

UDC 615.28: 615.036:615.11

<https://doi.org/10.24959/cphj.19.1495>**O. V. Tkachova, O. Ya. Mishchenko*, T. I. Sheptak**

National University of Pharmacy
Institute for Continuing Education of Pharmacy Professionals
at the National University of Pharmacy*

THE FREQUENCY AND VEN-ANALYSIS OF PHARMACOTHERAPY IN CHILDREN WITH ARVI IN THE HEALTHCARE INSTITUTION OF THE POLTAVA REGION

Acute respiratory viral infections (ARVI) are diseases that have important medico-social importance since they are associated with a wide distribution among the population, the risk of complications, reduced quality of life of patients, and high total cost of treatment.

Aim. To assess the quality of pharmacotherapy: the frequency of prescribing drugs for children with ARVI in the healthcare institution of the Poltava region and the correspondence of drug prescriptions to clinical protocols for providing medical care and the State Formulary of Medicines of Ukraine (SFMU).

Materials and methods. The quality assessment of pharmacotherapy of children with ARVI was performed using auxiliary clinical and economic methods – the frequency and formal VEN-analyses.

Results. The main directions of pharmacotherapy of children with ARVI in one of the healthcare institution of the Poltava region correspond to the unified clinical protocol of the primary care for adults and children with ARVI and clinical protocols for pharmacotherapy of concomitant diseases. Using the formal VEN-analysis it has been determined that the majority of INN drugs prescribed are recommended by clinical protocols for pharmacotherapy of the main (ARVI) and associated diseases registered in patients, and are available in the SFMU (87.50 and 54.69 %, respectively).

Conclusions. The formal VEN analysis has shown that the ARVI pharmacotherapy correction is needed in the healthcare institution of the Poltava region studied since a significant part of the INN drugs prescribed is absent in the SFMU (45.31 %) and in clinical protocols for the primary pharmacotherapy (ARVI) and associated diseases (17.19 %). In both medical and technological documents there are no 12.50 % of INNs prescribed. For them 11.74 % of funds (4808.81 UAH) were spent by parents of sick children; they were prescribed 8.74 % times (38 prescriptions) of the total number of prescriptions – 431.

Key words: acute respiratory viral infections; clinical and economic analysis; VEN analysis; frequency analysis

O. V. Tkachova, O. Ya. Mishchenko*, T. I. Sheptak

Національний фармацевтичний університет
Інститут підвищення кваліфікації спеціалістів фармації Національного фармацевтичного університету*

Частотний та VEN-аналіз фармакотерапії дітей з ГРВІ в закладі охорони здоров'я Полтавської області

Гострі респіраторні вірусні інфекції (ГРВІ) належать до захворювань, що мають важливе медико-соціальне значення, оскільки пов'язані з широким розповсюдженням серед населення, ризиком виникнення ускладнень, зниженням якості життя пацієнтів, високою загальною вартістю лікування.

Мета: оцінка якості фармакотерапії, зокрема частоти призначень лікарських засобів (ЛЗ) дітям з ГРВІ у закладі охорони здоров'я (ЗОЗ) Полтавської області та відповідності призначень ЛЗ клінічним протоколам надання медичної допомоги та Державному формуляру лікарських засобів України (ДФЛЗУ).

Матеріали та методи. Оцінку якості фармакотерапії дітей з ГРВІ проводили з використанням допоміжних клініко-економічних методів – частотного та «формального» VEN-аналізів.

Результати. Основні напрямки фармакотерапії дітей з ГРВІ в одному з ЗОЗ Полтавської області відповідають уніфікованому клінічному протоколу первинної медичної допомоги (УКППМД) дорослим та дітям з ГРВІ та клінічним протоколам фармакотерапії супутніх захворювань. Із використанням «формального» VEN-аналізу визначено, що більшість призначених МНН ЛЗ рекомендована клінічними протоколами для фармакотерапії основного (ГРВІ) і супутніх захворювань, що були зареєстровані в обстежених пацієнтів, та наявні в ДФЛЗУ (відповідно 87,50 та 54,69 %).

