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Conference report

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

Abstract

The Viral Hepatitis Prevention Board jointly organized with the European Union for School and University Health and Medicine a meeting on the prevention and control of viral hepatitis through adolescent health programmes in Europe, held in Ljubljana, Slovenia, 15–16 March 2007. Participants from some 16 countries in Europe as well as the United States of America emphasized the importance of reaching adolescents mainly through school health programmes, provided an overview of currently existing youth health systems and reviewed their experiences with childhood and adolescent immunization programmes. The meeting concluded with a discussion of issues, lessons learnt, opportunities and action points for the future.

Keywords: Adolescent; School health; Viral hepatitis; Vaccination

1. Introduction

Participants from some 16 countries in Europe as well as the United States of America discussed the prevention and control in European and other industrialized countries of diseases that can be prevented by vaccines, such as hepatitis B, mainly through school-based programmes.

The objectives 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 to setting up, implementing and evaluating vaccination programmes for children and adolescents, and to identify the role of various partners.

Tables 1 and 2 summarize the childhood and adolescent vaccination programmes of the participating countries, their strengths and the challenges they face, as presented at the meeting.

2. Context

2.1. The context—public health

Communicable diseases are still very much present in Europe, despite progress in their prevention and control. Both the public and public health workers were disturbed to learn of recent outbreaks of measles in western Europe. They are also concerned today about the rise in other communicable diseases, such as tuberculosis and its extremely resistant forms.

Concern about infectious diseases, however, has been dominated by HIV/AIDS, but one Dutch source was quoted as saying that in the Netherlands more people were dying from hepatitis B than from AIDS. Worryingly, rates of hepatitis B are increasing in young girls, mainly acquired through heterosexual intercourse. The experience with hepatitis B – more

☆ On behalf of the Viral Hepatitis Prevention Board (VHPB) and the European Union for School and University Health and Medicine (EUSUHM). A group of experts was called together and met in Ljubljana, Slovenia, on 15–16 March 2007, to discuss and review prevention and control of viral hepatitis through adolescent health programmes in Europe. Participants: Selim Badur; Hans Blystad; Paolo Bonanni; Ueli Bühlmann; Rudy JF Burgmeijer; Claire Cameron; Norbert De Clercq; David FitzSimons; Nicole Guérin; Roger Harrington; Luc Hessel; Karel Hoppenbrouwers; Jeanne-Marie Jacquet; Kaarina Jarvenpaa; Wolfgang Jilg; Mojca Juricic; Mark Kane; Mimi Karovska; Alenka Kraigher; Marina Kuzman; Harold Margolis; André Meheus; Hanne Nokleby; Vassiliki Papaevangelou; Matthias Pulz; Susan Rosenthal; Françoise Roudot-Thoraval; Craig Shapiro; Daniel Shouval; Susanne Stronski Huwiler; Simon Tamas; Pierre Van Damme; Alex Vorsters; John Ward; Alessandro Zanetti.

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Table 1
Breakdown of adolescent vaccination programmes for countries represented at the meeting

