pregnancy intention are usually asked retrospectively, creating a strong bias towards reporting more positive intentions, and they are often measured as a dichotomous variable and therefore fail to capture the nuance and complexity of feelings about the pregnancy. Another difficulty regarding the measurement of

pregnancy intentions is that researchers use different definitions to describe intention status, which can account, in part, for observed discrepancies between studies.

## Importance of Contraception

### Preventing pregnancy

The FDA has approved a wide range of contraceptive methods for preventing unintended pregnancy. Most of these methods, if used perfectly, would have negligible failure rates. In practice, the effectiveness of methods varies and those that require more user involvement generally have higher “typical-use” failure rates than those that require less involvement. However, the use of any method is still far more effective than using no method at all, since couples using no method of contraception have approximately an 85% chance of a pregnancy within 12 months.<sup>10,11</sup>

Certain modern contraceptive methods such as female and male sterilization, the IUD and the implant all have typical use failure rates of 1% or less, meaning that couples have a 1% or less chance of an unintended pregnancy within the first 12 months of using them.<sup>12</sup> The typical-use failure rates for injectable and oral contraceptives are 7% and 9%, respectively, due to some women missing or delaying an injection or pill.<sup>13</sup> The probability of condom failure is somewhat higher at 17%, again primarily due to imperfect or inconsistent use of the method. Those couples using fertility awareness–based methods risk an even higher failure rate of 25%, although use of such methods is still far more effective than using no method at all.

### Reducing unintended pregnancy and abortion

Contraceptive use prevents unintended pregnancies and reduces induced abortion, given the fact that 43% of unintended pregnancies result in abortion.<sup>5</sup> The proportion of women at risk for unintended pregnancy who were using contraceptives increased from 78% in 1982 to 89% in 2006–2010. This increase was accompanied by a decline in unintended pregnancy and abortion rates among these women over the same period.<sup>14,15</sup> The induced abortion rate fell from 29 per 1,000 women in 1982 to 19 per 1,000 in 2007.<sup>16</sup>

Similarly, improved contraceptive use led to a decline in the risk of pregnancy among adolescents. Contraceptive use improved among sexually active U.S. high school students from 1991 to 2011, with an increase in the proportion reporting condom use at last sex (from 46% to 60%) and declines in the proportion using no method (17% to 13%); these adolescents' risk of pregnancy declined 21% over the same time period.<sup>17</sup> Increased contraceptive use was responsible for 77% of the sharp decline in pregnancy among 15–17-year-olds between 1995 and 2002 (decreased sexual activity was responsible for the other 23%), and increased contraceptive use was responsible for all of the decline in pregnancy among 18–19-year-olds.<sup>18</sup> Since 2002, however, there has been little change in adolescents' sexual activity and a simultaneous increase in the use of more effective methods of contraception among adolescents.<sup>7</sup>

The impact of contraception on unintended pregnancy is evident in the accomplishments of federal and state programs providing public funding for family planning services. More than nine million clients received publicly funded contraceptive services in 2006; this national effort helped women avoid 1.94 million unintended pregnancies, including 860,000 unplanned births and 810,000 abortions.<sup>19</sup> By facilitating access to a more effective mix of contraceptive methods, publicly funded family planning centers enable their clients to have 78% fewer unintended pregnancies than are expected among similar women who do not use or do not have access to these services. Indeed, in the absence of this public effort, levels of unintended pregnancy and abortion would be nearly two-thirds higher among U.S. women overall and close to twice as high among poor women. Similar results have been found through evaluations of specific state programs. For example, California's Family PACT program, which provides expanded access to family planning services under Medicaid, provided contraceptives to nearly one million women in 2007, and helped them avoid 287,000 unintended pregnancies, including 79,000 among adolescents, and as a result, 118,200 abortions.<sup>20</sup> In addition, findings from a novel study in St. Louis, Missouri, indicate that providing contraception free-of-charge decreases both abortion and teenage pregnancy rates.<sup>21</sup>

### **Reducing pregnancy-related morbidity and mortality**

By preventing pregnancy, contraceptive methods decrease the number of births that women experience and, subsequently, decrease pregnancy and birth-related morbidity and mortality. This is especially important for women who are at or near the end of their reproductive years, when the risk of pregnancy-related complications and co-morbidities are elevated. Deaths due to pregnancy are low in the United States, but are still much higher than

deaths due to abortion or the use of any method of contraception, although many people incorrectly believe that oral contraception (and other birth control) is more dangerous than pregnancy.\* However, out of 100,000 live births in each age-group, 11 women aged 20–24, 24 women aged 35–39 and 55 women aged 39 years and older die due to pregnancy-related issues, and these rates are 3–4 times higher among black women.<sup>23</sup> Use of any contraceptive method significantly reduces these death rates among women in all age-groups around the world, and the effect is greatest in developing countries where childbirth is particularly dangerous.<sup>24,25</sup>

Abortion is often an indication of unintended pregnancy. The vast majority of abortions in the United States are performed safely and thus have very few negative health consequences for women. Induced abortion results in an estimated 0.64 abortion-related deaths per 100,000 reported legal abortions, making the United States one of the safest places to get an abortion worldwide.<sup>26</sup> However, the health risks associated with abortion increase with the length of pregnancy.<sup>27</sup> With increasing restrictions on abortion provision being proposed—and in some cases adopted—at the state level, avoiding unintended pregnancy is increasingly important in order to reduce the risk of morbidity, and, in rare cases, mortality, associated with having delayed or unsafe abortions.<sup>8,28</sup>

Unintended pregnancy may present an unacceptably high health risk for women who have underlying medical conditions, some of which are exacerbated by pregnancy. Medications taken to manage certain conditions, or the conditions themselves, when combined with pregnancy, may lead to increases in maternal morbidities and mortalities. Approximately one-fourth of deaths during pregnancy in the United States are among women with preexisting medical conditions, such as cardiovascular conditions.<sup>23</sup> Thus, contraceptive methods help women with these and other underlying medical conditions, including diabetes, seizure disorder and breast cancer, to avoid unintended pregnancies and to plan for managing their condition if and when they decide to become pregnant.<sup>29</sup>

Accounting for about 1% of all reported pregnancies, ectopic pregnancies are the leading cause of pregnancy-related death in the first trimester.<sup>30</sup> Between 1991 and 1999, there were 32 deaths per 100,000 ectopic pregnancies. Evidence demonstrates that current and past use of oral contraceptives, past use of IUDs and tubal sterilization all significantly decrease the risk of ectopic pregnancy, even in cases of method failure.<sup>31</sup>

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\* A recent small-scale study of reproductive-aged women in a California medical center found that 75% of respondents believed the pill to be more hazardous to a woman's health than pregnancy.<sup>22</sup>

By preventing pregnancies, use of contraceptive methods also prevents anemia associated with pregnancy; especially among mothers with closely-spaced births.<sup>32,33</sup> In addition, use of hormonal contraception, including the levonorgestrel IUD, reduces the risk of iron-deficiency anemia as a result of the reduction in the amount of menstrual blood lost as less menstrual blood loss results in higher levels of iron in the blood. In this vein, some evidence indicates that hormonal contraceptive methods have more of a protective effect with respect to anemia than do copper-containing IUDs, which can cause heavy and irregular menstrual bleeding.<sup>33</sup>

### **Helping women and couples time and space their pregnancies**

One of the main reasons that women and couples use contraception is to help them time and space their pregnancies, primarily for social and economic reasons. Timing and spacing births also helps women and couples to avoid many negative health outcomes that are associated with having babies too close together. Evidence indicates that short birth intervals can lead to adverse health consequences for both mothers and babies. Contraceptive use and receipt of family planning services are both protective against short birth intervals.<sup>34,35</sup>

Medicaid family planning eligibility expansions that have been implemented in about half of U.S. states provide some evidence of the effectiveness of contraceptive use in helping women to avoid short intervals between births, thereby reducing the risk of poor birth outcomes. In Arkansas, repeat births within 12 months dropped 84% between 2001 and 2005 for women enrolled in the family planning expansion, and it has dropped more quickly among expansion enrollees than among all women on Medicaid.<sup>36</sup> In Iowa, 11% of expansion participants gave birth within 24 months of their last delivery, compared with 15% of women who had a Medicaid-funded birth but who did not use family planning services under the expansion.<sup>37</sup> The difference was even larger for young adults aged 18–21 (13% vs. 21%, respectively). In New Mexico, women obtaining family planning services under the expansion were less likely to have a repeat delivery within 24 months than were women who did not access expansion services (35% vs. 50%).<sup>38</sup> In Rhode Island, the proportion of mothers on Medicaid with birth intervals of less than 18 months fell from 41% in 1993 to 28% in 2003, and the gap between privately insured and publicly insured women narrowed from 11 percentage points to less than one point.<sup>39</sup> In Texas, 18% of expansion participants had a repeat birth within 24 months, compared with 29% of Medicaid-eligible women who did not participate in the program.<sup>40</sup> Finally, in South Carolina, the proportion of expansion participants having a repeat conception

within 18 months decreased from 7% in 1995 to 4% in 2003, a substantially lower rate than was found among all women enrolled in Medicaid (13% in 2003).<sup>41</sup>

### **Improving Birth Outcomes**

Some of the strongest evidence regarding the link between family planning and health outcomes supports the conclusion that helping women and couples to time their pregnancies and births directly improves birth outcomes. This is important because avoiding preterm birth (before 37 weeks' gestation) and low birth weight (less than 5.5 pounds) significantly decreases the chances of infant mortality, birth complications and medical challenges for the baby at birth and beyond.<sup>42</sup> Short birth intervals have been linked with numerous negative perinatal outcomes. U.S. and international studies have found a causal link between the interpregnancy interval (IPI, the time between a birth and conception of a subsequent pregnancy) and three birth outcomes: low birth weight, preterm birth and small size for gestational age.<sup>43,44</sup> A recent systematic review of the literature on the relationship between the IPI and infant birth outcomes in high- and moderate-income countries determined that an IPI of less than six months was associated with increased odds of negative health outcomes for the subsequent pregnancy, including extreme prematurity (before 33 weeks; adjusted odds ratio, 1.6), very low birth weight (below 3.3 pounds; 1.4), stillbirth (1.4) and early neonatal death (1.3).<sup>45</sup> IPIs of 6–11 months were also associated with elevated odds of these negative outcomes, but to a lesser degree. These findings highlight the importance of contraceptive use to help women achieve optimal spacing and, consequently, improve their infants' health.

Given persistently high rates of teen pregnancy, the specific needs of adolescents require particular attention. Data from 2010 indicate that adolescent mothers were more likely than those aged 20 and older to experience a preterm birth before 37 weeks and to give birth to low-birth-weight babies weighing less than 5.5 pounds.<sup>46</sup> However, authors of a more recent study in 2012 found that adolescent mothers were not more likely than those giving birth at age 20 and older to experience these two negative birth outcomes.<sup>47</sup> In addition, infant mortality, although rare, was higher among adolescent mothers (9.6 infant deaths per 1,000 births) than it was among older mothers (6.6 per 1,000).<sup>46</sup> A large U.S.-based cohort study of more than 3.5 million young pregnant women younger than 25 demonstrated that these negative outcomes of early childbearing remain even after controlling for maternal demographic, reproductive and lifestyle characteristics.<sup>48</sup>

Evidence regarding the association between planning a pregnancy and birth outcomes is inconclusive. Some of the more rigorous U.S. reviews indicate that there are weak or



no effects of pregnancy intention (including both want- edness and timing of a pregnancy) on birth weight and prematurity.<sup>8,9</sup> One study identified in these reviews did find that mothers with unwanted births had slightly higher odds of having adverse birth outcomes, but the strength of this association diminished once maternal behavior during pregnancy was taken into account.<sup>49</sup> A more recent meta-analysis of 15 studies conducted in the United States (N=10) and abroad (N=5) concluded that, compared with intended pregnancies, both mistimed and unwanted pregnancies were associated with increased odds of low birth weight (odds ratios, 1.5 and 1.3, respectively), while only unwanted pregnancies—and not mistimed ones—were associated with preterm birth (1.5).<sup>50</sup> However, another review warned that these odds ratios were unadjusted, due to heterogeneity amongst the studies, and therefore should be interpreted with caution.<sup>28</sup> Evidence solely from the United States on the link between unintended child-bearing and infant mortality is similarly weak. Although two longitudinal studies documented an increased risk of neonatal mortality among women who felt “negatively” about their pregnancies, the authors did not control for several key variables and thus the findings should be interpreted with caution.<sup>8</sup> Again, the inconclusive nature of the evidence in this area is likely related to the difficulties associated with measuring pregnancy intentions and want- edness, as the retrospective nature of these measures often leads to more positive categorizations of a pregnancy after the fact. In the developing world, however, evidence regarding the connection between unintended childbearing and infant mortality is much stronger.

