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## Attitudes and Intentions Towards a Novel Male Contraceptive: A Health Belief Model Approach

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Attitudes and Intentions Towards a Novel Male Contraceptive:  
A Health Belief Model Approach

Senior Project submitted to  
The Division of Science, Mathematics and Computing  
of Bard College

by  
Aisha King

Annandale-on-Hudson, New York

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## Dedication

This senior project is dedicated to my family. To Grandma Zena, for being a constant source of inspiration and encouragement. Your love and support have meant more to me than I can express. To my parents, for raising me in a cocoon of unconditional love. To my siblings Rabia, Mo, and Saaj, for always being there for me. As long as you are a part of my life I will always have a home. To my aunts, uncles and cousins, for lighting a path towards my future and always offering to lend a hand.

Abstract

Unintended pregnancy is a serious problem that can result in a host of negative consequences for parents and children. A new long-acting reversible contraceptive could increase male contribution to family planning, and thus reduce the high rates of unintended pregnancy seen today. Vasalgel is one such contraceptive that is currently being developed in the United States. The current study used the Health Belief Model (HBM), with additional variables of interpersonal factors and social norms, as a basic framework to investigate men's attitudes towards and willingness to use Vasalgel. In the context of this study, the HBM suggests that behavior is a function of two factors: the value an individual places on pregnancy avoidance, and the individual's belief that a specific preventative action – getting Vasalgel – will achieve that goal. Heterosexual men took an online survey in which they learned about Vasalgel and answered questions related to the contraceptive and HBM constructs. Overall, men had positive attitudes towards Vasalgel, and 41% of men had positive intent to use it if the contraceptive became available. Analyses showed that the HBM was able to predict both attitudes towards and intent to use Vasalgel, and that including perceived norms and interpersonal factors significantly improved the model for intent to use Vasalgel but not for attitudes. The results indicate that a new contraceptive would be used by the male population and underscores the utility of theory-based models in health research.

# HBM APPROACH TO A NOVEL MALE CONTRACEPTIVE

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## Introduction

Approximately 38% of the 210 million pregnancies that occur throughout the world each year are unintended<sup>1</sup>, a figure that is appallingly high (Sedgh, 2014). This is a serious problem, as unintended pregnancies often have significant long-term negative health consequences for both mother and child. Upon discovering they are pregnant, women have three options: continuing the pregnancy, abortion, or alternative care-arrangements (e.g., adoption). Of all the unintended pregnancies worldwide, an estimated 50% end in abortion (Sedgh, 2014). While abortions in legal, sanitary spaces are generally safe, they can still cause lasting emotional and physical strain such as depression, risk of subsequent preterm delivery (Thorp, Hartmann, & Shadigan, 2003). What is even more concerning is that half of all abortions are performed illegally; these operations pose a definitive threat to maternal survival (Sedgh, 2014). But what can be done?

One proposed method of addressing the issue of unintended pregnancy is through contraception (Klima, 1998). *Contraception*, also referred to as birth control, is an umbrella term used to describe methods or devices designed to prevent pregnancy. There are many different methods of contraception available today, and many of them are safe and effective if used properly. Given the large range of contraceptive methods and devices (see Table 1), it is surprising that rates of unintended pregnancies remain high. The numbers become less surprising when viewed alongside the information that 26% of women in the world have an unmet need for contraception, a percentage that rises to 73% in developing countries (Singh, 2012). A multitude of factors contribute to these unmet needs: high cost, lack of access, fear of

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<sup>1</sup> Although unintended pregnancies are certainly not always unwelcome, the term “unintended pregnancy” is used in the literature to describe pregnancies that occur two or more years before desired and those that are not wanted by the mother (Sedgh, Singh, & Hussain, 2014).

side effects, and inadequate knowledge about methods (Singh, 2012; Dixon et al., 2014). In order to make headway with against unintended pregnancy, these barriers must be addressed. It is of critical importance that women receive reproductive health care and services. Close to 800 women die every day from *preventable* causes related to pregnancy and childbirth (World Health Organization [WHO], 2014). While the global maternal mortality rate is half of what it was in 1990, this number remains unacceptably high. In order to reduce maternal mortality and improve overall health, women need continuing and improved access to reproductive health care (WHO, 2014). At this point, however, it is not enough to continue to address the reproductive needs of only women.

Table 1

*Comparison of contraceptive methods by sex*

Female	Male
Diaphragm	Condom
IUD	Vasectomy
The 'Pill'	
Morning-after pill	
Birth control patch	
Female condom	
Vaginal ring (NuvaRing)	
Birth control shot (Depo-Provera)	
Birth control sponge (Today sponge)	
Birth control implant	
Tubal sterilization	

*Note.* This list was taken from the Planned Parenthood website. Withdrawal, outercourse, fertility awareness-based methods, breastfeeding as birth control, and abstinence are not included because these methods do not involve either contraceptive devices or surgery, and as such are not relevant to the present study.

Even if access to contraceptive methods is improved through the removal of obstacles, the role of men in reproductive health needs to be addressed. Present-day contraceptive developments and family planning programs worldwide overwhelmingly target women

(Kalmuss & Tatum, 2007). Both men and women contribute equally to pregnancy, and yet there is a large discrepancy between the number and kinds of contraceptive methods available to men versus those available to women – there are many more options and of greater variety for women than for men (see Table 1). Additionally, most reproductive health services are offered in clinics visited primarily by women, and offer limited services for men (Green et al., 2006). The narrow focus of family planning programs on women has consequently led to the exclusion of males in discussions of reproductive health, relegating men to the role of ‘sperm producers’ who do not have a say in fertility control (Maharaj, 2000). Even though women are the ones who actually become pregnant, they cannot be held solely responsible for their own reproductive health: men are hugely influential in fertility and contraceptive use decisions (Maharaj, 2000; Gage, 1998). And yet, despite findings that the involvement of men in reproductive health programs can increase utilization (Greene et al., 2006; Ezeh, 1993), the focus of such interventions and developments remains on women. In order to investigate why, it is necessary to go back to the beginning of modern-day contraceptives.

The first modern contraceptives were barrier methods intended to prevent sperm from passing through a woman’s cervix and reaching the uterus. Condoms are the classic example of a barrier method, and remain today one of the only contraceptive devices available to men. Diaphragms and cervical caps were among the first barrier methods of birth control available to women<sup>2</sup>. These methods are reasonably effective with perfect use (95% and 75%, respectively), but rely highly on proper user behavior and as such often fail to prevent pregnancy in real world situations (Trussel et al., 2009). Vaginal sponges have also been popularly used to block and absorb sperm, but are similarly ineffective to other barrier methods (80% effective with perfect

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<sup>2</sup> The female condom was approved for use in the United States in 1993 (Gollub, 2000).



use, 75% with typical use). Even though barrier methods are not always effective, they are vastly better than not using any device and do help women to control their family sizes (Trussel et al., 2009).

For women, the path to safe, reliable contraception began with a small pill, taken daily. The new pill was the first medical contraceptive available to women, and the first effective non-barrier form of birth control. Approved for contraceptive use in 1960, the pill's development and marketing of was arguably one of the most important innovations in reproductive health in the twentieth century (Dhont, 2010). It revolutionized the way the world saw both family planning and women's roles in society (Goldin & Katz, 2000). Ninety-one percent effective with typical use, the pill enabled women to take almost complete control over their own fertility (Trussel, 2011). Indeed, over the years the pill's effectiveness coupled with its ease of use has made it the most popular contraceptive in the United States (Jones, Mosher, & Daniels, 2012). By 2010 four out of every five sexually experienced women in the United States had used the pill at some point (Daniels, Mosher & Jones, 2012). The pill has also influenced the global approach to contraception and reproductive health, paving the way for other non-permanent long-term methods of contraception, such as intrauterine devices (IUDs), the patch, injectibles (e.g., Depo-Provera, injected once every three months), and vaginal rings. As a consequence of the development of the first pill, women today have a large variety of highly effective contraceptive methods open to them<sup>3</sup>.

There has been no such advance in contraceptive methods for men. The only non-behavioral forms of contraception available to men today are condoms and vasectomies, two

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<sup>3</sup> Regrettably, the most reliable contraceptive methods available to women are hormonal and can have negative side effects for the emotional and health- state of the women using them (e.g., mood swings, nausea, cramps, weight gain or loss; Robinson et al., 2004).

options that are both flawed. Condoms rely heavily on user behavior and require the interruption of a highly sexually charged moment; additionally, many men and women consider them to be uncomfortable (MacPhail & Campbell, 2001). While male condoms are 98% effective with perfect use, probability of failure with typical use is 17% (Kost et al., 2008). Vasectomies, although highly effective (Trussel, 2011), involve an operation that requires surgery and is not recommended for men who might *ever* want children in the future (Sharlip et al., 2012)<sup>4</sup>. In short, there is a huge discrepancy between the availability of safe and reliable contraceptive methods available to men versus women.

This disparity is important because, as discussed above, birth control is essential in the fight to reduce unintended pregnancies and their associated consequences. If men are excluded from contraceptive discussion, they cannot contribute helpfully to conversations surrounding reproductive health. A new form of long-acting reversible contraception for men could change the global approach to reproductive health in a similar way that the pill did for women. Such a development would certainly reduce unintended pregnancies, and could inspire an increased inclusion of men in reproductive health programs, services, and policies – which would improve overall reproductive and maternal health (Biddlecom & Fapohunda, 1998). There is promising new contraceptive method for men, not yet on the market, that could provide such a spark.

### **Vasalgel**

Vasalgel is a new, long-acting reversible contraceptive that is currently being developed in the United States. It closely resembles RISUG (Reversible Inhibition of Sperm Under

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<sup>4</sup> Vasectomies are technically reversible, but reversals are not always successful and do not guarantee a return to fertility (Belker et al., 1991).

Guidance), which is in Phase III trials<sup>5</sup> in India. The method involves the injection of a polymer into the vas deferens (the duct that transports sperm from the testicle to the urethra). The polymer acts as a semi-solid plug, preventing viable sperm from getting through the vas deferens. This method is similar to and as effective as a vasectomy, except that the vas deferens is not cut, and the process can be reversed at any time with a second injection (which dissolves the polymer). Vasalgel does not affect the ability to ejaculate. In addition, as fluids can pass through the polymer, chronic pain and sperm granulomas – common side effects of vasectomies – are unlikely to occur (Lohiya et al., 2009). The contraceptive method that most closely resembles Vasalgel is the IUD, a highly effective long-acting reversible contraceptive (LARC) that is inserted into a woman's uterus.

Vasalgel could provide a concrete way for men to become involved and take an active role in family planning, if they would use it. However, there has been no research on the likelihood that men would use Vasalgel if given the option, and little research on men's attitudes towards and willingness to use potential male LARCs.

### **Men and Contraception**

The limited options that men have for contraception, in addition to their current exclusion from reproductive health education and services, means that there has been insufficient research into potential attitudes towards a new form of male contraception. A few studies have, however, attempted to investigate whether men are interested in taking charge of their own fertility. These studies have generally shown that men view new contraceptive developments favorably. Middle and upper class men in the United States have been interested in a new form of male

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<sup>5</sup> In Phase III trials, a drug or treatment is given to a large group of people to confirm its effectiveness, monitor side effects, and collect information that will allow the drug or treatment to be used safely among the public.

contraception since the 1970s, when 70% of men interviewed in a study said that they would use a newly developed male contraceptive (Keith et al., 1975). The most popular option was a once a month shot or pill, but 19% indicated that they were in favor of an option for a reversible vasectomy. However, it is important to note that all of the men interviewed were over 30 years old and had higher levels of education than the general public (Keith et al., 1975). In fact, an earlier study found that among lower-class married men in the south-east United States, 47% objected to the mere idea of a male pill and 59% objected to vasectomies (Balswick et al., 1972). Consistent with these findings, a survey of a wide variety of men – from high school and college students to dentists and physicians – found that men who were either married, highly educated, or both had more favorable attitudes toward developments in long-acting male birth control than their counterparts. Married men tended to have more positive attitudes toward a male birth control pill than unmarried men, and education – long thought to create more liberal and egalitarian social attitudes – was associated with more positive attitudes towards birth control (Weinstein & Goebel, 1979). The above research indicates that while men of high socioeconomic status have viewed new forms of male contraception favorably for decades, it is likely that their social and marital statuses impacted their attitudes.

