

# VACCINATION AND INFECTIOUS DISEASES

## **VACCINATION OF ADOLESCENTS AND STUDENTS: NEW DEVELOPMENTS AND CHALLENGES FOR THE FUTURE**

Pierre Van Damme

*Centre for the Evaluation of Vaccination, WHO Collaborating Centre, University of Antwerp, Belgium*

In view of the dynamics of infectious diseases, the adolescent cohort represents a substantial population able to spread or to block infectious diseases, especially the ones with primary transmission modes at that age, e.g. STI (sexually transmitted infections).

With a prevalence of high risk type human papillomavirus (HPV) infections of 10 to 15% in adolescent girls, and an annual incidence of 12 to 26%, targeting girls at age 10-12 with a future HPV vaccine could for instance have a major importance in protecting individuals as well as blocking transmission.

Indeed, in view of this individual and collective dimension of infectious disease control, adolescents as well as students have been and will continue to be the target for vaccination programmes: depending on the epidemiology of the infectious disease to be controlled, they represent the ideal age group to start up a vaccination programme (e.g. HPV), to implement booster programmes (e.g. diphtheria, tetanus and pertussis), or to set up catch up programmes (e.g. meningococcal C, hepatitis B, MMR, varicella).

Often it is the last opportunity in a country to reach such a large part of the population in an organized universal way. In countries with school health or university health systems this population is rather easily reachable, whereas in other countries GPs or paediatricians have to be involved broadly in order to guarantee a sufficient coverage of such preventative programme.

But with the venue of new vaccines, new issues will arise: are data available on the safety and immunogenicity of co-administration of vaccines, on the long term efficacy when vaccinating adolescents, on the added value to immunize boys against HPV, on the acceptance of large adolescent vaccination programmes against STI, just to name a few.

The decision to implement such new vaccination programmes will need to take into consideration the public health impact of this intervention and the cost-effectiveness compared to other health interventions. Furthermore the optimum age for vaccination, the duration of protection as well as to which extent society is aware and prepared for such a vaccination program has to be determined.

Decision makers need to keep that in mind.

*Key words: vaccination programmes, cost-effectiveness*

## **MASS VACCINATION PROGRAMME ACHIEVEMENTS IN CROATIA (156)**

Gjenero-Margan I., Kaić B., Aleraj B., Ljubičić M., Baklaić Ž.

*Croatian National Institute of Public Health, Zagreb*

**INTRODUCTION:** Besides individual protection mass vaccination programme modifies diseases burden and protects those unvaccinated. The epidemiological methods provide the foundation for developing and evaluating the vaccination programme.

**SUBJECTS:** Overage diseases morbidity targeted with the Croatian vaccination programme before vaccination introduction and in the 1999-2004 periods were compared together with mass vaccination coverage and adverse reactions after vaccination in 2004.

**METHODS:** The evaluation was based on Croatian National Institute for Public Health's Epidemiology of Infectious Diseases Service data. Data are collected in three operative information systems for monitoring the Mass vaccination programme i.e. coverage surveillance, vaccine targeted diseases surveillance and adverse reactions following vaccination monitoring.

**RESULTS AND DISCUSSION:** Mass vaccination coverage for primary immunisation for all vaccines is >95% except newly introduced Hib and tetanus vaccination of the elderly population (93% and 72%, respectively). The epidemiologic approach used for the Programme design resulted in target diseases morbidity reduction of 93%-99% and diphtheria and polio eradication in Croatia. Adverse reactions rates following vaccination in 2004 are low, with the highest rate being for MMR (5.8/10000 doses distributed), All other rates are within the range of 0.6-1.6/10000. Most adverse reactions were mild and without sequelae demonstrating low reactogenicity of vaccines used for mass vaccination.

**CONCLUSION:** The above results are making the Croatian mass vaccination programme the most successful medical intervention in the country.

