CORA Cork Open Research Archive
Cartlann Taighde Oscailte Chorcaí

Title	Men's perspectives on cancer prevention behaviors associated with HPV
Authors	Fitzgerald, Serena;Cornally, Nicola;Hegarty, Josephine
Publication date	2017-07-28
Original Citation	Fitzgerald, S., Cornally, N. and Hegarty, J. (2017) 'Men's perspectives on cancer prevention behaviors associated with HPV', Psycho-Oncology, 27(2), pp. 484-491. doi: 10.1002/pon.4515
Type of publication	Article (peer-reviewed)
Link to publisher's version	10.1002/pon.4515
Rights	© 2017, John Wiley & Sons, Ltd. This is the peer reviewed version of the following item: Fitzgerald, S., Cornally, N. and Hegarty, J. (2017) 'Men's perspectives on cancer prevention behaviors associated with HPV', Psycho-Oncology, 27(2), pp. 484-491, doi: 10.1002/pon.4515, which has been published in final form at https://doi.org/10.1002/pon.4515. This article may be used for non-commercial purposes in accordance with Wiley Terms and Conditions for Use of Self-Archived Versions.
Download date	2026-11-07 10:54:26
Item downloaded from	https://hdl.handle.net/10468/11806

UCC
University College Cork, Ireland
Coláiste na hOllscoile Corcaigh

MEN'S PERSPECTIVES ON CANCER PREVENTION BEHAVIOURS ASSOCIATED WITH HPV

Corresponding author:

Serena FITZGERALD, PhD, BSc, RGN, PDTLHE

School of Nursing and Midwifery, University College Cork, Ireland

Email: serena.fitzgerald@ucc.ie

Tel: +353214901516

Co-author's:

Nicola CORNALLY, PhD, MSc, BSc RGN, DipNurs, CTLHE

School of Nursing and Midwifery, University College Cork, Cork, Ireland.

Email: n.cornally@ucc.ie

Tel: +252214901622

Josephine HEGARTY PhD, MSc, BSc, RNT, RGN

School of Nursing and Midwifery, University College Cork, Cork, Ireland.

Email: J.Hegarty@ucc.ie

Tel: +353214901462

Word Count: 3,562

This article has been accepted for publication and undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process which may lead to differences between this version and the Version of Record. Please cite this article as doi: 10.1002/pon.4515

.This article is protected by copyright. All rights reserved.

Accepted Article

ABSTRACT:

Background: The Human Papillomavirus (HPV) is associated with the diagnosis of anal, penile, and oropharyngeal cancers in men. Evidence indicates that correct condom use in addition to obtaining the HPV vaccine provides the greatest protection from HPV infections.

Aim: To explore young male's beliefs and behavioural intention in relation to receiving the HPV vaccine and using a condom correctly and consistently for sexual contact.

Methodology: A cross-sectional study underpinned by the Theory of Planned Behaviour was conducted with male participants (n=359, 18-28 years) who completed an online survey. Descriptive, correlational, and hierarchical regression analysis were performed on both status variables and variables of the Theory of Planned Behaviour

Findings: Sexual orientation ($\beta = 0.177$, $p<0.01$) and social influences [$\beta=0.519$, $p<0.001$] were identified as the most influential variables in relation to males' intention to receive the HPV vaccine. Whilst relationship status ($\beta=-.215$, $p<0.001$) and attitudes [$\beta=0.394$, $p<0.001$] presented as the most significant predictor of intention to use a condom. Summarily, 51% of the variance in intention to receive the HPV vaccine and 44% in intention to use a condom were explained by the TPB model.

Conclusion: Results from this study will impact on future sexual health research, education programmes, and interventions for both HPV preventative behaviours in the elimination of HPV related cancers in males.

Key words:

Human papillomavirus, oncology, cancer, sexually transmitted infection, HPV vaccine, condom use, cancer prevention, Theory of Planned Behaviour, health behaviours

Accepted Article

This article is protected by copyright. All rights reserved.

Background

Human Papillomavirus (HPV) is among one of the most common sexually transmitted diseases globally[1]. HPV is acquired by having vaginal, anal, or oral sex with someone who has the virus and is transmitted through skin to skin contact[2]. The highest rates of HPV infection are found in adults aged 18 to 28 years[3]. HPV types 16 and 18 are associated with the diagnosis of over 400,000 cases of cancer around the world each year [4].

In Ireland, there are two vaccines licensed for HPV prevention; Cervarix, and Gardasil. Gardasil is licensed for both males and females in Ireland and protects against HPV types 6, 11, 16 and 18[4]. Currently the Gardasil vaccine is only administered to young females in the Irish public school-based vaccination programme. The HPV vaccine has been administered to over 100 million people worldwide including over 220,000 young Irish women[5]. The vaccine is currently only available to young males through private payment of the vaccine and its administration, while men who have sex with men (MSM) can receive it free of charge since January 2017.

Clinical evidence indicates that use of a latex penile condom in addition to obtaining the HPV vaccine provides the greatest protection from HPV infections[6]. Latex condoms are an effective barrier to sexually transmitted infections (STI) pathogens[7]. To reduce transmission of HPV, and use a condom correctly and consistently, it is recommended that a new condom is used, from start to finish, for every act of vaginal, anal, and oral sex[7].

