THE MATCH GAME: INVESTIGATING THE EFFECT OF MESSAGE FRAMING ON PARENTS’ INTENTIONS TO VACCINATE THEIR CHILDREN AGAINST HPV

by

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Abstract

In Canada, parental acceptance and uptake of the HPV vaccine has been low. There is a need for more effective HPV vaccination health messages for parents. Whether a message is framed in terms of the benefits of engaging in the behaviour (gain frame), the costs of failing to engage in the behaviour (loss frame) or both the benefits and the costs (mixed frame) has potential to impact parents’ decision making. The appropriate frame of a message may depend on the recipient’s sex and involvement with the health issue. The purpose of this study was to investigate the persuasiveness of gain-, loss- and mixed-framed messages on mothers’ and fathers’ intentions to have their young son or daughter vaccinated against HPV. The study used a 3 Frame x 2 Sex of Parent x 2 Sex of Child design. We randomly assigned participants (n=367) to read a framed message and then complete a 29-item questionnaire assessing theoretical determinants of parental consent for vaccination. ANCOVAs revealed a three-way interaction for intentions to speak to a doctor about the HPV vaccine, $F(2, 342)=3.66, p = .03$, perceived severity of HPV, $F(2, 347) = 3.10, p = .05$, and for anxiety about their child contracting HPV, $F(2, 342)=3.58, p=.02$. Effect size comparisons revealed that gain-framed messages seem to persuade parents who are the opposite sex to the child for whom they are considering the vaccine. In turn, loss- and mixed-framed messages may persuade parents who are the same sex as the child for whom they are considering the vaccine. Perceived severity of HPV and anxiety about HPV mediated the relationship between message frame and intentions for some parent-child dyads. Findings have implications for constructing effective messages encouraging parents to consider having their child vaccinated against HPV.
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# Table of Contents

Abstract ................................................................................................................................. ii
Acknowledgements .................................................................................................................. iii
List of Figures .......................................................................................................................... ix
List of Tables ............................................................................................................................ x

Chapter 1 Introduction & Literature Review ....................................................................... 1
  1.1 Background & Rationale ................................................................................................. 1
    1.1.1 The Human Papillomavirus, Cancer and Vaccination ............................................ 1
      1.1.1.1 Our Girls’ are not Guinea Pigs: The HPV Vaccine Controversy ....................... 2
      1.1.1.2 Why Vaccinate Boys? ....................................................................................... 5
      1.1.1.3 Why have boys not been vaccinated? ............................................................... 6
      1.1.1.4 Lack of Knowledge about HPV and Vaccination ............................................. 6
    1.1.2 Boys & Girls and the Birds & the Bees ................................................................. 7
    1.1.3 Message Framing ...................................................................................................... 8
      1.1.3.1 Prospect Theory ............................................................................................ 9
      1.1.3.2 Mixed-framed Messages ............................................................................. 10
      1.1.3.3 Message Framing & Perceived Risk ............................................................ 11
      1.1.3.4 Message Framing and Vaccination ............................................................. 12
      1.1.3.5 Sex Differences in Message Framing ........................................................... 13
    1.1.4 Theoretical Framework ........................................................................................... 15
  1.2 Study Purpose ................................................................................................................. 20
  1.3 Hypotheses ....................................................................................................................... 20

Chapter 2 Method .................................................................................................................... 22
  2.1 Design ............................................................................................................................. 22
  2.2 Participants ...................................................................................................................... 23
  2.3 Measures ........................................................................................................................ 28
    2.3.1 Pre-intervention Questionnaires .......................................................................... 28
    2.3.2 Post-intervention Measures .................................................................................. 29
      2.3.2.1 Protection Motivation Theory Measures ....................................................... 30
      2.3.2.2 Theory of Planned Behavior Measures ....................................................... 32
      2.3.2.3 Other Variables ......................................................................................... 34
Appendix A: Recruitment Materials, Letter of Information/Consent Form ......................... 81
  Recruitment Poster ........................................................................................................... 81
  Letter of Information/Consent Form .............................................................................. 82
Appendix B: Questionnaires .......................................................................................... 83
  Pre-intervention Questionnaires .................................................................................... 83
  Post-intervention Questionnaires .................................................................................. 88
Appendix C: Messages ..................................................................................................... 107
  Messages for Parents of Daughters .............................................................................. 107
    Gain-framed Message .................................................................................................. 107
    Loss-framed Message .................................................................................................. 111
    Mixed-framed Message .............................................................................................. 115
  Messages for Parents of Sons ....................................................................................... 119
    Gain-framed Message .................................................................................................. 119
    Loss-framed Message .................................................................................................. 123
    Mixed-framed Message .............................................................................................. 127
List of Figures

Figure 1. *Comprehensive model of theoretical constructs predicting HPV vaccination behaviour.* ................................................................. 19

Figure 2. *Study Design Schema* ................................................................................................................................. 22
List of Tables

Table 1. Examples of Framed Messages........................................................................................................9
Table 2. Demographic Information by Parent-child Dyad...........................................................................25
Table 3. Parents’ Intentions to Speak to a Doctor About Vaccinating Their Child Against HPV.................43
Table 4. Parents’ Self-efficacy.........................................................................................................................45
Table 5. Parents’ Response Efficacy of the HPV Vaccine & Subjective Norms...........................................45
Table 6. Parents’ Perceived Severity of HPV..................................................................................................48
Table 7. Parents’ Perceived Anxiety of their Child Contracting HPV............................................................52
Table 8. Mediators of the Framing Effect on Parents Intentions to Speak to Their Doctor About the HPV Vaccine................................................................................................................54
Chapter 1

Introduction & Literature Review

1.1 Background & Rationale

1.1.1 The Human Papillomavirus, Cancer and Vaccination

In 2010, it is estimated that oral and cervical cancer will kill 1,520 Canadians and
4,700 new cases will be reported (Canadian Cancer Society, Public Health Agency of
Canada & Statistics Canada, 2010). During the past decade, studies have shown a strong
link between the human papillomavirus (HPV) and various cancers of the cervix, anus,
oropharynx and skin (Smith et al., 1998; Bosch, Lorincz, Munoz, Meijer, & Shah, 2002;
Pfister, 2003; Daling et al., 2004; Spano, Marcelin, Carcelin, 2005). Specifically, HPV
DNA has been identified in virtually all investigated specimens of invasive cervical
cancer (Bosch & Sanjose, 2007). Moreover, two types of the virus account for 70% of
cancers of the cervix, vagina, and anus, and for approximately 30-40% of cancers of the
vulva, penis, and oropharynx (Munoz, Castellsague, Berrington de Gonzalez &
Gissmann, 2006).

In 2006, Merck pharmaceuticals released a prophylactic vaccination, called
Gardasil, which provides protection against four types of HPV. Although this vaccine
does not prevent all types of HPV, it does offer protection against types 6, 11, 16 and 18.
Types 6 and 11 cause genital warts, and types 16 and 18 are classified as the top two of
the fifteen cancer-causing high risk types (Munoz et al., 2006; Gissman et al., 1983).
Initially the vaccine was only approved for women aged 9 to 26 but in February, 2010, Health Canada also approved Gardasil for men aged 9 to 26 (Merck, 2010; The Canadian Press, 2010).

In 2007, the Canadian government announced a $300 million investment in provincial HPV vaccination programmes for women and girls. Currently, the Public Health Agency of Canada is reviewing data to determine whether a similar vaccination programme will be implemented for men and boys (QMI Agency, 2010). In Ontario, all Grade eight female students have the opportunity to receive the HPV vaccine free of charge. Since Grade eight girls are below the age of majority, parental consent is required to vaccinate a child. Currently, Ontario’s self-reported HPV vaccine compliance rate is 49%, which is the lowest in Canada (Graveland, 2009). Similarly for boys in Grade 6, only 67% of Ontarian parents, who participated in a study about hypothetical publicly funded school-based HPV vaccine programme, intended to vaccinate their son(s) against HPV (Ogilvie et al., 2008). Given the low vaccination uptake and the possibility of vaccination programmes for boys, it becomes important to investigate messaging techniques to promote the HPV vaccine among parents.

1.1.1.1 Our Girls’ are not Guinea Pigs: The HPV Vaccine Controversy

Since its approval a storm of controversy has surrounded the HPV vaccine. Arguments supporting and opposing HPV vaccination can be found in both the mainstream media as well as in the scientific literature. Concerns have been raised regarding the safety of the vaccine and around social issues such as: age of sexual debut, religion,
and sexual promiscuity (Monk & Wiley, 2006; Singh, Wong, Howlett, 2008). In Canada, the controversy peaked in 2007, soon after the Canadian federal government announced its investment in HPV vaccination programmes.

Following the government’s announcement, the scientific community’s debate regarding the HPV vaccine was ignited by a commentary published in the Canadian Medical Association Journal (CMAJ; Lippman, Melynchuk, Shimmin & Boscoe, 2007). The commentary made strong statements opposing the government’s decision to invest in HPV vaccination programmes. The authors stated that a Canada-wide, universal immunization programme is premature and could have negative consequences for individuals and Canadian society. The authors questioned the seriousness of HPV infections and cervical cancer, the validity of the HPV vaccine trials and the overall cost and necessity of a vaccination programme. In the December 2007 issue of the CMAJ, three letters criticising this commentary were published. Only one of the letters was written by an employee and stockholder of Merck Frosst Canada. First, the authors contested that Lippman and colleagues’ paper did not represent the full burden of disease covered by the Gardasil vaccine. Second, the authors challenged the cautions about the vaccine’s testing. They stated that the argument is irreverent because the vaccine has been tested thoroughly on young women and the results of the trials have been peer-reviewed and are published in the Lancet and the New England Journal of Medicine. Third, the authors contested the commentary’s demeaning discussion of the consequences of cervical cancer stating that treatments for cervical cancer may be one of the most
complex and psychologically devastating surgical procedures (Mansi, 2007; Franco et al., 2007; Ferenczy, 2007). This controversy and these opposing views surrounding HPV vaccination programmes continue to be prominent in the scientific literature with researchers arguing both for (Morris & Nguyen, 2008; Bosch, 2008; Singh et al., 2008; Steben, 2008) and against the implementation of vaccination programmes (Hann & Peckham, 2008; Lippman, Boscoe, Scurfield, 2008; Lippman, 2008).

The HPV vaccine has been highly scrutinized in the media (Steben, 2008). The August 2007 Maclean’s magazine article entitled ‘Our girls are not guinea pigs’ (Gulli, 2007) may be the most notable Canadian article to have incited controversy about the vaccine in the main stream media. The article used strong and persuasive language to portray the HPV vaccine as poorly tested and dangerous. The article makes false claims that no one knows the medical dangers of the vaccine, and referred to the Canadian vaccination programme as the ‘biggest Canadian science experiment in decades’. The article further stated that Canadian girls are being used as guinea pigs. The Maclean’s article has been used as a reference for a number of Canadian anti-vaccination messages which are easily found in an online search (e.g. Vaccination Risk Awareness Network; the Canadian Institute for Education on the Family). Of concern, these messages are highly available to parents seeking information regarding the vaccine. Similarly, a content analysis of online news articles following the approval of the HPV vaccine found that some articles did insight controversy and negativity surrounding the vaccine. While the majority of the articles had a neutral tone, 14% of the articles used negative headlines.
to describe the vaccine. Headlines included controversial titles such as ‘Shots for Girls Stir Early Sex Concerns’ and the ‘Slut Shot’. Additionally, it was found that 87% of the inaccuracies in all of the articles were related to the vaccine’s efficacy (Habel, Liddon, Stryker, 2009). Recent articles relating to the vaccination of boys have also echoed the sentiments of the controversy that surrounded vaccination of girls. In particular, articles point to concerns about vaccine efficacy and safety (Black, 2010). Given the controversial climate of vaccination and the competing interests between pro-vaccination and anti-vaccination groups, it is understandable that many parents find the decision to have their child vaccinated difficult.

1.1.1.2 Why Vaccinate Boys?

Many individuals may question the benefits of vaccinating a boy against HPV because the vaccine has been so heavily scrutinized and has been marketed as a cervical cancer vaccine. However, not only would the HPV vaccine reduce the risk of boys contracting HPV related cancers and genital warts but vaccinating boys also would offer a number of other benefits to both men and women. First, vaccinating boys would help to protect women and men against HPV at a faster rate. Second, vaccinating boys is a cost-effective approach for areas in which reasonable levels of vaccination uptake for women have not been achieved (e.g. Ontario). Third, men who have sex with men will have greater protection against HPV and related diseases. Fourth, HPV vaccine public policy would be made more equitable. Finally, some cultural groups may be more receptive to the vaccine because vaccinating a man may be more culturally acceptable.

1.1.1.3 *Why have boys not been vaccinated?*

While HPV vaccination programmes exist for women and girls in Canada, equivalent vaccination programmes have not been implemented for men. Cost-effectiveness analyses for implementation of the HPV vaccine have shown that if high rates of vaccination among women are reached and herd immunity is achieved, the vaccination of boys would not be cost-effective (Brisson, Van de Velde, De Wals, Boily, 2007; Kim & Goldie, 2009). However, high vaccination rates have not been achieved and therefore the vaccination of boys may become cost-effective strategy for preventing HPV and HPV related diseases in men and women (Zimet & Rosenthal, 2010).

1.1.1.4 *Lack of Knowledge about HPV and Vaccination*

Despite the HPV vaccine being highlighted in the media and new research emphasizing the cancerous effect of HPV, knowledge about HPV, cervical cancer, pap testing and vaccination is low. In a study (Friedman and Shepeard, 2007) investigating adults’ awareness of HPV, only 3 of the 314 participants were aware that HPV was linked to cancer. Once informed of the causal link, participants expressed a need to obtain more information about signs and symptoms, prevalence, transmission, treatment, detection, testing and curability. Similarly, in a study investigating the acceptability of the HPV vaccine among adults residing in Quebec City, Canada, only 15% of adults enrolled in the study had heard of HPV (Sauvageau, Duval, Cilca, Lavoie, Ouakki, 2007).
One study conducted in London, Ontario, Canada found that only 40% of women surveyed, the majority of who were parents (60%), had heard of the HPV vaccine (Lenehan et al., 2008). Furthermore, in a study investigating parental acceptance of the HPV vaccine, only 14% of parents with children in Grades 5 to 8 were aware of the causal relationship between HPV and cervical cancer. Less than half of the parents knew that genital warts can be sexually transmitted. Once informed, parents still requested more information about cervical cancer, HPV, and vaccination (Lenselink et al., 2008). Clearly, education strategies for providing the public, particularly parents, with information about the nature of HPV, its link to cancer and its prevention are important to ensuring the effectiveness of HPV vaccination programmes.

1.1.2 Boys & Girls and the Birds & the Bees

In order to increase the uptake of HPV vaccination programmes, public health agencies need to gain parents’ support for the vaccine. Because the HPV vaccine protects against sexually transmitted infections, it is important to understand how parents approach the topic of sexual health with their children. Research has shown that mothers and fathers treat their sons and daughters differently in varying life situations (Fagot, 1978; Siegal, 1987; Harris & Morgan, 1991). Not surprisingly, the trend for differential treatment of children by parents extends to parents’ approach to sexual health education. A qualitative study by Walker (2001), found that sex of the parent and sex of the child clearly influenced parents’ provision of sexual health information. Specifically, mothers were more likely to be the main sexual health educators regardless of whether their
children were male or female. However, mothers felt more comfortable speaking with their daughters than their sons. Fathers had particular trouble speaking to their sons and daughters about sex and were likely to abdicate the role of sexual educator to the mother.