Although far from conclusive, the research from the 1970s suggests that men, particularly those of education and a certain class, would not be wholly unreceptive to the development and promotion of a new LARC designed for men. Thus, although men today have often been excluded from discussions on fertility, it may be due to a lack of options rather than disinterest on their part. Additionally, a recent cross-cultural survey on attitudes toward male fertility control found that across nine countries and four continents, 55% of men expressed willingness

to use a new method of male fertility control<sup>6</sup>. For the United States alone, the percentage of men willing to try a new contraceptive shrank slightly to 49%. Higher education was again significantly associated with more positive attitudes towards new methods of male contraception (Heinemann et al., 2004)<sup>7</sup>. The available evidence suggests that more than half of all men would try a new contraceptive; the development of such a method could alter how the world views reproductive health and men's roles in it.

Despite the fact that the aforementioned findings indicate that men would utilize a new contraceptive, there are significant limitations to the research thus far. The majority of the studies on men's attitudes towards contraceptive developments (Weinstein & Goebel, 1979; Balswick et al., 1972; Keith et al., 1975) were published more than 25 years ago. Moreover, the previous research has been predominantly descriptive in nature; the investigations were not based on theoretical models. Consequently, while these studies provide vital data about men's attitudes towards and willingness to use new contraceptives, they do not provide useful information regarding psychosocial correlates that could be used to predict those same attitudes and intentions. Without theoretical structure based on previous research, it is difficult to try to understand health behavior, let alone predict it. The Health Belief Model (HBM) is a psychological model that has been shown to effectively predict a variety of health behaviors including contraceptive intentions and attitudes in women and men (e.g., Laraque et al, 1997), and thus provides an appropriate framework for the present research.

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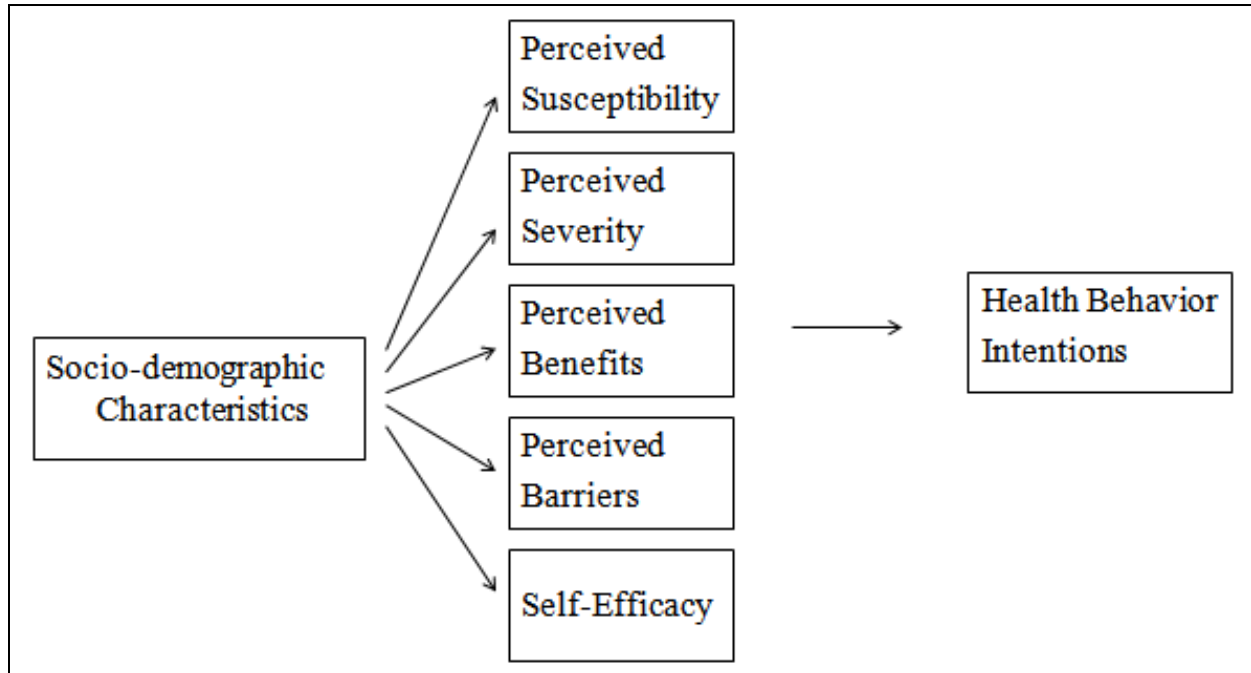
<sup>6</sup> This is the average of attitudes from all nine countries (France, Germany, Spain, Sweden, USA, Brazil, Mexico, Argentina, and Indonesia). Attitudes varied significantly across cultures.

<sup>7</sup> It is important to note that in their report of general "willingness to use," Heinemann et al. (2004) did not distinguish between different options for a male contraceptive (e.g., a male pill, monthly injection, yearly injection).

### **Health Belief Model**

To understand men's attitudes towards and willingness to use Vasalgel, it is helpful to address how other health behaviors and attitudes are examined. The HBM offers a good lens for the present research, as the model has been shown in numerous studies to effectively predict preventive health behaviors (e.g., Schnall, Rojas & Travers, 2015). As shown in Figure 1, the model is based on five primary constructs: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, and self-efficacy (Glanz, Rimer, & Viswanath, 2008). According to the HBM, an individual must first consider himself to be susceptible to a condition (perceived susceptibility), in this case impregnating a woman. Second, he must believe that the condition has potentially serious consequences (perceived severity); for example, children being financial burden. Third, the individual must understand that the negative outcome, pregnancy, is avoidable through the use of effective contraception (perceived benefits), and that he/she is personally able to perform this behavior (self-efficacy). These factors are then weighed against the costs of using contraception (perceived barriers). The HBM suggests that once the threat of pregnancy is recognized, if the perceived benefits of a contraceptive outweigh its perceived costs, an individual is likely to use that contraceptive.

Although there has been no research linking the HBM to men's attitudes towards and willingness to use potential LARCs, there has been substantial research on the HBM and its constructs as they relate to other contraceptive behaviors and attitudes in women and men (e.g., Laraque et al, 1997; Chernick et al., 2015). As such, the psychosocial constructs of the HBM (perceived susceptibility, perceived severity, perceived barriers, perceived benefits, and self-efficacy) provide a useful framework that can be applied to the investigation of men's attitudes towards and willingness to use Vasalgel.



*Figure 1.* Health Belief Model. The HBM provides an a priori framework for the model used in this study. Socio-demographic variables are assumed to have an indirect effect on behavior by influencing perceptions of the constructs of the HBM (susceptibility, severity, benefits, barriers, and self-efficacy). The constructs in turn directly affect health behavior intentions.

**Perceived susceptibility.** The first component of the HBM is perceived susceptibility: do men understand that they are capable of getting a woman pregnant if they have unprotected sexual intercourse? The HBM suggests that individuals who feel at greater risk for unintended pregnancy will be more likely to use effective methods of contraception. In support of this, Condelli (1986) found that users of ‘the pill’ felt more susceptible to pregnancy from unprotected sex than diaphragm users. As such, the former chose to adopt the pill because they knew it to be more effective at preventing pregnancy.

Recent research involving women obtaining abortions in the United States found that the majority of these women had, at the time of conception, believed that they could not get pregnant (Frohwrith, Moore & Maniaci, 2013). Interestingly, even though the women understood perfectly how pregnancy works, they still thought that it would not (or could not) happen to

them. Women reported feeling invulnerable to pregnancy due to the perception that they or their partners were barren, the fact that they could get pregnant did not occur to them, or the belief that they were using a contraceptive method at the time.<sup>8</sup> These feelings of insusceptibility were significantly correlated with ineffective (or lack of) contraceptive use and subsequent pregnancies (Frohworth, Moore & Maniaci, 2013). These findings provide strong evidence that perceived susceptibility to pregnancy influences contraceptive behavior.

Crucially, perceived susceptibility can only influence health behavior change when there are negative consequences to not using contraception. In order for an individual to be motivated to use contraception, he must view unintended pregnancy as a negative, rather than positive, consequence. It is possible that men do not view unintended pregnancy as negatively as women, given that they do not actually have to bear the child. Moreover, it is possible that men feel less tied down by the thought of a child, and as such the risks of unprotected sex and potential unintended pregnancy may be less salient to them. To investigate this possibility and its effect on contraceptive attitudes and intent, the second construct of the HBM is perceived severity.

**Perceived severity.** An essential part of the HBM, perceived severity measures how serious an individual perceives the consequences of a particular health behavior to be. However, in the case of unintended pregnancy it becomes necessary to deviate slightly from the standard model. As noted in several studies, (e.g., Nathanson & Becker 1983; Unger, Molina & Teran, 2000), pregnancy is not always perceived as a negative consequence, regardless of intention. In fact, some previous research utilizing the HBM to investigate pregnancy has altered the construct of perceived severity to “perceived consequences.” As this study investigates contraception,

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<sup>8</sup> Women who claimed perceived contraceptive use as the reason they felt unsusceptible to pregnancy often misunderstood the mechanics of contraception (for example, thinking that skipping a few birth control pills would not influence the effectiveness of the pill).



however, it will retain the original construct of perceived severity to pregnancy. Negative consequences of unintended pregnancy include but are not limited to: inability to finish school, having to raise a child when unprepared, delayed or lost career opportunities, having to become financially independent, and being unable to fulfill life goals.

One way that the consequences of unintended pregnancy have been shown to relate to contraceptive decision-making process concerns pregnancy ambivalence. *Pregnancy ambivalence* refers to the mixed feelings that an individual can have towards getting pregnant or impregnating another person, which in turn may lead to conflicting views on pregnancy. Individuals who are ambivalent towards pregnancy do not view the possibility of unintended pregnancy in a positive light, but neither do they perceive it as a severe negative consequence. Importantly, this is not uncommon occurrence: in 2012, 53% of men and 36% of women (between the ages 18-29) in the United States reported being ambivalent towards pregnancy (Higgins, Popkin, & Santelli, 2012). As a result of mixed feelings, ambivalence towards pregnancy in women has been shown to be strongly correlated with both less overall contraceptive use and with having a gap in contraceptive use while remaining at risk for pregnancy (Frost, Singh, & Finer, 2007). Furthermore, a later study found that pregnancy ambivalence in men was strongly correlated with less overall and less consistent contraceptive use. Compared to men who had clear intentions to avoid pregnancy, sexually active men who were ambivalent toward pregnancy were significantly less likely to have used any method of contraception in the previous month (Higgins, Popkin, & Santelli, 2012). These studies support the inclusion of perceived severity of pregnancy in the HBM. The construct appears to significantly impact contraceptive use and as such must be taken into account when investigating contraceptive behavior.

**Perceived Benefits.** Once levels of perceived severity and susceptibility have been established, individuals must next understand that there is benefit to changing their behavior. According to the HBM, if no benefits are perceived, no behavioral change can take place (DiClemente, Salazar, & Crosby, 2013). The primary benefit of going to a doctor and getting Vasalgel injected is the significantly reduced chance of impregnating a sexual partner. Vasalgel is as effective as a vasectomy but completely reversible. Effective contraception has the benefit of not having to deal with unintended pregnancy, not having to discuss the possibility of a partner getting an abortion, and not ending up raising a child before ready. Furthermore, this new form of contraception does not require the interruption of coitus, as do both condom use and withdrawal. The HBM is concerned with how individuals understand these benefits.

Perceived benefits of birth control have significant impact on contraceptive behavior. Among women in the United States at high risk of contracting HIV, perceived “pros,” or benefits, of condom use were positively associated with self-reported condom use. Women who scored higher on the perceived condom-use benefits scale were more likely to report using birth control in general as well as using condoms with their main partner and other partners (Lauby et al., 1998). Similarly, several studies have shown that individuals who believe that condoms are effective in preventing HIV transmission are significantly more likely to report consistent condom use (e.g., Hingson et al., 1990; Baiden & Rajulton, 2011)<sup>9</sup>. Given what we know from the background literature, perceived benefits of Vasalgel are likely to significantly impact men’s attitudes and intentions towards the contraceptive.

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<sup>9</sup> While this finding does not pertain specifically to pregnancy prevention, it does relate to contraceptive use and as such is relevant to the present research.