## Improving Maternal Health Behaviors

Evidence indicates that pregnancy intentions can influ- ence maternal health behaviors during and immediately following pregnancy. Several government and medical organizations, including the U.S. Department of Health and Human Services Maternal and Child Health Bureau, the USPSTF, CDC and the American Congress of Obstetri- cians and Gynecologists (ACOG), endorse routine prenatal care throughout the course of pregnancy to improve both maternal and child health outcomes. Evidence indicates that prenatal care leads to better birth outcomes, includ- ing reductions in preterm birth and low birth weight.<sup>42</sup> However, the relationship is not a straightforward causal one, as women who seek prenatal care tend to be at lower risk for prematurity than those who do not, and women who have a preterm birth may not have the oppor- tunity to complete a full pregnancy’s worth of prenatal care visits; comprehensive literature reviews assessing enhanced access to prenatal care have not demonstrated a conclusive reduction in premature birth.<sup>51</sup> Women who

receive family planning services are more likely to receive prenatal care than women who do not receive these services.<sup>35</sup> According to a comprehensive review of the literature from 2008, numerous U.S. and European studies have found a significant association between unintended pregnancy and both delayed initiation of prenatal care and few prenatal care visits.<sup>8</sup> This association can be partly explained by the fact that women are less likely to recog- nize a pregnancy early if it is unplanned. One study found only unwanted, and not mistimed, pregnancies to be associated with delay in seeking prenatal care.<sup>52</sup> Although measures of delay vary across studies, the overall trend shows a consistent association between unintended pregnancy and delayed prenatal care, across a variety of settings and among diverse samples.<sup>9</sup>

Several maternal health behaviors during pregnancy, including smoking, using alcohol and failing to take prena- tal vitamins, are considered to be risky behaviors, given their potentially negative effects on infant outcomes.<sup>42</sup> Evidence regarding the link between pregnancy intention and risky maternal health behaviors during and follow- ing pregnancy is mixed. On the one hand, three large, rigorous U.S. studies have demonstrated that there is not a strong association between pregnancy intention and maternal risk behaviors, especially smoking, during preg- nancy, once family background variables are included.<sup>8</sup> Yet, a more recent U.S. study, based on data from Maryland, broadened the measurement of maternal behaviors and found that even when controlling for multiple social and demographic factors, compared with women with intended pregnancies, women with unwanted and mistimed pregnancies were more likely to consume less than the recommended amount of folic acid before conception and to delay prenatal care.<sup>53</sup> Women in this study with unwanted pregnancies were also more likely to smoke both prenatally and postpartum. Further, this study determined that women who reported their pregnancies as intended were likely to experience postpartum depres- sion than those who had reported their pregnancies as mistimed or unwanted. Associations between pregnancy intention and maternal behaviors are complex, however, and it may be a third factor, such as having a high-risk personality, that leads to both riskier behaviors and unintended pregnancies and is the true driver behind the documented association.

The large majority of adolescent pregnancies—four in five—are unintended,<sup>5</sup> but it is important to note that most unintended pregnancies occur among adults; teens account for just one-fifth of unintended pregnancies. Due to the social concerns surrounding teen childbearing, however, the body of evidence on outcomes for adoles- cent mothers and their children is larger than that for adult

women who experience unintended births. It is not an adequate substitute, but data on adolescent mothers and their experiences are helpful in understanding some of the effects of unintended childbearing in general. In terms of long-term health outcomes, studies from the United Kingdom<sup>54</sup> and Australia<sup>55</sup> indicate that women who experienced an adolescent birth were more likely to smoke in greater quantities and to be overweight in their 30s and 40s than were women who had delayed childbearing until their 20s or beyond. The authors conjecture that having a child as an adolescent reduces choices and opportunities for the mother, thus leading to additional unhealthy behaviors and to negative economic and social outcomes later in life.

Certain behaviors can be promoted during the post-partum period to positively affect a child's health during infancy and beyond. Breast-feeding is a primary example; it has been linked with numerous positive outcomes throughout a child's life.<sup>56</sup> Evidence from several U.S. and European studies strongly indicates that children who are born as a result of unintended pregnancies are both less likely to be breast-fed and more likely to be breast-fed for a shorter duration, compared with children whose births were intended.<sup>8,9</sup> A few studies have examined pregnancy intentions more closely and determined that only unwanted pregnancies, and not mistimed ones, are associated with shorter durations of breast-feeding.<sup>9,53</sup>

The bulk of evidence indicates that children born as a result of unintended pregnancies tend to have poorer physical health than those born as a result of intended pregnancies, in terms of being too active or not active enough by mothers' reports (activity levels that are too high or too low are associated with poorer health and development<sup>57</sup>), being overweight and generally having less than excellent health.<sup>9</sup> In some studies, however, once controls for birth outcomes and other risk factors are included, the association between pregnancy wantedness and children's physical health disappears, indicating that prenatal and birth outcomes likely influence how pregnancy intendedness affects children's health. Moreover, although evidence is limited, several studies from the United States, Europe and Japan suggest an association between unintended pregnancy and subsequent child abuse.<sup>8</sup>

Evidence indicates that the intendedness of a pregnancy according to the father has significant effects on prenatal behaviors and some measures of child health. Several studies have found that residential fathers who report a pregnancy to be unintended are less involved during pregnancy and after birth than those who report a pregnancy as intended.<sup>58-60</sup> Fathers' level of involvement during pregnancy, in turn, is associated both with mothers' receipt of prenatal care and the likelihood of the

mother reducing smoking during pregnancy.<sup>60</sup> Parental discordance in pregnancy intentions can also have adverse effects. In particular, infants born to mothers and fathers who differed in their pregnancy intention face significantly higher risks of several adverse maternal behaviors and birth outcomes than those born to parents who both intended to have the birth.<sup>61</sup>

## KEY FINDINGS

### There is strong evidence that:

- By reducing abortion and unintended pregnancy, contraceptive use decreases pregnancy-related morbidity and mortality, particularly for women who are near the end of their reproductive years and those who have medical conditions that may be exacerbated by pregnancy.
- Spacing pregnancies, particularly by at least six months between a birth and the conception of a subsequent pregnancy, is associated with improved birth outcomes, including reductions in the number of babies born premature, low-birth-weight or small for their gestational age.
- Delaying pregnancy until after the adolescent years is associated with reductions in infant mortality.
- Planning a pregnancy is associated with earlier initiation of prenatal care, more prenatal care visits, increased likelihood of breast-feeding and longer duration of breast-feeding.
- When a father reports a pregnancy as planned, he may have increased odds of being involved both during pregnancy and after birth.

### There is somewhat less evidence that:

- Delaying pregnancy until after the adolescent years may be associated with reductions in the numbers of babies born premature or low-birth-weight.
- Children born as a result of a planned pregnancy may have improved physical health and experience less child abuse compared with those born as a result of an unintended pregnancy.
- Parental discordance on pregnancy intention is associated with adverse birth outcomes and risky prenatal maternal behavior.

### There is inconclusive evidence that:

- Planning a pregnancy leads to reductions in risky maternal behaviors during pregnancy, including decreased smoking and drinking and increased likelihood to take prenatal vitamins.
- Planning a pregnancy leads to improved birth outcomes.

# Noncontraceptive Health Benefits of Contraceptive Methods

Contraceptive methods are primarily used to prevent pregnancy; currently available methods, especially hormonal ones, are very successful at achieving this outcome. Virtually every sexually active American woman will use some form of contraception during her reproductive lifetime. At any given time, almost two-thirds of women aged 15–44 (62%; 38.5 million) are using a method of contraception; most of the remainder are pregnant or trying to become pregnant, or are not capable of becoming pregnant.<sup>14</sup> Among women at risk of unintended pregnancy, 89% are using some form of contraception. Although contraceptives are most widely recognized and used for their effectiveness in preventing pregnancy, many methods offer noncontraceptive health benefits. News stories often report on the negative aspects of contraceptive methods, in particular their side effects, while the health benefits of contraceptive methods receive much less attention.

In recent years, manufacturers of contraceptive methods have begun to highlight some of these noncontraceptive benefits to market their products. Several methods are approved by the FDA to provide relief from menstrual-related conditions, such as heavy bleeding, migraines, premenstrual dysphoric disorder (PMDD) and acne. Many women have recognized these additional benefits, sometimes selecting a contraceptive method based on some of these noncontraceptive side benefits. In fact, recent evidence shows that among the 11.2 million women who use oral contraceptive pills, 58% do so at least in part for noncontraceptive reasons.<sup>62</sup> Moreover, 14% of pill users (more than 1.5 million women), about half of whom have never had sex, use the pill exclusively for noncontraceptive reasons; this phenomenon is especially common among adolescent users of the pill, 33% of whom report reasons unrelated to fertility control as their sole purpose for using the method. The most common noncontraceptive reasons cited for using the pill are treatment for cramps or menstrual pain (31%), menstrual regulation (28%) and treatment for acne (14%).

This section reviews the noncontraceptive health benefits of a range of contraceptive methods, including general health benefits experienced by all users and the benefits to certain users of using contraceptives to treat disorders or conditions. Much of the evidence in these areas has been documented in two recent, extensive

literature reviews that together include more than 100 articles.<sup>24,63</sup> Oral contraceptive pills, and particularly combined oral contraception (COC), have been available to U.S. women longer than any other modern hormonal contraceptive method; as such, the bulk of evidence on the short- and long-term health impacts of contraceptive methods focuses primarily on pills.

Although the focus in this chapter is on the many and varied benefits associated with using contraception, it is worth noting that several methods are not without their side effects. Most initial side effects of methods diminish after the first 3–6 months of use. However, some women do experience persistent side effects with certain methods, including breakthrough bleeding on some types of pills and the implant, increased vaginal discharge with the vaginal ring, and weight gain with injectable contraceptives.<sup>64</sup> The risk of blood clots, strokes and heart attacks in reproductive-aged women is overall very low but is increased in users of some of the combined hormonal contraceptive methods, especially those older than age 35 who are smokers.<sup>65</sup> The breadth of experiences that women have using different types of contraception therefore underscores the need for a wide selection of contraceptive methods to assist women in avoiding side effects or outcomes that they are either at higher risk for or less willing to accept.