The interaction between sex of the parent and sex of the child also was evident in a study by Berne et al. (2000). The study used focus groups to determine Australian parents’ perceptions of sexual health education. Again, it was found that mothers were more likely to talk to their children about sexual issues, whereas, fathers felt it was more important to be a good role model than to engage in discussions about sex. Fathers also were significantly less likely to address readiness for sex. However, fathers who did address readiness gave different messages to daughters versus sons. Given that sex of the parent and sex of the child seem to significantly affect the sexual health environment, it is important to research how the sex of the parent and child interact to influence the effectiveness of health messages.

1.1.3 Message Framing

One way of creating effective health messages is message framing. Message framing refers to how a particular health message is conveyed. Appropriately framing a message can affect health decision making (Rothman & Salovey, 1997). Specifically, messages can be delivered in either a gain or loss frame. Regardless of frame, equivalent health information is provided. Gain-framed messages emphasize the benefits of performing the preferred behaviour or the benefits of avoiding the undesirable behaviour. Loss-framed messages emphasize costs of not performing the preferred behaviour or the
costs related to performing the undesirable behaviour (Table 1) (Rothman & Salovey, 1997).

Table 1. *Examples of Framed Messages*

<table>
<thead>
<tr>
<th>Desirable (Benefits)</th>
<th>Undesirable (Costs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>E.g. protection against genital warts</td>
<td>E.g. increased chance of cervical cancer</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Attain</th>
<th>Gain-framed</th>
<th>Loss-framed</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Being vaccinated against HPV protects you against genital warts”</td>
<td>“Not being vaccinated against increases your chances of being diagnosed with cervical cancer”</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Avoid</th>
<th>Loss-framed</th>
<th>Gain-framed</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Not being vaccinated against HPV does not protect you against genital warts”</td>
<td>“Being vaccinated against HPV, you will not have increased chances of being diagnosed with cervical cancer”</td>
<td></td>
</tr>
</tbody>
</table>

1.1.3.1 Prospect Theory

Message framing is grounded in *prospect theory*, which states that when individuals consider gains they will avoid risk but when individuals consider losses they will endure risk (Kahneman & Tversky, 1988; Tversky & Kahneman, 1981). Drawing on the concepts of prospect theory, Rothman and Salovey (1997) suggested that health behaviours can be motivated by message framing. Particularly, it has been suggested that detection behaviours, which are seen to be risk seeking, are best promoted using loss
frames, whereas prevention behaviours, which are risk averse, are better influenced by
gain frames (Rothman & Salovey, 1997; Rothman, Martino, Bedell, Detweiler &
Salovey, 1999). This pattern has been further demonstrated in the message framing
literature. For example, loss-framed messages have been shown to be particularly
effective for behaviours such as prostate examinations (Cherubini, Rumiati, Rossi, Nigro,
Calabro, 2005) and breast self-exams (Williams, Clarke, Borland, 2001), while gain-
framed messages are especially effective in promoting behaviours such as physical
activity (Latimer et al., 2008) and the use of sunscreen (Hevey et al., 2010).

1.1.3.2 Mixed-framed Messages

The present study also utilized mixed-framed messages which included both gain-
and loss-framed statements. Mixed-framed messages reflect the benefits of compliance
and the risks of non-compliance to a health behaviour (Janis & Mann, 1977). Mixed-
framed messages can be used to create a control condition because the combination of
gain- and loss-framed statements allows researchers to ensure that all messages are
factually equivalent (Latimer et al., 2008).

To date, two studies have investigated the effect of gain-, loss- and mixed-framed
messages on physical activity (Latimer et al., 2008) and the use of travel health care
products (Chang, 2007). While Latimer et al. (2008) found mixed-framed messages did
not lead to increased physical activity, Chang (2007) found that mixed-framed messages
lead to higher behavioural intentions to use travel health care products if participants
were familiar with the product. Given that the effect of mixed-framed messages has been
sparsely investigated in the literature, the use of mixed-framed messages in the present study provided an unique contribution to message framing and vaccination literature.

1.1.3.3 Message Framing & Perceived Risk

While the evidence supporting the link between behaviour type (prevention/detection) and message framing is strong, recent research has indicated that the relationship may be due to the perceived risk implication of the behaviour rather than the behaviour type. Behaviours are considered risky or safe depending on whether or not the behaviour will result in an unpleasant outcome. Detection behaviours run the risk of revealing unpleasant information (Rothman, Bartels, Wlaschin & Salovey, 2006). Therefore, it is hypothesized that the behaviour type relationship may be present due to the assumption that detection behaviours typically are perceived as risky and prevention behaviours typically are perceived as risk averse (Rothman, Kelly, Hertel & Salovey, 2003). This perceived risk hypothesis is further confirmed by research that indicates that if prevention behaviours are seen as risky, individuals will benefit from a loss-framed message and if detection behaviours are perceived as risk averse, individuals will benefit from a gain-framed message (O’Connor, Ferguson, O’Connor, 2005). For example, individuals who perceive themselves to be at low-risk for HIV benefit from a gain-framed message because even though a HIV test is a detection behaviour, having themselves tested would likely result in low-risk personal consequences (Apanovitch, McCarthy, Salovey, 2003). Current research investigating message framing and vaccination also provides evidence for the perceived risk hypothesis.
1.1.3.4 Message Framing and Vaccination

To date, four studies have examined the effect of message framing on vaccination intentions. These studies provide insight into the factors that affect the overall impact of the vaccination messages. Taken together the findings of the studies contradict the behaviour type hypothesis and indicate that loss-framed messages lead to greater intentions to vaccinate.

Studies by Gerend et al. (2007; 2008; 2009) provide insight into message framing factors that moderate HPV vaccine message effectiveness in college-aged men and women. In a study by Gerend & Shepherd (2007), undergraduate women were given either a gain- or loss-framed booklet about the HPV vaccine. The loss-framed messages led to greater vaccination intentions among women who engaged in risky sexual behaviour and among women whose motivational style was oriented towards avoiding negative outcomes (Gerend and Shepherd, 2007). In a second study, women were given a gain- or loss-framed message and were told that the HPV vaccination schedule would consist of either one shot or six shots. A frame-by-frequency interaction was detected. A loss-framed message led to the greatest intentions to be vaccinated among women in the one-shot condition. Additionally, perceived susceptibility mediated the framing-intention relationship (Gerend, Shepherd & Monday, 2008). In a third study by Gerend & Sias (2009), undergraduate men were asked to read a gain- or loss-framed message in which specific words had or had not been emphasized with red text (colour primed). Vaccination intentions were highest among men who received the colour primed loss-framed message. Taken together these findings point to a loss-framed advantage for
HPV vaccine messages and indicate that a number of factors may moderate men’s and women’s intentions to vaccinate. Therefore, it is important to determine whether moderators of HPV vaccination framing effects exist for messages encouraging parents to consider the HPV vaccine for their child.

In a study investigating women’s intentions to vaccinate their child against measles, mumps and rubella (MMR), Abhyankar, O’Connor & Lawton (2008) studied the role of message framing on parents’ intentions to vaccinate their child. Participants included women with and without children. Women read a gain- or loss- framed message about the MMR vaccination. Women who did not have children were asked to read and respond to the message by imagining that they had children. Results indicated that women had stronger behavioural intentions to vaccinate their child if they received the loss-framed message. This relationship was further strengthened if the women had previously vaccinated their children. In addition, attitudes, subjective norms, perceived response efficacy, and past behaviour predicted the variance in behavioural intentions. Finally, it was found that perceived response efficacy was the only social cognitive variable to mediate the framing-behavioural intention relationship. Given these results, it is important to determine whether similar variables mediate and predict parents’ intentions to vaccinate against HPV.

1.1.3.5 Sex Differences in Message Framing

Because there are sex differences in parents’ approach to sexual health education, it is also important to examine sex differences in parents’ response to framed sexual
health messages. The literature examining sex differences in response to framed messages is limited. There is some evidence that framing effects are stronger for women than for men (Fagley & Miller, 1990; Frisch, 1993). The stronger framing effects for women have been attributed to their greater involvement and greater risk perceptions of the health issues being considered compared to men (Rothman, Salovey, Antone, Keough & Martin, 1993; Toll et al., 2008).

For example, a study by Toll et al. (2008) found that the effects of message framing on smoking cessation behaviour were different for men and women. Women reported having a higher perceived risk of quitting compared to men. An interaction between perceived risk of quitting and sex was detected. Women who reported low perceived risk of smoking cessation and received a gain-framed message had a greater number of days to relapse compared to women who received a loss-framed message. The authors recommend that future message framing interventions consider the effect of sex and risk perceptions on framing effects. Given that the controversy surrounding the HPV vaccine may have affected parents’ perceptions differently, it will be important to determine whether framing effects are different for mothers and fathers.

In a second example, Rothman, Salovey, Antone, Keough & Martin (1993) investigated the moderating effect of involvement with the health issue and sex on health behaviours relevant to preventing or detecting skin cancer. For detection behaviours, women had greater intention if they received the loss-framed message whereas men had greater intentions if they received the gain-framed message. For prevention behaviours,
women were more likely to request sunscreen if they received a gain-framed message, whereas, no framing effects were detected for men. Women indicated that they were more concerned about sun tanning and skin cancer than men. Therefore, the authors postulated that the sex and message framing interaction may be a result of women being more involved with the health issue of skin cancer. Since mothers tend to have higher involvement in the sexual health of their children than fathers (Walker, 2001), it is important to determine whether similar sex differences exist in the context of HPV vaccination messages.

1.1.4 Theoretical Framework

In order to create the most effective health messages, it is important to consider theoretical constructs that may mediate health behaviours and framing effects (Wilson, Purdon & Wallston, 1988). Applying a theoretical framework to guide an intervention ensures that key determinants are targeted. It also allows researchers to test and further inform theoretical principles (Rothman, 2004). The present study used theory to gain an understanding of the theoretical constructs mediating the framing effects for parents’ intentions to vaccinate their children against HPV.

Previous research investigating parents’ perceptions of and attitudes towards the HPV vaccine have demonstrated that parents’ decision to vaccinate their children is based on a myriad of factors. Perceived vaccine safety, perceived vulnerability to HPV, side-effects of the vaccine, important others opinions, and the fear of promoting sexually permissive behaviour all influence parents’ decisions to vaccinate (Olshen, Woods,
Austin, Luskin & Bauchner, 2005; Zimet, 2005; Brewer & Fazekas, 2007; Ogilvie et al., 2008; Ogilvie et al., 2010). Given that parents’ decisions are heavily based on their thoughts about the vaccine, vulnerability to HPV and social factors such as important others, the study used the theoretical frameworks of protection-motivation theory (PMT; Rogers, 1975) and the theory of planned behaviour (TPB; Ajzen, 1988).

Protection-motivation theory (PMT) is an expectancy-value theory rooted in fear appeal research. It states that individuals’ intentions to adopt a recommended response are guided by their amount of ‘protection motivation’ which is comprised of two independent appraisals: a threat appraisal and a coping appraisal. A threat appraisal refers to a person’s perception of the threat and the probability of the person attaining the maladaptive consequences of the threat (e.g. the infection). A threat appraisal is comprised of two cognitive processes: perceived severity and perceived vulnerability. Perceived severity refers to a person’s perception of seriousness of the consequences associated with a disease or a maladaptive response. Perceived vulnerability refers to a person’s evaluation of the likelihood that the threat will affect them. Conversely, a coping appraisal refers to factors that may increase or decrease the likelihood of the person performing the desired adaptive response. A coping appraisal consists of a persons’ self-efficacy and response efficacy. Self-efficacy is one’s belief in their ability to perform the recommended behaviour and response efficacy refers to a person’s belief about whether the recommended behaviour will effectively reduce the threat. This
construct may include beliefs about side-effects and benefits of the behaviour (Rogers, 1975).

In the case of HPV and vaccination, parents’ perceived severity of the virus and their child’s vulnerability to the virus leads to a threat appraisal. Whereas, the parents’ perceived response efficacy of the vaccine, including its side-effects, safety and efficacy, and their self-efficacy to vaccinate their child leads to the coping response appraisal. In turn, these two appraisals lead to the parents’ ‘protection-motivation’ or intentions which lead behaviour. All of the constructs of the PMT were measured in the present study except for parents’ perception of their child’s vulnerability to HPV. Questions regarding perceived vulnerability require asking parents about sensitive topics such as their child’s likelihood of contracting a sexually transmitted infection and therefore this construct was not included in our questionnaire.

While the PMT includes several important determinants of health behaviour, it does not assess social factors affecting parents’ decision to vaccinate their child or their overall appraisal of vaccination. Therefore, in addition to the psychological constructs of the PMT, the constructs of subjective norms and attitudes from the theory of planned behaviour (TPB) as well as perceived anxiety of HPV also were used to create a more comprehensive model (see Figure 1). The theory of planned behaviour (Ajzen, 1988) defines subjective norms as one’s motivation to comply with a relevant other and attitudes as one’s overall evaluation of a behaviour. Anxiety is defined by Bandura (1988) as a state of apprehension about the negative consequences of a potential event
(e.g. contracting HPV). Previous research regarding parents’ acceptance of the HPV vaccine has indicated that the acceptability of the HPV vaccine is higher when individuals believed that important others, including their physician, wanted them to vaccinate their children (Zimet, 2005; Brewer & Fazekas, 2007; Ogilvie et al., 2008; Ogilvie et al., 2010). Similarly, research has indicated that parents’ overall attitude about the HPV vaccine affects their decision to vaccinate (Zimet, 2005; Ogilvie et al., 2008). Finally, research has shown that men’s acceptance of the HPV vaccine is determined by their perceived anxiety about the negative implications of HPV (Ferris et al., 2008).
Figure 1. Comprehensive model of theoretical constructs predicting HPV vaccination behaviour.

*Note.* Circles represent PMT variables, octagons represent TPB variables and triangles represent other variables.
Previous research has found that using persuasive messages to manipulate the constructs of protection-motivation theory (Graham, Prapavessis, Cameron, 2006; Courneya & Hellsten, 2001) and the theory of planned behaviour (Parker, Stradling, Manstead, 1996) can result in greater intentions to perform the desired behaviour. Therefore, messages used in the intervention targeted the PMT constructs of perceived severity, perceived vulnerability, self-efficacy and response efficacy as well the TPB constructs of subjective norms and attitudes.

1.2 Study Purpose

The purpose of this study was to a) determine the effect of gain-, loss- and mixed-framed messages on parents’ intentions to have their child vaccinated against HPV and b) investigate theoretical constructs that may mediate the effect of message framing on parents’ intentions to have their child vaccinated against HPV.

1.3 Hypotheses

Given the previous research demonstrating a) a loss-framed advantage for vaccination health messages, b) different message framing effects for men and women, c) parents who are the same sex as their child are more comfortable talking about sexual health with their child than parents who are the opposite sex to their child, and d) factors that can moderate and mediate framing effects, three hypotheses have been established:

1. Parents’ intention to vaccinate will be moderated by their parent-child dyad. The possible dyads include mothers considering vaccination of their daughter, fathers considering vaccination of their daughter, mothers considering vaccination of
their son, and fathers considering vaccination of their son. In particular, parents who are the same sex as their child and receive a loss-framed message will have the greatest intentions to vaccinate their child.

