



VIRAL HEPATITIS

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This edition of *Viral Hepatitis* is based on material presented at the **Viral Hepatitis Prevention Board / European Union for School and University Health and Medicine** meeting on the **Prevention and control of viral hepatitis through adolescent health programmes in Europe**, Ljubljana, Slovenia, March 15-16, 2007.

Editorial

This issue of *Viral Hepatitis* reviews topics covered at the Viral Hepatitis Prevention Board (VHPB) spring meeting "Prevention and control of viral hepatitis through adolescent health programmes in Europe", jointly organized with the European Union for School and University Health and Medicine (EUSUHM) on March 15-16, 2007 in Ljubljana, Slovenia.

Participants from 16 European countries and the United States of America discussed the prevention and control in European and other industrialized countries of vaccine preventable diseases, such as hepatitis B, mainly through school based programmes.

The adolescent age should be regarded as a target group for catch-up vaccination (due to missed opportunities at younger age), for offering booster immunization and for introducing new vaccines such as hepatitis B vaccination.

The objectives of the meeting were to emphasize the importance of reaching adolescents, provide an overview of currently existing youth health systems and to review the experiences with childhood and adolescent immunization programmes of the industrialized countries represented. The aim was also to identify obstacles and the limitations of setting up, implementing and evaluating vaccination programmes for children and adolescents, and to identify the role of various partners.

Several lessons were learnt during the meeting and issues identified, which should be taken into consideration for the implementation of vaccination programmes. These included sociocultural differences regarding the roles of doctors and nurses in different societies, as well as different perceptions and, in some cases, misperceptions of risk, disease and available prevention or treatment.

In most of the countries represented, vaccination at school proved successful in leading to high vaccination coverage of young people, as well as offering the opportunity of health promotion. Higher coverage was in some countries also associated with mandatory vaccination and free provision of vaccines.

The importance of partnership and networking of vaccinators, teachers, parents and young people was recognized by all participating countries in order to efficiently reach adolescents and meet their needs with regards to health promotion and immunization. However, different practical approaches were reported to achieve this aim, varying among countries in terms of infrastructure used, identity of vaccinators, funding systems and legal issues, such as consent.

The participants agreed a series of action points for the future, contributing to the promotion of adolescents' rights in terms of health and immunization. Such actions addressed aspects ranging from the need to accurate communication, continuous training of vaccinators, improved collection of coverage data, resolving of consent issues, funding, as well as maintain of existing programmes and steps to reach out-of-schools, deprived and disadvantaged groups.

Bringing together the know-how of the VHPB regarding control and prevention of viral hepatitis, and the skills of EUSUHM in the field of development and improvement of health services in schools and universities turned out to be a very fruitful initiative. The topic of this meeting was exactly at the cross-section of both expert groups. The complementarity of both groups was already tangible during the preparations of the meeting and is definitely reflected in the presentations and discussions during the meeting. In addition the fact that each expert group has a non-overlapping influence field and network will also have an added value toward the impact of the outcome and recommendations of this meeting.

*Karel Hoppenbrouwers and Alex Vorsters
on behalf of EUSUHM and the VHPB*

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Prevention and control of viral hepatitis through adolescent health programmes in Europe

Factors influencing success of adolescent vaccination programmes

Gaps in knowledge on adolescent health

Adolescents -defined by the World Health Organization (WHO) as 10–19 year-olds- represent an important proportion of the overall population, varying from 12% in Japan up to 23% in Africa [1]. Adolescents represent a large group of individuals, with a positive force in society, now and for the future.

Adolescence is a critical formative life stage, different and even discontinuous from childhood, when major changes take place, including biologic, cognitive, psychological, psychosexual and changes at social level. New cognitive abilities are developed that allow for the development of personal identity. Although they can often be strongly tied to a family or social system, adolescents acquire an emotional and psychological independence from parental figures, and possibly from teachers or healthcare providers. At this stage, they try on different roles and analyze merit of divergent point of view. They tend to change and are more unpredictable and, importantly, they also take risks, to see what their limits are. They face dangers more complex than previous generations faced, and often with less support.

Needs

Three stages of development can be distinguished: early (10-13 years), mid (14-16 years) and late (>17 years) adolescence. According to their stage of development and their personal circumstances, adolescents have different needs and therefore need to be differently approached. Those who are especially vulnerable or hard to reach are in extra need for support.

Health services play a specific role in preventing health problems and responding to adolescents. Young people need a safe and supportive environment that offers protection and opportunities for development. They need information and skills to understand and interact with the world. Health services and counseling should be provided to address their health problems and deal with personal difficulties.

Basic health services must be tailored to local needs, including growth and development monitoring, and immunization. Each country must develop their own range of basic services, according to their specific economic, epidemiological and social circumstances. Healthcare providers cannot meet all these needs alone but they can join or create networks acting together and maximizing resources.

Adolescent Health

Among the various developmental tasks to be dealt with during adolescence, development of sexuality and relations are the main factors influencing reproductive health (see figure beside).

Important consequences of the onset of sexual activity during adolescence are the increasing risk for sexually transmittable infections (STI). Among the various reasons for not seeking treatment of STI (listed in the slides below [2]), fear of parents and other adults finding out about their sexual activity is the most important

Adolescent Health Reproductive health			
	early adolescence	mid-adolescence	late adolescence
independence	emotional break	ambivalence	own identity
body image	adj. to changes	„trying on“	integration
sexuality relations	masturbation	experiments	caring, intimacy
career plans	peer group	peer group	individuality
cognitive devel.	unrealistic plans	concrete plans	reaching goals
	concrete thoughts		abstract thoughts

**Adolescent Health
STI – reasons for not getting treatment**

- Lack of knowledge of symptoms
- STI treatment a low priority
- Do not know where to go for treatment
- Do not have the skills needed to express a sexual health problem
- Fear of examination
- Fear of parents and other adults finding out (issue of consent and confidentiality)

WHO, 2004

**Adolescent Health
STI – reasons for not getting treatment**

- Long distances to clinics or lack of transport (money!)
- Inconvenient opening times for adolescents (e.g. clinic closed after school)
- Legal/policy restrictions (e.g. parental consent; need to bring partner)
- Unfriendly/judgmental providers
- High cost of treatment
- Drug shortages

WHO, 2004

one. Likewise, the main reason for not using contraceptives is legal/policy restriction (e.g. parental consent needed). This discrepancy between what adolescents see as normal and adults' perception of what is 'right' often leads to unprotected sex.

The above examples clearly show that current healthcare systems are not really addressing adolescents' needs. Healthcare providers need to learn to deal with young people, according to their different needs, depending on their stage of development, their personal circumstances and difficulties. There is a clear need for youth friendly healthcare services where confidentiality is important with adults who are aware of the adolescents' development.

Impact on vaccination

Different behaviours and conditions can have an impact on health and vaccination during adolescence, e.g. substance use or abuse, emerging sexual behaviours, eating disorders, obesity and sexual aggression.

The impact of these medico-psychosocial conditions and diseases on vaccination is multiple, both positive and negative. It is the combined effect of confrontation of adolescence with these diseases and conditions that create an impact on vaccination at the following levels:

- **Access to vaccination**
- **Perception of vaccination**
- **Timing of vaccination**
- **Surveillance**
- **Safety or efficacy of vaccination in certain conditions or with certain treatment.**

The following adolescent characteristics and development will influence immunization at the above mentioned levels:

- **Onset of puberty**
- **Autonomy seeking (refusal of vaccine and/or visit to healthcare facility)**
- **Identity**
- **Cognitive changes (concrete thinking vs. formal operation: questioning the value of vaccination)**
- **Intimacy-body image (fear of intrusion)**
- **Omnipotency-selfcentered (invulnerable)**
- **Peer influence**
- **Social integration (conformity)**
- **Laws**

Although peers play an important role in adolescent life, the key factor in dealing with their health problems is the relationship with parents, whose role needs to be more stressed.

Health programmes, including those foreseeing vaccination of adolescents, will need to be adapted to the reality of the adolescent age group and to the specific context where diseases and medico-psychosocial conditions are confronted with adolescent characteristics and development. On the other hand, healthcare programmes will need to rely on the strengths and creativity of adolescents, who represent a positive force in society.

WHO and adolescent vaccination

WHO's Global Immunization Vision and Strategy (GIVS) targets four strategic areas:

- **Protecting more people by expanding immunization beyond infancy to older age groups**
- **Introducing new vaccines and technologies**
- **Integration with other interventions in health systems context**
- **Global interdependence.**

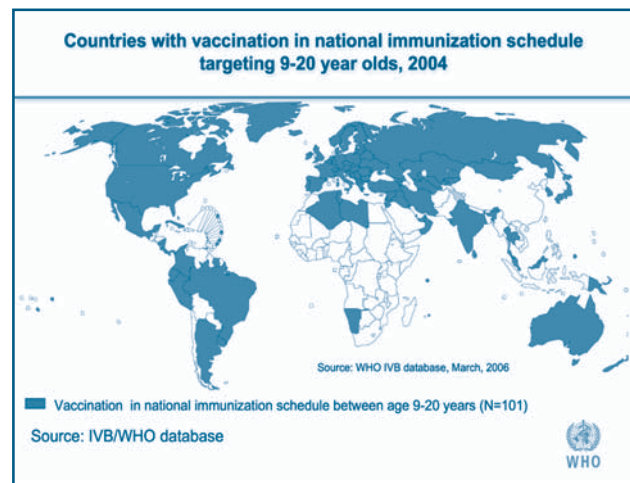
The 58th World Health Assembly Resolution (May 2005) and UNICEF Executive Board (June 2005) urged WHO member states:

- **To meet immunization targets**
- **To adopt the GIVS as the framework for strengthening of national immunization programmes between 2006 and 2015, with the goal of achieving greater coverage and equity in access to immunizations, of improving access to existing and future vaccines**
- **To ensure that immunization remains a priority on the national health agenda.**

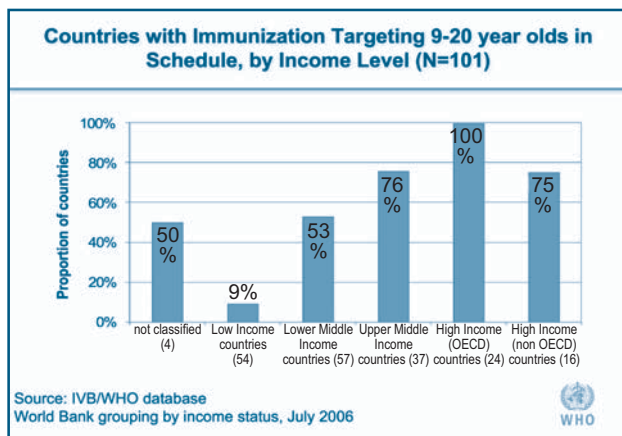
Strategies for delivering new and future vaccines such as human papilloma virus (HPV), meningitis and HIV vaccines will include targeting groups other than infants, and therefore will require innovative approaches to reach older age groups.

