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Child infections and immunization problems in adults. Experience of the Family Vaccinal Prevention Center

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The article is dedicated to the vaccination issues of the adult population. The authors list the main factors conditioning the problem's relevance. The given material reflects the experience of foreign colleagues and cites the authors' observations. The amount of people vaccinated at the family vaccinal prevention Center of the RAMS FSBI "SCCH" from January 2010 and July 2012 thanks to the active health communication offered by the Center's personnel is as follows: against hepatitis B - 118, against hepatitis A - 121, against chickenpox - 92 adult patients. According to the authors, this category of patients is being actively immunized against influenza and pneumococcal infection. An important role in the article is given to the cervical carcinoma prevention. 2,352 vaccinations against the human papilloma virus were made at the Center in 2007-2011. The authors analyzed the motivation of the vaccinated patients and proved the role of public awareness measures. The article discloses the role and prospects of family vaccination and shows the need for regulatory legal measures in order to change the current unregulated vaccination tendencies in the adult population.

Keywords: *infectious diseases, vaccinal prevention, national immunization calendar, adults, children*

Control and reporting system for the immunization of children and adolescents in the framework of the National Immunization Calendar on all stages from maternity hospital to school present in Russia has resulted in many dangerous infectious diseases becoming controlled infections. Morbidity increase in the senior age group has become a statistical regularity as the vast majority of adults

are not immunized at all. Lack of community health education, insufficient control over the timely routine immunization of adult population and, on the other hand, eager and aggressive activity of anti-vaccine movement advocates are the main reasons why most people over 18 years of age find themselves unprotected against infectious diseases. The family vaccinal prevention Center at the FSBI "Scientific Center of Children's Health" conducts active work with families due to the urgency of this problem. The experience that we have accumulated on the main vaccines in adult patients is given in this article.

One cannot but touch upon the problem of immunization in adults while discussing family vaccination; it is a problem indeed, as it is only rarely discussed in research-and-practice circles, while infectious diseases are dangerous at any age. Some of them, the so called infantile infections, take a severe course in adults. Moreover, the chronic diseases accumulated with age conduce the development of complications of infectious diseases; this might even result in the life expectancy reduction. It should not be forgotten that it is the adults that may often play an important role in transmitting "infantile" infections. Thus, it should be admitted that adults require immunization as much as children do. All the more reason for it is that the prescription of most vaccines is not age-limited.

Justification of immunization for adults is multicomponent.

- Some vaccines, such as the DT, are not capable of creating life-long immunity, which is why they must be administered repeatedly at certain intervals.
- Causative agent's antigenic composition renews; this requires regular vaccination (e.g., seasonal vaccination against influenza).
- Protection against some causative agents is necessary at a certain age. Immunization against cervical carcinoma is recommended both to girls and young women. Vaccine against chickenpox and *Herpes zoster* is indicated to people over 60 years of age.
- A range of vaccines is administered according to epidemiological indications or to representatives of certain occupations.

E.g., hepatitis A vaccines are administered to food-handlers and sewer system workers; travelers are vaccinated against the destination-relevant infections (tick-borne encephalitis, meningitis, yellow fever).

- Some diseases or pathological states (cardiac and pulmonary diseases, cancers and nephrological diseases) require immunization against the infections, which are especially dangerous for this category of patients (pneumococcal infection, chickenpox, influenza etc.).
- Most adults have absolutely no idea about their vaccinal status; this equates them with immunologically naïve categories. These people should be vaccinated again (according to certain schemes).
- "Cocooning" is becoming widespread in Europe; it aims to protect newborn infants against the most dangerous infections by administering vaccines to the adults who would come into regular contact with a child. Even the 3rd-trimester pregnant women who had not been vaccinated before getting pregnant are included in this category.

Vaccination of adults is a regular occasion in most developed countries. The USA has the best vaccination situation; there the National preventive vaccination calendar is clearly divided into the vaccination of children, adolescents and adults (tb. 1) [1].

However, the issue of the uniform vaccination system for adults is still relevant for the world healthcare. In most countries, the situation is not as well-ordered as in the USA. In particular, analysis of situation in adult population vaccination conducted in 29 European countries in 2010 revealed an uncoordinated character of such recommendations, lack of exhaustive comprehensive information on the uniform adult population vaccination strategy in whole [2].