2. PMT variables will act as mediators of the framing-intention relationship.

3. TPB variables will act as mediators of the framing-intention relationship.
Chapter 2

Method

2.1 Design

This study employed a 2(sex of the parent) x 2(sex of the target) x 3 (message frame) between-groups quasi-experimental design (see Figure 2).

Figure 2. Study Design Schema
2.2 Participants

An a priori sample size calculation was computed to determine the optimal number of participants needed for the study. Sample size was calculated in GPower (version 3.0.10) with the following parameters: Cohen’s $f = 0.25$, $\alpha = .05$, power = .95, numerator $df = 2$, number of groups = 12. A medium effect size was used in the calculation because it corresponds to Gerend & Shepherd’s (2007) reported data ($partial r^2 = .32$). Based on this calculation, the desired sample size was 252 with 21 participants in each group.

A convenience sample of 367 parents of children in Grade 5, 6 or 7 participated in the study in exchange for a chance to win one of ten $25 gift certificates. Currently, the HPV vaccine is provided to Grade 8 girls and may be offered to Grade 8 boys in the future. Parents of daughters and sons in Grades five through seven were selected in an attempt to provide parents with information about the vaccine prior to them making a decision about having their child vaccinated and to limit the probability that parents would receive the study message and the message from the school board at the same time. The majority of the participants (84%) were recruited face-to-face at various child-centred community and sporting events in Ontario, Canada. The remaining participants were recruited using online advertisements (e.g. Facebook.com) and word of mouth.

As shown in Table 2, the mean age of the participants was 42.55 years (SD = 4.73), 81% of the sample was female. The majority of participants had two (49%) or three (31%) children with an average age of 11.32 (SD = 2.61) years. Most of the
participants were either Protestant Christian or Roman Catholic, highly educated and caucasian.

In terms of family dynamics, 51% of the sample was mothers considering vaccination for their daughters, 28% was mothers considering vaccination for their sons, 11% was fathers considering vaccination for their daughters and 9% was fathers considering vaccination for their sons. The majority of the sample was married, in a dual-income family that had an income equal to or greater than $75,000 a year. Ten percent of participants had a family history of HPV related diseases (e.g. cervical cancer, anal cancer). Participants were satisfied with communication between themselves and their child (M = 6.29, SD = 1.22).

Regarding vaccination, 15% of participants had personal beliefs against vaccination. Half of the participants had previously received information about the HPV vaccine. Of the participants who received information, the overall tone was perceived to be positive (M = 4.95, SD = 1.23). In terms of the vaccination decision, 59% of the sample will be making the decision with their spouse and 37% will be the primary decision maker (refer to Table 2).
Table 2. Demographic Information by Parent-child Dyad

<table>
<thead>
<tr>
<th></th>
<th>Father-Daughter</th>
<th>Father-Son</th>
<th>Mother-Daughter</th>
<th>Mother-Son</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>42.67 (3.74)</td>
<td>44.72 (4.45)</td>
<td>42.49 (4.92)</td>
<td>41.93 (4.67)</td>
<td>42.55 (4.73)</td>
</tr>
<tr>
<td>(Mean (SD))</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minority % (n)</td>
<td>8% (3)</td>
<td>16% (5)</td>
<td>3% (5)</td>
<td>7% (7)</td>
<td>5.4%</td>
</tr>
<tr>
<td>Aboriginal % (n)</td>
<td>0% (0)</td>
<td>3% (1)</td>
<td>2% (4)</td>
<td>&lt;1% (1)</td>
<td>1.6%</td>
</tr>
<tr>
<td>Education % (college)</td>
<td>77%</td>
<td>69%</td>
<td>80%</td>
<td>85%</td>
<td>80.3%</td>
</tr>
<tr>
<td>Religion % (Protestant or Roman Catholic)</td>
<td>77%</td>
<td>59%</td>
<td>74%</td>
<td>67%</td>
<td>70.6%</td>
</tr>
<tr>
<td>Married</td>
<td>85%</td>
<td>81%</td>
<td>83%</td>
<td>79%</td>
<td>82%</td>
</tr>
<tr>
<td>Dual Income</td>
<td>79%</td>
<td>81%</td>
<td>79%</td>
<td>79%</td>
<td>79%</td>
</tr>
<tr>
<td>Family</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Father-Daughter</td>
<td>Father-Son</td>
<td>Mother-Daughter</td>
<td>Mother-Son</td>
<td>Total</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-----------------</td>
<td>------------</td>
<td>-----------------</td>
<td>------------</td>
<td>--------</td>
</tr>
<tr>
<td>Income (&gt; $75,000)</td>
<td>84%</td>
<td>84%</td>
<td>73%</td>
<td>74%</td>
<td>76%</td>
</tr>
<tr>
<td>Number of Children (Median(Range))</td>
<td>2 (4)</td>
<td>2(4)</td>
<td>2(4)</td>
<td>2(4)</td>
<td>2(4)</td>
</tr>
<tr>
<td>Mean age of all children (years) (Mean (SD))</td>
<td>10.56 (2.13)</td>
<td>11.19 (2.91)</td>
<td>11.51 (2.58)</td>
<td>11.31 (2.72)</td>
<td>11.32 (2.61)</td>
</tr>
<tr>
<td>History of Disease</td>
<td>8%</td>
<td>3%</td>
<td>12%</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>Information Previously Received</td>
<td>46%</td>
<td>28%</td>
<td>54%</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td>Beliefs Against Vaccination</td>
<td>21%</td>
<td>19%</td>
<td>14%</td>
<td>15%</td>
<td>15%</td>
</tr>
<tr>
<td>Vaccination</td>
<td>77%</td>
<td>81%</td>
<td>51%</td>
<td>36%</td>
<td>59%</td>
</tr>
<tr>
<td></td>
<td>Father-Daughter</td>
<td>Father-Son</td>
<td>Mother-Daughter</td>
<td>Mother-Son</td>
<td>Total</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-----------------</td>
<td>------------</td>
<td>-----------------</td>
<td>------------</td>
<td>-------</td>
</tr>
<tr>
<td>decision made with spouse</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary vaccination decision maker</td>
<td>3%</td>
<td>9%</td>
<td>49%</td>
<td>36%</td>
<td>37%</td>
</tr>
<tr>
<td>Communication (Mean (SD))</td>
<td>6.21 (1.51)</td>
<td>5.78 (1.88)</td>
<td>6.33 (1.23)</td>
<td>6.39 (.90)</td>
<td>6.29 (1.22)</td>
</tr>
</tbody>
</table>
2.3 Measures

The identical constructs were measured for the study related to daughters and for the study related to sons. It was necessary to modify some items to be specific to daughters or sons. Modifications in wording are indicated in the descriptions of the measures. Prior to conducting the study, the measures were pilot tested on a sub-set of parents who had a daughter. All measures demonstrated acceptable internal reliability with a Cronbach’s alpha greater than .80 (Nunally, 1978)

2.3.1 Pre-intervention Questionnaires

Three questionnaires were administered prior to the participants receiving the messages. The demographic and family history questionnaires were placed at the beginning to gain background information about the participants, whereas, the perceived risk questionnaire were completed prior to the message to ensure that the content of the message did not affect participants’ responses.

*Demographic Questionnaire.* Participants indicated their sex, age, ethnicity, religion, education, marital status, and household income.

*Family History Questionnaire.* In a measure adapted from Abhyankar et al. (2008), participants indicated the number of children in their family, age, sex of each child and whether or not they previously had their child vaccinated against HPV. If their child in Grade 5, 6 or 7 had not been vaccinated, the parent was included in the study. In addition, participants were asked whether or not they had personal beliefs against vaccination in general and whether or not their family has a medical history of HPV.
related diseases (e.g. cervical cancer, penile cancer). Participants were asked whether or not they had previously received information about the HPV vaccine and if they had received information, they were asked to rate on a seven point scale (1 = extremely negative to 7 = extremely positive) what the overall tone of the information was that they received. Participants were also asked who would be the primary person deciding whether or not their child will be receiving the HPV vaccination. Parents may also include their child in the vaccination decision (Brabin et al., 2009), therefore, parents were asked to rate the quality of communication between themselves and their child using a scale from 1 (very satisfied) to 7 (very dissatisfied).

2.3.2 Post-intervention Measures

To assess the effectiveness of the messages and their effect on various constructs of the PMT and TPB, eight questionnaires were administered after participants read a framed message. The knowledge comprehension and manipulation check measures were used as an indication that participants read the message.

Knowledge Comprehension. This measure is a four-item multiple choice questionnaire adapted from Gainforth & Latimer (submitted) that is designed to ensure that participants attended to and understood the content of the message. Three versions of this measure, one for the gain-framed message, one for the loss-framed message and one for the mixed-framed message, were designed to match the frame conveyed in the participant’s message condition and emphasize the frame of the message. Items targeted key points regarding the message including information about response efficacy of the
vaccine, vulnerability to HPV and consequences of being infected with HPV. Responses to the four questions were totalled. Correct responses were given a value of one and incorrect responses were given a value of zero (range 0 – 4).

Manipulation Check. This two-item measure assessed whether participants attended to the message frame conveyed in the passage (Latimer et al., 2008). Participants responded to the first item, ‘The information in the passage focused on...’, using a scale ranging from 1 (the cost of not vaccinating my son/daughter) to 7 (the benefits of vaccinating my son/daughter). Participants responded to the second item, ‘the overall tone of the passage was...’, using a scale ranging from 1 (extremely negative) to 7 (extremely positive). To assess the manipulation, both of the two-items were analyzed separately. This measure has demonstrated sensitivity to differences in framed information (Latimer et al., 2008).

2.3.2.1 Protection Motivation Theory Measures

Perceived Severity of HPV. This three-item measure adapted from Courneya & Hellsten (2001) captured participants’ beliefs about the seriousness of their child developing HPV and/or HPV related diseases. Items included ‘HPV is a serious infection for my son/daughter to contract’, ‘cervical, penile and anal cancer is a serious disease for my son/daughter to develop’ and ‘genital warts is a serious disease for my son/daughter to develop’. Parents responded using a Likert-scale ranging from 1 (strongly agree) to 7 (strongly disagree). A total score was calculated by adding the scores from each of the three items (range 3 – 21). This scale has shown previous internal reliability with a
Cronbach’s alpha of .87 (Courneya & Hellsten, 2001) and demonstrated good internal reliability with a Cronbach’s alpha of 0.92 in this study (Nunnally, 1978). This measure has also demonstrated sensitivity to change in the context of a message (Courneya & Hellsten, 2001).

*Perceived Response (outcome) Efficacy.* This measure was adapted from Abhyankar et al. (2008) and includes four-items assessing participants’ perception of the HPV vaccine’s effectiveness. The scale used the stem ‘the HPV vaccination leads to’ (a) certainty about my son/daughter’s health, (b) relief, (c) reassurance, (d) serious side-effects and will range from 1 (strongly agree) to 7 (strongly disagree). A total score was calculated by adding the scores from each of the four items together (range 4 – 28). Similar to the results of Abhyankar (2008) (α = .76), this scale had good internal reliability with a Cronbach’s alpha of .87 (Nunnally, 1978). This measure has demonstrated sensitivity to differences in message frames (Abhyankar et al., 2008).

*Self-efficacy.* This four-item measure assessed the participants’ confidence in their ability to have their son/daughter vaccinated and their perception of the ease of doing so. Previous research by Rhodes & Courneya (2004) has stressed the importance of holding motivation as a positive constant when creating a self-efficacy scale. Holding motivation as a positive constant means that participants were asked to imagine that they are motivated to perform the desired behaviour (e.g. ‘If you were really motivated...’). Validated items from research by Rhodes & Courneya’s (2004) were adapted to assess parents’ self-efficacy to vaccinate their son/daughter against HPV. All items used a scale
ranging from 1 to 7 and began with a statement holding motivation as a positive constant (e.g. ‘If I was really motivated…’). Confidence items included (a) ‘How confident are you that you will be able to have your son/daughter vaccinated against HPV (very unconfident/very confident)’, and (b) ‘How confident are you that you will be able to have your son/daughter vaccinated against HPV if you really wanted to (very unconfident/very confident)’. Ease-difficulty items included (a) ‘For me to be able to have my son/daughter vaccinated against HPV would be (very difficult/very easy)’, and (b) ‘If you really desired to have your son/daughter vaccinated against HPV, it would be (very difficult/very easy)’. A total score was calculated by adding the scores from each of the four items (range 4 – 28). This scale had acceptable internal reliability with a Cronbach’s alpha of 0.86 (Nunnally, 1978).

2.3.2.2 Theory of Planned Behavior Measures

Subjective Norm. This four-item measure assessed participants beliefs as to whether significant-others believe they should or should not vaccinate their son/daughter. Items were rated on a Likert-scale ranging from 1 (strongly agree) to 7 (strongly disagree). The first three items were created using Ajzen’s recommendations (2002) and include (a) ‘Most people who are important to me think that I should have my son/daughter vaccinated against HPV’, (b) ‘People in my life whose opinions I value would approve of me having my son/daughter vaccinated against HPV’ and (c) ‘Many individuals who I like and value have had their sons/daughters vaccinated against HPV’. The final item, ‘my son/daughter thinks that he/she should get the HPV vaccine’, was
added to capture parents’ assessment of their son/daughter as a subjective norm within the decision making process. A total score was calculated by adding the scores from each of the four items (range 4 – 28). A study that also used Ajzen’s (2002) recommendations found that the items were sensitive enough to determine parents’ subjective norms regarding their decision to speak to their daughters about sex when vaccinating their daughter against HPV (Akelson et al., in press). This scale had good internal reliability with a Cronbach’s alpha of 0.84 (Nunnally, 1978)

**Attitudes.** This five-item questionnaire was adapted from Abhyankar et al. (2008) and assessed participants’ positive or negative evaluation of the HPV vaccine. Items were rated on a semantic differential scale (range 1 to 7). Participants were presented with the statement: ‘Having my son/daughter vaccinated against HPV would be…’ followed by the endpoints: ‘bad-good’, ‘harmful-beneficial’, ‘foolish-wise’, ‘threatening-assuring’ and ‘risky-safe’. A total score was calculated by adding the scores from each of the five items (range 5 – 35). Similar to the finding by Abhyankar et al. (2008) indicating good internal reliability of the scale (α = .75), this scale had acceptable internal reliability with a Cronbach’s alpha of 0.97 (Nunnally, 1978) in the current study.

**Intentions.** This six-item questionnaire was created using Ajzen’s recommendations (2002). Items were rated on a Likert-scale ranging from 1(strongly agree) to 7 (strongly disagree). Items began with one of two stems (‘I intend’ or ‘I will’) and captured parents’ intentions within the next three years to: have their sons/daughters vaccinated against HPV, speak to their doctor about having their son/daughter vaccinated
against HPV and to look for more information about having their son/daughter vaccinated. Three total scores were calculated (intention to vaccinate; intention to speak to a doctor; intention to look for more information) by adding the two scores from the corresponding items (range 2 – 14). This scale had good internal reliability with a Cronbach’s alpha of .90 (Nunnally, 1978).

2.3.2.3 Other Variables

HPV Anxiety. This three-item measure was adapted from Abhyankar et al. (2008) to assess participants’ anxiety about their child contracting HPV in the future. Participants responded using a Likert-scale ranging from 1 (strongly agree) to 7 (strongly disagree). Items began with the stem ‘Thinking about the possibility of my son/daughter getting HPV when he/she grows up makes me feel’ and is followed by the end points ‘anxious’, ‘fearful’ and ‘worried’. A total score was calculated by adding the scores from each of the three items (range 3 – 21). Similar to the results of Abhyankar et al. (2008) (α = .96), this scale had acceptable internal reliability with a Cronbach’s alpha of .95 (Nunnally, 1978).