## Reduced Cancer Risk

Contraceptive methods have general protective effects for women's health. Perhaps the greatest noncontraceptive benefit associated with the use of hormonal contraceptives is a reduced risk of developing certain cancers. Endometrial cancer, a form of uterine cancer, is the most common gynecological cancer in the United States.<sup>66</sup> There is strong epidemiological evidence that oral contraception has a sizable protective effect against developing endometrial cancer, reducing risk among users by approximately 50%,<sup>24,63</sup> or by 7–8% per year of menstrual life.<sup>67</sup> A recent study demonstrates that the longer a woman has used oral contraception, the higher the protection against endometrial cancer due to suppression of endometrial cancer cell development; indeed, this protective effect is sustained more than twenty years after discontinuation of oral contraceptive pills.<sup>68</sup> The estimated cumulative

incidence of endometrial cancer through age 74 in the United States is 2.4% among women who never used oral contraception; in contrast, it is 1.7%, 1.5% and 1.4% among four-year, eight-year and 12-year users, respectively.<sup>69</sup> Levonorgestrel-containing IUDs may also confer a reduction in risk of developing endometrial hyperplasia, one of the primary risk factors for endometrial cancer, although data on this outcome are limited.<sup>63</sup>

Ovarian cancer, although not as common as endometrial cancer, is more aggressive and more likely to be fatal than any of the other gynecological cancers due to the fact that it is often discovered in advanced stages.<sup>66</sup> Substantial evidence indicates that COCs significantly reduce the risk of ovarian cancer by at least 20% among ever-users, and the longer the duration of use of COCs, the lower the risk.<sup>24,63,68</sup> A protective effect of the pill against ovarian cancer has been demonstrated after just 3–6 months of use.<sup>70</sup> For every five additional years of COC use, there is an additional risk reduction of approximately 20%.<sup>63,68</sup> As with endometrial cancer, the protective effect against ovarian cancer conferred by oral contraception persists long after ceasing use of the method.<sup>24,68</sup> For every 5,000 woman-years of COC use, about two cases of ovarian cancer and one death from the disease before age 75 are prevented.<sup>71</sup> Moreover, several studies have indicated that the reduced risk of ovarian cancer associated with the use of COCs extends to women who are hereditarily predisposed to developing ovarian cancer, namely women who carry the BRCA gene.<sup>24,63,68</sup> Although much of the earlier data on the association between oral contraception and reduced ovarian cancer risk focused on COCs with higher doses of estrogen, more recent data indicates that newer pills with lower doses of estrogen have similar risk reduction profiles. Ness and colleagues have demonstrated that in addition to oral contraception, tubal ligation and IUDs also reduce the risk of ovarian cancer, with IUDs conferring significant protection against the cancer even with short durations of use.<sup>72,73</sup>

Compared with the wealth of evidence on the association between reduced ovarian and endometrial cancer risk and COC use, far fewer studies have examined the relationship between pill use and colorectal cancer. The few studies that have, however, report that oral contraceptive users have an 18–50% reduction in the risk of developing colorectal cancer, compared with nonusers of oral contraceptives.<sup>24,63</sup> Unlike in the cases of endometrial and ovarian cancers, the reduction in risk is primarily a short-term benefit that is concentrated among current and recent oral contraceptive users; a duration effect of use was not demonstrated for colorectal cancer.

The reduction in risk of these cancers associated with hormonal contraceptive use must be viewed in light of

broader evidence indicating slightly increased risk in certain other cancers associated with contraceptive use. Although the evidence is weak, oral contraceptive use has been linked to cervical cancer, and this association is stronger with longer duration of COC use.<sup>74–76</sup> With a growing understanding of the role that HPV plays in most cervical cancer cases, however, researchers speculate that oral contraception is simply a cofactor and not a main driver of increased cervical cancer risk.<sup>77</sup> In contrast, copper IUD use is associated with a slightly lowered risk of cervical cancer.<sup>78</sup> Existing evidence regarding the link between oral contraceptive use and breast cancer is mixed, as some studies have documented a slightly increased risk of breast cancer among COC users,<sup>75</sup> while some larger population-based studies have found no increase in risk.<sup>77</sup> Several studies have examined overall cancer risk associated with the use of hormonal contraception and indicate that the benefits of reducing the risk of endometrial, ovarian and colorectal cancers outweigh the potential harm from increased risk of cervical cancer and, to a lesser extent, breast cancer.<sup>74,76</sup> Data collected in the United Kingdom indicate that when the risks associated with developing cervical, uterine and ovarian cancer are combined, COC users experience an overall 30% reduction in risk, compared with nonusers (this study found no relationship between breast cancer and OC use).<sup>76</sup> Broadening the scope to include a range of other cancers, such as large bowel or rectum, lung, pituitary and liver cancer, Hannaford and colleagues demonstrated that COC users in the United Kingdom experienced a 3–12% reduction in overall cancer risk, compared with nonusers.<sup>74</sup>

The evidence detailed above is widely supported within the medical community. Several expert bodies have released statements highlighting the cancer risk-reducing benefits of contraceptive methods. For example, the American Congress of Obstetricians and Gynecologists (ACOG) states that there is “good and consistent scientific evidence that...the use of combined hormonal contraception has been shown to decrease the risk of endometrial and ovarian cancer.”<sup>63</sup> The National Cancer Institute also produces a cancer fact sheet that describes the protective effects of oral contraceptives in reducing the risk of ovarian and endometrial cancer.<sup>79</sup>

## **Other General Health Benefits of Contraception**

In addition to a reduction in cancer risk, some evidence shows that hormonal contraceptives may provide other health-related benefits. For example, some studies have demonstrated that oral contraceptive users have higher bone mineral density (and thus lower presumed fracture risk).<sup>32,63</sup> However, other studies have found no association between COCs and bones density,<sup>24,63</sup> and evidence from

a few small studies indicates that the vaginal ring and the injectable may decrease bone mineral density.<sup>24,63</sup> Contraceptive users also experience overall improved mental health-related outcomes.<sup>1</sup> Finally, the male and female condom can help prevent STIs, including HIV, among sexually active women and men.<sup>39,80,81</sup> (See the next chapter for a more in-depth discussion of the STI-related health benefits associated with condom use.)

## Treatment for Menstrual-Related Symptoms and Disorders

Beyond the broader health benefits experienced by the general population of women using contraceptive methods, certain methods help to treat irregularities, symptoms and disorders associated with the menstrual cycle. There is significant evidence that oral contraception can reduce the most common menstrual disorder, dysmenorrhea, or severe menstrual pain, in 70–80% of women who suffer from this side effect of menstruation.<sup>24,63</sup> Fewer studies have examined the impact of other methods on dysmenorrhea, but those that have suggest that the vaginal ring, the implant and the hormonal IUD may also lead to a reduction in this disorder.<sup>63</sup> Among women with endometriosis, COCs and progestin-only methods, such as injectables, implants and hormonal IUDs, have all been demonstrated to reduce the chronic pelvic pain associated with dysmenorrhea.<sup>63</sup>

Heavy menstrual bleeding, or menorrhagia, occurs in approximately 10% of reproductive-aged women, but even greater proportions seek treatment for heavy periods in general.<sup>82–84</sup> Without treatment, heavy menstrual bleeding can lead to iron deficiency anemia. The levonorgestrel IUD has been shown to be the most effective contraceptive method for treating menorrhagia, and several studies have demonstrated the superiority and cost-effectiveness of using this method, as compared with more permanent surgical therapy such as endometrial ablation (breaking down of the uterine lining) or hysterectomy.<sup>63,85,86</sup>

COCs can significantly reduce blood loss during menstruation by 40–50%.<sup>24,63</sup> Use of a progestin-only method, such as the injectable, implant, hormonal IUD or progestin-only pill, or continuous use of COCs, may reduce blood loss by even more (by decreasing the length of the menstrual period) or may stop menstrual bleeding altogether (amenorrhea).<sup>63</sup> Several of these methods, and certain COC regimens, are specifically marketed to potential users for their ability to decrease or eliminate the bleeding associated with monthly periods.

In addition to allowing women to have greater control over their menstrual cycles, several contraceptive methods help to relieve common side effects associated with menstruation, including premenstrual syndrome (PMS)

and premenstrual dysphoric disorder (PMDD), menstrual migraines and acne. PMS is experienced by about 19% of young women in the United States.<sup>87</sup> In a UK-based study, use of any form of hormonal contraception was demonstrated to lower the number of PMS symptoms experienced.<sup>88</sup> PMDD, a severe form of PMS, is experienced by about 3–5% of reproductive-aged women.<sup>89</sup> Evidence indicates that COCs, as well as the vaginal ring, may help to reduce women's PMDD-related symptoms,<sup>24,63</sup> and one brand of pills (Yaz) has been approved by the FDA to treat PMDD. For the 8–14% of women who experience migraines linked to menstruation, COCs, the injectable and the patch have all been shown to reduce or eliminate the hormonal changes associated with the onset of menstrual migraines, other than those associated with visual disturbances called focal neurological signs.<sup>63</sup> COCs are also effective in reducing facial acne, and several pill products are FDA-approved for this specific purpose.<sup>24,63</sup> Progestin-only methods are not considered effective in treatment of acne.<sup>63</sup>

ACOG has long argued that beyond their primary purpose of preventing unplanned pregnancies and promoting planned, healthy ones, hormonal contraceptives have for years been prescribed “to alleviate heavy bleeding, irregular periods, and acne and to protect against a number of other health problems that affect women, such as ovarian cysts, bone loss, benign breast disease, the symptoms of polycystic ovary syndrome, and anemia.”<sup>90</sup>

## KEY FINDINGS

### There is strong evidence that:

- Oral contraception reduces the risk of endometrial and ovarian cancers.
- Combined oral contraception, and many progestin-only methods, can be used to treat and diminish several menstrual-related symptoms and disorders.

### There is somewhat less evidence that:

- Tubal ligation and IUDs may reduce the risk of endometrial and ovarian cancers.
- Oral contraception may reduce the risk of colorectal cancer.

### There is inconclusive evidence that:

- Oral contraception may affect the bone mineral density of users.
- Oral contraception may increase the risk of cervical cancer.
- Oral contraception may increase the risk of breast cancer.

# Health Benefits of Receiving Noncontraceptive Services at Family Planning Clinics

Many services beyond contraceptive care are available to patients who attend publicly funded sites that provide family planning. In fact, each year, family planning centers serve nearly one in five women receiving a Pap test, one in three women getting tested or treated for an STI, and one in three women being tested for HIV.<sup>3</sup> Women who seek family planning services are more likely than those who do not to receive broader health services, including tests for STIs, blood pressure screening, breast examinations, and a pelvic exam or Pap test.<sup>91</sup> In fact, women who receive reproductive health care at a publicly funded clinic tend to receive a wider range of services and diagnostics than do those who seek care from a private provider.<sup>92</sup> For many women, these publicly funded family planning sites are their only source of regular medical care.<sup>93</sup>

The federal Title X program, which includes more than half of all publicly funded clinics, provides reproductive health care to more than five million women and men each year.<sup>94</sup> The program is devoted to providing high-quality family planning services specifically to poor and low-income women. Title X family planning health service centers are required to offer information, education and counseling related to contraception, and HIV and other STIs, as well as provide and encourage several other services, including a blood pressure exam; pelvic examination and Pap test; screening for diabetes, anemia, rubella, hepatitis B, gonorrhea, chlamydia, syphilis and HIV.<sup>95</sup> The initial guidelines also required screening for colorectal, breast, kidney and bladder cancers, but based on existing evidence regarding the appropriate age range for colorectal cancer screening (now starting at age 50) and a lack of consensus about the effectiveness of clinical breast exams and urinalysis as optimal tools for identifying breast, kidney and bladder cancer, these services are no longer mandated for all clients seen at Title X facilities.<sup>96</sup> This chapter details the broader and varied services that are often available at sites that provide contraceptive care to women and men and the health benefits of these services.