The issue often seems "neglected", i.e. it is not clear who is to conduct specific immune prevention of healthy adult people: from the elaboration of schemes to the direct realization of vaccination. There are only separate recommendations on the vaccination of adults, including children with chronic

diseases, different funding sources and differently conducted vaccination coverage monitoring at present in the 29 European countries, which took part in the study. The age considered the main feature of an *adult* person varies from 15 to 19 years of age and is on the average 18 years. The number of vaccinal drugs recommended to use in adults is 8 (on the average), although it depends on the country very much – 3-13. Detailed adult population vaccination schedule is elaborated only in 5 out of the 29 European countries.

Experience of the RAMS FSBI "SCCH" family vaccinal prevention Center

The vaccinal prevention room had existed since Soviet times until 2007, when it was transformed into a department known as the family vaccinal prevention Center. However, we started working with adult people much earlier when we encountered the lack of knowledge in the small patients' parents on infectious diseases and vaccination opportunities for themselves. Development of this area is not only because the population's need in being competent about their health has increased, but also because new knowledge on vaccination of both children and adults has appeared. This knowledge is constantly being updated by new scientific research, creation of new vaccines and recommendations to them. We are always glad to see the older generation willing to find reliable information, discuss and obtains answers about their health, which contain the accumulated vaccinal prevention experience and its latest achievements.

For convenience, we classify the vaccination analysis in a family in whole and in adult patients in particular by nosologies. However, the general regularities, conclusions and solution approaches to the family vaccination are common and independent of a given vaccine.

Vaccination against viral hepatitis B

Causative agent of viral hepatitis B (HB) affects hepatocytes and belongs to the genus of hepadnaviruses with parenteral infection mechanism [3].

Hepatitis B virus is contained in all biological fluids of an ill person or carrier and is distinguished by an extremely high tolerance to various physical and

chemical factors: low and high temperatures, multiple freezing and defrosting, ultraviolet irradiation and long-term exposure to acid environment.

Hepatitis B virus (HBV) is transmitted by evolutionally formed natural and artificial ways: transfusion of blood or its specimens, use of non-sterile medical tools or appliances, use of comfort welfare items (scissors, razors, combs, tattoo needles) result in the infection; it is also transmitted sexually [4-6]. Vertical transmission plays a big role in the spread of HB-infection – from mother to fetus; the transmission occurs diaplacentally in 5% of cases, in 95% - when a child passes through maternal passages [3, 7-10].

Viral hepatitis B infection outcomes are unfavorable: transformation into chronic hepatitis occurs in ca. 10% of adults; in their turn, 30% of chronic HBV patients develop liver cirrhosis. Primary liver cancer (hepatocellular carcinoma) is diagnosed in 7-8% in the outcome. In Russia, up to 80% of all primary hepatocarcinoma cases are caused by hepatitis B virus infection [3, 11], i.e. we may speak of the viral source of liver cancer.

At present, vaccinal prevention of viral hepatitis B is the main method of fighting this infection; it has already been introduced in 171 out of 193 member countries of the World Health Organization (WHO), including countries with low endemicity of HBV (USA, Switzerland, Italy, Spain, Portugal) [12-15]. After the cohort immunization of newborns in the first 24 hours of life and of unvaccinated 13-year-old adolescents against viral hepatitis B started in Russia in 1990 in concordance with the WHO strategy, the acute hepatitis B morbidity has fallen from 42.5 in 2000 to 2.7 in 2009 per 100,000. However, HBV remains a serious medical and social issue in the Russian Federation. Total amount of patients with chronic HBV forms and of HBV carrier is ca. 5mn people. These people are the main source of HB-infection.

Health communication is actively conducted at the RAMS FSBI “SCCH” family vaccinal prevention department for parents taking their children to do vaccination. There is a vaccinal school where department doctors read lectures on the main issues of vaccination. Our effort has resulted in many parents vaccinating

against this infection together with their children having realized the real danger of being infected with viral hepatitis B. At the same time, we have discovered by polling adult patients anonymously for the last 2.5 years that motivation to vaccination may be different. 118 people of 18-69 years of age were vaccinated against viral hepatitis B from January 2010 to July 2012. Most patients – 98 (83.05%) – were parents who decided to vaccinate "together" with a child following the advice of our Center's doctor. Immunization of these patients was conducted according to the standard scheme: 0-1st-6th month. 17 adults (14.41%) who came to vaccination themselves had such reasons as: admission to study or work where a vaccination certificate is required. The standard HBV vaccinal prevention scheme was used in these patients as well: 0-1st-6th month. Vaccination of 3 doctors who had had a massive contact with infected blood (anesthesiologist, cancer surgeon and dentist) was conducted after receiving negative blood analysis results for HBsAg and anti-HBsAg. Vaccination in them was conducted according to the urgent immunization scheme: 0-7th-21st day – 12th month. It should be emphasized that these medical workers had not been vaccinated against hepatitis B at workplace, although they had encountered the threat of infection almost every day due to their professional responsibilities.