2.4 Messages

In total, six messages about the HPV vaccine were developed, three for parents of girls and three for parents of boys. Messages were framed in one of three ways, gain frame, loss frame, and mixed frame. The messages were based on the current message that the Ontario government provides to parents of Grade 8 girls. All message content was identical across message conditions except for difference in frame and content that
was sex specific (e.g. cervical cancer vs. cancer of the genitals). The content of the government message included factual information about HPV and the vaccine and was modified to target the theoretical constructs of the TPB and PMT. Information about the virus included topics such as the types of HPV, HPV transmission, and the consequences of an HPV infection (perceived severity). Information about the vaccine included topics such as what types of the virus the vaccine protects against, recommendations about who should receive the vaccine, side effects, efficacy of the vaccine (response efficacy), information about the Grade 8 vaccination programme (self-efficacy), and a list of organizations that recommend the vaccine (subjective norms). The gain-framed message stressed the benefits of obtaining the vaccine, for example, ‘If your daughter is vaccinated, she will be protected against cervical cancer and genital warts’ or ‘If your son is vaccinated, he will be protected against cancer of the genitals and genital warts’. Conversely, the loss-framed message emphasized the costs of not obtaining the HPV vaccine, for example, ‘If your daughter is not vaccinated, she will not be protected against cervical cancer and genital warts’ or ‘If your son is not vaccinated, he will not be protected against cancer of the genitals and genital warts’. Sample messages are included in Table 2. Full messages are included in Appendix C. Framed content in the mixed message alternated between gain- and loss-framed statements. Specifically 12% of the mixed message content was gain-framed and 12% was loss-framed. The remainder of the information was unframed.
2.5 Procedure

The entire study was completed online using StudentVoice, an online interface for managing questionnaire administration. Participants were screened based on whether or not they had a son or daughter. All participants with a daughter in Grade 5, 6 or 7 were included in the study of daughters. If participants did not have a daughter in Grade 5, 6 or 7 but had a son in the target Grades, they were included in the study of parents with sons. Parents were screened for the study of daughters first because parents with a daughter would have the greatest opportunity to vaccinate in the next year and therefore they were considered to be of greater interest. Once assigned to a study, participants were randomized into one of three framing conditions (gain, loss or mixed). Consenting participants completed the pre-intervention questionnaires. Immediately after they were asked to read either a gain-, loss-, mixed-framed message and then completed the post-intervention questionnaires. Finally, participants were debriefed.
Chapter 3

Results

3.1 Manipulation Check

3.1.1 Knowledge comprehension

Results indicated good understanding of the message. The mean score in all conditions was above 3.33 out of a possible 4.00 with 96% of the sample scoring 3 or above. A 2 (Sex of Parent) x 2 (Sex of Target) x 3 (Frame) Analysis of Variance (ANOVA) indicated that there were no significant differences in knowledge comprehension between the conditions, $F(2, 355) = .50, p = .61$.

3.1.2 Framing

A 2 (Sex of Parent) x 2 (Sex of Target) x 3 (Frame) multivariate analysis of variance (MANOVA) with follow-up ANOVAs was conducted on the manipulation check items to confirm the effectiveness of the framing manipulations. The main effect of message frame was found, $F(2, 698) = 7.25, p < .01$, Pillai’s Trace = .02. Follow-up ANOVAs indicated that message frame significantly affected whether the participants perceived the message to focus on the benefits of the HPV vaccine, $F(2, 349) = 9.41, p < .001$, and whether the participants perceived that the overall tone of the message was positive, $F(2, 349) = 14.14, p < .001$. Bonferroni pairwise comparisons were conducted to identify differences between the three conditions. For the message focus variable,
participants who received the gain-framed message perceived the message to focus more heavily on the benefits of vaccination compared to those who received the loss-framed message ($p < .001$) or the mixed-framed message ($p = .05$). Participants who received the mixed-framed message perceived the message to focus more on the benefits than participants in the loss-framed condition ($p = .01$). For the message tone variable, participants who received the gain or the mixed message perceived the overall tone of the message to be more positive compared to participants in the loss-framed condition ($p < .01$). Participants in the gain-framed condition tended to perceive the tone of the message as more positive compared to participants in the mixed condition ($p = .12$). No other significant effects emerged.

3.2 Randomization Checks

Randomization checks were performed to determine whether there were differences between the 12 experimental groups. A series of 2 (Sex of Parent) x 2 (Sex of Target) x 3 (Frame) ANOVAs were conducted on continuous demographic variables including age, number of children, and mean age of all children. In all cases no differences between the groups were found ($p > .05$). Categorical data had some cell counts less than five. Therefore, Chi Square tests were not computed.

3.3 Moderation vs. Mediation

Analyzing our hypotheses required testing the effect of both moderator and mediator variables. Moderator variables affect the direction and/or strength of the relationship between the independent variable and the dependent variable (Baron &
Kenny, 1986). For example, the study hypothesized that sex of the parent and sex of the child would moderate the effect of message frame on intentions. A mediator variable accounts for the relationship between the independent variable and the dependent variable (Baron & Kenny, 1986). For example, a mediator of the framing-intention relationship would explain how framing affects intention.

3.4 Primary Hypotheses

To test our hypotheses we conducted 2 (Sex of Parent) x 2 (Sex of Target) x 3 (Frame) ANCOVAs on all dependent variables. Participants’ beliefs against vaccination and their knowledge scores were entered as covariates in all analyses. We used the beliefs against vaccination variable to control for pre-existing vaccination beliefs. These beliefs may have caused parents to be more or less receptive to the message (Poland, Jacobson, Ovsyannikova, 2009). The knowledge score was used as a covariate to control for participants’ overall understanding and attention to the framed message. In the following analyses, only the highest order effects are reported. Significant three-way interactions were decomposed in two ways. In the first approach, a significant three-way interaction was decomposed initially by sex of the parent. Significant two-way interactions were followed up with ANCOVAs for each framing conditions. This approach allowed us to determine which frame was most persuasive for a specific parent-child dyad (e.g. gain-frame vs. loss-frame for mothers with daughters). In the second approach, a significant three-way interaction was decomposed initially by frame. Significant two-way interactions were followed up with separate ANCOVAs for mothers.
and fathers. This approach allowed us to compare the effect of a specific frame between two parent-child dyads (e.g. mothers of sons vs. mothers of daughters; fathers of sons vs. fathers of daughters). Cohen’s $d$ was calculated to determine the effect size. Effect sizes of .20, .50 and .80 were considered small, medium and large effects respectively (Cohen, 1992).

3.4.1 Parents’ intention to speak to their doctor about having child vaccinated against HPV

A 2 (Sex of Parent) x 2 (Sex of Target) x 3 (Frame) ANCOVA indicated a three-way interaction, $F(2, 342) = 3.66$, $p = .03$. When the interaction was decomposed by the sex of the parent, the separate ANCOVAs for mothers and fathers indicated a two-way interaction between sex of the target and frame for mothers, $F(2, 278) = 4.31$, $p = .01$, and a non-significant trend for fathers, $F(2, 62) = 2.00$, $p = .14$ (refer to Table 3). We conducted analyses to subsequently examine the pattern of findings for mother-daughter and mother-son dyads. While we did not conduct further analyses for fathers, we explored the pattern of findings in terms of effect sizes.

Mothers of daughters. The ANCOVA on message frame did not reveal any significant differences between the three message frames for this dyad. However, small effect sizes indicated that mothers who received a mixed-framed message tended to have greater intentions to speak to a doctor about vaccinating their daughter compared to mothers who received a loss-framed message ($d = .21$) or a gain-framed message ($d = .17$).
Mothers of sons. An ANCOVA on message frame revealed significant differences among mothers considering vaccination for their son, $F(2, 93) = 4.53, p = .01$. Bonferroni pairwise comparisons indicated an advantage for a gain-framed message over a mixed-framed message ($p = .02, d = .68$). Gain-framed messages also tended to have an advantage over loss-framed messages ($p = .09, d = .57$).

Fathers of daughters. Small to medium sized effects indicated that fathers who received a gain-framed message tended to have higher intentions to speak to a doctor about vaccinating their daughter compared to fathers who received a mixed-framed message ($d = .45$) or a loss-framed message ($d = .25$).

Fathers of sons. A medium sized effect was observed in the comparison between the gain- and mixed-framed messages and a small sized effect was observed between the loss- and mixed-framed messages. Fathers who received a mixed-framed message tended to have higher intentions to speak to a doctor about vaccinating their son compared to fathers who received a gain-framed message ($d = .69$) or a loss-framed message ($d = .32$).

When the three-way interaction was decomposed by frame, a significant sex of the parent by sex of the target interaction emerged for the gain-framed messages, $F(1, 117) = 5.12, p = .03$. The two-way interaction for mixed-framed messages, $F(1, 115) = 3.09, p = .08$, approached significance. We conducted subsequent analyses for mothers and fathers to examine the effects of gain-framed messages. We used effect sizes to explore the pattern of findings for loss- and mixed-framed messages.
Mothers. ANCOVAs indicated that the mixed-framed message resulted in mothers having stronger intentions to talk to a doctor about vaccinating their daughter than their sons ($p = .01, d = .56$). Small effect sizes were also observed for gain- and loss-framed messages. Mothers of sons who received a gain-framed message tended to have greater intentions to speak to a doctor about vaccination than mothers of daughters ($d = .23$). Mothers of daughters who received a loss-framed message tended to have greater intentions to speak to a doctor about vaccination compared to mothers of sons ($d = .23$).

Fathers. An ANCOVA indicated that fathers who received a gain-framed message tended to have stronger intention to talk to a doctor about having their daughters vaccinated compared to their sons ($p = .06, d = .85$). Small effect sizes were observed for mixed- and loss-framed messages. Fathers who received a mixed-framed message tended to have greater intentions to speak to a doctor about vaccinating their son compared to their daughter ($d = .30$). Conversely, fathers who received a loss-framed message tended to have greater intentions to speak to a doctor about having their daughter vaccinated compared to their son ($d = .20$).
Table 3. *Parents’ Intentions to Speak to a Doctor About Vaccinating Their Child Against HPV*

<table>
<thead>
<tr>
<th></th>
<th>Mean (SD)</th>
<th>Effect Size (d)</th>
<th>Mean (SD)</th>
<th>Effect Size (d)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mother - Daughter</td>
<td>Father - Daughter</td>
<td>Mother - Son</td>
<td>Father - Son</td>
</tr>
<tr>
<td>Gain Frame</td>
<td>10.61 (3.61)</td>
<td>11.73 (2.87)</td>
<td>11.35 (2.74)</td>
<td>8.80 (3.88)</td>
</tr>
<tr>
<td>Loss Frame</td>
<td>10.40 (4.26)</td>
<td>10.88 (3.93)</td>
<td>9.47 (3.79)</td>
<td>10.08 (4.23)</td>
</tr>
<tr>
<td>Mixed Frame</td>
<td>11.25 (3.84)</td>
<td>10.25 (3.70)</td>
<td>8.82 (4.75)</td>
<td>11.33 (3.49)</td>
</tr>
</tbody>
</table>

**Effect Size (d)**

<table>
<thead>
<tr>
<th></th>
<th>Gain vs. Loss</th>
<th>Gain vs. Mixed</th>
<th>Loss vs. Mixed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.05</td>
<td>.17</td>
<td>.21</td>
</tr>
<tr>
<td></td>
<td>.26*</td>
<td>.65**</td>
<td>.15</td>
</tr>
<tr>
<td></td>
<td></td>
<td>.45</td>
<td>.17</td>
</tr>
<tr>
<td></td>
<td></td>
<td>.32</td>
<td>.32</td>
</tr>
</tbody>
</table>

*Note.* *p < .10, **p < .05, ***p < .01
3.4.2 Parents’ intention to have their child vaccinated against HPV

The 2 (Sex of Parent) x 2 (Sex of Target) x 3 (Frame) ANCOVA did not reveal any significant effects, $F(2, 342) = 1.77, p = .17$.

3.4.3 Parents’ intention to seek information about having their child vaccinated against HPV

The 2 (Sex of Parent) x 2 (Sex of Target) x 3 (Frame) ANCOVA did not reveal any significant effects, $F(2, 342) = 1.68, p = .19$.

3.5 Secondary Hypotheses

3.5.1 Coping Appraisal

We conducted two independent ANCOVAs testing the relationship between sex of the parent, sex of the target, and message frame and parents’ self-efficacy and response efficacy. An interaction between sex of the parent and sex of the target was found for self-efficacy, $F(1, 342) = 3.76, p = .05$. Separate ANCOVAs for mothers and fathers indicated that mothers, $F(1, 282) = 7.43, p = .01, d=.36$, and fathers, $F(1, 66) = 8.24, p = .01, d=.82$, had greater self-efficacy to vaccinate their daughter than their son (refer to Table 4). A significant main effect for sex of the target was found for response efficacy, $F(1, 342) = 4.59, p = .03$. Bonferonni pairwise comparisons indicated that parents’ response efficacy was higher for vaccinating their daughter versus their son ($d= .25$) (refer to Table 5). No other significant effects emerged.
Table 4. *Parents’ Self-efficacy*

<table>
<thead>
<tr>
<th></th>
<th>Mean (SD)</th>
<th>Effect Size (d)</th>
<th>Mean (SD)</th>
<th>Effect Size (d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mother - Daughter</td>
<td>24.42 (4.94)</td>
<td>.36**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother - Son</td>
<td>22.64 (4.82)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Father - Daughter</td>
<td>24.95 (4.59)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Father - Son</td>
<td>20.35 (6.45)</td>
<td></td>
<td></td>
<td>.82**</td>
</tr>
</tbody>
</table>

*Note. *p < .10, ** p < .05, *** p < .01*

Table 5. *Parents’ Response Efficacy of the HPV Vaccine & Subjective Norms*

<table>
<thead>
<tr>
<th></th>
<th>Mean (SD)</th>
<th>Effect Size (d)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Daughter</td>
<td>Son</td>
</tr>
<tr>
<td>Response Efficacy</td>
<td>18.47 (5.93)</td>
<td>16.94 (5.72)</td>
</tr>
<tr>
<td>Subjective Norms</td>
<td>17.71 (5.51)</td>
<td>14.47 (4.47)</td>
</tr>
</tbody>
</table>

*Note. *p < .10, ** p < .05, *** p < .01*
3.5.2 Threat Appraisal

In the analysis testing the relationship between sex of the parent, sex of the target and message frame and parents’ perceptions of the severity of HPV a significant main effect for sex of the target was detected, $F(1, 347) = 6.00, p = .02$. Specifically, parents had greater perceived severity of HPV for daughters compared to their sons. The three-way interaction was also significant, $F(2, 347) = 3.10, p = .05$. The separate ANCOVAs for mothers and fathers indicated a two-way interaction between sex of the target and frame for fathers, $F(2, 62) = 3.71, p = .03$ but not for mothers. While we did not conduct further analyses for any of the parent-child dyads, we explored the pattern of findings in terms of effect sizes (refer to Table 6).

Mothers of daughters. A small sized effect indicated that mothers who received a loss-framed message had higher perceived severity than mothers who received a mixed-framed message ($d=.19$).