Country	Well-developed school system	Antigens[a] (school age ≥6 years and adolescents)	Mandatory	Infrastructure for vaccination		Number of contacts (age range)[b]	Vaccinators	Training	Financing
				Well developed	Location				
Belgium	Yes	HBV, DTaP-IPV, dTpa/Td, MMR2	No	Yes, Web-based system in Flanders	At school or organized through the school in a health center	7 (3–14 years)	School doctors/nurses, general practitioners, paediatricians	Pre-service training at medical school (general practitioner curriculum), Master Youth Health Continuous education	Shared between Federal and Regional Ministry of Health
Croatia	Yes	HBV dT, MMR2, OPV, BCG	Yes	Yes	Public health institution ($n = 20$) and at school; 1 nurse and 1 school medical specialist/5000 children and adolescents	6 (6–19 years)	Nurses, school health system for school children	Pre-service training at medical school	Health insurance system
Finland	Yes	MMR2, dTap, HBV (risk groups outside school system)	No	Yes	At school (7–16 years); 1 nurse/600–900 pupils, 1 doctor/2100 pupils	3 (4–15 years)	School health nurses, general practitioners, private polyclinics (not free of charge)	Pre-service training at medical school, training handbook issued, telephone counselling system	National budget, local government, traditional vaccines free of charge, new vaccines chargeable
France	No	DTaP, IPV, dT, MMR2, HBV catch-up	No	No	Outside school	3 (6–18 years)	General practitioners, paediatricians, public vaccination centers, nurses under supervision	Minimal in medical education, national guide issued	Free of charge or refundable, social security system complemented by private insurances
Germany	No	dTaP, IPV, HBV (catch-up), MMRV (catch-up)	No	No	Local health department at school entry	2 (5–17 years)	Local health department, general practitioners, paediatricians	Minimal in medical education	Health insurances
Greece	No, but school entry medical certificate needed	DTaP, BCG, HBV catch-up	No	No	Outside school	2 (11–18 years)	Paediatricians, public/private, nurses in public sector	Not specific	Covered by public insurance or by parents and/or private insurance in private sector where parents pay for doctors' visit
Hungary	Yes	DTaP, IPV, dT, MMR2, HBV	Yes	Yes	At school	3 (11–14 years)	School doctors, general practitioners, paediatricians	Pre-service training at medical school	National budget + social security, mandatory vaccines free of charge, not mandatory vaccines, 25% of costs reimbursed
Italy	No longer any school health system local vaccination services	DTaP, IPV, MMR2, dTpa, Var (catch-up)	Depends on antigen	Local health unit	Outside school	2 (5–15 years)	Public health services (nurses, physicians), family paediatricians	Pre-service training at medical school, in-service 'ad hoc' courses	Regional authorities and central government; re-commended vaccines free of charge
Norway	Yes	DTaP-IPV, MMR2, DT(aP), IPV, HBV (risk groups outside school system, re-evaluation ongoing)	Mandatory to offer, but not to accept	Yes	At school (responsibility of the municipality)	3 (7–16 years)	Public health nurses	School health nurses have specific training	Government
Slovenia	Yes	T, dT, MMR2, HBV	Yes	Yes	Outside school (school dispensaries at regional health centres)	3 (5–19 years)	School doctors at health center, nurses at health center, general practitioners	Pre-service training at medical school, advanced in-service training	National Health Insurance Institute of Slovenia
Switzerland	Yes (school health system at cantonal level)	HBV, DTaP-IPV, dT, MMR2, Var (catch-up)	No	Yes	At school and private sector, school health system at cantonal level (26 cantons, 26 ministries of health and 26 health laws)	2 (12–15 years)	Private doctors, preventive school health system: doctors, nurses	Postgraduate, continuous medical education, national meetings, in-service training for nurses	National health insurance vaccines free of charge through school health system
Macedonia	Yes	Td, R, T, MMR2	Yes	Yes	At school: public health services for schools and adolescents	6 (7–18 years)	Paediatric/school nurses, school doctors, paediatricians, general practitioners	Pre-service training at medical school, special training for staff is organized	Government and health insurance

