N E W S
OF THE NATIONAL ACADEMY OF SCIENCES OF THE REPUBLIC OF KAZAKHSTAN
SERIES OF BIOLOGICAL AND MEDICAL
ISSN 2224-5308
Volume 2, Number 326 (2018), 18 – 23

UDC 616.022

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EFFECTIVENESS AND SAFETY OF VACCINATION FOR PREVENTING PNEUMOCOCCAL INFECTION IN ADULT PATIENTS: REVIEW OF INTERNATIONAL RECOMMENDATIONS AND STUDIES

Abstract. *Purpose of review:* to summarize the effectiveness and safety of vaccination for preventing pneumococcal infection, namely community-acquired pneumonia among adult patients.

Materials and methods: a literature search for international recommendations and studies was conducted in electronic databases and publications included in Embase, PubMed/Medline, Science Direct, eLibrary. More than 20 publications were selected and reviewed, including full-text articles, Systematic Reviews and Meta-Analysis that were published in English. The depth of the literature search was 8 years.

Results and conclusions: currently, international organizations recommended the routine use of the 13-valent conjugate vaccine (PCV13) sequentially with the 23-valent polysaccharide vaccine (PPSV23) for all adults aged 65 years and over. However, some studies indicate that repeated vaccination has no effect, since pneumococcal polysaccharide capsular antigens elicit an immune response by a T-cell independent mechanism.

Keywords: vaccination, community-acquired pneumonia, 13-valent pneumococcal conjugate vaccine, 23-valent pneumococcal polysaccharide vaccine.

Introduction. Pneumococcus (Streptococcus pneumoniae) remains the main causative agent of pneumococcal infections and can cause a wide range of diseases [1]. Pneumococcal infection causes pneumonia, meningitis, middle ear infections (otitis media), sinusitis, and sepsis. Currently, according to the data of foreign authors, pneumococcus is responsible for 25-35% of all community-acquired pneumonia and 3-5% of hospital- acquired pneumonia.

Community-acquired pneumonia is an acute disease that has arisen in out-of-hospital conditions, accompanied by symptoms of infection of the lower respiratory tract and radiographic signs in the lungs in the absence of an obvious diagnostic alternative. Among adult patients, community-acquired pneumonia is a common type of pneumococcal infection [2] and it is difficult on the background of comorbid conditions (cardiovascular diseases, oncological and hematological diseases, diabetes, renal and liver diseases, and others). In elderly patients, the risk of death from community-acquired pneumonia and its complications is 3-5 times higher than that of young patients, estimated at 5-7%.

Treatment of pneumococcal infections with penicillin and other drugs was quite effective until some strains of the disease became resistant to these drugs. Therefore, to date, vaccination is the most effective method of preventing pneumococcal infections. According to the World Health Organization (WHO), in the world, life expectancy has increased by 20-30 years due to mass immunization. Every year, more than 2 million lives are saved thanks to immunization. According to WHO's position, vacci-nation of all age groups of the population is the only way to significantly affect morbidity and mortality from pneumo-

coccal infection and it is considered necessary to include routine vaccinations against pneumococcal infection in national calendars of all countries.

The purpose of this review is summarize the effectiveness and safety of vaccination for preventing pneumococcal infection, namely community-acquired pneumonia among adult patients.

Pneumococcal vaccines. To prevent diseases caused by pneumococcus, two vaccines are recommended worldwide that are available for adult vaccination: a 13-valent conjugate vaccine (PCV13) and a 23-valent polysaccharide vaccine (PPSV23).