Mothers of sons. Effect size comparisons did not reach the criterion for small effects.

Fathers of daughters. A large and medium sized effect indicated that fathers of daughters tended to have higher perceived severity if they received a gain-framed message versus a loss-framed message ($d=.85$) or a mixed-framed message ($d=.54$).

Fathers of sons. Effect sizes indicated that fathers of sons tended to have higher perceived severity if they received a loss-framed message compared to a gain-framed message ($d=.85$) and compared to a mixed-framed message ($d=.55$).
When the three-way interaction was decomposed by frame, the sex of parent by sex of target interaction for loss-framed messages, $F(1, 115) = 3.70, p = .06$, and gain-framed messages, $F(1, 117) = 3.19, p = .08$, were marginally significant. We conducted subsequent analyses for mothers and fathers to explore the effects of gain- and loss-framed messages. We also used effect size to examine the pattern of findings for mixed-framed messages.

*Mothers.* Separate ANCOVAs indicated that the loss-framed message resulted in mothers of daughters having higher perceived severity of HPV compared to mothers of sons ($p = .01, d = .38$). Also, gain-framed messages tended to result in mothers of daughters having higher perceived severity of HPV compared to mothers of sons ($p = .06, d = .58$). Mothers of daughters compared to mothers of sons also tended to have higher perceived severity if they received a mixed-framed message ($d = .26$).

*Fathers.* Separate ANCOVAs indicated that the gain-framed message resulted in fathers of daughters having higher perceived severity of HPV compared to fathers of sons ($p = .01, d = 1.36$). Fathers of daughters who received the mixed-framed message also had higher perceived severity scores than fathers of sons ($d = .19$). Fathers of sons compared to fathers of daughters had higher perceived severity if they received a loss-framed message ($d = .27$).
Table 6. *Parents’ Perceived Severity of HPV*

<table>
<thead>
<tr>
<th></th>
<th>Mean (SD)</th>
<th>Effect Size (d)</th>
<th>Mean (SD)</th>
<th>Effect Size (d)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mother - Daughter</td>
<td>Mother - Son</td>
<td>Father - Daughter</td>
<td>Father - Son</td>
</tr>
<tr>
<td>Gain Frame</td>
<td>18.27 (3.68)</td>
<td>16.47 (5.53)</td>
<td>.38*</td>
<td>19.45 (1.51)</td>
</tr>
<tr>
<td>Loss Frame</td>
<td>18.57 (3.79)</td>
<td>16.34 (3.87)</td>
<td>.58**</td>
<td>16.75 (4.20)</td>
</tr>
<tr>
<td>Mixed Frame</td>
<td>17.71 (5.15)</td>
<td>16.42 (4.88)</td>
<td>.26</td>
<td>17.66 (4.48)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Effect Size (d)</th>
<th>Effect Size (d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gain vs. Loss</td>
<td>.08</td>
<td>.03</td>
</tr>
<tr>
<td>Gain vs. Mixed</td>
<td>.13</td>
<td>.01</td>
</tr>
<tr>
<td>Loss vs. Mixed</td>
<td>.19</td>
<td>.02</td>
</tr>
</tbody>
</table>

*Note.* *p < .10, **p < .05, ***p < .01
3.5.3 Attitudes

An independent ANCOVA testing the relationship between sex of the parent, sex of the target, and message frame and parents’ attitudes indicated no significant effects ($p > .05$).

3.5.4 Subjective Norms

A 2 (Sex of Parent) x 2 (Sex of Target) x 3 (Frame) ANCOVA indicated a significant main effect for sex of the target, $F(1, 352) = 31.79, p < .001$. Parents of girls had higher subjective norms scores than parents of boys ($d = .64$) (refer to Table 5). No other effects were found.

3.5.5 HPV Anxiety

A 2 (Sex of Parent) x 2 (Sex of Target) x 3 (Frame) ANCOVA indicated a three-way interaction, $F(2, 342) = 3.58, p = .02$. The separate ANCOVAs for mothers and fathers indicated a two-way interaction for mothers, $F(2, 278) = 4.47, p = .01$, but not fathers ($p > .05$). We conducted subsequent analyses to examine the pattern of findings for mother-daughter and mother-son dyads. While we did not conduct further analyses for fathers, we explored the pattern of findings in terms of effect sizes (refer to Table 7).

Mothers of daughters. When the interaction was decomposed by parent-child dyad, an ANCOVA revealed significant differences among mothers considering vaccination for their daughter, $F(2, 183) = 33.88, p = .02$. Bonferroni pairwise comparisons indicated that mothers who received a loss-framed message had higher
levels of anxiety about their daughter contracting HPV compared to mothers who received a gain-framed message ($p = .02, d = .46$).

**Mothers of sons.** The ANCOVA on message frame did not reveal any significant differences between the three message frames. However, a medium sized effect was observed in the comparison between the gain- and mixed-framed message ($d = .40$) and a small sized effect was observed in the comparison between the gain- and loss-framed message ($d = .24$). Thus, mothers of sons tended to have higher anxiety about their son contracting HPV if they received a gain-framed message.

**Fathers of daughters.** A medium sized effect was observed in the comparison between the gain- and mixed-framed messages ($d = .43$) and in the comparison between the gain- and loss-framed messages ($d = .35$). Thus, fathers of daughters tended to have higher anxiety about their daughter contracting HPV if they received a gain-framed message.

**Fathers of sons.** A medium sized effect was observed in the comparison between the loss- and gain-framed message ($d = .42$) and a small sized effect was observed between the loss- and mixed-framed message ($d = .26$). Thus, fathers of sons tended to have higher anxiety about their son contracting HPV if they received a loss-framed message.

When the three-way interaction was decomposed by frame, a significant sex of the parent by sex of the target interaction was detected for the loss-framed message, $F(1, 110) = 7.60, p = .01$ and the mixed-framed message, $F(1, 113) = 5.34, p = .02$. We
conducted subsequent analyses for mothers and fathers to examine the effects of loss- and mixed-framed messages. We also explored the pattern of findings for gain-framed messages using effect sizes.

**Mothers.** The loss-framed message resulted in higher anxiety about a child contracting HPV for mothers of daughters than mothers of sons ($p < .01, d = .73$). Similarly, the mixed-framed message resulted in higher anxiety for mothers of daughters compared to mothers of sons ($p < .01, d = .78$). For the gain-framed message, there were no differences in anxiety between mothers of daughters and mothers of sons ($p > .05, d = .01$).

**Fathers.** Separate ANCOVAs for fathers did not reveal any significant differences between the dyads. However, a medium effect size was observed between fathers of daughters and fathers of sons for the gain- ($d = .40$) and loss-framed messages ($d = .36$). A small effect size was observed between fathers of daughters and fathers of sons for the mixed-framed message ($d = .19$). Fathers who received a gain-framed message tended to have higher anxiety about their daughter contracting HPV compared to their son whereas fathers who received a loss- or mixed-framed message tended to have higher anxiety about their son contracting HPV compared to their daughter.
Table 7. *Parents’ Perceived Anxiety of their Child Contracting HPV*

<table>
<thead>
<tr>
<th></th>
<th>Mean (SD)</th>
<th>Effect Size (d)</th>
<th>Mean (SD)</th>
<th>Effect Size (d)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mother - Daughter</td>
<td>Mother - Son</td>
<td>Father – Daughter</td>
<td>Father - Son</td>
</tr>
<tr>
<td>Gain Frame</td>
<td>13.93 (5.25)</td>
<td>13.91 (4.88)</td>
<td>&gt;.01</td>
<td>14.27 (5.71)</td>
</tr>
<tr>
<td>Loss Frame</td>
<td>16.31 (5.00)</td>
<td>12.73 (4.84)</td>
<td>.73***</td>
<td>12.50 (4.43)</td>
</tr>
<tr>
<td>Mixed Frame</td>
<td>15.75 (4.84)</td>
<td>11.85 (5.20)</td>
<td>.78***</td>
<td>11.83 (5.70)</td>
</tr>
<tr>
<td></td>
<td>Effect Size (d)</td>
<td>Effect Size (d)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gain vs. Loss</td>
<td>.46**</td>
<td>.24</td>
<td>.35</td>
<td>.42</td>
</tr>
<tr>
<td>Gain vs. Mixed</td>
<td>.36</td>
<td>.40</td>
<td>.43</td>
<td>.17</td>
</tr>
<tr>
<td>Loss vs. Mixed</td>
<td>.11</td>
<td>.17</td>
<td>.13</td>
<td>.26</td>
</tr>
</tbody>
</table>

*Note.* *p < .10, ** p < .05, *** p < .01
3.6 Mediation

Given that the intervention moderated parents’ perceived severity of HPV and parents’ anxiety about their child contracting HPV, we examined each variable as a mediator of intervention effects on parents’ intention to talk to their doctor about having their child vaccinated against HPV. A separate Sobel test was conducted for each potential mediator for each parent-child dyad. To confirm mediation, we used the SOBELSPSS macro and bootstrap procedure outlined by Preacher and Hayes (2004). Bootstrapping increases the sample size by taking a series of samples from the data. Confidence intervals for the indirect effects are calculated for the entirety of the bootstrap data. If the confidence interval crosses zero, mediation is not present. If the confidence interval does not include zero, mediation is confirmed (Preacher & Hayes, 2004). Using the recommendations of Wehren, Putter & Buydens (2000), we used 10000 bootstrap samples.

A Sobel test with a second order standard error indicated that anxiety mediated message framing effects on intention to speak to a doctor about the HPV vaccine among mothers of sons, $p(-1.21 < \mu < -.7395) = .95$. Also, perceived severity mediated the effects of the framed message on intentions to speak to a doctor about the HPV vaccine among mothers of daughters, $p(-.40 < \mu < -.16) = .95$, and fathers of daughters, $p(-.21 < \mu < -.02) = .95$. $R^2_{med}$ is reported in Table 8 and provides an indication of the amount of the variance in the dependent variable that is accounted for by the mediator (Fairchild et al., 2009) (refer to Table 8).
Table 8. Mediators of the Framing Effect on Parents Intentions to Speak to Their Doctor About the HPV Vaccine.

<table>
<thead>
<tr>
<th>Parent-Child Dyad</th>
<th>Mediator</th>
<th>Sample Size</th>
<th># of resamples</th>
<th>Sobel Value</th>
<th>SE</th>
<th>LL 95 CI</th>
<th>UL 95 CI</th>
<th>$R^2_{med}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mother-Son</td>
<td>Anxiety</td>
<td>98</td>
<td>10000</td>
<td>.94</td>
<td>.04</td>
<td>-1.21</td>
<td>-.7395</td>
<td>.58</td>
</tr>
<tr>
<td>Mother-Daughter</td>
<td>Perceived Severity</td>
<td>188</td>
<td>10000</td>
<td>1.05</td>
<td>.06</td>
<td>-.40</td>
<td>-.16</td>
<td>-.16</td>
</tr>
<tr>
<td>Father-Daughter</td>
<td>Perceived Severity</td>
<td>39</td>
<td>10000</td>
<td>.14</td>
<td>.03</td>
<td>-.21</td>
<td>-.02</td>
<td>.31</td>
</tr>
</tbody>
</table>

*Note.* SE = standard error; CI = confidence interval; A negative $R^2_{med}$ indicated possible suppression effects.
Chapter 4

Discussion

The present study investigated the effect of gain-, loss- and mixed-framed messages on parents’ intentions to have their child vaccinated against HPV. Our hypothesis that parents who receive a loss-framed message and who are the same sex as their child would have the greatest intentions to vaccinate their child against HPV was not confirmed. Rather, gain-framed messages seem to have persuaded parents who are the opposite sex to the child for whom they are considering the vaccine. In turn, loss- and mixed-framed messages may have persuaded parents who are the same sex as the child for whom they are considering the vaccine. Our hypotheses that PMT and TPB variables would mediate the framing effects were partially confirmed. Parents’ perceptions of the severity of HPV and their anxiety about their child contracting HPV mediated the framing-intention relationship for certain parent-child dyads. Taken together these findings provide preliminary support for considering the parent-child relationship when creating persuasive HPV vaccination messages.

4.1 Different Relationships, Different Messages

The pattern of findings for the effect of message framing and the parent-child dyad indicated that parents who were the opposite sex to their child (e.g. mother-son; father-daughter) were affected by gain-framed messages whereas parents who were the same sex as their child (e.g. mother-daughter; father-son) tended to be least persuaded by
gain-framed messages. Parents who were the same sex as their child were persuaded by either mixed- or loss-framed messages. These findings tended to be present for parents’ intentions to speak to a doctor about vaccination, their perceived severity of HPV and their anxiety about their child contracting HPV. Results comparing mothers of daughters to mothers of sons and fathers of daughters to fathers of sons, further emphasize that gain-framed messages may benefit parents who are the opposite sex to their child and that mixed- or loss-framed messages may work best for parents who are the same sex as their child. These findings indicate that it may not be optimal to use a single message frame when providing vaccination messages.

This pattern of findings can be explained in terms of the heuristic-systematic model (HSM) of information processing (Maheswaran & Meyers-Levy, 1990). The HSM states individuals may employ systematic or heuristic processing of messages. Systematic processing is comprehensive and analytic. When systematically processing information, an individual will scrutinize information and will use relevant information to form their opinions. Conversely, heuristic processing requires less cognitive effort than systematic processing. When processing information heuristically an individual will use simple inferential rules to form their judgments (Chaiken, Liberman, Eagly, 1989). Systematic processing occurs when an individual is involved in the issue presented in a message whereas heuristic processing occurs when an individual is not involved in the issue presented in the message. Furthermore, it has been found that when someone processes information systematically, a loss-framed message is more effective and when
someone processes information heuristically, a gain-framed message is more effective (Maheswaran & Meyers-Levy, 1990; Meyers-Levy & Maheswaran, 2004). While mothers tend to take the primary role in sexual health education, research has found that parental involvement in a child’s sexual education also is dependent on the parent-child dyad. Parents who are the opposite sex to their child are typically less involved with the issue of the child’s sexual health whereas parents who are the same sex as their child may be more involved in their child’s sexual health (Berne, 2000; Walker, 2001). Thus, it is plausible that gain-framed messages persuaded parents who were the opposite sex to their child because they were processing the HPV vaccination messages heuristically. Parents who were the same sex as their child may have been persuaded by the loss-framed messages in some cases because they were processing the message systematically. Future research should measure parents’ participation in their child’s sexual health to further examine the possibility that the relationship between message framing and the parent-child dyad can be explained by the HSM.

While the HSM provides insight into why loss-framed messages might influence some of the thoughts and feelings parents have towards the HPV vaccine for same-sex parent-child dyads, the reasons for the mixed-framed advantage for increasing parents’ intentions to speak to a doctor about the HPV vaccine is not clearly defined by the HSM. Mixed-framed messages may be effective because the mixed tone implies that the whole story is being represented in the message (Rucker, Petty & Brinol, 2008). Research has found that when both positive and negative frames are presented about a product instead
of only positive or negative information, individuals will feel more certain about their
attitudes regarding the product and their attitudes are more likely to affect their behaviour
(Rucker, Petty & Brinol, 2008). Furthermore, it has been shown that when consumers are
more familiar with a product, they have greater behavioural intentions if they receive a
mixed-framed message compared to a one-sided (gain or loss) message (Chang, 2007).
Parents who are the same sex as their child may be more familiar with the topic of HPV
and the vaccine. The mixed-framed message may have elicited greater certainty in their
decision to speak to a doctor because the mixed-framed message may be perceived to
provide a more complete representation of the HPV vaccine.