As for the age, prevalence of young people (under 40 years of age) has been noted (tb. 2).

Given high HBsAg carriage level in population and severe irreversible consequences of the disease, we deem it necessary to introduce the vaccination of adults against viral hepatitis B in the National immunization calendar. Given the relatively low price of the vaccine, availability of the domestically produced drugs and economic loss suffered by each sick person and state in general because of the infection, we believe that the resolution of this issue must not be delayed.

Vaccination against viral hepatitis A

Viral hepatitis A (HAV) is caused by an RNA-containing virus transmitted fecal-orally. The virus is spread everywhere, however, the situation is aggravated by high migration level, unsatisfactory condition of water and sewerage systems,

low hygiene level, hot climate and water deficiency. The most susceptible category in the regions with the aforementioned conditions is children. A distinct tendency towards the change in age morbidity structure is noted in the developed countries: increase in the number of non-immune adolescents and adults and, accordingly, an increase in the number of clinically significant hepatitis A cases among adults [16]. A similar morbidity shift to the older age has also been noted in Russia: thus, children of 0-14 years of age constituted 70% of all patients in the USSR in the beginning of 1980s, while in the RF in 2005 they only constitute 21.2% (these values are even lower in Moscow – only 16.9%) [17]. Thus, in 2009 in comparison with 1999 according to S.L. Mukomolov et al., the proportion of subjects with anti-HAV among the residents of St. Petersburg of 20-29 and 30-39 years reduced by 3.1 and 2.8 times respectively [18]. Apart from medical problems, these age viral hepatitis A morbidity structure changes undoubtedly lead to a considerable economic loss. Viral hepatitis A very rarely leads to the process's chronization; however, it is not a "mild" disease. There are fulminant forms of this disease resulting in fatal outcomes. Apart from hepatotoxic action, the virus disturbs work of many organs and body systems: gastrointestinal tract, central nervous system, including visual analyzer [1].

A complex of preventive measures against viral hepatitis A includes not only the influence on virus's transmission routes and infection sources, but also increase in the population's immunity to HAV. Vaccination against hepatitis A remains the most effective preventive measure; its main fields are:

- control of eruptions – post-exposition prevention – is used to prevent disease eruptions in the infection nidus; must be conducted for 10 days from the contact with a sick person;
- protection of risk groups: people traveling to hepatitis A endemic regions (tourism, work, business trips), including contract servicemen and conscripts; sales and catering workers (including children's preschool institutions [CPI] and schools); water and sewerage service

workers; people suffering from chronic hepatic diseases, including infectious hepatites.

- universal cohort immunization programs [19].

Cohort immunization is conducted in Israel, Spain, Italy and the USA [12, 13, 20, 21]. As for Russia, extensive routine immunization of children against HAV is conducted only within regional programs: the best results have been achieved in Perm Territory, Republic of Sakha (Yakutia), Saint-Petersburg and Lipetsk. According to the Order of the Moscow Healthcare Department, children of 3-6 years of age before entering CPI and risk groups must be vaccinated in the framework of the Moscow regional calendar [22]. However, this program is not fully implemented due to insufficient financing and lack of control.

Thus, the first step in fighting viral hepatitis A is to introduce vaccination of preschoolers into the National calendar; this will reliably result in the considerable reduction of adult patients as well. Low viral hepatitis A lethality and lack of severe complications (apart from cases of overlay of this infection on chronic hepatites B and C) cannot excuse further delay of immunization. However, apart from that, vaccination of risk groups against this infection and post-exposition prevention in adults are extremely important as well; they must be strictly inspected. At present, there is no such control and no health communication to population; we have received evidence ourselves. Information on the spread of hepatitis A, its clinical manifestations and simple and effective opportunity to avoid infection by vaccinating against HAV was a revelation for many our adult patients.

