Executive Summary

Overview

Information on the fertility knowledge or awareness among young adults in the United States is limited in scope and quality. Existing studies, most of which are based on small convenience or other nonprobability samples, find that women and men lack awareness of infertility risk factors—including women’s age—and believe various myths and misconceptions about infertility that may adversely affect their ability to achieve their reproductive goals. Having accurate knowledge about human fertility can help young adults who are entering their reproductive years to make informed decisions and plans about reproduction and empower them to seek appropriate and timely healthcare to achieve their goals.

To address the limitations on data about fertility knowledge among young adults in the United States, the U.S. Office of Population Affairs (OPA) contracted with the Centers for Medicare & Medicaid Services (CMS) Alliance to Modernize Healthcare (CAMH) Federally Funded Research and Development Center (FFRDC). As the CAMH operator, The MITRE Corporation (MITRE) contracted with RTI International (RTI; Alliance Partner) to develop, test, and administer the Fertility Knowledge Survey, and analyze its data and report the results. In this study, “fertility” is defined as the ability of a woman to become pregnant or the ability of a man to get a woman pregnant. “Infertility” for individuals aged 18 to 29 years is the inability to get pregnant (female) or get a woman pregnant (male) after at least 1 year of trying.

This report presents and discusses the preliminary findings from the Fertility Knowledge Survey. The report describes the study rationale, goal, and research questions; summarizes the process for developing and fielding the survey instrument; describes how the data were prepared for analysis and

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1 Task Order HHSP233201700025U (“Teen Pregnancy Prevention Study”), issued on September 30, 2017, to The MITRE Corporation.

2 Report authors, all of whom are RTI International staff, are: Christina I. Fowler, PhD, MPH (Principal Investigator, Fertility Knowledge Study), Helen P. Koo, DrPH (Senior Advisor), Jessica Roycroft, BS (Statistician), Tracy L. Kline, PhD (Psychometrician), and Jill Dever, PhD (Senior Statistician).
the analytic approach employed; and presents and discusses preliminary findings based on bivariate analysis.

**Purpose, Research Questions, and Population of Interest**

The stated purpose of the *Fertility Knowledge Survey* was to collect information that contributes to understanding (1) the level of human fertility (female and male) knowledge among young adults and (2) how this knowledge is related to behaviors and intentions involving childbearing. Eight research questions (RQ) were constructed to guide the development of the questionnaire. OPA prioritized six of the eight questions (RQ1–RQ6) for examination in this report. The inclusion of both women and men in the study, and the focus on both female and male fertility, is a unique and important contribution of this study to our understanding of fertility knowledge. OPA plans to use the results of the survey to determine the need for educational and informational strategies that aim to reduce the knowledge gaps, counter myths, and correct misinformation about fertility and fertility-related behaviors. The population of interest was English-speaking females and males, aged 18 to 29 years in the United States, who were able to get pregnant (females) or to get a woman pregnant (males). The survey focused on young adults for whom infertility is less common, who were in or entering their reproductive years, and who were young enough to possibly avoid infertility related to age and possibly other risk factors.

**Methods**

**Data and Survey Instrument**

**Data.** RTI contracted with Ipsos Public Affairs (Ipsos) to conduct the *Fertility Knowledge Survey*, using a sample drawn from two addressed-based probability web panels (KnowledgePanel® and YouthPulse) that were designed to be representative of the United States. The survey was conducted online from February 7, 2020, through March 5, 2020. The median completion time was 16 minutes and the average completion time was 21.6 minutes. Respondents who completed the survey received a study-specific incentive of 5,000 points, an equivalent of $5 (KnowledgePanel members) or $10 (YouthPulse members).

**Survey Instrument.** The survey instrument addressed five domains based on the eight research questions: (1) fertility knowledge, awareness, and attitudes; (2) pregnancy / childbearing knowledge, attitudes, and behaviors; (3) healthcare access and status; (4) fertility-related risk behaviors; and (5) sociodemographic characteristics. The final programmed survey instrument consisted of 11 sections, 76 main questions, and 124 specific questions (many main questions were formatted as matrices requiring respondents to answer several sub-questions). Nineteen items measured knowledge related to women’s and men’s fertility, postpartum fertility, and contraception and fertility. The knowledge items included both biological and behavioral risk factors, as well as myths and misconceptions about contraception and fertility. Question and response option wording and skip patterns were programmed to fit each respondent’s sex and other circumstances (e.g., marital / relationship status, number of children,
sexual experience). The survey instrument received expert review and was subjected to cognitive and usability testing.

**Review and Clearance**

RTI’s Institutional Review Board (IRB) provided oversight for all data collection instruments and activities. The Office of Management and Budget (OMB) reviewed the survey instrument and protocol and on October 4, 2019, granted approval for its administration (OMB Control Number: 0937-0208; Expiration: 10/31/2022). The National Institutes of Health Office of Extramural Research issued RTI and Dr. Christina Fowler (RTI Principal Investigator) a Certificate of Confidentiality to protect respondents’ privacy.

