

# **GEORGIAN MEDICAL NEWS**

---

ISSN 1512-0112

NO 2 (335) Февраль 2023

---

ТБИЛИСИ - NEW YORK



**ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ**

Медицинские новости Грузии  
საქართველოს სამედიცინო სიახლენი

## GEORGIAN MEDICAL NEWS

Monthly Georgia-US joint scientific journal published both in electronic and paper formats of the Agency of Medical Information of the Georgian Association of Business Press.  
Published since 1994. Distributed in NIS, EU and USA.

**GMN: Georgian Medical News** is peer-reviewed, published monthly journal committed to promoting the science and art of medicine and the betterment of public health, published by the GMN Editorial Board since 1994. GMN carries original scientific articles on medicine, biology and pharmacy, which are of experimental, theoretical and practical character; publishes original research, reviews, commentaries, editorials, essays, medical news, and correspondence in English and Russian.

GMN is indexed in MEDLINE, SCOPUS, PubMed and VINITI Russian Academy of Sciences. The full text content is available through EBSCO databases.

**GMN: Медицинские новости Грузии** - ежемесячный рецензируемый научный журнал, издаётся Редакционной коллегией с 1994 года на русском и английском языках в целях поддержки медицинской науки и улучшения здравоохранения. В журнале публикуются оригинальные научные статьи в области медицины, биологии и фармации, статьи обзорного характера, научные сообщения, новости медицины и здравоохранения. Журнал индексируется в MEDLINE, отражён в базе данных SCOPUS, PubMed и ВИНТИ РАН. Полнотекстовые статьи журнала доступны через БД EBSCO.

**GMN: Georgian Medical News** – საქართველოს სამედიცინო სიახლენი – არის ყოველთვიური სამეცნიერო სამედიცინო რეცენზირებადი ჟურნალი, გამოიცემა 1994 წლიდან, წარმოადგენს სარედაქციო კოლეგიისა და აშშ-ის მეცნიერების, განათლების, ინდუსტრიის, ხელოვნებისა და ბუნებისმეტყველების საერთაშორისო აკადემიის ერთობლივ გამოცემას. GMN-ში რუსულ და ინგლისურ ენებზე ქვეყნდება ექსპერიმენტული, თეორიული და პრაქტიკული ხასიათის ორიგინალური სამეცნიერო სტატიები მედიცინის, ბიოლოგიისა და ფარმაციის სფეროში, მიმოხილვითი ხასიათის სტატიები.

ჟურნალი ინდექსირებულია MEDLINE-ის საერთაშორისო სისტემაში, ასახულია SCOPUS-ის, PubMed-ის და ВИНТИ РАН-ის მონაცემთა ბაზებში. სტატიების სრული ტექსტი ხელმისაწვდომია EBSCO-ს მონაცემთა ბაზებიდან.

### WEBSITE

[www.geomednews.com](http://www.geomednews.com)

## К СВЕДЕНИЮ АВТОРОВ!

При направлении статьи в редакцию необходимо соблюдать следующие правила:

1. Статья должна быть представлена в двух экземплярах, на русском или английском языках, напечатанная через **полтора интервала на одной стороне стандартного листа с шириной левого поля в три сантиметра**. Используемый компьютерный шрифт для текста на русском и английском языках - **Times New Roman (Кириллица)**, для текста на грузинском языке следует использовать **AcadNusx**. Размер шрифта - **12**. К рукописи, напечатанной на компьютере, должен быть приложен CD со статьей.

2. Размер статьи должен быть не менее десяти и не более двадцати страниц машинописи, включая указатель литературы и резюме на английском, русском и грузинском языках.

3. В статье должны быть освещены актуальность данного материала, методы и результаты исследования и их обсуждение.

При представлении в печать научных экспериментальных работ авторы должны указывать вид и количество экспериментальных животных, применявшиеся методы обезболивания и усыпления (в ходе острых опытов).

4. К статье должны быть приложены краткое (на полстраницы) резюме на английском, русском и грузинском языках (включающее следующие разделы: цель исследования, материал и методы, результаты и заключение) и список ключевых слов (key words).

5. Таблицы необходимо представлять в печатной форме. Фотокопии не принимаются. **Все цифровые, итоговые и процентные данные в таблицах должны соответствовать таковым в тексте статьи**. Таблицы и графики должны быть озаглавлены.

6. Фотографии должны быть контрастными, фотокопии с рентгенограмм - в позитивном изображении. Рисунки, чертежи и диаграммы следует озаглавить, пронумеровать и вставить в соответствующее место текста **в tiff формате**.

В подписях к микрофотографиям следует указывать степень увеличения через окуляр или объектив и метод окраски или импрегнации срезов.

7. Фамилии отечественных авторов приводятся в оригинальной транскрипции.

8. При оформлении и направлении статей в журнал МНГ просим авторов соблюдать правила, изложенные в «Единых требованиях к рукописям, представляемым в биомедицинские журналы», принятых Международным комитетом редакторов медицинских журналов - <http://www.spinesurgery.ru/files/publish.pdf> и [http://www.nlm.nih.gov/bsd/uniform\\_requirements.html](http://www.nlm.nih.gov/bsd/uniform_requirements.html) В конце каждой оригинальной статьи приводится библиографический список. В список литературы включаются все материалы, на которые имеются ссылки в тексте. Список составляется в алфавитном порядке и нумеруется. Литературный источник приводится на языке оригинала. В списке литературы сначала приводятся работы, написанные знаками грузинского алфавита, затем кириллицей и латиницей. Ссылки на цитируемые работы в тексте статьи даются в квадратных скобках в виде номера, соответствующего номеру данной работы в списке литературы. Большинство цитированных источников должны быть за последние 5-7 лет.

9. Для получения права на публикацию статья должна иметь от руководителя работы или учреждения визу и сопроводительное отношение, написанные или напечатанные на бланке и заверенные подписью и печатью.