## Services to Prevent, Screen for and Treat STIs

Screening for STIs, including chlamydia, gonorrhea, syphilis and HIV, is an integral component of sexual health services and is offered at 97% of publicly funded sites that provide family planning.<sup>97</sup> Chlamydia is one of the most common

STIs in the United States, and it disproportionately affects sexually active people who are younger than 25 or who are black.<sup>98</sup> There were approximately 1.4 million reported cases of chlamydia in 2011, but the actual number is likely twice that amount, as many infections go unreported. The infection is often asymptomatic, particularly among women, and is therefore difficult to detect; as a result, many people who are infected do not seek treatment.<sup>99-101</sup> Untreated infection can lead to a host of adverse health outcomes, particularly for young women,<sup>98</sup> including pelvic inflammatory disease (PID), infertility, ectopic pregnancy, chronic pelvic pain and possible adverse pregnancy outcomes; it can also increase one's risk of contracting HIV.<sup>101-103</sup> Widespread screening programs, focused on testing individuals both with and without symptoms, have been demonstrated to reduce the prevalence of both chlamydia infection and PID among women.<sup>101,104-107</sup> The sole randomized control trial to examine the impact of chlamydia screening on PID demonstrated that, among high-risk women aged 18–34, screening for chlamydia could lead to a 60% reduction in cases of PID, with one case of PID being prevented for every 83 women screened.<sup>106</sup> Current CDC and USPSTF guidelines recommend universal screening of all sexually active women aged 25 and younger, although some studies recommend either expanding the age range to include women up to age 30<sup>108</sup> or offering universal screening to high-risk men and women and those living amongst high-prevalence populations.<sup>99,109,110</sup>

Gonorrhea, another common STI has much in common with chlamydia in terms of high underreporting, a lack of symptoms (particularly among women) and high prevalence among sexually active individuals aged 25 and younger.<sup>111,112</sup> Other subgroups at high risk for gonorrhea include men who engage in same-sex sexual relations and blacks. The CDC estimates that more than 700,000 people in the United States contract gonorrhea every year,<sup>111</sup> although recent data indicate the rate of gonorrhea decreased between 2005–2008.<sup>113</sup> Regardless of the presence or severity of symptoms, untreated gonorrhea can lead to adverse health outcomes for both men and women, such as inflammation in the urethra, epididymis or prostate in men and, among women, inflammation of the cervix and PID; these conditions and diseases can

lead to difficulties becoming or remaining pregnant and to adverse pregnancy and birth outcomes.<sup>112</sup> Evidence suggests that men and women with gonorrhea may have an elevated risk of contracting HIV.<sup>102,103,112</sup> Like for chlamydia, screening recommendations for gonorrhea are focused on women, since the consequences of infection are more severe than for men.<sup>112</sup> In the mid-1970s, a federally funded gonorrhea-prevention effort primarily targeting asymptomatic, infected women was implemented at local and state health departments to reduce population-level rates of the infection;<sup>114</sup> the rate declined by 75% from 1975 to 2003.<sup>115</sup> During this time period, one study estimated that 32 million cases of gonorrhea were averted because of the federal prevention efforts.

Although syphilis is far less common than gonorrhea or chlamydia, with only 46,042 reported new cases in the United States in 2011, untreated infection can be extremely severe and may lead to paralysis, blindness, dementia and premature death.<sup>116,117</sup> Symptoms of syphilis commonly include sores on the genitals or mouth and a skin rash; symptoms usually appear about 21 days after infection.<sup>116</sup> In the 1990s, syphilis rates were declining and were concentrated among heterosexual women and black men. In 2001, however, syphilis rates increased and the burden of shifted to men who have sex with men and individuals who engage in high-risk sexual behavior (such as having multiple partners or having unprotected sex).<sup>116,117</sup> The USPSTF recommends that women and men who engage in high-risk sexual behaviors be regularly screened for syphilis, with the caveat that health care providers should take local syphilis prevalence rates into account,<sup>117</sup> while the CDC recommends only screening women who have been exposed to the disease.<sup>116</sup> Screening approximately 24,000 people in the general population would reveal one syphilis infection; by comparison, among incarcerated women, a high-risk population, only 10 screenings would be necessary to reveal one infection.<sup>117</sup> Syphilis also increases the risk of HIV transmission; among black women and men in 2000, an estimated 545 new cases of HIV infection could be attributed to syphilis.<sup>118</sup> Therefore, syphilis prevention efforts would also help to curb the incidence of HIV, especially within the black community.

The HIV epidemic currently affects 1.1 million individuals in the United States.<sup>119</sup> HIV testing is a key component of health services and is offered at 92% of publicly funded family planning clinics.<sup>97</sup> The CDC recently estimated that approximately 41,400 new cases of HIV occur in the United States each year;<sup>119</sup> this rate of new infection has remained relatively stable since 1998 because of widespread testing and treatment efforts.<sup>120,121</sup> Since HIV arrived in the United States, the demographics of HIV-positive individuals has changed considerably. Today,

in addition to men who have sex with men, those most at risk are women, individuals under 20 and blacks.<sup>119</sup> Detection of HIV through early testing yields benefits for individuals, as early monitoring of the infection may lead to earlier and more effective treatment. Given the evidence indicating that discovering one's HIV-positive status leads to decreases in high-risk sexual behavior,<sup>122</sup> early detection also benefits HIV-positive individuals' past, present and future partners. The CDC and the USPSTF recommend that clinicians routinely screen all individuals aged 15–65 for HIV.<sup>117,121,123</sup> These screening efforts can help avert cases of HIV; for example, one published decision analysis model suggests that HIV counseling and testing, when provided to a cohort of 10,000 people with 1.5% HIV seroprevalence, would avert eight cases of HIV.<sup>115</sup> Another model by Farnham and colleagues estimates that from 1991 to 2006, HIV prevention programs, including screening efforts, averted 361,878 cases of HIV infection.<sup>124</sup>

As one of the simplest and lowest cost preventive services, condoms, when used consistently and correctly, are perhaps the best strategy for sexually active individuals to prevent the transmission of HIV and other STIs. The vast majority of publicly funded facilities that offer family planning (90%) provided condoms onsite to patients seeking care in 2010–2011.<sup>97</sup> Condoms are most effective in preventing transmission of STIs that occur through bodily secretions, such as gonorrhea, chlamydia and trichomoniasis, but are also effective in preventing transmission of genital ulcer diseases and HPV infection when they cover the infected area.<sup>125</sup> Because untreated STIs can have adverse health consequences for women, using barrier methods helps to preserve women's fertility by preventing transmission of STIs.<sup>25</sup>

A 2002 Cochrane review examining condom use among HIV serodiscordant couples (those in which one partner is positive and one is negative) determined that regular condom use is approximately 80% effective in preventing HIV transmission.<sup>81</sup> According to the most recent summary of the evidence by the CDC:

*Latex condoms, when used consistently and correctly, are highly effective in preventing the sexual transmission of HIV, the virus that causes AIDS. In addition, consistent and correct use of latex condoms reduces the risk of other sexually transmitted diseases (STDs), including diseases transmitted by genital secretions, and to a lesser degree, genital ulcer diseases. Condom use may reduce the risk for genital human papillomavirus (HPV) infection and HPV-associated diseases, e.g., genital warts and cervical cancer.<sup>126</sup>*

The majority of publicly funded sites (95%) offer treatment for STIs.<sup>97</sup> Treatment for STIs, including chlamydia,

gonorrhea and syphilis, consists of either one course of medication or a discrete series of medication to restore the health of the individual; many treatments can be dispensed or prescribed on site at family planning clinics. HIV diagnoses require ongoing care and attention over the course of an individual's life, and patients who receive these diagnoses are typically referred out and linked to alternative sources for this follow-up care.

In addition to treatment directly for clients who test positive during a screening test received at a clinic, prompt treatment for the sexual partners of individuals infected with an STI is a useful tool in preventing the spread of these infections. Expedited partner therapy, which is permissible or potentially allowable in 43 states, includes providing treatment medications to patients diagnosed with gonorrhea or chlamydia to take to their partners and is highly effective in reducing reinfection rates.<sup>127</sup> It is therefore recommended when partners are unlikely to seek timely evaluation and direct treatment.

## HPV Vaccination and Pap Testing

Human papillomavirus (HPV) is the most widespread of all STIs; the CDC estimates that 79 million Americans are living with HPV and that almost every sexually active person will have HPV at some point in their sexual lifetime.<sup>128</sup> Although 90% of infections resolve without treatment and do not lead to any adverse outcomes, some strains of HPV can lead to cervical, anal, vaginal, vulvar and oropharyngeal cancers or genital warts.<sup>128,129</sup>

In 2009, 12,357 women in the United States were diagnosed with cervical cancer; 3,909 of these women died from the disease.<sup>66</sup> Cervical cancer was one of the deadliest cancers for women in the United States until about forty years ago, when widespread screening of reproductive-aged women through conventional Pap tests was implemented.<sup>130,131</sup> Due to increased early detection through the incorporation of the Pap test as a routine service during women's annual gynecological exams, cervical cancer rates and associated mortality have significantly decreased.<sup>131</sup>

Pap tests during pelvic examinations are one of the most common services received as part of reproductive health care, although rates of conventional Pap tests in the most recent years are trending downwards as newer technologies for cervical cancer screening become more prevalent<sup>97</sup> and evidence on the effectiveness of HPV screening for identifying cervical cancer<sup>131</sup> and the cost effectiveness of HPV screening, as compared with Pap tests,<sup>132</sup> has emerged. HPV testing in conjunction with a lifetime of biennial Pap tests starting at age 20 averts 225 cases of cervical cancer per 100,000 tests and decreases cervical cancer-related mortality by 59%.<sup>131</sup> Current screening guidelines for cervical cancer recommend that

women younger than 21 not be tested regardless of sexual history, that all women aged 21–65 receive a Pap test every three years and that women aged 30–65 also be screened for HPV every five years.<sup>130,133,134</sup> A recent review of the literature on HPV testing indicates that women who have tested negative for HPV can have longer testing intervals of up to five or six years.<sup>135</sup>

Widespread HPV vaccination efforts were introduced in 2006 in response to research showing an association between HPV and negative health outcomes and demonstrating the effectiveness of HPV vaccines administered prior to the initiation of sexual activity in preventing high-risk strains of HPV.<sup>129</sup> Initial efforts targeted young female adolescents aged 11 and 12 for primary inoculation and recommended that girls as young as age nine could also be vaccinated based on doctor discretion; women as old as 26 could also receive the full series if they had not already done so.<sup>128</sup> More recently, guidelines for vaccination recipients broadened to include young males between the ages of 11 or 12 and 21, men who have sex with men and those with a compromised immune system. Overall, HPV vaccination efforts have been associated with a 60–88% reduction in lifetime risk of cervical cancer; when combined with HPV screening every five years, vaccination reduces risk by 83–95%.<sup>136</sup> The vaccine is about 90% effective against initial infection of the most common strains of HPV and 100% effective against persistent infection with these strains.<sup>137</sup> In 2010–2011, 87% of publicly funded family planning clinics provided the HPV vaccination onsite.<sup>97</sup>

Follow-up care for women who receive abnormal HPV or Pap test results may include continued monitoring, colposcopy to examine the cervix, biopsy to remove a small portion of the cervix for closer study or treatment to remove any abnormal cells—services which can often be done right at the family planning center.<sup>138</sup> Women who are diagnosed with cervical cancer based on results from these screenings and additional follow-up tests require ongoing care and attention over the course of their lives. Patients who receive these diagnoses are typically referred out and linked to alternative sources for this follow-up care.