**Sample**

Ipsos used a stratified random sampling methodology to select independent samples of English-speaking panel members in four sex and age subgroups of interest (females 18–24 and 25–29 and males 18–24 and 25–29). Of the 9,395 panel members invited to take the survey, 3,284 clicked the survey link to answer three screening questions (age, biological sex, and whether they have been surgically sterilized), 3,227 confirmed their age and sex, 3,174 were study eligible (i.e., met all screening criteria), and 3,145 consented to participate and completed the survey. The screening completion rate was 34.3% and the main survey completion rate was 99.1%. Once all the data were collected and processed, a post-stratification weighting process was used to adjust for differential nonresponse. The analytic weights were scaled to sum to 3,145 (number of completed surveys). Because 38 cases were excluded for data quality problems, the data file used in the preliminary analyses consists of 3,107 observations (1,779 females and 1,328 males).

**Analytic Techniques**

**Psychometric.** We used three psychometric analytic methods to assess the 19 fertility knowledge items. Exploratory factor analysis (EFA) was used as a data reduction technique to investigate if two or more latent (unobserved) constructs were present in the fertility knowledge items. Confirmatory factor analysis (CFA) was then applied to verify these constructs, but they did not achieve an adequate level of fit as separate constructs. We used the Rasch measurement framework to test the possibility of a single fertility knowledge construct, and the analysis confirmed that the 19 fertility knowledge items could be pooled into a single construct. Therefore, in the analyses of research questions, we use an individual’s mean score or percentage of 19 items.

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3 The screening completion rate is the percentage of all panelists invited to take the survey (N=9,395) who completed the screener by confirming age and sex (N=3,227).
4 The main survey completion rate is the percentage of all qualified (i.e., study eligible) panelists (N=3,174) who consented and completed the survey (N=3,145 "qualified completes").
answered correctly as our summary measure of fertility knowledge. Internal consistency reliability\(^8\) of the single construct was assessed to be 0.70 using Cronbach’s alpha coefficient. Software used included Mplus (EFA and CFA), WINSTEPS (Rasch), and SAS (internal consistency reliability).

**Bivariate Analysis.** The preliminary findings are based on bivariate analyses, meaning that they consider the relationships between only two variables at a time. The relationships discovered in the bivariate analysis may change when the effects of other variables are considered simultaneously using multivariable analysis. For all analyses, we used SAS and SAS-callable SUDAAN® (Version 11),\(^9\) which is designed for analyzing data from complex samples with weighted data. For the unweighted analyses, we created weight (=1) and strata (=1) variables and assigned them to all respondents.

To determine whether the two sexes differed in their level of knowledge of each of the 19 items (binary dependent variables of correct or not correct), we used PROC RLOGIST and t-tests of significance to compare the two sexes. We also compared the mean fertility knowledge score (percentage of 19 items answered correctly) by sex using one-way analysis of variance (ANOVA) using the PROC REGRESS procedure. We also used one-way ANOVA (PROC REGRESS) to examine the relationships between fertility knowledge scores and various characteristics within each sex. Finally, to analyze the distributions of the sample across various characteristics, we used the PROC DESCRIPT procedure to compute the distributions by sex and the PROC CROSSTAB procedure to compare the distributions of the two sexes using the chi-square test.

Point estimates are based on unweighted data in accordance with OMB’s directive that we use only unweighted point estimates (e.g., mean fertility knowledge score, percentage distributions) for public policy. However, we used weighted data to obtain more precise standard errors and p-values. To account for multiple tests of significance, we used a “family-wise” Bonferroni correction\(^10\) to adjust significance levels for the p-values computed using the weighted data.

**Key Findings and Discussion**

**What Are the Sociodemographic Characteristics of the Sample?**

**Findings.** We describe the sample using 16 sociodemographic characteristics.

- About one-half the sample are aged 25 to 29, around 41% are 20 to 24, and less than 10% are 18 to 19. Around 20% have a high school education or less, about one-half are working full time, almost 40% have incomes at or below 250% of poverty, and over half reside in a metropolitan county of at least 1 million people. Those for whom religion is not important make up nearly half the sample.

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• More women (41%) than men (30%) are married or cohabiting, have ever had heterosexual vaginal intercourse (77% vs 67%), and have had children (19% vs 10%).

• Women and men differ significantly in the distributions of 8 of the 16 characteristics examined, including employment, marital / relationship status, sexual orientation, sexual experience and number of opposite sex partners, number of pregnancies and live births, and experience with unintended pregnancy.

Discussion. Of the 16 characteristics, the only demographic or socioeconomic variable in which the sexes differ is employment. In contrast, women and men differ in their distributions of all but two of the nine variables related to relationship status and characteristics and sexual experience and childbearing. In other words, the women and men in our sample differ primarily in their life experiences in the related realms of love, intimate relationships, and family building.

What Do Young Women and Men Know about Female and Male Fertility?

Findings. We describe the differences, by sex, in the knowledge summary score and for each of the 19 items that comprise the score.

• Fertility knowledge summary score, overall and by sex. Of the 19 fertility knowledge questions that comprise the summary score, on average women answered 11 (or 59%) of them correctly compared with 10 (or 54%) by men, and women scored significantly higher (by 5 to 21 percentage points) on 9 of the 19 items.