As of 2005, 154 WHO member states (80%) had introduced hepatitis B vaccine in their routine national infant immunization programs; an additional 4 countries had partial implementation of routine HBV infant vaccination. WHO estimates that among the Member States, the global immunization coverage with 3 doses of HBV-containing vaccines in infants reached 55% in 2005. Regions with high coverage are mainly Europe, Eastern Mediterranean, America and Western Pacific.

Regarding targeting adolescents with any type of vaccines, not all countries have immunization for adolescents in their national routine immunization schedules (see figure below).



Among low-income countries, relatively few have included adolescent immunizations, as shown from figure below.



Nearly all immunizations delivered to the age group 9 to 20-year-olds are booster doses for tetanus and diphtheria vaccines, as opposed to primary immunizations, except for some countries that deliver hepatitis B vaccine to adolescents.

(Note: the source of global data on immunization schedules and coverage is from official reports by WHO Member States through a joint WHO/UNICEF reporting process. Updated data can be obtained at http://www.who.int/immunization_monitoring/data/en/).

The adolescent age group is accessed through routine visits, campaigns and/or school-based activities; coverage data for this age group has not been collected by WHO at the global level.

Issues to consider regarding adolescent immunization include the delivery approach (routine versus campaigns) and delivery option (clinic-based, community outreach or school-based). Other issues may also have an impact, such as legal restrictions (parental consent needed) and temporal, but coincidental, disease associations in adolescents that may raise safety concerns, such as diabetes, asthma, thyroid disorders, rheumatoid arthritis, enteritis, or Group B streptococcal disease.

Worldwide, school-based immunization is not or poorly documented. As shown from table below, global world school attendance is lower than expected: 75-78% for primary school and only 43-46% for secondary school. These low percentages represent a major challenge for school-based immunization programmes.

School Attendance, by Country/Area

Country/area	Primary school, male (%)	Primary school, female (%)	Secondary school, male (%)	Secondary school, female (%)
Sub-Saharan Africa	63	59	21	20
Eastern/Southern Africa	66	66	16	17
West/Central Africa	59	52	26	22
Middle East/North Africa	83	77	50	44
South Asia	81	75	54	48
East Asia and Pacific	--	--	53	55
Latin America and Caribbean	89	89	44	51
Industrialized countries	--	--	--	--
Developing countries	78	75	46	43
Least developed countries	64	59	22	20
World	78	75	46	43

Source: UNICEF State of the Children Report, 2007

In conclusion, immunization of adolescents will contribute to WHO's Global Immunization and Vision Strategy of "Protecting More" and, in this respect, some countries are reaching adolescents through a variety of approaches. However, it remains a challenge to extend the Expanded Programme on Immunization (EPI) to age groups beyond infancy.

Surveys on behavioural issues

Vaccination perception among adolescents

In order to properly address challenges and policy issues within different regions and cultures and enable policy makers and healthcare professionals to successfully design and implement adolescent vaccination programmes, a survey sponsored by Sanofi Pasteur-MSD was conducted in 2006, in 5 European countries (France, Germany, Italy, Spain and UK) among adolescents aged 14 to 17 years.

The objectives of the survey were:

- To describe the image and perception of vaccines and vaccination by European teenagers
- To analyze knowledge and information about vaccination
- To identify drivers and barriers to adolescent vaccinations
- To understand the type and importance of information channels about vaccination.

For this purpose, information was collected from approximately 300 adolescents per country in October 2006, by means of face to face interviews.

Adolescents perceive vaccination in the first place as an intervention. Spontaneous thoughts related to vaccination are mainly associated with the action of administering a medicine (including syringe, prick and needle).

In general, there is limited interest in the vaccination topic among young people. Overall, 44% of those interviewed expressed some degree of interest (somewhat or very interested), and girls (49%) appeared to be more interested than boys (38%). When looking at the results by country, most interest was shown in Germany (63%) and France (62%), followed by Italy and Spain (both 36%). Lowest interest in vaccination was observed in UK (22%).

Reassuringly, the majority of adolescents (90%) understand vaccination as a way to prevent diseases. Few (8%) think of vaccination as a means to treat a disease once it occurred. The majority of adolescents in Europe also feel that they are better protected than their parents (78%), grand-parents (91%) or teenagers in developing countries (84%).

Although the overall interest is limited, young people quite well understood (at least 85% of them did) that vaccines are available in their country for classical diseases such as influenza (the survey was conducted in October), tetanus and measles. The knowledge that a vaccine is available was somewhat less for hepatitis (75%), polio (71%) and meningitis (66%). Country differences were noted depending on the existence of a programme in the country (e.g. for meningitis). HBV vaccine was less well recognised in the UK (by 51% of interviewees), as compared to other countries (69-89%). Of note, some misconception exists, for instance with diabetes and HIV/AIDS where 27% and 16%, respectively, thought that a vaccine exists against these diseases.

Interest in getting vaccinated with vaccines that would become available in the near future depended on the severity of the disease as shown in the table

below. Overall, the proportion of adolescents willing to receive vaccination was high, especially for vaccines against HIV (72%) and cervical cancer (67%). This was somewhat lower for any type of meningitis (52%) and hepatitis C (50%) and lowest for genital herpes (32%) and avian flu (38%).

Interest scores were always higher for girls than for boys, reflecting the gender difference in cognitive aspects for this age group.

Q7. In the next 5 years, vaccines will be available to protect against the following disease. Would you be interested to get the following vaccinations? For each of them give mark on a scale from 1 to 10: 1 meaning you would not be interested at all to get vaccinated and 10 that you would be very interested to get vaccinated.

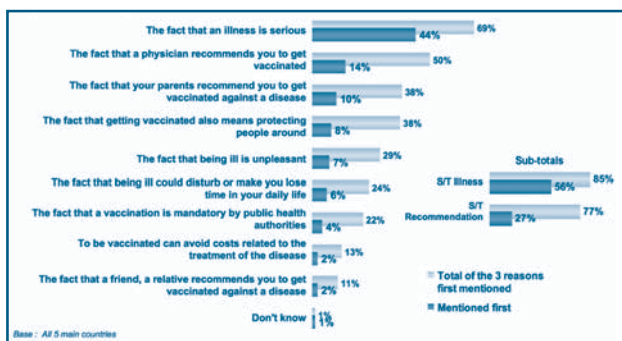
Disease	Average Mark		
	Whole population n=1530	Boys only n=756	Girls only n=774
HIV	8.8	8.7	9.0
Cervical Cancer	8.6*	-	8.6
All types of Meningitis	8.1	8.0	8.3
Hepatitis C	8.1	8.0	8.2
Genital Herpes	6.8	6.7	7.0
Avian Flu	7.1	7.0	7.3

Base: all 5 main countries *to female respondents only n= 774

The first motivation among adolescents to be vaccinated is individual protection, followed by the benefit of the family contacts and relatives. Although this was considered more important than community benefits and global solidarity, avoiding epidemics was still well recognised.

The most important reason for deciding to get vaccinated was fear for the seriousness of an illness (44%), followed by recommendations by physicians or parents (14% and 10%, respectively (see figure below). Importantly, whether vaccination is mandatory by public health authorities was perceived of low importance (mentioned as first reason by only 4% of survey participants).

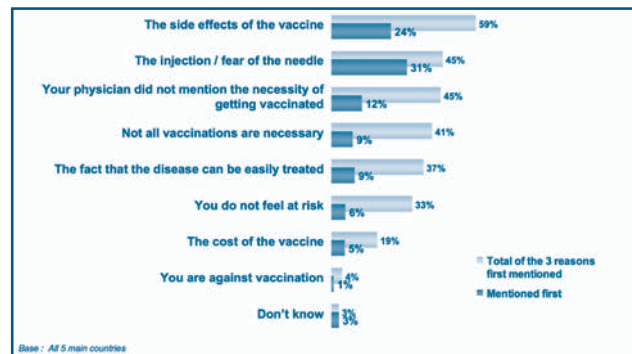
Q9. What would be for yourself the 3 first reasons that would have the highest impact on your decision to get vaccinated?



Attributes providing information or recommendations that could have strong influence on the decision to get vaccinated were the doctor's and parents' recommendations (score 8.6 and 8.4 on a scale 1-10, respectively), whereas school recommendations were of somewhat lower influence (score 6.7). News in media and campaigns from health authorities or from manufacturers were less influential for young people (score 4.6-6.3 on scale 1-10). This clearly indicates that most influence on the decision to get vaccinated comes from the close surrounding of the adolescent.

The primary reasons for not being vaccinated were mainly linked to fear of injection (31%) or for side effects of the vaccine (24%). As shown in the figure below, 59% of the adolescents mentioned side effects of the vaccine among the first 3 reasons for not getting vaccinated. It is also important for the physician to mention the necessity of vaccination, as 45% of interviewees named the lack of physician's mentioning among the first 3 reasons for not being vaccinated. Of note, and opposed to the general feeling of being invulnerable among adolescents, only 6% said that the first reason for not getting vaccinated was because they did not feel at risk.

Q10. And what would be for you the 3 main reasons for not getting vaccinated?



More than one third of the participating adolescents (37%) considered themselves as being not well informed about vaccination; only 6% found themselves very well informed (score 9-10). A large group (62%) was interested in getting more information, especially about new vaccines, the safety and efficacy of vaccines, and their own vaccination status.

Like factors influencing the decision to get vaccinated, sources of information are essentially coming from the close environment. Parents/friends (62%), general practitioners (56%) and school (35%) were most frequently named to be providing information on vaccines, and to a much lesser extent media in general (including internet, 8%). The level of being well informed appeared to be independent of the level of information received at school. The proportion of adolescents having lessons about vaccination at school was relatively low (43%) and large country differences were noted. More adolescents reported to have vaccination included in the education package in Germany (61%) than in Italy (14%), whereas this was 51, 49 and 39% in Spain, UK and France, respectively.

Parental attitudes towards vaccination

There have been many advances in vaccine technology and production in the last 10 years resulting in dramatic reductions in life-threatening diseases. However, parental attitudes towards vaccination have not changed significantly over the past 10 years and parents still have concerns about vaccination.