10. В конце статьи должны быть подписи всех авторов, полностью приведены их фамилии, имена и отчества, указаны служебный и домашний номера телефонов и адреса или иные координаты. Количество авторов (соавторов) не должно превышать пяти человек.

11. Редакция оставляет за собой право сокращать и исправлять статьи. Корректур авторам не высылаются, вся работа и сверка проводится по авторскому оригиналу.

12. Недопустимо направление в редакцию работ, представленных к печати в иных издательствах или опубликованных в других изданиях.

**При нарушении указанных правил статьи не рассматриваются.**

## REQUIREMENTS

Please note, materials submitted to the Editorial Office Staff are supposed to meet the following requirements:

1. Articles must be provided with a double copy, in English or Russian languages and typed or computer-printed on a single side of standard typing paper, with the left margin of 3 centimeters width, and 1.5 spacing between the lines, typeface - **Times New Roman (Cyrillic)**, print size - 12 (referring to Georgian and Russian materials). With computer-printed texts please enclose a CD carrying the same file titled with Latin symbols.

2. Size of the article, including index and resume in English, Russian and Georgian languages must be at least 10 pages and not exceed the limit of 20 pages of typed or computer-printed text.

3. Submitted material must include a coverage of a topical subject, research methods, results, and review.

Authors of the scientific-research works must indicate the number of experimental biological species drawn in, list the employed methods of anesthetization and soporific means used during acute tests.

4. Articles must have a short (half page) abstract in English, Russian and Georgian (including the following sections: aim of study, material and methods, results and conclusions) and a list of key words.

5. Tables must be presented in an original typed or computer-printed form, instead of a photocopied version. **Numbers, totals, percentile data on the tables must coincide with those in the texts of the articles.** Tables and graphs must be headed.

6. Photographs are required to be contrasted and must be submitted with doubles. Please number each photograph with a pencil on its back, indicate author's name, title of the article (short version), and mark out its top and bottom parts. Drawings must be accurate, drafts and diagrams drawn in Indian ink (or black ink). Photocopies of the X-ray photographs must be presented in a positive image in **tiff format**.

Accurately numbered subtitles for each illustration must be listed on a separate sheet of paper. In the subtitles for the microphotographs please indicate the ocular and objective lens magnification power, method of coloring or impregnation of the microscopic sections (preparations).

7. Please indicate last names, first and middle initials of the native authors, present names and initials of the foreign authors in the transcription of the original language, enclose in parenthesis corresponding number under which the author is listed in the reference materials.

8. Please follow guidance offered to authors by The International Committee of Medical Journal Editors guidance in its Uniform Requirements for Manuscripts Submitted to Biomedical Journals publication available online at: [http://www.nlm.nih.gov/bsd/uniform\\_requirements.html](http://www.nlm.nih.gov/bsd/uniform_requirements.html)  
[http://www.icmje.org/urm\\_full.pdf](http://www.icmje.org/urm_full.pdf)

In GMN style for each work cited in the text, a bibliographic reference is given, and this is located at the end of the article under the title "References". All references cited in the text must be listed. The list of references should be arranged alphabetically and then numbered. References are numbered in the text [numbers in square brackets] and in the reference list and numbers are repeated throughout the text as needed. The bibliographic description is given in the language of publication (citations in Georgian script are followed by Cyrillic and Latin).

9. To obtain the rights of publication articles must be accompanied by a visa from the project instructor or the establishment, where the work has been performed, and a reference letter, both written or typed on a special signed form, certified by a stamp or a seal.

10. Articles must be signed by all of the authors at the end, and they must be provided with a list of full names, office and home phone numbers and addresses or other non-office locations where the authors could be reached. The number of the authors (co-authors) must not exceed the limit of 5 people.

11. Editorial Staff reserves the rights to cut down in size and correct the articles. Proof-sheets are not sent out to the authors. The entire editorial and collation work is performed according to the author's original text.

12. Sending in the works that have already been assigned to the press by other Editorial Staffs or have been printed by other publishers is not permissible.

**Articles that Fail to Meet the Aforementioned  
Requirements are not Assigned to be Reviewed.**

## ავტორთა საქურაღებოლ!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დაიცვათ შემდეგი წესები:

1. სტატია უნდა წარმოადგინოთ 2 ცალად, რუსულ ან ინგლისურ ენებზე დაბეჭდილი სტანდარტული ფურცლის 1 გვერდზე, 3 სმ სიგანის მარცხენა ველისა და სტრიქონებს შორის 1,5 ინტერვალის დაცვით. გამოყენებული კომპიუტერული შრიფტი რუსულ და ინგლისურენოვან ტექსტებში - **Times New Roman (Кириллица)**, ხოლო ქართულენოვან ტექსტში საჭიროა გამოვიყენოთ **AcadNusx**. შრიფტის ზომა – 12. სტატიას თან უნდა ახლდეს CD სტატიით.

2. სტატიის მოცულობა არ უნდა შეადგენდეს 10 გვერდზე ნაკლებს და 20 გვერდზე მეტს ლიტერატურის სიის და რეზიუმეების (ინგლისურ, რუსულ და ქართულ ენებზე) ჩათვლით.

3. სტატიაში საჭიროა გაშუქდეს: საკითხის აქტუალობა; კვლევის მიზანი; საკვლევი მასალა და გამოყენებული მეთოდები; მიღებული შედეგები და მათი განსჯა. ექსპერიმენტული ხასიათის სტატიების წარმოდგენისას ავტორებმა უნდა მიუთითონ საექსპერიმენტო ცხოველების სახეობა და რაოდენობა; გაუტკივარებისა და დაძინების მეთოდები (მწვავე ცდების პირობებში).

4. სტატიას თან უნდა ახლდეს რეზიუმე ინგლისურ, რუსულ და ქართულ ენებზე არანაკლებ ნახევარი გვერდის მოცულობისა (სათაურის, ავტორების, დაწესებულების მითითებით და უნდა შეიცავდეს შემდეგ განყოფილებებს: მიზანი, მასალა და მეთოდები, შედეგები და დასკვნები; ტექსტუალური ნაწილი არ უნდა იყოს 15 სტრიქონზე ნაკლები) და საკვანძო სიტყვების ჩამონათვალი (key words).