• Knowledge of women’s fertility. On the eight items measuring knowledge of women’s fertility, the percentages of respondents answering correctly ranged from 47% to 82% for women and 38% to 81% for men.

For three items—knowing the fertile period in the menstrual cycle, knowing whether women’s ovaries continuously produce new eggs, or knowing whether a woman’s weight can affect her fertility—the percentages answering correctly are significantly higher for women than men.

Respondents had the least knowledge on three items:
• 50% of women and 38% of men know that the ovaries do not keep producing new eggs until menopause
• 47% of women and 41% of men know that women are not the main cause of couple’s infertility
• 62% of women and 43% of men can identify the fertile period during a woman’s menstrual cycle

Finally, only two-thirds of women (65%) and men (64%) know that women’s fertility declines sharply after their mid-30s.
• **Knowledge of postpartum fertility.** On the two items measuring knowledge of postpartum fertility, women (69%) are significantly more likely than men (48%) to know the correct answer about being able to get pregnant before the return of menses, while there is no difference between women (87%) and men (83%) in their knowledge of pregnancy risk during breastfeeding.

• **Knowledge of contraceptive use and fertility.** On all four items measuring knowledge of contraceptive (pill and IUD) use and fertility, the percentages answering correctly are significantly higher for women than men. For three of the four items listed below, the percentage of women and men who answered correctly is 50% or lower:
  - 30% of women and 23% of men know that using birth control pills for any length of time has no effect on a woman’s chances of getting pregnant once she stops taking them.
  - 37% of women and 22% of men know that IUD users do not take longer to conceive than non-IUD users after they discontinue the method.
  - 50% of women and 45% of men know that taking birth control pills is not riskier to a woman’s health than getting pregnant and having a baby.
  - 85% of women and 73% of men know that nulliparous women can use an IUD.

• **Knowledge of men’s fertility.** On five items measuring knowledge of men’s fertility, the percentages of women and men answering correctly ranges from 21% to 64% for women and 25% to 66% for men. Although men score higher than women on all five items, the difference is significant only for one item (impact of wearing tight pants / underwear). For two items, the percentages of either group answering correctly is less than 50% and as low as 21%, indicating particularly low knowledge:
  - 21% of women and 25% of men know that using some commercially available lubricants during vaginal sex can decrease a man’s chances of getting a woman pregnant.
  - 41% of women and 46% of men know that men’s use of testosterone or anabolic steroids can reduce a man’s ability to get a woman pregnant.

**Discussion.** Among this sample of young adults aged 18 to 29 years, most are neither married nor cohabiting, and only a minority have experienced pregnancy or had a child. Given these life circumstances, it may not be surprising that, on average, respondents answered correctly fewer than 60% of the 19 fertility knowledge questions. The topic may not be relevant (in their opinion) to the lives of many of them. Women’s knowledge is higher than men’s, which probably reflects the greater centrality of childbearing and childrearing for women and their more significant childbearing experience.

Respondents’ knowledge about some items is very low, and some of the topics about which they are mistaken may have grave implications for their ability to plan their fertility, both to avoid unplanned pregnancies as well as to follow practices that would help ensure that they are able to become pregnant or father a child when they want to. For example, lack of correct knowledge about women’s ovaries and egg production (38%–50% answering correctly), the sharp decline in a woman’s fertility after her mid-30s (64%–65%), or of the clinical definition of female infertility (60%–63%) may all lead
women to delay getting pregnant to a time when they may be at high risk of infertility and possibly involuntary childlessness. Similarly, the mistaken belief (held by about half the respondents) that age has no effect on male fertility may lead some men to delay fathering children until an age when they are at increased risk of infertility due to declines in sexual function and sperm quality.

Knowledge is especially low regarding the impact of some types of lubricants during sex or use of testosterone or anabolic steroids on men’s fertility. Many couples may use such lubricants while unaware that they are reducing their fertility—an unfortunate outcome if they are trying to have a baby. Erroneous understanding about the effects of testosterone or anabolic steroid use on men’s fertility could lead some men to be infertile, unaware that they could reverse the condition by stopping use.

There is also low knowledge (22%–50%) about use of the pill or IUD and future fertility, and risk to women’s health of using the pill. Popular misconceptions like these are barriers to women using these safe and highly effective methods to achieve their reproductive goals, space their desired pregnancies, and prevent unwanted pregnancies.

Finally, the popular misbelief that women are the cause of most cases of infertility (41%–47%) can lead to frustration or delay in seeking help for infertility problems that reside with the man. Over 60% of women but only 43% of men correctly identified the fertile period in the menstrual cycle. Inaccurate knowledge may hinder efforts to get pregnant or to prevent unintended pregnancy.

Further research into reasons why some pieces of information have been absorbed by the young population and not others could help health educators and clinicians to develop ways to improve knowledge in the other fertility topics.

