Table des matières

Explore the students' knowledge about STI in general and in particular HPV infection and consequences

Regardless of students who have heard or not about HPV, 67% of pupils (N= 4615) have knowledge about STI by school curriculum, and 33% don't. About 44% of the students surveyed have no knowledge about STIs and have not heard about HPV, while 56% have. On the other hand, 68% of pupils who have knowledge about STI have heard about HPV.
Regarding vaccination status, 63% of pupils who have knowledge about STI are not vaccinated and only 37% are. Indeed, regardless their knowledge on STI there are more un vaccinated than vaccinated.
Among unvaccinated middle school pupils, 34% who have knowledge about STI have the intention to get vaccinated while 55% are undecided.
Interestingly, we found that school curricula on sexually transmittable infections were associated only with higher HPV vaccine awareness, not with generally higher intention or uptake.

The level of knowledge about HPV infections varies among middle school pupils, particularly in relation to whether HPV cause cervical cancer. Among pupils who had a RP visit with an offer, 82% were aware of this consequence, while only 45% of those who did not have a visit knew about it. Girls were more knowledgeable about HPV and cervical cancer than boys, with 75% of girls answering correctly compared to 52% of boys. 60% of middle-school pupils who have heard about HPV vaccination, by multilingualism know that HPV cause cervical cancer while 69% by French monolingual environment. Those with parents who had a higher education level (bac or above) were also slightly more likely to know about this link (76%) than those with parents who had a lower education level (69%). Additionally, pupils in low school deprivation areas were more likely to know that HPV cause cervical cancer than those in high school deprivation areas, with 75% and 63% correct answers, respectively. On average, 68% of pupils knew that HPV causes cervical cancer regardless of whether or not they remembered learning about it in school.

Interestingly, knowledge about whether HPV cause HIV was relatively the same across all groups, with an average of 72% of pupils answering correctly regardless of sex, multilingualism, parents' education level or school area deprivation level.

Explore the students' knowledge about vaccination in general and in particular HPV vaccination

Knowledge regarding HPV vaccination was assessed using 5 items:

1. Recommended groups
2. Recommended age
3. Age group with best antibody response
4. History of HPV vaccine surveillance
5. Potential for cancer surveillance

Those were collected by subgroups of socio educational characteristics, among middle-school pupils who have heard about HPV vaccination, by referring physician (RP) visit and vaccine offer in the last 12 months/ by sex/ by multilingualism/ by parental education/ by school area deprivation level/ by remembering school curriculum on vaccination.

Knowledge among adolescents having heard about HPV vaccine showed several gradients across relevant subgroups.

Knowledge about recommended groups

We observe that adolescents with a RP visit combined with HPV vaccine offer had the best results with more than 80% of correct answer versus 60-65% for those who didn't have an offer or visit. The percentage is slightly higher for girls (70-75%) than boys (75%) and for French monolingual environment (71%) to multilingual environment (65-70%). Whether parents have an education < bac or >bac, we observe an average of 11% of incorrect answer with 71% and 75% respectively. Adolescents from a low school area deprivation have a percentage (79%) higher than adolescent from high school area deprivation (65%); with more uncertainty. Additionally, 70% of pupils who remember the school curriculum on vaccination know the recommended groups with less uncertainty (-) than those who didn't remember (-).

Knowledge about recommended age

Knowledge about the recommended age of HPV vaccination varied between 46.1%, 52.3% and 81.5% (p-value <0.001), respectively, across groups reporting no visit, visit without and visit with offer. Girls know more than boys the recommended age, with more uncertainty (31%) and incorrect answer (19%) for them. Adolescents who are in a French monolingual have more correct answer (65%), less incorrect (15%) than those who are in a multilingual environment with 55% of correct answer and 22% incorrect. Adolescents who know this by parental education varied between 62%, 68%, 56%, respectively, across parents with an education < Bac, >Bac and DNK. Pupils from area with a high school deprivation have less knowledge on this topic with 59% of correct answers, 26% of uncertainty and 15% incorrect answers. While we observe 70% of correct answers in a low school deprivation area. By remembering or not school curriculum on vaccination, we observe an average of 61% of correct answers.