121 people of 18-66 years of age were vaccinated against viral hepatitis A at the RAMS FSBI “SCCH” vaccinal prevention department for 2.5 years – from January 2010 to July 2012.

As with vaccination against viral hepatitis B, the most active vaccinees were young people (under 40 years of age) (tb. 3).

The main motivation factors for adult patients were touristic trips abroad and in the country within Russia (90%) and employer’s requirements when applying

for a job in catering, sales and children's educational institutions. There were no cases of vaccination due to the contact with a viral hepatitis A infected person.

Vaccination against chickenpox

Infection caused by human herpesvirus 3 is extremely contagious and is spread everywhere. Per se, one and the same virus may cause 2 different diseases: chickenpox at exogenous infection and *H. zoster* at endogenous virus activation. This infection is characterized by apparent seasonality and airborne transmission [3, 13, 19, 23]. Vertical (transplacental) infection transmission from mother, who developed chickenpox during pregnancy, to fetus is possible; this results in fatal consequences [24]. Chickenpox takes a severe course also in adults and patients with immunodeficiency: cancers, HIV-infection; in people receiving systemic corticosteroids, immunosuppressive therapy and after organ transplantation. Chickenpox lethality in this group of patients may be up to 10%.

Chickenpox has not yet been managed by a simple measure – vaccinal prevention – despite evident enormous economic benefit of such a program: chickenpox causes the 2nd worst (after intestinal infections) economic damage out of all infectious diseases, which includes direct medical (drugs, remuneration of labor of medical staff) and indirect expenses (temporary disability). Up to 10-12% of all patients are adults, and this is in adults that the "infantile" disease takes a severe course, with a risk of complications.

3 main strategies of preventing chickenpox have been developed:

- selective vaccination of patients with high risk of complicated chickenpox course;
- post-exposition prevention;
- universal cohort immunization of all susceptible children over 12 months of age using a double-dose immunization scheme [25].

At the RAMS FSBI "SCCH" family vaccinal prevention department, we provide health communication to the parents of our small patients. Thus, we vaccinated against chickenpox 92 adult patients of 18-72 years of age from January 2009 to May 2012.

Tb. 4 shows that young people (under 30 years of age) are prevalent among the adult patients who we vaccinated.

According to the poll, the main motives of the chickenpox vaccinees were:

- fear of contracting chickenpox from the child (61 people; 66.3%);
- women of reproductive age planning pregnancy (19; 20.7%). Interestingly, all of them were vaccinating against rubella and did not know about another real threat for the future fetus – chickenpox. Women were making a decision to vaccinate against 2 infections after being consulted by a Center's doctor;
- post-contact vaccination (12; 13%). Out of this group of vaccinees 1 woman contracted the disease on the 17^{th} post-vaccination day, but the infection took a mild course (no hyperthermia, non-abundant rashes).

A story of a young man who turned to the department after contacting an infected friend on the severe chickenpox course is very instructive: "He experiences such a pruritus all over his body strewn with elements that he is ready to jump out of the window only to get rid of it".

Of course, the situation will not change until vaccination against chickenpox takes its place in the RF vaccination calendar. In the meanwhile, every therapist, obstetrician-gynecologist and pediatrician must communicate to their patients information on the importance of this preventive measure.

Vaccination against influenza

It is difficult to find a chronic disease that influenza does not influence unfavorably. Given that chronic diseases only "accumulate" with age, vaccination against influenza is indicated to all people over 60 years of age, because it is in old age that influenza may often be complicated with pneumonia, especially in people with chronic pulmonary diseases, tuberculosis. A large sample of patients with chronic pulmonary pathology in Holland showed that influenza exacerbated the primary process in 13% of patients; pneumonia, heart failure and death – in 2%, mainly in people over the age of 65 years. I.e., patients with cardiac, pulmonary

and renal pathology, diabetes and immunosuppressed patients (because of a disease or after transplantation) must be vaccinated just like old people are [26].

Apart from the influenza virus immunization of children, the family vaccinal prevention Center has also analyzed immune prevention in the senior age group [27]. The analysis revealed that the most susceptible of severe course of influenza virus infection are people over 60 years of age constitute only 11.6% of all adults vaccinated against influenza. Interestingly, old people observed at the Center are grandparents of small patients who had not initially been thinking about influenza virus vaccination. Only a talk with a doctor could convince them to protect themselves as well. The main motivation for both parents and seniors was “a fear of being an infection source for their children in case of contracting influenza”. Young parents (of working age) gave various reasons why they decided to immunize against influenza; the main reason was the unwillingness to suspend working schedule because of influenza.