*Key words: mass vaccination, vaccination programme, morbidity reduction, infectious diseases*

**'SAFE VACCINATION OF CHILDREN IN YOUTH HEALTH CARE: A NEW BELGIAN GUIDELINE FOR THE PREVENTION AND MANAGEMENT OF ANAPHYLACTIC SHOCK' INSTEAD OF 'RECOMMENDATION FOR GOOD MEDICAL PRACTICE FOR THE PREVENTION AND OUT-OF-HOSPITAL MANAGEMENT OF ANAPHYLACTIC SHOCK AFTER VACCINATION OF CHILDREN' (168)**

Vanlander A.<sup>1</sup>, Hoppenbrouwers K.<sup>2</sup>

<sup>1</sup>*Flemish Scientific Society for Youth Health Care, Leuven, Belgium,*

<sup>2</sup>*Department of Youth Health Care, Katholieke Universiteit Leuven, Belgium*

**INTRODUCTION:** In almost all European countries preventive health services are key players in the implementation of national vaccination programs. Collective vaccination of children and youngsters in the framework of well-baby clinics, school and student health services has ended in very high vaccination rates. Most vaccine-preventable infectious diseases being no longer endemic, public awareness about the safety of vaccination was exponentially growing during the last decade. Due to the very small, but real risk of anaphylactic shock after vaccination, questions arise whether safe vaccination of children in preventive (out-of-hospital) settings could be warranted.

**METHODS:** On the authority of the Ministry of Health, the Flemish Scientific Society for Youth Health Care has been engaged in the development of an evidence-based guideline for the prevention and first-aid management of anaphylactic shock related to vaccination of children and youngsters in preventive settings. This guideline was approved by the Belgian Health Council, and will be adopted by the Minister of Health as the standard for safe vaccination practice in out-of-hospital settings.

**RESULTS:** According to actual Belgian recommendations for 0 to 18 years olds, almost 2 million vaccine doses were administered in the year 2004. Based on available U.S. post-marketing data annually no more than 1 probably and 1 possibly vaccine-related anaphylactic incident might be expected in Belgium in this age group.

The guideline consist of two sections:

- (1) A literature overview with information about: (a) definition, pathophysiology and epidemiology of anaphylactic shock, (b) the allergens present in the vaccines used in the Belgium program, and (c) existing international guidelines regarding this topic;
- (2) The guideline itself includes recommendations about: (a) pre-vaccination risk assessment for known allergies, (b) differential diagnosis between anaphylactic shock and other post-vaccination incidents, (c) management of anaphylactic shock, (d) continuous training of cardiopulmonary resuscitation (CPR) techniques, and (e) measures to be taken after vaccination.

**CONCLUSION:** The background of the guideline and the decision process (presented as a flowchart) for the prevention and management of a post-vaccination anaphylactic incident will be highlighted in the presentation. (Study supported by the Flemish Government)

*Key words: vaccination, anaphylaxis, prevention, management, guideline*

## **INSIGHT INTO THE VACCINATION STATUS OF FUTURE FIRST GRADE PUPILS (112)**

Juroš D., Balarin F., Šonjić M.

*Split-Dalmatian County Public Health Institute, Croatia*

**AIM:** The aim of study is to analyse the vaccination status of the children at the examination before the entrance into the elementary school for school years 00/01 and 03/04. Vaccines analysed are DiTePer + Polio and MPR. Results are relevant for vaccination planning of school children.

**MATERIAL AND METHODS:** All vaccine statuses were collected from the children of pre-school age by help of children's' health files. Data were collected from school-medicine doctors from 15 different locations.

**RESULTS:** Total number of children with inadequately done vaccination DiTePer + Polio (<5 applications) is 22.40% for school year 00/01 and 17.77% for school year 03/04.

Total number of children vaccinated properly with MPR is 87.02% for school year 00/01.

**CONCLUSION:** All research have confirmed high level of vaccination with DTP + Polio and MPR.

**DISCUSSION:** Before entering elementary education all children are well protected for DiTePer + Polio, and the next vaccination is in the eight grade so some countries (like Slovenia), transferred this vaccine into the third grade. Do we need to think about that too?