An international survey, sponsored by GlaxoSmithKline Biologicals to establish mothers' attitudes towards vaccination was conducted in 2005 [3]. The objectives of this large sociological study were:

- To examine gaps between healthcare achievements and mothers' concerns
- To explore the mothers' desire to protect their children, their behaviour towards healthcare (particularly vaccination), and their future role (i.e. mother-doctor dialogue)
- To evaluate if attitudes towards vaccination changed over the past 10 years.

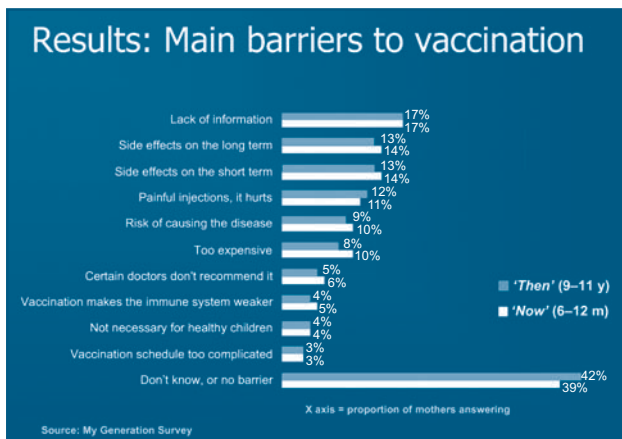
Three continents (14 countries) were involved: Europe (Belgium, France, Germany, Italy, Netherlands, Poland, Turkey), America (Brazil, Mexico), Asia (Korea, Malaysia, Singapore, Taiwan, China). A total of 6,606 mothers were interviewed face to face at home. Of these, 4,165 mothers had babies aged 6–12 months and 2,441 mothers had children aged 9–11 years. Those with older children were asked to recall their experiences of the time when their child was a baby. More than 50% of the mothers were the main decision-maker on vaccination.

The questionnaire /interview addressed the following items:

- Concerns regarding their baby and vaccination
- Definition of good health for their baby
- Vaccination practices and attitude towards vaccination
- Awareness of vaccines and infant diseases
- Wish to have influence on the vaccination process
- Sources of information on vaccination.

Health and well-being of the children were of primary concern for parents. Parents' concern is about accidents/ injuries (49%) and childhood diseases/ fever (33-34%). One quarter of parents is concerned about the risk of a serious infectious disease, yet a relatively high percentage (9%) remains concerned about vaccination because of safety and conflicting information. Mothers in all geographical areas covered, believe that vaccination is an absolute necessity for the good health of their babies, needed for the protection of the well-being of the child and perceive vaccination as an investment for the child's health.

The main barriers to vaccination are lack of information and side effects, including painful injections (see figure below).

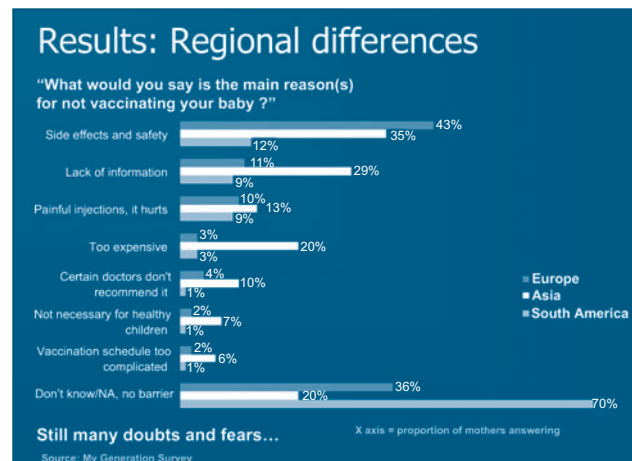


These data indicate that confidence in vaccination can be improved by effective communication and by continuous monitoring of vaccine safety and dissemination of this information. This may be particularly important in Europe and Asia where confidence in decision making appears to be lowest.

Vaccine awareness depends on the country and on the type of vaccine used. Awareness for hepatitis B is relatively high (62% in 2005 versus 56% 10 years earlier).

There are important regional differences in reasons for not vaccinating babies (see Figure below). In Europe, reasons are mainly associated with side effect and safety concerns, whereas in Latin America -where parents are more confronted with infectious diseases- this is a less important reason. In

Asia, not vaccinating is more linked to lack of information, which is likely due to a less effective dialogue with the physician.



Physicians are the preferred source of vaccine information (76% in 2005, 84% 10 years earlier), while friends/family and media in general are less important information sources. Information expected from the physician includes against which disease a child can be vaccinated, safety and efficacy of vaccines and details about the vaccination course.

Overall, 71% of the mothers in 2005 versus 65% 10 years earlier had a dialogue with their baby's doctor about vaccination; 45% of the mothers of 6–12 month old babies who hadn't yet, still intend to initiate a discussion about this with their baby's doctor, while most of the others just prefer to trust the doctor's decisions and advice. For those who had, the dialogue was initiated by themselves in 48% of cases.

In general, mothers feel that their participation in the decision process is low and they would like to have more influence on their baby's vaccination. Not more than 20% feel able to participate while 80% admit that they only feel able to agree with a doctor's advice. This indicates that support is needed to increase the mothers' decision power. General information is needed about vaccines, which diseases can be covered by vaccination, the number of vaccine doses and information about brands. Encouraging greater and more effective dialogue with physicians will likely help parents to feel more involved in the decisions about the health and well-being of their children. A better dialogue with the doctor could help to facilitate adherence to vaccination programmes.

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Implementation of HBV vaccination in adolescent programmes

Future challenges for school vaccination

Why vaccinate at school?

In many regions of the world, particularly industrialized countries, a high proportion of adolescents are required to attend school by law, which makes it an ideal setting for vaccination. However, only 60% of children are enrolled for secondary education worldwide, with figures decreasing to 49% in India, 45% in Northern Africa, 25% in South-eastern Africa and 13% in Central Africa [1]. Equity of vaccine delivery via school in these populations, particularly for girls, may therefore require further consideration.

A second rationale for vaccination at school is that, conversely to school attendance, the proportion of adolescents who routinely attend primary care is low when compared to main populations who traditionally receive vaccines in primary care, mainly infants, pre-school children, and the elderly.

As a result of these two factors, higher vaccine uptake has often been observed among adolescents when adopting a school setting strategy while, at the same time, ensuring higher cost-effectiveness of HBV vaccination programmes, compared to vaccination in primary care [2].

Today, vaccination at school often takes place as part of integrated strategies for health promotion. Schools are centres of learning, offering the opportunity for health promotion activities such as healthy eating, sexual health, smoking and exercise, but also including broader health protection measures, such as immunization. The concept of health promoting schools is strongly advocated today and global initiatives have been taken in this field by UNESCO and WHO [3, 4].

Vaccination at school: the UK experience

Historical

Like many other countries, the UK has a long history of offering vaccination at school, starting with BCG vaccine in the 1950s, followed by diphtheria, tetanus and polio vaccines, and rubella vaccine for girls in the 1970s. In addition to these routinely offered vaccines, national vaccination campaigns were conducted for measles/rubella in 1994 and for meningococcal C in 1999. In 2001, a pilot HBV vaccination study was conducted in Glasgow in order to assess the feasibility, acceptability and cost of a school based programme.

Of these, only the diphtheria/tetanus/polio vaccination programme is still in place. This is an important aspect when considering the importance of maintaining an existing infrastructure which might be necessary for incorporation of future adolescent vaccines, such as HPV. This is of particular relevance in countries where HBV immunization programmes might come to an end as a result of vaccinated infant cohorts.

In the UK, vaccines which are part of school programmes are procured nationally and free of charge to all pupils at all schools on a voluntary basis, with no incentives.

Information on the UK experience of vaccination at school is summarized in slide beside.

Practicalities of vaccination programmes

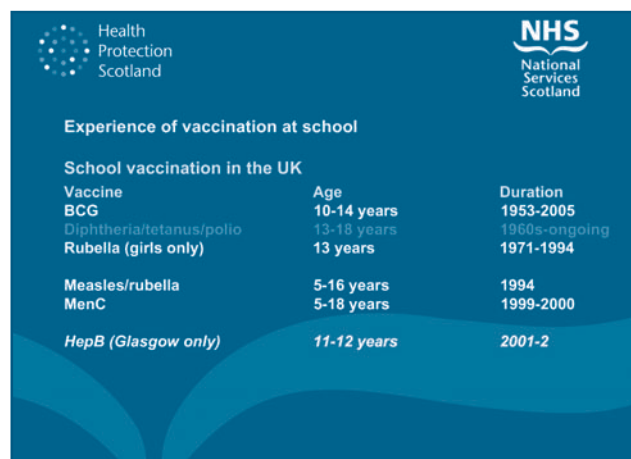
Vaccinators are an important stakeholder group who are key to the success of vaccination programmes. They should therefore be involved in discussions as early as possible in order to avoid short notice implementation of programmes. In the UK, vaccination is nurse-led in most places. School nurses are employed by primary care organizations (Community

Health Care Partnerships) while, for important vaccination campaigns, they are supplemented by agency nurses working under their supervision and in partnership with other key stakeholders, such as teachers, parents, and adolescents themselves. Routine immunization and mass campaigns form a core part of school nurses' expected delivery service although their remit is broader. Each school has a named school nurse (1 per 2380 children according to *Royal College of Nursing*, 2005). Recent training updates have included an online learning resource for all immunizers, based on national standards for immunization and a core curriculum developed by the Health Protection Agency.

Administrators are another key group of workers involved in immunization programmes who, like nurses, are employed by Community Health Care Partnerships. Efficient administration is essential, in particular in terms of call-up system of children, records of vaccines given and recall of non-attenders. Ideally call-recall systems should be managed electronically, however some areas are still relying on paper based systems. In addition to more efficient administration of programmes, electronic data processing would also enhance research capability through linkage to other data sets, as is currently possible for infants.

Logistics of vaccination programmes should also be taken into consideration. Suitable accommodation needs to be found, e.g. school halls, as well as suitable times which do not conflict with exams or social activities. As a result, vaccination schedules sometimes need to be altered to accommodate such constraints. Also, immunization series should preferably be completed within one academic year in order to avoid dropouts due to pupils changing schools in the summertime. Vaccines are delivered on the morning to the school from pharmacy, together with consumables. For some long-time campaigns, the question of balancing needs and resources might also arise if ongoing capacity for other services, such as educational talks and counseling services, have to be suspended.