Thus, the analysis of appealability of adult patients showed that such a reason as threat of severe or complicated infection course rarely prevails: people do not know and do not read about it. Attitude to vaccination as the protection of children against infantile infections remains dominant in contemporary Russia.

Interestingly, parents immunized “instead” of a child or together with a child are somewhat right. Appraisal of influenza virus vaccination’s epidemiologic efficacy in children showed that vaccinated children who still developed severe acute respiratory infection were from families where closest relatives, who refused from influenza virus vaccination in due time, constituted the disease source. As a result, scientific work substantiated high significance of joint vaccinal prevention of all family members against influenza. Maximum protection of infants and senior family members against influenza and its complications is gained when the whole family is covered.

Vaccination against pneumococcal infection

Pneumococcal infection causes such severe diseases as meningitis, sepsis, bacteremia and pneumonia; pneumococci are the main cause of bacterial otites

media and sinusites. *Streptococcus pneumoniae* colonizes nasopharynx and is spread by airborne transmission. Small children are the most frequent pneumococcus carriers; carriage rate is estimated from 27% in the developed countries to 85% in the developing countries [28].

Apart from small children, another group of people susceptible of severe course of pneumococcal infection is people over 60 years of age. Problem of increase in morbidity and mortality of senior population of pneumoniae and invasive pneumococcal diseases is recognized in the world in whole and in the RF in particular.

According to the data of report form #1 "Data on infectious and parasitic diseases", community-acquired pneumonia morbidity rate in 2011 was 223.6 per 100,000. According to the RF Ministry of Health, pneumonia mortality of adult population in 2006 was 27.3 per 100,000 [29].

Conjugated pneumococcal vaccine for use in children under 1 year of age has been included in many immunization programs of European and American countries for almost 10 years. Conjugated pneumococcal 13-valent vaccine for use in people over 50 years of age has been registered in the European Union countries since November 2011 (EMEA), in the USA – since January 2012 (FDA). 9 clinical studies involving 5,667 people of 50-93.5 years of age had been conducted before the vaccine was registered in the USA and the European Union countries. Several studies involved adults who had not previously been vaccinated against pneumococcal infection ("naïve"); the other studies involved adults who had previously been vaccinated with a 23-valent polysaccharidic vaccine.

These studies showed that conjugated 13-valent vaccine (Prevenar 13) provides long-term effective protection against pneumococcal diseases caused by S. pneumoniae of serotypes 1, 3, 4, 5, 6A, 6B, 7A, 9V, 14, 18C, 19A, 19F, 23F and has high safety profile. Total frequency of serious unfavorable phenomena within the 1st postvaccinal month was less than 2% in all groups under study. The most frequent unfavorable reactions were tenderness, reddening and edema in injection

site, movement limitation in the hand in which the vaccine was administered, fatigue and headache [30].

According to the studies conducted in Russia, Prevenar 13 includes the most epidemiologically significant serotypes, to which antibiotic resistance has been growing in the RF [31].

Given the generalized results, the RF Ministry of Health decided to approve additional medical indications to using Prevenar 13 – vaccination of adults over 50 years of age.

European medical association and WHO also recommend starting preventive measures with just the 13-valent conjugated vaccine in order to immunize adults against pneumococcal infection and to prevent the development of low sensitivity to repeated vaccinal administrations [32].

Use of Prevenar 13 to vaccinate population over 50 years of age will allow reducing morbidity rate of severe invasive pneumococcal infections, pneumonia and increasing life span and quality of senior people.

Experience of vaccinating adults with a conjugated pneumococcal vaccine is only starting to accumulate at our Center; a lot of health communication is yet to be done in this area.

Prevention of papillomavirus infection

High incidence rate of sexually transmitted diseases attracts attention of specialists all over the world due to frequent complications resulting in the reproductive system's malfunction. In its turn, one of the most significant sexually transmitted diseases is papillomavirus infection caused by human papilloma virus (HPV) – the most widespread such disease. The number of infected people in the world has increased more than tenfold within the last decade. It is assumed that at least 70-80% of sexually active population contract the infection throughout life. There are certain risk factors of HPV-infection development:

- sexual hyperactivity (early sexual debut, big number of partners, frequent sexual encounters);

- concurrent genital infections; young age; pernicious habits (tobacco smoking etc.);
- endogenous factors (pregnancy, avitaminosis, immune status change, endometriosis).