**What Is the Relationship between Fertility Knowledge and the Sociodemographic Characteristics of Women and Men?**

**Findings.** Fertility knowledge is associated with 6 of 16 sociodemographic characteristics for both sexes, and with 3 characteristics for one sex only. Respondents with the following characteristics have higher levels of fertility knowledge:

- Older age
- Non-Hispanic White race
- More highly educated (*men only*)
- Higher household income (as % poverty)
- Working full time or not working because of being student (*men only*)
- Religion not important in daily life
- Married or cohabiting
- Experience with voluntary vaginal sex with an opposite-sex partner
- Having an opposite-sex sexual partner in the past 12 months (*women only*)

- Seven characteristics are not associated with fertility knowledge levels, including number of pregnancies, number of live births, and experience of unintended pregnancy.
Discussion. Although sexual experience and marital / relationship status are related to experiences of childbearing (number of pregnancies and live births and unintended pregnancy), only the former are related to fertility knowledge, with the married / cohabiting and sexually experienced having greater knowledge. One may expect that having had children would be associated with fertility knowledge, but that is not the case in bivariate analysis. The explanation may be that women and men in this young population who have already had children, especially if they already have all the children they want, are not concerned about fertility or infertility issues. It would require multivariable analysis to determine which (if either) of these two sets of factors are associated with fertility knowledge when other factors are considered simultaneously.

What Are the Childbearing Attitudes and Plans of Women and Men in the Study Sample?

Findings. Of the 22 variables measuring childbearing attitudes and plans, we highlight some of the most important results. Unless otherwise noted, women and men differ significantly in these attitudes and plans:

- **Pre-survey knowledge of fertility.** When asked how much they know about female and male fertility before starting the survey, more women (73%) than men (57%) report knowing a “moderate amount” or “a lot” about female fertility, while more men (69%) than women (44%) report knowing a “moderate amount” or “a lot” about male fertility.

- **Importance of and amount of thought given to having biological children.** Women and men differ in their rating of the importance of having biological children. For example, around 21% of women and 17% of men report that giving birth to children is “not at all” important, whereas 24% of women and 19% of men rate it as being “extremely” important. Similarly, more women than men have given thought to whether they want biological children (or more children), with 42% or women reporting that they have given the issue “a lot” of thought compared with just 23% of men.

- **Wanting and intending to have children (or more children).** Whereas slightly lower percentages of women than men either want (68% vs. 73%) or realistically intend (65% vs. 69%) to have (more) children, more women than men neither want (26% vs. 19%) nor intend (28% vs. 21%) to have any (more).

- **Number of intended children and ages at which they expect to have first/next and last one.** The same percentages (59%) of women and men intend to have one or more children, and more men than women (21% vs. 13%) either intend to have (more) children but do not know a number or they are unsure about their childbearing intentions.
  
  - Among those intending to have at least one (more) child, over 91% of both sexes expect to have that (first or next) child at ages 30–34 or younger. But more men (7%) than women (2%) expect it at age 35 or older.
  
  - Among those intending to have two or more children, most women expect to have the last child at between the ages of 30 and 34 (47%) or 35 to 39 (36%).
Although most (78%) men also intend to have their last child in their 30s, 12% expect the last birth at ages 40 or over.

- **Perception of own fertility.** Around half of women and men “don’t know” how likely it is that they “would have difficulty or be unable” to conceive or father a child. However, more men (35%) than women (20%) think it is “not at all likely,” whereas more women (20%) than men (12%) report it is “slightly” or “moderately” likely.

- **Discussion of childbearing plans with a medical provider.** Whereas 32% of women report having ever discussed plans to have or not have children with a medical care provider, this is true for only 9% of men.

- **Egg freezing.** The vast majority of both sexes have heard of egg freezing, but more women (90%) than men (82%) have heard of it. Among those who intend to have (more) children, more women than men (16% vs 10%) would be “very” or “extremely” likely to consider using egg freezing if they had to delay having a child to a worrisome age.

**Discussion.** The majority of respondents are childless, think it is important to have biological children, and both want and intend to have them. Given the different roles that U.S. women and men play in childbearing and childrearing, it is not surprising that their distributions on many related reproductive attitudes and plans differ significantly. Moreover, they generally differ in ways that reflect not only these differential roles but their greater experience in childbearing. Thus, compared to men, the women in the sample have given more thought to whether they want to have children (or more children) in the future, are more likely to say the number of children they intend is none, and have talked about this topic with their spouse or partner. Women are also more tempered in their assessment of their own ability to conceive: women are more likely than men to think they would have difficulty or be unable to conceive and are more concerned about it than men are about their own fertility.

Over 65% of both women and men want or intend to have (more) children, but only 32% of women and 9% of men have discussed their plans to have children with a medical provider. Likewise, although 28% of women and 17% of men think they may have difficulty or be unable to get pregnant or father a child, only 36% of women and 15% of men have talked with a medical provider about such relevant topics as their ability to conceive or father a child, behaviors and other factors that could affect fertility, and the use of assisted reproduction.

In view of the greater thoughtfulness and concern about fertility among women, it is noteworthy that 44% of them think that the socially ideal age for women’s last birth is 35–39 or older, and that similarly, 40% expect to have their own last birth at 35–39 or older. If they carry out their view of the socially ideal age at last birth and their own expected age, they could experience infertility problems. Yet, 65% of these women answered this knowledge question correctly: “After her mid-30s, a woman’s chances of getting pregnant decrease sharply.” It may be that women who know about this fertility decline but still expect to conceive later in life think that their life circumstances will necessitate a late birth, but it may also be that they feel that this fact does not apply to
them. In addition, it is possible that some of them think that if it becomes necessary, they could use egg freezing to help them have children at older ages.