Communication/education between all stakeholders is another key factor for the success of vaccination programmes. Communication between healthcare providers, teachers, parents and pupils should be facilitated in order to enhance acceptability of vaccination and ensure consent. Tailored information should be provided to parents and pupils in advance of immunization, such as targeted immunization leaflets, contact telephone numbers for queries, etc. Early engagement and broader communication should also be ensured among all key players in the immunization process, involving

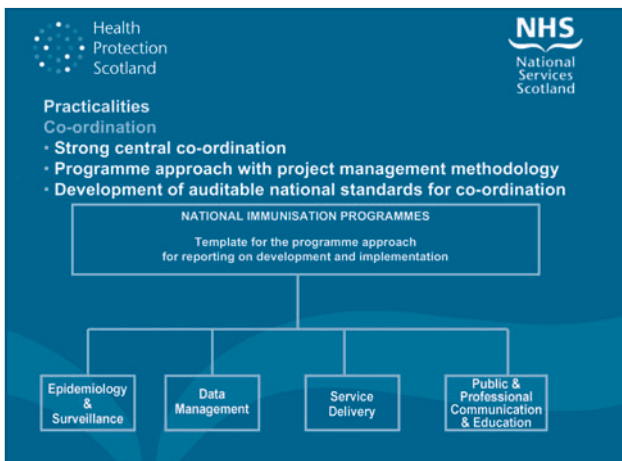


Experience of vaccination at school		
School vaccination in the UK		
Vaccine	Age	Duration
BCG	10-14 years	1953-2005
Diphtheria/tetanus/polio	13-18 years	1960s-ongoing
Rubella (girls only)	13 years	1971-1994
Measles/rubella	5-16 years	1994
MenC	5-18 years	1999-2000
HepB (Glasgow only)	11-12 years	2001-2

the media, faith organizations, politicians and policy makers, professional organizations including education authorities, and health providers in the primary care.

Consent is an important step of the vaccination process in the UK. Consent forms are sent home for parent signature but adolescent rights are also considered. Parents of adolescents over the age of 16 have no formal role in consent. Adolescents themselves must always be willing to undergo immunization and those under 16 may consent for themselves if they are considered to understand what is involved, even in the absence of parental consent. Interestingly, results from a survey conducted in Manchester in 2005 on parental attitudes regarding future acceptance of HPV vaccination revealed that most parents favored a joint decision with child but 19% would not take their child's view into consideration; also, 42% of parents agreed that the child should be able to be vaccinated without parental consent, while 48% opposed [5]. While highlighting potential areas for contention, these results also show that making vaccines mandatory may not help in all settings and that it might even be counter-productive in some cases, as, for example, in the UK.

Finally, the success of immunization programmes largely depends on strong **coordination** at local level where the most important part of the work is done, but also at national level for which the UK has started to implement a programme approach with project management methodology, as well as to develop auditable national standards for coordination, as illustrated below.



Acceptability of immunization

Qualitative research was conducted in focus group discussions with adolescents and parents in secondary schools before the implementation of the pilot HBV immunization programme in Glasgow [6]. This study aimed at assessing perceptions of acceptability and attitudes to HBV vaccination; investigating factors influencing vaccine uptake; exploring reasons for participation and non-participation; and drafting health education material.

Vaccination at school: both adolescents and parents were overwhelmingly in favour of vaccination at school rather than primary care, including informative sessions in the school setting rather than discussions at home. Only a minority of pupils perceived the school environment as lack of privacy and embarrassment.

HBV risk perception: both adolescents and parents had little knowledge of HBV and pupils were mostly worried to hear about the main risks of spread, in particular secondary transmission sources, such as tattooing and piercing, thus almost indicating the need to reduce risk perception of these activities

in order not to create overanxiety. Parents were rather realistic about their child's future risk of HBV through the main transmission sources.

HBV vaccination: most adolescents and parents were in favour of HBV vaccination and were indignant on hearing that HBV vaccine was offered in other countries and not in theirs. Although in favour of vaccination at school, parents would nevertheless seek advice from primary care specialists and would want to be reassured about the potential side-effects of HBV vaccine.

Vaccine uptake

Positive attitudes of adolescents and parents toward HBV vaccination resulted in high vaccine uptake during HBV pilot vaccination programme in Glasgow, with higher vaccination rates achieved, compared to other vaccines: 91.3% (dose 1), 89.2% (dose 2) and 80.3% (dose 3) versus 86% for diphtheria, tetanus and oral polio vaccines and 90.9-83.4% for MenC vaccine. [7]

The greatest drop-off rates were observed between doses 2 and 3, confirming the advantage of a 2-dose versus 3-dose HBV vaccination schedule [8]. The Glasgow HBV vaccination programme only lasted for an academic year but it could be observed from experience with MenC vaccine campaign that uptake varies by age, increasing through primary school, stabilizing between 8 and 12 years, and subsequently decreasing. This means that adolescent vaccination programmes in the UK should ideally be started during the first years of secondary school, combining the economic advantage of fewer institution visits than with primary school, as well as offering vaccines, such as HBV vaccine, when sexual education has already taken place and adolescents can better understand the issues involved.

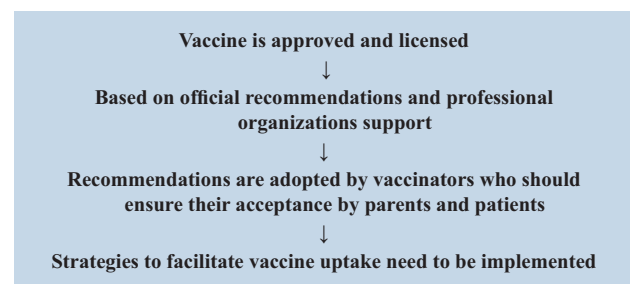
Other factors influencing vaccine uptake were identified during the HBV pilot programme, with lower vaccination rates with males (78% versus 82% for 3 doses); pupils living in more deprived areas (74% highly deprived versus 89% most affluent); schools with higher absentee rates (74% versus 83%); pupils attending special needs schools (66% versus 80%) and schools with more non-Caucasian populations (75% versus 80%) [7].

Costs of vaccination programmes

Modelling and cost-effectiveness studies have shown that school based vaccination programmes can be more effective than primary care vaccination [2]. However, it was also shown that 70% of economic costs linked to the HBV pilot vaccination programme were associated with the vaccine itself, suggesting that this fraction could even rise for newer and more expensive vaccines [9].

Issues in implementing HBV vaccination in adolescents: US experience

Experience with HBV vaccination has shown that availability of an effective vaccine does not automatically translate into vaccine acceptance, which, in turn, does not necessarily translate into vaccine uptake. The implementation of vaccination programmes in the USA is a stepwise process that can be described as follows:

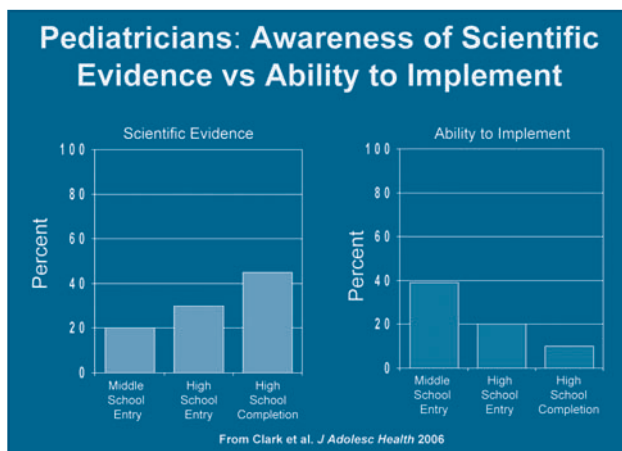


The implementation process is not linear and its successful completion is dependent on a number of elements interacting with each other, such as government approval, vaccine supply and cost, competing needs for resources and healthcare infrastructure.

Vaccine supply and cost are key factors influencing vaccine uptake, as reflected by the increasing importance of the question: *Who is paying for it?* Also, the question of vaccine cost is particularly relevant to adolescent immunization as it appears that more adolescents than children are uninsured and have to be vaccinated at designated health centres.

The interaction between vaccine cost and demand depends on the funding system adopted by each country. In the USA, which is characterized by a combination of private market and public funding, some private pediatricians have expressed concerns about the upfront costs of the increasing number of vaccines and the risk of dropped vials and freezer failure, while those who rely on government programmes are often overwhelmed. In many countries, including the USA, Australia and the UK, government funding is determined by cost-effectiveness analyses.

Healthcare infrastructure plays an important role and is particularly relevant to the context of adolescent immunization. This is illustrated by the Advisory Committee on Immunization Practices (ACIP) recommendation to vaccinate adolescents against meningococcal disease at middle school entry (11-12 yrs). Indeed, this recommendation is based on correspondence with preventive care visit at that age and consolidation with other vaccines for 11-12 year-olds, despite mismatch with epidemiology of the disease, as illustrated in graph below.



In the USA, the success of vaccination programmes strongly relies on recommendations made by traditional professional organizations, such as the American Academy of Pediatrics (AAP) and the American Academy of Family Physicians (AAFP), as well as the Society of Adolescent Medicine which has played a growing role in the implementation of an increasing number of adolescent vaccines.

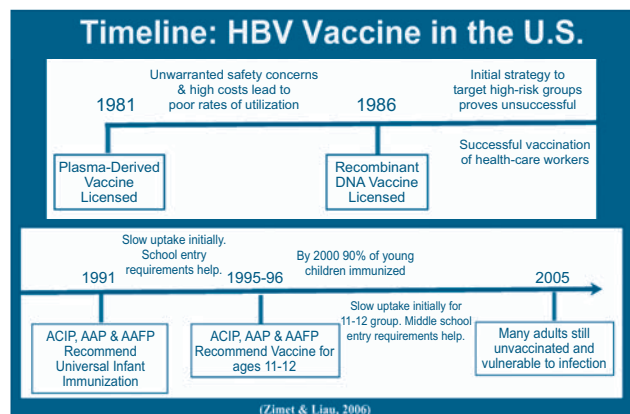
As demonstrated in the historical example of HBV vaccine implementation in the USA, vaccinators rely on ACIP and professional organization recommendations which directly contribute to the acceptability of the vaccine. In North Carolina, 32% of pediatricians and 23% of family physicians agreed with ACIP recommendation for universal infant HBV immunization after three months. However, eight months later, after AAP and AAFP recommendations had been made, a greater number agreed with the recommendations but only 53% of pediatricians and 23% of family physicians had adopted it into practice [10]. This example also shows the importance of identifying groups of providers who are more likely to immunize, such as

pediatricians rather than family physicians in the USA. It should also be noted that adolescent vaccinators are fewer than for children and that they are different for older than younger adolescents.