The Netherlands	Yes, immunization not part of school health system (except for MMR and Td-IPV at 9 years of age)	MMR2, Td-IPV, HBV (risk groups outside school system)	No	Yes	Outside school (responsibility of municipalities)	2–3 (9–18 years)	Nurses (child health care)	Postgraduate youth health specialization, no training for general practitioners and paediatricians	Government and health insurance
Turkey	Yes	OPV, HBV, MMR2, R, dT	No	Yes	Outside school, public health centers, campaigns at school	2 (7–15 years)	Nurses in public health center	Pre-service training at medical school, in-service training of nurses and general practitioners	Government, free of charge at public health centre
United Kingdom	Yes	Td, IPV, MMR (catch-up), HBV (for high risk groups), Campaigns, e.g. menC	No	No	Nurses in state schools (93%) and in private schools (7%), some in primary health care	1 (13–18 years)	Nurses, health visitors, general practitioners, community paediatricians	Minimal undergraduate training, training in resuscitation and, immunization standards for all who immunize or give advice on immunization	National Health Insurance, free of charge for vaccines
United States of America	No	Td, MMR2, HBV, HAV	No, school entry law only	More or less	Outside school	2 (11–18 years)	Public health nurses and physicians (14.2%), private practice; nurses and physicians (60.4%), mixed (24.2%)		Free of charge in the Vaccine for Children Program

[a] 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.

[b] Number of contacts within specified age range; possible contacts outside this age range can still occur within or outside the school health system in a specific country.

than 25 years since the licensing of the first vaccine – will be valuable for the introduction of human papillomavirus vaccine against cervical cancer, and in turn experience with the latter will be useful for yet other vaccines (for instance, HIV, if and when that arrives) or campaigns aimed at young people.

In 2005, the World Health Assembly adopted resolution WHA58.15 on global immunization strategy. It "urged Member States to meet immunization targets expressed in the United Nations General Assembly special session on children; to adopt the Strategy as the framework for strengthening of national immunization programmes, with the goal of achieving greater coverage and equity in access to immunizations, of improving access to existing and future vaccines, and of extending the benefits of vaccination linked with other health interventions to age groups beyond infancy; to ensure that immunization remains a priority on the national health agenda, . . ." 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 to a catch-up vaccination for missed opportunities in the past. Coverage data for immunization of adolescents has not been collected in 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 sector or the public sector, or both. Vaccines can be administered through clinic-based schemes (e.g. in health centres), in the community or in schools. However, because of the age of the target group – the WHO definition of an adolescent being aged between 10 and 19 being adopted – legal issues (such as consent for minors) arise. Furthermore, medical issues also complicate the matter; a substantial proportion (about 10%) of young people suffer chronic illnesses (e.g. diabetes, whose incidence in young people is increasing) which need to be considered before vaccination is given. Other temporal, coincidental associations in adolescents (e.g. asthma, auto-immune thyroiditis and Guillain-Barré syndrome) may raise safety concerns.

Not only have new vaccines, for instance, against type C meningococcal meningitis and pneumococcal disease, been introduced, but others, in particular rotavirus and human papillomavirus, have been licensed and are being launched in several countries. Their introduction 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. That process will differ by country and sometimes by state, region or canton and will involve both public and private sectors. But no matter what system of government, a common feature was the unduly long time interval between launch and delivery in programmes, and the net result is that at present these new vaccines are expensive and underused.