**Is There a Relationship between Fertility Knowledge and Childbearing Attitudes and Plans?**

**Findings.** Most of the 22 measures of childbearing attitudes and plans are significantly related to fertility knowledge, but more of these measures are significant for women (18) than men (13).

- **Self-perceived fertility knowledge before starting survey.** For both sexes, fertility knowledge increases with self-reported, pre-survey knowledge of both female and male fertility. Even though they have the highest fertility knowledge scores, women and men who report that they knew “a lot” about either female or male fertility before starting the survey score only between 61% and 66% correct.

- **Socially ideal ages for having first and last child.** Fertility knowledge rises with socially ideal ages for women’s and men’s first child, but this relationship is not significant for men with respect to the ideal age for women’s first child. Opinions on men’s ideal age at last birth is not associated with knowledge. Women who think the ideal age for a woman’s last child is under 30 or 40 or older have lower knowledge (around 55%) than those reporting ideal ages in the 30s (around 60%). The association between ideal age for a woman’s last child and knowledge is not significant for men.

- **Importance and amount of thought about having biological children.** Women and men who respond “I haven’t thought about it” to the question about the importance of having biological children scored about 16 percentage points lower in fertility knowledge than those who have weighed the importance. For both sexes, the level of fertility knowledge increases with the amount of thought they have given to whether they want to have (more) children in the future (from 50% to 62% for women and from 46% to 58% for men).

- **Desire (want) and intention to have (more) biological children.** Fertility knowledge is not associated with whether respondents want or intend to have (more) children or their combined desires and intentions (most of whom are consistent between wanting and intending to have children).

- **Intended number of (more) children** Among both women and men, those who intend to have (additional) children but do not know the number and those who do not know if they intend to have more children have the lowest knowledge scores.

- **Expected ages at first / next and last births.** Among those intending to have one or more (additional) children, those who do not know at what age they expect to have that (first or next) child have the least knowledge (around 45%), while those expecting it to occur at age 30–34 have the highest knowledge (63% for women, 57% for men). Among respondents intending to have two or more (additional) children, those who do not know at what age they expect to have that last child have the least knowledge (48%), compared to 61% for those who expected it to occur in their 30s. This relationship is significant only for women.
• **Discussions with a spouse / partner about having (more) children together.** Among both sexes, fertility knowledge scores are the highest among respondents who report they have talked with their partner and determined that their partner either wants or does not want to have (more) children together (59% to 62%). Those who have spoken with their partner but are unsure about their partner’s desire to have (more) children together, and those who have not talked with their partner about having (more) children together have lower knowledge (52% to 55%).

• **Perceptions of own ability and that of spouse / partner to conceive or father a child.** Fertility knowledge is associated with one’s perception of the likelihood that they would have difficulty getting pregnant or fathering a child. Those who “don’t know” the likelihood have the lowest knowledge (57% for women and 50% for men).

• **Concern about own ability to conceive or father a child.** Among both women and men, those who say they have not thought about how concerned they are about their ability to conceive in the future have the lowest fertility knowledge (53% for women and 47% for men).

• **Concern about spouse’s / partner’s ability to conceive or father a child.** Respondents who have not thought about how concerned they are about their spouse’s / partner’s ability to have a child also have the least knowledge (55% for women and 52% for men), but the association of this concern with fertility knowledge is significant only for women.

• **Medical providers’ discussion of reproductive goals and other fertility-related topics.** Among both sexes, those who report that medical care providers have discussed with them their plans or goals for having or not having children have higher fertility knowledge (by about 5 percentage points) than respondents who have not had such discussions. Respondents reporting that providers have discussed other fertility-related topics11 with them also have higher fertility knowledge. However, this association is significant only for men (4 percentage points difference).

• **Egg freezing.** Both women and men who have heard of egg freezing have markedly higher fertility knowledge than those who have not (60% vs. 47% for women and 56% vs. 43% for men). Fertility knowledge increases with the likelihood that individuals who intend to have (more) children would consider using egg freezing if they had to delay pregnancy until a worrisome age. This association is significant only for women (a difference of 6 percentage points between most likely to use and not at all likely).

**Discussion.** Neither respondents’ desires or realistic intentions for having or not having children, nor (as noted earlier) their past experience of childbearing are related to

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11 The other topics include respondent’s ability to get pregnant and give birth or impregnate a woman; how to improve health before a pregnancy; impact of diet or lifestyle on ability to conceive; impact of STDs on fertility; how age affects ability to conceive or impregnate; factors affecting spouse’s / partner’s ability to conceive or impregnate; how to get and use donor sperm; and how to get and use an egg donor or gestational/traditional surrogate.
fertility knowledge, but for both sexes the amount of thought and concern about many childbearing issues is related to knowledge. Not surprisingly, respondents who have lower knowledge scores are those who say that they have not given childbearing or its importance in their lives any thought (5%–6% of women and 7%–10% of men), or they do not know if they intend to have (more) children or they intend but do not know the number of children they intend (13% of women and 20% of men). Similarly, respondents (about 50% of sample) who do not know the likelihood that they would have difficulty or be unable to get pregnant or father a child also have the lowest fertility knowledge scores.