Persistent HPV infections are mainly associated with cervical cancer in females, despite HPV also being intrinsically linked to oropharyngeal, anal, and penile cancers in males[4]. The burden of HPV related diseases in males has emerged from the literature in recent years surging an increase in research exploring male's knowledge on HPV[8], their attitudes and intentions to receiving the HPV vaccine[9] and protective behaviors against HPV[10]. Yet, little theoretical based research has been utilized to simultaneously examine preventative HPV behaviors in young males. Guided by the Theory of Planned Behavior (TPB), this study explored HPV preventative behaviors in young males, focusing on their attitudes, beliefs, and behavioral intention toward receiving the HPV vaccine and use a condom correctly and consistently.

Accepted Article

This article is protected by copyright. All rights reserved.

Methodology

The conceptual framework for this study is the Theory of Planned Behaviour (TPB). There is strong evidence of the efficacy of this theoretical formwork when determining factors associated with health-related behaviors[11, 12] thus supporting its application within this health behaviour context. Furthermore, several behaviour specific meta-analyses support the effectiveness of the TPB in condom use. [13, 14] The TPB has also been successfully applied to studies exploring male behaviors with regard to HPV vaccination uptake[15, 16]

The TPB is a model of human behavior that determines an individual's intention to perform a behaviour through three core constructs; attitudes, subjective norms and perceived behavioral control[17]. A person's attitude toward a behaviour is defined as a personal evaluation of the behaviour, and is based on positive and negative values (behavioural beliefs) associated with the behavior[17]. Subjective norm is defined as perceived social pressure to engage in a behaviour, and is dependent on the expectations of important people in an individual's life (normative beliefs). Finally, perceived behavioural control refers to an individual's perceived ability to perform a behaviour, and is reliant on factors that may enable or inhibit (control beliefs) the behaviour[17].

This study was conducted in four phases. Firstly, a belief elicitation phase was conducted to identify modal salient beliefs (behavioral beliefs, normative beliefs, control beliefs) with a representative sample of young males and to assist in generating items for an online survey[18, 19, 20]. An expert panel then validated the survey items through completing a content validity index. A pilot test (n=15) was conducted with a representative sample to establish any final issues with regard to wording, layout, clarity, and consistency of the online survey. The new developed online survey (HPV-PB) was then utilized in a large cross-sectional study, which is described in this publication (See Appendix 1).

The HPV-PB survey was framed around the key constructs of the TPB. In the first section of the survey participants were provided with information about HPV, the HPV vaccine and its link to condom use. Participants were provided with this information as the vaccine was not available to young males at the time of data collection. The second section included socio-demographics questions which aided in differentiating between different sub-groups e.g. age, relationship status, occupation, race, sexual orientation, religion, age of first sexual encounter, number of sexual partners, STI history. The final section included items from the key constructs of the Theory of Planned Behavior. These items were generated for each behavior and grouped into six direct scales measuring attitudes, subjective norms, and

This article is protected by copyright. All rights reserved.

perceived behavioural control, twelve indirect belief scales measuring outcome expectancy weighted by outcome evaluations (behavioural beliefs), normative expectations weighted motivation to comply (normative beliefs), presence of control factors weighted by perceived power of control factors (control beliefs); and two intention scales (See Figure 1).

Ethical approval was granted from the Clinical Research Ethics Committee in University College Cork, Ireland. Data collection took place over a three-month time frame. Survey Monkey ™, an online survey development software, was used as the host platform for the survey. Male participants were recruited from a university in Southern Ireland via a student email system, as well as posting advertisements on numerous health, social and sports websites. Inclusion criteria included males, aged 18- 28 years, as the highest rates of HPV infection are found in adults of this age. Data were analysed using IBM SPSS statistic software package. For all correlational and regression analysis only participants who had completed all variable scales were included in analysis, with missing data presented where applicable. Correlational analysis, multiple regression analysis, and hierarchical regressions were performed with the socio-demographics, independent variables (behavioural intention), and dependent variables (attitudes, subjective norms, and perceived behavioural control). Frequency, means and standard deviations were also determined on the dependent and independent variables through descriptive statistical analysis.

Results

Participants Characteristics

Males aged 18-28 years (n=359) completed the online survey. Within Table 1 a comprehensive overview of all socio-demographic variables is provided. The majority of participants stated that they were of Irish nationality (86.9%). In terms of religion 49% of participants referred to themselves as "not religious" (49.0%), while 42.1% identified themselves as Roman Catholic. Half of all participants had private medical insurance (50.1%), while 29.5% were neither covered by medical card or private health insurance. Over two thirds of the sample were students (73.5%), referring to themselves as either being in an intimate relationship (45.7%) or not in an intimate relationship (47.9%). Sexual orientation was mainly stated as heterosexual (80.8%), but also included gay (13.6%) and bisexual orientation (5.3%).

Accepted Article

This article is protected by copyright. All rights reserved.

Over 80% of the sample had a history of sexual intercourse, with the main age of first sexual intercourse being 16-18 years (48.5%). A significant number of participants (20.1%) reported having over ten sexual partners in their lifetime, while 30.6% stated they had 1-2 sexual lifetime partners. A condom was used by 44.3% of participants for sexual intercourse, and 78.6% never used a condom for oral sex. Sexually transmitted infections had been previously contracted by 10.6% of the sample, with 10.3% unsure if they had ever contracted an infection.