Knowledge about age group with best antibody response

Pupils who had a visit and an offer for the vaccine had higher knowledge about the age group with best antibody response (75%) compared to those who had a visit without an offer (52%) or no visit at all (47%). We observe more correct response among girls (63%) and boys had more uncertainty (41%). It varied slightly between multilingual and French monolingual pupils, with 55% and 60% correct answers, respectively. Parental education < or > bac don't influence that much; the

percentage of correct answers varied between 60 and 65%. We observe 68% of correct answers from area with low school deprivation and 58% from area with high school deprivation. By remembering or not school curriculum on vaccination, we observe an average of 58% of correct answers.

Knowledge about history of vaccine surveillance

Knowledge of middle school pupils about the history of HPV vaccine surveillance is relatively low. Regardless of they have a visit with or without a vaccine offer or not even a visit, correct answers varied between 18 and 20% (20%, 19%, 18% respectively). Similarly, the knowledge was relatively low between genders (18% girls, 19% boys), multilingual or French monolingual environment (21%, 19% respectively), parents education (< = bac 21% ; >18%), school area deprivation level (18% in low school deprivation areas and 20% in high school deprivation areas) and among pupils who remembered or not their school curriculum on vaccination (20%, 17% respectively).

Knowledge about HPV vaccine potential for cancer elimination

The percentage of pupils who know that HPV vaccine is potential for cancer elimination didn't exceed 39%. With the higher percentage from pupils who heard about HPV vaccination by a low school area deprivation level (39%) and pupils who had a RP visit and a vaccine offer (37%). The knowledge of girls and boys has an average of 29.5% of correct response, 29% from a multilingual or French monolingual environment, an average of 30% correct answers regardless of parental education or by remembering or not school curriculum on vaccination.

Discussion

There are significant differences in knowledge regarding HPV vaccination among subgroups. The knowledge about recommended age for HPV vaccination and the recommended group is higher than the knowledge about the age group with best antibody response, the history of vaccine surveillance and the potential for cancer elimination. Across all subgroups, the awareness about the potential of the vaccine for cancer elimination is low.

We found that pupils who had a referring physician visit with a vaccine offer had the highest knowledge percentage across all 5 items. Girls had higher scores than boys and pupils in a French monolingual environment than those in a multilingual environment. This analyse provide evidence of educational inequalities in the context of HPV vaccination. Pupils from disadvantaged areas have lower knowledge score. However, parental education level didn't seem to have a significant impact on scores.

Explore the sources of information they have

Referring physicians are the primary gatekeepers to HPV vaccination in France, but they do not systematically offer or recommend this vaccine to adolescent

Notably, the school curriculum does not systematically address adolescent vaccination

The questionnaire (SM1) included questions on socio-demographic characteristics of the adolescents' family, awareness, knowledge, attitudes and behaviour around HPV-related disease and vaccination, their self-declared HPV vaccination status and intention to get vaccinated.

.For specific analyses, we collated parental education (the highest achieved level among parents) and multilingualism. This followed the hypothesis that the significance of a multilingual family environment for the uptake of prevention messages depends on the parental educational level.

School curriculum was assessed by whether pupils remembered specific topics during class (bacteria and viruses; vaccination in general; human reproduction; sexual education; and sexually transmittable infections). These topics can be addressed in biology classes in middle-schools in France, but neither content nor format is standardised.

. Determinants of awareness, uptake and intention of HPV vaccination among middle-school pupils in France, 20221-22 :

Among pupils aware of HPV vaccination (N=6 992), 48.1% respond that it is easy to find information, while 7.2% disagree with it.