**Perceived Barriers.** When investigating the benefits of a change in health behavior, it is necessary to look at costs as well. The HBM is based on the assumption that when an individual perceives a threat to their health, behavior change can occur if the perceived benefits outweigh the costs, or barriers (DiClemente, Salazar, & Crosby, 2013). Possible barriers to men's intentions towards Vasalgel may include those barriers found to affect the use of other contraceptive methods: fear of pain or needles (Bharadwah et al., 2012), perceived side effects (Bharadwaj et al., 2012), and perceived structural barriers (e.g., lack of knowledge or financial means; Leeman, 2007).

***Fear of pain.*** The first barrier that might affect men's willingness to try Vasalgel is fear of pain, something that most humans share regardless of culture or upbringing. Needles have significantly different connotations across different countries and societies, however. In the United States and most Western societies, vaccines and shots are thought to be "necessary evils"; negative, painful, and only sometimes effective. In several Eastern societies (e.g., parts of Asia), shots are seen as essential to healing and as such are considered both necessary and desirable (Concepción et al., 1991). One example of the way the Western world associates needles with pain can be seen in the effect that fear of pain has on women's decisions to use LARCs. Among young, sexually active women in North London, for example, fear of pain was the most powerful deterrent to using LARCs, more influential even than fear of side effects or potential damage to future fertility (Bharadwah et al., 2012). Fear of needles and pain was also found to be a significant disincentive for IUD use in a study of 500 adult women in the United States, indicating the widespread repercussions of this fear (Bracken & Graham, 2007).

Women are not alone in allowing fear of pain to guide their decisions, however. Fear of needles was able to significantly predict non-willingness to undergo a vasectomy among male

heads of households in Kenya (Odhiambo, 2014). Pain, therefore, is a significant deterrent in contraceptive decisions in both men and women. As Vasalgel involves an injection into a sensitive part of the body, it is vital to investigate how fear of pain affects men's willingness to participate.

***Perceived side effects.*** Although there are no known side effects to Vasalgel, men may still worry about as yet unknown side effects, as well as potential long-term consequences of the injection – for example, fear that they will not be able to ejaculate or that the contraceptive is not actually reversible. Fear of side effects and concerns about lasting effects on fertility have been found to be powerful disincentives to the adoption of LARC for women (Bracken & Graham, 2014), as has fear of side effects of injection generally (Bharadwaj et al., 2012).

***Structural.*** A third barrier often included in health research is the perception of structural barriers. Whether from economic inequalities or poor infrastructure barring access to clinics, structural barriers often affect health behaviors (for a review of structural barriers to HIV prevention, see; Parker, Easton, & Klein, 2000). One structural barrier to Vasalgel use may be fear of not being able to afford the contraceptive or that insurance would not cover it. Even though Vasalgel has not reached the market, it is still appropriate to measure men's perception of potential structural barriers to using the contraceptive. If they see structural barriers to the use of Vasalgel even before it is a viable option, they may be less likely to explore the option if it becomes available, or to indicate intent to use the contraceptive.

***Self-Efficacy.*** The final psychosocial level of the HBM states that in order to enact behavioral change, an individual must believe that he or she is capable of taking action (Glanz, Rimer, & Viswanath, 2008). An individual must believe that engaging in a particular behavior

will achieve a desired outcome, and in his or her ability to perform that behavior. The belief in one's own capacity to perform a behavior is referred to as *self-efficacy*. Self-perception of one's capabilities is often more predictive of behavior change than actual ability to make the change, and as such is a vital component of the HBM.

The connection is generally supported by literature regarding the influence of self-efficacy on contraceptive use. Research into the relationship between self-efficacy and teenage girls' contraceptive behavior has found that girls with low contraceptive self-efficacy, significantly more than girls with high contraceptive self-efficacy, described conflicted feelings regarding sexual activities, which in turn contributed to self-reported ineffective and inconsistent contraceptive use (Strecher et al., 1986). Additionally, contraceptive self-efficacy was found to be a significantly predictive factor for intentions to use condoms in a large sample of male and female college students; students who reported higher contraceptive self-efficacy were more likely to report intent to use condoms in the future (Joffe and Radius 1993). Furthermore, among unmarried, female, and sexually active college students, contraceptive self-efficacy has been found to be significantly associated with effective contraceptive use (Heinrich, 1993). More recently, contraceptive self-efficacy was found to be a significant predictor of positive intent to use condoms in sexually inexperienced adolescents and of reported consistency of condom use in sexually experienced adolescents (Baele, Dusseldorp and Maes 2001).

Longmore et al. (2003) found that adolescents of both sexes who had higher contraceptive self-efficacy were also more likely to use a contraceptive method (condom or other) than to use no method of contraception. Thus, contraceptive self-efficacy was able to effectively predict contraceptive use regardless of method (Longmore et al. 2003). This finding, in conjunction with the extensive research on how contraceptive self-efficacy pertains to condom-use, provides

convincing evidence that self-efficacy as a psychological construct can predict contraceptive intentions and use.

### **Limitations of the Health Belief Model**

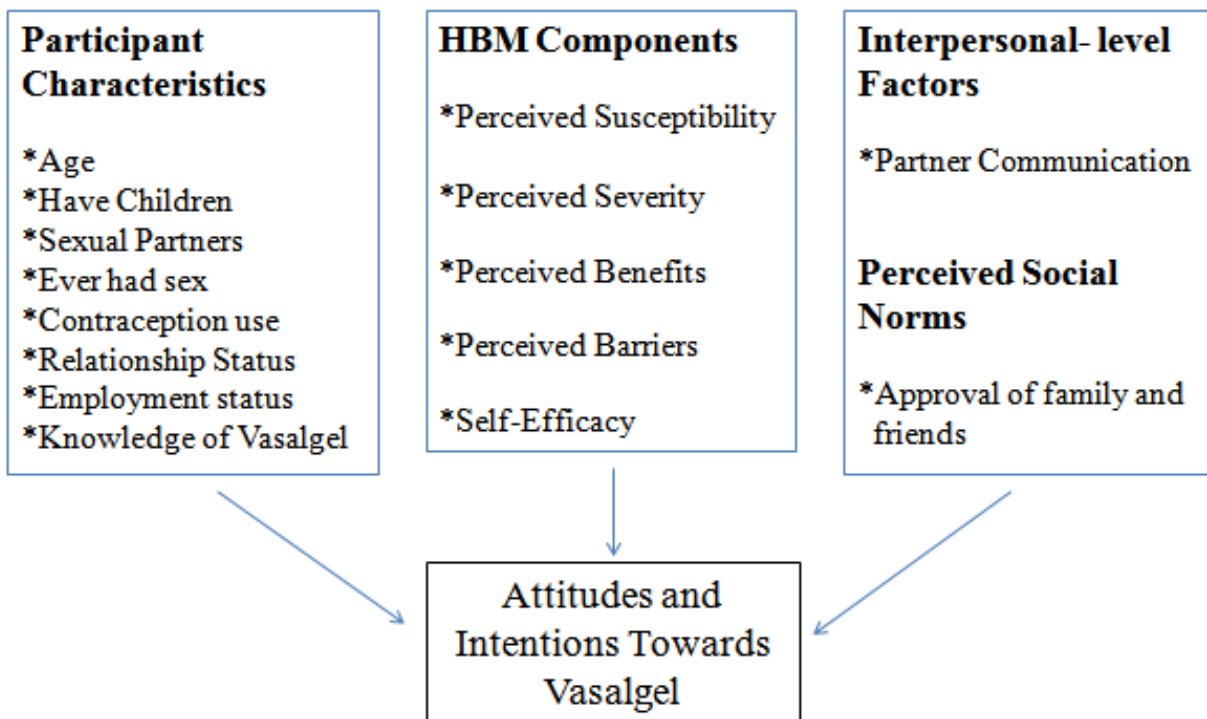
Although the HBM has had remarkable success at predicting health behaviors, there are some limitations to the model. The first limitation of the HBM is that it fails to address the impact that others' approval – or disapproval – may have on health behavior, and consequently fails to account for behavior that is influenced by societal norms (Sheeran & Abraham, 1996). Perceived social norms, although not included in the standard HBM, are an integral part of many health-related behaviors. Studies on a variety of health behaviors have found that the more an individual feels social pressure or social support to perform a behavior, the more likely he or she is to perform that behavior (e.g., intent to speed; Cestac, Paran & Delhomme, 2011, regular exercise; Pender & Pender, 1986, and binge drinking; Johnston & White, 2003). As sexuality is deeply affected by culture and societal norms, perceived norms are particularly important to take into account when researching contraceptive behavior. Social norms have indeed been shown to influence contraceptive behaviors (Fekadu & Kraft, 2001), and may predict attitudes and intentions towards Vasalgel.

Perceived social norms have been added to the HBM in previous studies to create the best possible model for contraceptive behavior. For example, perceived social support was an important factor among women of reproductive age in the United States in their decision to adopt either “the pill” or a diaphragm as their primary contraceptive method in the 1980s (Condelli, 1986). As would be expected, both pill and diaphragm users perceived high social support for their respective chosen methods; however, while pill users did not perceive any social opposition

for using a diaphragm, diaphragm users expected significant outside resistance to choosing the pill. Perceived societal opposition was thus a probable significant factor in preventing diaphragm users from adopting the pill as a contraceptive method, even though the pill is a much more reliable form of contraception than the diaphragm (Condelli, 1986). Furthermore, men and women in St. Lucia who believed that their friends used condoms were found to be significantly more likely to report consistent condom use than individuals who believed that their friends did not use condoms (Fishbein et al., 1993). There is strong support for the prediction that perceived social support plays an intrinsic role in individual contraceptive decisions and behavior.

The second limitation of the HBM is that the model tends to isolate health decisions from an individual's ongoing relationships, such as those with a significant other or spouse (Gillam, 1991). Although the decision to use Vasalgel could potentially be made without regard for a partner, contraceptive behaviors and decisions can never be fully investigated in isolation. The interpersonal factor that is most likely to have an impact on contraceptive behavior is communication with one's sexual partner. In a meta-analysis of psychological factors that relate to heterosexual condom use, communication with a partner about condoms and positive partner attitude regarding condom use were both found to be positively correlated with more consistent condom use (Sheeran, Abraham & Orbell, 1999). In addition, even though most adolescents don't discuss sexual issues with their partners, sexually active adolescents who communicated about sexual issues with their partners were more likely to report consistent condom use (Widman et al., 2013). Moreover, men and women who had had a sexual partner suggest using condoms were significantly more likely to report condom use than individuals who had never had a sexual partner suggest condom use (Fishbein et al., 1993). This is a strong indication that partner communication influences actual contraceptive behavior. As contraceptive use is so

often based on the decisions and beliefs of more than one person, it is necessary to take an individual's partner (if applicable) into account when investigating attitudes and intentions toward any contraceptive method. As can be seen in Figure 2, perceived social norms and interpersonal factors were added to the model of this study in order to address the limitations of the HBM.



*Figure 2.* Representation of the current study's model. HBM components are expected to predict attitudes and intentions above and beyond the capabilities of participant characteristics, and interpersonal and social norm factors are expected to improve the model even further.

### **Overview of the Current Study**

There has been no study yet which uses a psychological framework to analyze men's attitudes and intentions towards Vasalgel or a similar male contraceptive method. At this point in the field it is necessary to move away from research that is purely descriptive in nature and towards established theory, in order to better understand and predict health behavior and attitudes



related to contraception. In this way it will be possible to contribute to the previous research and strengthen prior assumptions of the theoretical framework, if it is supported. The model used in the current study is a modification of the HBM through the inclusion of social norms and interpersonal factors. Additionally, no previous study has investigated men's attitudes to a tangible contraceptive development (named and previously publicized).

Rather than addressing unspecified male contraceptive developments as has been done in previous research, this study investigates men's attitudes and intentions towards a contraceptive that is currently being developed, Vasalgel. There were several motives behind this decision. First, Vasalgel has been publicized in multiple news sources, most notably The Guardian (Valenti, 2014). This most likely increased the contraceptive's tangibility, as some men may have heard of it prior to participating in this study. Second, specifying the contraceptive should prompt men to respond in a way that reflects their actual intentions were Vasalgel to hit the market. Third, most of the previous literature on the HBM has dealt with behavior or behavioral intentions that individuals could actually adopt or change. As such, asking about Vasalgel as though it is a viable option should make the HBM more applicable to the current study. Although Vasalgel is not on the market yet, it has a name and a specific description (provided to men who participated in the survey). This is important because willingness to use LARCS has been shown to depend on the kind of contraception being investigated, be it a male pill, injection, or applied jelly. If Vasalgel (or another product) becomes available, it will have a specific name and description, which will affect attitudes and intent to use. Research into contraceptive methods has to take that knowledge into account.

