

# Parental attitudes towards vaccinating sons with human papillomavirus vaccine

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## ABSTRACT

**INTRODUCTION:** Male human papillomavirus (HPV) infections are frequent and lead to an increased risk of HPV-related disease in their female sexual partners. In males, HPV can cause head/neck, penile and anal cancer, as well as genital warts. In this study we assessed parental attitudes to HPV vaccination of their sons.

**MATERIAL AND METHODS:** Telephone interviews were conducted in a random, nationally representative sample of 450 Danish parents with sons aged 12-15 years. We gave them information about the main direct benefits of male vaccination and then asked them about their views on HPV vaccination of their sons aged 12-15 years.

**RESULTS:** HPV vaccination of sons was accepted by 80% of respondents; 45% were willing to cover the cost themselves. Parents primarily wanted to protect their sons from cancer and genital warts. 20% rejected or had doubts about HPV vaccination of their sons. Their concerns were mainly due to lack of knowledge about the vaccine, fear of side-effects and lack of recommendations from health care authorities.

**CONCLUSION:** These high acceptance rates are similar to those reported for vaccination of girls prior to its inclusion in the Danish immunisation programme. General practitioners and national health services play a crucial role in providing parents with the information required to make an informed decision about HPV vaccination of sons as well as daughters.

Human papillomavirus (HPV) is one of the most common sexually transmitted infections worldwide. It is a leading cause of ano-genital precancerous lesions as well as cancers and genital warts (GWs). Since the approval of the quadrivalent HPV vaccine Gardasil (against types 6/11/16/18) in 2006, attention has been focused on the prevention of cervical cancer [1], with HPV vaccination being introduced in many national immunisation programmes (NIP) worldwide [2]. In Denmark, HPV vaccination has been included in the publicly financed NIP for girls aged 12-15 years since October 2008. The vaccine is available for individuals outside the NIP, but at their own expense.

Prevention of HPV-related diseases in males has received much less attention, despite the fact that the

prevalence of HPV infections in males is similar to that reported in females [3-7]. HPV infections in males not only increase the risk of infection in their female partners, but may cause male head and neck, penile and anal cancer [8]. One study estimated that 63% of oropharyngeal cancers, 93% of anal cancers and 36% of penile cancers were attributable to high risk (oncogenic) HPV types (mainly 16 and 18) [6]. Low risk (non-oncogenic) types 6 and 11 account for about 90% of GWs [9]. Interim results from a clinical trial in males aged 16-26 has shown that quadrivalent HPV vaccination effectively reduces the incidence of HPV infection and related diseases [10-12]. Based on this, the quadrivalent vaccine is now indicated for use in men up to 26 years in the USA, Canada, Ecuador and the Philippines. By November 2010 the U.S. Food and Drug Administration's Vaccines and Related Biological Products Advisory Committee has decided to support the approval of Gardasil for prevention of anal cancer and anal intraepithelial neoplasia in men and women. In Europe, the full clinical data were submitted to the European Medicines Agency for approval in June 2010.

Only few studies exist on acceptance of male HPV vaccination, and most of these assess the willingness to vaccinate males with the aim of preventing cervical cancer in females [13]. This research, which was mostly based on convenience sampling, revealed that most parents viewed HPV vaccination of children of both sexes favourably. This was associated with positive views on other vaccines, knowledge of HPV and recommendations from health professionals [13]. A Danish health technology assessment (HTA) of HPV vaccination prior to its introduction in the NIP for girls included a qualitative study of parental attitudes and revealed that overall, these were also in favour of HPV vaccination of children of both sexes [14]. Other studies have shown that males were particularly willing to receive HPV vaccine that could prevent GWs, i.e. with direct benefit for them. Their willingness to be vaccinated was associated with lifetime number of sexual partners, knowledge of HPV, a history of sexually transmitted disease(s), feeling at risk of HPV infection and recommendation by significant others, i.e. people whose advice was deemed important. The greatest barrier among males, parents and

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health professionals towards male HPV vaccination was the perception of an absence of direct benefit for vaccinated males [13].