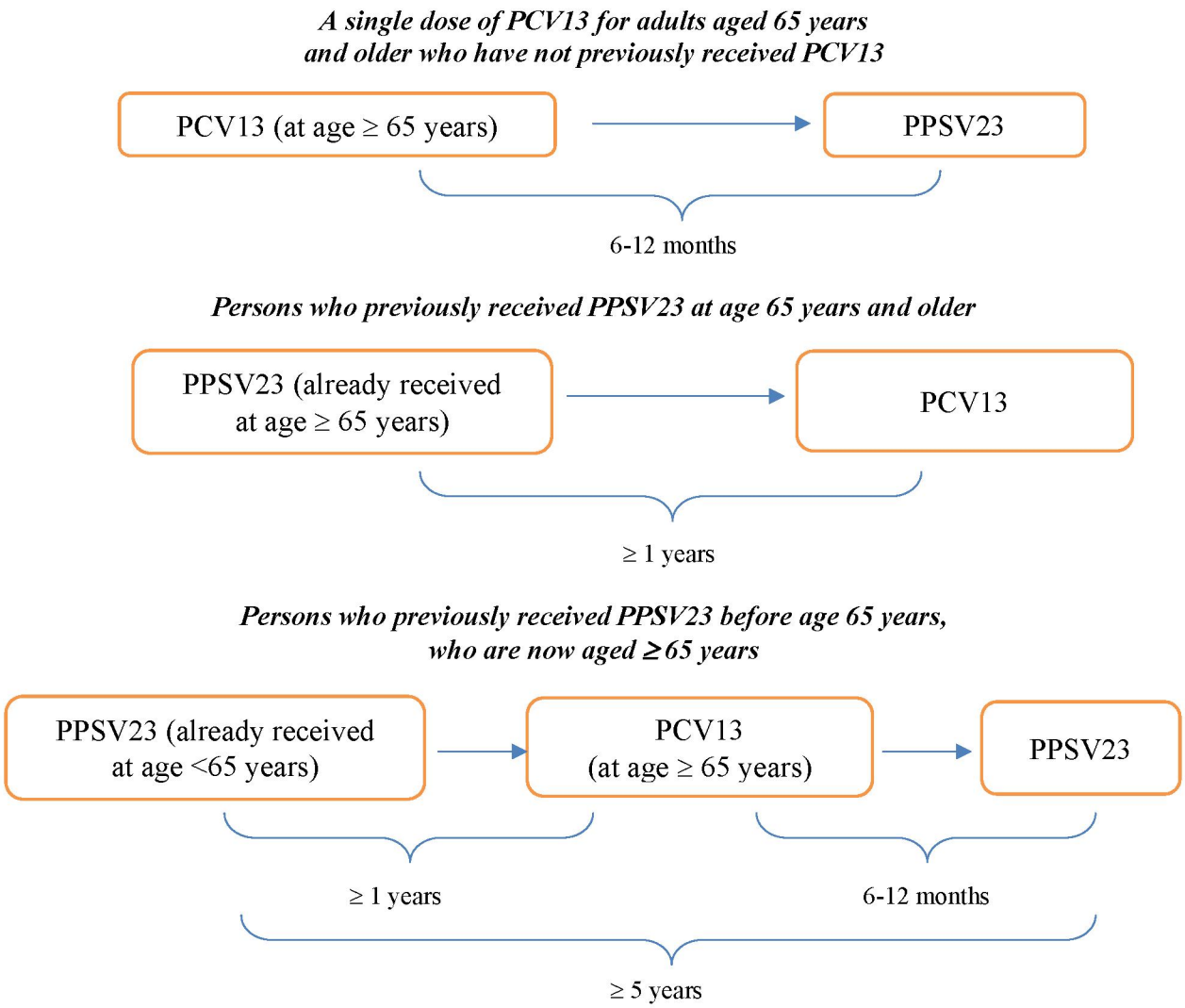
PCV13 is inactivated and consists of capsular polysaccharides of thirteen serotypes of pneumococcus, individually conjugated to a carrier protein. In the European Union, PCV13 is approved for use from 6 weeks without further age restriction.

PPSV23 consists of capsular polysaccharides of 23 serotypes of pneumococcus (12 serotypes together with PCV13 and 11 additional serotypes). Basically, people need one dose of PPSV23, and the second dose is recommended for certain risk groups.

In 2010, the American Advisory Committee on Immunization Practices (ACIP) approved revised recommendations that all persons should be vaccinated with PPSV23 at the age of 65 years.

In 2012, ACIP developed recommendations for the use of PCV13 and PPSV23 for adults aged 19 years and older with immunocompromising conditions.

According to the recommendations of ACIP, adult vaccination should be started with PCV13 (scheme).



Sequential administration and recommended intervals for PCV13 and PPSV23 (ACIP recommendations)