## Screening for General Health Issues

All individuals who seek care at Title X clinics are encouraged to receive a range of screenings not related to sexual and reproductive health, including for diabetes, blood pressure, cholesterol, anemia and rubella. Diabetes, which can lead to hypertension, cardiovascular disease, stroke and other outcomes, is one of the leading causes of death and disability in the United States, with more than 25.8 million people diagnosed and rates continuing to increase.<sup>139,140</sup> Type 2 diabetes represents 90–95% of cases of the disease



and is often asymptomatic in its early stages, which makes early diagnosis without screening virtually impossible.<sup>139,141,142</sup> In 2010–2011, 72% of publicly funded facilities that provide family planning reported providing diabetes screening.<sup>97</sup> While there is no definitive evidence that early treatment can reduce later complications, annual diabetes screening is still recommended for those who have a sustained blood pressure of 135/80 mm Hg or higher.<sup>139</sup>

Strong evidence exists to support regular blood pressure screening among all individuals 18 and older to enable early identification of hypertension and treatment to reduce blood pressure and subsequent risks of associated cardiovascular events, such as heart attacks, heart failure and stroke.<sup>143,144</sup> Cholesterol screening is recommended for women aged 20 and older and for men aged 20–35 who are at increased risk of coronary heart disease, as well as all men older than 35, to detect lipid disorders, which can also lead to heart attacks and strokes.<sup>145</sup>

Other routine recommended screenings offered at sites that provide family planning services are targeted at detecting conditions that could negatively affect pregnant women; these include hepatitis B testing, anemia screening, and rubella titers to assess immunity to the rubella virus.<sup>146</sup>

Finally, although not specifically identified as a core service offering in the Title X guidelines, screening for intimate partner violence (IPV) is provided at 83% of publicly funded sites.<sup>97</sup> Evidence is mixed as to whether IPV screening can reduce the incidence of IPV,<sup>147,148</sup> but screening for IPV provides an opportunity to “inform and shape” attitudes around abuse and can reduce women’s sense of alienation.<sup>148</sup> Both the USPSTF and the Institute of Medicine support routine IPV screening for all women of childbearing age, with the Institute of Medicine recently endorsing screening and counseling for IPV as one of the key preventive services for women in their recommendations for services that should be included in updated clinical guidelines under the new Affordable Care Act.<sup>149,150</sup>

Identification of symptoms associated with chronic diseases such as high blood pressure and diabetes typically requires ongoing care and attention over the course of an individual’s life, and patients who receive these diagnoses are typically referred out and linked to alternative sources for this follow-up care.

### **Benefits for Men of Attending Family Planning Centers**

Although women are the primary focus of most of the sexual and reproductive health services offered at publicly funded family planning facilities, most clinics also provide services to men, with 65% of facilities indicating that

their staff members are specifically trained to provide these same services to men.<sup>97</sup> As is the case with young women who visit federally funded clinics, young men with publically funded health insurance are more likely to receive reproductive health services than are those with private insurance.<sup>151</sup> In 2011, 8% of clients seen at Title X facilities were male.<sup>152</sup> Standard services for men offered at Title X facilities include many of the same screenings offered to women, including for HIV and other STIs, diabetes, blood pressure and cholesterol,<sup>95</sup> and thus men reap many of the same benefits associated with these screenings that are detailed above for women. Some of these men are served because they seek care on their own, while others attend as partners of female patients. For example, in 2010, 63% of publicly funded clinics reported that STI treatment for male partners was often provided when female clients test positive; in other instances, men often sought and received STI services and contraceptive services on their own (at 57% and 21% of clinics, respectively).<sup>97</sup> Although studies focused on men’s receipt of sexual and reproductive health services are scarce, recent efforts have called for greater attention to the sexual and reproductive health care needs of men, especially during adolescence.<sup>151,153,154</sup>

## **KEY FINDINGS**

**Women and men who seek family planning services, as well as those who do so at publically funded clinics, receive a wide range of other health services and diagnostics besides contraceptive care. These services include:**

- Screening for STIs, such as chlamydia, gonorrhea, syphilis and HIV, which enables early detection and treatment, thus averting many of the negative health outcomes associated with their progression.
- A combination of HPV vaccination, Pap tests and HPV testing following recommended guidelines to prevent or enable early detection of HPV infection, which can lead to cervical cancer.
- Screening for other general health conditions, such as diabetes, blood pressure and cholesterol to enable early detection and prevent serious adverse health outcomes.
- Treatment services, available either onsite or through referrals to other providers, to help individuals to manage diseases and their associated symptoms.
- Provision of condoms, which prevent STIs and unintended pregnancy.

# Summary and Discussion

The impact of family planning is evident on multiple levels: individual, interpersonal, familial and societal. Contraception—both in terms of method use and the broader effects of family planning—has benefits that reach into all realms of women’s and men’s social, economic and physical well-being. The social and economic ramifications of contraception for women and their families have been covered elsewhere;<sup>1</sup> this review has focused specifically on health benefits associated with contraception. In addition, this review has examined an expanded scope of other benefits individuals receive from family planning providers, as many women and men who seek care at publicly funded clinics receive health services beyond contraceptive care. The health benefits that these related services have for women and men should be taken into account when discussing the far-reaching impact of the services provided at facilities within this network of publicly funded family planning centers.

The broader benefits associated with planning, delaying, spacing and limiting births affect women, their partners and their children. By preventing pregnancy, contraception reduces morbidity and mortality associated with becoming pregnant and giving birth. Contraception allows women and men to time and space their pregnancies, which, research demonstrates, has positive ramifications for healthy births and healthy babies. Contraception also helps couples to plan for pregnancy; research indicates that pregnancy planning is associated with some improvements in maternal behavior both during and following a pregnancy, ultimately leading to improved physical health for babies.

Research indicates that combined oral contraceptive pills, as well as some other contraceptive methods, reduce the risk of several gynecological cancers for all users, even when possible increased risks of other cancers are taken into account. For many women who experience negative side effects associated with their menstrual cycle, contraceptive methods, especially the pill and the hormonal IUD, have been demonstrated to significantly reduce and treat several of these disorders. Many women taking the pill report using it for reasons other than pregnancy prevention, taking advantage of the fact that contraceptive methods have benefits beyond birth control and, in some cases, seeking out methods purely

for noncontraceptive reasons. More research is needed to establish the benefits (and possible risks) associated with the use of some newer contraceptive methods, such as the vaginal ring, birth control patch and hormonal implant.

Services provided at publicly funded family planning centers, including those that go beyond contraceptive care, are vitally important to the health of men and women who seek care at these sites. This is the case both for the 63% of female family planning clients who rely on these sites as their usual source of health care,<sup>155</sup> as well as for those male and female clients who benefit from being linked to follow-up care with other health care providers. For example, preventive services, such as HPV vaccinations, are critical for helping women and men avoid STIs and resulting conditions. Screening services, which represent the bulk of noncontraceptive care during family planning visits, detect HIV and other STIs, several cancers and a variety of other general health conditions early. Early detection can facilitate prompt and, in some cases, more effective treatment, thus improving health and preventing progression into more serious stages of a condition or disease that brings more severe health consequences. Treatment services may be provided either onsite at publicly funded family planning centers or through referrals to specialized providers and are essential to improve clients’ health.

Despite the many and varied benefits that contraception and related services confer on women and their families, all women in the United States do not have equal access to these benefits. Poor women experience a disproportionate share of the burden of unintended pregnancy and its consequences: For instance, women with incomes below the federal poverty level have an unplanned pregnancy rate five times that of higher-income women (those above 200% of poverty). Poor women frequently experience challenges and barriers in their attempts to access health care services and obtain contraception, therefore rendering them less able to reap many of the health benefits described in this paper. For example, recent evidence indicates that aside from being one of the most effective contraceptive methods available, the levonorgestrel IUD may also reduce cancer risk and improve menstrual-related symptoms. Yet, as one of the most expensive methods currently available, the IUD is not accessible to all women.

The government's primary attempt to address these disparities has been through its public investment in family planning services for young and lower-income women, and in a network of safety-net health centers to provide these services. Over the years, that investment has paid considerable dividends in terms of helping women obtain contraceptives and avoid unintended pregnancies. Ensuring access to contraceptive methods and services is a top priority at publicly funded family planning facilities, and the expansive impact that these services have on women's ability to fully participate in society cannot be understated. Publicly funded family planning services currently reach more than nine million women and men each year—seven million who are served at publicly funded clinics and two million Medicaid clients who are served in other settings. Services provided to these individuals enable women to avoid almost two million unintended pregnancies. Without publicly funded family planning, levels of unintended pregnancy and abortion in the United States would be two-thirds higher than they are today (and more than twice as high among poor women). In addition to enabling women to avoid pregnancies they do not want to have, these services are extraordinarily cost effective. Every dollar spent to provide publicly funded family planning services saves \$5.68 that would otherwise have to be spent to provide maternity and infant care related to unintended pregnancies.<sup>156</sup>

As compelling as these data are, they capture only a subset of the true public-sector savings generated by these efforts. These numbers consider only the impact of contraceptive services, even though the package of care delivered in family planning centers is much broader, as discussed in this review. Evidence indicates that if additional health services were considered, that would significantly increase the overall cost savings associated with receiving care at publicly funded family planning centers. For example, the federally funded gonorrhea-prevention effort implemented in the mid-1970s was estimated to have averted 32 million cases of gonorrhea and resulted in net savings of \$3.2 billion.<sup>115</sup> Likewise, the cost per quality-adjusted life year gained by adding routine HPV vaccinations for young women starting at age 12 to existing screening practices was estimated to range from only \$4,000 to under \$15,000 in 2005 dollars.<sup>129</sup> Finally, the National Commission on Prevention Priorities ranked screening females younger than 25 years for chlamydia as one of the 10 most beneficial and cost-effective prevention services.<sup>157</sup>

Unfortunately, public funding has never been enough to fully meet women's needs. Moreover, that inadequate level of funding has suffered recently under budget cuts and political attacks on contraception. The 2010 Affordable

Care Act could do much to address the unmet need for affordable family planning services. If fully implemented, the health reform law could extend comprehensive health coverage—including coverage for contraceptive methods and counseling—to more than 30 million individuals who would otherwise be uninsured. It would accomplish this through expanded eligibility for Medicaid and federal subsidies to purchase private insurance on new health insurance "exchanges." Moreover, most women's insurance, whether Medicaid or private coverage, will cover contraception without out-of-pocket costs. Combined, these measures should eliminate the financial barriers millions of women have faced to choosing a method they can use consistently and effectively.

The potential of the Affordable Care Act is by no means assured, however. The U.S. Supreme Court, in its 2012 decision upholding the law overall, ruled that the federal government could not enforce the requirement that all states expand Medicaid to cover Americans with incomes up to 138% of poverty. Although states have numerous strong reasons to take up the expansion—including protecting public health, bolstering the finances of safety-net hospitals and bringing billions of federal dollars to their economy—some are declining to participate on political grounds, which would leave millions of their most disadvantaged residents without affordable insurance options and expand the nation's already sizable inequities in access to coverage and care.

The evidence for the need to broaden coverage of, and access to, a wide range of contraceptive and related services is clear. Providing a broad range of methods within the context of contraceptive care allows women and their partners to select the method that will be most beneficial for them and fit their unique needs, whether these needs are primarily pregnancy prevention or noncontraceptive benefits, or a combination of the two. Correct and consistent use of contraceptives prevents unintended pregnancies, improves spacing between births and leads to a range of subsequent health benefits. The many additional services that clients of family planning clinics receive unrelated to contraceptive methods, including STI, cancer and diabetes screenings, and the resulting health benefits, underscore the importance of publicly funded family planning clinics in providing vital basic preventive services to the American public. Many of these preventive services are recognized as critical ones that should be made broadly available to all Americans, as evidenced by the focus on them as a centerpiece in the Affordable Care Act.

Existing inequities in access to contraceptive and related services highlight the urgent need for continued and expanded funding of the existing network of publicly funded family planning clinics, as this is a critical channel

through which millions of men and women obtain crucial health services, ultimately decreasing public costs. Many prominent health care associations support the Department of Health and Human Services' Healthy People 2020, a government-led national initiative that outlines 10-year objectives aimed at improving the health of Americans, which highlights the importance of improved health care and better health outcomes for all individuals. Specifically, the initiative outlines the following critical services, all of which are provided or facilitated by family planning clinics: improved contraceptive use, reduced unintended pregnancies, improved birthspacing, increased prenatal care, reduced incidence of preterm and low-birth-weight babies, increased breast-feeding, increased HPV vaccinations and cervical cancer screenings, increased screenings for HIV and other STIs and for chronic conditions, and improved linkages between screening or testing and treatment. With continued and even increased support, these clinics could do all the more to improve access to these services, allowing greater numbers of women, men and their children to experience the multitude of benefits—social, economic and health-related—that ensue from the practice of family planning.