Correlates of Receiving the HPV Vaccine

Behavioural intention was measured across a 3 item scale (scored 1-7) on the HPV vaccine intention scale. An overall moderate intention to receive the HPV vaccine was identified [Mean 4.45 (SD 1.67)]. Participants had positive attitudes toward receiving the HPV vaccine, with 61.5 % (n=219) describing it as good, 68.1% (n=243) identified receiving the vaccine as wise, and 59.5 % (n=213) of participants saw the vaccine as beneficial. Stepwise regression between individual weighted beliefs and HPV vaccine intention revealed several beliefs which were significantly associated with male's intention to receive the HPV vaccine. "Receiving the HPV vaccine would protect me against HPV and HPV related diseases" [β(95% CI): 0.055(0.024 to 0.086), p=0.001]; "receiving the HPV vaccine would cost me too much money" [β(95% CI): 0.048(0.024 to 0.072), p<0.001]; and "receiving the HPV vaccine would not be a priority for me" [β(95% CI): -0.052(-0.083 to -0.022), p=0.001], "cost of HPV vaccine subsidised by government" [β(95% CI): 0.057(0.030 to 0.084), p<0.001]; and "worrying about potential side-effects of the HPV vaccine" [β(95% CI): 0.031(0.010 to 0.051), p=0.004] were all significantly associated with intention to receive the vaccine.

The opinions of healthcare professionals [β(95% CI): 0.025(0.007 to 0.043), p=0.006] were perceived as influencing participants' intention to receive the HPV vaccine. Hierarchical regression modeling (Table 2) was used to identify the variables that were statistically linked to intention to receive the HPV vaccine. Within the model, subjective norms presented the highest unique contribution [β=0.519, p<0.001], with a total of 51% variance identified once all constructs had been incorporated.

Accepted Article

This article is protected by copyright. All rights reserved.

Correlates of Using a Condom

Intention with regard to using a condom throughout an entire sexual act was measured using 4 items [scored 1-7]. Overall, 240 participants answered all 4 items across the scale. Similar to the HPV vaccine scales an accumulative mean total score of 4.43 [SD 1.99] was obtained, showing a moderate intention for this behaviour. Using a condom correctly and consistently was scored less positively than intention to receive the HPV vaccine. Nonetheless, very few participants described using a condom as bad [6.2%, n=16], and similarly agreed that using a condom was wise [71.5%, n=186] and beneficial [55.8%, n=145]. Five individual beliefs were significantly associated with intention to use a condom in the stepwise regression model, those were identified as "preventing an unplanned pregnancy" [β(95% CI): 0.073(0.035 to 0.110), p<0.001]; "reduce my sexual pleasure" [β(95% CI): 0.096(0.060 to 0.132), p<0.001], "feeling awkward using a condom" [β(95% CI): -0.048(-0.093 to -0.003), p=0.038]; and "less enjoyment for partner" [β(95% CI): 0.081(0.039 to 0.123), p<0.001].

Current or future sexual partners [β(95% CI): 0.050(0.023 to 0.077), p<0.001] were also perceived as influential the use of a condom correctly and consistently. The hierarchical regression model (Table 3) revealed that "relationship status" i.e. those who were single [β=-.215, p<0.001] was the only status variable which positively influenced intention to use a condom. Attitudes [β=0.394, p<0.001] were the most significant predictor of intention within the TPB model. Total variance explained by this model was 44%, with perceived behavioural control [β(95% CI): 0.06(-0.10 to 0.22)] having no influence on intention.

Risky Sexual Behaviour

To investigate whether males who practiced safe condom use were more likely to also be pro vaccination, the relationship between both continuous behavioural intentions (i.e. condom use and vaccination) were reentered into the opposite hierarchical regression models. When the HPV vaccine intention variable was added to the hierarchical regression model for condom use R^2 remained at 43.9%. The condom use intention variable was added to the hierarchical regression model for the HPV vaccine, identifying a statistically significant increase in R^2 from 51.1% to 52.4%. Demonstrating that those who intended to receive the HPV vaccine had a higher intention to use a condom correctly and consistently.

Accepted Article

This article is protected by copyright. All rights reserved.

Discussion

This study has identified a range of factors that influence males in relation to receiving the HPV vaccine, and using a condom correctly and consistently, i.e. throughout an entire sexual act. These two behaviours were chosen as they are the main preventative behaviors linked to global reduction in the transmission of HPV and HPV related cancers[21]. Prevention of HPV transmission is of vital importance as rates of HPV are increasing every year, with an associated increase in the prevalence of HPV related cancers in males. In the international literature, there are a number of studies which look at both male and female intentions to receive the HPV vaccine[22], and explore patterns of condom use[23]. There is a dearth of literature underpinned by the TPB exploring male only views in relation to these individual behaviours, and no published literature could be found assessing both behaviours simultaneously utilising the TPB.

Sexual health demographic variables such as participant's number of sexual partners, history of contracting an STI and condom use highlighted emerging risk factors amongst this population; such findings are not uncommon, especially amongst this age group[24]. In an Irish study 2,784 first-time patients (aged 13–19 years) received 3,475 STI diagnoses between January 1999 and September 2009[25]. Dominant risk factors associated with STI diagnosis included males who sometimes or never use condoms[25]. The significance of age, condom use, and number of sexual partners as risk factors toward adolescents being diagnosed with STI's highlight the need for an integrated public health approach[25].