According to population studies, polymerase chain reaction reveals human papilloma virus's DNA in 46% of women and 33% of men. The virus is most frequently revealed in sexually active women of 16-25 years of age; the value is decreasing in women over 30 years of age [33-35]. However, even if woman's body eliminates the virus by itself, it is susceptible of the same HPV type, as postinfectious immunity is depressed and does not guarantee protection against the repeated infection in future.

According to official statistics, papillomavirus infection spread in Russia is increasing every year. In-depth studies reveal the infection in 15-34.4% of general population women and in 44% of patients of women's clinics undergoing examination for sexually transmitted diseases [36]. HPV-infection risk starts with the first sexual encounter and continues throughout life [36, 37].

This risk decreases with age, possibly, as a result of the formed immune response to HPV-infection and/or the decrease in the number of sexual partners. However, the "second wave" of infection increase in women at 30-39 years of age is observed in some countries. In other countries the "second wave" is at 40-45 years of age. That is why older women are now also considered a risk group of HPV-infection [34]. Despite the remaining risk of infection, a higher persistence risk of the contracted infection is noted in older women due to the age involution of immune system. HPV persistence is a necessary condition for cervical carcinoma development. Moreover, the number of HPV elimination cases also varies in proportion to age: from 85% at 21 years of age to 74.4% at the age of 51 [36-39].

The main problem of HPV-infection is not only its spread and high contagiousness, but its oncogenic potential – an ability to cause malignant degeneration of epithelial cells of genital (primarily) and other body areas.

Persistent HPV-infection favors the development of both immediate predecessors of cervical carcinoma (high-grade intraepithelial neoplasia of uterine neck CIN 2/3) and adenocarcinoma *in situ* (AIS), invasive cervical, vulvar, vaginal and anal carcinomae. HPV-infection affects men to a lesser extent – leads to anogenital cancer.

10mn new cervical carcinoma cases are annually revealed around the world.

The most oncogenetically potential are types 16, 18, 31, 33, 35, 39, 45, 51, 52 and 56. The most frequent virus in case of cervical carcinoma is type 16, in case of adenocarcinoma – type 18 [33, 34].

Unfortunately, preventive measures aimed at avoiding cervical carcinoma are insufficiently developed in Russia. Uterine neck's pathology detection by preventive examinations does not exceed 25%. However, even the effective screening program functioning in many developed countries cannot influence the spread of papillomavirus infection – the underlying cause of oncological pathology in women. Only the primary prevention – vaccination against high oncogenic risk HPV – gives substantiated hope for success in fighting cervical carcinoma [36, 40, 41].

Vaccines against papillomavirus infection are used all around the world (in Russia – since 2006). One of the 2 registered vaccines is quadrivalent and protects from human papilloma virus types 6, 11, 16 and 18 (Gardasil); it is indicated to girls and women of 9-26 years of age; according to the new instruction, from June 2012 it is also indicated to women up to 45 years of age. Another vaccine is bivalent, protects from types 16 and 18 (Cervarix) and is used in patients of 9-25 years of age.

2,352 vaccinations against papilloma virus by a quadrivalent (Gardasil) and bivalent (Cervarix) vaccine were conducted at the vaccinal prevention department

at the Scientific Center of Children's Health in 2007-2011. The data on patient distribution by years, sex and age are given in pic. 1 and 2.

Our Center has also conducted an anonymous poll of the vaccinated patients at the time of vaccination. The analysis of polling data showed that motivations to vaccination were:

- a diagnosed disease (including HPV carriage) capable of resulting in cervical carcinoma (26.5%);
- compromised oncological anamnesis in female line relatives (cervical carcinoma in particular; 17%);
- advice of acquaintances successfully vaccinated against HPV-infection (13.5%);
- mass media (34%);
- doctor's advice (9%).