In the USA, there are three ways of getting adolescent immunization into practice:

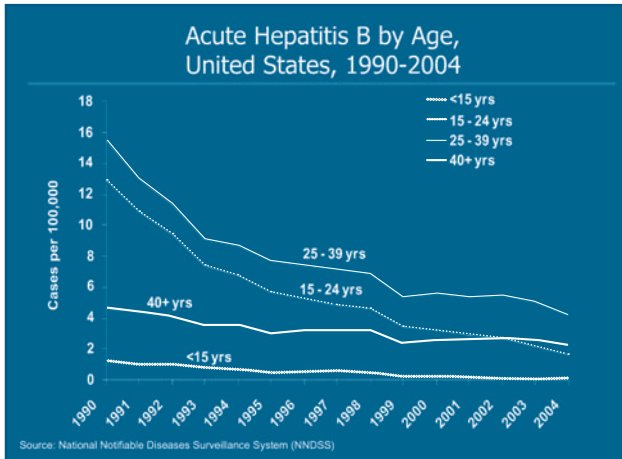
- School entry laws or education/notification laws** are a very successful (e.g. HBV vaccine) and unique strategy to the USA which forces parents to immunize their children before school entry. The impact of this strategy is reflected in the example of 9th graders in Missouri schools with a mandate, with differences of 72.8% versus 18.6% in immunization rates in schools with no entry requirements [11]. Mandatory school entry strategies require public funding for vaccination and laws vary by vaccine and by state in terms of the ability to opt out.
- School based vaccination programmes** present advantages in terms of easier vaccine scheduling, improved logistics of programmes, including reduced time and transportation demands, as well as decreased cultural barriers. Such strategies have been very effective in the implementation of HBV vaccination in the USA and they are commonly used in many European countries where they are associated with higher HBV immunization rates.
- Healthcare settings** that are already in place, e.g. sports medical visits, provide a context not to miss opportunities in terms of immunization which, in turn, provide an additional reason for preventive visits and the reinforcement of adolescent healthcare programmes. In alternative healthcare settings, it is particularly important to immunize children and adolescents with the first dose of a schedule whenever possible whereas improved reminder and recall, as well as tracking systems, are needed in order to maximize the chances for completion of immunization series. In particular, older adolescents are a difficult group to reach: in the USA healthcare structure they fall out of the pediatric system but have not yet entered the internal medicine office. Also, public funding stops at the age of 18 with the possibility of 18-21 year-olds being left uncovered. These considerations illustrate the need for non-traditional settings to reach high risk youth, such as HBV catch-up vaccination of previously unvaccinated adolescents recommended since 2005 for routine administration in juvenile correction facilities, as well as part of programmes that serve high risk youth for STI, HIV/AIDS, and substance abuse treatment and prevention.

The graph below illustrates and summarizes issues linked to implementation of a vaccination programme. HBV vaccination started in the USA in 1981 with very low rates of immunization and initial high-risk group strat-

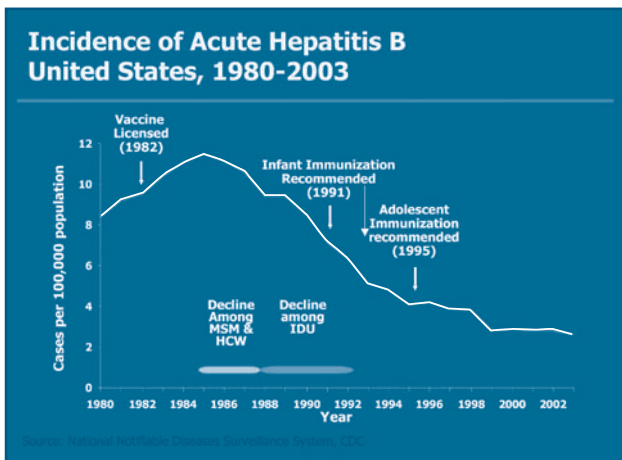


egy evolving toward successful universal immunization of children in 2000 while adult coverage is still to be improved today.

The success and future challenges of the US HBV comprehensive immunization strategy are reflected in graph below, showing an overall reduction of reported acute HBV cases over the period 1990-2004 with, however, temporary increasing rates among 40+ year-olds since 1999.



In the next slide, the particular contribution of HBV adolescent immunization recommended in the USA since 1995 is shown in the reduction of acute HBV cases:



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Adolescent health programmes and their contribution to the success of vaccination: country presentations and shared experiences

An overview of preventative adolescent health programmes was provided by countries represented at the meeting including Belgium, Croatia, Finland, France, Germany, Greece, Hungary, Italy, Macedonia, Norway, Slovenia, Switzerland, The Netherlands, Turkey, United Kingdom, USA. Particular focus was placed on recommended vaccine schedules, channels used to reach adolescent cohorts, vaccinators' profiles and their specific training, financing of vaccination programmes, decision-making procedure for the introduction of new vaccines, and vaccination coverage data.

Strengths, Weaknesses, Opportunities and Threats (SWOT) analyses result-

ing from meeting breakout sessions on shared country experiences are also presented. These focus on mandatory versus voluntary vaccination, school based versus other vaccination practices and related consent issues.

Recommended children/adolescent vaccination schedules

Most countries reported existing vaccination programmes or recommendations for ≥6-year-olds and adolescents for antigens listed in table below [1]:

Overview of existing adolescent vaccination programmes per country and vaccine

Country	Well-developed school health system	Antigens ¹ (school age ≥ 6 years and adolescents)	Infrastructure for vaccination	
			well-developed	location
Belgium	Yes	HBV; DTaP-IPV; dTpa/Td; MMR2	Yes Web-based system in Flanders	At school or organized through the school in a health centre
Croatia	Yes	HBV; dT; MMR2; OPV; BCG	Yes	Public health institution (n=20) and at school; 1 nurse & 1 school medical specialist/5000 children and adolescents
Finland	Yes	MMR2; dTap; HBV (risk groups outside school system)	Yes	At school (7-16y); 1 nurse/600-900 pupils 1 doctor/2100 pupils
France	No	DTaP; IPV; dT; MMR2; HBV catch-up	No	Outside school
Germany	No	dTaP; IPV HBV (catch-up) MMRV (catch-up)	No	Local health department at school entry
Greece	No, but school entry medical certificate needed	DTaP; BCG HBV catch-up	No	Outside school
Hungary	Yes	DTaP; IPV; dT; MMR2; HBV	Yes	At school
Italy	No longer any school health system Local vaccination services	DTaP; IPV; MMR2; dTpa; Var (catch-up)	Local health Unit	Outside school
Norway	Yes	DTaP-IPV; MMR2; DT(aP); IPV; HBV (risk groups outside school system, re-evaluation ongoing)	Yes	At school (responsibility of the municipality)
Slovenia	Yes	T; dT; MMR2 HBV	Yes	Outside school (school dispensaries at regional health centres)
Switzerland	Yes (school health system at cantonal level)	HBV; DTaP-IPV; dT; MMR2; Var (catch-up)	Yes	At school and private sector School health system at cantonal level (26 cantons, 26 ministries of health & 26 health laws)
Macedonia	Yes	Td; R; T; MMR2	Yes	At school: public health services for schools and adolescents
The Netherlands	Yes Immunization not part of school health system (except for MMR and Td-IPV at 9 yr of age)	MMR2; Td-IPV; HBV (risk groups outside school system)	Yes	Outside school (responsibility of municipalities)

For Turkey, United Kingdom and United States of America, see next page.

Country	Well-developed school health system	Antigens ¹ (school age ≥ 6 years and adolescents)	Infrastructure for vaccination	
			well-developed	location
Turkey	Yes	OPV; HBV; MMR2; R; dT	Yes	Outside school Public Health centres Campaigns at school
United Kingdom	Yes	Td; IPV; MMR (catch-up) HBV (for high risk groups) Campaigns e.g. menC	No	Nurses in state schools (93%) and in private schools (7%), some in primary health care
United States of America	No	Td; MMR 2 HBV; HAV	more or less	Outside school

¹Following abbreviations used: **D**: Diphtheria vaccine (normal dose)*, **d**: Low dose diphtheria vaccine (booster dose)*, **T**: Tetanus vaccine (normal dose)*, **aP**: Acellular pertussis vaccine (normal dose)*, **ap**: Low dose acellular pertussis vaccine (booster dose)*, **OPV**: Live oral polio vaccine, **IPV**: Inactivated polio vaccine, **Var**: Varicella vaccine, **HBV**: Hepatitis B vaccine, **HAV**: Hepatitis A vaccine, **MenC**: Meningococcal C conjugate vaccine, **MMR**: Measles, Mumps and Rubella vaccine, **MMR 2**: second dose of Measles, Mumps and Rubella vaccine, **R**: Rubella vaccine, **BCG**: Bacillus Calmette-Guérin vaccine
 * Given as part of DTaP, DT, dT, or dTaP

Vaccination systems in place: how are children/adolescent cohorts reached?

Mandatory versus voluntary vaccination

Vaccination was reported to be mandatory in 4/16 countries; in addition, vaccination is mandatory for specific antigens only, in Italy. In the USA, legal mandates for vaccination apply in the form of “school entry laws” which require from parents to vaccinate their children prior to primary and middle school entry; in some states, such laws are extended to high school and college entry. The implementation of school entry laws as a unique US strategy has proven successful in the US, as shown by significantly higher

immunization rates among 9th graders in Missouri schools with a mandate [2], as well as increased HBV vaccine coverage among 7th graders in San Diego after school entry requirement came into force in 1998 [3]. Such findings are in line with higher immunization coverage rates correlated with mandatory vaccination in some European countries, as shown for example with successful mandatory HBV vaccination in Italy, compared to a less successful MMR voluntary vaccination programme. Higher vaccination rate was also mentioned as a result of mandatory vaccination in the SWOT analysis performed by meeting participants on the basis of their discussions (see below):

Mandatory (versus voluntary) vaccination	
<p>Strengths</p> <ul style="list-style-type: none"> • Correlation with national recommendations • Correlation with higher coverage, including risk groups • Publicly funded vaccines and guaranteed infrastructure <ul style="list-style-type: none"> • Clearly defined responsibilities • Adverse reactions are covered by State laws 	<p>Weaknesses</p> <ul style="list-style-type: none"> • Low cultural acceptance or cultural opposition in some countries <ul style="list-style-type: none"> • No guarantee of ability to reach “difficult” target groups • Laws may be unknown, ignored or misunderstood by the population
<p>Opportunities</p> <ul style="list-style-type: none"> • Vaccinators are accountable toward the state, which can for example facilitate the introduction of new vaccines 	<p>Threats</p> <ul style="list-style-type: none"> • Mandatory vaccination is being replaced by voluntary vaccination <ul style="list-style-type: none"> • Opt-out policy may give rise to ethical concerns • Decreasing awareness of the importance of vaccination when not mandatory

While items listed in SWOT analysis above provide an overview of issues commonly perceived as most important among meeting participants in relation to mandatory vaccination, country-specific experience was also shared regarding enforcement of mandatory laws. Although penalty and/or prosecution procedures are foreseen in some countries (e.g. Croatia and Slovenia), these are usually not implemented in common practice, and many countries have opt-out policies. Meeting discussions also brought significant cultural differences to light among participating countries in terms of respective acceptability criteria of both mandatory and voluntary vaccination programmes.