5. ცხრილები საჭიროა წარმოადგინოთ ნაბეჭდი სახით. ყველა ციფრული, შემაჯამებელი და პროცენტული მონაცემები უნდა შეესაბამებოდეს ტექსტში მოყვანილს.

6. ფოტოსურათები უნდა იყოს კონტრასტული; სურათები, ნახაზები, დიაგრამები - დასათაურებული, დანომრილი და სათანადო ადგილას ჩასმული. რენტგენოგრამების ფოტოასლები წარმოადგინეთ პოზიტიური გამოსახულებით **tiff** ფორმატში. მიკროფოტოსურათების წარწერებში საჭიროა მიუთითოთ ოკულარის ან ობიექტივის საშუალებით გადიდების ხარისხი, ანათალების შედეგის ან იმპრეგნაციის მეთოდი და აღნიშნოთ სურათის ზედა და ქვედა ნაწილები.

7. სამამულო ავტორების გვარები სტატიაში აღინიშნება ინიციალების თანდართვით, უცხოურისა – უცხოური ტრანსკრიპციით.

8. სტატიას თან უნდა ახლდეს ავტორის მიერ გამოყენებული სამამულო და უცხოური შრომების ბიბლიოგრაფიული სია (ბოლო 5-8 წლის სიღრმით). ანბანური წყობით წარმოდგენილ ბიბლიოგრაფიულ სიაში მიუთითეთ ჯერ სამამულო, შემდეგ უცხოელი ავტორები (გვარი, ინიციალები, სტატიის სათაური, ჟურნალის დასახელება, გამოცემის ადგილი, წელი, ჟურნალის №, პირველი და ბოლო გვერდები). მონოგრაფიის შემთხვევაში მიუთითეთ გამოცემის წელი, ადგილი და გვერდების საერთო რაოდენობა. ტექსტში კვადრატულ ფხიხლებში უნდა მიუთითოთ ავტორის შესაბამისი N ლიტერატურის სიის მიხედვით. მიზანშეწონილია, რომ ციტირებული წყაროების უმეტესი ნაწილი იყოს 5-6 წლის სიღრმის.

9. სტატიას თან უნდა ახლდეს: ა) დაწესებულების ან სამეცნიერო ხელმძღვანელის წარდგინება, დამოწმებული ხელმოწერითა და ბეჭდით; ბ) დარგის სპეციალისტის დამოწმებული რეცენზია, რომელშიც მითითებული იქნება საკითხის აქტუალობა, მასალის საკმაობა, მეთოდის სანდოობა, შედეგების სამეცნიერო-პრაქტიკული მნიშვნელობა.

10. სტატიის ბოლოს საჭიროა ყველა ავტორის ხელმოწერა, რომელთა რაოდენობა არ უნდა აღემატებოდეს 5-ს.

11. რედაქცია იტოვებს უფლებას შეასწოროს სტატია. ტექსტზე მუშაობა და შეჯერება ხდება საავტორო ორიგინალის მიხედვით.

12. დაუშვებელია რედაქციაში ისეთი სტატიის წარდგენა, რომელიც დასაბეჭდად წარდგენილი იყო სხვა რედაქციაში ან გამოქვეყნებული იყო სხვა გამოცემებში.

აღნიშნული წესების დარღვევის შემთხვევაში სტატიები არ განიხილება.