## Appendix

### INDIVIDUAL STUDIES

Study	Sample	Variables measured	Key findings (quoted from original sources)
Bronte-Tinkew J et al. (2007)	Longitudinal study of fathers (n= 6,816); United States; Early Childhood Longitudinal Study-Birth (ECLS-B) Cohort	Predictors: male pregnancy intentions  Outcomes: male prenatal behaviors and postbirth father involvement	“Findings indicate that prenatal behaviors are associated with five domains of father involvement. Men who did not want the pregnancy are less likely to exhibit paternal warmth following the birth, whereas men who wanted the pregnancy sooner than it occurred are more likely to exhibit nurturing behaviors. The influence of fathers’ pregnancy intentions and prenatal behaviors on postbirth involvement is for the most part not dependent on child gender. Findings suggest that prenatal programs that encourage fathers to actively participate in the pregnancy may be beneficial to later child well-being.”
Bronte-Tinkew J, Scott M and Horowitz A (2009)	Longitudinal study of biological fathers (n=5,300) and their children; United States; Early Childhood Longitudinal Study Birth Cohort (ECLS-B) nine- and 24-month surveys	Predictors: male pregnancy intentions  Outcomes: toddlers’ mental proficiency and attachment security	“Findings indicate that unwanted and mistimed pregnancies for fathers had negative consequences for toddlers’ mental proficiency and attachment security. Additionally, men’s pregnancy intentions were found to work indirectly through lower prenatal behaviors and father engagement and greater mother-father relationship conflict to negatively influence toddlers’ mental proficiency. Men’s pregnancy intentions also worked indirectly through greater relationship conflict and higher father involvement to influence attachment security.”
Centers for Disease Control and National Institute of Child Health and Development (1987)	Case-controlled study of women aged 20–54 with ovarian cancer (n=546); the controls (n=4228) were women selected from the same areas; United States; Cancer and Steroid Hormone Study (1980 to 1982)	Predictors: use of oral contraceptives  Outcomes: risk of epithelial ovarian cancer	“Women who had used oral contraceptives had a risk of epithelial ovarian cancer of 0.6 (95 percent confidence interval, 0.5 to 0.7) as compared with those who had never used them.”  “This protective effect was seen in women who had used oral contraceptives for as little as three to six months, and it continued for 15 years after use ended; it was independent of the specific oral-contraceptive formulation and of the histologic type of epithelial ovarian cancer.”

Chen X et al. (2007)	Retrospective cohort study of nulliparous pregnant women younger than 25 with a live singleton birth during 1995 and 2000 (n=3,886,364); United States; National Center for Health Statistics and Centers for Disease Control and Prevention	Predictors: teenage pregnancy  Outcomes: adverse birth outcomes	“All teenage groups were associated with increased risks for pre-term delivery, low birth weight and neonatal mortality. Restricting the analysis to white married mothers with age-appropriate education level, adequate prenatal care, without smoking and alcohol use during pregnancy yielded similar results.”
Cheng D et al. (2009)	Cross-sectional study of mothers (n= 9048) who delivered live born infants between 2001 and 2006 and completed the survey 2–9 months after delivery; United States; Pregnancy Risk Assessment Monitoring System	Predictors: pregnancy intention  Outcomes: maternal preconception, prenatal and postpartum behaviors	“Compared to women with intended pregnancies, mothers with unwanted pregnancies were more likely to consume less than the recommended amount of preconception folic acid [adjusted odds ratio (OR) 2.39, 95% confidence interval (CI) 1.7-3.2], smoke prenatally (OR 2.03, 95% CI 1.5-2.9), smoke postpartum (OR 1.86, 95% CI 1.35-2.55) and report postpartum depression (OR 1.98, 95% CI 1.48-2.64); they were less likely to initiate prenatal care during the first trimester (OR 0.34, 95% CI 0.3-0.5) and breastfeed for 8 or more weeks (OR 0.74, 95% CI 0.57-0.97).”  “Compared to women with intended pregnancies, women with mistimed pregnancies were also more likely to consume inadequate folic acid, delay prenatal care and report postpartum depression.”
Dossus L et al. (2010)	“Longitudinal study of incident endometrial cancer cases (n=1,017); Denmark, France, Germany, Greece, Italy, Netherlands,	Predictors: menstrual and reproductive variables  Outcomes: risk of endometrial cancer	“Findings confirmed a reduction in risk of endometrial cancer with factors associated with a lower cumulative exposure to estrogen and/or higher exposure to progesterone, such as increasing number of FTPs and shorter menstrual lifespan and, therefore, support an important role of hormonal mechanisms in endometrial carcinogenesis.”
Frost JJ (2001)	Norway, Spain, Sweden and United Kingdom; European Prospective Investigation into Cancer and Nutrition”	Predictor: source of various types of medical care  Outcomes: obtaining any contraceptive or other reproductive health service in the past year	“Women whose primary source of reproductive care was a publicly funded family planning clinic received a wider range of services than women who visited private providers; moreover the former were significantly more likely to report obtaining contraceptive care or STI-related care, even after the effects of their background characteristics were controlled. Young, unmarried, minority less-educated and poor women were more likely than others to depend on publicly subsidized family planning clinics. Source of health insurance was one of the most important predictors of the use of public family planning clinics: Medicaid recipients and uninsured women were 3-4 times as likely as women with private insurance to obtain clinic care.”

Goldhaber-Fiebert J et al. (2007)	Cross-sectional study of women aged 15–44; United States; 1995 National Survey of Family Growth (NSFG)	<p>Predictors: HPV vaccination and testing</p> <p>Outcomes: cervical cancer incidence and lifetime risk</p>	<p>“The expected reductions in lifetime risk of cancer with annual or biennial screening were 76% (range across 50 sets: 69-82%) and 69% (60-77%), respectively. The reduction from vaccination alone was 75%, although it ranged from 60% to 88%, reflecting considerable parameter uncertainty about the natural history of type-specific HPV infection. The uncertainty surrounding the model-predicted reduction in cervical cancer incidence narrowed substantially when vaccination was combined with every-5-year screening, with a mean reduction of 89% and range of 83% to 95%.”</p>
Hannafor P et al. (2007)	Microsimulation models of cervical carcinogenesis; United States	<p>Predictors: ever-use of oral contraceptives, duration of use and time since last use</p> <p>Outcomes: relative risks for different types of cancer, main gynecological cancers and any cancer</p>	<p>“In this UK cohort, oral contraception was not associated with an overall increased risk of cancer. Depending on which dataset was examined, our analyses suggest either a significant 12% reduced risk of any cancer (main dataset) or a more modest, non-significant, 3% reduction (general practitioner observation dataset). In either case we found no evidence of a substantial increased risk of cancer overall.”</p> <p>“Compared with never users, ever users had statistically significant lower rates of cancers of the large bowel or rectum, uterine body, and ovaries, tumours of unknown site, and other malignancies; main gynaecological cancers combined; and any cancer.”</p> <p>“The relative risk for any cancer in the smaller general practitioner observation dataset was not significantly reduced. Statistically significant trends of increasing risk of cervical and central nervous system or pituitary cancer, and decreasing risk of uterine body and ovarian malignancies, were seen with increasing duration of oral contraceptive use.”</p>
Hobcraft J and Kiernan K (2001)	Inception cohort study using 339,000 woman-years of observation for never-users and 744,000 woman-years for ever-users; United Kingdom; Royal College of General Practitioners’ oral contraception study	<p>Predictors: childhood poverty, early motherhood</p> <p>Outcomes: adult social exclusion measures, including: welfare, socioeconomic, physical health, emotional well-being and demographic behaviour</p>	<p>“There are clear associations for the adult outcomes with age at first birth, even after controlling for childhood poverty and the other childhood background factors. Moreover, we demonstrate that the widest gulf in adult outcomes occurs for those who enter motherhood early (before age 23), though further reinforced by teenage motherhood for most adult outcomes. We also show that any experience of childhood poverty is clearly associated with adverse outcomes in adulthood, with reinforcement for higher levels of childhood poverty for a few outcomes.”</p>
Harville E, Madkour A and Xie Y (2012)	Longitudinal study of survey participants at several timepoints in life; United Kingdom; National Child Development Survey	<p>Predictors: maternal health and behavior</p> <p>Outcomes: preterm birth and low birth weight</p>	<p>“Among black adolescents, low parental educational levels and older age at pregnancy were associated with higher birth weight, whereas low parental educational levels and being on birth control when one got pregnant were associated with higher gestational age. In nonblack adolescents, lower body mass index was associated with lower birth weight, whereas being unmarried was associated with lower gestational age. Predictors of birth outcomes may differ by age group and social context.”</p>

<p>Jamieson D and Buescher P (1992)</p>	<p>Longitudinal study of a nationally representative sample of adolescents in grades 7–12; among female participants who had had a first singleton live birth, study compared those who did so before age 20 (n=1,101) vs. at age 20 or older (n=2,846); United States; National Longitudinal Study of Adolescent Health, 1994–1995 through 2008</p>	<p>Predictors: use of family planning services</p> <p>Outcomes: prenatal care, use of food supplement program/maternity care, age, low birth weight of infant and family's income</p>	<p>“Women who had used family planning services in the two years before conception were significantly more likely than those who had not used such services to have a birth-to-conception interval of greater than six months. They were also more likely to receive early and adequate prenatal care and to be involved in a food supplement program and maternity care coordination. In addition, the family planning participants were less likely than the nonparticipants to be younger than 18 and were somewhat less likely to deliver a low-birth-weight infant. Though the results of this retrospective study must be interpreted with caution because of such factors as self-selection into family planning programs, they suggest that family planning services may improve birth weight and use of prenatal health services among low-income women.”</p>
<p>Joyce T, Kaestner R and Korenman S (2000)</p>	<p>Cross-sectional study of women (n=45,000) in North Carolina who gave birth in 1989 and 1990; United States; Health Services Information System</p>	<p>Predictors: unintended pregnancy</p> <p>Outcomes: child health and development</p>	<p>“Women whose pregnancy intention changes between the two assessments are similar in marital status and socioeconomic background to those who report both during pregnancy and after delivery that the pregnancy is unintended.”</p> <p>“Disagreement during pregnancy between the parents’ pregnancy intentions is the most important predictor of instability in the mother’s pregnancy intention.”</p> <p>“Effects of unintended pregnancy on the timing of initiation of prenatal care, smoking during pregnancy, and breastfeeding based on reports after delivery are smaller than those based on reports during pregnancy, although differences are not statistically significant.”</p>
<p>Korenman S, Kaestner R and Joyce T (2002)</p>	<p>Longitudinal study of women (n=240) for whom information on pregnancy intention was collected both during pregnancy and after delivery; United States; 1994 National Longitudinal Survey of Youth (NLSY)</p>	<p>Predictors: pregnancy intention and parental disagreement on intention</p> <p>Outcomes: infant health and development</p>	<p>“Infants whose conception was intended by their mother but not their father are at elevated risk of adverse health events. When a pregnancy was not intended by the mother, risks are higher than they are if both parents intended the pregnancy, but they differ little according to father’s intention. Thus, it may be useful to classify pregnancies as intended by both parents or not intended by at least one. In comparisons of siblings, unintended fertility (so defined) is associated with delayed prenatal care and reduced initiation of breastfeeding.”</p>