Висновки. Проведений VEN-аналіз показав, що необхідна корекція фармакотерапії ГРВІ в досліджуваному ЗОЗ Полтавської області, оскільки значна частина призначених МНН ЛЗ відсутня в ДФЛЗУ (45,31 %) та в УКППМД дорослим та дітям, хворим на ГРВІ, та в клінічних протоколах лікування супутніх захворювань (17,19 %). В обох медико-технологічних документах відсутні 12,50 % призначуваних МНН, на які витрачено 11,74 % коштів (4808,81 грн) батьків хворих дітей та які призначалися 8,74 % разів (38 призначень) від загальної кількості призначень – 431.

Ключові слова: гострі респіраторні вірусні інфекції; клініко-економічний аналіз; VEN-аналіз; частотний аналіз

О. В. Ткачева, О. Я. Мищенко*, Т. И. Шентак

Национальный фармацевтический университет

*Институт повышения квалификации специалистов фармации Национального фармацевтического университета**

Частотный и VEN-анализ фармакотерапии детей с ОРВИ в учреждении здравоохранения Полтавской области

Острые респираторные вирусные инфекции (ОРВИ) относятся к заболеваниям, которые имеют важное медико-социальное значение, поскольку связаны с широким распространением среди населения, риском возникновения осложнений, снижением качества жизни пациентов, высокой общей стоимостью лечения.

Целью работы стала оценка качества фармакотерапии: частоты назначений лекарственных средств (ЛС) детям с ОРВИ в учреждении здравоохранения (УЗ) Полтавской области и соответствия назначений ЛС клиническим протоколам оказания медицинской помощи и Государственному формуляру лекарственных средств Украины (ГФЛСУ).

Материалы и методы. Оценку качества фармакотерапии детей с ОРВИ проводили с использованием вспомогательных клинико-экономических методов – частотного и «формального» VEN-анализов.

Результаты. Основные направления фармакотерапии детей с ОРВИ в одном из УЗ Полтавской области соответствуют унифицированному клиническому протоколу первичной медицинской помощи взрослым и детям, больным ОРВИ, и клиническим протоколам фармакотерапии сопутствующих заболеваний. С использованием «формального» VEN-анализа определено, что большинство назначенных МНН ЛС рекомендовано клиническими протоколами для фармакотерапии основного (ОРВИ) и сопутствующих заболеваний, зарегистрированных у пациентов, и имеются в ГФЛСУ (соответственно 87,50 и 54,69 %).

Выводы. Проведенный «формальный» VEN-анализ показал, что необходима коррекция фармакотерапии ОРВИ в исследуемом УЗ Полтавской области, поскольку значительная часть назначенных МНН ЛС отсутствует в ГФЛСУ (45,31 %) и в клинических протоколах для фармакотерапии основного (ОРВИ) и сопутствующих заболеваний (17,19 %). В обоих медико-технологических документах отсутствуют 12,50 % назначаемых МНН, на которые потрачено 11,74 % средств (4808,81 грн) родителей больных детей и которые назначались 8,74 % раз (38 назначений) от общего количества назначений – 431.

Ключевые слова: острые респираторные вирусные инфекции; клинико-экономический анализ; VEN-анализ; частотный анализ

An acute respiratory viral infection (ARVI) is one of the most important medical and social problem of modern society and a common cause of disease incidence at an early age [1]. According to the International Statistical Classification of Diseases and Related Health Problems (ICSD) 10 and 11 examinations of ARVI belong to Acute Respiratory Infections (ARI). In other words, ARVI is a general name of any respiratory virus infection. ARVIs include all viral infections characterized by a common toxic syndrome and a predominant blennosis of respiratory passages [2]. The WHO experts point out that this most commonly occurring disease in the human population in recent years has a steady increasing tendency. The aerial transmission of the pathogen, high sensitivity of the population to virtually all the causative agents of ARVI causes the main epidemiological condition – the rate of their spread [3].

Today, a significant number of acute respiratory viral infections, which belong to 9 different groups of viruses, are known; they are influenza, parainfluenza, adeno-, RC- (respiratory syncytial), рycorna-, coronary-, reo-, entero-, rhino- and herpesvirus closely associated with diseases of the human respiratory tract causing the progression of ARVI [2].

The objective inability to apply methods of specific diagnosis for etiological interpretation of each disease case does not allow identifying the current prevalence rate of both the acute respiratory viral infection (ARVI), and the acute respiratory infection

(ARI) of other etiology (legionella, mycoplasmal, COCs, Rickettsia, etc.). The prevalence of these diseases across the globe, the involvement of many people into the epidemic process, sometimes severe consequences, significant economic damages determine the relevance of respiratory infections for humanity.