The sizeable minority of young adults in our sample who have not thought about or do not know their childbearing preferences or concerns (and therefore have lower fertility knowledge) may not feel that they personally are in a stage of life where childbearing is something they need to be concerned with. It is important, therefore, to increase their understanding of the effects of risk behaviors on future fertility and the possible impact of waiting until they or a partner are at an age that could place them at risk for infertility.

Successful communication with one’s spouse/partner about childbearing appears to be related to better fertility knowledge. Those who have talked with their spouse/partner about whether they want to have (more) children together and have determined their preference have the best knowledge. It may be that individuals who have such open communication with their partners about having (more) children are more attuned to childbearing issues in general, including infertility risk factors.

Finally, it is encouraging that both men and women who have discussed their childbearing plans or other reproductive topics with a medical provider have higher fertility knowledge than those who have not. Presumably, they would have learned about fertility issues from the discussions and acquired related knowledge. It is also possible that an individual who is already aware of some of these issues would raise the topic with a health provider. Regardless of who initiates this conversation, the findings suggest that engaging young adults on this topic may be an important way for providers to increase knowledge of fertility topics, which may help young adults to achieve their childbearing preferences.

Where Do Women and Men Get Information about Fertility or Their Plans and Goals for Having or Not Having Children? Which Sources Are Most Trusted to Provide Accurate Information?

Findings. We describe the characteristics of the study sample with regard to whether they have ever received information about their fertility or their plans and goals for having or not having children from 12 possible sources. Respondents were also asked which three sources they would trust the most to give them accurate information on these topics. For some analyses, we classified sources according to whether they are medical or nonmedical.

- **Number and type of information sources.** More men (55%) than women (39%) report not having obtained fertility-related information from any of the 12 listed sources. More women (36%) than men (20%) have received information from 3, 4, and 5 to 12 sources.
• **Whether respondents obtained information from medical or nonmedical sources.** More women (27%) than men (9%) obtained information from either a medical source (i.e., doctor, nurse, or other medical care provider) alone or a combination of medical and nonmedical sources.

• **First most trusted source.** The source most often chosen as the first most trusted by both women (70%) and men (61%) is a doctor, nurse, or other medical care provider.

• **Top three most trusted sources.** Women and men do not differ in their choice of the top three most trusted sources. They include a doctor, nurse, or other medical care provider (83%–87%); a mother or father (55%); or a spouse or partner (29% for women and 40% for men).

**Discussion.** Very low percentages among both sexes, but especially men, report that at least one source was a doctor, nurse, or other medical provider. Reasons for this result include possibly poor recall, lack of access to healthcare, lack of rapport with their health provider, or a failure of health providers to engage young adults on these critical topics. Despite their low reliance on medical sources for fertility and reproductive planning information, most women and men named medical providers as either the first most trusted source or one of the top three most trusted sources for accurate information on these topics. Further study is warranted to clarify why this discrepancy exists and how it might be addressed so that receipt of fertility-related information from a most trusted source is more common.

In addition to medical providers, respondents view other sources as trustworthy. About half of respondents view a parent as a top three trusted source, and over one in five view a spouse or partner, a friend or acquaintance, a U.S. government website, or books, magazines, or pamphlets as top three most trusted sources. While the findings highlight the need to increase the medical provider’s role in providing fertility and reproductive planning information to young adults, they also suggest a need to increase the availability of accurate information through sources that young adults trust to provide them with accurate information.

**What Is the Relationship between Fertility Knowledge and Sources of Information about Fertility or Plans / Goals for Having or Not Having Children?**

**Findings.** Among both women and men, fertility knowledge is significantly associated with the following characteristics: number and types of information sources from which they obtained fertility-related information and the source identified as the “first most trusted” to provide accurate information.

• **Number of sources.** Fertility knowledge is lowest among women (55%) and men (51%) who have never obtained information from any of the 12 listed sources, and highest for women (65%) and men (62%) who report 5 to 12 sources.

• **Types of sources.** Among women, fertility knowledge is highest (64%) among those who mention a combination of medical and nonmedical sources, while for
men, fertility knowledge is highest among those who rely on a medical source alone (61%).

- **Sources identified as the first most trusted.** Women who identify the following sources as their most trusted source of fertility information had the highest fertility knowledge scores: a U.S. government website (66%) or a doctor, nurse, or other medical provider (60%).

- **Sources identified as the top three most trusted.** Among women, those who identify a sibling or other relative or a religious leader as one of the top three most trusted sources have significantly lower knowledge than those who do not, while women who identify a U.S. government website as one of the top three most trusted sources have significantly higher fertility knowledge than women who do not. Among men, fertility knowledge is not related to any of the 12 sources they identified as being their top three most trusted.