<p>Kost K, Darroch Forrest J and Harlap S (1991)</p>	<p>Longitudinal study of mothers, fathers and children; United States; 1979–1992 NLSY</p>	<p>Predictors: various contraceptive methods, no method</p> <p>Outcomes: risks of pregnancy, infertility, heart disease, cancer and death</p>	<p>“Women who never use any method and who never have an abortion would have an average of 18 births during their reproductive lifetime, compared with no more than five among women using any of the available birth control methods. Consequently, use of any method prevents more deaths from pregnancy and childbirth than are associated with method use.”</p> <p>“The proportion of women who would become infertile . . . is reduced substantially if women at low risk of sexually transmitted diseases use any method and if women at high risk use oral contraceptives or barrier and spermicide methods.”</p> <p>“Oral contraceptive use has a relatively small, independent effect on the risk of cardiovascular diseases, but it greatly augments that risk in combination with smoking and increased age.”</p> <p>“When ovarian, endometrial and breast cancers are considered together, there will be approximately 110 fewer diagnoses of these three cancers per 100,000 ever-users of the pill aged 15-54 than among 100,000 never-users; furthermore, prior to age 45, 100,000 ever-users will experience 10 fewer deaths from ovarian or endometrial cancers than never-users of the pill.”</p> <p>“Women who use barrier or spermicide methods at ages 15-19 will, by age 45, experience approximately 60 fewer deaths per 100,000 from cervical cancer than will nonusers.”</p>
<p>Kost K, Landry D and Darroch JE (1998)</p>	<p>Simulation models among hypothetical cohorts of 100,000 women aged 15–44</p>	<p>Predictors: planning status</p> <p>Outcomes: negative birth outcomes (premature delivery, low birth weight, small size for gestational age) and infant care (early well-baby care, breast-feeding)</p>	<p>“The proportion of infants born with a health disadvantage is significantly lower if the pregnancy was intended than if it was mistimed or not wanted; the proportions who receive well-baby care by age three months and who are ever breastfed are highest if the pregnancy was intended.”</p> <p>“In analyses controlling for the mother’s background characteristics, however, a mistimed pregnancy has no significant effect on any of these outcomes. An unwanted pregnancy increases the likelihood that the infant’s health will be compromised (odds ratio, 1.3), but the association is no longer significant when the mother’s prenatal behaviors are also taken into account.”</p> <p>“Unwanted pregnancy has no independent effect on the likelihood of well-baby care, but it reduces the odds of breastfeeding (0.6).”</p>

Lassise D et al. (1991)	Cross-sectional study of births (n=9,122); United States; 1988 National Maternal and Infant Health Survey; and cross-sectional study of births (n=2,548); United States; 1988 NSFG	<p>Predictors: duration of IUD use, type of IUD</p> <p>Outcomes: risk of cervical cancer</p>	<p>“The crude odds ratio for the association between IUD use and invasive cervical cancer was 0.6 (0.4-0.8 95% confidence interval). Adjustment for all possible confounding factors (i.e., age, race, number of sexual partners, age at first intercourse, parity, cigarette smoking, number of marriages, previous genital or venereal infections, income, interval since last Pap smear, and use of oral and barrier contraception) resulted in an odds ratio of 0.8 (0.5-1.2).”</p> <p>“The odds ratio was unaffected when study subjects were categorized according to duration of IUD use. On the other hand, the presence or absence of copper in the IUD did exert a significant effect on the degree of cervical cancer risk.”</p> <p>“A protective effect against invasive cervical cancer was observed for copper-containing IUDs (adjusted odds ratio of 0.6, 95% confidence interval 0.3-1.2) but not for inert devices (adjusted odds ratio 1.1, 95% confidence interval 0.9-1.7). The reduced risk associated with copper IUDs increased with increased duration of use. Although prior studies have also failed to detect any association between IUD use and an increased risk of invasive cervical cancer, this is the first to suggest the possibility of a protective effect of copper IUDs on this risk.”</p>
Martin L et al. (2007)	Case-controlled study using interviews of women (n=481) with invasive cervical cancer and general controls (n=801); 24 hospitals in Birmingham, Chicago, Denver, Miami and Philadelphia	<p>Predictors: father involvement during pregnancy</p> <p>Outcomes: maternal behaviors during pregnancy</p>	<p>“Women whose partners were involved in their pregnancy were 1.5 times more likely to receive prenatal care in the first trimester and, among those who smoked at conception, to reduce their cigarette consumption 36% more than women whose partners were not involved in the pregnancy (p = .09).”</p> <p>“Fathers with less than a high school education were significantly less likely to be involved in their partner’s pregnancy, while first-time fathers and fathers who reported wanting the pregnancy were significantly more likely to be involved.”</p>
Ness R et al. (2011)	Cross-sectional study of women (n=5,404) and their partners from the first wave; United States; ECLS-B	<p>Predictors: use of various types of hormonal contraception</p> <p>Outcome: incidence of ovarian cancer</p>	<p>“In the largest case-control study to date, a range of effective methods of contraception reduced the risk for ovarian cancer. OCs and tubal ligation reduced ovarian cancer risk with lower odds ratios with longer duration of use, whereas IUDs reduced risk overall, having the greatest impact with short duration of use.”</p>

Ness R et al. (2000)	Case-controlled study of women (n=902) aged 25 and older with incident ovarian/peritoneal/tubal cancer compared with population controls (n=1,800); select regions of Pennsylvania, New York and Ohio	Predictors: use of various forms of contraception  Outcomes: risk of ovarian cancer	<p>“A number of reproductive and contraceptive factors that suppress ovulation, including gravidity, breast feeding, and oral contraception, reduced the risk of ovarian cancer.”</p> <p>“Gynecologic surgery including hysterectomy and tubal ligation were protective. Tubal ligation afforded a risk reduction even 20 or more years after the surgery.”</p>
Sadler C et al. (2010)	Case-controlled study of women (n=767) aged 20–69 with a recent diagnosis of epithelial ovarian cancer compared with community controls (n=1,367); United States	Predictors: hormonal contraceptive use  Outcomes: premenstrual symptoms	<p>“Of the women surveyed, 24% were considered to have premenstrual symptoms (95% confidence interval [CI] 21-27).”</p> <p>“Women were less likely to have symptoms if they had higher levels of educational attainment and suffered less from stress.”</p> <p>“No associations were found between premenstrual symptoms and diet, alcohol, or strenuous exercise nor after adjustment for other factors, with age, smoking, or body mass index (BMI).”</p> <p>“Use of any form of hormonal contraceptives was associated with a lower prevalence of premenstrual symptoms (prevalence ratio 0.66, 95% CI 0.52-0.84).”</p>
Vessey M and Painter R (2006)	Cross-sectional survey of women (n=974) aged 20–34 years; Southampton, UK; Southampton Women’s Survey	Predictors: oral contraceptive use  Outcomes: risk of certain types of cancer	<p>“OC use was not significantly related to nonreproductive cancer.”</p> <p>“Breast cancer findings (844 cases) likewise were very reassuring (rate ratio (RR) comparing women ever using OCs with those never doing so 1.0, 95% confidence interval (CI) 0.8-1.1).”</p> <p>“There was a strong positive relationship between cervical cancer incidence (59 cases) and duration of OC use (RR comparing users for 97+ months with nonusers 6.1, 95%CI, 2.5-17.9).”</p> <p>“Uterine body cancer (77 cases) and ovarian cancer (106 cases) showed strong negative associations with duration of OC use: RRs for 97+ months of use were 0.1 (95%CI, 0.0-0.4) and 0.3 (95%CI, 0.1-0.5) respectively. This apparent protective effect for both cancers persisted more than 20 years after stopping OCs.”</p> <p>“Combining data for cancers of the cervix, uterine body and ovary, the age adjusted RR for women ever using OCs compared with those never doing so was 0.7 (95%CI, 0.5-0.8). Beneficial effects of OCs on the gynaecological cancers thus outweighed adverse effects.”</p>

Webbink D, Martin N and Visscher P (2008)	Longitudinal study of women (n=17,032) who were using oral contraceptives, diaphragms or IUDs, recruited from 17 clinics; England and Scotland; Oxford Family Planning Association study	Predictors: teenage childbearing  Outcomes: smoking, drinking and body size	"Teenage mothers smoke more during their lives. Teen mothers tend to have a higher probability of being overweight, especially if they are older than 40 years. Their spouses are more likely to smoke and drink more. The quality of the spouse seems to be an important mechanism through which teenage childbearing affects subsequent maternal health."
Wilcox L and Mosher W (1993)	Longitudinal study of two mail surveys of twin pairs older than 18; Australia; Australian National Health and Medical Research Council Twin Registry	Predictor: visit for family planning service in past 12 months  Outcome: receipt of screenings (pap or pelvic exam, breast exam, blood pressure screening)	"More than 90% of women who had a family planning service visit within 12 months received each of the tests, regardless of who provided the service or who paid for the visit. Women who were not sexually active, women with little education or low income, American Indian women, Hispanic women, and women of Asian or Pacific Islander descent had lower rates of screening than others, regardless of their risk status. These findings strongly suggest that the likelihood of having obtained screening among women 15-44 years old is determined primarily by how often a woman uses health care, rather than by her risk of disease."
Williams S et al. (2012)	Cross-sectional survey of women (n=8,450) aged 15-44; United States; 1988 NSFG	Predictors: pregnancy intentions and recent contraceptive use, adjusted for age, race, marital status, education and pregnancy intentions  Outcomes: health-related quality of life (HRQoL)	"Using any form of contraception were more likely to have average or better mental HRQoL than women using no contraception [adjusted odds ratio (aOR)=1.60, 95% confidence interval (CI) 1.01-2.53]."  "Women using injectable contraception were less likely than those using combined hormonal methods to have average or better physical HRQoL (aOR=0.26, 95% CT 0.09-0.80) and mental HRQoL (aOR=0.24, 95% CI 0.06-0.86)."

## Appendix

### LITERATURE REVIEWS and COMPILATIONS

Study	Variables measured	Key findings (quoted from original sources)
American College of Obstetricians and Gynecologists (2010)	Predictor: use of various types of hormonal contraception	<p>“Use of combined hormonal contraception has been shown to decrease the risk of endometrial and ovarian cancer.”</p> <p>“Combined OCs have been shown to regulate and reduce menstrual bleeding, treat dysmenorrhea, reduce premenstrual dysphoric disorder symptoms, and ameliorate acne.”</p> <p>“Continuous combined hormonal contraception, DMPA, and the levonorgestrel intrauterine system may be considered for long-term menstrual suppression.”</p>
American Society for Reproductive Medicine (2008)	Predictor: use of various types of hormonal contraception	<p>“In addition to the contraceptive benefits, many other health benefits have been realized with hormonal contraception, including reduction of the risk of endometrial and ovarian cancers, control of menstrual bleeding, and relief from cyclic pelvic pain.”</p>
Best K (2004)	Predictors: use of family planning methods or services	<p>“Family planning services can greatly contribute to preventing HIV-positive births.”</p>
Blackburn R, Cunkelman A and Zlidar V (2000)	Predictor: use of oral contraception	<p>“By reducing menstrual bleeding, oral contraceptives help prevent iron deficiency anemia, which is common and serious in developing countries.”</p>
Collaborative Group on Epidemiological Studies of Ovarian Cancer (2008)	Predictor: oral contraceptive use	<p>“The longer that women had used oral contraceptives, the greater the reduction in ovarian cancer risk (<math>p &lt; 0.0001</math>). This reduction in risk persisted for more than 30 years after oral contraceptive use had ceased but became somewhat attenuated over time—the proportional risk reductions per 5 years of use were 29% (95% CI 23–34%) for use that had ceased less than 10 years previously, 19% (14–24%) for use that had ceased 10–19 years previously, and 15% (9–21%) for use that had ceased 20–29 years previously.”</p> <p>“In high-income countries, 10 years use of oral contraceptives was estimated to reduce ovarian cancer incidence before age 75 from 1.2 to 0.8 per 100 users and mortality from 0.7 to 0.5 per 100; for every 5000 woman-years of use, about two ovarian cancers and one death from the disease before age 75 are prevented.”</p>
Conde-Agudelo A, Rosas-Bermudez A and Kafury-Goeta A (2006)	Predictor: interpregnancy interval	<p>“Interpregnancy intervals shorter than 18 months and longer than 59 months are significantly associated with increased risk of adverse perinatal outcomes. These data suggest that spacing pregnancies appropriately could help prevent such adverse perinatal outcomes.”</p>