Pic. 1 shows that in 2009 there was a sharp increase in patients referring to Center. It is connected with the information-educational program "Hope" on the prevention of cervical carcinoma conducted in Russia in 2008-2009. The program involved special lectures for doctors, teacher and pedagogues, radio and television messages of specialists on the problem. The flow of patients increased dramatically. The program's activity soon flattened; this immediately reflected on the number of girls and women who learned about the impending threat and willing to prevent it. This brightly illustrates the role of popular information-educational programs on vaccinal prevention in the modern Russian healthcare. Our poll's data also show that most people obtain information from mass media and the Internet web-sites; without any doubt, this should be used to make professional information available for the population.

Analysis results of the age of vaccinated girls and women showed that girls of 9-18 years of age vaccinates twice as little as young women of 18-26 years of age (primarily those who have already encountered the problem or developed a disease). One may observe that an exclusively Russian principle – to remember about health only when a misfortune has come – works there. Neither adolescents

nor parents know (and pediatricians do not bring it to their notice) that maximal HPV-infection immunization effect is achieved before the sexual debut when an organism has not yet encountered a virus, as, unfortunately, the vaccine does not have a therapeutic action.

Long-term work with families and adult patients suggests that family vaccination has a lot of advantages:

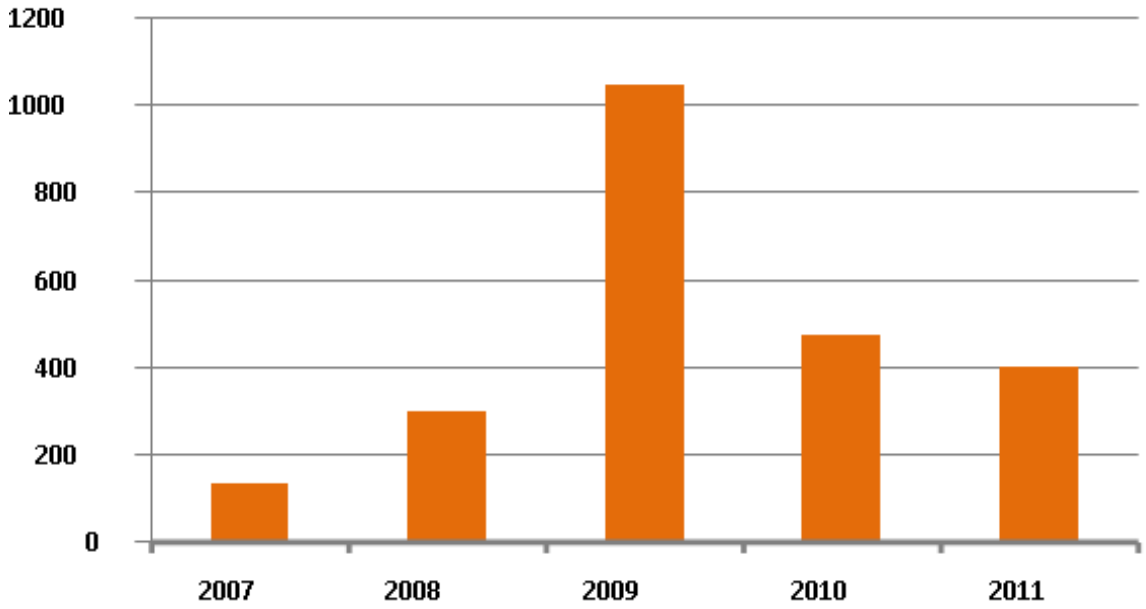
- vaccination efficacy does not depend on the vaccination coverage (it is impossible to extend coverage without involving all age categories);
- in practice, emotional support of children by their parents' personal example has a determining effect;
- in addition, people do not want to be sick at any age, which is why they require protection against infectious diseases.

In the conditions of an extending range of new vaccinal drugs and, accordingly, of a possibility to preserve health, vaccinal prevention is taking a key role both in pediatric and adult healthcare. Only joint effort of pediatricians, therapists and highly specialized doctors will allow getting off the ground the modern Russian recommendations in this sphere of health. Mass media role should not be forgotten; their a priori policy cannot run counter to state policy, which on the modern stage puts medical prevention on the leading position.

We hope that laws stating vaccination not only of children, but also of adults, will soon be developed and introduced into the Russian healthcare practice and that soon any necessary vaccine will be available for most people regardless of their age, health and profession.