**Discussion.** Fertility knowledge scores are lowest for respondents who report no information source and increase with the number of sources identified. However, even those reporting the highest possible number of sources scored no more than 65%. This finding suggests that individuals may benefit from having multiple sources, but that currently available sources may be inadequate and in need of technical support to improve the quality (i.e., scope and accuracy) of information offered and the effectiveness of their communication.

Women who report both medical and nonmedical sources have the highest knowledge, but women who report only nonmedical sources have knowledge scores on par with women who report only medical sources. This is not the case among men. It is plausible that accurate fertility information may be more readily available to women than men through nonmedical channels because women are more likely than men to share their insights, experiences, knowledge, and advice on these issues with their family, friends, and acquaintances.

For both women and men, higher knowledge scores are associated with the sources that they identified as most trustworthy to provide accurate fertility planning information. Respondents who identify better informed sources like a U.S. government website or medical provider have higher knowledge scores than those who do not, while those who identify possibly less knowledgeable sources like religious leaders or siblings and relatives have lower scores. Individuals who seek information from better informed sources may have other characteristics that are associated with higher knowledge scores. Because of OPA’s interest in exploring the use of informational interventions to increase fertility knowledge among young adults, more research on these relationships utilizing more complex analyses is warranted.

**What Are the Health Care Access Characteristics of the Sample?**

**Findings.** We present the sample characteristics across five healthcare access measures.

- **Health insurance coverage.** Women and men do not differ in their health insurance coverage. In the past year, about 83% of both sexes had health
insurance for a full year, between 9% and 10% were insured for less than a year, and between 4% and 5% were uninsured.

- **Usual source of care.** Women and men do not differ in the percentage having a usual source of general / primary healthcare (84% and 80%), but women (67%) are more likely than men (25%) to have a usual source of sexual / reproductive health.

- **Visits for general health care and sexual or reproductive health (SRH) care.** In the past year, more women (84%) than men (75%) made a visit for a physical exam or for an illness or injury, as well as for SRH services (66% vs. 16%).

**Discussion.** Although women and men do not differ significantly in their health insurance coverage or in having a usual source of general / primary healthcare, women are more likely to have a usual source of SRH care and to have made a visit for primary health or SRH services in the past year. Women’s increased contact with the health system in general, especially better access to and use of SRH services, is likely to foster the type of trust and rapport that facilitates discussions about sensitive topics like fertility and reproductive planning. Because very few men report having a usual source of SRH care or receiving SRH care in the past year, a strategy that engages primary care providers in reaching men with fertility-related information and related preventive healthcare warrants consideration.

**What Is the Relationship between Fertility Knowledge and Health Care Access?**

**Findings.** For women, fertility knowledge is significantly associated with all five healthcare access measures while for men, this was true for only two of the measures—health insurance status and having made a primary healthcare visit in the past year.

- **Health insurance coverage.** Among both women and men, respondents who had full- or part-year health insurance coverage had higher fertility knowledge than those who were uninsured or were unsure of their coverage status.

- **Usual source of care.** Respondents who have a usual source of primary healthcare or of SRH care have higher knowledge than those who do not. However, these associations are significant for women only.

- **Visits for general health care and SRH care.** Similarly, respondents who have made a visit in the past year for general health issues or for SRH healthcare have higher knowledge scores than those who have not made such visits. The association between reproductive health visits and knowledge is significant only for women, however.

**Discussion.** Although the differences are significant, the gap in knowledge scores between those with and without good healthcare access is modest. Even under optimal conditions for accessing healthcare, the analysis reveals low fertility knowledge (i.e., scores do not exceed 61% for those with potentially ideal access) and highlights a need to evaluate practice standards for educating and counseling reproductive-aged patients on topics critical to their understanding, planning, and decisions about childbearing.
Limitations

This study has several limitations. The study is based on an online probability sample of young adults that has been weighted to match the distributions of several sociodemographic benchmarks of the U.S. population. However, the completion rate of 34% among those invited to participate in the survey leaves the possibility of selection bias because those who did not respond to the invitation may differ from those who did in ways that are unknown.

In our analysis, this issue is exacerbated by the use of unweighted data to estimate means and percentages (as required by OMB). The unweighted point estimates are likely subject to selection bias, that is, they may not represent the correct percentage distributions or summary fertility knowledge scores that would be generated from a sample properly weighted as described above. Thus, the scores may be biased because some segments of the population are not properly represented.

In addition, we conducted only bivariate analyses, examining only two variables at a time. The relationships found in these analyses may change if multivariable analyses were conducted, investigating the relationships of fertility knowledge to many variables simultaneously.

Finally, as with all surveys, respondents may be subject to recall error and other errors such as not wanting to answer some questions honestly. We tried to minimize these errors by how we organized the questionnaire, the use of wording and skip patterns tailored to each individual’s circumstances, and cognitive and usability testing to ascertain that the testing participants understood the questions as they were intended and did not object to the questions. However, it is not possible to eliminate all sources of errors from any survey.