Protecting oneself against HPV and HPV related diseases was a major influencing factor in receiving the HPV vaccine. If the HPV vaccine was associated with cancer prevention during health promotion strategies, males may be more inclined to receive the vaccine[26]. In addition, cost of the HPV vaccine and worrying about potential side-effects were the main unfavorable beliefs identified in this current study. Males are most likely to receive the HPV vaccine if it were available at no cost[27]. This is a significant issue within the current Irish context as the HPV vaccine is not available to young males within the school-based vaccination programmes. International literature on HPV vaccination acceptability among female and parental populations have also highlighted key concerns with regard to safety and side effects of the vaccine[28, 29]. For health promotion interventions to be successful, healthcare specialists need to understand the key factors which contribute to vaccination choices.

Perceived social pressures were most likely to influence participants in relation to receiving the HPV vaccine, with healthcare professionals being most influential. Men's attitudes

This article is protected by copyright. All rights reserved.

Accepted Article

toward getting vaccinated and their perceptions of social support for vaccination have been moderately correlated with their intentions to be vaccinated. Since the initial role out of the HPV vaccine in 2006, the healthcare professional, and more specifically the doctor or general practitioner have been cited as playing a key role in vaccine initiation and completion for both females[30, 31] and parents[32]. Endorsement of the vaccine by a healthcare professionals would be a key motivating factor in relation to males receiving the vaccine[33], such endorsements not only needs to target young men but also their parents.

Participants identified positive attitudes toward using a condom. Using a condom to decrease worry during sexual intercourse i.e. reducing the risk of an unplanned pregnancy, or contracting an STI was the most favourable outcome by many of the participants. Yet, condom use has also been identified as distancing sexual partners physically, emotionally, and compromises bodily pleasure[34]. Nurses, both in the hospital and community settings, have the opportunity to implement health promotion strategies focused on addressing barriers and emphasizing the importance of effective condom use.

There is extensive empirical support surrounding the use of TPB in predicting condom use intention across adolescents and college student populations[35, 14, 13.] Interestingly, perceived behavioural control which is an individual's perceived ability to perform a behaviour was not statistically significant within the current TPB model, but was significant when analysed as a single variable with intention. Such theoretical implications with regard to perceived behavioral control are consistent amongst literature pertaining to condom use behaviour[36, 37, 14]. This may be explained by the fact that use of a condom involves two individuals. Condom use is an interpersonal behaviour that requires decision-making, and therefore needs to include both partners[38]. Therefore, it could be considered that participants were unsure how to answer certain items if they were also considering what their partner may think. The relationship between intention to use condoms may vary depending on the relationship with a partner [i.e. casual sexual partners compared to long-term partners] as established by this study and others[39]. Future research on condom use should consider using the Theory of Reasoned Action (TRA), as the TRA excludes perceived behavioural control and condom use is a behaviour that one may not have complete control over. However, if this approach had been adopted for this study, then an insight into males overall control, as well as inhibiting and enabling factors of males using a condom would not have been identified.

Therefore, while the focus should remain on male health promotion and using condoms to reduce incidences of HPV, the importance of communication with one's sexual partner should be key in promoting use of condoms. Additionally, educating women to encourage

This article is protected by copyright. All rights reserved.

their partner to use condoms correctly and consistently would potentially increase the frequency of condom use. Interestingly, in this current study "relationship status" was the only significant status variable to emanate from the hierarchical regression model pertaining to condom use. Thus, those who were single and not in an intimate relationship were more likely to use a condom correctly and consistently. This demonstrates ownership and responsibility for single participants with regard to their own sexual health, but is also concerning if complacency in condom usage is associated with longer term relationships. This may be due to a lower perception of risk in monogamous relationships or with regular partners.

Clinical Implications

Management of an effective national vaccine strategy necessitates careful planning; including a rational choice of how best to implement the HPV vaccine, as well as the ability to reassure the public on any of their concerns. A HPV vaccination programme has not been implemented for males in many European countries, and correct and consistent condom use remains low. Healthcare professionals can use the results from this study to avoid potential pitfalls in introducing HPV vaccination programmes for men, and designing educational campaigns around correct condom use. This will encourage a holistic approach to young men's health with regard HPV disease prevention.

Study Limitations

Taking into consideration this studies limitations, it is possible that behavioural intention may have been altered if the researcher were to measure intention to use a condom only [i.e. not including throughout an entire sexual act]. Nevertheless, it is recommended that future research conducted in this area would use this behaviour, as measuring condom use alone without incorporating correct and consistent use does not adequately measure a behaviour that reduces incidences of HPV. Furthermore, measuring intention to perform a behavior (receiving the HPV vaccine) which did not yet exist is much more difficult to categorise. In this instance, the researcher utilised implementation intention as the vaccine was unavailable for males in Ireland during the time of data collection. Implementation intentions are said to transmit control over goal-directed behaviour to situational cues i.e. behavioural intention scale questions included a future time point when the vaccine would be available, thus

This article is protected by copyright. All rights reserved.

Accepted Article

automating initiation of the behavior[40]. While attitudes, subjective norm and perceived behavioural control have an important role in predicting, understanding and changing health behaviour, a broader theoretical approach incorporating motivational and self-regulatory measures may be needed in the future.