Table 2
Coverage, strengths and challenges by country

Country	Coverage	Strengths	Challenges
Belgium	>75% (Flemish), >68% (French) (HBV)	Well-functioning school health network Collaboration with general practitioner; complement the network Free of charge vaccines Computerized vaccine database Vaccines fit in broader health check up	To preserve the harmonization of programmes across regions; To increase documentation and registration, including that of adverse events To reduce time between launching, financing and implementation To develop web-based registration system over the country
Croatia	>93% (HBV >98%)	Compulsory system Well-organized structure Skilled personnel Financial support Reporting system Part of a broader comprehensive programme Parents give permission for all interventions for a whole school year (no informed consent needed for each intervention)	To get parents to give permission for all interventions for a whole school year (no informed consent needed for each intervention) Support of professional organizations needed Time consuming introduction of new vaccines To reach out-of-school adolescents
Finland	No exact data, estimated arround 95%	Well-functioning system Free of charge vaccines Positive attitude to vaccination Nurses in all schools	Refusal by parents (small group) New vaccines: not free of charge Immigration (cultural changes)
France	35–95% depending on vaccine (survey 2003–2004 data)	Good coverage for old vaccines Immunization schedule (theoretically) verified at school and parents advised about need for booster or dose	No school immunization programme since 1998 Moderate-to-bad compliance for new vaccines
Germany	Adolescents: no data; for children 5–7 years: 85–90%; HBV: 85–92%	Campaigns have stimulating effect through private system (general practitioners, paediatricians), where also subsidiary vaccination can be offered	Low coverage of adolescents Specific campaigns needed Provision through public health system is limited Need for coverage studies in adolescents To reach out to children at risk for under vaccination
Greece	18–45% (underestimation, 1996–1997 data)	Success in several regions	The national Paediatric Society will be reluctant to relinquish vaccination to school medicine system To resolve potential conflict between the Paediatric Society and school medicine over incentives Success varies between regions
Hungary	>99% for mandatory vaccines	Well-organized system available at school, easy access communication with parents	To resolve conflict between obligation for vaccination and personal freedom To overcome price obstacles
Italy	>90% for HBV (no adolescent data for other vaccines)	Wide distribution of health units with standard approaches and procedures Accessible for all age groups Free of charge system High coverage	Regional responsibilities could create inequalities To redress the imbalances caused by regionalization of responsibility for vaccination
Norway	90–92%	Written consent from parents Good and effective system High coverage High public acceptance Little controversy	To maintain priority at municipality level To determine whether would introduction of new vaccines would undermine school-based system
Slovenia	91.5–99.2%	High coverage Free of charge Embedded in periodic health check ups Mandatory system	School health system in a process of change Risk of non-existence of system

Table 2 (*Continued*)

Country	Coverage	Strengths	Challenges
Switzerland	No national data 63–80%	Private sector: Well established Lower coverage No outreach School health system: High coverage At lower cost (than through private sector)	Based at cantonal level—and varies between cantons (e.g. 62% have hepatitis B vaccination implementation) Private sector not adequate to reach adolescents School health system not well established over the whole country Long time to introduce new vaccines
Macedonia	>99%	Mandatory system High coverage Monitoring of coverage and case-based surveillance	To achieve higher coverage for all antigens To include hepatitis B prevention
The Netherlands	>90%	High coverage Free of charge Not compulsory Well organized	System terminates at year 9 Slow decision-making No integration with other immunization programmes (e.g. after 9 years of age) Not compulsory (e.g. consequences in the 'Bible belt')
Turkey	85–98%	Free of charge Mass campaign at school Easy access for parents High coverage	No comprehensive school system No adolescent health centers
United Kingdom	No data for adolescents	Based on the primary care system which reaches most children	Low vaccination rate in poorer areas Controversies in the media
United States of America	60–80%	Increasing number of states with school entry law, for middle schools as well	Legal mandate for vaccination requires public support Fewer adolescents insured Lower use of preventive care services by adolescents Limited number of vaccine providers Need for specific strategies for implementation

Each country had its own specificities in terms of providers, in both the private and public sectors, with the participation at various stages of the process of numerous professional bodies, associations and other entities. 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.

2.2. The context—adolescents

Adolescents currently make up about one fifth of the world's population, around 1300 million young people—a positive force in society. Where vaccination of young people between the ages of 9 and 20 years is included in national immunization programmes, these vaccinations are delivered through a mixture of routine visits to health clinics, campaigns and/or school-based activities. School health services have been identified as having a specific role in the prevention and response to adolescent health problems.

Adolescence, with its early, mid and late stages, is a time of extraordinary change, physically and mentally, over a short time span for young people. Their bodies change and their minds develop. They 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. It is a time of much thinking—thinking about themselves, about their own thoughts, 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. The influence of the family, parents and teachers is greater than is apparent [1,2]; often young people accept arguments after a display of apparent rebellion. Nevertheless, they are vulnerable. About a third of adolescents reported experiencing stressful events and one fifth go through a tumultuous development period.