*Key words: vaccination, DiTePer + Polio, MPR, vaccination level, school children*

## **RESULTS OF VOLUNTARY AND ANONYMOUS ANTI-HBC, ANTI-HCV AND ANTI-HIV TESTING, ZADAR 2002-2004 (222)**

Cavenago Morović N.<sup>1</sup>, Foretić Visković V.<sup>2</sup>, Morović M.<sup>2</sup>

<sup>1</sup>*Zadarska County Public Health Institute*

<sup>2</sup>*Zadar General Hospital, Croatia*

**INTRODUCTION:** Croatia is considered as a low endemic area for hepatitis B, C and HIV infections with overall prevalence < 1%. However, the official statistic based on notification data (all the three diseases are mandatory notifiable diseases) have proved to be of limited value in definition of people at increased risk of infection. Zadar has been known for a long time as one of the cities with the highest prevalence of injecting drug users (IDU) in Croatia.

**AIM:** To examine hepatitis B, C and HIV prevalence among persons with risk history of acquiring infection.

**SUBJECTS AND METHODS:** Persons tested on voluntarily basis, coming after the information of anonymous screening test was distributed through various campaigns and media, were taken as "risk population". Randomly selected persons undergoing "routine" medical check-up in laboratory represent "general population".

**RESULTS:** 2/3 of persons with risk histories were between 15 and 40 years; about 50% of "risk population" were unemployed or students. Anti-HBc prevalence was 5%, anti-HCV 9% and anti-HIV 0% in "risk population" vs 15% anti-HBc, 1% anti-HCV and 0% anti-HIV in "general population". The dominant reason for testing was risk sexual contacts 62%, piercing, tattooing and needle sticks 34% and drug addiction 23%.

**DISCUSSION AND CONCLUSION:** The high prevalence of anti-HCV antibodies in 9% of "risk" younger population is in correlation primary with high prevalence of IDUs (1065 registered in 2004) in Zadar. Decreasing prevalence of HBV infections during recent years correlated with HBV vaccination programme introduced in Croatia in 1999. The higher distribution of HBV infections in female correlated with history of risk sexual contacts, the higher distribution of HCV infection in male with drug abuse. Voluntary and anonymous testing showed to be a significant contribution in preventive programmes of HBV, HCV and HIV infections, particularly in areas with high IDUs prevalence.

*Key words: voluntary anonymous testing, anti-HBC, anti-HCV, anti-HIV*

## **REORGANISATION OF THE VACCINE STORAGE AND THE COLD CHAIN PROCEDURES IN ACCORDANCE WITH INTERNATIONAL GUIDELINES AND GENERAL QUALITY RECOMMENDATIONS (163)**

Debyser M., Pauwels J.

*Child & Family, Belgium*

**INTRODUCTION:** Vaccines have a national impact on public health. All vaccines are thermo-sensitive and must be stored and transported within an efficient cold chain. Although this is common knowledge, a better registration shows that even today a lot of preventable problems show up. The vaccine storage and the cold chain procedures within our organisation: “K&G (Child and Family)” has been completely reorganised in 2004, using the international guidelines and the Deming cycle (PDCA) for quality improvement.

**METHODS:** The responsibilities of everyone involved had to be precisely recorded. Therefore a flowchart entitled ‘who is doing what in case of vaccine troubles’ was put in all refrigerators. It contains written duties in case of manipulation problems, quality problems, cold chain problems, vaccination errors, serious reactions and expired vaccines.

A sticker, showing the FIFO (first in first out) principle, was put on all refrigerators. This sticker bears also a message to consider the refrigerator as a critical control point (HACCP). Continuous temperature monitoring with a minimum/maximum thermometer and an audible alarm has also been ordered. A very fast warning procedure, in case of problems identified within a certain batch of vaccines, using fax or pop-up screens on the PC’s, is still pending. All offices received a poster for the doctor with practical information concerning vaccination and its possible pitfalls (schedule, measures in case of anaphylactic reaction, important telephone numbers, other points of issue). The medical files were adapted in order to make it possible to stick the batch number of the vaccines beneath the registration date. Probably the most effective measure taken was the order to count all vaccines before and after the consultation. Every vaccine problem or error with a possible repercussion to a child has to be registered. The data are centrally pooled in order to close the PDCA circle, and make well-documented new actions possible. In this way a number of mistakes were identified and afterwards corrected.