Conclusion

This is the first piece of research to solely examine young male's attitudes, beliefs, and behavioural intention in relation to receiving the HPV vaccine, and using a condom correctly and consistently, and to do so using a robust theory of human behavior. Despite the complex nature of this theory, valuable findings in an under investigated population have been established. Intention to perform both behaviours is most likely to be influenced by healthcare professionals, sexual partners, and the desire to protect oneself. This research is essential, in terms of population needs and acceptability in order to better understand and implement HPV vaccination programs and sexual health education strategies accordingly.

Conflict of interest

The authors certify that they have no affiliations with or involvement in any organization or entity of a financial or non-financial interest.

Accepted Article

This article is protected by copyright. All rights reserved.

References

1. World Health Organisation (2015) Human papillomavirus (HPV) and cervical cancer, Fact sheet N°380. http://www.who.int/mediacentre/factsheets/fs380/en/ Retrieved April 2015

2. Centers for Disease Control and Prevention (2014) Sexually Transmitted Disease Surveillance, Division of STD Prevention. https://www.cdc.gov/std/stats14/surv-2014-print.pdf Retrieved May 2015

3. Zenilman,J.M., & Shahmanesh, M. (2012) Sexually Transmitted Infections-Diagnosis, Management, and Diagnosis. Jones &Bartlett: USA

4. U.S. Department of Health and Human Services, National Institutes of Health, National Cancer Institute (2014). Accelerating HPV Vaccine Uptake: Urgency for Action to Prevent Cancer. A Report to the President of the United States from the President's Cancer Panel. Bethesda MD: National Cancer Institute.

5. Health Service Executive (2017) Facts about HPV vaccine. HSE National Immunisation Office: Dublin. http://www.hse.ie/eng/health/Immunisation/pubinfo/schoolprog/HPV/hpvfacts/hpvfacts.pdf Retrieved June 2017

6. Miksis, S. (2008) A Review of the Evidence Comparing the Human Papillomavirus Vaccine and Condoms in the Prevention of Human Papillomavirus Infections. Journal of Obstetric, Gynaecologic, & Neonatal Nursing 37, 329-337

7. Centers for Disease Control and Prevention (2013). Condom Fact Sheet in Brief. Available at www.cdc.gov/condomeffectiveness/brief.html. Last accessed January 1st, 2014.

8. Preston, S., Gabbidon, K., Clarke, R. and Darrow, W., 2017. Temporal Trends in HPV Related Knowledge: A Global Systematic review. The Journal of Sexual Medicine, 14(5), 244.

9. Hunter, T. and Weinstein, M., 2016. Beliefs and knowledge about the human papillomavirus vaccine among undergraduate men. Health Education Journal, 75(2), 249-256.

10. Pask, E.B. and Rawlins, S.T., 2016. Men's intentions to engage in behaviors to protect against human papillomavirus (HPV): Testing the risk perception attitude framework. Health communication, 31(2), 139-149.

Accepted Article

This article is protected by copyright. All rights reserved.

11. Webb, T. L., & Sheeran, P. (2006). Does changing behavioural intentions engender behaviour change? A meta-analysis of the experimental evidence. Psychological Bulletin, 132, 249–268.

12. Ajzen, I. (2011). The theory of planned behaviour: Reactions and reflections. Psychology & Health, 26, 1113–1127

13. Sheeran, P. and Taylor, S., 1999. Predicting Intentions to Use Condoms: A Meta-Analysis and Comparison of the Theories of Reasoned Action and Planned Behavior1. Journal of Applied Social Psychology, 29(8), 1624-1675.

14. Albarracin, D., Johnson, B.T., Fishbein, M. and Muellerleile, P.A., 2001. Theories of reasoned action and planned behavior as models of condom use: a meta-analysis. Psychological bulletin, 127(1), 142.

15. Gutierrez B., Leung A., Jones KT, et al. (2013) Acceptability of the human papillomavirus vaccine among urban adolescent males. American Journal of Men's Health 7(1), 27–36.

16. Catalano, H.P., Knowlden, A.P., Birch, D.A., Leeper, J.D., Paschal, A.M. and Usdan, S.L., 2017. Using the Theory of Planned Behavior to predict HPV vaccination intentions of college men. Journal of American College Health, 65(3), 197-207.

17. Ajzen, I. (1991). The theory of planned behavior. Organizational Behaviour and Human Decision Processes 50(2), 179-211.

18. Ajzen, I., (2002). Constructing a TPB questionnaire: Conceptual and methodological considerations. Working Paper. University of Massachusetts, Amherst. Available at http://www-unix.oit.umass.edu/~aizen/pdf/tpb.measurement.pdf

19. FitzGerald, S., Savage, E., Hegarty, J. (2014) 'The Human Papillomavirus: Men's Attitudes and Beliefs Toward the HPV Vaccination and Condom Use in Cancer Prevention'. Journal of Men's Health, 11 (3), 121-129.

20. Francis, J., Eccles, M., Johnston, M., et al. (2004) Constructing Questionnaires Based On The Theory of Planned Behaviour- A Manual for Health Services Researchers. Centre for Health Services Research; University of Newcastle. Available at http://openaccess.city.ac.uk/1735/1/TPB%20Manual%20FINAL%20May2004.pdf

21. Lam, J. U. H., Rebolj, M., Dugué, P. A., et al. (2014). Condom use in prevention of Human Papillomavirus infections and cervical neoplasia: systematic review of longitudinal studies. Journal of Medical Screening, 21(1), 38-50.