Evaluation of the overall and direct benefits of male vaccination and use in different target groups should be included in the design of studies assessing attitudes to

male HPV vaccination. In the context of HPV vaccination of boys as part of the NIP, this evaluation should include parents to boys that would be covered by the NIP, and parental views should be collected after presentation of information that would most likely be distributed in a vaccine information campaign. In this first-of-a-kind Danish study, and following up on the Danish HTA, a representative sample of parents of 12-15 year-old boys were briefly informed about the main direct benefits of male HPV vaccination. Subsequently, parents' attitudes towards male HPV vaccination were assessed in terms of their acceptance, refusal or doubts, and who they relied on for information.

### MATERIAL AND METHODS

Data were collected via telephone interviews with a representative sample of Danish parents. Respondents were asked about their views on HPV vaccination of their sons. Respondents were recruited via random digit dialling to Danish households in March 2010. Parents of boys aged 12-15 years were informed about the purpose of the study and the parent primarily or equally in charge of health-related decisions regarding the child was invited to participate anonymously.

At the beginning of the interview, participants were informed briefly about HPV, HPV vaccination of girls in the NIP, sexual transmission of HPV and the role of HPV in development of cervical, head/neck and ano-genital cancers as well as GWs in males and females. As it was important that participants responded on the basis of a comparable level of knowledge, trained interviewers (DMA/Research, Aarhus, Denmark) refrained from answering any questions about these issues. Computer-assisted telephone interviewing (CATI) software (Sawtooth) and a structured interview guide (**Table 1**) were used. The guide was developed on the basis of a literature search of factors influencing vaccine acceptance and previous studies conducted by the author on attitudes to HPV vaccination [14, 15]. The questions covered the number, age and gender of children, attitudes to HPV vaccination of girls and 12-15 year-old son(s), and adherence to the NIP. Open-ended questions were asked about the main reasons for parents' acceptance, refusal or doubts and who the parents turned to for advice in health-related matters. A number of predefined response options to each question were included in the CATI guide and there was an opportunity for open responses ("other") using free text. These were subsequently coded into main topic areas. The participants' level of education and income as well as gender and region of residence were also recorded.

Unweighted data were analysed using PASW 18.0 (SPSS statistics). Logistic regression models were used to

 TABLE 1

Interview guide – translated from Danish language. I would like to present you with some brief information on HPV vaccination. HPV is a sexually transmitted infection that most women and men will be exposed to at some point during their lifetime. Girls aged 12-15 are offered a vaccine against HPV in the childhood immunisation programme as protection against cervical cancer. In addition to cervical cancer, HPV can also, although rarely, cause other kinds of cancers in men; in the genital region, the mouth and the throat, and it can cause genital warts, currently one of the most prevalent sexually transmitted diseases in this country.