The current study was conducted at Bard College and the surrounding towns of Dutchess County. The decision to broaden the population sample of the study was both to expand the age

range of potential participants and to investigate a wider range of opinions and contraceptive beliefs. Bard College is a small liberal arts college (averaging 500 per class) with a relatively homogenous student population (76% of the incoming class of 2019 held United States citizenship). Given that Bard is primarily an undergraduate college, respondents from within the college were expected to range in age from eighteen to twenty-four. According to the latest census data, the median age of males in Dutchess County is 39 years (U.S. Census Bureau, 2010). To measure men's attitudes and intent to use Vasalgel, male participants completed an online survey, which asked them questions related to the constructs of the HBM, certain interpersonal-level factors, and their perceived social norms.

Studies investigating intent to use and attitudes towards male contraceptive developments are few. Consequently, this study utilized the basic framework of the HBM, which has been used in the past to research a variety of contraceptive behaviors and intentions, with the inclusion of the two additional independent variables of perceived social norms and interpersonal factors to test the research hypotheses. The goal was to investigate how personal perceptions (of susceptibility to pregnancy, severity of pregnancy, benefits of Vasalgel, barriers to use of Vasalgel, contraceptive self-efficacy, and social norms) influence men's attitudes and intentions towards Vasalgel. Hence, the first hypothesis of this study is that the constructs of the HBM will predict men's attitudes and intent to use. The second hypothesis is that the inclusion of interpersonal-level factors and perceived social norms will significantly improve the predictive ability of the HBM, and therefore the model.

## Method

### Participants

Study participants, all men, ranged in age from 18-48 ( $M = 24$ ;  $SD = 5.5$ ). One hundred and forty-six participants completed the study survey. Three respondents were excluded from subsequent analyses: two were outliers (their scores were more than 3 standard deviations from the mean on one or both of the dependent variables), and one failed to answer any of the items corresponding with the dependent variables. As such, final analyses were run with a total of 143 participants. All reported being biologically male, and all reported being interested in vaginal sex with women. Fifty one percent ( $n = 74$ ) were students, 46% ( $n = 67$ ) reported being employed, and 2.7% ( $n = 4$ ) reported being unemployed at the time of taking the survey. Seventy eight percent of the students who participated in the study were Bard students ( $n = 57$ ). Ninety percent of all participants ( $n = 130$ ) reported having had sex with a woman, and 75% of those men reported sexual activity in the previous month ( $n = 98$ ). Fifty seven percent of all participants were in an ongoing sexual relationship with a woman ( $n = 84$ ). Of participants in relationships, condoms (48%) and oral contraception (44%) were the most popular forms of contraception used. The next most popular method was withdrawal (20%), followed by intrauterine devices (8%). No participants reported using a diaphragm as a form of contraception.

### Measures

**Socio-demographic measures.** The first section of the survey measured socio-demographics. Participants were asked to indicate their age, highest level of education reached, and current employment status (student, employed, unemployed). If participants reported being

students, they were then prompted to specify which college or university they attended and their current year in school. Participants were then asked a series of questions relating to their sexual history (e.g., “Have you ever had sex with a woman?”). A full list of these items can be found in Appendix A.

**Interpersonal Factors.** Participants were subsequently asked whether they were in a current, ongoing sexual relationship with a woman (regardless of relationships with other men or women). If they said “yes,” indicating that they were at that time in an ongoing sexual relationship with a woman, they were then asked to rate, on a 6-point scale (1 = strongly disagree, 6 = strongly agree), how well they communicate with their partner about birth control (For items see Table 2).

**Attitudes and intentions.** Following demographic and interpersonal factor questions, a brief description of Vasalgel was provided. Attitude towards Vasalgel was then measured by asking participants to rate the following questions on a 6-point scale (1 = strongly disagree, 6 = strongly agree): “I think that Vasalgel is an important invention,” and “Vasalgel should be put on the market as soon as possible.” Participants were also asked to rate the statements: “I would use Vasalgel if it became available,” on the aforementioned 6-point scale and “Using Vasalgel as a long-term contraceptive method for me would be: [Very Awful, Awful, Somewhat Awful, Somewhat Nice, Nice, Very Nice]” on a 6-point scale where 1 = Very Awful and 6 = Very Nice. These two items were averaged to create a composite score, which characterized intent to use.

**HBM constructs.** Twenty-two separate items measured the constructs of the HBM (perceived susceptibility, perceived severity, perceived benefits, perceived barriers, self-efficacy). Survey items that examined the constructs of the HBM were adapted from a study by

Bish, Sutton, and Golombok (2000), which investigated whether the HBM could predict an increase of routine cervical smear testing in women. Participants rated, on a 6-point scale (1 = strongly disagree, 6 = strongly agree), how susceptible they felt to getting a woman pregnant (e.g., “I cannot get a woman pregnant.<sup>10</sup>”) and how severe they believed the consequences of impregnating a woman would be (e.g., “Getting a woman pregnant is one of the worst things that could happen at this stage in my life.”). They were then asked to rate, on the same 6-point scale, statements concerning benefits and barriers to the use of Vasalgel. An example of a statement measuring perceived benefits was “I am confident Vasalgel is able to prevent pregnancy.” An example of an item measuring perceived barriers to Vasalgel use was “I am worried about the side effects of Vasalgel.” Contraceptive self-efficacy was measured using 6-point scales, asking participants to rate how capable they felt of going to a doctor to get Vasalgel (regardless of actual intent). Importantly, in order to accurately predict behavior change, self-efficacy measures must relate specifically to the health behavior in question (for a review of self-efficacy in health behaviors, see Strecher et al., 1986). This measure was therefore tailored specifically to Vasalgel use (See Table 2).

**Perceived social norms.** Three items measured perceived social norms (rated on a scale of 1-6, 1 = strongly disagree, 6 = strongly agree): “My family and friends would make fun of me if I used Vasalgel,” “My male friends would encourage me to get Vasalgel if it became available,” and “As far as I know, my male friends would be interested in using Vasalgel if it became available.”

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<sup>10</sup> This item was reverse-coded.

Table 2

*Health Belief Model Items Grouped by Construct used to Assess Pregnancy and Vasalgel Use perceptions*

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**Construct**

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**Interpersonal Factors**

- I do not talk about birth control with my partner.\*
- I often feel embarrassed when talking about birth control with my partner.\*
- My partner is comfortable talking about birth control with me.

**Susceptibility to Pregnancy**

- I cannot get a woman pregnant.\*
- My physical health makes it more likely that I won't get a woman pregnant if we have unprotected sex.\*

**Severity of Pregnancy**

- Getting a woman pregnant is one of the worst things that could happen at this stage in my life.
- I would be happy if I got a woman pregnant in the next six months.\*
- Problems I would experience from getting a woman pregnant would last a long time.
- If I got a woman pregnant, my whole life would change.
- The thought of impregnating a woman scares me.
- If I got a woman pregnant my job opportunities and professional career would be endangered.

**Benefits of Vasalgel**

- I am confident Vasalgel is able to prevent pregnancy.
- Using Vasalgel would reduce my fear of getting a woman pregnant.
- I have a lot to gain by using Vasalgel.

**Barriers to Vasalgel Use**

- I am afraid that if I use Vasalgel it would affect my ability to have children later.\*
- I am worried about the side effects of Vasalgel.\*
- The fact that Vasalgel is injected into a sensitive part of my body would not deter me from using it.
- I am afraid that getting Vasalgel would hurt me.\*
- I am not worried that getting Vasalgel would cause me to be permanently infertile.
- I am afraid that Vasalgel would affect my sex drive.\*

**Self-efficacy of Vasalgel Use**

- It would be difficult to tell a partner that I am going to get Vasalgel.\*
- I am confident that I could go to the doctor to get Vasalgel if it became available.
- I would not insist on getting Vasalgel if a partner threatened to leave me if I got it.\*
- I feel capable of discussing the importance of using Vasalgel with a sex partner.
- I would get Vasalgel even if my partner did not want me to.

**Social Norms regarding Vasalgel**

- My family and friends would make fun of me if I used Vasalgel.\*
  - My male friends would encourage me to get Vasalgel if it became available.
  - As far as I know, my male friends would be interested in using Vasalgel if it became available.
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\* Items were reverse coded.

*Note:* Response categories are six points: (1) strongly disagree to (6) strongly agree.

**Procedure**

Participants were recruited at Bard College and surrounding areas of the Hudson Valley in New York State (Kingston, Rhinebeck, Red Hook, Tivoli, Hudson, and Catskill). Participants at Bard College were recruited by through flyers on bulletin boards around campus and through flyers on tables in Kline Commons. Recruitment in surrounding areas took place via flyers posted in local businesses (e.g., cafes, stores, restaurants). Flyers noted that participants must be male and over eighteen years old. Flyers advertised the link to the survey and the incentive, which was the chance to win one of four \$25 gift cards to Amazon.com. To see copies of the flyers used, refer to Appendix B.

When participants entered the link to the online survey into their computers, the first screen they saw was the informed consent form. After reading the consent form, participants either clicked “Yes, I consent to participate,” or “No, I do not consent.” If they consented, they were asked three screening questions: “Are you 18 years of age or older,” “Are you biologically male,” and “Are you interested in having vaginal sex with a woman (or women)?” If participants answered “no” to any of these questions, they were directed to a page thanking them for their interest in the study, but telling them that they did not qualify for the study. If they responded “yes” to all three screening questions, they were able to continue on to the rest of the survey. Upon completing the survey, participants were redirected to a debriefing statement, which informed participants of the purpose of the study, the availability of counseling services, the method for entering the lottery to win a gift card, and resources where they could find more information about contraception and Vasalgel.

## **General Analysis**

There were two dependent variables of interest: attitude toward and intent to use Vasalgel. The independent variables were the constructs of the HBM (perceived susceptibility, perceived severity, perceived benefits, perceived barriers, and self-efficacy), as well as the additional constructs of interpersonal factors, and perceived social norms. Independent variables were measured by separate subscales, each of which was comprised of several items. To create composite scores and to generate a valid HBM global score, negatively worded items were recoded so that high and low values would indicate the same type of response for each item. The following survey items were reverse coded: 25, 26, 32, 36, 37, 40, 41, 45, 49, 52, 53, 55, 58, 59, 61, 64, and 69 (see Appendix A for corresponding items). In order to test for scale reliability, a Cronbach's alpha was run for each subscale of the HBM, as well as for the scales measuring perceived social norms and interpersonal factors. Items that had intercorrelations under 0.3 (of medium strength) were removed from the scales. Items 24, 35, 38, 40, 45, 48, 49, and 57 were removed in order to improve internal consistency of the subscales. Refer to Appendix A for full survey and Table 2 for subscale items used in the final analyses. For each independent variable, a composite score was calculated by averaging the scores of individual items. A "global score" was then calculated for the HBM by averaging the composite scores of the HBM subscales.

## **Data Analysis**

To determine possible confounds, linear regressions (dependent variables: intent to use and attitudes towards Vasalgel) were run on the following demographic variables: age, number of sexual partners in the past year or ever, ever having had sex, contraception use at last sex, current employment status, and currently being in a relationship, having children, and having



heard of Vasalgel prior to taking the survey. Confounding variables found to impact the dependent variables were included in subsequent regression models. To test for multicollinearity between subscales, cross-correlations were run on all of the independent variables.

Two hierarchical multiple regressions were run to test how well the independent variables predicted attitudes towards (dependent variable 1) and intent to use (dependent variable 2) Vasalgel within the context of the full model of this study. Participant characteristics which significantly impacted attitudes (Heard of Vasalgel previously) and intentions (Having children and having heard of Vasalgel previously) towards Vasalgel were entered at Stage 1. At Stage 2, the score on independent components of the HBM were entered to test the predictive power of each construct within the setting of the model as a whole. Next, based on previous research demonstrating the relevance of social norms (Condelli, 1986) and interpersonal-level factors (Sheeran, Abraham & Orbell, 1999) to contraceptive behavior, these variables were entered at Stage 3 to explore whether social norms and interpersonal factors significantly improved model estimates of participants' attitudes towards and intent to use Vasalgel above the HBM alone.