For the treatment of ARVI both in adults and children in Ukraine, a unified clinical protocol for the primary care (UCPPC) “Acute respiratory infections” for adults and children was introduced into medical practice (the Order of the Ministry of Health of Ukraine No. 499 dated 16.07.2014). According to this clinical protocol, the following diseases of the upper and central respiratory airways are classified as ARVI [4]: acute nasopharyngitis (nasal catarrh) (J00); acute sinusitis (J01); acute pharyngitis (J02); acute tonsillitis (J03); acute laryngitis and tracheitis (J04); upper respiration tract infections of multiple localizations (J06); acute bronchitis (J20); acute bronchiolitis (J21); acute respiratory infections of the central airway (not classified) (J22).

The complex treatment of acute respiratory viral infections includes etiotropic, pathogenetic and symptomatic therapy [1]. Pharmaceutical products of etiotropic therapy of ARVI include antiviral drugs (AVD) [5].

Although it is known that ARVI are typically caused by viruses, but today there is no sufficiently reliable information on the efficiency of all AVD registered in Ukraine. Therefore, AVD for systemic

use in UCPPC “Acute respiratory infections” for adults and children [4] are not recommended for the treatment of acute respiratory viral infections, except for oseltamivir and zanamivir recommended by the Unified clinical protocol of the primary, secondary (specialized) medical care for adults and children “Influenza” for medicinal treatment of influenza. The pathogenetic therapy of ARVI includes prescription of antipyretics and non-steroidal anti-inflammatory drugs. As the circumstances require, mucolytics, local antiseptics can be used as drugs of the symptomatic therapy in acute respiratory viral infections.

High incidence of disease and high cost of treatment of ARVI and its complications indicate that they have important medical and socio-economic significance. There is also a need for pharmacoeconomic approaches to the drug alternatives for pharmacotherapy of patients. The analysis of recent studies and publications has shown that research on clinical and economic analysis of various diseases in children is mainly devoted to the rationalization of costs for pharmacotherapy. However, special attention was not paid to the quality assessment of pharmacotherapy for acute respiratory infections in children according to the requirements of medical and technological documents of the Ministry of Health of Ukraine: the State Formulary of Medicines of Ukraine (SFMU) and UCPPC for adults and children with ARVI. This indicates the consideration of this question with the purpose of analyzing the correspondence of drugs to the abovementioned documents regulating the quality of pharmacotherapy of patients.

The aim of this work is to assess the quality of pharmacotherapy: the frequency of prescribing drugs for children with ARVI in one healthcare institution of the Poltava region and the correspondence of drug prescriptions to the existing clinical protocols for providing medical care and the SFMU.

Materials and methods

To achieve this aim, a retrospective analysis of the prescription leaflets for children suffering from ARVI was performed; the frequency of drug prescription to a patient was determined. According to the results of the formal VEN-analysis the correspondence of the treatment of ARVI in the healthcare institution studied to the requirements of modern UCPPC was assessed in adults and children with ARVI [6]. The SFMU, edition 8 (2016), and the UCPPC for adults and children with ARVI (2014) were chosen as pharmacotherapy standards [4].

Results and discussion

In total, 66 prescription leaflets of pediatric patients with ARVI (age – 3 months to 16 years old) undergoing their treatment in the healthcare insti-

tution of the Poltava region studied were analyzed during 2016. Prescription leaflets were considered by the following criteria: the number of case histories, the sex and age of pediatric patients, duration of the hospital stay, the number of drug prescriptions to one child, the number of concomitant diseases.