|    | Topic   | Question   |
|----|---|--|
| Q1 | Number, age and sex of children               | What is the age and gender of all children in the household?   |
| Q2 | Attitudes towards HPV vaccination in girls    | What are your views on HPV vaccination in girls?<br>1. If 0-11 year-old daughter(s): Will you let your daughter(s) receive HPV vaccination? (Yes/No/Uncertain)<br>2. If 12-15 year-old daughter(s): Has your daughter(s) received HPV vaccine? (Yes/No). Do you think she/they will be vaccinated? (Yes/No/Uncertain)<br>3. If daughter(s) aged 16+ years: Has your daughter(s) received HPV vaccination? (Yes/No/Uncertain)<br>4. If no daughters: What is your attitude towards HPV vaccination of 12-15 year-old girls? (For/Against/Uncertain)   |
| Q3 | Attitudes towards the CIP                     | Have your child/children received the other vaccinations included in the childhood immunisation programme?<br>1. Yes, all (adherence)<br>2. Yes, some (partial adherence)<br>3. None (non-adherence)<br>4. Uncertain   |
| Q4 | Attitudes towards HPV vaccination in boys     | In light of the information you received at the beginning of this interview, would you want your son to be vaccinated against HPV?<br>1. Yes, if included in the free CIP => Q5<br>2. Yes, even if I pay (~3.500 DKK/470 €) <sup>a</sup> => Q5<br>3. Already received HPV vaccine => Q5<br>4. No, under no circumstances => Q6<br>5. Uncertain => Q6   |
| Q5 | Reasons for accepting HPV vaccination in sons | What are the main reasons for wanting your son(s) to receive HPV vaccination? <i>Unassisted – multiple answers allowed – probed</i><br>1. Reduction of sexually transmitted infections is a shared responsibility of both genders<br>2. I welcome all vaccines<br>3. I welcome any protection against cancer<br>4. To protect women against cervical cancer<br>5. To protect everyone against GWs<br>6. To protect my son against cancer<br>7. To protect my son against GWs<br>8. Personal experience with cancer among my close family/relations<br>9. Personal experience with GWs among my close family/relations<br>10. High risk of HPV infection in my son<br>11. (If) HPV vaccination was recommended by a health care professional or the National Board of Health<br>12. If HPV vaccination was included in the CIP, I would vaccinate without questioning<br>13. If HPV vaccination was included in the CIP, I would not fear side effects<br>14. Other: _____<br>15. Uncertain |

Continues

examine bivariate correlates of HPV vaccine acceptability. Two-sided tests with a significance level of 0.05 were used. Tests were adjusted for all pair-wise comparisons using the Bonferroni correction (multiple-answer questions) and the Pearson  $\chi^2$  test (single-answer questions). The study did not require approval from the Danish National Committee on Biomedical Research Ethics.

## RESULTS

### Participants' characteristics

A total of 10,445 households were called in order to complete telephone interviews with 450 parents of 12-15 year-old boys; 73% of the respondents were mothers and 27% fathers (Table 2). The participants were regionally representative of the country-wide distribution of families with children [16]. The 450 households had a total of 1,144 children, including those who had left home. Overall, 501 (44%) were boys aged 12-15 years. Most participants (78%) had a middle or high annual household income and higher education (84%) which is representative of Danish parents of children in that age group, but above the average of all Danish households [16].

### Attitudes towards human papillomavirus vaccination of girls and adherence to the national childhood immunisation programme

The parents generally held positive attitudes to HPV vaccination of their daughters. Overall, 85% of parents with 0-11 year-old daughters wanted them to be vaccinated at 12 years (12% were uncertain). Eighty-four percent of 12-15 year-old daughters had already been vaccinated. Among the remaining parents with 12-15 year-old daughters, 80% planned to have them vaccinated in due time. Only 3% of the parents of 0-15 year-old girls refused HPV vaccination. Forty-eight percent of daughters aged over 16 had already been vaccinated. Eighty-eight percent of the parents who only had boys were also in favour of HPV vaccination of girls. The children of 94% of all participants had received all vaccines in the NIP, 5% had received some but not all, and 1% had received none.

### Attitudes towards human papillomavirus vaccination of boys

80% of all participants said that given the information provided, they would have their 12-15-year-old sons vaccinated. However, 34% said they would do so only if HPV vaccination of boys was included in the NIP. At a current cost of approximately 470€, a total of 45% said that they were willing to pay for the vaccination themselves, and 1% had already had their son(s) vaccinated. Five percent did not want to have their son(s) HPV vaccinated, and 15% were uncertain (Figure 1).

### Reasons for accepting human papillomavirus vaccination of boys

The most common reasons for parents to accept HPV vaccination of boys was to protect them against cancer (67%) and against GWs (36%). Many participants welcomed any protection against cancer (25%) and/or any kind of vaccination (21%) to protect their children (Table 3).