School based, public health and private sector vaccination practices

In 9/16 countries children and adolescents are routinely vaccinated as part of school health programmes according to country-specific recommended vaccination schedules. However, some countries have more

complete vaccination calendars than others and variability was reported in terms of well or less developed infrastructures. Among 9 countries with a school based vaccination programme, 3 have vaccination sessions at school sites only (Norway, Hungary, and Macedonia); three countries additionally rely on publicly funded services for vaccine administration, such as youth health centres (Belgium), health centres, hospitals and polyclinics (Finland) and primary care centres (UK); and another 3 rely on health care centres linked to school medicine services (coupled with vaccination campaigns in Turkish schools), school dispensaries at regional health centres (Slovenia), and institutes of public health within school medicine system, including university students (Croatia).

In Switzerland, each canton has its own system of school health services which may offer vaccination at school. Of note, 16/26 Swiss cantons offer HBV vaccination at school. Cantons with school health systems offering vaccination have proven better vaccination coverage [4].

Several school vaccination initiatives were reported by countries where immunizations are not part of the school health system. These include HBV routine vaccination in France until 1998; HBV vaccination programmes in the USA; and BCG vaccination of 6-yr-olds in Greece.

In 4/16 countries, nationally recommended vaccines are administered in public health entities which are not directly linked to a school health system, i.e.: public vaccination centres in France; local health departments (“come-structure”) in Germany; local healthcare units in Italy (of note, Italy used to have a very well-developed school medicine system that is no longer in place) and public health centres in the USA (no school health system, “school entry” laws only).

In the Netherlands, the school health system is organized at the level of municipalities but it does not include vaccination responsibilities except for MMR and Td-IPV routine vaccination of 9-year-olds. On the other hand, the National Immunization Programme (NIP) is a well organized system under the responsibility of the Dutch government. The NIP is carried out within the setting of child health care, ensuring very high coverage and a good monitoring system.

In several countries with no school based vaccination programme, i.e. Germany, Greece, Italy, and the USA, monitoring of vaccination status was nonetheless reported as a well-functioning system. Belgium was the only country to report use of web-based recording (Vaccinnet database in Flemish region).

In addition to school based and/or vaccination in public health centres, all countries reported vaccination by GPs and pediatricians of the private sector, especially for vaccines outside the nationally recommended calendars. In some cases the private sector was reported to be a minor practice, as in Slovenia, while a major one in others, as in France, Germany or the USA (60.4% private vaccine providers in the USA).

School based vaccination was further discussed and compared to other vaccination practices during a breakout session concluding with SWOT analysis below.

Meeting discussions relating to school based health and vaccination programmes mainly focused on the importance of offering protection against disease to the greatest number of children and adolescents while respecting cultural differences in terms of mandatory versus voluntary vaccination. A vast majority of parents were reported to accept immunization in countries with school based mandatory vaccination programmes, while in other coun-

tries, such as Norway, a different approach is adopted where vaccination is offered in schools but parents are free to refuse it. Several countries reported problems facing the complexity of mixed systems relying on school based and private vaccination practices.

A comparative analysis of related consent modalities was performed by meeting participants and summarized in table below:

Parental Consent by age and country*		
	Immunization	Treatment **
Belgium	<18 yrs	<12 yrs
Finland	<18 yrs	<12 yrs
Germany	<15 yrs (no clear regulations for 15-16 yr-olds)	no clear regulations
Netherlands	<12 yrs	<12 yrs
Norway	12-16 yrs + assent***	<16 yrs
Switzerland	Canton-based laws based on “capacity to understand”	-
UK	no distinction between treatment and immunization <16 yrs****	

* information was only available for countries that participated in breakout session

** defined as contraception; illness and STI disease in health planning centres

*** adolescents may “ethically” assent but not “legally” consent

**** <16 yrs can give consent if they are capable of fully understanding what is involved

During discussions relating to parental consent modalities, additional information was provided from the USA where 16-year-olds may assent for treatment but not for immunization. Also, most countries reported consent given by parents once for all immunizations included in the programme or for a fixed period of time while in the USA, parents need to consent for each immunization.

Certain “grey zone” areas were commonly identified in several countries, such as consent/assent modalities for <15-year-olds, parental consent versus child/adolescent refusal and child/adolescent capacity to overrule parental decision, child/adolescent “capacity to understand”.

Meeting participants tended to agree that age for consent should be lowered at 12 years, however the difficulty of overcoming country-specific differences was underlined and the Convention on the Rights of the Child was

School based vaccination programmes (versus other practices)	
<p>Strengths</p> <ul style="list-style-type: none"> • Vaccination offered to all children attending school <ul style="list-style-type: none"> • Cheaper than private vaccination • No need for visit to GP/ family doctor • Higher compliance rate for complete vaccine series <ul style="list-style-type: none"> • Careful monitoring of immunization status • Mixed system of mandatory (school) and voluntary (consent) interventions 	<p>Weaknesses</p> <ul style="list-style-type: none"> • Consent issues • Non-attending children/adolescents are not captured • “Social” increase of fear for needles in school setting • Countries with no well-developed school system
<p>Opportunities</p> <ul style="list-style-type: none"> • Possibility to offer other health education interventions • Single consent for multiple interventions during the year 	<p>Threats</p> <ul style="list-style-type: none"> • Changing trends in the organization of health systems have led to decreased school based programmes

cited as a reference to be considered by groups such as the VHPB with a view to promote the rights of adolescents and minors to make decisions on their health and have access to health services. Reference was also made to a WHO initiative taken in the form of a workshop on consent and confidentiality in adolescents regarding HIV testing and abortion [5].

Who are vaccinators and how are they trained?

Most countries represented at the meeting reported that children <6 years of age are vaccinated by pediatricians and GPs in private/public practice or well baby clinics, and less commonly by nurses.

In countries with school based vaccination programmes (9/16), school health doctors and nurses are the main vaccinators while a small proportion of pediatricians and GPs (usually around 20%) administer vaccines in private practice or clinics. In some countries, such as Finland, Norway and the UK, vaccinations are routinely performed by nurses while in other countries only doctors may vaccinate (e.g. Hungary).

In countries where no school based vaccination programmes are implemented, vaccination is routinely performed in local/regional/public health centres by both doctors and nurses, in some cases doctors only (Germany), or nurses under doctor's supervision (Turkey and France), while pediatricians and GPs also vaccinate in private practice or clinics.

In Germany, vaccinations are also performed by gynecologists who administer specific vaccines such as HBV and MMR, while other disciplines include dermatologists and surgeons.

Some less common professional profiles who may act as vaccinators are country-specific, such as physician's assistants, "family" GPs and pediatricians, "community pediatricians", "health visitors" and "clinical medical officers".

Although general trends could be identified from country experiences summarized above, no standard vaccinator profile could be established and, in some cases, fluctuating local practice was also described within the same country.

In terms of vaccinators' training, country practices were also rather heterogeneous, ranging from in-depth specialized training in vaccinology or youth health in 7/16 countries versus minimal, non-specific training in 6/16 countries.

Specific training in vaccinology, sometimes including both theory and practice, is usually part of medical curricula of pediatricians and GPs and is also often linked to specializations in "youth medicine" as in Belgium, "child health care" (The Netherlands) or school/public health discipline (Croatia and Italy). In 6/16 countries, specific training in vaccinology is also part of nurses' training.

In 5/16 countries continuous professional training of vaccinators is organized by universities, professional medical associations, or public health institutes and ministries.

Country-specific training experience, using a vaccinator's handbook edited by the public health institute (also available in e-form), as well as telephone counseling, was reported from Finland.

Decision-making process for the introduction of new vaccines

In the majority of countries represented at the meeting, the decision to introduce a new vaccine in the national recommended vaccination calendar is taken by the Ministry of Health (MOH), on the basis of expert recommendations. The department responsible for immunization policies within the MOH is often the National Institute of (Public) Health but some countries

also have a dedicated decision-making body, such as the National Vaccination Commission in Italy and Greece, Committee of Immunization in Macedonia, or Netherlands Vaccine Institute (NVI).

Vaccine recommendations are usually made by advisory boards or technical committees such as the German Standing Vaccination Committee (STIKO) or the Joint Committee on Vaccination and Immunization (JCVI) in the UK. Members of these committees include experts from the academy and professional organizations. In addition to considerations relating to the importance of disease burden within national health priorities and the availability of a safe and efficacious vaccine, several countries, such as Belgium, UK, Macedonia, The Netherlands, Norway and the USA reported explicit reliance on cost-effectiveness analyses in their assessment of whether or not to include a new vaccine in their national recommendations.

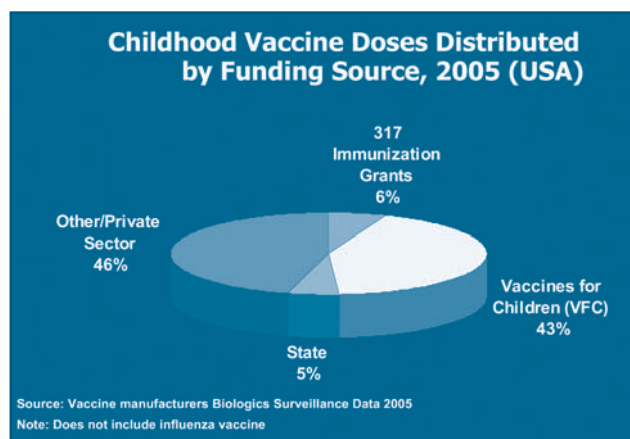
Some countries rely on a two-level decision-making structure whereby a general recommendation is made at federal or national level, and is then subsequently adopted or implemented at regional (Belgium, Spain and Italy), federal state (Germany) or cantonal level (Switzerland).