As a result of the retrospective analysis of case histories it was found that along with the ARVI diagnosis in children physicians indicated the name of a exact disease of the respiratory system, namely acute sinusitis (24 patients), acute otitis media (11 patients), acute pharyngitis (8 patients), and acute laryngitis (10 patients). Except for the prior disease in case histories of diseases in children, there were the following concomitant diseases: oral moniliasis (1 patient), bronchial asthma (1 patient). During the research period, no sick child was diagnosed with “influenza”, which allowed conducting the clinical and economic analysis with the recommendations for the use of drugs in accordance with the UCPPC for adults and children with ARVI, not including the clinical protocol for patients with influenza. For children with ARVI, 92 trade names (TN) of drugs were prescribed on the basis of 63 INN of drugs and 1 dietary food supplement belonging to 19 pharmacotherapeutic groups. These drugs were prescribed to children 431 times. In total, 40960.89 UAH were spent for the pharmacotherapy of patients in the healthcare institution of the Poltava region. The average number of prescriptions for one sick child was 6 (the maximum number – 12, the minimum number – 3). This fact confirms that physicians practice polypharmacy in this healthcare institution. Such number of prescriptions may be associated with severe progression of the disease or the presence of comorbidities.

The first stage of this work was the frequency analysis conducted by pharmacotherapeutic (PT) groups and INN drugs. The analysis of medical prescriptions for children with ARVI conducted showed that the TOP-10 leaders among PT groups were antiseptics used in throat diseases (62 prescriptions); antimicrobial agents for systemic use (47 prescriptions); pharmaceutical products used in diseases of the nasal cavity (42 prescriptions); antiviral drugs for systemic use (34 prescriptions); combined homeopathic products (31 prescriptions); drugs used in cough and colds (27 prescriptions); non-steroidal anti-inflammatory drugs (21 prescriptions); analgesics-antipyretics (21 prescriptions); antihistamines for systemic use (9 prescriptions). Among the abovementioned TOP-10 leaders, 8 PT groups (other than antiviral and combined homeopathic products) were used according to the UCPPC for adults and children with ARVI [4].

The frequency analysis showed that mucolytics and expectorants were taken by 92 % of children, antiseptic drugs – 94 % of pediatric patients; among

Table

The secondary medical products, which are not included in medical regulatory documents – SFMU (edition 8) and clinical protocols

No.	Pharmacological group	INPN of the drug, ATC code	Trade name, pharmaceutical form, manufacturing company (country)	% of prescriptions	% of the expenditure amount
1	Antidiarrheal microbial drugs	Comb drug A07F	"Acidolac", 10 sachets, 3 g, Chr. Hansen A / C (Denmark)	0.40	0.48
2	Food supplements	–	"Lactiale", capsules, No.30, "Farmak" PJSC (Ukraine)	0.46	0.53
3	Immunostimulating drugs for systemic use	Tilorone L03A X	"Amixin IC", 0.06 g, No. 3i, Ltd. "Interchim" (Ukraine)	0.23	0.12
4	Homeopathic products	Comb drug L03AX	"Engystol", tablets, No. 50, Biologis Heilmittel Heel, (Germany)	0.93	4.00
			"Immunokind", tablets, No. 150 Deutsche Homoeopathy-Union DKU-Arznaymittel (Germany)	0.46	0.68
		Seawater R01AX10	"Delufen", nasal spray, 20 ml, Richard Bittner (Austria)	0.23	0.34
		Comb drug R03DX	"Anaferon for children", tablets, No. 20, Materia Medica Holding Ltd., (Ukraine)	0.46	0.61
		Comb drug R05X	"Aflubin", drops, 20 ml, Richard Bittner (Ukraine)	5.11	4.95
5	Polyvitamins	Comb drug A11BA	"Revit", Pills No. 100, PJSC "Technolog" (Ukraine)	0.46	0.03
Total				8.74 %	11.74 %

them phenol based antiseptics were taken by 35 % of children. Combined homeopathic medicines were very popular among doctors; they were prescribed to 47 % of sick children. Half of children with ARVI were prescribed a physiological solution of sodium chloride in the form of a spray to provide the elimination therapy. Non-steroidal anti-inflammatory drugs were prescribed to 32 % of children with acute respiratory infections. Many children (71 %) received antimicrobials for systemic use, indicating the adherence to acute respiratory infections associated with a microbial infection.

The following drugs were the leaders (TOP-10) by the frequency of prescriptions among INN: combined homeopathic products (38 prescriptions), sodium chloride (33 prescriptions), ambroxol (28 prescriptions), fenspiride (23 prescriptions), phenol (23 prescriptions), inosine pranobex (22 prescriptions), ibuprofen (21 prescriptions), paracetamol (18 prescriptions), sulfamethoxazole and trimethoprim (15 prescriptions), amoxicillin (14 prescriptions). Among 10 leaders almost all, except for combined homeopathic products and inosine pranobex, were recommended in the UCPC for adults and children with ARVI [4]. Thus, directions of the treatment in this healthcare institution mainly corresponded to the current unified clinical protocol.