4.2 Different Parents, Different Mediators

Perceived severity of HPV and anxiety about HPV mediated the relationship
between message framing and parents’ intentions to speak to a doctor about vaccinating
their child against HPV for some parent-child dyads. It was found that perceived severity
mediated the effect of message frame on intention to speak to a doctor about the HPV
vaccine for fathers of daughters and mothers of daughters. Additionally, anxiety
mediated the effect of message frame on intention to speak to a doctor about the HPV
vaccine for mothers of sons. In all cases where mediation was confirmed, higher
perceived severity or anxiety scores resulted in higher intentions to speak to a doctor
about vaccination.

The findings that different mediators are present for different parent-child dyads
may be due to the conceptual differences between the theoretical constructs of perceived
severity and anxiety. Perceived severity refers to a person’s perception of the seriousness of the consequences of HPV and is opinion based whereas anxiousness about a child contracting HPV is an affective response (e.g. worry). For mothers of sons the framing-intention relationship was mediated by perceived anxiety about the virus. This relationship may have emerged because the HPV vaccine for boys has only recently been approved and awareness that the HPV vaccine is available to men is low (Zimet & Rosenthal, 2010). Therefore, a mother of a son may have less understanding of the seriousness of HPV for her son. Her decision may be more likely to be guided by an affective response to the message due to the uncertainty related to HPV and vaccination for boys. For parents of daughters, it may be that perceived severity mediated the framing-intention relationship because perceptions of the severity may be more relevant. It may be easier to convince these parents of the consequences of HPV and they may be better at gauging the seriousness of HPV for their daughter (Ogilvie, 2008). A father of a son may be least aware of the consequences of HPV and therefore, their perceived severity or anxiety may not have affected their intentions to speak to a doctor about vaccinating their son.

4.3 An unframed family picture

Message frame did not affect parents’ intentions to vaccinate, intentions to complete their own research about the vaccine, their coping appraisal of the vaccine or their subjective norms. Previous studies have shown that doctors play an important role in parents’ vaccination decisions (Ogilvie et al., 2008; Ogilvie et al., 2010). It is possible
that the message could only motivate parents’ intentions to speak to a doctor because a doctor’s approval may be necessary before parents will consider vaccination. In regards to participants’ coping appraisal and subjective norms, it is plausible that framing effects were not observed because some of the message content aimed at affecting participants’ coping appraisal of the vaccine and subjective norms, was presented as factual statements and typically was not framed. Additionally, framing effects may not have been apparent for self-efficacy because the measure only focused on parents’ confidence to have a child vaccinated and not self-efficacy to speak to a doctor about vaccination. Future research should consider using more specific measures of self-efficacy.

While framing effects were not shown, the composition of the parent-child dyad had a moderating effect on parents’ self-efficacy. As well, sex of the child moderated parents’ perceived response efficacy of the vaccine and subjective norms. Specifically, parents of daughters had the highest self-efficacy to vaccinate their child followed by mothers of sons and then fathers of sons. Parents of daughters had higher ratings of the response efficacy of the vaccine and were more likely to think that important others approved of them vaccinating their daughter. The HPV vaccine has been available for girls longer than boys and a vaccination programme currently only exists for girls and not boys. Parents of girls may have greater coping appraisals (i.e., self-efficacy and response efficacy) because they may be more aware of the efficacy of the vaccine for girls and perceive fewer barriers for vaccinating a daughter. Because the HPV vaccine has been
available for girls for longer than boys, parents may also be more aware of important others opinions of them vaccinating their daughter.

4.4 Message Framing: Past and Present

Findings from this study compliment and challenge previous research that has shown message framing effects for vaccination, as well as, findings that indicate that theoretical constructs may mediate the framing-intention relationship.

Previous studies investigating message framing and vaccination have shown an advantage for loss-framed messages for promoting HPV vaccination on the college-aged population and among women considering the MMR vaccine for their child (Gerend, 2007; Gerend, 2008; Abhyankar et al., 2008; Gerend, 2009). For the most part, HPV vaccination was a relevant topic for participants in these studies (e.g. college-aged women for HPV vaccination messages). Thus, participants may have been highly invested in the topic of the message. Therefore, the results of the previous vaccination studies, indicating a loss-framed advantage, also concur with the HSM (Maheswaran & Meyers-Levy, 1990) and the results of the present study. Additionally, previous message framing vaccination studies have not examined the effect of sex or mixed-framed messages. It is possible that if previous studies had included both sexes and a mixed-framed message, an advantage for mixed-framed messages over loss-framed messages may have been observed (Rucker, Petty & Brinol, 2008).

In terms of mediation, the present study differs from the findings reported by Abhyankar et al. (2008). In the study by Abhyankar and colleagues perceived response
efficacy of the MMR vaccine mediated the framing-intention relationship. The present study did not find that response efficacy mediated the relationship. However, the present study did find that theoretical constructs, specifically perceived severity and anxiety about a child contracting HPV, mediate the framing-intention relationship for some parent-child dyads. Differences in findings may be explained by differences in message content. Our messages may have provided more information about the virus, whereas the Abhyankar et al. (2008) may have provided more information about the vaccine. The differences may indicate that the effect of potential mediators may depend on both the behaviour being considered, the content of the message and the characteristics of the person considering the behaviour.

4.5 Limitations

The results of this study provide evidence demonstrating that message framing and the parent-child dyad can affect parents’ intentions to speak to a doctor about the HPV vaccine yet there are a number of limitations that should be addressed.

A series of limitations relate to our sampling strategy and the participants who enrolled in the study. First, we were limited by our recruitment locations and therefore our sample was relatively homogenous. Specifically, participants were primarily white, wealthy, and highly educated women. The lack of diversity within our sample limits the generalizability of our results. However, a recent study indicated that it may be particularly important to provide well-educated women with accurate vaccination messages as these women are the least likely to have their daughter vaccinated against
against HPV (Ogilvie, 2010). Second, parents were not considering equivalent health decisions. Parents of daughters were considering a real future decision, whereas parents of boys were considering a hypothetical future decision. Finally, we did not stratify our sample. Proportionally, mothers considering vaccination for a daughter accounted for half of our sample. As a result, the study was underpowered in some cases causing us to rely on effect sizes to make inferences about our results.

Additional limitations of the study relate to the messages provided to parents and the study design. Parents were provided with a single online message. It is possible that multiple exposures to the messages could have produced greater effects (Dijkstra, De Vries, Roijackers, 1999). While the internet is a common source for health information for adults (Brodie, Flournoy, Altman, Blendon, Rosenbaum, 2000), we are unable to determine whether presenting the HPV vaccine messages online was optimal. We did not offer the message in alternate media forms. Additionally, statements targeting the theoretical constructs were not equally distributed in the message. The finding of message effects for some theoretical constructs but not for others may be indicative of inadequate message content in certain areas. Finally, mediators were assessed using cross-sectional data and the direction of the predictive pathways cannot be confirmed.

4.6 Future Directions

The findings from the present study point to a number of opportunities for future research. The study highlights an interesting pattern of results for message framing that warrant conducting the study on a larger scale. Future researchers could collaborate with
administrators of Grade 8 vaccination programmes. Collaboration would increase the ecological relevance of the results and allow researchers to investigate whether the pattern of results extend to behaviour. It also would be interesting to explore the connection between involvement in a health issue and message framing. Specifically, researchers should consider measuring parents’ involvement in a child’s sexual health prior to providing the framed messages about the HPV vaccine. Finally, researchers should continue to investigate the role of the parent-child dyad and message framing for other relevant health behaviours (e.g. birth control, MMR vaccination, physical activity).

4.7 Strengths & Contributions

To our knowledge, this is the first study to investigate the effect of message framing in the context of different parent-child dyads. The unique approach of examining the parent–child dyad resulted in interesting findings that contribute to both the scientific literature investigating the effects of framed message and the practical realm of public health.

The findings of this study contribute to the message framing vaccination literature by providing a new perspective on how to frame vaccination messages effectively. This study is the first to examine parents of both sexes’ intentions to vaccinate a child. The results differ from previous research that has only sampled college-aged students’ vaccination behaviours or mothers’ intentions to vaccinate (Gerend, 2007; Gerend, 2008; Abhyankar et al., 2008; Gerend, 2009). Furthermore, this is the only study to examine the effect of mixed-framed messages on vaccination intentions. In particular, results
contradict prior evidence indicating that loss-framed messages are the most persuasive frame for promoting vaccination intentions. The study provides an alternative perspective that considers both mixed-framed messages and potential moderators of the framing effects. Specifically, it seems that for HPV vaccination, different parents may be persuaded by different message frames.

The study also provides insight into the mechanisms underlying message framing. Not only do the results provide evidence supporting the HSM, but findings also point to theoretical constructs that may mediate and moderate the framing-intention relationship. It is difficult to study the mechanisms of message framing, such as mediation, in studies that are ecologically relevant (Salovey & William-Piehota, 2004). Therefore many message framing studies that have postulated that theoretical constructs will act as potential mediators have not detected mediation relationships (Detweiler et al., 1999; Finney & Iannotti, 2002; Millar & Millar, 2000). The findings of this study add to a relatively sparse area of literature demonstrating mediators of the framing-intention relationship and also highlight a new finding that the mechanisms underlying framing effects may vary for different groups. Furthermore, the findings of the study can also contribute to a body of work indicating that women and men respond differently to gain-and loss-framed messages (Fagley & Miller, 1990; Frisch, 1993; Rothman, Salovey, Antone, Keough & Martin, 1993; Toll et al., 2008). The study adds a unique perspective to that literature by demonstrating that it is not only the sex of the message recipient that
is important to determining the effects of message framing but also the sex of the child for which they are making a decision.

Finally the findings of this study have potential practical implications for organizations that may use health messaging to increase the uptake of the HPV vaccine. Studies have shown that participants’ gender, ethnicity and dispositional motivations (Mann, Sherman & Udegraff, 2004; Gerend & Shepherd, 2007; Schneider et al., 2001; Toll et al., 2008) can moderate the effect of message frame. Taken together with the findings of the present study, it seems that it may be beneficial to tailor both message frame and message content to the relevant needs and characteristics of the target population.

4.8 Conclusions

To our knowledge this is the first study to investigate the moderating effect of message framing and the parent-child dyad on parents’ intentions to vaccinate their child. Results provide evidence indicating that certain frames may be more effective for different parent-child dyads. Results also provide further insight into the mechanisms underlying message framing by demonstrating that the theoretical constructs that mediate intentions to speak to a doctor about vaccination vary for different parent-child dyads. Findings offer unique and interesting contributions to the message framing literature as well as potentially interesting practical implications.
References


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Latimer, A., Rivers, S., Rench, T., Katulak, N., Hicks, A., Keany Hodorowski, J.,


Mann, T., Sherman, D., Updegraff, J. (2004). Dispositional motivations and message


male contraception: The role of message framing, attitudes and stress appraisals.


Appendices

Appendix A: Recruitment Materials, Letter of Information/Consent Form

Recruitment Poster

Queen's University researchers are currently recruiting parents of grade 5, 6 and 7 students for an online study about the HPV vaccine.

Participants will be entered in a draw to win $25 gift certificates! The study is done completely online and only takes 30 minutes to complete.

If you are interested please use the link or email the researchers:

femalehealthstudy@gmail.com
Letter of Information/Consent Form

INFORMATION AND CONSENT FORM FOR PARTICIPANTS

This study is being conducted by Heather Gainforth and Amy Latimer from the School of Kinesiology and Health Studies at Queen’s University, Canada.

This study examines your thoughts and feelings about vaccinating your daughter against the Human Papillomavirus (HPV). You will be asked to complete a few online questionnaires. You will then read a short passage about the HPV vaccine and then complete one final questionnaire. The entire online session should last approximately 35 minutes. If you complete this survey, you could win one of eight $25 gift certificates to Swiss Chalet, Milestones or Home Depot.

This study is considered to be low risk. Your participation is completely voluntary and you may withdraw from this study at any time without any consequences by merely exiting the survey by closing your browser. If you wish to leave the study, you are welcome to receive the debriefing information just by emailing me.

If you would like further information about the study, or have additional questions or concerns, please feel free to contact: the researchers, Heather Gainforth at heather.gainforth@queensu.ca, Dr. Amy Latimer, at 613-533-6000, ext. 78773 or amy.latimer@queensu.ca, Queen’s University General Research Ethics Board ChairGREB@queensu.ca, or the Acting Head of the School of Kinesiology and Health Studies, Dr. Pat Costigan 613-533-6601 or pat.costigan@queensu.ca.

If you understand and accept these conditions, please indicate your electronic consent by selecting yes or no.

Yes
I consent to participate.

No
I do not consent.

** Please print this form for your records **
Appendix B: Questionnaires

Pre-intervention Questionnaires

**Demographic Questionnaire**

Please ensure that you are the only parent completing this study.

Please provide the following information about yourself.

Are you female or male?

- [ ] Female

- [ ] Male

What is your date of birth: Day: ______ Month: ______ Year: ____________

How old are you? ______ years

What are the first three letters and numbers of your postal code (i.e. K7L)? _ _ _

A member of a visible minority/racialized group in Canada is someone (other than an Aboriginal Person) who self-identifies as non-white in colour or non-Caucasian in racial origin, regardless of birthplace or citizenship. Members of ethnic or national groups (such as Portuguese, Italian, Greek, etc.) are not considered to be racially visible unless they also meet the criteria above.

*Are you a member of a visible minority group in Canada?*

- [ ] No
- [ ] Yes

If YES please check all responses that apply

- [ ] Black (e.g., African American, Canadian, Caribbean)
- [ ] Chinese
- [ ] Filipino
- [ ] Japanese
- [ ] Korean
- [ ] Indigenous person from outside North America
South Asian/East Indian (e.g., Bangladeshi, Pakistani, Indian from India, East Indian from Guyana, Trinidadian, Sri Lankan, East African)

South East Asian (e.g., Burmese, Cambodian/Kampuchean, Laotian, Malaysian, Thai, Vietnamese, Indonesian)

Non-White West Asian (e.g., Iranian, Lebanese, Afghan)

Non-White North African (e.g., Egyptian, Libyan)

Arab

Non-White Latin American (including indigenous persons from Central and South America)  Person of mixed origin (with one parent in one of the visible minority groups listed above)

Other (please specify): ________________________

An Aboriginal Person is a North American Indian, Métis or Inuit, or a member of a North American First Nation. An Aboriginal Person may be a treaty status or a non-status, registered or non-registered Indian.

Are you an Aboriginal Person?

O No     O Yes

What is your highest level of education?

☐ Less than high school
☐ High school
☐ Some college (no degree)
☐ College degree
☐ Some university
☐ University – Bachelor-level Degree (BA, BSc, etc.)
☐ University – Master-level degree (MS, MA, etc.)
☐ University – Doctorate-level degree (Ph.D.)
What is your religious affiliation?

☐ Protestant Christian
☐ Roman Catholic
☐ Evangelical Christian
☐ Jewish
☐ Muslim
☐ Hindu
☐ Buddhist
☐ Other: ____________________

What is your marital status?

☐ Single
☐ Common-law
☐ Married
☐ Divorced
☐ Other
☐ Do not wish to specify.

How many individuals contribute to your household income?

____________

What is your household income?