Financing of children/adolescent vaccination

Vaccinations recommended in national calendars are offered free of charge to vaccinees-some countries specified vaccine and administration costs- in a majority of countries, including those where 'free of charge' means 'refund-ing', such as in France or Greece. In Switzerland, vaccination is offered for free by school health services which get reimbursed via health insurance. For vaccines that are not offered at school, 10% of the consultation fee has to be paid by the patient.

Costs for vaccinations which are offered free of charge are usually supported by the MOH via the national budget or public health insurance, including social security and mutual funding systems. In countries with mandatory vaccination, the national immunization scheme is supported by a legal act, which is also the case for the voluntary National Immunization Programme (NIP) in The Netherlands. In Hungary, 25% reimbursement is offered for vaccines which are available outside the recommended calendar. In Belgium, the responsibility of financial support is shared between federal and regional ministries while in Italy it is entirely covered by regional health authorities. In Greece, recommended vaccinations are covered by either public or private insurances.

In the USA, only vaccines included in the Vaccines for Children (VFC) programme are offered free of charge, i.e. 43% of childhood vaccine doses distributed in 2005, as can be seen from graph below.



Coverage data of children/adolescent vaccination

Coverage data for children/adolescent vaccination presented by individual countries during the meeting are hardly comparable since, in numerous cases, these data were compiled from sentinel surveys or research studies conducted for different vaccines, years and age groups. Several countries mentioned the absence of coverage data collection in school children and adolescents.

Table beside [1] summarizes the feedback from countries when specific coverage data relating to children/adolescent vaccination was requested. In line with observations made during meeting presentations and discussions, vaccination coverage rates in older children and adolescents are generally lower than those recorded for infant vaccination programmes.

Strengths and challenges of immunization programmes

The table below provides an overview of identified pros and cons of immunization systems in place in countries represented at the meeting. Importantly, this summary reveals trends as to commonly perceived and confirmed successful immunization strategies, as well as identified threats to currently well-functioning systems, and opportunities for decision-makers to anticipate drawbacks of future immunization strategies.

Vaccine coverage by country

Country	Coverage
Belgium	>75% (Flemish) >68% (French) (HBV)
Croatia	>93% (HBV >98%)
Finland	No exact data, estimated around 95%
France	35-95% depending on vaccine (survey 2003-2004 data)
Germany	Adolescents: no data For children: 5-7y: 85-90% HBV: 85-92%
Greece	18-45% (underestimation, 1996-1997 data)
Hungary	>99% for mandatory vaccines
Italy	>90% for HBV (no adolescent data for other vaccines)
Norway	90-92%
Slovenia	91.5-99.2%
Switzerland	No national data 63-80%
Macedonia	>99%
The Netherlands	>90%
Turkey	85-98%
United Kingdom	No data for adolescents
United States of America	60-80%

Strengths	Challenges
<ul style="list-style-type: none"> Vaccines are offered free of charge; are at least partially reimbursed; are cheaper (reported by 50% of countries) High vaccination coverage based on a well-developed (school) health system allows for minimized vaccination costs (including use of combination vaccines) and logistics (reported by >50% of countries) Well-functioning registration and monitoring system for vaccination status, including adverse event reporting (reported by 25% of countries) 	<ul style="list-style-type: none"> Immunization programmes hampered by slow decision-making process and administrative bureaucracy (reported by 50% of countries) Introduction of new and costly vaccines with lower compliance (e.g. HPV, influenza, etc) could jeopardize well-functioning existing system (reported by 50% of countries) New vaccines are costly (>50% of countries) Older children and adolescents are difficult to reach and should be more actively contacted (reported by 50% of countries) More initiatives should be taken to reach high-risk, less compliant children and adolescents, i.e. ethnic minorities and socially deprived (reported by 30% of countries)
<p>The following arguments were less frequently reported:</p> <ul style="list-style-type: none"> Well-trained vaccinators Nurse-led vaccination Positive attitudes observed towards vaccination, including successful vaccination campaigns School regarded as an appropriate setting for reaching the greatest number of vaccines. School regarded as an opportunity to provide children/adolescents with appropriate information on vaccination. High coverage achieved, allowing development of herd immunity. 	<p>The following arguments were less frequently reported:</p> <ul style="list-style-type: none"> Need for enhanced registration and monitoring of vaccination status Need for broader consensus from professional organizations on benefits of new vaccines Growing cultural diversities within countries lead to more opt-outs; growing opposition to mandatory vaccination; growing pressure from anti-vaccination lobbies Countries with incomplete school programme coverage Current trend to privatize immunization practices are a threat for school/public health programmes
<p>Mandatory vaccination was regarded as a strength of programmes by 2 countries; voluntary vaccination was regarded as a strength of the system by one country; and the question whether a voluntary scheme should be regarded as a strength or weakness was asked by another country.</p>	

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- Based on presentations by S Badur, University of Istanbul, Istanbul, Turkey; P Bonanni, University of Florence, Florence, Italy; RJF Burgmeijer, Netherlands Vaccine Institute, Bilthoven; C Cameron, Health Protection Scotland, Glasgow, Scotland R Harrington, North End Surgery, Buckingham, UK; K Hoppenbrouwers, Catholic University of Leuven, Belgium; K Järvenpää, Finnish Organization of School and Adolescent Medicine (FASAM), Espoo, Finland; M Juricic, Slovenian Medical Association - Society of School Medicine and University Doctors, Slovenia; M Karovska, Macedonian Association of School and University Medicine, Kavadarci, Macedonia; M Kuzman, Croatian National Institute of Public Health, Zagreb, Croatia; H. Nokleby, Norwegian Institute of Public Health, Oslo, Norway; V Papaevangelou, University of Athens, Goudi, Greece; M Pulz, Governmental Institute of Public Health of Lower Saxony, Germany; S Rosenthal, University of Texas Medical Branch Galveston, Texas, USA; F Roudot-Thoraval, Hôpital Henri Mondor, Créteil, France; T Simon, Jozsef Fodor School Health Society, Budapest, Hungary; S Stronski Huwiler, Service of School Medicine, Zurich, Switzerland; J Ward, Centers for Disease Control and Prevention, Atlanta, USA.

Conclusions

The Context: Public Health

- The experience with HBV vaccine in adolescents will be valuable for the introduction of HPV vaccine which, in turn, will be useful for future adolescent vaccines and campaigns aimed at young people.
- In 2005, the World Health Assembly (WHA) and the UNICEF Executive Board endorsed WHO's Global Immunization Vision and Strategy (GIVS). WHO Member States were urged to meet immunization targets, to ensure that immunization remains a priority on the national health agenda and to adopt the GIVS as the framework for strengthening of national immunization programmes, with the following goals:
 - achieving greater coverage and equity in access to immunizations;
 - improving access to existing and future vaccines;
 - extending the benefits of vaccination linked with other health interventions to age groups beyond infancy.
- Although many countries already include vaccination of young people between the ages of 9 and 20 years in their national immunization programmes, this mainly relates to booster doses against diphtheria and tetanus or catch-up vaccination for missed opportunities in the past.
- Coverage data for immunization of adolescents has not been collected in a systematic way; school-based immunization is documented either poorly or not at all.
- Adolescent vaccination can be provided through routine immunization programmes or campaigns, run with the support and participation of either the private or public sector, or both. Vaccines can be administered through clinic-based schemes (e.g. in health centres), in the community or in schools.
- School health services have been identified as having a specific role in the prevention and response to adolescent health problems.
- A number of issues need to be addressed in relation to adolescent vaccination, including:
 - legal issues (such as consent for minors);
 - medical issues in the form of young people suffering from chronic illnesses (e.g. diabetes);
 - temporal, coincidental associations with certain pathologies in adolescents (e.g. asthma, auto-immune thyroiditis and Guillain-Barré syndrome).
- The introduction, licensure and launch of new vaccines in adolescents, such as type C meningococcal meningitis, hepatitis B and HPV vaccines has revealed that the process from launch to full immunization programmes is not linear: once a vaccine is approved, providers have to adopt recommendations on its use and target group, and parents have to accept those recommendations. Then the government has to make the vaccine available, ensuring that funding is secured and maintained.
- Introduction of a new vaccine is country-specific and sometimes it differs by state, region or canton; it involves both public and private sectors. However, a common feature among countries was the long time interval between launch and delivery in universal programmes, and, as a result, new vaccines being underused.
- Funding arrangements are equally diverse within and between countries, but often the main challenge to the introduction of a new or additional vaccine for adolescents is cost and access to this target group.

The Context: Adolescents

- Adolescents make up about one fifth of the world's population and represent a positive force in society.
- Adolescence, with its early, mid and late stages, is a time of extraordinary physical and mental change over a short time span.
- It is a time of much thinking (about themselves, about others and their relation to others) and they feel a sense of invulnerability and omnipotence. All these factors influence the way that parents, teachers and health professionals communicate with adolescents and vice versa. The influence of the family, parents and teachers is greater than is apparent; often young people accept arguments despite a display of rebellion.
- Adolescents have to come to terms with their psychosocial and cognitive development, with questions about sexuality and the pressures that accompany it, conformity and peer influence, autonomy and recognition of responsibility.
- Adolescents are vulnerable; about a third of adolescents reported experiencing stressful events and one fifth go through a tumultuous development period. They need a safe and supportive environment.
- Young people are exposed to risks which can have serious consequences to health (HIV, STIs, pregnancy with – in low income countries - possible maternal mortality). However, their sense of invulnerability coupled with the lack of relevance of a disease that possibly will manifest itself in decades' time lowers interest in protection.
- Generally, adolescents' interest in immunization is good (especially about new vaccines), but their knowledge about vaccines is mixed. In general, girls were better informed than boys. Fear of disease is a motivating factor for immunization.
- The most influential sources of information and advice were health-care workers, especially doctors, and parents rather than school or the media (including the Internet). Even though they may be well informed, e.g. about contraception and STIs, putting that knowledge into practice is a different matter.
- Legal and policy restrictions, including consent of minors and parents, can lead to not using contraceptives or not seeking treatment (e.g. pregnancy or STIs) because of fear of parents and other adults finding out about the consequences of their actions.
- Other legal issues include legislation: in the United States of America some states operate entry laws for students into middle schools, which could result in higher vaccination rates.
- An important population of young people is hard to reach. Few adolescents attend primary health care clinics, school health programmes are limited, and many adolescents cannot even be reached through the existing programmes or campaigns. Globally, less than half of adolescents in countries outside the industrialized world attend secondary school. The chances of reaching these children with vaccination campaigns are small.
- In countries with no strong school health facilities or vaccine programmes, such as in France and Germany, rates of adolescent vaccination have been low, but even in the United States of America school entry laws did not completely overcome the effect of low socioeconomic indicators; additional efforts were needed in poorer areas to make school entry mandates, and thus immunization rates, effective.
- Young people need user-friendly health services and counselling adapted to national or regional contexts (e.g. sport visits or visits for health check).