	Awareness		Uptake (among those who are aware)		Intention (among unvaccinated)	
Total Number in Analysis	N=6992	Heard vs Not Heard	N=4385	Vaccinated vs Unvaccinated	N =2815	Intention vs Refusal
	N (% aware)	OR (p-value)	N (% vaccinated)	OR (p-value)	N (% with intention)	OR (p-value)
Easy finding information						
Disagree	334 (7.2)		302 (7.1)	1	215 (7.9)	1
Unsure	2071 (44.7)		1860 (43.9)	0.81 (0.265)	1247 (46.0)	1.43 (0.178)
Agree	2226 (48.1)		2079 (49.0)	0.76 (0.146)	1251 (46.1)	2.63 (<0.001)

Table SM3. Determinants of having heard about HPV and related vaccination among middle-school pupils in France, 20221-22 (N=6992). Bi- and full multivariable logistic regression models.

Characteristics	Having heard of HPV				
	Total (column %)	No (row %)	Yes (n = row %)	Bi-variable (p-value)	Multi-variable *(p-value)
	N = 6992	N = 2520 (36)	N = 4472 (64)		
Easy finding information					
Disagree	334 (7)	23 (7)	311 (93)	1	- a
Unsure	2071 (45)	166 (8)	1905 (92)	0.85 (0.477)	
Agree	2226 (48)	118 (5)	2108 (95)	1.32 (0.238)	

Among 2631 middle school pupils, 48% agree that it easy to find information, with 95% of pupils who have heard of HPV vaccination and only 5% of pupils of have not heard of this vaccine.

7% disagree with 7% of pupils who have not heard of HPV vaccination and 93% who have heard of HPV vaccination.

Finally, 45% are unsure. Among them, 8% are pupils who have not heard of HPV vaccination and 92% are pupils who have heard of HPV vaccination.

Table SM4. Determinants of HPV vaccination status among middle-school pupils in France, 20221-22, who have heard about HPV vaccination (N=4385). Bi- and full multivariable logistic regression models.

Characteristics	Vaccination Status				
	Total (n = %)	No (n = %)	Yes (n = %)	Bi-variable (p-value)	Multi-variable * (p-value)
	N = 4385	N = 2817 (64.2)	N = 1568 (35.8)		
Easy finding information					
Disagree	302 (7)	215 (71)	87 (29)	1	1
Unsure	1860 (44)	1247 (67)	613 (33)	1.21 (0.153)	0.81 (0.265)
Agree	2079 (49)	1253 (60)	826 (40)	1.63 (<0.001)	0.76 (0.146)

Among 4241 response of pupils who have heard of HPV vaccination, 71% of disagreement are from pupils not vaccinated and 29% from vaccinated.

60% of agreement are from vaccinated ones and 40% of vaccinated. 67% of unsure pupils are not vaccinated and 33% are vaccinated.

Table SM5. Determinants of HPV vaccine intentionality among HPV unvaccinated middle-school pupils in France, 2021-22, (N=2815). Bi- and full multivariable logistic regression models.

Characteristics	Intentionality							
	Total (n, %)	Refusal (n, %)	Indecision (n, %)	Intention (n = %)	Bi-variable (p-value)		Multi-variable (p-value)	
	N = 2815	N = 311 (11)	N = 1565 (56)	N = 939 (33)	Indecision vs Refusal	Intention vs Refusal	Indecision vs Refusal	Intention vs Refusal
Easy finding information								
Disagree	215 (8)	65 (30)	91 (42)	59 (27)	1	1	1	1
Unsure	1247 (46)	149 (12)	775 (62)	323 (26)	3.71 (<0.001)	2.39 (<0.001)	2.45 (<0.001)	1.43 (0.178)
Agree	1251 (46)	87 (7)	635 (51)	529 (42)	5.21 (<0.001)	6.70 (<0.001)	3.11 (<0.001)	2.63 (<0.001)

Among unvaccinated middle school pupils, there is only 8% who disagree that its is easy to find information, 46% agree that it is easy to find information and 46% are unsure.

The majority of disagreement (42%) came from undecided pupils, 30% from pupils who refused and 27% from intentional pupils.

Among pupils who agree that it is easy to find information (46%), 51% are undecided pupils, 42% have the intention and 7% are refusal pupils.

Usure ones (46%), are 62% undecided, 26% have the intention, and 12% refused to get vaccinated.

- ➔ Unvaccinated people are not in the majority people who can't find information and therefore refuse to be vaccinated, but more pupils who are undecided due to "undecided esay finding information". However, pupils who find it easy to find information have the intention to get vaccinated.