TABLE 1, CONTINUED

|     | Topic   | Question   |
|-----|---|--|
| Q6  | Reasons for refusing HPV vaccination in sons              | What are the main reasons you do not want/are uncertain about your son(s) receiving HPV vaccination? <i>Unassisted – multiple answers allowed – probed</i> <ol style="list-style-type: none"> <li>1. Fear of side effects (the vaccination is new/has not been in use long enough)</li> <li>2. The vaccination is unsuitable for boys</li> <li>3. Don't know enough about the vaccination</li> <li>4. I am against (too many) vaccinations</li> <li>5. Unlikely that he/they will be HPV infected</li> <li>6. Better for him/they to use condoms as protection against HPV infections</li> <li>7. He is/they are too young – not yet relevant</li> <li>8. Too late – he/they already had his/their sexual debut</li> <li>9. Prefer my son(s) makes his/their own decision later</li> <li>10. Sufficient that girls are HPV vaccinated</li> <li>11. He is/they are afraid of needles – does not want to see the doctor</li> <li>12. Difficulties talking about such (sexual) matters</li> <li>13. Lack of recommendations</li> <li>14. Other: _____</li> <li>15. Uncertain</li> </ol> |
| Q7  | Significant others  | Are there any persons or authorities whose recommendations you particularly listen to in connection with health-related issues such as this? <ol style="list-style-type: none"> <li>1. My general practitioner</li> <li>2. The National Board of Health</li> <li>3. Family member(s)</li> <li>4. Friends/acquaintances</li> <li>5. Other: _____</li> <li>6. Uncertain</li> </ol>   |
| Q8  | Level of household income                                 | Approximate annual income of the household (before tax)? <ol style="list-style-type: none"> <li>1. 0-399,999 DKK (0-53,773 €)<sup>a</sup></li> <li>2. 400,000-699,999 DKK (53,773-94,102 €)</li> <li>3. 700,000+ DKK (94.102+ €)</li> <li>4. Not stated</li> </ol>   |
| Q9  | Level of education  | Highest level of education? <ol style="list-style-type: none"> <li>1. Primary/lower secondary school (7-16 year-olds)</li> <li>2. Upper secondary school</li> <li>3. Short training/college degree</li> <li>4. Middle-range training/college degree</li> <li>5. Long/advanced studies</li> <li>6. Other: _____</li> <li>7. Uncertain</li> </ol>  |
| Q10 | Gender of the participant                                 | <ol style="list-style-type: none"> <li>1. Male (father)</li> <li>2. Female (mother)</li> </ol>   |
| Q11 | Geographical region (from the random digit dialling list) | 1. Post code: _____  |

CIP = childhood immunisation programme; GW = genital wart; HPV = human papillomavirus.

a) Conversion rate: 1 DKK = 0.13 €.

### Reasons for refusing or having doubts about human papillomavirus vaccination of boys

Overall, only 91 (20%) participants said that they refused or had doubts about HPV vaccination. The main reason for this was lack of knowledge about the vaccine (70%). In addition, 29% feared side-effects, and 14% lacked recommendations from health authorities (Table 3).

Parents refusing HPV vaccination tended to adhere less to the NIP: 24% had only given their children some of the vaccines in the NIP, 5% none at all. Parents having doubts about HPV vaccination had a similar level of adherence to the NIP as parents accepting it. Among the parents refusing or having doubts about HPV vaccination of their sons, 81% and 60%, respectively, also had daughters. There were no statistically significant differences between attitudes or reasons for acceptance, refusal or doubts among parents with different incomes or educational levels, mothers and fathers or between regions.

### Whom parents take advice from

When asked about whom they took advice from regarding decisions about vaccination, most participants mentioned their general practitioner (GP) (48%) and the National Board of Health (NBH) (44%). Relatively few mentioned friends (9%), the media (9%), family (5%), or the Danish Cancer Society (3%). Overall, 11% of participants said that there was no-one they took advice from, but this applied to 19% of parents refusing HPV vaccination of their sons. Only 29% of parents refusing vaccination said that they took advice from the NBH, but they listened to their GP to the same extent as parents accepting vaccination (43%).