Ahmad Ali Alrasheedi. THE PREVALENCE OF COVID-19 IN THE COUNTRIES OF THE GULF COOPERATION COUNCIL: AN EXAMINATION AFTER THREE YEARS.....	6-12
Kordeva S, Cardoso JC, Tchernev G. MULTIFOCAL FIXED DRUG ERUPTION MIMICKING ACQUIRED DERMAL MELANOCYTOSIS.....	13-16
Oksana Matsyura, Lesya Besh, Zoryana Slyuzar, Olena Borysiuk, Olesia Besh, Taras Gutor. ARTIFICIAL VENTILATION OF THE LUNGS IN THE NEONATAL PERIOD: LONG-TERM OUTCOMES.....	17-21
Tchernev G, Kordeva S, Lozev I. METATYPICAL BCCS OF THE NOSE TREATED SUCCESSFULLY VIA BILOBED TRANSPOSITION FLAP: NITROSAMINES IN ACES (ENALAPRIL), ARBS (LOSARTAN) AS POSSIBLE SKIN CANCER KEY TRIGGERING FACTOR.....	22-25
Zahraa M Alzubaidi, Wafaa M. A. Al-attar. NURSES' KNOWLEDGE ABOUT HEPATITIS C VIRUS IN BAGHDAD TEACHING HOSPITALS: A CROSS-SECTIONAL STUDY.....	26-31
Theresa Semmelmann, Alexander Schuh, Horst Rottmann, Reinhard Schröder, Christopher Fleischmann, Stefan Sesselmann. HOW TO AVOID FRACTURE OF THE LOCKING SCREW IN MODULAR REVISION ARTHROPLASTY OF THE HIP USING THE MRP TITAN REVISION SYSTEM.....	32-35
Siranush Mkrtychyan, Razmik Dunamalyan, Ganna Sakanyan, Hasmik Varuzhanyan, Sona Hambardzumyan, Marine Mardiyan. EFFECT OF CHRONIC PERIODONTITIS ON HEALTH-RELATED QUALITY OF LIFE AND ANXIETY AMONG PATIENTS IN YEREVAN, ARMENIA.....	36-40
Raghad O Aldabbagh, Marwah abdulmelik Alshorbaji, Yahya Mohammed Alsabbagh. THE PHYSICAL AND PSYCHOLOGICAL EFFECTS OF MOBILE GAMES ON CHILDREN IN MOSUL/IRAQ.....	41-45
Bukia N.G., Butskhrikidze M.P., Machavariani L.P., Svanidze M.J., Nozadze T.N. ELECTRIC-MAGNETIC STIMULATION PREVENTS STRESS-INDUCED DETERIORATION OF SPATIAL MEMORY.....	46-53
Marko Kozyk, Adam Wahl, Kateryna Strubchevska, Kolosova Iryna, Shatorna Vira. CHRONIC EFFECTS OF CADMIUM CHLORIDE ON RAT EMBRYOGENESIS.....	54-59
Labeeb H. Alsadoon, Kassim Salih Abdullah. COMPARATIVE EFFECT OF INSULIN, GLIMEPIRIDE, AND METFORMIN ON INFLAMMATORY MARKERS IN TYPE 2 DIABETES MELLITUS.....	60-63
Miloslav Doul, Philipp Koehl, Marcel Betsch, Stefan Sesselmann, Alexander Schuh. RETURN TO SPORT AFTER SURGICAL TREATED TIBIAL PLATEAU FRACTURES.....	64-68
Zaid Saaduldeen Khudhur, Uday Hani Mohammad, Nooman Hadi Saeed. HAEMATOSPERMIA: CAUSES AND ASSOCIATED CHANGES IN SEMEN ANALYSIS IN NORTH OF IRAQ.....	69-72
Prots H, Rozhko M, Paliichuk I, Nychyporchuk H, Prots I. STUDY OF BONE RESORPTION AS A RISK FACTOR IN DENTAL IMPLANTATION IN PATIENTS WITH GENERALIZED PERIODONTITIS.....	73-78
Teimuraz Lezhava, Tinatin Jokhadze, Jamlet Monaselidze, Tamar Buadze, Maia Gaiozishvili, Tamar Sigua, Inga Khujadze, Ketevan Gogidze, Nano Mikaia, Nino Chigvinadze. EPIGENETIC MODIFICATION UNDER THE INFLUENCE OF PEPTIDE BIOREGULATORS ON THE "OLD" CHROMATIN.....	79-83
Mudrenko I.G., Kolenko O.I., Kiptenko L.I., Lychko V.S., Sotnikov D.D., Yurchenko O.P. THE PROGRAM OF THE COMPLEX DIFFERENTIATED MEDICAL AND PSYCHOLOGICAL REHABILITATION OF THE PATIENTS WITH SUICIDAL BEHAVIOUR IN DEMENTIA.....	84-89
Tchernev G, Kordeva S. MULTIPLE BCCS AND DYSPLASTIC NEVI AFTER ACE INHIBITORS (ENALAPRIL/PERINDOPRIL): THE ROLE OF NITROSAMINE CONTAMINATION/AVAILABILITY AS SUBSTANTIAL SKIN CANCER TRIGGERING FACTOR.....	90-94
Lyazzat T. Yeraliyeva, Assiya M. Issayeva. CHANGES IN DEATH RATES FROM LOWER RESPIRATORY INFECTIONS BETWEEN 1991 AND 2019 IN THE REPUBLIC OF KAZAKHSTAN.....	95-98
Rocco De Vitis, Marco Passiatore, Giovanni Barchetti, Isabella Ceravolo, Luigi M. Larocca, Marta Starnoni, Francesco Federico, Federica Castri, Giuseppe Taccardo. PATTERN OF A PRIMARY B-CELL LYMPHOMA IN ULNAR NERVE: INTRANEURAL OR EXTRANEURAL.....	99-103
Bazargaliyev Ye, Makashova M, Kudabayeva Kh, Kosmuratova R. EPIDEMIOLOGY OF GENES ASSOCIATED WITH OBESITY IN ASIAN POPULATION. LITERATURE REVIEW.....	104-110

Samsonia M.D, Kandelaki M.A, Baratashvili N.G, Gvaramia L.G. NEUROPROTECTIVE AND ANTIOXIDANT POTENTIAL OF MONTELUKAST-ACETYLCYSTEINE COMBINATION THERAPY FOR BRAIN PROTECTION IN PATIENTS WITH COVID-19 INDUCED PNEUMONIA.....	111-118
Condé Kaba, Carlos Othon Guelngar, Barry Souleymane Digué, Keita Karinka, Diallo Mamadou Hady, Keita Fatoumata Binta, Cissé Fodé Abass. ALZHEIMER’S DISEASE, AN ASSOCIATION OR A COMPLICATION OF PAGET’S DISEASE? STUDY OF AN OBSERVATION IN GUINEA.....	119-120
Condé Kaba, Keita Karinka, Carlos Othon Guelngar, Diallo Mamadou Hady, Keita Fatoumata Binta, Cissé Fodé Abass. CLINICAL AND IMAGING ASPECTS OF TALAR OSTEOCHONDRITIS: A CASE REPORT FROM GUINEA.....	121-123
Fishchenko Iakiv, Kravchuk Lyudmila, Kormiltsev Volodymyr, Saponenko Andrey, Kozak Roman. THE USE OF RADIOFREQUENCY NEUROABLATION IN THE TREATMENT OF OMALGIA IN PATIENTS WITH SHOULDER JOINT ARTHROSIS.....	124-128
V.V. Talash, I.P. Katerenchuk, Iu.A. Kostrikova, T.I. Yarmola, G.L. Pustovoit, L.A. Tkachenko. TERATOMAL NEOPLASMS OF THE PERICARD: THE PROBLEM AND REALITIES (CLINICAL CASE).....	129-136

## ARTIFICIAL VENTILATION OF THE LUNGS IN THE NEONATAL PERIOD: LONG-TERM OUTCOMES

Oksana Matsyura<sup>1,4</sup>, Lesya Besh<sup>1,4</sup>, Zoryana Slyuzar<sup>1</sup>, Olena Borysiuk<sup>1</sup>, Olesia Besh<sup>2</sup>, Taras Gutor<sup>3</sup>.