<p>Gipson J, Koenig M and Hindin M (2008)</p>	<p>Predictor: unintended pregnancy</p>	<p>“Among studies that have assessed antenatal care, breastfeeding behavior, and child nutrition, the evidence is relatively consistent, showing a negative effect of unintended pregnancy.”</p> <p>“The developed country studies found more pronounced effects on the timing, rather than the frequency, of antenatal care and found persistent negative effects on the breastfeeding of children who resulted from unintended pregnancies.”</p> <p>“For other outcomes, such as maternal risk behaviors, pregnancy outcomes, and curative care, developed country studies failed to find a significant association with pregnancy intention; the paucity of studies from developing countries precludes an overall assessment of such an impact. The few existing studies suggest that the children who result from unintended pregnancies may, in fact, be disadvantaged with respect to low birth weight and incomplete vaccinations; additional investigation is needed to substantiate or contradict these findings.”</p> <p>“The review finds some evidence that low birth weight and incomplete vaccinations have a relationship with unintendedness, as well as some evidence of increased mental stress on the parents (though the evidence is weaker there).”</p>
<p>Grimbizis G and Tarlatzis B (2009)</p>	<p>Predictor: hormonal contraception use</p>	<p>“Hormonal contraception has a protective effect over ovarian and endometrial cancer development. Relative risk of ovarian cancer decreases by approximately 20% for each five years of use; it is approximately 50% for 15 years of use and decreasing with further use.”</p> <p>“The protective effect gained declines as time passes from its last use, but a significant effect remains a long time after ceasing. The effect is independent from the type of formulation used.”</p> <p>“Relative risk reduction of endometrial cancer is even higher; the estimated relative risk decrease is approximately 50% with 4 years of use, approximately 70% within 12 years of use and decreasing with further use.”</p> <p>“After ceasing oral contraception, the risk begins to rise from its reduced levels but it is still approximately 50% even after &gt;20 years after its last use.”</p> <p>“Hormonal contraception could be used for primary protection from ovarian and endometrial cancer development. “</p>
<p>Kaunitz A and Inki P (2012)</p>	<p>Predictor: use of the levonorgestrel-releasing intrauterine system (LNG-IUS)</p>	<p>“The LNG-IUS consistently reduces menstrual blood loss (MBL) in women with HMB, including those with underlying uterine pathology or bleeding disorders.”</p> <p>“The available data suggest that it reduces MBL to a greater extent than other medical therapies, including combined oral contraceptives, oral progestogens (both short- or long-term cycle regimens), tranexamic acid and oral mefanamic acid. In addition, the LNG-IUS and endometrial ablation appear to reduce MBL to a similar extent.”</p>

Kaye K (2012)	Predictor: age of mother	<p>“Infants born to teen mothers were 17% more likely to be preterm and 25% more likely to be born low-birthweight compared to infants born to older mothers.”</p> <p>“Recent studies found that, even after controlling for various maternal characteristics and circumstances, teen childbearing remains a significant risk factor for adverse infant health outcomes.”</p> <p>“Regardless of the extent to which healthy births are affected by teen childbearing vs. other sources of disadvantage in their lives, it is important to understand that, on average, teen mothers and their infant children are at higher risk for preterm delivery, low birthweight, and infant mortality, compared to mothers who postpone childbearing beyond the teen years.”</p>
Lech M and Ostrowska L (2006)	Predictor: use of combined oral contraception	<p>“Studies have not unequivocally confirmed that such a relation exists with regard to breast cancer.”</p> <p>“Ovarian carcinoma has the worst prognosis of all cancers of reproductive organs in women. The risk of developing ovarian cancer in women using COCs is at least 40% smaller than in other women; the degree of protection given by COCs is directly proportional to the duration of use of this form of contraception.”</p> <p>“Reliable scientific data prove convincingly that the risk of endometrial cancer is smaller in women who used COCs than in women who never took them.”</p>
Lethaby A, Cooke I and Rees M (2009)	Predictor: use of the levonorgestrel-releasing intrauterine system (LNG-IUS)	<p>“The levonorgestrel-releasing intrauterine device (LNG IUS) is more effective than cyclical norethisterone (for 21 days) as a treatment for heavy menstrual bleeding. Women with an LNG IUS are more satisfied and willing to continue with treatment but experience more side effects, such as intermenstrual bleeding and breast tenderness.”</p> <p>“The LNG IUS results in a smaller mean reduction in menstrual blood loss (as assessed by the PBAC chart) than endometrial ablation but there is no evidence of a difference in the rate of satisfaction with treatment. Women with an LNG IUS experience more progestogenic side effects compared to women having TCRE for treatment of their heavy menstrual bleeding but there is no evidence of a difference in their perceived quality of life.”</p>
Logan C et al. (2007)	Predictor: unintended pregnancy	<p>“This research consistently shows that women with mistimed and unwanted pregnancies initiate prenatal care at a later time than those whose pregnancies were intended. In terms of other prenatal behaviors, the connection between pregnancy intention and smoking during pregnancy is less clear, and little recent research has examined other healthy behaviors such as alcohol use and increased vitamin intake.<sup>20</sup> After the birth, however, studies find that mothers with intended pregnancies are more likely to breastfeed than those with unwanted and mistimed pregnancies.”</p> <p>“Finds significant effects in: initiation of prenatal care, breastfeeding, physical and mental health in childhood (though mental health data is very limited), problem behaviors during adolescence (though not in childhood), quality of mother-child relationship (including abuse), and poor mental health/stress for the mother (though some results are mixed). Many effects are only significant when it comes to unwanted births, not mistimed ones (which is consistent across many of these reviews).”</p>

Maguire K and Westhoff C (2011)	Predictor: use of oral contraception	<p>“Immediate benefits include improvement of menorrhagia and dysmenorrhea, reduction in premenstrual dysphoric disorder symptoms, and decreased acne.”</p> <p>“As an effective birth control method oral contraceptives continues to be beneficial, reducing the risk of death from ovarian and endometrial cancer.”</p> <p>“All these benefits have held up over time whereas cardiovascular risks have lessened because of the decrease in oral contraceptive pill dosage. Decreased ovarian cyst formation is an example of benefit with higher-dose oral contraceptive formulation that no longer holds true with low-dose pills.”</p>
Mol B et al. (1995)	Predictor: use of various contraceptive methods	<p>“Women becoming pregnant after sterilization or while currently using an IUCD are at an increased risk.”</p> <p>“The IUCD is the only contraceptive method associated with an increased risk after discontinuation of its use.”</p>
Schlesselman J (1997)	Predictor: use of combined oral contraception	<p>“A review of the epidemiological literature indicates that oral contraception reduces the risk of endometrial cancer.”</p> <p>“There appears to be a residual protective effect that continues long after oral contraceptive use is stopped...users of combined oral contraceptives are spared a proportionately large number of endometrial cancers.”</p>
Shah P et al. (2011)	Predictor: unintended pregnancy	<p>“There were significantly increased odds of LBW among unintended pregnancies [odds ratio (OR) 1.36, 95% confidence interval (CI) 1.25, 1.48] ending in a live birth. Within the unintended category, mistimed (OR 1.31, 95% CI 1.13, 1.52) and unwanted (OR 1.51, 95% CI 1.29, 1.78) pregnancies were associated with LBW. There were statistically significantly increased odds of PTB among unintended (OR 1.31, 95% CI 1.09, 1.58), and unwanted (OR 1.50, 95% CI 1.41, 1.61) but not for mistimed (OR 1.36, 95% CI 0.96, 1.93) pregnancies. Unintended, unwanted, and mistimed pregnancies ending in a live birth are associated with a significantly increased risk of LBW and PTB.”</p>
Skegg D (1999)	Predictor: use of various contraceptive methods	<p>“Contraception is believed to lower the risk of iron-deficiency anaemia by reducing the number of pregnancies and increasing the interval of time between them, but individual methods of fertility regulation may also modify iron status through effects on menstrual blood loss . . . The results suggested that hormonal contraceptives had more beneficial effects on haemoglobin levels than did IUDs.”</p> <p>“Injectable contraceptive depot-medroxyprogesterone acetate protects against endometrial cancer and does not increase the overall risk of breast cancer; in clarifying which groups of women are susceptible to the rare cardiovascular complications of oral contraceptives (myocardial infarction, stroke, and venous thromboembolism); and in establishing the long-term effectiveness and safety of intrauterine devices.”</p>
Tsui A, McDonald-Mosley R and Burke A (2010)	Predictor: use of contraception	<p>“Family planning is documented to prevent mother-child transmission of human immunodeficiency virus, contribute to birth spacing, lower infant mortality risk, and reduce the number of abortions, especially unsafe ones.”</p> <p>“It is also shown to significantly lower maternal mortality and maternal morbidity associated with unintended pregnancy. Still, a new generation of research is needed to investigate the modest correlation between unintended pregnancy and contraceptive use rates to derive the full health benefits of a proven and cost-effective reproductive technology.”</p>



Weller S and Davis-Beatty K (2007)	Predictor: condom use	<p>“Of the 4709 references that were initially identified, 14 were included in the final analysis. There were 13 cohorts of “always” users that yielded an homogeneous HIV incidence estimate of 1.14 [95% C.I.: .56, 2.04] per 100 person-years. There were 10 cohorts of “never” users that appeared to be heterogeneous. The studies with the longest follow-up time, consisting mainly of studies of partners of hemophiliac and transfusion patients, yielded an HIV incidence estimate of 5.75 [95% C.I.: 3.16, 9.66] per 100 person-years. Overall effectiveness, the proportionate reduction in HIV seroconversion with condom use, is approximately 80%.”</p>
Wendt A et al. (2012)	Predictor: interpregnancy interval	<p>“We found too few higher-quality studies of the impact of IPIs (measured as the time between the birth of a previous child and conception of the next child) on maternal health to reach conclusions about maternal nutrition, morbidity or mortality. However, the evidence for infant effects justified meta-analyses.”</p> <p>“We found significant impacts of short IPIs for extreme preterm birth (&lt;6 m adjusted odds ratio (aOR): 1.58 [95% confidence interval (CI) 1.40, 1.78], 6–11 m aOR: 1.23 [1.03, 1.46]), moderate preterm birth (&lt;6 m aOR: 1.41 [1.20, 1.65], 6–11 m aOR: 1.09 [1.01, 1.18]), low birthweight (&lt;6 m aOR: 1.44 [1.30, 1.61], 6–11 m aOR: 1.12 [1.08, 1.17]), stillbirth (aOR: 1.35 [1.07, 1.71] and early neonatal death (aOR: 1.29 [1.02, 1.64]) outcomes largely in high- and moderate-income countries. It is likely these effects would be greater in settings with poorer maternal health and nutrition. This is particularly important in developing countries, where often the pattern is to start childbearing at a young age, have all desired children quickly and then control fertility through permanent contraception, thereby contracting women’s fertile years and potentially increasing their exposure to the ill effects of very short IPIs.”</p>
Yeakey M et al. (2009)	Predictor: contraceptive use	<p>“The findings from these studies are mixed but suggest that the use of contraceptives is protective against short birth intervals.”</p>
Zhu B (2005)	Predictor: interpregnancy interval	<p>“The risk for adverse birth outcomes is lowest when the interpregnancy interval was 18-23 months and increased when the interval departed from 18-23 months.”</p>

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