**CONCLUSION:** A much better awareness and follow-up of problems was achieved. And this was true both for the fieldworkers and the general management.

*Key words: vaccines, storage, cold chain, implementation, flow chart*

## **EPIDEMIC OF VIRAL HEPATITIS A (44)**

Mancheva V.

*Public Health Institution, Macedonia*

AIM: The aim of this examination is to show epidemic of viral hepatitis A in village Marvinci-Valandovo.

MATERIALS AND METHOD: The reported cards for infectious diseases and computer information were used. The descriptive and statistic methods of working were used.

RESULTS: Epidemical occurrence of viral hepatitis A starts from 23.10.2002 with 3 reported cases. Epidemic reaches its peak on 31.12.2002, when 7 patients were reported and it finishes with the last patient on 28.01.2003. The biggest number was registered on 28.10.2002. In the epidemic 46 patients were taken ill: 24 female and 22 male. By the age: the biggest number is group from 7-9 year with 16 patients, then aged group from 10-14 year with 14 patients. By profession: 30 pupils, 15 pre-school children and 1 unemployed. By way of cure: 43 are cured in hospital, 3 in domestic conditions. Most of the patients are uncovered with active epidemiological survey, without some of diseases symptoms, with colaboratin of teacher.

CONCLUSION: After serological examination, they are confirmed viral hepatitis A. All off patients are relatives, friends or neighbours. One of more important reason, why has the viral hepatitis A appeared is low social-economic condition for living and low healthy education. Morbidity is 8, 86% of all number of populations.

*Key words: epidemic of viral hepatitis A*

## **OVERSENSITIVENESS ON THE TUBERCULIN PPD TEST IN ALLERGIC CHILDREN (90)**

Podrug Lj., Podrug S.

*Vukovarsko-Srijemska County Public Health Institute, Service for school medicine, Croatia*

**INTRODUCTION:** PPD testing is carried out by regular vaccination calendar in second and seventh grade of the grammar school, before anti-TBC vaccination.

**AIM:** to show the correlation of intensified tuberculin reaction, examined with the Mantoux's intracutaneous tuberculin test, in the children who have had proven allergies on some inhalation and nutritive allergens, drugs and some vaccination.

**SUBJECTS & METHODS:** this study included 1257 seventh grade pupils. Testing was performed with intracutaneous tuberculin test, by intracutaneous injection of tuberculin on the middle third of the inner part of the forearm, with 0, 1 ml preparation PPD (protein purified derivate) in which were 2 i.j. Reaction was interpreted 72 hours after tuberculin injection. Induration was measured, not the redness. If diameter was larger than 6 mm, test was positive. Infiltration larger than 15 mm was considered to be tuberculin oversensitiveness, pertaining to healthy children who already had anti-TBC vaccination.

**RESULTS:** from 1257 pupils included in this study, 32 of them (2%), had intensified tuberculin reaction (PPD larger than 15 mm). 6 pupils (18 %) were oversensitive with no allergies ascertained. 26 pupils (82%) were oversensitive with already known allergy.

**DISCUSSION:** PPD test has shown oversensitiveness in major percentage of the children who were allergic on drug – penicillin.

**CONCLUSION:** from these results we can conclude that intensified tuberculin reaction is characteristic for pupils who already have proven allergy on drugs, inhalation and nutritive allergens or vaccination.

*Key words: PPD test, oversensitiveness, allergies*

## **ACUTE OTITIS MEDIA (45)**

Bogdanova Cilakova M., Karovska M., Kamceva S.

*Medical Center Veles, Macedonia*

**INTRODUCTION:** Acute otitis media is not so rare disease in school age.

**PURPOSE:** The characteristics and the frequency of acute otitis media at our patients.

**MATERIAL AND METHODS:** The study was conducted in a tree year period (2002-2004) and it comprised 561 patients, 317 male and 244 female. Patients were in age from 7 – 20. We used the analytic and descriptive method. Diagnosis was based on standard clinical, biochemical and microbiological findings.