<sup>1</sup>Department of Pediatrics №2, Danylo Halytsky Lviv National Medical University, Ukraine.

<sup>2</sup>Department of Internal medicine №2, Danylo Halytsky Lviv National Medical University, Ukraine.

<sup>3</sup>Department of Public Health Management, Danylo Halytsky Lviv National Medical University, Lviv, Ukraine.

<sup>4</sup>Municipal Non-profit Organization "Lviv Territorial Medical Union, Multidisciplinary Clinical Hospital of Emergency and Intensive Care (First Lviv Territorial Medical Union)", Separated Subdivision of St. Nicholas Hospital (Children's Hospital), Lviv, Ukraine.

### Abstract.

It is observed a correlation between the administration of artificial ventilation in the neonatal period and the subsequent formation of bronchopulmonary pathology.

**Aim:** To study the frequency and the features of the course of broncho-pulmonary pathology in young children who were on artificial ventilation of the lungs in the neonatal period.

**Materials and methods:** The directions of the selection of medical histories were conducted, which was carried out by artificial ventilation of the lungs for pulmonary causes. The article presents the literature data and own experience of authors, which proves that there is a correlation between the conducted artificial ventilation of the lungs in the neonatal period and the subsequent formation of bronchopulmonary pathology.

**Results:** The results of a retrospective analysis of 475 children who received respiratory therapy are shown. It is a positive correlation is observed between the duration of artificial ventilation and the incidence of bronchitis ( $p < 0.005$ ) and pneumonia ( $p < 0.005$ ). There is a close correlation between the early introduction of artificial feeding and the development of allergies. We found a positive correlation between the presence of allergic pathology and hereditary predisposition to the development of atopy, gestational age and the development of bronchopulmonary dysplasia.

**Conclusions:** In 27% of children who stayed on artificial ventilation during the neonatal period, there was a recurrent broncho-obstructive syndrome in early childhood. Premature children who have undergone acute pulmonary disorder and hereditary burdens should be considered as a high-risk group for developing bronchial asthma. Repeated episodes of broncho-obstructive syndrome in young children, who during the neonatal period were on artificial ventilation of the lungs, were most often due to bronchial asthma, which was characterized by a severe course.

**Key words.** Respiratory therapy, artificial ventilation of lungs, neonatal period, long-term outcomes, bronchopulmonary pathology.

### Introduction.

The incidence of premature has been increased all over the world [1,2]. In this situation more often children need artificial ventilation of the lungs (AVL) and form risk group for recurrent and chronic bronchopulmonary pathology development [3].

Interconnection of prematurity – acute pulmonary disorders – the further formation of bronchopulmonary disease is no longer in doubt. It is observed a correlation between the administration

of artificial ventilation in the neonatal period and the subsequent formation of bronchopulmonary pathology [4].

Our studies have shown that in the case of developing bronchial asthma in a child born prematurely and suffering from acute pulmonary disorders in the period of newborn birth, the risk of developing a severe variant of the disease is extremely high [5]. The obtained data showed that asthma in such children is characterized by a severe course, often the so-called variant "difficult asthma" (with frequent exacerbations in the form of an asthmatic condition) is often observed [6,7]. We have been followed up 27 children with bronchial asthma, whom after birth prolonged ventilation (more than 7 days) was performed due to pulmonary sickness. The course of asthma in these children is characterized by frequent exacerbations and prescription of high doses of  $\beta_2$ -agonists and hormonal drugs. This cohort of patients requires special care both on the part of parents and nursing staff.

The reason should be sought, analyzing the features of the ante and perinatal period of the child's development [8,9]. Frequent causes of miscarriage are inflammatory processes of diverse nature and etiology. In the process of inflammation, the number of cytokines, oxidants, and lytic enzymes increases in the mother's body. In immature children, control over the inflammation process is inadequate [2,10]. Low levels of antioxidants, antiprotease and anti-inflammatory cytokines can negatively affect the balance between inflammatory and anti-inflammatory cytokines, which in turn causes persistent inflammatory reaction and damage [3,11]. Chronic inflammation causes hyperreactivity of the respiratory tract, which cannot but affect the development and progress of bronchial asthma in the future [6,12]. It is precisely this situation that determined the relevance and purpose of our study.

**Aim** is to study the frequency and the features of the course of broncho-pulmonary pathology in young children who were on artificial ventilation of the lungs in the neonatal period.

### Materials and Methods.

Subjects for retrospective analysis: age <1-month; mechanically ventilated; not having suspected metabolic disorders or congenital anomalies; excluding postoperative patients.

On the start of the investigation was performed retrospective analysis of medical records. 624 history cases with artificial ventilation during the neonatal period were selected.

475 of history cases indicated pulmonary causes of ventilation and for this group of children questionnaires were sent via



**Table 1.** Formation of study groups.

Group	Duaration of artificial pulmonary ventilation (hours)	Number of respondents (n)
I	till 72	252
II	72 – 120	138
III	120 – 150	33
IV	more than 150	52

post. Anamnestic data were recorded by parents in a specially designed questionnaire to provide information on the state of health of the child from birth to the present time.

The proposed questionnaire design made it possible to control the evaluation and, in the event of a discrepancy, the survey questionnaire was withdrawn.

Finally, the answers were received from 201 respondents (42% of the total number of sent questionnaires). We analyzed the children’s health under 3 years old who had undergone artificial ventilation of the lungs for pulmonary causes during the neonatal period.

For the analysis of personal data, based on the indicators of the duration of artificial ventilation, 4 groups of research were formed. In each group, the following indicators were analyzed: the nature of breastfeeding infants; physical development; peculiarities of life and mode of physical activity; prophylactic vaccinations; burden of family history (bronchopulmonary pathology, atopy); manifestations of atopy in a child (detailed description of occurrence and duration of symptoms, provocative factors); the frequency and nature of respiratory pathology; the volume of treatment for respiratory pathology; the presence of health problems from birth to the time of the survey. When analyzing the questionnaires, the child's state of health was taken into account.