Accepted Article

This article is protected by copyright. All rights reserved.

22. Cullen, K. A., Stokley, S., & Markowitz, L. E. (2014). Uptake of Human Papillomavirus Vaccine Among Adolescent Males and Females: Immunization Information System Sentinel Sites, 2009–2012. Academic Paediatrics 14(5), 497-504.

23. Higgins, J.A. and Wang, Y., 2015. The role of young adults' pleasure attitudes in shaping condom use. American journal of public health, 105(7), 1329-1332.

24. Rich, A., Mullan, B. A., Sainsbury, K., et al. (2014). The role of gender and sexual experience in predicting adolescent condom use intentions using the theory of planned behaviour. The European Journal of Contraception and Reproductive Health Care, (0), 1-12.

25. Davoren, M. P., Hayes, K., Horgan, M., et al. (2014). Sexually transmitted infection incidence among adolescents in Ireland. The Journal of Family Planning and Reproductive Health Care 40(4), 276–282.

26. McRee, A.L., Reiter, P.L., Chantala, K., et al. (2010) Does framing human papillomavirus vaccine as preventing cancer in men increase vaccine acceptability? Cancer epidemiology, biomarkers & prevention. American Association for Cancer Research & American Society of Preventive Oncology, 19(8), 1937-44

27. Poole, D. N., Tracy, J. K., Levitz, L., et al. (2013). A cross-sectional study to assess HPV knowledge and HPV vaccine acceptability in Mali. PloS One 8(2), e56402.

28. Rambout, L., Tashkandi, M., Hopkins, L. and Tricco, A.C., 2014. Self-reported barriers and facilitators to preventive human papillomavirus vaccination among adolescent girls and young women: a systematic review. Preventive Medicine, 58, 22-32.

29. Dayal, K., Robinson, S., Schoening, J., Smith, M.C. and Kim, S.C., 2017. Predictors of Human Papillomavirus Vaccine uptake or intent among parents of preadolescents and adolescents. Journal of Nursing Education and Practice, 7(6), 35-42

30. Hopkins, T.G. and Wood, N., 2013. Female human papillomavirus (HPV) vaccination: global uptake and the impact of attitudes. Vaccine, 31(13), 1673-1679.

31. Wilson, A.R., Hashibe, M., Bodson, J., Gren, L.H., Taylor, B.A., Greenwood, J., Jackson, B.R., She, R., Egger, M.J. and Kepka, D., 2016. Factors related to HPV vaccine uptake and 3-dose completion among women in a low vaccination region of the USA: an observational study. BMC Women's Health, 16(1), 41-50.

32. Holman, D.M., Benard, V., Roland, K.B., Watson, M., Liddon, N. and Stokley, S., 2014. Barriers to human papillomavirus vaccination among US adolescents: a systematic review of the literature. JAMA pediatrics, 168(1), 76-82.

This article is protected by copyright. All rights reserved.

Accepted Article

33. Dorell, C. G., Yankey, D., Santibanez, T. A., et al. (2011). Human papillomavirus vaccination series initiation and completion, 2008-2009. Pediatrics 128, 830-839.

34. Protogerou, C., Flisher, A. J., Wild, L. G., et al. (2013).Predictors of condom use in South African university students: A prospective application of the theory of planned behavior. Journal of Applied Social Psychology 43, E23-E36

35. Espada, J.P., Morales, A., Guillén-Riquelme, A., Ballester, R. and Orgilés, M., 2016. Predicting condom use in adolescents: a test of three socio-cognitive models using a structural equation modeling approach. BMC Public Health, 16(1), 35.

36. Andrew, B.J., Mullan, B.A., de Wit, J.B., Monds, L.A., Todd, J. and Kothe, E.J., 2016. Does the Theory of Planned Behaviour Explain Condom Use Behaviour Among Men Who have Sex with Men? A Meta-analytic Review of the Literature. AIDS and Behavior, 20(12), 2834-2844.

37. Prati, G., Mazzoni, D. and Zani, B., 2014. Perceived behavioural control, subjective norms, attitudes and intention to use condom: A longitudinal cross-lagged design. Psychology & health, 29(10), 1119-1136.

38. Beadnell, B., Baker, S.A., Gillmore, M.R., et al. (2008).The theory of reasoned action and the role of external factors on heterosexual men's monogamy and condom use. Journal of Applied Social Psychology 38(1), 97–134.