## Results

Attitudes towards Vasalgel were predominantly favorable ( $M = 4.82$ ), as were intentions to use Vasalgel ( $M = 4.30$ ). More specifically, 41% of all participants ( $n = 59$ ) either moderately or strongly agreed with the statement "I would use Vasalgel if it became available," compared to 22% ( $n = 31$ ) who either moderately or strongly disagreed. Interestingly, 57% of participants ( $n = 82$ ) reported that using Vasalgel would be for them "very nice" or "nice," compared to only 0.06% ( $n = 9$ ) who said it would be "awful" or "very awful." Fifty-five percent ( $n = 79$ ) moderately or strongly agreed with the statement: "Vasalgel should be put on the market as soon as possible," and 0.06% ( $n = 9$ ) moderately or strongly disagreed. Additionally, 78% of

participants ( $n = 112$ ) moderately or strongly agreed that “Vasalgel is an important invention,” whereas only 0.03% ( $n = 4$ ) moderately or strongly disagreed with the statement.

The only demographic characteristic that had a significant effect on both intent to use and attitude towards Vasalgel was having heard of Vasalgel prior to the present study ( $n = 63$ ). Currently having children ( $n = 5$ ) had a significant effect on intent to use, but not attitude. Age, number of sexual partners in the past year or ever, ever having had sex, contraception use at last sex, current employment status, and currently being in a relationship had no direct relationship with intent to use or attitude. Mean scores and frequencies for participant characteristics are in Table 3.

Although only having heard of Vasalgel prior to the study and having children were shown to significantly impact attitude and/or intent to use, other demographic characteristics were associated with certain HBM constructs and perceived social norms. Linear regressions exploring the impact of participant characteristics on HBM constructs and perceived social norms found that younger age was significantly associated with higher perceived severity ( $F(1,140) = 24.83, p < 0.001$ ). Having children was associated with lower perceived severity ( $F(1,126) = 11.01, p < 0.01$ ) and lower perceived benefits ( $F(1,125) = 4.08, p < 0.05$ ). Additionally, having heard of Vasalgel significantly increased perceived social norms ( $F(1,138) = 26.93, p < 0.001$ ), perceived benefits ( $F(1,138) = 42.53, p < 0.001$ ), and perceived barriers<sup>11</sup> ( $F(1,139) = 29.82, p < 0.001$ ). There was a significant difference between employment groups (student, employed, unemployed) as determined by one-way ANOVA ( $F(2,138) = 4.10, p < 0.05$ ). A Tukey post-hoc revealed that students had significantly higher levels of perceived

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<sup>11</sup> The entirety of the perceived barriers scale was reverse-coded. Having heard of Vasalgel was associated with lower levels of the non-reverse scored construct of perceived barriers.

severity of pregnancy than employed individuals ( $p = 0.05$ ). There were no significant differences between perceived severity of non-employed and employed individuals ( $p = 0.82$ ) or non-employed individuals and students ( $p = 0.98$ ).

Table 3

<i>Participant characteristics</i>		
Characteristic	Total ( $N = 143$ )	Range
Age [mean ( $SD$ )]	24.31 (5.51)	18 - 48
Sexual partners this year [mean ( $SD$ )]	2.28 (8.29)	0 - 25
Sexual partners ever [mean ( $SD$ )]	8.29 (8.07)	0 - 40
Current employment status [ $n$ (%)]		
Student	73 (51)	
Employed	65 (45.5)	
Unemployed	4 (2.8)	
Ever had sex [ $n$ (%)]		
Yes	129 (90.2)	
No	13 (9.1)	
Contraception use at last sex [ $n$ (%)]		
Yes	111 (77.6)	
No	17 (11.9)	
Currently has children [ $n$ (%)]		
Yes	5 (3.5)	
No	124 (86.7)	
Currently in sexual relationship [ $n$ (%)]		
Yes	82 (57.3)	
No	46 (32.2)	
Heard of Vasalgel previously [ $n$ (%)]		
Yes	63 (44.1)	
No	79 (55.2)	

*Note:* Percentages do not add up to 100 in all cases as they are calculated from the total sample, not only of participants who answered a particular question.

Internal consistency (Cronbach's alphas) for the subscales of perceived severity, perceived benefits, perceived barriers, and self-efficacy were above 0.70, indicating good scale reliability (George & Mallery, 2003). Cronbach's alphas for the perceived susceptibility, perceived social norms, and interpersonal factors scales were below 0.7, which suggests

questionable internal consistency (see Table 4 for full list of Cronbach's alphas). However, given the centrality of these measures to this study, regression analyses retained these factors.

Table 4

*Cronbach's Alphas for Subscales of HBM and Social Norms and Interpersonal Factors Scales*

Construct	Cronbach's Alpha	Items
Perceived Susceptibility	0.59	2
Perceived Severity	0.77	6
Perceived Benefits	0.78	3
Perceived Barriers	0.83	6
Self-efficacy	0.73	5
Perceived Social Norms	0.66	3
Interpersonal Factors	0.60	3

Means for the composite scores of HBM subscales and scales of interpersonal factors were generally high (above 4.0), with the exception of that of perceived barriers (3.34; see Table 5 for full list of means). Higher scores indicate stronger agreement with items in the scale.

Table 5

*HBM subscales, interpersonal factors, and perceived social norms*

Construct	Mean (SD)
Perceived Susceptibility	5.77 (0.55)
Perceived Severity	5.94 (1.10)
Perceived Benefits	4.47 (1.09)
Perceived Barriers	3.34 (1.07)
Self-efficacy	4.08 (0.97)
Perceived Social Norms	4.18 (1.00)
Interpersonal Factors	5.39 (0.79)

*Note:* Scale responses ranged from 1 = completely disagree to 6 = completely agree. The construct of perceived barriers was reverse coded for the purpose of analysis.

There were significant correlations between several of the composite scores for components of the HBM, perceived social norms, and interpersonal-level factors. These correlations and significance levels are reported in full in Table 6.

Table 6

*Correlation matrix of HBM constructs, perceived social norms, and interpersonal factors*

Construct	1	2	3	4	5	6
1 Perceived Susceptibility						
2 Perceived Severity	0.11					
3 Perceived Benefits	0.15	0.34*				
4 Perceived Barriers	0.11	0.09	0.58*			
5 Self-efficacy	0.11	0.16	0.57*	0.48*		
6 Perceived Social Norms	0.15	0.11	0.54*	0.46*	0.57*	
7 Interpersonal Factors	0.12	-0.11	0.14	0.14	0.15	0.18

\* Correlations are significant to the level of  $p < 0.01$ 

Two three stage hierarchical multiple regressions were conducted with attitude and intent to use as the dependent variables. Control variables were entered at stage one of the regression. There was one control variable for attitude (having heard of Vasalgel prior to this study) and two control variables for intent to use (having heard of Vasalgel previously and currently having children. For hierarchical regressions on both intent to use and attitude, HBM variables were entered at stage two, and interpersonal and perceived social norm variables were entered at stage three. Regression statistics for intent to use are reported in Table 7, and for attitude in Table 8.

### **Hypothesis 1: The HBM can predict intent and attitude towards Vasalgel**

Results of the regression analyses provided confirmation for the first research hypothesis. The hierarchical multiple regressions for both intent to use and attitude revealed that at step two, HBM variables contributed significantly to the model (attitude, step 2:  $F(6,73) = 12.61$ ,  $R^2 = 0.51$ ,  $p < 0.001$ ; intent, step 2;  $F(7,71) = 22.17$ ,  $R^2 = 0.69$ ,  $p < 0.001$ ) above and beyond any participant characteristics (see Tables 7 and 8 for model comparison statistics).

At step 2 for intent to use Vasalgel, the HBM constructs that independently contributed significantly to the model were: self-efficacy ( $t(78) = 2.46$ ,  $p < 0.05$ ), perceived benefits ( $t(78) =$

3.25,  $p < 0.01$ ), and perceived barriers ( $t(78) = 2.52, p < 0.05$ ). At step 2 for attitudes towards Vasalgel, only perceived benefits contributed significantly to the model independently of the other subscales of the HBM ( $t(79) = 0.95, p < 0.001$ ). Refer to Table 7 for full regression statistics for intent to use and Table 8 for attitude.

**Hypothesis 2: Interpersonal factors and perceived social norms increase the HBM's predictive capacity**

Interpersonal and perceived social norm variables were entered at step three. The inclusion of these variables significantly improved model predictions for intent to use Vasalgel (full model:  $F(9,69) = 19.37, R^2 = 0.72, p < 0.001$ ), but did not significantly affect the predictive ability of the model for attitude (full model:  $F(8,71) = 9.30, R^2 = 0.51, p = 0.82$ ; see Tables 7 and 8 for model comparison statistics). Additionally, although the full model for intent to use Vasalgel was significant, at step three only the addition of social norms (not interpersonal factors) individually contributed significantly to the model ( $t(78) = 2.69, p < 0.01$ ).

Table 7

*Hierarchical model (Intent to use): Effect of having children, previous knowledge of Vasalgel, HBM constructs, interpersonal factors, and perceived social norms on intent to use Vasalgel*

	Unstandardized estimate (SE)	Standardized estimate	<i>t</i> -value
<b>Step 1</b>			
Intercept	5.01 (1.35)		3.7**
Have children?	0.82 (0.61)	0.13	1.33
Heard of Vasalgel previously	-1.41 (0.27)	-0.51	-5.25*
<b>Step 2</b>			
Intercept	0.32 (1.62)		0.2
Have children?	0.91 (0.46)	0.14	1.95
Heard of Vasalgel previously	-0.22 (0.23)	-0.08	-0.094
Perceived Susceptibility	-0.28 (0.21)	-0.09	-1.33
Perceived Severity	-0.11 (0.09)	0.09	-1.2
Perceived Benefits	0.47 (0.13)	0.37	3.54**
Perceived Barriers	0.34 (0.12)	0.27	2.89**
Self-efficacy	0.39 (0.12)	0.29	3.28**
$\Delta R^2 = 0.38 \Delta F = 17.08 p = 0.01$			
<b>Step 3</b>			
Intercept	0.24 (1.67)		0.14
Have children?	0.68 (0.46)	0.11	1.48
Heard of Vasalgel previously	-0.22 (0.23)	-0.08	-0.98
Perceived Susceptibility	-0.24 (0.20)	-0.08	-1.17
Perceived Severity	-0.08 (0.09)	-0.07	-0.91
Perceived Benefits	0.42 (0.13)	0.33	3.25**
Perceived Barriers	0.28 (0.11)	0.23	2.51*
Self-efficacy	0.30 (0.12)	0.22	2.46*
Perceived Social Norms	0.29 (0.11)	0.22	2.69**
Interpersonal Factors	-0.06 (0.12)	-0.03	-0.51
$\Delta R^2 = 0.03 \Delta F = 3.70 p = 0.03$			

\*  $p < 0.05$

\*\*  $p < 0.01$

Table 8

*Hierarchical model (Attitude): Effect of previous knowledge of Vasalgel, HBM constructs, interpersonal factors, and perceived social norms on attitude towards Vasalgel*

	Unstandardized estimate (SE)	Standardized estimate	<i>t</i> -value
<b>Step 1</b>			
Intercept	6.13 (0.31)		20.12**
Heard of Vasalgel previously	-0.76 (0.19)	-0.41	-4.01**
<b>Step 2</b>			
Intercept	2.58 (1.23)		2.09*
Heard of Vasalgel previously	-0.07 (0.19)	-0.04	-0.36
Perceived Susceptibility	-0.09 (0.17)	-0.05	-0.54
Perceived Severity	0.02 (0.08)	0.03	0.31
Perceived Benefits	0.45 (0.11)	0.52	4.1**
Perceived Barriers	0.09 (0.09)	0.11	0.97
Self-efficacy	0.12 (0.10)	0.14	1.25
$\Delta R^2 = 0.34 \Delta F = 10.05 p < 0.01$			
<b>Step 3</b>			
Intercept	2.91 (1.36)		2.14*
Heard of Vasalgel previously	-0.08 (0.19)	-0.04	-0.42
Perceived Susceptibility	-0.08 (0.17)	-0.04	-0.48
Perceived Severity	0.01 (0.08)	0.02	0.17
Perceived Benefits	0.45 (0.11)	0.54	4.07**
Perceived Barriers	0.09 (0.09)	0.11	0.95
Self-efficacy	0.13 (0.11)	0.14	1.21
Perceived Social Norms	-0.01 (0.09)	-0.01	-0.09
Interpersonal Factors	-0.62 (0.10)	-0.05	-0.62
$\Delta R^2 = 0.003 \Delta F = -0.2 p = 0.82$			

\*  $p < 0.05$

\*\*  $p < 0.01$



## Discussion

### Overview of key findings

Overall, attitudes of men in this sample show that they are generally receptive to the idea of a new form of male birth control. Additionally, a large proportion of men (41%) claimed that they would use Vasalgel if it came on the market, with positive intent classified as responses ranging from “strongly agree” to “moderately agree.” This finding is consistent with previous research, which has found that roughly 35% to 70% of men report being willing to try a new male contraceptive method (Heinemann et al., 2004; Keith et al., 1975).<sup>12</sup> As research into male contraception advances, findings that men would actually use a new method become more vital – both to encourage rapid development of products and to understand how unwillingness to use a new male contraceptive can be addressed.