The next stage of clinical and economic analysis was the assessment of the importance of prescribed drugs for pharmacotherapy of children with ARVI by the results of the formal VEN analysis according to medical regulatory documents: the SFMU (edition 8) [6] and the UCPC in adults and children with ARVI [4]. Today, pharmacotherapy of patients must comply with medical and technological documents for treating a certain disease, and drugs should be prescribed by their presence in the SFMU. To conduct the formal VEN analysis, the drugs were divided into 2 groups: vital-essential (group V) available in the SFMU and the secondary ones – non-essential (group N).

The results obtained showed that among 63 INN drugs prescribed and 1 dietary food supplement 35 INN (57.38 %) were in the SFMU, they were assigned the grade "V", and 28 INN drugs and 1 dietary supplement (45.31 %) were classified as "N" – the secondary drugs. The low index of compliance with the pharmacotherapy of the SFMU is associated with frequent prescription of drugs with a low level of evidence-based effectiveness (herbal products, antiviral, immunostimulating and homeopathic remedies) by doctors.

The UCPC for adults and children with ARVI included 50 out of 63 INN drugs and 1 dietary food supplement (78.13 %) of the total list of the pre-

scribed medications, and 13 INN drugs and 1 dietary food supplement (21.87 %) were categorized as “N” – the secondary drugs. After careful analysis of 13 INN drugs and a dietary food supplement that were not included in the UCPPC for adults and children with ARVI it was found that 3 INN drugs were recommended in the clinical protocols in patients with concomitant diseases: 2 INN drugs were used for patients with candidiasis of the mucous membrane of the oral cavity [8], one INN drug was prescribed for children with bronchial asthma [9]. Thus, 10 INN drugs, as well as 1 dietary food supplement “Lactiale” (17.19 %) were absent in all clinical protocols analyzed.

Among all the drugs under research only 4 INN drugs (6.25 %) were included in the UCPPC, only 21 INN drugs (32.82 %) were included into the clinical protocols; there were 31 INN drugs (48.43 %) simultaneously in the UCPPC (edition 8) and clinical protocols, while 7 INN drugs and 1 dietary food supplement (12.50 %) were absent in both medical and technological documents, such as clinical protocols analyzed, and the UCPPC (edition 8). These secondary preparations were included into 5 PT groups, and 11.74 % of the total funds were spent on them. These drugs with the low evidence base included an antidiarrheal agent “Acidolac”, an immunostimulating drug “Amixin IC”, homeopathic preparations “Engystol”, “Delufen”, “Immunokind”, “Anaferon for children” and “Aflubin”, vitamins “Revit” and dietary supplement “Lactiale” (Tab.).

All secondary medicinal products indicated were rarely applied except for “Aflubin” that in total composed 8.74 % of all medical prescriptions (38 prescriptions). The overall costs for the secondary drugs amounted to 4808.81 UAH of the total cost (11.74 %). It would be wiser to use them more rationally – on the vital preparations recommended in the corresponding medical normative documents (the SFMU and clinical protocols of treatment). Costs for the homeopathic drug “Aflubin” often prescribed were 4.95 % (2027.96 UAH). Although the drug is safe for children with ARVI, its low evidence base of efficacy suggests that the expenditures spent are ir-

rational, which could be more rationally spent on drugs with the proven clinical efficacy included in medical and technological documents.

Thus, the results of the formal VEN analysis showed that the majority of prescribed drugs – 35 INN drugs (54.69 %) were available in the SFMU (edition 8). This indicates that physicians in most cases adhered to the modern standard of pharmacotherapy – the “State Formulary of Medicines of Ukraine” annually reviewed and updated. However, 11.74 % of the funds (4808.81 UAH) of parents of sick children for 9 drugs were spent irrationally – for drugs with low efficiency, which were not recommended in any of the medical and technological documents.

CONCLUSIONS

1. According to the results of the clinical and economic analysis the principal directions of pharmacotherapy of ARVI in children in this healthcare institution generally corresponded to the unified clinical protocol of the primary healthcare (UCPPC) on acute respiratory infections in adults and children.