☐ $35,000 or less.
☐ $35,000 - $49,999
☐ $50,000 - $64,999
☐ $65,000 - $74,999
☐ $75,000 - $99,999
☐ $100,000 - $149,999
☐ $150,000 or more.
Please provide the following information about your family.
How many children do you have? _________

Please indicate the age and sex of each of your children. In addition, please indicate which of your daughters have been previously vaccinated against the Human Papillomavirus (HPV).

*For your reference: The Human Papillomavirus (HPV) is a sexually transmitted infection that causes cervical cancer and genital warts.*

<table>
<thead>
<tr>
<th>Age</th>
<th>Sex</th>
<th>Vaccination Against HPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Age: ___</td>
<td>□ Male</td>
<td>□ Female →</td>
</tr>
<tr>
<td>2. Age: ___</td>
<td>□ Male</td>
<td>□ Female →</td>
</tr>
<tr>
<td>3. Age: ___</td>
<td>□ Male</td>
<td>□ Female →</td>
</tr>
<tr>
<td>4. Age: ___</td>
<td>□ Male</td>
<td>□ Female →</td>
</tr>
<tr>
<td>5. Age: ___</td>
<td>□ Male</td>
<td>□ Female →</td>
</tr>
<tr>
<td>6. Age: ___</td>
<td>□ Male</td>
<td>□ Female →</td>
</tr>
<tr>
<td>7. Age: ___</td>
<td>□ Male</td>
<td>□ Female →</td>
</tr>
</tbody>
</table>

Does your family have a medical history of HPV related diseases including genital warts and cervical cancer?

□ yes □ no

Have you previously received information about the HPV vaccine?

□ yes □ no
If yes, what was the overall tone of the information that you received?

1  2  3  4  5  6  7
Extremely Negative

Extremely Positive

In general, do you or your spouse have personal beliefs against vaccination?

☐ yes  ☐ no

Who will be the primary person/people deciding whether or not your son/daughter is vaccinated against HPV?

☐ I will be the primary person deciding whether or not my daughter is vaccinated.

☐ My spouse will be the primary person deciding whether or not my son/daughter is vaccinated.

☐ My spouse and I will be the primary people deciding whether or not my son/daughter will be vaccinated.

☐ Not applicable.

Overall, how satisfied are you with the quality of communication between you and your daughter/son?

1  2  3  4  5  6  7
Very Satisfied

Very Dissatisfied
Post-intervention Questionnaires

Knowledge Comprehension
Parents of Daughters – Gain Frame

Based on the passage you just read, please answer the following questions.

1. Having my daughter vaccinated against HPV will protect her from:
   a) Cervical cancer
   b) Ovarian cancer
   c) Genital warts
   d) Both A and C

2. How many Canadians will not be infected with HPV over the course of their lifetime?
   a) 10%
   b) 25%
   c) 75%
   d) 50%

3. How effective is the vaccine at protecting against the four types of HPV that cause cervical cancer and genital warts?
   a) 75%
   b) 85%
   c) 95%
   d) Almost 100%

4. The National Advisory Committee on Immunization, Canadian Immunization Committee, the Canadian Cancer Society and many doctors recommended the vaccine for:
   a) Females aged 9 - 26
   b) Males and females aged 9 – 26
c) Females aged 9 – 46

d) Males and females aged 9 – 46
Knowledge Comprehension
Parents of Daughters – Loss Frame

Based on the passage you just read, please answer the following questions.

1. By not having my daughter vaccinated against HPV she will lose out on protection against:
   a) Cervical cancer
   b) Ovarian cancer
   c) Genital warts
   d) Both A and C

2. How many Canadians will be infected with HPV over the course of their lifetime?
   a) 10%
   b) 25%
   c) 75%
   d) 50%

3. How effective is the vaccine at protecting against the four types of HPV that cause cervical cancer and genital warts?
   a) 75%
   b) 85%
   c) 95%
   d) Almost 100%

4. The National Advisory Committee on Immunization, Canadian Immunization Committee, the Canadian Cancer Society and many doctors recommended the vaccine for:
   a) Females aged 9 - 26
   b) Males and females aged 9 – 26
   c) Females aged 9 -46
   d) Males and females aged 9 – 46
Knowledge Comprehension
Parents of Daughters – Mixed Frame
Based on the passage you just read, please answer the following questions.
1. Having my daughter vaccinated against HPV will protect her from:
   a) Cervical cancer
   b) Ovarian cancer
   c) Genital warts
   d) Both A and C

2. How many Canadians will be infected with HPV over the course of their lifetime?
   a) 10%
   b) 25%
   c) 75%
   d) 50%

3. How effective is the vaccine at protecting against the four types of HPV that cause cervical cancer and genital warts?
   a) 75%
   b) 85%
   c) 95%
   d) Almost 100%

4. The National Advisory Committee on Immunization, Canadian Immunization Committee, the Canadian Cancer Society and many doctors recommended the vaccine for:
   a) Females aged 9 - 26
   b) Males and females aged 9 – 26
   c) Females aged 9 -46
   d) Males and females aged 9 – 46
Knowledge Comprehension
Parents of Sons – Gain Frame

Based on the passage you just read, please answer the following questions. Please answer the following questions as if the vaccine has been approved for boys in Canada and is provided to Grade 8 boys free of change.

1. Having my son vaccinated against HPV will protect him from:
   a) Anal cancer
   b) Testicular cancer
   c) Genital warts
   d) Both A and C

2. How many Canadians will not be infected with HPV over the course of their lifetime?
   a) 10%
   b) 75%
   c) 25%
   d) 50%

3. How effective is the vaccine at protecting against the four types of HPV that cause penile cancer and genital warts?
   a) 75%
   b) 85%
   c) 95%
   d) Almost 100%

4. The Food and Drug Administration in the US, National Centre for Immunization Research and Surveillance in Australia, the Department of Health in the UK
   a) Females aged 9 - 26
   b) Males and females aged 9 – 26
c) Females aged 9 - 46

d) Males and females aged 9 – 46
Knowledge Comprehension
Parents of Sons – Loss Frame

Based on the passage you just read, please answer the following questions. Please answer the following questions as if the vaccine has been approved for boys in Canada and is provided to Grade 8 boys free of change.

1. Not having my son vaccinated against HPV he will lose out on protection against:
   a) Anal cancer
   b) Testicular cancer
   c) Genital warts
   d) Both A and C

2. How many Canadians will be infected with HPV over the course of their lifetime?
   a) 10%
   b) 25%
   c) 75%
   d) 50%

3. How effective is the vaccine at protecting against the four types of HPV that cause penile cancer and genital warts?
   a) 75%
   b) 85%
   c) 95%
   d) Almost 100%

4. The Food and Drug Administration in the US, National Centre for Immunization Research and Surveillance in Australia, the Department of Health in the UK for:
   a) Females aged 9 - 26
b) Males and females aged 9 – 26

c) Females aged 9 -46

d) Males and females aged 9 – 46
Knowledge Comprehension
Parents of Sons – Mixed Frame

Based on the passage you just read, please answer the following questions. Please answer the following questions as if the vaccine has been approved for boys in Canada and is provided to Grade 8 boys free of change.

1. Having my son vaccinated against HPV will protect him from:
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   b) Testicular cancer
   c) Genital warts
   d) Both A and C

2. How many Canadians will be infected with HPV over the course of their lifetime?
   a) 10%
   b) 25%
   c) 75%
   d) 50%

3. How effective is the vaccine at protecting against the four types of HPV that cause penile cancer and genital warts?
   a) 75%
   b) 85%
   c) 95%
   d) Almost 100%

4. The Food and Drug Administration in the US, National Centre for Immunization Research and Surveillance in Australia, the Department of Health in the UK
   a) Females aged 9 - 26
   b) Males and females aged 9 – 26
c) Females aged 9 - 46

d) Males and females aged 9 – 46
**Manipulation Check**

*The researchers would like to know what your thoughts are about the passage.*

*Please indicate which one of the following best describes the content of the information passage.*

1. The passage focused heavily on...

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>The cost of not vaccinating my daughter/son</td>
<td>The benefit of vaccinating my daughter/son</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. The overall tone of the passage...

<table>
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<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extremely Negative</td>
<td>Extremely Positive</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Perceived Severity of HPV

Please indicate your response by choosing the number that best represents your answer.

1. I feel that HPV is a serious infection for my daughter/son to contract.
   
   1 2 3 4 5 6 7
   
   Strongly Agree
   
   Strongly Disagree

2. I feel that cervical cancer/penile and anal cancer is a serious disease for my daughter/son to develop.
   
   1 2 3 4 5 6 7
   
   Strongly Agree
   
   Strongly Disagree

3. I feel that genital warts are a serious disease for my daughter/son to develop.
   
   1 2 3 4 5 6 7
   
   Strongly Agree
   
   Strongly Disagree
**Attitudes**

*Please indicate your response by choosing the number that best represents your answer.*

1. Having my daughter/son vaccinated against HPV would be:
   - 1 2 3 4 5 6 7
   - Bad Good

2. Having my daughter/son vaccinated against HPV would be:
   - 1 2 3 4 5 6 7
   - Harmful Beneficial

3. Having my daughter/son vaccinated against HPV would be:
   - 1 2 3 4 5 6 7
   - Foolish Wise

4. Having my daughter/son vaccinated against HPV would be:
   - 1 2 3 4 5 6 7
   - Threatening Reassuring

5. Having my daughter/son vaccinated against HPV would be:
   - 1 2 3 4 5 6 7
   - Risky Safe

*Note: All questions about parents of sons’ attitudes began with the statement: “Assuming the vaccine were available and given for free to Grade 8 boys”*
HPV Anxiety

Please indicate your response by choosing the number that best represents your answer.

1. Thinking about the possibility of my daughter/son getting HPV makes me feel anxious.

    1  2  3  4  5  6  7
    Strongly Agree
    Strongly Disagree

2. Thinking about the possibility of my daughter/son getting HPV makes me feel fearful.

    1  2  3  4  5  6  7
    Strongly Agree
    Strongly Disagree

3. Thinking about the possibility of my daughter/son getting HPV makes me feel worried.

    1  2  3  4  5  6  7
    Strongly Agree
    Strongly Disagree
Subjective Norms

Please indicate your response by choosing the number that best represents your answer.

1. Most people who are important to me think that I should have my daughter/son vaccinated against HPV.
   
   1  2  3  4  5  6  7
   Strongly  Agree
   Strongly  Disagree

2. People in my life whose opinions I value would approve of me having my daughter/son vaccinated against HPV.
   
   1  2  3  4  5  6  7
   Strongly  Agree
   Strongly  Disagree

3. Many individuals who I like and value have had their daughters/sons vaccinated against HPV.
   
   1  2  3  4  5  6  7
   Strongly  Agree
   Strongly  Disagree

4. My daughter/son thinks that she should get the HPV vaccine.
   
   1  2  3  4  5  6  7
   Strongly  Agree
   Strongly  Disagree
**Self-Efficacy**

*Please indicate your response by choosing the number that best represents your answer.*

1. If you were really motivated, how confident are you that you would be able to have your daughter/son vaccinated against HPV?

   1 2 3 4 5 6 7

   Very unconfident. Very confident.

2. If you were really motivated, how confident are you that you would be able to have your daughter/son vaccinated against HPV if you really wanted to?

   1 2 3 4 5 6 7

   Very unconfident. Very confident.

3. If I were really motivated, for me to be able to have my daughter/son vaccinated against HPV would be...

   1 2 3 4 5 6 7

   Very difficult Very easy

4. If you were really motivated and you really desired to have your daughter/son vaccinated against HPV, it would be...

   1 2 3 4 5 6 7

   Very difficult Very easy
Perceived Response Efficacy

Please indicate your response by choosing the number that best represents your answer.

1. If my daughter/son got the HPV vaccine it would lead to certainty about my daughter/son’s health.

   1   2   3   4   5   6   7

   Strongly Agree  Strongly Disagree

2. If my daughter/son got the HPV vaccine it would lead to relief about my daughter/son’s health.

   1   2   3   4   5   6   7

   Strongly Agree  Strongly Disagree

3. If my daughter/son got the HPV vaccine it would lead to reassurance about my daughter/son’s health.

   1   2   3   4   5   6   7

   Strongly Agree  Strongly Disagree

4. If my daughter/son got the HPV vaccine it would lead to serious side-effects for my daughter/son’s health.

   1   2   3   4   5   6   7

   Strongly Agree  Strongly Disagree
**Intentions**

Please indicate your response by choosing the number that best represents your answer.

1. I intend to give my consent for my daughter/son to be vaccinated against HPV in the next three years.
   - 1 2 3 4 5 6 7
   - Strongly Agree
   - Strongly Disagree

2. I intend to speak to my doctor about having my daughter/son vaccinated against HPV in the next three years.
   - 1 2 3 4 5 6 7
   - Strongly Agree
   - Strongly Disagree

3. I intend to look for more information about having my daughter/son vaccinated against HPV in the next three years.
   - 1 2 3 4 5 6 7
   - Strongly Agree
   - Strongly Disagree

4. I will give my consent for my daughter/son to be vaccinated against HPV in the next three years.
   - 1 2 3 4 5 6 7
   - Strongly Agree
   - Strongly Disagree

5. I will speak to my doctor about having my daughter/son vaccinated against HPV in the next three years.
   - 1 2 3 4 5 6 7
   - Strongly Agree
   - Strongly Disagree
6. I will look for more information about having my daughter/son vaccinated against HPV in the next three years.

1 2 3 4 5 6 7
Strongly Agree Strongly Disagree

Note: All questions about parents-of-sons’ intentions began with the statement:

“Assuming the vaccine were available and given for free to Grade 8 boys”
Appendix C: Messages

Messages for Parents of Daughters

Gain-framed Message

WHAT YOU NEED TO KNOW

THE BENEFITS OF VACCINATING YOUR DAUGHTER AGAINST HPV

What is the Human Papillomavirus (HPV)?

HPV is a common virus and there are more than 100 different types. Some types of HPV can lead to cancer of the cervix in women. If you vaccinate your daughter against HPV you can prevent infections that cause cervical cancer.

How is HPV spread?

HPV is spread during sexual activity by skin-to-skin intimate contact with an infected person. If you vaccinate your daughter against HPV you can help to reduce the spread of the virus.

What are the symptoms of HPV?

Most people who contract HPV never get symptoms and may never know that they have been infected but these people still carry the virus and can infect others. Depending on the type of HPV infection, infected individuals may develop cervical abnormalities, cervical cancers, other genital cancers or genital warts. Development of these symptoms can be prevented by vaccinating your daughter against HPV.

What can happen when you get HPV?
A small number of adults will never get HPV in their lifetime. It is estimated that 25% of Canadians will not be infected over the course of their life. The body’s immune system usually can get rid of the virus on its own, yet, in some people the virus can lead to cervical cancer or genital warts. In Ontario, 500 women are diagnosed with cervical cancer and 140 women die of cervical cancer each year. In Canada, genital warts are common. However, 9 out of 10 Canadians will never get genital warts at any point in their lives. Parents who vaccinate their daughter against HPV can help reduce her chances of getting genital warts and dying from cervical cancer.

**How can I help protect my daughter from HPV?**

If you choose to vaccinate your daughter against HPV then you can prevent her from being infected by four types of HPV – type 6, 11, 16 and 18. In Canada, strains 16 and 18 cause 70% of cervical cancer and strains 6 and 11 cause 90% of genital warts. If your daughter is vaccinated, she will be protected against cervical cancer and genital warts.