The approach to understanding men’s attitudes towards and willingness to use Vasalgel taken by this study was to build research around a theoretical model that has been shown previously to predict and understand health behavior: the HBM. Confirming the primary research hypothesis, the HBM was able to significantly predict both intent to use Vasalgel and attitudes towards it. This finding indicates that the HBM is an appropriate lens through which men’s contraceptive intentions and attitudes can be examined.

Consistent with previous research on the HBM, perceived barriers, perceived benefits, and self-efficacy were all significant predictors of intent to use Vasalgel within the full model. Notably, perceived susceptibility and perceived severity did not individually contribute. Within the model of this study, intent to use Vasalgel is based largely on a consideration of the

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<sup>12</sup> Willingness to use varies widely depending on men’s age and country of origin, so the findings of the current study are not out of the ordinary.

perceived benefits and barriers of the contraceptive, as well as individual self-efficacy and perceived social norms specific to Vasalgel. Benefits of Vasalgel are high effectiveness, length of potential use, and ease of use. On the other hand, barriers to using Vasalgel include fear of side effects or infertility and fear of pain at injection site. Although self-efficacy, the belief that one is capable of taking action, is often contested in its role as a predictor of contraceptive use, Strecher et al. (1986) asserts that as long as a self-efficacy measure is tailored to the specific health behavior, it is appropriate to include the construct. In fact, the finding that self-efficacy is associated with higher intent to use Vasalgel corresponds the literature on the role of self-efficacy in contraceptive use (e.g., Baele, Dusseldorp & Maes, 2001).

In the context of previous research on the HBM, the finding that perceived susceptibility and severity do not independently predict contraceptive intentions is not unusual. Past research examining the relationship between perceived susceptibility to and perceived severity of pregnancy and contraceptive use has occasionally yielded inconsistent results. Among young, low-income women, perceived susceptibility to pregnancy did not seem to have any impact on use of contraception, safer sex, or the rate of subsequent unintended pregnancies (Rahman, Berenson, & Herrera, 2013). In addition, in some cases neither worrying about the possibility of pregnancy (Schofield, 1965) nor fear of pregnancy (Sorensen, 1973) were shown to have significant effects on contraceptive use among adolescents in the United States.<sup>13</sup> Furthermore, self-rated importance of avoiding pregnancy was not significantly associated with LARC use among young unmarried women in the United States (Dempsey et al., 2011). It is thus unclear as to whether perceived susceptibility and severity are useful components of the HBM in research concerning contraceptive use.

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<sup>13</sup> Although worry and fear appear as distinct concepts in these articles, both fall under the heading of perceived severity of pregnancy in the context of the HBM.

One further aspect of the data which could have affected the independent significance of perceived severity and susceptibility was the finding that the mean scores for perceived susceptibility (5.77) and perceived severity (5.94) are extremely close to the highest possible score (6). These results may have caused a ceiling effect and prevented the subscales from contributing significantly to the model. This effect may be partially due to the relatively young age of participants ( $M = 24$ ), especially considering that younger age was associated with higher levels of perceived severity.

In addition to intent to use, this study investigated men's attitudes towards Vasalgel. There was overall high acceptance of Vasalgel as a potential male contraceptive (67%). With regard to attitude towards Vasalgel, the data support the primary hypothesis; the HBM was able to predict attitudes towards Vasalgel beyond the influence of participant characteristics. It is therefore possible that although most previous research utilizing the HBM has focused on health behavior and intent, attitudes towards health behaviors may share some underlying psychosocial constructs with intentions. On the other hand, it is important to note that only the subscale of perceived benefits was able to predict attitudes independently of the full model.

With regard to intent to use, the data support the full model and thus the secondary hypothesis of this study; the addition of perceived social norms and interpersonal-level factors to the HBM significantly improved the predictive ability of the model. However, only perceived social norms was independently significant in the full model including HBM constructs, interpersonal factors, and social norms. As such it is unclear as to whether interpersonal-level factors contributed to the model.

The finding that perceived social norms significantly influences intent to use Vasalgel is essential to future research on male contraception. Consistent with previous research by Condelli (1986), the results of this study indicate that decisions involving contraceptive choice are affected by perceptions of the opinions of family and friends. Thus, the findings of this study indicate that the HBM can indeed be improved by the addition of social norms.

The finding that perceived social norms influence intent to use Vasalgel is an interesting finding especially in the context of contraceptive research. Many studies on contraceptive behavior are modeled either on constructs of the HBM (personal perceptions of the contraceptive method and/or one's own ability to use it) *or* on the social aspect of contraceptive use. This study supports the merging of the two modes of thought. In combining the constructs of the HBM and perceived social norms, it is possible to build a more complete understanding of contraception intentions.

A potential ceiling effect could also have influenced the significance of interpersonal-level factors in the model for intent to use Vasalgel ( $M = 5.39$ ). On the other hand, the failure of interpersonal-level factors to contribute to the model could also be seen as further support of the utility of using the HBM in research on male LARCs. The HBM generally focuses on how an individual's perceptions impact their personal health behavior attitudes and intentions, and does not often take into account interpersonal factors outside of relationship status (as part of participant characteristics). It is possible, therefore, that men in this study viewed the decision to get Vasalgel as one independent of their partners. This is supported by previous research by Heinemann et al. (2004), who found that in North America – as opposed to Europe – a significant proportion of men (8 -12%) stated that they would make such a contraceptive decision independently of their partners.

With regard to attitude, the second hypothesis of this study was not supported. Although the HBM was able to significantly predict attitudes towards Vasalgel, the addition of perceived social norms and interpersonal-level factors to the model had no significant impact on attitude. The results indicate that while the model developed for this study seems to be an appropriate lens for research involving intent to use Vasalgel, it is possible that slightly different constructs affect attitudes towards male contraception. It appears that whereas intent to use Vasalgel is affected by how men's perceptions of their peers' attitudes and intentions, general attitudes towards Vasalgel are independent of perceived social norms.

Interestingly, the only demographic characteristic that was significantly associated with both intent to use and attitude was whether men had heard of Vasalgel or a similar injected male contraceptive prior to taking the survey (44% had). This finding is open to multiple interpretations. First, it is possible that men who were already interested in male contraception had researched the topic and were excited about the possibilities. In other words, men who already have favorable attitude and intentions towards male contraception may be driven to find out more. A second interpretation is that upon coming across the idea of male contraception (for example, in the newspaper or through a friend), men's willingness to try it increased and attitude became more positive. Consequently, exposure to information on Vasalgel and male contraception may increase intent to use as well as attitude.

### **Limitations**

The key limitation of this study was the multicollinearity seen between scales. As mentioned in the results section, many of the subscales of this study were highly correlated with each other. Although this did not influence the overall fit of the model, it may have caused other

problems within the study. Multicollinearity interferes with determining the precise effect of each predictor and makes it unclear as to whether the subscales were actually measuring distinct factors. However, the fact that the model was significant despite the high intercorrelations between the independent constructs indicates that the HBM is still a useful tool for examining attitudes and intentions towards male contraception. A larger sample size or a more detailed survey may have helped to avoid multicollinearity.

A second issue with the current research concerns the relatively low Cronbach's alphas for some of the subscales utilized. As mentioned in the results section, coefficients above 0.70 are considered acceptable (George and Mallery 2003), with coefficient closer to 1.0 indicating progressively greater internal consistency of items. The scales for perceived susceptibility and interpersonal factors had Cronbach's alphas of 0.59 and 0.60, respectively, which indicates questionable internal validity of those scales. The scale measuring perceived social norms had a coefficient of 0.66, which approached acceptability but did not reach it. This is problematic because it means that the items in these scales may not have been measuring one particular construct or variable. It may also be an indication that these scales should be reexamined and potentially adjusted in any future research using this model. However, previous studies using the HBM as a framework have run analyses with scales that have Cronbach's alphas ranging from 0.58 to 0.81 (Petosa & Jackson, 1991; Eisen, Zellman, & McAlister, 1992). This implies that among past research on contraceptive intentions, the scales developed for this study have acceptable levels of internal consistency.

The third limitation of this study concerns participant sampling and demographics. The majority of men who completed the survey were relatively young ( $M = 24$ ;  $SD = 5.5$ ), which may have affected some of the findings of this study. Although this study did not find that age was

associated with attitudes towards or intent to use Vasalgel, contraceptive use has often been found to vary with age (Baele, Dusseldorp & Maes, 2001). Additionally, this study surveyed only Bard students and respondents from the Hudson Valley, both of which are very specific populations. Bard College is an expensive (in comparison to other colleges and universities) four-year liberal arts college whose students often have liberal political and social views. Furthermore, local stores where flyers were put up self-selected themselves to be more liberal, as not all businesses allowed flyers with the word 'birth control' to be placed. Considering that class was a significant factor in previous studies on male LARCs (Balswick et al., 1972), it is important to note that the way this survey was advertised may have caused a sampling bias. As cultures even within the United States vary greatly, future studies on contraceptive developments would benefit from surveying an even broader population.

### **Future Directions**

In this study, men's attitudes and intentions towards a novel contraceptive were examined; it was beyond the scope of this senior project to investigate women's attitudes. Studies across a variety of cultures have found that women have generally positive attitudes towards a male hormonal contraceptive (Glasier et al., 2000), indicating that women support the development of a male hormonal contraceptive. Investigations into whether women would trust men to use such a contraceptive have found conflicting results, however. Many women report that they would trust a partner to use a male LARC (Glasier et al., 2000), but they have limited trust that men would use it effectively (Eberhardt, Wersch, & Meikle, 2009). However, women's attitudes towards a non-hormonal injected contraceptive method for men have not been assessed. Trust of effective use may be less of an issue in the case of an injected contraceptive, as it would be injected by a doctor and thus not dependent on proper user behavior. In the event

that a contraceptive like Vasalgel reaches the market, it is vital to assess women's attitudes towards it as well as men's.

Future studies into women's attitudes towards long-term male contraception could also benefit from a framework such as the HBM. The benefit of using the HBM in research is that it enables health workers to develop interventions and education programs that are designed to best meet men's and women's needs. Once a male contraceptive is available to the general public, the HBM can help to structure promotional campaigns – which will need to target both men and women.

### **Conclusion**

The current study makes a significant contribution to research into male contraceptive behavior and attitudes by highlighting the relationship between individual perceptions of contraception and actual contraceptive intentions with regard to Vasalgel. This was the first study to apply a psychological framework to research on male contraceptive developments, and as such it can guide future research towards an even deeper understanding of how men would react (and act) if any new male contraceptive method, not only Vasalgel, were to reach the market.

Furthermore, this study supports previous research (Heinemann et al., 2004) that a significant proportion of men in the United States are willing to take on contraceptive responsibility by using a new contraceptive method, a finding which is strengthened by the fact that participants of this study were given a specific, tangible contraceptive method to base their responses on. The evidence up to this point is a good indication that research and pharmaceutical companies should be working towards a new male contraceptive method,



regardless of whether it is Vasalgel or another method. Now that this study has supplied a working framework upon which to base future research, it will be easier to investigate its applicability to other potential male contraceptive methods such as a male oral contraceptive, or a once a month shot.

This research is also important because it will enable services that try to increase awareness to male contraception to frame their programs in a structured way in order to be as effective as possible. The HBM has been used to inform the structuring of programs and interventions in the past (Eisen, Zellman, & McAlister, 1992) and now it is clear that the model can be applied to programs pertaining to male contraceptive developments as well. It is vital to educate both men and women about their reproductive health, the contraceptive options that they have available today, and options that are currently being researched. This is especially true in connection with the finding that previous knowledge was the single predictive demographic characteristic for both attitudes and intentions towards Vasalgel. If more men knew about Vasalgel or similar contraceptive developments for men, it is possible that there would be more pressure on pharmaceuticals to fund research into their development. Additionally, if men claim that they are willing to use a long-term contraceptive now, it is likely that if it reaches the market even more men (once they know about it and research it) will want to try the new method.