The Context: Immunization Programmes

- The countries represented at the meeting mostly had a strong public health tradition, even if the emphasis (for example the role of schools in health delivery) varied considerably.
- The infrastructure for delivering immunization programmes, in terms of physical and human resources, generally exists; however, the complexity of immunization schedules results in varying practices at national, federal, provincial and even regional level, with for instance doses of HBV vaccine still varying between 2 and 4.
- In some countries, immunization is mandatory whereas in others it is voluntary, and there are variants between these two positions (e.g. mandatorily offered vaccination can be refused by individuals in Norway).
- Globally, older children are vaccinated through campaigns but sometimes through routine immunization.
- In the industrialized countries, where high proportions of adolescents are required to attend school (and lower proportions of adolescents routinely attend primary care), the arguments for vaccination at school are more persuasive.
- The private sector also contributes to vaccination coverage, especially for vaccines that are not part of the school programme, or has a more complementary role to the free vaccination of children in the schools programmes.
- School programmes offer integrated opportunities for health promotion although logistical difficulties have to be managed (such as extra staff needed, suitable location and time, etc.)
- Although in European countries with adolescent vaccination programmes reported coverage rates are generally high, data are incomplete and often scattered, especially where the private sector is involved. Coverage rates also varied with the individual vaccine and were lowered by community deprivation, ethnicity and mobility. Record systems are often paper based.
- Public attitudes towards adolescent vaccination are mostly supportive, but anti-vaccination lobbies and media scares decrease public confidence and lower vaccination rates.
- Benefits of school immunization programmes besides high coverage rates include easy access to vaccination for parents (no effort required from them) and easy monitoring of coverage and side effects.
- However, school immunization programmes form only one part of a school medicine system, and cannot manage common adolescent problems including smoking, alcohol and drug use, sexual behaviour and violence, unless it is fully imbedded in a comprehensive programme.
- Where there are school health services, purchasing of vaccines is mostly centralized.

Lessons Learnt

- Based on the parent survey data, it was understood that sociocultural differences need to be recognized. Common popular misperceptions exist in societies about the status of vaccination - whether it is mandatory or not. In different countries, doctors occupy different hierarchical positions in society, and the respective roles and authority of doctors and nurses are viewed and valued differently. Even within Europe, the prevalence of vaccine-preventable diseases varies as does the perception of their importance or danger.

- Not only adolescents but also adults revealed gaps in knowledge about infectious diseases and their threats and the existence and purposes of vaccines; but there is a good awareness among adolescents and mothers about poliomyelitis, HBV and DTP vaccines – Internet is not a major source of information for mothers regarding infant immunization.
- Safety issues were an important consideration in the discussions about vaccination; within families mothers feel that they are not sufficiently well informed; in part this is because of misleading information.
- With school attendance mandatory for high proportions of adolescents, the presence of a captive audience makes sense for vaccination at school. The continued existence of school health services in most of the countries represented at the meeting testifies to the value that can be attributed to them in fulfilling the role of immunizing young people.
- Furthermore, schools offer opportunities for health promotion (in areas such as sexual health), and programmes for health-promoting schools are flourishing and successful.
- Systems in which vaccination is mandatory lead to higher coverage rates, free provision of vaccines and a guaranteed infrastructure, and there may be compensation systems for adverse reactions to a vaccine.
- The corollary of school attendance is that not all children are in secondary education and therefore not reachable through school health services. Some countries have specific programmes to contact hard-to-reach groups of adolescents, including those with risky behaviours. More energy needs to be put into seeking and immunizing adolescents outside the reach of schools.
- The data in general confirmed that high uptake rates can be achieved cost effectively, with high compliance and better ability to verify immunization status. Efficient administrations are needed in order to contact adolescents and recall them for vaccination. Electronic systems are ideal, but not in wide use.
- Stark divisions were reported on the identity of the staff administering the vaccines to adolescents. In some countries vaccinators were uniquely doctors whereas in others vaccines were given by doctors or nurses under their supervision, or in many cases by nursing staff alone.
- Little specialist or continued education or training of vaccinators was evident in most countries, and is an area for future progress.
- Parents, teachers and adolescents were supportive of adolescent immunization but need to be involved early in discussions about adolescent vaccination.
- The issue of consent was, however, divisive, and little common ground was evident between legislators, politicians, health professionals, parents, teachers and the children themselves.
- Funding too varied among countries. In some the government paid for vaccine and its administration, in others health insurance funded vaccine purchase, while in others the private sector played a large role and some patients had to pay out of their own pockets. Individual approaches have to be formulated and implemented according to local circumstances and policies. Nevertheless, it is evident that national procurement of vaccine is a powerful negotiating tool for lowering the purchase price of vaccines.
- No “one size fits all” solution exists, as evidenced by the mosaic of national, regional, cantonal and municipal approaches that were reported. Yet among these approaches, certain common directions appeared.
- Parents, families and teachers had a crucial role; in private sector, evidence was presented that the dialogue about immunization had

to be initiated with the doctor by the parents, and that that dialogue needs to be encouraged.

- Mothers are the key decision-makers about vaccination, and they want to participate more in the decision-making process.
- Generally, religious views were not an obstacle to success of immunization programmes.

Issues

- Despite the encouraging indication that religion was not an obstacle to vaccination (with certain minor exceptions), it was not evident that it would be easy to change hard and fast traditions, practices and perceptions.
- Cultural sensitivities about mandatory vaccination and consent exist and need to be taken into consideration in planning.
- In some countries the possibility of opting out from mandatory immunization programmes is protected constitutionally, but in others those who refuse to allow vaccination can be punished by law, although it was admitted that this recourse has rarely been taken.
- Coverage data for adolescent vaccination are incomplete or absent, and need to be improved. WHO/UNICEF do not yet routinely collect coverage data for adolescent immunization. This could be encouraged and proposed for the future.
- The quality of call-recall systems and data collection also needs to be improved, in particular through use of electronic means; an identified strength of the public health service in Flanders (Belgium) is the existence of an Internet-based database on vaccination with access for all vaccinators. At the same time, data protection issues need to be resolved. The software used should be compatible and user-friendly.
- A report from Scotland highlighted the complexity of the logistic considerations for school immunization (e.g. timing, location, presence of parents and doctors, vaccine delivery and cold chain); tight coordination is needed for effective campaigns to be undertaken.
- A related issue was the question of how to balance and embed immunization campaigns within routine school health services. Campaigns can place heavy burdens on nursing and other immunization staff.
- Both in the United States of America and several countries in Europe the powerful role of paediatricians was evident. In the United States paediatricians were more likely to vaccinate than family physicians, and the dominance of the paediatric specialty was observed also in Greece and some other countries.
- In the United Kingdom incentives paid to general practitioners for child and adolescent vaccination sometimes had the paradoxical effect of being a disincentive, when doctors in deprived areas stopped offering vaccinations because they knew that they would not achieve their targets.
- Numerous countries recognized that there were socioeconomic and other risk factors that contributed to children and adolescents not being immunized. How to overcome those obstacles and indeed how to reach out-of school children were unresolved issues.
- Although most countries represented at the meeting had school-based systems, the number of active systems is declining.
- Most school health services operate in the state system, raising the question of how to involve and raise coverage rates in the private sector. The more general role of the private sector and its reporting of vaccinations was an issue that needs further consideration. Mixed systems can offer benefits but need coherence, coordination and good communication between all parties.

- Concerns were voiced that, with school health systems under the control of education ministries, health and funding for vaccination programmes may be given lower priority (a similar argument to that for countries where responsibility lay at levels other than central government).
- With respect to communication, parents and adolescents have different information needs as well as rights to information and in decision-making. Within the school setting, adolescents' embarrassment and need for privacy and confidentiality have to be taken into account in vaccination programmes. Other potential barriers (eg irrational fears of needles, fear of side effects) have to be overcome for successful programmes.
- Parental consent, minors' consent (assent) and legality thereof (e.g. Switzerland), concept of "capacity to understand" and "competence", action in case of parental opposition – these and other issues are the focus of much debate, not just for immunization programmes, and will continue to be discussed.
- Another feature that emerged was the disconnect between practice for immunization and other medical procedures ("treatment"), including the role of school health services to deal with other health problems such as drug use, alcohol use, and violence.
- Numerous stakeholders were identified, and the engagement of the media, faith organizations, politicians, education authorities, primary health care providers and professional organizations was noted.
- With regard to the decision-making process about vaccination and the introduction of new vaccines, it was clear that no matter how many or how few involved parties there were, the process was slow, and a challenge is how safely to accelerate it, especially for the introduction of new vaccines.
- That, of course, raises funding issues, and here again the picture was complex, with a broad range of parties playing a role- from ministries of health and national insurance bodies to private insurance schemes and patients themselves paying out-of-pocket expenses.
- The concept of health-promoting schools seems to be successfully taking off. Health promotion could be broadened to include immunization, yet health promoters seem to be reluctant to embrace health protection.
- Health care providers alone cannot meet adolescents' needs: there has to be partnership and networking - of vaccinators, teachers, parents and young people all playing a role.
- Vaccination should be integrated into other interventions in health systems (e.g. sexual health education and sports medical examinations). Various approaches are being successfully used by countries to reach adolescents.

Action points for the future

The participants agreed a series of action points for the future.

- every country has a duty to offer immunization to every child
- promote the rights of adolescents by basing decisions on the Charter for the Rights of the Child
- resolve consent issues - from individual interventions to blanket assents
- countries should work towards lowering the age of consent to 12 years for immunization and perhaps for some other medical procedures as well ("treatment")
- redefine the approach of the Expanded Programme on Immunization, designed to reach infants, in order to accommodate childhood as well as adolescent vaccination
- reduce time between launch of a new vaccine and financing and implementation of a universal immunization programme
- motivate and secure existing services in order to reach adolescents and to assure funding of new vaccines
- retain and sustain school health services
- estimate costs of school-based programmes
- instigate action where school programmes no longer exist and where private sector is not adequate to reach adolescents or where they are poorly covered by insurance
- take steps to reach out-of-school, deprived or disadvantaged groups
- bring paper-based call-recall systems into the electronic age
- improve collection and quality of data on vaccine coverage of adolescents; use Internet-based approaches with harmonized databases (successful examples) and check vaccine documentation
- institute training - from undergraduate medical students to post-graduate courses and continuous education
- generate and disseminate clear and authoritative information to counter anti-vaccination lobbies.

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