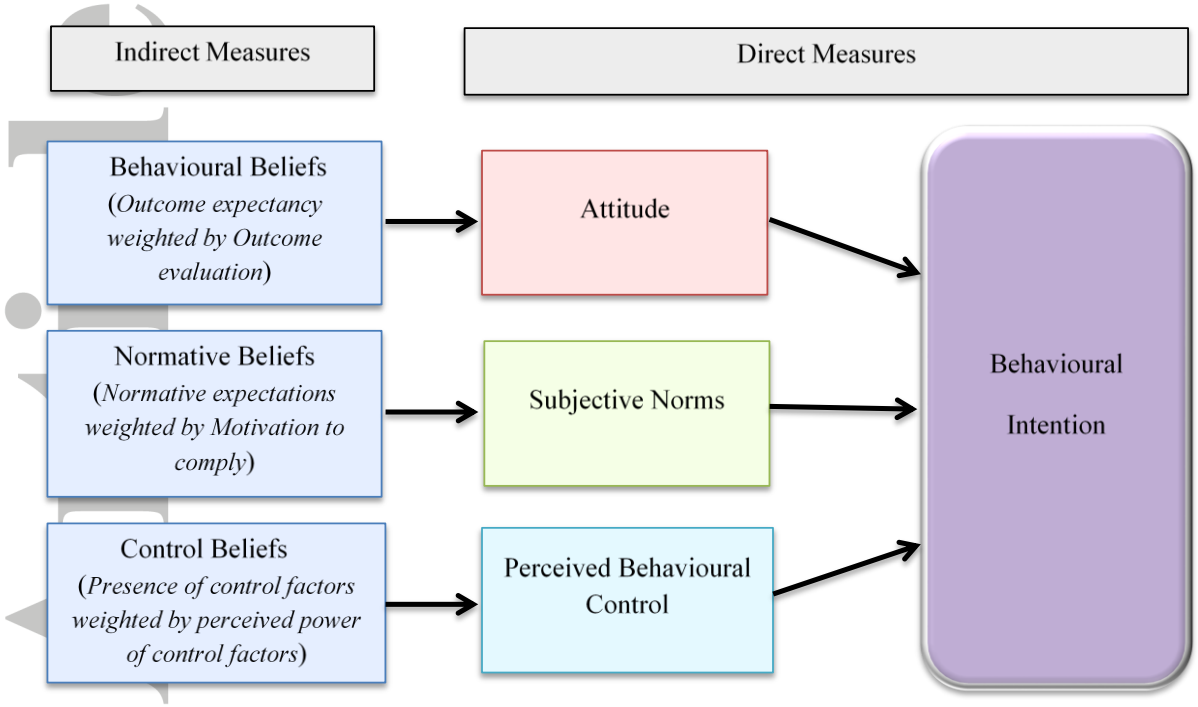
39. Newby, K. V., Brown, K. E., French, D. P., Wallace, L. M. (2013). Which outcome expectancies are important in determining young adults' intentions to use condoms with casual sexual partners? A cross-sectional study. BMC public health, 13(1), 133

40. Gollwitzer, P.M. (1999). Implementation intentions. Strong effects of simple plans. American Psychologist, 54, 493-503.

Accepted Article

This article is protected by copyright. All rights reserved.

Figure 1 Overview of the Theory of Planned Behavior



Accepted

This article is protected by copyright. All rights reserved.

Table 1 Demographic and Sexual Health Variables

Variable	N	%
Age*(Years)		
18-21	166	47.3
22-25	109	30.4
26-28	80	22.2
Nationality*		
Irish	312	86.9
Other	46	12.8
Current Residence*		
Ireland	346	96.4
Other	9	2.5
Race*		
Caucasian	331	92.2
Black (African) /Any other Black background	4	1.1
Asian	10	2.8
Other	11	3.1
Religion*		
Roman Catholic	151	42.1
Church of Ireland	6	1.7
Islam	11	3.1
Not religious	176	49.0
Other	13	3.6
Medical Cover*		
General public health cover (neither medical card or private insurance)	106	29.5
Medical card	61	17.0
Private health insurance	180	50.1
Other	7	1.9
Employment Status*		
In Employment	75	20.8
Unemployed	13	3.6
Student	264	73.5
Other	5	1.4

Accepted Article

This article is protected by copyright. All rights reserved.

Table 1 Continued

Variable	N	%
Sexual Orientation*		
Heterosexual	290	80.8
Gay	49	13.6
Bisexual	19	5.3
Number of participants who have had sexual intercourse*		
Yes	303	84.4
No	54	15.1
Age (years) at first sexual intercourse*		
Before 13 years	4	1.1
13-15	23	6.4
16-18	174	48.5
19-23	95	26.5
Over 23 years	10	2.8
N/A	47	13.1
Number of sexual partners*		
0	49	13.6
1-2	110	30.6
3-5	70	19.5
6-10	55	15.3
Over 10 partners	72	20.1
Frequency of Condom Use for Sexual Intercourse*		
Never	30	8.4
Sometimes	120	33.8
Always	159	44.3
Never had sexual intercourse	46	12.8
Frequency of Condom Use for Oral Sex*		
Never	282	78.6
Sometimes	27	7.5
Always	3	.8
Never had oral sex	44	12.3
Previously Contracted Sexually Transmitted Infections		
Yes	38	10.6
No	284	79.1
Don't know	37	10.3

Missing Data: (n=4), Nationality (n=1), Current Residence (n=4), Race (n=3), Religion (n=2), Medical Cover (n=5), Employment Status (n=2) **Relationship Status (n=2), Sexual Orientation (n=1), No. of Participants who have has Sexual Intercourse (n=2), Age (years) at first sexual intercourse (n=6), No. of Sexual Partners (n=3), Frequency of Condom Use for Sexual Intercourse (n=4), Frequency of Condom Use for Oral Sex (n=3)**

This article is protected by copyright. All rights reserved.