As I mentioned in the introduction, women's reproductive health and services are of vital importance. Given the topic of this study, it is crucial to note that developing and promoting male contraception is likely to improve the reproductive health of women in at least two ways. First, the burden of contraceptive responsibility would no longer rest so heavily on women. We now know that many men would use a new LARC, which could mean that fewer women would have to use birth control (if they are in long-term relationships). Second, if men have more

options for birth control, they may be more inclined or encouraged to learn about reproductive health. This would involve them more in family planning, improve conversations surrounding sexual health, and could lead to the improvement of everyone's sexual health. Access, accurate knowledge, and communication are key – and would be supplemented by the development of a new contraceptive.

Finally, this study lends support to the steadily growing literature on the importance of involving men in conversations and research on reproductive health and family planning. As men have been excluded from most current discussion surrounding reproductive health, it has often been difficult to gauge men's attitudes towards contraception and fertility control. This study is one of several that suggest that it is time to bring men back into the dialogue. It provides a strong indication that young men today are ready to shoulder some of the contraceptive responsibility that has rested predominantly upon women in the last three-quarters of a century. Both men and women deserve the right to reproductive health education, services, and developments.

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## Appendix A

### Complete Survey

*You will now be asked to answer some questions about your personal life, as well as your sexual activity. You will be asked about sex and contraception.*

*In this survey, when any questions refer to 'sex' they are referring explicitly to vaginal intercourse. In addition, when any questions refer to a 'woman' they are referring specifically to a biological woman.*

*'Contraception' refers to the deliberate use of a method (artificial or not) to prevent pregnancy as a result of sexual intercourse. One common example of a contraceptive method is condom use.*

5) How old are you? \_\_\_\_\_

6) What is the highest level of education you have reached?

- Did not finish high school
- High school degree
- Undergraduate degree
- Graduate degree

7) What is your current employment status?

- Student
- Employed
- Unemployed

8) What college do you currently attend?

- Bard College
- New Paltz
- Columbia-Greene Community College
- Other - Write In: \_\_\_\_\_

9) What is your current year in college?

- Freshman
- Sophomore
- Junior
- Senior
- 5th year
- Graduate student

10) Please check any and all forms of contraception you have knowledge of:

- Condoms
- "The pill"
- Intra-uterine devices (IUD)

Diaphragm

The rhythm method (only having sex when a female partner is not ovulating)

Withdrawal (pulling out before ejaculation)

11) Have you ever had sex with a woman?

Yes

No

12) When was the most recent time you had sex with a woman?

In the past month

In the past six months

In the past year

Over one year ago

13) On this occasion, did you (or your partner) use any method of contraception?

Yes

No

14) When you have sex, how often do you (or a partner) use a method of contraception?

Always

Often

Sometimes

Rarely

Never

15) How many sexual partners have you had in the last year? \_\_\_\_\_

16) How many sexual partners have you ever had? \_\_\_\_\_

17) Do you currently have any children?

Yes

No

18) Do you intend to have children in the future?

Yes

No

I don't know

19) What is your relationship status?

Single

Casual (or open) relationship

Steady Relationship

Living together

Married

20) Are you currently in an ongoing sexual relationship with a woman (regardless of relationship with other men or women)?

- Yes  
 No

21) When did this relationship begin?

- Less than one month ago  
 Between one month and six months ago  
 Between six months and one year ago  
 Between one and five years ago  
 More than five years ago

22) Please check any and all forms of contraception you (or your partner) currently use:

- Condoms  
 The pill  
 Intra-uterine device (IUD)  
 Diaphragm  
 The rhythm method  
 Withdrawal  
 Other: \_\_\_\_\_

23) During the last six months, how many times have you and your sexual partner discussed how to prevent pregnancy?

- Never  
 1-3 times  
 4-6 times  
 7 or more times

*The next series of statements have to do with contraceptive behavior and pregnancy. Please respond with your primary partner in mind. Please indicate your answers on a scale from "strongly agree" to "strongly disagree."*

24) I am committed to my partner.

- Strongly disagree     Moderately disagree     Slightly disagree     Slightly agree  
 Moderately agree     Strongly agree

\*25) I do not talk about birth control with my partner.

- Strongly disagree     Moderately disagree     Slightly disagree     Slightly agree  
 Moderately agree     Strongly agree

\*26) I often feel embarrassed when talking about birth control with my partner.

- Strongly disagree     Moderately disagree     Slightly disagree     Slightly agree  
 Moderately agree     Strongly agree

27) My partner is comfortable talking about birth control with me.

- Strongly disagree     Moderately disagree     Slightly disagree     Slightly agree  
 Moderately agree     Strongly agree

28) My partner and I are actively trying to have a baby.

- Strongly disagree     Moderately disagree     Slightly disagree     Slightly agree  
 Moderately agree     Strongly agree

*Please read the following on a new birth control method for men (not yet on the market):*

*Vasalgel™ is similar to getting a vasectomy but with one significant advantage: research to date shows that it is 100% reversible. Researchers achieve this feature by injecting a gel into the vas deferens, rather than cutting the vas (as is done in vasectomy). The gel then hardens, forming a semi-solid obstruction that prevents viable sperm from passing through. If a man wishes to restore his fertility, whether after months or years, the gel is flushed out with another injection. There are currently no known side effects of Vasalgel. However, as it is still in the early stages of human testing, it is impossible to know definitively about any long-term consequences or side effects of using Vasalgel.*

29) Have you heard about Vasalgel (or a similar kind of injected contraceptive) before reading about it here?

- Yes  
 No

*Now you will be asked about some of your opinions on Vasalgel. Please indicate your answers on a scale from “strongly agree” to “strongly disagree.”*

30) I think that Vasalgel is an important invention.

- Strongly disagree     Moderately disagree     Slightly disagree     Slightly agree  
 Moderately agree     Strongly agree

31) Vasalgel should be put on the market as soon as possible.

- Strongly disagree     Moderately disagree     Slightly disagree     Slightly agree  
 Moderately agree     Strongly agree

\*32) The thought of using Vasalgel makes me uncomfortable.

- Strongly disagree     Moderately disagree     Slightly disagree     Slightly agree  
 Moderately agree     Strongly agree

33) I would use Vasalgel if it became available.

- Strongly disagree     Moderately disagree     Slightly disagree     Slightly agree  
 Moderately agree     Strongly agree

34) Using Vasalgel as a long-term contraceptive method for me would be:

- Very Awful     Awful     Somewhat Awful     Somewhat Nice     Nice     Very Nice

35) A woman can get pregnant the first time she has unprotected sex.

- Strongly disagree    Moderately disagree    Slightly disagree    Slightly agree  
 Moderately agree    Strongly agree

\*36) I cannot get a woman pregnant.

- Strongly disagree    Moderately disagree    Slightly disagree    Slightly agree  
 Moderately agree    Strongly agree

\*37) My physical health makes it more likely that I won't get a woman pregnant if we have unprotected sex.

- Strongly disagree    Moderately disagree    Slightly disagree    Slightly agree  
 Moderately agree    Strongly agree

38) I worry a lot about getting my sexual partner(s) pregnant.

- Strongly disagree    Moderately disagree    Slightly disagree    Slightly agree  
 Moderately agree    Strongly agree

39) Getting a woman pregnant is one of the worst things that could happen at this stage in my life.

- Strongly disagree    Moderately disagree    Slightly disagree    Slightly agree  
 Moderately agree    Strongly agree

\*40) My financial security would not be endangered if I got a woman pregnant.

- Strongly disagree    Moderately disagree    Slightly disagree    Slightly agree  
 Moderately agree    Strongly agree

\*41) I would be happy if I got a woman pregnant in the next six months.

- Strongly disagree    Moderately disagree    Slightly disagree    Slightly agree  
 Moderately agree    Strongly agree

42) Problems I would experience from getting a woman pregnant would last a long time.

- Strongly disagree    Moderately disagree    Slightly disagree    Slightly agree  
 Moderately agree    Strongly agree

43) If I got a woman pregnant, my whole life would change.

- Strongly disagree    Moderately disagree    Slightly disagree    Slightly agree  
 Moderately agree    Strongly agree

44) The thought of impregnating a woman scares me.

- Strongly disagree    Moderately disagree    Slightly disagree    Slightly agree  
 Moderately agree    Strongly agree

\*45) If I got a woman pregnant my academic career would not be endangered.

- Strongly disagree    Moderately disagree    Slightly disagree    Slightly agree  
 Moderately agree    Strongly agree    Not applicable



46) If I got a woman pregnant my job opportunities and professional career would be endangered.

- Strongly disagree    Moderately disagree    Slightly disagree    Slightly agree  
 Moderately agree    Strongly agree

47) I am confident Vasalgel is able to prevent pregnancy.

- Strongly disagree    Moderately disagree    Slightly disagree    Slightly agree  
 Moderately agree    Strongly agree

48) I enjoy sex more when I know my partner cannot get pregnant.

- Strongly disagree    Moderately disagree    Slightly disagree    Slightly agree  
 Moderately agree    Strongly agree

\*49) My sexual response would be diminished if I used Vasalgel.

- Strongly disagree    Moderately disagree    Slightly disagree    Slightly agree  
 Moderately agree    Strongly agree

50) Using Vasalgel would reduce my fear of getting a woman pregnant.

- Strongly disagree    Moderately disagree    Slightly disagree    Slightly agree  
 Moderately agree    Strongly agree

51) I have a lot to gain by using Vasalgel.

- Strongly disagree    Moderately disagree    Slightly disagree    Slightly agree  
 Moderately agree    Strongly agree

52) I am afraid that if I use Vasalgel it would affect my ability to have children later.

- Strongly disagree    Moderately disagree    Slightly disagree    Slightly agree  
 Moderately agree    Strongly agree

53) I am worried about the side effects of Vasalgel.

- Strongly disagree    Moderately disagree    Slightly disagree    Slightly agree  
 Moderately agree    Strongly agree

54) The fact that Vasalgel is injected into a sensitive part of my body would not deter me from using it.

- Strongly disagree    Moderately disagree    Slightly disagree    Slightly agree  
 Moderately agree    Strongly agree

55) I am afraid that getting Vasalgel would hurt me.

- Strongly disagree    Moderately disagree    Slightly disagree    Slightly agree  
 Moderately agree    Strongly agree

\*56) I am not worried that getting Vasalgel would cause me to be permanently infertile.

- Strongly disagree    Moderately disagree    Slightly disagree    Slightly agree  
 Moderately agree    Strongly agree

\*57) Vasalgel would be worth getting (for me) even if the monetary cost is high.

- Strongly disagree    Moderately disagree    Slightly disagree    Slightly agree  
 Moderately agree    Strongly agree

58) I am afraid that Vasalgel would affect my sex drive.

- Strongly disagree    Moderately disagree    Slightly disagree    Slightly agree  
 Moderately agree    Strongly agree

\*59) It would be difficult to tell a partner that I am going to get Vasalgel.

- Strongly disagree    Moderately disagree    Slightly disagree    Slightly agree  
 Moderately agree    Strongly agree

60) I am confident that I could go to the doctor to get Vasalgel if it became available.

- Strongly disagree    Moderately disagree    Slightly disagree    Slightly agree  
 Moderately agree    Strongly agree

\*61) I would not insist on getting Vasalgel if a partner threatened to leave me if I got it.

- Strongly disagree    Moderately disagree    Slightly disagree    Slightly agree  
 Moderately agree    Strongly agree

62) I feel capable of discussing the importance of using Vasalgel with a sex partner.

- Strongly disagree    Moderately disagree    Slightly disagree    Slightly agree  
 Moderately agree    Strongly agree

63) I would get Vasalgel even if my partner did not want me to.

- Strongly disagree    Moderately disagree    Slightly disagree    Slightly agree  
 Moderately agree    Strongly agree

\*64) It is a woman's responsibility if she gets pregnant.

- Strongly disagree    Moderately disagree    Slightly disagree    Slightly agree  
 Moderately agree    Strongly agree

65) I have no objection to contraception as long as my partner uses it and I don't have to.