A correlative analysis was conducted between the influence of various factors and the development of bronchopulmonary pathology in children. The evaluation was carried out using StatSoft Inc. STATISTICA 6.0 application package (USA). The connection of the attributes is evaluated by the nonparametric Spearman’s method.

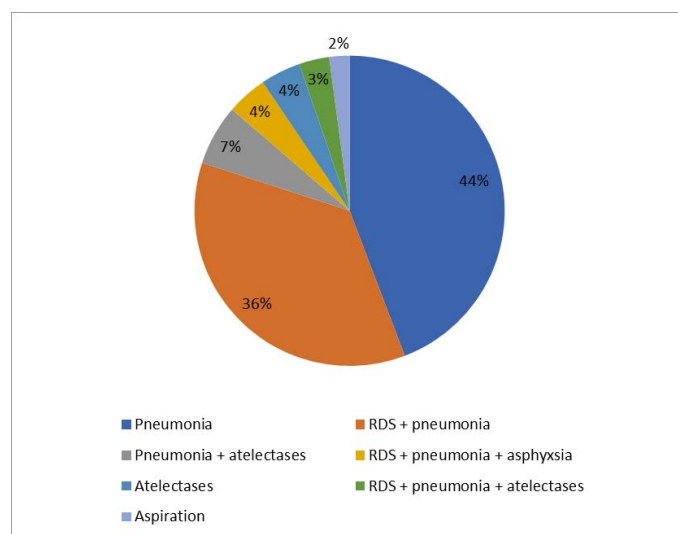
Evaluating the following indicators: duration of ventilation; morbidity of bronchitis; morbidity of pneumonia; allergic diseases of the child; hereditary predisposition to allergies; early onset of artificial feeding; physical development; development of bronchopulmonary dysplasia; birth from multiple pregnancy; application of surfactant; antenatal prophylaxis of bronchopulmonary pathology; the term of gestation at birth; vaccination.

Ethical Committee or Institutional Animal Care and Use Committee Approval in Danylo Halytsky Lviv National Medical University 20/12/2010 № 10; Nonprofit Communal Enterprise “City Children’s Clinical Hospital of Lviv”; 16.Nov.2018 № 6.

**Results.**

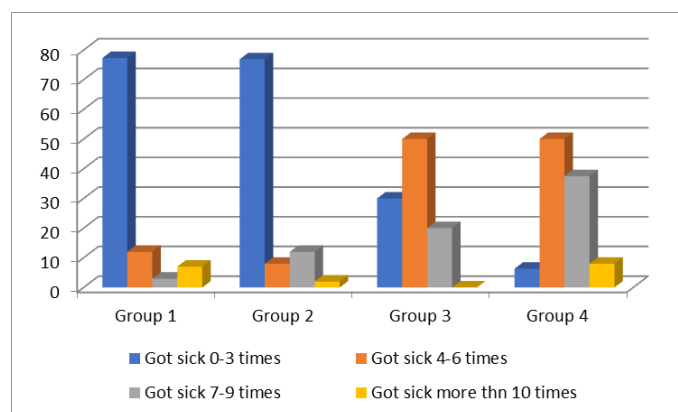
The leading role among the causes of artificial ventilation was occupied by pneumonia (42%). 34% - respiratory distress syndrome (RDS) + pneumonia. Pneumonia and atelectasis – 6%. According to the literature, the primary reason for conducting artificial ventilation is the RDS. Our analysis showed that RDS,

as a separate demonstration of ventilation, was recorded in 1.4% of cases. The RDS met among the complex reasons for carrying out artificial ventilation, amounting to 44.3% (Figure 1).



**Figure 1.** Structure of nosologies that became the cause of mechanical ventilation.

89.7% (426) of children were born prematurely. 16% (76) of children who were on artificial ventilation were born with multiple pregnancy. 6.9% (33) introduced an exogenous surfactant. 24% (114) of pregnant women had antenatal steroid prophylaxis.



**Figure 2.** The incidence of bronchitis in the research group.

For a detailed study of the incidence of bronchopulmonary pathology, all respondents were divided into 4 groups, depending on the duration of artificial ventilation.

Particular attention was paid to the nature of broncho-pulmonary pathology in children and the incidence rate of disorders during the first 3 years of life (Figure 2 and Figure 3). An analysis of the frequency of bronchitis during the first three years of life has shown that 77.3% of children in group I having bronchitis were ill (the largest indicator compared to other groups), in group II – 76.9%, the proportion of such children in groups III and IV was significantly lower (30% and 6.3% respectively). The

number of children suffering from bronchitis is 4 to 6 times the same in groups III and IV (50%). At the same time, 37.5% of respondents in Group IV, bronchitis was diagnosed 7 – 9 times, and 6.3% - more than 10 times. Thus, the recurrent respiratory pathology is found in all groups, but the highest frequency is concentrated in Groups III and IV. Bronchitis in these groups was associated with severe obstructive syndrome: parents often pointed to the shortness of breath and wheezing.

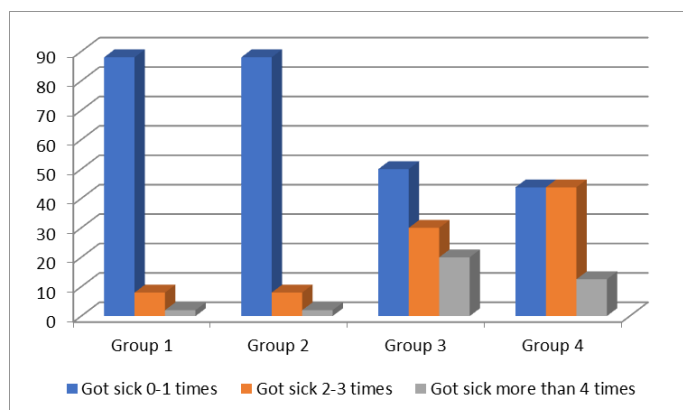


Figure 3. The incidence of pneumonia.