### DISCUSSION

This study differs from other published studies because its focus is on the most relevant target group for male HPV vaccination (12-15-year-old boys), the participants



TABLE 2

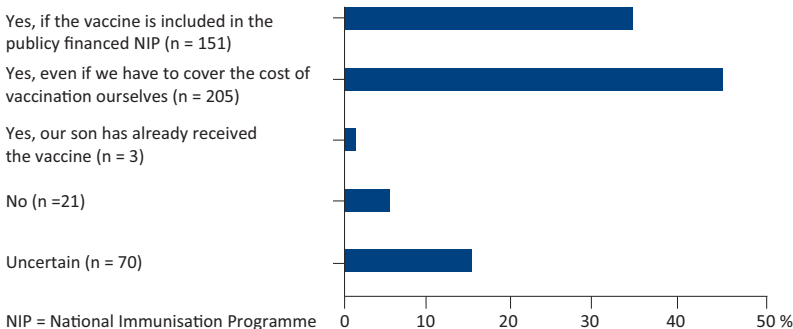
Characteristics of the 450 participants.

| Characteristics  | n (%)    |
|--|----------|
| <i>Parent who participated</i>                             |          |
| Mother   | 328 (73) |
| Father   | 122 (27) |
| <i>Children, n = 1,144</i>                                 |          |
| <i>Son(s)</i>  |          |
| 0-11 years   | 158 (14) |
| 12-15 years  | 501 (44) |
| > 15 years   | 141 (12) |
| <i>Daughter(s)</i>   |          |
| 0-11 years   | 155 (14) |
| 12-15 years  | 62 (5)   |
| > 15 years   | 127 (11) |
| No daughters   | 176 (15) |
| <i>Annual household income before taxes, €<sup>a</sup></i> |          |
| 0-53,773   | 68 (15)  |
| 53,773-94,101  | 181 (40) |
| > 94,101   | 169 (38) |
| Undisclosed  | 32 (7)   |
| <i>Level of education</i>                                  |          |
| Primary and lower secondary school for 7-16 year-olds      | 22 (5)   |
| Upper secondary school                                     | 26 (6)   |
| Short training/college degree                              | 84 (19)  |
| Middle-range training/college degree                       | 181 (40) |
| Long/advanced studies                                      | 75 (17)  |
| Skilled workers  | 37 (8)   |
| Other  | 25 (5)   |
| <i>Region of residence</i>                                 |          |
| Capital – Copenhagen area                                  | 90 (20)  |
| Region Zealand – Sjælland                                  | 61 (14)  |
| Central Denmark – Midtjylland                              | 133 (29) |
| Southern Denmark – Syddanmark                              | 103 (23) |
| Northern Denmark – Nordjylland                             | 48 (11)  |

a) Conversion rate: 1 DKK = 0.13 €.

FIGURE 1

Parental acceptance of human papillomavirus vaccination of their 12-15 year-old son(s) following brief human papillomavirus information (n = 450).



were nationally representative decision-making parents of sons in this age group, and information was provided to participants about the direct benefits of HPV vaccination for males.

Being a study of healthcare-related intensions, it has the limitation that these intensions do not always translate into behaviour when vaccination is available in a specific programme and given specific information [15, 17]. Our participants had not received general information or recommendations from health authorities, but they were influenced by the specific information provided at the beginning of the survey. The ways in which information about HPV and vaccination is presented has a high impact on acceptance rates [18]. Presenting HPV vaccination as a means of protecting their son from cancer may encourage parents to overstate positive intentions. However, the HPV vaccination coverage of girls in the Danish NIP is currently over 70%



TABLE 3

Reasons to accept or refuse human papilloma vaccination of sons (multiple answers were allowed).