Conclusion

The low levels of fertility knowledge among adults aged 18 to 29 years may be understandable, but it is worrisome. Although over 80% of the sample are childless, the majority want and intend to have children, and having biological children is important to them. Interestingly, there is no difference in fertility knowledge between those who have children versus those who do not and between those who want or intend children versus those who do not. However, for all these groups—including those who are either unsure of their plans or who state that they do not want or intend to have (more) children—having an accurate understanding of fertility and infertility risk factors may help young adults to modify their behaviors, formulate more realistic and comprehensive reproductive plans, and help them adjust plans when life circumstances or preferences change. In addition, there is a sizeable minority of the sample who have not thought about their reproductive plans; they have the lowest fertility knowledge. This group may be most vulnerable to a problem that is also faced by others who currently think they want children—not understanding that they may have to act sooner than they realize to increase their chances of having the number of children that they desire should they want to get pregnant or biologically father children.
It should be noted that this population of young adults have expressed their current childbearing desires and intentions in response to survey questions. These thoughts may not be well considered or deeply held convictions, and in any case, may change as they mature or as their circumstances change. Currently, some individuals may be ambivalent toward having any children or more children if they already have some; and others may have firm ideas about the number of children or their timing but may become ambivalent in the future. Thus, the associations of fertility knowledge with the childbearing attitudes and plans present a cross-sectional view, at one point in time.

Among the respondents, misconceptions about the safety of highly effective contraceptives (pill and IUD) or their effect on future fertility might lead them to rely on less effective or no contraception. The consequences of these misconceptions are that some respondents will become parents before they want to be, have pregnancies that are spaced too closely, or have more children than they want. Increasing young adults’ understanding of the relationship between different contraceptive methods and future fertility may help them to practice, as appropriate, the safe and effective use of contraception to postpone, space, and prevent pregnancy. Furthermore, misunderstandings about the effects of age on both women’s and men’s fertility may cause some to delay desired pregnancies to an age when they are difficult to achieve.

For health educators and medical providers, there is the challenge of identifying and reaching young adults from all these groups, as well as others who do not fit these patterns. Regarding young adults who have not thought about childbearing, educators and providers may face an additional challenge in developing compelling ways to reach individuals who have maturing adolescent brains (which generally continue to mature into the mid-20s) and thus may have difficulty planning and organizing behavior to reach a future goal. As noted earlier, we cannot discern any reason why young adults know some disparate items of fertility knowledge quite well but not others that seem similar in nature. So, educators and providers need to actively explore with specific individuals not only what their childbearing concerns are (if any), but what they know and do not know and whether they are likely to act upon their beliefs (or misbeliefs).

There also seems to be a disconnect between medical care providers and their patients in terms of engaging in discussions about fertility and plans and goals for having or not having children. Although most young adults were insured, had a usual source of health care, and made a primary health or sexual health care visit in the past year, most reported that they had not discussed fertility or reproductive plans with a medical care provider, suggesting missed opportunities by providers to educate and counsel young adults about fertility, especially men who are less likely than women to seek preventive or SRH healthcare. Whereas both women and men named medical care providers as the source they trust the most for accurate information about fertility and childbearing plans, they more often actually use other sources—close relatives and friends—for that information. Similarly, many respondents report that they intend to have children, but have not discussed childbearing plans with a medical provider; and a significant number say they think they may have difficulty having biological children but have never talked about this topic with a medical provider. Given the respondents’ high level of trust in the accuracy of information that medical providers can offer on fertility and childbearing plans, it seems critical to understand and reduce barriers that prevent providers from
discussing these important topics that are salient to their young adult patients. From the patients’ perspective, low fertility knowledge or embarrassment may prevent them from asking questions that might lead to a discussion with their provider. Increasing fertility knowledge through a variety of information sources and encouraging young adults to take an active part in their healthcare may empower them to raise the issue of their own reproductive plans with their health providers. Using these data to understand the characteristics of young adults who report having or not having these discussions with a provider may help to identify individual or enabling factors that are associated with helping or hindering these discussions.

Finally, the survey findings suggest that federal recommendations that health providers play a central role in promoting awareness and understanding of fertility and infertility risk factors; helping clients to articulate their reproductive life plans; and providing the appropriate services to help them achieve their plans require renewed attention. In 2006, the CDC recommended\(^\text{12}\) that all individuals capable of having children have a reproductive life plan,\(^\text{13}\) that efforts be made to increase public awareness of the importance of preconception health behaviors, and that risk assessment and educational efforts be integrated into preventive health visits. Eight years later, in 2014, the CDC and OPA released the *Providing Quality Family Planning*\(^\text{14}\) recommendations in which they highlight the importance of assessing the reproductive life plans\(^\text{15}\) of childbearing aged women and men to help determine their need for health services to prevent or achieve pregnancy. The study findings suggest that efforts may be needed to increase health providers’ awareness and understanding of the recommendations and strengthen their implementation.

The present study has added a great deal of important information and understanding to the area of young adults’ knowledge of fertility and infertility risks. It also has made evident that much more needs to be learned and has suggested some possible avenues for further research.

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\(^{13}\) Defined as “whether or when women and men want to have children and how they will maintain their reproductive health” (p.5).


\(^{15}\) Defined as “whether the client wants to have any or more children and, if so, the desired timing and spacing of those children” (p.8).