During the first three years of life, they did not suffer from pneumonia, or got sick for 1 time from 43.8% (Group IV) to 88% (Group I) of respondents. The largest number of children who were 2 to 3 years old were found in group IV – 43.8%. In the third group, the figure shows 30%. The incidence of pneumonia more than 4 times was observed in the third group – 20%, in the IV group – 12,5%. As we can see, the largest proportion of children who suffered from pneumonia 1 time in their lifetime, or not ill at all, is concentrated in I – II groups, however, frequent diseases of pneumonia are observed in children of III and IV groups.

Analyzing the anamnestic data, the structural distribution of recurrent broncho-pulmonary pathology according to age was established (Figure 4).

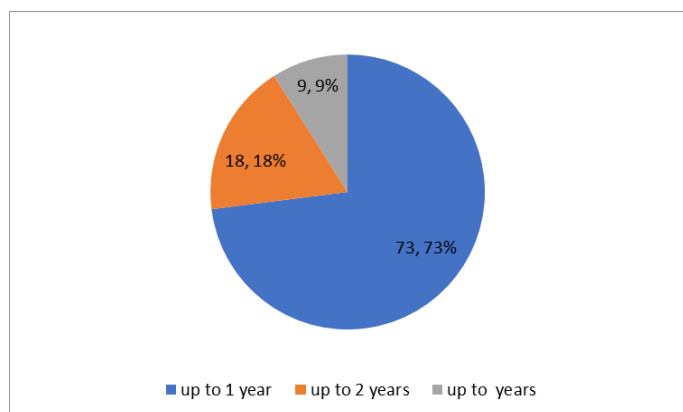


Figure 4. Structural distribution of recurrent bronchopulmonary disease by age.

Consequently, in the group of children who continued to be on artificial ventilation, broncho-pulmonary pathology was more often observed. The largest proportion of children suffering from relapsing bronchopulmonary pathology falls on the first year of life.

According to parents, almost 40% of children were healthy. In the structure of the pathology, the most common (27%) were pulmonary diseases, neurological diseases (cerebral palsy, seizures, hypersensitivity, hydrocephalus, frequent headaches, speech disorders) – 12%. 9% were ear, nose, and throat problems (ENT) and ophthalmologic pathologies (chronic tonsillitis, otitis, adenoiditis, sinusitis, sensory loss of hearing; reduced visual acuity, strabismus, congenital visual impairment, cataract, astigmatism). Among other types of pathology were registered allergic, gastroenterological, nephrological, cardiovascular problems.

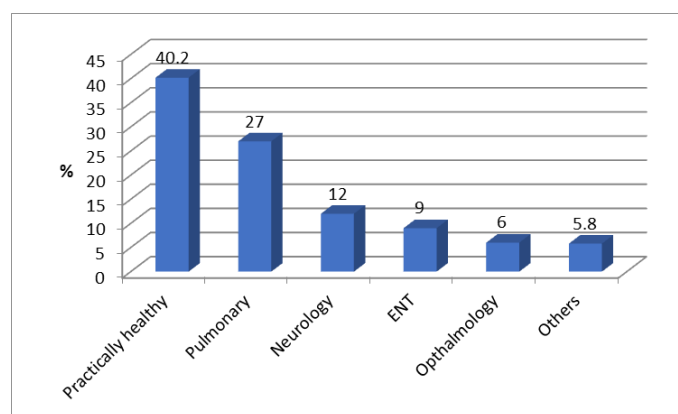


Figure 5. Structure of morbidity in the group of children under study disease.

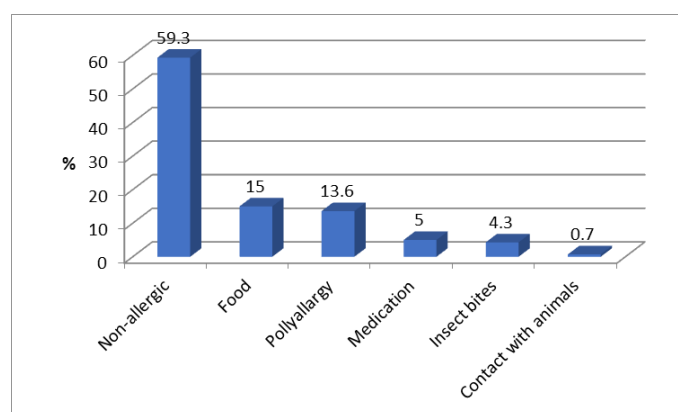


Figure 6. Manifestations of atopy in children.

Physical development of children is regarded by parents as "good" in 86% of cases. "Violation" (behind the peers) – 14%, which is mainly due to (10%) a substantiated health problem.

In 59,3% of children, allergic pathology was not revealed. Food allergy was observed in 15% of children. Often in the role of allergens there were citrus, honey, cocoa, fish. Polyallergy was detected in 13.6% of respondents. The combination of food and drug allergy was most often recorded. Medicinal

allergy was observed in 5%. Response to insect bites (mainly mosquitoes) – 4.3%.

Analyzing the data of the anamnesis, we found the following incidence of atopic pathology in children (Figure 6).

The family history was not burdened with 67% of respondents. Allergic pathology in families was observed in 27.9% (food allergy, asthmatic bronchitis, bronchial asthma, allergic rhinosinusopathy, pollinosis, urticaria, drug allergy, allergy to insect bites). Heart disease was 15%, endocrinology – 7,1%. In the category of "other" diseases included gastroenterological, pulmonary, nephrology, systemic and oncological diseases (Figure 5).

An analysis of the nature of breastfeeding showed that 16.4% were breastfed for only 1 month of life, 28.6% - up to 3 months of life. 48.6% of the respondents were breastfed after reaching 6 months of age.