**RESULTS:** The incidence of acute otitis media was higher in males-57%. It also increased in winter and early spring and is the most frequent in age from 10-14 with 50%. Viral and bacterial infections were the most common cause for the otitis, so the adenoidal vegetations, bad hygiene and life conditions as the predisposed factors. Streptococcus pneumonia was the most common causative agent of acute otitis media caused by the bacterial infection (30%) then was H. Influence and a low percent was on S. Pyogenes, M. Catarrhalis, S. Aureus and others.

**CONCLUSION:** Acute otitis media is the most prevalent disease of childhood, after respiratory tract infections. The incidence of the disease tends to decrease after the age of 6 years, but it also tends to increase in age of 10-14. Diagnosis and therapy on time is necessary for avoiding complications and sequels of acute otitis media witch may seriously disturbed the health of the young population.

*Key words: health needs (chronic non-communicable diseases)*

## **A CASE OF OSTEOMYELITIS IN TEENAGE BOY (63)**

Kirkovska C., Krstanoska B., Kirkovski I., Petkova V.

*Medical Center "Dr. Trifun Panovski", Bitola, Macedonia*

**OBJECTIVE:** Presentation of a case of osteomyelitis in teenage boy.

Definition and brief review of the osteomyelitis as a disease.

**PRESENTATION OF THE CASE:** The patient is an 18 year old boy who came to the school ambulance due to the pain in the lumbosacral region. Also, he had difficulties at every movement of the legs. The patient's anamnesis has showed that he had been exercising hard body work (lifting weight) in the gym for over a month. Also, the patient said that he felt severe pain when he had jumped down the stairs a week before. His medical record showed that he has grown up over 25 cm during the last three years.

The X – ray radiography has shown a protrusio disci intervertebrales L5 / S1. A recommendation was given to the patient to stay in bed. The treatment included nonsteroid anti-inflammatory medicaments. However, this treatment did not result in improvement of the patient's health; on the contrary his condition has worsened due to increased pain, inability to move and raised body temperature. The further treatment included laboratory tests (blood analysis, sedimentation, rheumatic factors, Wright's test), Mantoux test, as well as CT.

The results have shown high sedimentation, the leukocytosis and the CT result that showed lysis of S1 and S2 . Therefore the patient was sent to an orthopaedic clinic for further treatment and tests. There he was treated with antibiotics. The trepanation of the vertebrae, and the histopathologic, cytologic and microbiologic findings helped to establish the final diagnosis: osteomyelitis S1 / S2.

The patient has been cured and he is in good condition now.

**CONCLUSION:** The analysis of this case has shown that the fast growth of the bone tissue at this age, uncontrolled body work at gym and the microtrauma of the osseous tissue in the sacral region of the vertebrae, resulted in "locus minoris" for appearance of a hematogenic bone infection in this patient.

*Key word: osteomyelitis*

## URINARY TRACT INFECTIONS CAUSED BY E. COLI AT SCHOOL CHILDREN IN SLAVONSKI BROD DURING THE 2003 YEAR (75)

Krištof Ž., Pervan T.

*Brodsko-Posavska County Public Health Institute, Croatia*

**INTRODUCTION:** During the 2003 year microbiological laboratory of Public Health Institute of the Brod-Posavina County analyzed total 40237 samples. Urine samples were 31.8%. From total amount of analyzed samples of urine positive were 27.6%, from which 201 samples was positive at school children age.

**SUBJECT:** Purpose of this research was to examine frequency of urinal infections caused by E. coli at school children during 2003 year. Beside that we want to determine sensitivity on antimicrobial medicaments, find out connection between number of leukocytes in sediment and presence of urinal infection. Also we made agglutination test for detection of percentage of uropathogenic strains of E. coli.

**METHODS:** Samples of urine collected by obtaining the midstream flow by the clean-catch technique, were inoculated with calibrated loop on standard blood agar plates, while sediment was coloured in methylene blue for the purpose of presentation possible leukocyte presence. After incubation on 37 C thru 24 hours suspected colonies are identified by specific bio-chemical tests as well as determination of the urinal pathogenic with aglutunatin test.