2. The formal VEN analysis conducted has shown that the ARVI pharmacotherapy correction is needed in the healthcare institution of the Poltava region studied since a considerable part of the INN drugs prescribed (45.31 %) is absent in the SFMU and in the UCPPC in adults and children with ARI and in clinical protocols with underlying diseases (17.19 %). Both medical and technological documents do not contain 12.50 % of INN. For them, 11.74 % of funds (4808.81 UAH) were spent by parents of sick children; they were prescribed 8.74 % times (38 prescriptions).

3. The optimization of pharmacotherapy in children with ARVI in the healthcare institution and finances for its implementation is generally possible at the expense of exclusion of the homeopathic medicine “Aflubin” from treatment regimens; it is often prescribed (5.11 %), expensive and absent in clinical protocols and the SFMU, and its total cost amounted to 2027.96 UAH (4.95 %).

Conflict of interests: authors have no conflict of interests to declare.

References

1. Сучасні етіопатогенетичні та клініко-діагностичні особливості перебігу гострих респіраторних вірусних інфекцій у дітей / О. І. Сміян, Т. П. Бинда, Є. В. Дмитрова, В. А. Сухарєва // Журн. клінічних та експерим. мед. досліджень. – 2013. – Т. 1, № 3. – С. 328–336.
2. Богомолов, Б. П. Инфекционные болезни : неотложная диагностика, лечение, профилактика. – М. : Ньюдиамед, 2007. – 653 с.
3. Зупанец, И. А. Современные подходы к лечению кашля при ОРВИ в детской практике / И. А. Зупанец, М. А. Георгиянц, Н. П. Безуглая // Ліки України. – 2014. – № 5-6 (181–182). – С. 5–9.
4. Уніфікований клінічний протокол первинної медичної допомоги дорослим та дітям. Гострі респіраторні інфекції. Наказ МОЗУ від 16.07.2014 № 499. [Електронний ресурс]. – Режим доступу : http://moz.gov.ua/ua/portal/dn_20140716_0499.htm
5. Arbidol : a broad-spectrum antiviral compound that blocks viral fusion / Y. Boriskin, I. Leneva, E. Pecheur, S. Polyak // Current Med. Chem. – 2008. – № 15. – P. 997–1005.
6. Оцінка клінічної та економічної доцільності використання лікарських засобів у лікувально-профілактичному закладі (супровід формулярної системи) : метод. рек. / А. М. Морозов, Л. В. Яковлева, Н. В. Бездітко та ін. – Х. : Стиль-Издат, 2013. – 36 с.

7. Державний формуляр лікарських засобів. Випуск восьмий. – К. : ДП «Державний експертний центр МОЗ України». – 2016. – 1076 с.
8. Клінічний протокол «Кандидози слизової оболонки порожнини рота: гострий перебіг». Наказ МОЗ України № 566 від 23.11.2004 р. [Електронний ресурс]. – Режим доступу : <http://medstandart.net/browse/1469>
9. Уніфікований клінічний протокол первинної, вторинної (спеціалізованої) медичної допомоги «Бронхіальна астма у дітей». Наказ МОЗ України № 868 від 08 жовтня 2013 р. [Електронний ресурс]. – Режим доступу : http://mtd.dec.gov.ua/images/dodatki/2013_868BA_dor_dit/2013_868_ukpmd_BA_dity.pdf