Risks can appeal, too. But the consequences can be serious for health (HIV infection, sexually transmitted infections, and pregnancy, with possible later maternal mortality in lower income countries) [2]. Few adolescents attend primary health care clinics where vaccines are traditionally administered (or even any health clinics over a period of several years), and they have little perception of future consequences of infections. 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.

Young people need a safe and supportive environment, protected by adults through information and school, in order to understand and interact with the world. A survey of young people in several European countries showed that ado-

lescents did not consider themselves well informed about vaccination and most wanted further information, especially about new vaccines, safety and efficacy and the impact of vaccination programmes. Surveys of attitudes also showed that adolescents do admit that fear of disease is a motivating factor for immunization, with a good willingness to be vaccinated against HIV (were a vaccine available) and cervical cancer being reported. Generally their interest in immunization is good, but their knowledge about vaccines is mixed: most recognized the role and value of vaccines against poliomyelitis, hepatitis B and "classical" vaccines, but some were convinced that there were vaccines against diabetes or obesity. In general, girls were better informed than boys, and 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). Young people may be well informed, but putting that knowledge into practice is a different matter, as rates of teenage pregnancies and sexually transmitted infections reveal.

HIV infection, sexually transmitted infections and pregnancy raise more than just clinical issues. Young people may be afraid of the reactions and consequences of their parents and other adults finding out what their child has been doing and what has happened, whether it is pregnancy or an infection. There are legal and policy issues, including consent of minors and consent of parents for under-age contraception or prevention or treatment of sexually transmitted infections. Other legal issues include legislation: in the United States of America some states operate entry laws for students into middle schools, and one comparative study showed that one state with such a policy had dramatically higher vaccination rates for hepatitis B vaccine compared with the state without such a policy.

Some young people are hard to reach. During their youth few adolescents attend primary health care clinics where vaccines are routinely administered. School health programmes are limited, and many adolescents cannot even be reached through those programmes or campaigns that exist. Globally, it was reported that less than half of adolescents in countries outside the industrialized world attend secondary school. The chances of reaching these children with vaccination campaigns are slim.

Where there were no strong school health facilities or vaccine programmes, such as in France, Germany and Italy, rates of adolescent vaccination have been low, but even in the United States of America school-entry laws did not completely overcome low socioeconomic indicators [3]; 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 [4]. In the United States of America, for example, young people's attendance at sports physicals and other existing visits for health care was identified as an opportunity for increasing adolescent immunization rates.

2.3. The context—immunization programmes

The countries represented at the meeting mostly had a strong public health tradition (for instance, Belgium has had a school health system for more than 100 years and in the Netherlands the first well-baby clinic was opened in 1901), 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. Nevertheless, the countries are bedeviled by the continuing complexity of immunization schedules; national, federal, provincial and, as in Italy, regional practices vary, with for instance doses of hepatitis B 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, for example in Norway, it is obligatory to offer vaccination but people have the freedom to refuse.

Globally, older children are vaccinated generally through campaigns but sometimes through routine immunization. Less than half the population aged 5–15 years in Africa and southern Asia are enrolled in secondary education, but 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. As evidenced with hepatitis B and meningococcal meningitis type C vaccination, the school immunization approach is economically attractive (in Scotland one programme found that 70% of the overall cost was for vaccine) [5] and uptake can be high, although as with school-entry laws in the United States of America lower uptake was noted in pupils living in more deprived areas. Coverage rates of 95% were reported in Turkey, for instance, for school vaccination programmes, which come under the responsibility of doctors and nurses in local primary health care centres. The private sector also contributes to vaccination coverage, especially for vaccines that are not part of the school programme, but has to compete against the free vaccination of children in the schools programmes.

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. Records systems are often paper-based and in several countries recall systems are suboptimal or splintered (in Switzerland each of its 26 cantons has its own system for reaching and contacting adolescents for vaccination). Public attitudes towards adolescent vaccination are mostly supportive, but vociferous anti-vaccination lobbies and media scares dent public confidence and lower vaccination rates.