Test of sensibility on antibiotics was performed with disk-diffusion method on Muller-Hinton agar plate.

**RESULTS:** In 2003 there were from total of 643 taken samples 31.2% of positive urine results at school children. From that were 53.7% urine samples where presence of E. coli was founded. Rest of positive results were caused by ENTEROCOCCUS SPP., STREPTOCOCCUS SPP., PROTEUS MIRABILIS, KLEBSIELLA PNEUMONIAE and other in very low percentage.

**DISCUSSION:** Tests of sensibility show us very good sensibilities (more than 60 %) on all tested antibiotics, excluding Amoxicilin (41.7%) and Ampicilin+Sulbactam (59.3 %).

In sediments of urine are found leukocytes in 77.8% cases of urinal infections caused by E. coli. Uropathogenic E.coli was 23.1%. In this groups were not ESBL strains.

**CONCLUSION:** Samples of urine are the biggest part in total number of samples for microbiological tests in 2003 year. In that period we have analyzed 643 urine samples of school children. From that amount just around one third of urine samples were positive, and most isolated cause was E. coli. Percentage of the positive leukocytes in urine sediment is in correlation whit present urinal infection.

*Key words: urinary tract infections, school children, E. coli*

## VACCINATION AGAINST INFLUENZA (228)

Tešović G.

*Dr. Fran Mihaljević Infectious Disease Clinic, Zagreb, Croatia*  
Sponsored by MEDOKA

Influenza is the classic emerging infection. Despite the availability of relatively inexpensive vaccines, influenza is the least controlled vaccine-preventable disease in industrialised countries. Vaccination coverage of high-risk patients has improved in most European countries, but all-cause mortality attributable to influenza continues to increase. A supplemental strategy is to vaccinate the principal disseminators of influenza in community; schoolchildren in the first place. Schoolchildren have the highest influenza attack rates, especially on the beginning of an epidemics, thus representing the main reservoir of infection. The vaccination of schoolchildren in Japan against influenza prevented about one death for every 420 children vaccinated. The most significant reduction in mortality occurred among elderly people.

Currently there is no universal strategy on immunisation against influenza among children. The economic data do not conclusively support universal vaccination. Increased efforts are needed to identify and recall high-risk children which are target population for influenza immunisation. Children with recurrent acute otitis media as well as healthy children attending day-care centres and elementary schools should be included among the paediatric groups requiring vaccination. Schoolchildren vaccination may reduce the socio-economic burden of influenza on the community. Live attenuated vaccine against influenza may become an important adjunct to control influenza among schoolchildren. Effectiveness of a single dose, ease of administration and ready acceptance by children are major advantages of this new vaccine.

*Key words: schoolchildren, influenza, vaccination*

## **PRIORIX: LIVE ATTENUATED MMR VACCINE WITH HIGH SAFETY PROFILE (246)**

Harjaček M.

*Clinic for children diseases Zagreb, Croatia*  
Sponsored by GlaxoSmithKline

Croatia has a long history of vaccination against viral diseases. Since 1978 the combined MMR vaccine, manufactured by Imunološki zavod, is included in the Croatian vaccination schedule. Croatian MMR vaccine is composed of Wistar RA 27/3 rubela strain, Edmonston-Zagreb measles and L-Zagreb mumps strain. Since 2002 PRIORIX, MMR vaccine manufactured by GlaxoSmithKline, is available in Croatia. Similar to Croatian MMR, PRIORIX is composed of Wistar RA 27/3 rubela strain, but other two antigens are very different. In addition to rubela, PRIORIX has Schwarz measles strain and RIT 4385 mumps strain. PRIORIX production is in accordance to WHO guidelines for MMR vaccine production. PRIORIX is highly immunogenic and protective with high safety profile. Vaccine mumps strain RIT4385, although derived from Jeryl Lynn strain, has a even better safety profile with comparable immunogenicity and long-term protection. RIT4385 has low neuroreactivity with incidence of 0-1/750 000 post-vaccine aseptic meningitis<sup>1,2,3</sup> and low incidence of other systemic or local side effects.

*Key words: MMR vaccine*