Table 2 Hierarchical Regression with Direct TPB Measures, Statistically Significant Status Variables, and the Dependent Variable of HPV Vaccination Intention

Predictor	Model 1	Model 2	Model 3	Model 4
Status Variables				
Nationality				
-Non-Irish [ref]	**0**	**0**	**0**	**0**
-Irish	**0.29(-0.37 to 0.94)**	**0.32(-0.27 to 0.91)**	**0.42(-0.07 to 0.92)**	**0.29(-0.19 to 0.77)**
Religion				
-Non-Religious [ref]	**0**	**0**	**0**	**0**
-Religious	**-0.18(-0.60 to 0.23)**	**-0.15(-0.52 to 0.23)**	**-0.09(-0.40 to 0.23)**	**-0.16(-0.46 to 0.15)**
Sexual Orientation				
-Heterosexual [ref]	**0***	**0**	**0**	**0**
-Gay	**0.89(0.27 to 1.50)**	**0.51(-0.06 to 1.07)**	**0.17(-0.30 to 0.65)**	**0.08(-0.39 to 0.54)**
-Bisexual	**-0.03(-0.90 to 0.85)**	**0.05(-0.74 to 0.84)**	**0.30(-0.36 to 0.97)**	**0.36(-0.28 to 1.00)**
Medical Cover				
-PHI [ref]	**0**	**0**	**0**	**0**
-MC	**0.04(-0.52 to 0.59)**	**0.17(-0.33 to 0.67)**	**0.30(-0.13 to 0.72)**	**0.17(-0.24 to 0.58)**
-G.PHC	**-0.37(-0.86 to 0.11)**	**-0.18(-0.63 to 0.26)**	**-0.04(-0.41 to 0.33)**	**0.01(-0.35 to 0.37)**
Ever had sexual intercourse				
-No [ref]	**0**	**0**	**0**	**0**
-Yes	**0.51(-0.06 to 1.09)**	**0.29(-0.23 to 0.81)**	**0.14(-0.30 to 0.58)**	**-0.02(-0.45 to 0.41)**
Attitudes		**0.56(0.42 to 0.71)*** **	**0.22(0.08 to 0.36)** **	**0.17(0.04 to 0.31)***
Subjective Norms			**0.65(0.52 to 0.77)*** **	**0.62(0.49 to 0.74)*** **
PBC** **				
Lower score (1 to 5.67) [ref]				**0**
Higher score (6 to 7)				**0.73(0.40 to 1.06)*** **
Model Summary				
R^2	**.069**	**.246**	**.470**	**.510**
R^2 *Change*		**.177*** **	**.225*** **	**.040*** **
Adjusted R^2	**.042**	**.221**	**.451**	**.490**
Model p-value	**p= 0.014**	**p<0.001**	**p<0.001**	**p<0.001**

***p<0.05, **p<0.01, ***p<0.001 , n=252 across all models**

Note 1: Model 1= Status variables entered into model; Model 2= Status variables and attitudes entered into model; Model 3= Status variables, attitudes, and subjective norm entered into model**;** Model 4= Status variables, attitudes, subjective norm, and perceived behavioural control entered into final model. **Note 2**: PBC has been divided into 2 categories (Category 1 [1-5.67]; Category 2 [6-7]) using a median split to improve the model fit.

Accepted Article

This article is protected by copyright. All rights reserved.

Table 3 Hierarchical Regression with Direct TPB Measures, Statistically Significant Status Variables, and the Dependent Variable of Condom Use Intention

Predictor	Model 1	Model 2	Model 3	Model 4
Status Variables				
Age	**-0.05(-0.14 to 0.03)**	**-0.05(-0.12 to 0.02)**	**-0.02(-0.09 to 0.05)**	**-0.02(-0.09 to 0.06)**
Relationship Status				
-Single (not in an intimate relationship) [ref]	**0**	**0**	**0**	**0**
-Single in (an intimate relationship)	**-1.02(-1.59 to -0.45)*** **	**-0.92(-1.39 to -0.45)*** **	**-0.86(-1.32 to -0.41)*** **	**-0.87(-1.32 to -0.42)*** **
Ever had sexual intercourse				
-No [ref]	**0**	**0**	**0**	**0**
-Yes	**-0.43(-1.21 to 0.35)**	**-0.50(-1.15 to 0.15)**	**-0.60(-1.23 to 0.03)**	**-0.60(-1.22 to 0.03)**
Attitudes		**0.94(0.75 to 1.13)*** **	**0.70(0.48 to 0.92)*** **	**0.69(0.48 to 0.91)*** **
Subjective Norms			**0.37(0.19 to 0.55)*** **	**0.36(0.18 to 0.54)*** **
PBC				**0.06(-0.10 to 0.22)**
Model Summary				
R^2	**.101**	**.386**	**.434**	**.436**
R^2 Change		**.286*** **	**.048*** **	**.001**
Adjusted R^2	**.088**	**.375**	**.420**	**.419**
Model p-value	**p< 0.001**	**p< 0.001**	**p< 0.001**	**p< 0.001**

***p<0.05, **p<0.01, ***p<0.001, n=211 across all models**

Note: Model 1= Status variables entered into model; Model 2= Status variables and attitudes entered into model; Model 3= Status variables, attitudes, and subjective norm entered into model**;** Model 4= Status variables, attitudes, subjective norm, and perceived behavioural control entered into final model.

Accepted Article

This article is protected by copyright. All rights reserved.