**How is the HPV vaccine given?**

The vaccine is given as a needle in the arm. The three doses of the vaccine are given during the Grade 8 school year. Usually, the second dose is 2 months after the first dose and the third dose is 6 months after the first dose. In addition, a booster may be required later in life. Your daughter will only be protected if she receives all three doses of the vaccine.

**Who should get the HPV vaccine?**
The HPV vaccine has been approved for females aged 9 to 26. It is most effective when given before sexual activity begins. The provincial government is funding the HPV vaccine at no cost to all girls in Grade 8 through school clinics.

**Are there side-effects from the vaccine?**

The HPV vaccine is safe and approved for use in Canada for females ages 9 to 26. The HPV vaccine has similar side effects to most other available vaccines. These side-effects include redness, tenderness and swelling of the injection site and, less commonly, fever, nausea, dizziness and headache. Rare reactions that occur within 15 days of the vaccination should be reported to your doctor or local health unit. These reactions include trouble with breathing, swelling of the face or mouth, a fever over 39°C, hives or rashes. Public health nurses administer the vaccine and are present at school clinics at all times. They are trained to handle severe reactions.

**How good is the vaccine?**

The HPV vaccine has been approved by Health Canada, the authority responsible for establishing the safety, efficacy and quality of all drugs and vaccines. The vaccine is almost 100% effective against the four HPV types that the vaccine protects against. Studies have shown good protection for five years after vaccination. There is no risk of getting an HPV infection from the vaccine, since the vaccine does not contain live virus.

**Who recommends the vaccine?**

Before introducing a new vaccine to Ontario's publicly funded immunization program, the province considers the advice of several immunization expert groups. The vaccine is recommended for females between the ages of 9 and 26 years of age by the National
Advisory Committee on Immunization, Canadian Immunization Committee and the Canadian Cancer Society as well as by many doctors.

**Other important things you should know about the HPV vaccine**

Although the vaccine provides a high degree of protection against HPV, it is not a replacement for cervical cancer screening. If your daughter receives regular cervical cancer screening and the HPV vaccine, then she will have the best protection against cervical cancer.

**If I have a child who is not in Grade 8, can she get the vaccine too?**

The Ontario government is funding the HPV vaccine at no cost to all females in Grade 8 through school clinics. All other females aged 9 to 26 can see their doctor and pay to get the vaccine. The three doses cost approximately $400 in total.

Choosing to have your daughter vaccinated against HPV is an effective way to protect her against cervical cancer and genital warts. If you vaccinate your daughter you will have peace of mind about her health. You will know that you have reduced her risk of contracting HPV. Vaccinating your daughter against HPV can save her life. It can decrease her chances of developing and dying from cervical cancer.
Loss-framed Message

WHAT YOU NEED TO KNOW
THE RISKS OF NOT VACCINATING YOUR DAUGHTER AGAINST HPV

What is the Human Papillomavirus (HPV)?

HPV is a common virus and there are more than 100 different types. Some types of HPV can lead to cancer of the cervix in women. If you don’t vaccinate your daughter against HPV then you won’t prevent most infections that cause cervical cancer.

How is HPV spread?

HPV is spread during sexual activity by skin-to-skin intimate contact with an infected person. If you don’t vaccinate your daughter against HPV then you can’t help reduce the spread of HPV.

What are the symptoms of HPV?

Most people who contract HPV never get symptoms and may never know that they have been infected but these people still carry the virus and can infect others. Depending on the type of HPV infection, infected individuals may develop cervical abnormalities, cervical cancers, other genital cancers or genital warts. The development of these symptoms will not be prevented if you do not vaccinate you daughter against HPV.

What can happen when you get HPV?

Most adults will get HPV in their lifetime. It is estimated that 75% of Canadians will be infected over the course of their life. The body’s immune system usually can get rid of
the virus on its own, yet, in some people the virus can lead to cervical cancer or genital warts. In Ontario, 500 women are diagnosed with cervical cancer and 140 women die of cervical cancer each year. In Canada, genital warts are common. One in 10 Canadians will be affected at some point in their lives. Parents who do not vaccinate their daughter against HPV will not reduce her chances of getting genital warts and dying from cervical cancer.

**How can I help protect my daughter from HPV?**

If you do not choose to vaccinate your daughter against HPV then you won’t protect her from being infected by four types of HPV – type 6, 11, 16 and 18. In Canada, strains 16 and 18 cause 70% of cervical cancer and strains 6 and 11 cause 90% of genital warts. If your daughter is not vaccinated, she will not be protected against cervical cancer or genital warts.

**How is the HPV vaccine given?**

The vaccine is given as a needle in the arm. The three doses of the vaccine are given during the Grade 8 school year. Usually, the second dose is 2 months after the first dose and the third dose is 6 months after the first dose. In addition, a booster may be required later in life. Your daughter will not be protected if she does not receive all three doses of the vaccine.

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113
Other important things you should know about the HPV vaccine

Although the vaccine provides a high degree of protection against HPV, it is not a replacement for cervical cancer screening. If your daughter fails to receive regular cervical cancer screening and the HPV vaccine, then she will miss the opportunity to receive the best protection against cervical cancer.

If I have a child who is not in Grade 8, can she get the vaccine too?

The Ontario government is funding the HPV vaccine at no cost to all females in Grade 8 through school clinics. All other females aged 9 to 26 can see their doctor and pay to get the vaccine. The three doses cost approximately $400 in total.

Choosing not to vaccinate your daughter against HPV is not an effective way to protect her against cervical cancer and genital warts. If you fail to vaccinate your daughter, you will not have peace of mind about her health. You will be unable to know whether you have reduced her risk of contracting HPV. Failing to vaccinate your daughter against HPV can cost your daughter her life. It can increase her chances of developing and dying from cervical cancer.
Mixed-framed Message

WHAT YOU NEED TO KNOW
INFORMATION ABOUT THE HUMAN PAPILLOMAVIRUS (HPV) VACCINATION

What is the Human Papillomavirus (HPV)?

HPV is a common virus and there are more than 100 different types. Some types of HPV can lead to cancer of the cervix in women. If you vaccinate your daughter against HPV you can prevent infections that cause cervical cancer.

How is HPV spread?

HPV is spread during sexual activity by skin-to-skin intimate contact with an infected person. If you don’t vaccinate your daughter against HPV then you can’t help reduce the spread of HPV.

What are the symptoms of HPV?

Most people who contract HPV never get symptoms and may never know that they have been infected but these people still carry the virus and can infect others. Depending on the type of HPV infection, infected individuals may develop cervical abnormalities, cervical cancers, other genital cancers or genital warts. Development of these symptoms can be prevented by vaccinating your daughter against HPV.

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**How can I help protect my daughter from HPV?**

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**Who recommends the vaccine?**

Before introducing a new vaccine to Ontario's publicly funded immunization program, the province considers the advice of several immunization expert groups. The vaccine is recommended for females between the ages of 9 to 26 years of age by the National
Advisory Committee on Immunization, Canadian Immunization Committee and the Canadian Cancer Society as well as by many doctors.

**Other important things you should know about the HPV vaccine**

Although the vaccine provides a high degree of protection against HPV, it is not a replacement for cervical cancer screening. If your daughter receives regular cervical cancer screening and the HPV vaccine, then she will have the best protection against cervical cancer.

**If I have a child who is not in Grade 8, can she get the vaccine too?**

The Ontario government is funding the HPV vaccine at no cost to all females in Grade 8 through school clinics. All other females aged 9 to 26 can see their doctor and pay to get the vaccine. The three doses cost approximately $400 in total.

Choosing not to vaccinate your daughter against HPV is not an effective way to protect her against cervical cancer and genital warts. If you vaccinate your daughter you will have peace of mind about her health. You will know that you have reduced her risk of contracting HPV. Failing to vaccinate your daughter against HPV can cost your daughter her life. It can increase her chances of developing and dying from cervical cancer.
Messages for Parents of Sons

Gain-framed Message

WHAT YOU NEED TO KNOW

THE BENEFITS OF VACCINATING YOUR SON AGAINST HPV

What is the Human Papillomavirus (HPV)?

HPV is a common virus spread during sexual activity. In the past, it was thought only women were affected by HPV. However, research indicates that men are affected too. Having your son vaccinated against HPV before he is sexually active is an effective way to protect him against HPV.

There are more than 100 different types. Some types of HPV can lead to genital warts and cancer of the genitals, including penis and anus, in men. If you vaccinate your son against HPV you can prevent infections that cause penile and anal cancer.

How is HPV spread?

HPV is spread during sexual activity by skin-to-skin intimate contact with an infected person. If you vaccinate your son against HPV you can help to reduce the spread of the virus.

What are the symptoms of HPV?

Most people who contract HPV never get symptoms and may never know that they have been infected but these people still carry the virus and can infect others. Depending on the type of HPV infection, infected individuals may develop penile abnormalities, penile
cancers, other genital cancers or genital warts. Development of these symptoms can be prevented by vaccinating your son against HPV.

**What can happen when you get HPV?**

A small number of adults will never get HPV in their lifetime. It is estimated that 25% of Canadians will not be infected over the course of their life. The body’s immune system usually can get rid of the virus on its own, yet, in some people the virus can lead to cancer of the genitals or genital warts. Up to 90% of anal cancer cases, 40 to 50% of cancers of penis and 10 to 20% of cancers of mouth, head and neck are caused by HPV infection. While genital warts are common, 9 out of 10 Canadians will not get genital warts at any point in their lives. Parents who vaccinate their son against HPV can help reduce his chances of getting genital warts and dying from cancer of the genitals.

**How can I help protect my son from HPV?**

If you choose to vaccinate your son against HPV then you can prevent him from being infected by four types of HPV – type 6, 11, 16 and 18. Strain 16, is linked to cancers of the penis and anus as well as cancers of the oral cavity and throat. Strains 6 and 11 cause 90% of genital warts. If your son is vaccinated, he will be protected against cancer of the genitals and genital warts.

**How is the HPV vaccine given?**

The vaccine is given as a needle in the arm in a series of three doses. Usually, the second dose is 2 months after the first dose and the third dose is 6 months after the first dose. In addition, a booster may be required later in life. Your son will only be protected if he receives all three doses of the vaccine. It is anticipated that the vaccine will gain
approval in Canada during the next few years and potentially will be available for free for Grade 8 boys.

**Are there side-effects from the vaccine?**

The HPV vaccine is safe and approved for use in the US for boys and men ages 9 to 26 on September 9th, 2009. It is expected that the vaccine will be approved in Canada during the next few years. The HPV vaccine has similar side effects to most other available vaccines. These side-effects include redness, tenderness and swelling of the injection site and, less commonly, fever, nausea, dizziness and headache. Rare reactions that occur within 15 days of the vaccination should be reported to your doctor or local health unit. These reactions include trouble with breathing, swelling of the face or mouth, a fever over 39°C, hives or rashes. Public health nurses administer the vaccine. They are trained to handle severe reactions.

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**Who recommends the vaccine?**

The vaccine is recommended for boys and men between the ages of 9 to 26 years of age by the Food and Drug Administration in the US, National Centre for Immunization.
Research and Surveillance in Australia, the Department of Health in the UK as well as by many doctors.

**Other important things you should know about the HPV vaccine**

Although the vaccine provides a high degree of protection against HPV, it is not a replacement for sexual health check-ups. If your son receives regular sexual health check-ups and the HPV vaccine, then he will have the best protection against genital cancer.

**If I have a child who is not in Grade 8, can he or she get the vaccine too?**

Currently, the vaccine is available to all Grade 8 girls free of charge. When the vaccine is approved in Canada, the Ontario government may fund the HPV vaccine at no cost to all males in Grade 8 through school clinics. All other males and females aged 9 to 26 can see their doctor and pay to get the vaccine. The three doses cost approximately $400 in total.

Choosing to have your son vaccinated against HPV is an effective way to protect him against cancer of the penis and anus and genital warts. If you vaccinate your son you will have peace of mind about his health. You will know that you have reduced his risk of contracting HPV. Vaccinating your son against HPV can save his life. It can decrease his chances of developing and dying from genital cancer.
Loss-framed Message

WHAT YOU NEED TO KNOW
THE RISKS OF NOT VACCINATING YOUR SON AGAINST HPV

What is the Human Papillomavirus (HPV)?

HPV is a common virus spread during sexual activity. In the past, it was thought only women were affected by HPV. However, research indicates that men are affected too. Not having your son vaccinated against HPV before he is sexually active is not an effective way to protect him against HPV.

HPV is a common virus and there are more than 100 different types. Some types of HPV can lead to genital warts and cancer of the genitals, including penis and anus, in men. If you don’t vaccinate your son against HPV then you won’t prevent most infections that cause penile and anal cancer.

How is HPV spread?

HPV is spread during sexual activity by skin-to-skin intimate contact with an infected person. If you don’t vaccinate your son against HPV then you can’t help reduce the spread of HPV.

What are the symptoms of HPV?

Most people who contract HPV never get symptoms and may never know that they have been infected but these people still carry the virus and can infect others. Depending on the type of HPV infection, infected individuals may develop genital abnormalities,
genital cancers, other genital cancers or genital warts. The development of these symptoms will not be prevented if you do not vaccinate your son against HPV.

**What can happen when you get HPV?**

Most adults will get HPV in their lifetime. It is estimated that 75% of Canadians will be infected over the course of their life. The body’s immune system usually can get rid of the virus on its own, yet, in some people the virus can lead to cancer of the genitals or genital warts. Up to 90% of anal cancer cases, 40 to 50% of cancers of penis and 10 to 20% of cancers of mouth, head and neck are caused by HPV infection. Genital warts are common. One in 10 Canadians will be affected at some point in their lives. Parents who do not vaccinate their son against HPV will not reduce his chances of getting genital warts and dying from cancer of the genitals.

**How can I help protect my son from HPV?**

If you do not choose to vaccinate your son against HPV then you won’t protect her from being infected by four types of HPV – type 6, 11, 16 and 18. Strain 16, is linked to cancers of the penis and anus as well as cancers of the oral cavity and throat. Strains 6 and 11 cause 90% of genital warts. If you son is not vaccinated, he will not be protected against cancer of the genitals and genital warts.

**How is the HPV vaccine given?**

The vaccine is given as a needle in the arm in a series of three doses. Usually, the second dose is 2 months after the first dose and the third dose is 6 months after the first dose. In addition, a booster may be required later in life. Your son will not be protected if he does not receive all three doses of the vaccine. It is anticipated that the vaccine will gain
approval in Canada during the next few years and potentially will be available for free for Grade 8 boys.

**Are there side-effects from the vaccine?**

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**Who recommends the vaccine?**

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**Other important things you should know about the HPV vaccine**

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Choosing not to vaccinate your son against HPV is not an effective way to protect him against penile cancer and genital warts. If you fail to vaccinate your son, you will not have peace of mind about his health. You will be unable to know whether you have reduced his risk of contracting HPV. Failing to vaccinate your son against HPV can cost your son his life. It can increase his chances of developing and dying from cancer of the penis and anus.
Mixed-framed Message

WHAT YOU NEED TO KNOW

INFORMATION ABOUT THE HUMAN PAPILLOMAVIRUS (HPV)

VACCINATION

What is the Human Papillomavirus (HPV)?

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he does not receive all three doses of the vaccine. It is anticipated that the vaccine will gain approval in Canada during the next few years and potentially will be available for free for Grade 8 boys.

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