Explore students' attitudes, beliefs and concerns about vaccines in general and HPV in particular;

Usefulness: favourable attitude

Pupils who received a visit and offer of HPV vaccination have a more favourable attitude (88%) toward HPV vaccine usefulness than those who didn't receive a visit (60%) or offer (65%). Unfavourable attitudes are more present through pupils who didn't have a visit, but only 10%. Gender also plays a role, with 78% of girls having a favourable attitude toward HPV vaccine usefulness, while 16% of the boys are undecided and 9% with an unfavourable attitude.

Multilingual environment or French monolingual, pupils have an average of 69% of favourable attitude toward the usefulness (with a little more favourable attitude from French monolingual pupils 75%). By parental education, pupils have a favourable attitude toward the usefulness of the HPV vaccine (70% from parents' education <= bac / 79% from parents' education > bac). Pupils from a high school deprivation area are less favourable to the usefulness of the vaccine (63%) compared from pupils in a low school deprivation area (80%).

Safety: favourable attitude

Regarding safety, the data shows that students who received a healthcare visit and were offered the HPV vaccine are more likely to have a favourable attitude towards its safety (78%) than those who did not receive a visit (47%). However, there appears to be no significant differences regardless gender (60% of favourable attitude), parental education (55% of favourable attitude). We observed that, pupils from a french monolingual environment are more favourable regarding the safety of HPV vaccination (63%) than those with a multilingual environment (50%).

- ➔ It can be due to differences in cultural beliefs or access to information about the vaccine. It highlights the importance of providing clear and accurate information about the vaccine to all communities to ensure that everyone can make informed decisions about their health.

Logistics of getting vaccinated: favourable attitude

Concerning the logistics of getting vaccinated, students who received a healthcare visit with an offer for the HPV vaccine are more likely to have a favourable attitude towards the logistics of getting vaccinated (81%) than those who did not receive a visit (40%) or received a visit but without an offer (51%). There is a difference in attitudes towards the logistics of getting vaccinated based on parental educational level, with students who have parents with a higher education (>bac) level being more favourable towards the logistics of getting vaccinated (70%). Moreover, pupils from a multilingual environment have the highest percentage of unfavourable attitude (15.10%) (moyenne d'attitude infavorable 10%). School area deprivation level influence the favourable attitude regarding the logistic, with more favourable attitude from low school deprivation area (69%) compared to 55% from high school deprivation area.

Importance of reducing transmission: favourable attitude

The importance of reducing transmission have in general a favourable attitude through middle school pupils, with an average of 79% of favourable attitude, 17% of undecided attitude and only 4% of unfavourable attitude.

Middle school pupils who had a RP visit and an offer, parents with higher education (> bac), girls, from low school deprivation are more likely to be favourable for reducing the transmission. Participants from a multilingual environment are 7% unfavourable to the importance of getting vaccinated.

Attitude regarding Benefits outweigh risks of the HPV vaccine:

Among subgroups, there is an average of 53% of favouable attitude, 37% of undecided and 11% of unfavourable attitude regarding the benefits outweigh risks.

68% of pupils who had a RP visit with an offer have a favourable attitude. Pupils from areas with low school deprivation and with parental education >bac have also an important favourable attitude, 67% and 65% respectively. Girls, pupils in a French monolingual environment and who remembered school curriculum have 55% of favourable attitude.

Highest percentage of unfavourable attitude came from pupils in a multilingual environment (14%), those who didn't have a visit (12%) and parents with an education <bac (12%). Boys and pupils from high school deprivation area are 11% unfavourable.

Among the 37% of undecided regarding the benefits outweigh risks, the majority are pupils who didn't have a visit (48%), pupils who didn't know about their parents' education (46%) and those in a high school deprivation area (44%). The less undecided are pupil who got a RP visit with an offer.

Pupils living in a multilingual environment or with parents with an education < bac, seem to be more apprehensive about the risk. An explanation by the RP, schools in a low deprivation area and parents with an education tend towards trust about the benefits.