References

1. Smiian, O. I., Bynda, T. P., Dmitrova, Ye. V., Sukharieva, V. A. (2013). *Zhurnal klinichnykh ta eksperymentalnykh medychnykh doslidzhen*, 1 (3), 328–336.
2. Bogomolov, B. P. (2007). *Infekcionnye bolezni: neotlozhnaja diagnostika, lechenie, profilaktika*. Moscow: N'judiamed, 653.
3. Zupanets, I. A., Georgijanc, M. A., Bezuglaja, N. P. (2014). *Liki Ukraini*, 5-6 (181–182), 5–9.
4. Nakaz MOZU vid 16.07.2014 № 499. (2014). Unifikovanyi klinichni protokoli pervynnoi medychnoi dopomohy doroslym ta ditiam. Hostri respiratorni infektsii. Available at: http://moz.gov.ua/ua/portal/dn_20140716_0499.htm
5. Boriskin, Y., Leneva, I., Pecheur, E., Polyak, S. (2008). Arbidol: a broad-spectrum antiviral compound that blocks viral fusion. *Current Med. Chem.*, 15, 997–1005.
6. Morozov, A. M., Yakovlieva, L. V., Bezditko, N. V., Mishchenko, O. Ya., Stepanenko, A. V., Zimenkovskiy, A. B., Parii, V. D., ... Dumenko, T. M. (2013). *Otsinka klinichnoi ta ekonomichnoi dotsilnosti vykorystannia likarskykh zasobiv u likuvalno-profilaktychnomu zakladi (suprovid formuliarnoi systemy) : metodychni rekomendatsii*. Kharkiv: Styl-Yzdat, 36.
7. *Derzhavnyi formuliar likarskykh zasobiv*. (2016). Kyiv: DP «Derzhavnyi ekspertnyi tsentr MOZ Ukrainy», 1076.
8. *Nakaz MOZ Ukrainy № 566 vid 23.11.2004 r.* (2004). Klinichni protokoli «Kandydozy slyzovoi obolonky porozhnyny rota: hostry perebih». Available at: <http://medstandart.net/browse/1469>
9. *Nakaz MOZ Ukrainy № 868 vid 08 zhovtnia 2013 r.* (2013). Unifikovanyi klinichni protokoli pervynnoi, vtorynnoi (spetsializovanoi) medychnoi dopomohy «Bronkhialna astma u ditei». Available at: http://mtd.dec.gov.ua/images/dodatki/2013_868BA_dor_dit/2013_868_ukpmd_BA_dity.pdf

Information about authors / Відомості про авторів / Сведения об авторах

Tkachova O. V., Doctor of Pharmacy (Dr. habil.), associate professor of the Department of Pharmacoeconomics, National University of Pharmacy (<https://orcid.org/0000-0003-4646-0400>). E-mail: ph-econom@nuph.edu.ua

Tkachova O. V., доктор фармацевтичних наук, доцент кафедри фармакоэкономики, Національний фармацевтичний університет (<https://orcid.org/0000-0003-4646-0400>). E-mail: ph-econom@nuph.edu.ua

Tkachova O. V., доктор фармацевтичних наук, доцент кафедри фармакоэкономики, Национальный фармацевтический университет (<https://orcid.org/0000-0003-4646-0400>). E-mail: ph-econom@nuph.edu.ua

Mishchenko O. Ya., Doctor of Pharmacy (Dr. habil.), head of the Clinical Pharmacology Department, Institute for Continuing Education of Pharmacy Professionals at the National University of Pharmacy (<https://orcid.org/0000-0001-5862-4543>).

E-mail: clinpharmacol_ipksph@nuph.edu.ua

Mishchenko O. Ya., доктор фармацевтичних наук, завідувач кафедри клінічної фармакології, Інститут підвищення кваліфікації спеціалістів фармації Національного фармацевтичного університету (<https://orcid.org/0000-0001-5862-4543>).

E-mail: clinpharmacol_ipksph@nuph.edu.ua

Mishchenko O. Ya., доктор фармацевтичних наук, заведующая кафедрой клинической фармакологии, Институт повышения квалификации специалистов фармации Национального фармацевтического университета (<https://orcid.org/0000-0001-5862-4543>).

E-mail: clinpharmacol_ipksph@nuph.edu.ua

Sheptak T. I., Master's degree student of the Department of Pharmacoeconomics, National University of Pharmacy. E-mail: tsheptak@ukr.net

Sheptak T. I., магістрант кафедри фармакоэкономики, Національний фармацевтичний університет. E-mail: tsheptak@ukr.net

Sheptak T. I., магістрант кафедры фармакоэкономики, Национальный фармацевтический университет. E-mail: tsheptak@ukr.net

Mailing address: 4, Valentynivska str., Kharkiv, 61168, Department of Pharmacoeconomics. Tel.: (0572) 658895

Адреса для листування: 61168, м. Харків, вул. Валентинівська, 4, кафедра фармакоэкономики НФаУ. Тел.: (0572) 658895

Адрес для переписки: 61168, г. Харьков, ул. Валентиновская, 4, кафедра фармакоэкономики НФаУ. Тел.: (0572) 658895