Pic. 1. Spread of patients by years

Dynamics of the HPV-vaccinated patients in 2007-2011



Pic. 2. Spread of patients by sex and age

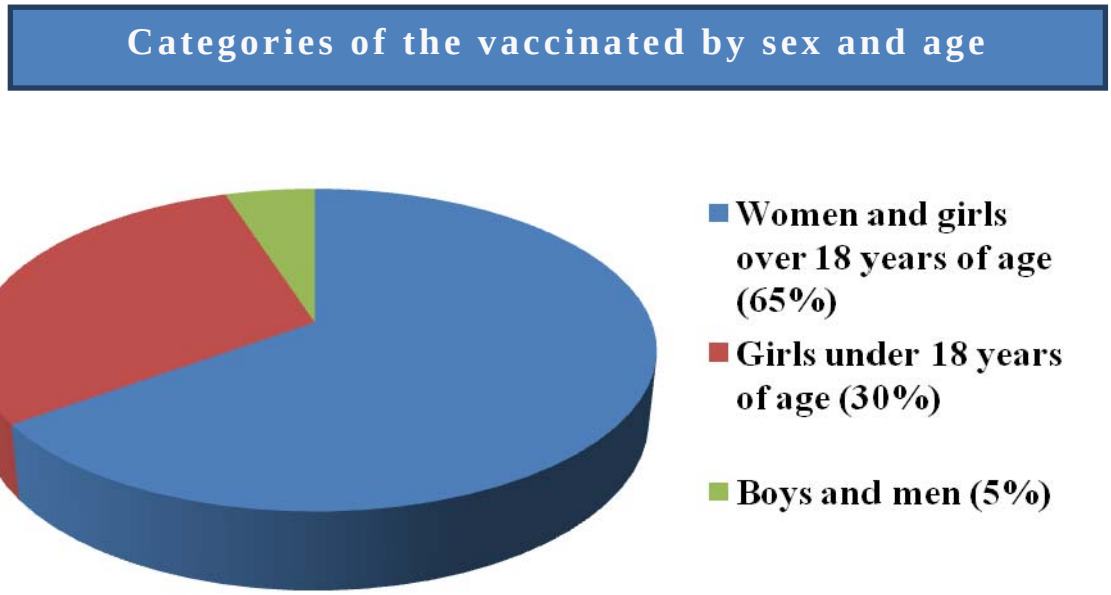


Table. 1. Immunization schedule for adults, USA, 2012

Vaccine / Age	**19-21**	**22-26**	**27-49**	**50-59**	**60-64**	**Over 65**
Influenza	1 dose every year					
Pertussis, diphtheria, tetanus	Substitute 1-time dose of DTAP for TD booster; then – booster administration every 10 years					TD/aTD

Динамика привитых ВПЧ-вакциной за период 2007–2011 гг.

Chickenpox	2 doses					
HPV (women)	3 doses					
HPV (men)	3 doses	3 doses				
Herpes zoster					1 dose	
Measles, rubella, parotitis	1 or 2 doses				1 dose	
Pneumococcus	1 or 2 doses					1 dose
Meningococcus	1 or more doses					
Hepatitis A	2 doses					
Hepatitis B	3 doses					

Table 2. Spread of adult patients by age

Age of patients / Vaccine used	**18-30 years of age**	**31-40 years of age**	**41-50 years of age**	**over 51 years of age**	**Total**
Engerix	11 (34.4%)	18 (56.25%)	2 (6.25%)	1 (3.1%)	32
Twinrix	8 (29.6%)	17 (63%)	0	2 (7.4%)	27
Regevac	19 (32.2%)	29 (49.1%)	7 (11.9%)	4 (6.8%)	59
Total	38	64	9	7	118

Table 3. Spread of adult patients by age

Age of patients / Vaccine used	**18-30 years of age**	**31-40 years of age**	**41-50 years of age**	**over 51 years of age**	**Total**
Havrix 1440	34 (36.2%)	46 (48.9%)	8 (8.5%)	6 (6.4%)	94

Twinrix	8 (29.7%)	17 (62.9%)	0	2 (7.4%)	27
Total	42	63	8	8	121

Table 4. Spread of adult patients by age

Age of patients / Vaccine used	**18-30 years of age**	**31-40 years of age**	**41-50 years of age**	**over 51 years of age**	**Total**
Varilrix	39 (62.9%)	17 (27.5%)	3 (4.8%)	3 (4.8%)	62
Okavax	10 (33.3%)	18 (60%)	2 (6.7%)	0	30
Total	49	35	5	3	92

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