- Strongly disagree    Moderately disagree    Slightly disagree    Slightly agree  
 Moderately agree    Strongly agree

66) Knowing about my partner's use of birth control devices frees me of any thoughts about pregnancy.

- Strongly disagree    Moderately disagree    Slightly disagree    Slightly agree  
 Moderately agree    Strongly agree

67) It would be embarrassing for me to ask my doctor about Vasalgel.

- Strongly disagree    Moderately disagree    Slightly disagree    Slightly agree  
 Moderately agree    Strongly agree

68) If Vasalgel becomes available, it will increase promiscuity in men.

Strongly disagree    Moderately disagree    Slightly disagree    Slightly agree  
 Moderately agree    Strongly agree

\*69) My family and friends would make fun of me if I used Vasalgel.

Strongly disagree    Moderately disagree    Slightly disagree    Slightly agree  
 Moderately agree    Strongly agree

70) My male friends would encourage me to get Vasalgel if it became available.

Strongly disagree    Moderately disagree    Slightly disagree    Slightly agree  
 Moderately agree    Strongly agree

71) As far as I know, my male friends would be interested in using Vasalgel if it became available.

Strongly disagree    Moderately disagree    Slightly disagree    Slightly agree  
 Moderately agree    Strongly agree

72) Who should take more responsibility for preventing pregnancy in a heterosexual relationship?

The male  
 The female  
 Both should take equal responsibility

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\* Reverse-coded

## Appendix B

### Survey Distribution Material



Are you 18 years or older?  
Are you male?

Please help me with my senior project by taking a 10 minute survey.  
Type the link into your browser to go directly to the survey site.

*Complete the survey for the chance to win one of four \$25 Amazon gift cards!*

Thank you!

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<http://www.surveygizmo.com/s3/2083776/psych1273>

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## Are you 18 years or older? Are you male?

Please help me with my senior project by taking a 10 minute survey.  
Type the link into your browser to go directly to the survey site.

*Complete the survey for the chance to win one of four \$25 Amazon gift cards!*

Thank you!

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<http://www.surveygizmo.com/s3/2083776/psych1273>

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## Appendix C

### IRB Approval

Bard College

Institutional Review Board

Date: April 26, 2015  
To: Aisha King  
Cc: Farnaz Kaighobadi, Megan Karcher  
From: Pavlina R. Tcherneva, IRB Chair  
Re: April 2015 IRB proposal

#### **DECISION: APPROVED**

Dear Aisha,

The Bard Institutional Review Board reviewed your April 2015 proposal. Your project is approved through April 26, 2016.

Please notify the IRB if your methodology changes or unexpected events arise.

We wish you best of luck with your research.

Sincerely,

Pavlina R. Tcherneva  
tchernev@bard.edu  
IRB Chair

## Appendix E

### IRB Proposal

*When do you plan to begin collecting data for this project? (begin date):* May 1<sup>st</sup>, 2015

*When do plan to end your data collection for this project? (end date):* October 30<sup>th</sup>, 2015

*What is the title for your project?*

Attitudes and Intentions Toward a Novel Long-acting Reversible Contraceptive for Men

*Describe your **research question** briefly (250 words or less)*

According to the research done by the Alan Guttmacher Institute, an estimated 210 million pregnancies currently occur throughout the world each year. About 38% of these pregnancies are unplanned, and 22% end in abortion. Contraception and family planning programs (especially in developing countries) overwhelmingly target women, leaving men, for the most part, out of the discussion. As of now, the only forms of male contraception on the market are condoms and vasectomies. This is why for my senior project I am interested in studying men's attitudes and intentions towards a new method of male contraception not yet on the market, called Vasalgel™. This method is a non-hormonal male contraceptive that involves the injection of a polymer into the vas deferens and prevents viable sperm from passing through, while allowing for the passage of seminal fluid.

This survey study will use the Health Belief Model (HBM) to determine how men's perceived susceptibility, perceived barriers, perceived benefits, and self-efficacy may affect men's attitudes and intentions towards a new, injected, long-acting, reversible contraceptive method. I will also add two levels to the HBM in order to create a model that can better predict

attitudes and intentions: social norms, and interpersonal level factors. These findings will hopefully give some insight into whether young, college-aged men would be willing to take on some of the contraceptive responsibility that has rested on their female counterparts since the 1960s.

*Will your participants include individuals from specific populations (e.g., children, pregnant women, prisoners, or the cognitively impaired)?*

No

*If your participants will include individuals from specific populations, please specify the population(s) and briefly describe any special precautions you will use.*

N/A

*Briefly describe **how** you will recruit participants. (e.g., Who will approach participants? What is the source of the participants?)*

I will recruit participants at Bard College by advertising on campus using flyers including the link to the survey (sent to [irb@bard.edu](mailto:irb@bard.edu)). The flyers will be placed in areas where students frequent often like the Bertelsmann Campus Center and Kline Commons. Furthermore professors who believe the survey is related to their subject matter will send the link out to their classes.

*Briefly describe the **procedures** you will be using to conduct your research. Include descriptions of what tasks your participants will be asked to do, and about how much time will be expected of each individual.*

The participant will be asked to complete an online survey using Survey Gizmo (sample questions sent to [IRB@bard.edu](mailto:IRB@bard.edu)) that will take 15-20 minutes. The first step of the survey will



be the consent form (sent to IRB@bard.edu). If the participant consents to taking the survey, the next section will be three screening questions asking their age, biological gender, and sexual orientation. If they are older than 18, biologically male, and of self-reported heterosexual or bisexual orientation, they will be prompted to continue onto the survey. If they do not fulfill any or all of the requirements, they will be directed to a screen thanking them for their interest and informing them that they did not qualify for the study. The first part of the survey will ask about participant's demographics and individual characteristics (e.g. year in college, relationship status). Participants will then be asked to read a short description of Vasalge<sup>TM</sup>, and asked a small number of questions as to their attitudes and intentions towards the contraceptive method. Participants will subsequently be asked a series of questions designed to measure the principle components of the Health Belief Model – perceived susceptibility, perceived benefits, perceived barriers, and perceived self-efficacy. They will then answer a short series of questions on their perceived social norms. In the last part of the survey participants will be asked in more detail about their interpersonal relationships with dating partners (if applicable) and peers.

Completion of this survey will take no longer than 15-20 minutes. After the survey is completed, the participant will be given an email address, created specifically for this study, that they can send a message to saying “I have completed the study” in order to be entered into the lottery for a chance to win one of four \$25 Amazon gift cards. This method will ensure that the collected data is no way attached to e-mail addresses of participants and therefore maintain confidentiality.

*Approximately how many individuals do you expect to participate in your study?*

200 from Bard

*Please describe any **risks and benefits** your research may have for your participants.*

One risk of this study may be emotional discomfort due to the personal nature of the questions, specifically questions that examine sexual behaviors and attitudes towards contraception. Eye-strain and impatience may also be experienced during the process. The benefit of completing the survey is gaining knowledge and awareness about different contraceptive methods, and new possibilities for the future of contraception. In order to address possible emotional discomfort produced by the study, the debriefing statement will include contact information for Health Services at Bard College. To further inform participants on contraception and fulfill any curiosity they might develop throughout the survey, the debriefing statement will also include links for websites containing information on numerous forms of contraception.

*Please include here the **verbal description of the consent process** (how you will explain the consent form and the consent process to your participants):*

Because this survey will be completed online, the consent process will be written. The participant will click the link if it is sent to them via email. If they type it in, then they will be directed to a web page that will state the objectives of the survey, their rights as a participant and the benefits and risks of undertaking the survey. The participant will also be informed that if they press next, they are agreeing to participate in the study and will be directed to the next step of the survey which will be two screening questions, mentioned above in the procedure section. The online consent form was sent to IRB@bard.edu

*If your project will require that you use only a verbal consent process (no written consent forms), please describe why this process is necessary, how verbal consent will be obtained, and any additional precautions you will take to ensure the confidentiality of your participants.*

No.

*What procedures will you use to ensure that the information your participants provide will remain **confidential**?*

The survey will be online using Survey Gizmo, which has numerous anti-hacking measure, firewalls, and constant security checks. All information gained through Survey Gizmo remains confidential. Participants will be given an email ([psych1273@gmail.com](mailto:psych1273@gmail.com)) at the end of the survey that they will be told to send a message to along the lines of “I completed your survey” if they want to be entered into the lottery. This email account has been created specifically for this study as well, will not be in any way connected to the data and will be deleted as soon as the lottery is performed. There will be no way to connect the participant with the specific survey they completed. To ensure further confidentiality, the data will be stored on the computer of the principle investigator, which is password protected at all times. A password will have to be entered in order to view the folder where the data is contained. There will be no data on any personal computer. The only people who will have access to the data will be the primary investigator, Aisha King and the Senior Project Advisor, Farnaz Kaighobadi.

*Will it be necessary to use deception with your participants at any time during this research?*

No.

## Informed Consent Form

Thank you for agreeing to participate in this research study!

**Background:** The purpose of this study is to investigate men's reactions to a new form of long-lasting male birth control method.

**What you will do in this study:** You will complete a confidential and anonymous online survey that will take about 15-20 minutes to complete. This survey will introduce you to a new form of male birth control (that is not yet on the market), and will ask you about your attitudes and intentions toward it. It will also include questions about your opinions on contraception, and your sexual and contraceptive behavior.

**Benefits:** The benefit of completing this survey is gaining knowledge and awareness of different current and future forms of birth control.

**Compensation:** If you choose, you can be entered into a lottery for a chance to win one of four \$25 Amazon gift cards.

**Risks:** This study may cause emotional discomfort due to the personal nature of the questions, specifically questions that examine sexual behaviors and attitudes towards contraception. Eye-strain and impatience may also be experienced during the process.

**Your rights as a participant:** Your participation is completely voluntary. You may quit the survey at any time with no questions asked.

Any questions or concerns can be directed to the primary researcher, Aisha King ([ak4628@bard.edu](mailto:ak4628@bard.edu))

**Anonymity:** No personal or identifying information will be asked from you, and the survey is completely anonymous. At the end of the survey, you will be given the option to enter a lottery by sending an email confirming your participation in the study. This method will ensure that the data is in no way attached to your email address and therefore will preserve your anonymity completely. Your identity will thus remain anonymous, as there will be no possible way that your email address can be connected to your survey responses.

**You must be 18 years or older to participate.**

If you have any questions about this research project, please contact the primary investigator Aisha King at [ak4628@bard.edu](mailto:ak4628@bard.edu) or the senior project advisor Farnaz Kaighobadi at [fkaighob@bard.edu](mailto:fkaighob@bard.edu). If you have questions about your rights as a research participant, please contact the Chair of the Bard College Institutional Review Board; [IRB@bard.edu](mailto:IRB@bard.edu).

To continue to the survey, please press:

**“Yes, I consent to participate.”**

If you do not wish to participate, please press:

**“No, I do not consent.”**

### Debriefing Statement

Title of Study: Attitudes and Intentions Toward a Novel Long-acting Reversible Contraceptive for Men

Thank you for participating in this study!

The goal of this study is to investigate men's attitudes and intentions towards a new form of male contraception, Vasalge<sup>TM</sup>. In order to do this, a brief description of the contraceptive method was provided. The survey was also designed to measure how perceived costs and benefits of using this method might affect attitudes and intentions towards it (e.g. willingness to try it). Given the high number of unplanned pregnancies that occur every year, and the fact that most contraceptive responsibility rests on female shoulders, research into a longer lasting male form of birth control is very important. The results of this study will hopefully give some insight into what men think about such a method, whether or not men would take advantage of it, and why.

If you have any questions regarding the study or would like more information about it, please contact Aisha King at [ak4628@bard.edu](mailto:ak4628@bard.edu).

If you feel that you are experiencing any adverse consequences from this study, or if you have any questions about contraceptive methods, please contact Bard Health Services at (845) 758-7433. If they cannot help immediately, they will be able to provide you with a list of counseling/medical services in the area.

If you are interested in learning more about contraception or different forms of male and female contraception here is a list of online resources you may find helpful:

Vasalge<sup>TM</sup>: <https://www.parsemusfoundation.org/vasalge-home/>

Contraceptive methods: <http://www.plannedparenthood.org/learn/birth-control>

<http://www.nhs.uk/Conditions/contraception-guide/Pages/contraception.aspx>

Birth control for men: <http://www.plannedparenthood.org/learn/men/birth-control-men>

Thank you again for your participation in this study.

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