School programmes offer integrated opportunities for health promotion, especially with the implementation of the strategic programme of the European Network of Health Pro-

moting Schools in more than 40 countries in the WHO European Region. Nevertheless, a report from Great Britain noted that the advantages of school immunization programmes, including strong central coordination, were tempered by logistical difficulties such as the need to hire extra nursing staff, finding suitable locations for mass administration of vaccines and the use of paper-based record and recall systems. Pupils appeared to prefer to be vaccinated at school than in primary care settings and there was an element of peer education. Benefits besides high coverage rates include easy access to vaccination for parents (no effort required from them) and easy monitoring of coverage and side effects. On the down side, 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.

A survey of attitudes towards acceptance of adolescent vaccination against human papillomavirus infection showed parents to be spilt between those who favoured a joint decision with the child and those who agree that the child should be able to be vaccinated without parental consent. Politicians too are divided. In Switzerland, the Federal Office of Health ruled that a minor who is considered to have the capacity to make a decision can request vaccination without parental consent but the City of Zürich denies this right.

Even though new vaccines are being introduced in some countries or are in the pipeline, the interval between launch of a new vaccine and implementation of a programme for its wide administration is long. The decision-making path and processes for introduction of a new vaccine in Europe are varied and arduous, sometimes with numerous bodies assessing the seriousness of the disease, the efficacy of the vaccine and the economic aspects. Where there are school health services, purchasing of vaccines is mostly centralized, but elsewhere it was not.

3. Lessons learnt

Based on the parent survey data, it was understood that sociocultural differences need to be recognized [6,7]. Common popular misperceptions exist in societies about the status of vaccination—whether it is mandatory or not. In different societies, 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. Generally, adolescents and mothers showed good awareness about poliomyelitis, hepatitis B and diphtheria–tetanus–pertussis vaccines. In terms of sources of information, the Internet was not a major source of information on infant immunization for mothers.

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. Safety issues were an important consideration in the discussions about vaccination but within families mothers feel that they are not sufficiently well informed; in part this is because of misleading information.

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, although in countries such as Switzerland national data are lacking. 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 simply by nursing staff. 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; 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. Furthermore, within the family, they are the mothers who 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.

4. 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. 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 [5]. 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.

A report on hepatitis B immunization of adolescents in the United States of America underlined the need to balance supply and demand of vaccine, as failed to happen recently with influenza vaccine; raised expectations were not met and funding encountered difficulties. It also emphasized the facts that availability of a vaccine did not automatically mean its acceptance and that acceptance did not guarantee its uptake.

Although most countries represented at the meeting had school-based systems, the number of active systems is declining. For instance, the system in Italy had become moribund and France abandoned in 1998 its experiment with a school programme for hepatitis B vaccination. Federal countries had the normal problems of delegation of decisions to regional, state or cantonal level. In some countries, such as Norway, responsibilities were set at municipal level, and issues related not only to harmonization of decisions and programmes but to maintaining priority for vaccination programmes.

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. 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). Mixed systems can offer benefits but need coherence, coordination and good communication between all parties.

Several other communication issues were raised. 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. Surveys of young people's attitudes and perceptions revealed other potential barriers that have to be overcome for successful programmes: for instance, irrational fears of needles for injection (even though their use in piercing is acceptable), and fear of side effects and injection. Some studies showed a low rate of recall of information given at school.

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 abuse, 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.

5. 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 other medical procedures ("treatment");
- redefine the approach of the Expanded Programme on Immunization, designed to reach infants, in order to accommodate adolescent vaccination;
- reduce time between launch of a new vaccine and financing and implementation of an immunization programme;
- motivate and secure existing services in order to reach adolescents and to assure funding of new vaccines;
- retain and protect 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 postgraduate courses and continuous education;
- generate and disseminate clear and authoritative information to counter anti-vaccination lobbies.

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