| Reasons  | n (%)    |
|--|----------|
| <i>To accept, n = 359</i>  |          |
| To protect my son against cancer   | 240 (67) |
| To protect my son against GW   | 130 (36) |
| I welcome any protection against (any type of) cancer  | 90 (25)  |
| I welcome all vaccines   | 76 (21)  |
| The reduction of sexually transmitted infections is a shared responsibility  | 47 (13)  |
| To protect my son and his future partners from GW  | 47 (13)  |
| To protect women from cervical cancer  | 33 (9)   |
| If HPV vaccination is in the childhood immunisation programme, it is something you just do   | 33 (9)   |
| Experiences with cancer among close relations  | 30 (8)   |
| There is a risk that my son will get an HPV infection  | 13 (4)   |
| HPV vaccination was recommended for our son by a health care professional/if it becomes recommended by health care professionals or the National Board of Health | 13 (4)   |
| If HPV vaccination for boys is included in the childhood immunization programme, I will worry less about side-effects  | 13 (4)   |
| Experiences with GW among close relations  | 4 (1)    |
| Other  | 10 (3)   |
| Uncertain  | 3 (1)    |
| <i>To reject or have doubts, n = 91</i>  |          |
| Lack of knowledge about the vaccine  | 64 (70)  |
| Fear of side-effects   | 26 (29)  |
| Lack of recommendations  | 13 (14)  |
| I am against (too many) vaccines   | 10 (11)  |
| My son(s) are too young/it is not yet relevant   | 6 (7)    |
| It is unlikely that my son(s) will get a (serious) HPV infection   | 4 (4)    |
| It is better for my son(s) to use a condom for protection  | 4 (4)    |
| The vaccine is unfit for boys  | 2 (2)    |
| This decision is for sons to take at a later stage   | 2 (2)    |
| It is sufficient that girls are vaccinated against HPV   | 2 (2)    |
| We have difficulties talking about such (sexual) issues  | 1 (1)    |
| Other  | 6 (7)    |

GW = genital warts; HPV = human papillomavirus.

which shows that HPV vaccination has indeed been well accepted for girls in practice [19].

Our results are consistent with other reports that mothers are often the primary health-related decision-makers [19]. The majority of parents in this study had a favourable view of HPV vaccination of their 12-15 year-old sons after being briefly informed about HPV-related diseases in males. Many only accepted if HPV vaccination was included in the NIP for boys, but more than half were willing to pay for vaccination. Both primarily wanted to protect their sons from cancer and GWs. Our results seem to refute the hypothesis that parents who have daughters would be more inclined to vaccinate their sons. Very few parents refused vaccin-

ation of their sons – a number similar to those refusing HPV vaccination of their daughters and vaccination as a whole – but 15% expressed doubts. Their main concerns were a lack of knowledge about the vaccine, fear of side-effects and lack of recommendations. However, some of these results may be imprecise because of small sample sizes and they should be interpreted with caution. GPs and the NBH comprise the main influences on parents' decisions about vaccination. Parents refusing HPV vaccination tended to be less willing to take advice from anyone; however, when they did, their GP had the greatest influence.

The high acceptance rates reported in this study are similar to those reported for HPV vaccination of 12-15 year-old girls prior to its introduction in the Danish NIP, when the vaccine was only available at the recipient's expense. International studies carried out before the general availability of HPV vaccines showed that 70-90% of parents wanted to have their daughters vaccinated. As with parents in this study, acceptance of HPV vaccination of girls was dependent on knowledge about HPV-related diseases, the safety and efficacy of the vaccine, and recommendations from significant others [15]. When informed about the benefits of HPV vaccination and reassured about its safety, most parents thus welcome this means of preventing HPV-related diseases in both sexes.

Even when HPV vaccination is not reimbursed, studies have shown that cost, knowledge and recommendations from health authorities are the most important factors for 16-26-year-old Danish females [15]. In a recent study of physicians' attitudes to HPV vaccination in males, it was reported that they thought it was important for the prevention of GWs and cancers in both males and females [20]. GPs and national health authorities will play a crucial role in the dissemination of information needed by parents to make an informed choice about HPV vaccination of their sons, irrespective of whether vaccination is included in the NIP or it is at their own expense.

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The complete list of references can be obtained by contacting the author.

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