### Discussion.

The literature review represents the existence of correlation between conduction of continuous respiratory support in neonatal period (artificial ventilation), spontaneous breathing with continuous positive airway pressure, oxygen therapy and further formation of hyperactivity of the airways, which is clinically manifested by recurrent bronchial obstruction [6,11]. The results of our investigation also illustrate a positive correlation between the duration of artificial ventilation and the incidence of bronchitis ( $p < 0.005$ ) and pneumonia ( $p < 0.005$ ). More than 50% of children with prolonged duration of artificial pulmonary ventilation in neonatal period (more than 120 hours) were suffering from recurrent bronchitis 4 to 6 times during the first 3 years of life. At the same time, frequent diseases of pneumonia were observed in children with prolonged ventilation. The incidence of pneumonia more than 4 times was observed in 20% of cases in the third group (120 – 150 hours of ventilation) and in 12,5% of the group IV (more than 150 hours). Bronchitis and pneumonia in these groups were often associated with severe obstructive syndrome.

There is a close correlation between the early introduction of artificial feeding and the development of allergies. We found a positive correlation between the presence of allergic pathology and hereditary predisposition to the development of atopy, gestational age, and the development of bronchopulmonary dysplasia [1,2].

It was not possible to trace a reliable correlation between gestational age and the incidence of bronchitis and pneumonia, as well as the effects of frequent bronchitis on physical development [3,4]. There is a positive correlation between the incidence of pneumonia and the lag in physical development.

### Conclusion.

1. In 27% of children who stayed on artificial ventilation during the neonatal period, there was a recurrent broncho-obstructive syndrome in early childhood.

2. There is a close correlation between the duration of artificial ventilation and the frequency of relapsing broncho-obstructive syndrome ( $p < 0.005$ ).

3. Premature children who have undergone acute pulmonary disorder and hereditary burdens should be considered as a high-risk group for developing bronchial asthma.

4. Repeated episodes of broncho-obstructive syndrome in young children, who during the neonatal period were on artificial ventilation of the lungs, were most often due to bronchial asthma, which was characterized by a severe course.

### Acknowledgments.

We are grateful to the children and their parents for participating in the study.

### Conflict of interest.

The authors have no conflict of interests to disclose.

### REFERENCES

1. Matsyura O, Besh L, Besh O, et al. Hypersensitivity reactions to food additives in pediatric practice: two clinical cases. Georgian medical news. 2020;307:91-95.
2. Matsyura O, Besh L, Zubchenko S, et al. Analysis of causative factors of recurrent bronchial obstruction syndrome in young children. Georgian Med News. 2021;320:59-64.
3. Committee on Fetus and Newborn. Respiratory support in preterm infants at birth. Pediatrics. 2014;133:171-174.
4. Matsyura O, Besh L, Borysiuk O, et al. Food Hypersensitivity in Children Aged 0-3 Years of the Lviv Region in Ukraine: A Cross-Sectional Study. Front Pediatr. 2022;9:800331.
5. Richard E. Validation of the National Institutes of Health Consensus Definition of Bronchopulmonary Dysplasia. Pediatrics. 2005;116:1353-1360.
6. Henderson J, Sherriff A, Farrow A, et al. Household chemicals, persistent wheezing, and lung function: effect modification by atopy? European Respiratory Journal. 2008;31:547-554.
7. Menshykova AO, Dobryansky DO, Salabay ZV, et al. Choosing the type of respiratory support for preterm infants after extubation: noninvasive ventilation versus continuous positive airway pressure. Sovremennaya pediatriya. 2016;4:91-96.
8. Besh LV, Fus SV, Matyura OI, et al. Individual adjustment of dietary plan in children with different forms of allergy. Sovremennaya pediatriya. 2017;7:64-69.
9. Force AD. Acute respiratory distress syndrome. JAMA. 2012;307:2526-2533.
10. Rabi Y, Lodha A, Soraisham A, et al. Outcomes of preterm infants following the introduction of room air resuscitation. 2015;96:252-259.
11. Nair V, Loganathan P, Soraisham AS. Azithromycin, and other macrolides for prevention of bronchopulmonary dysplasia: A systematic review and meta-analysis. Neonatology. 2014;106:337-347.
12. Isayama T, Chai-Adisaksoha C, McDonald SD. Noninvasive ventilation with vs without early surfactant to prevent chronic lung disease in preterm infants: a systematic review and meta-analysis. JAMA Pediatr. 2015;169: 731-739.

### РЕЗЮМЕ

Мацюра О.<sup>1,4</sup>, Беш Л.<sup>1,4</sup>, Слюзар З.<sup>1</sup>, Борисюк О.<sup>1</sup>, Беш О.<sup>2</sup>, Гутор Т.<sup>1</sup>

<sup>1</sup>Кафедра педиатрии №2, Львовский национальный медицинский университет имени Данила Галицкого;

<sup>2</sup> Кафедра внутренних болезней №2, Львовский национальный медицинский университет имени Данила Галицкого;

<sup>3</sup>Кафедра управления общественным здравоохранением, Львовский национальный медицинский университет имени Данила Галицкого, Львов, Украина;

<sup>4</sup>Муниципальная некоммерческая организация «Львовское территориальное медицинское объединение, Многопрофильная клиническая больница скорой и интенсивной терапии (Первое Львовское территориальное медицинское объединение)», Обособленное подразделение „Детская больница Святого Николая”, г. Львов; Украина  
Наблюдается корреляция между назначением искусственной вентиляции легких в неонатальном периоде и последующим формированием бронхолегочной патологии.

**Цель** – изучить частоту и особенности течения бронхолегочной патологии у детей раннего возраста, находящихся на искусственной вентиляции легких в неонатальном периоде.

**Материалы и методы:** Проводилась направленная подборка историй болезни детей, которым проводилась искусственная вентиляция легких по легочным причинам. В статье представлены данные литературы и собственный опыт авторов, доказывающий наличие взаимосвязи между проводимой искусственной вентиляцией легких в периоде новорожденности и последующим формированием бронхолегочной патологии.

**Результаты.** Приведены результаты ретроспективного

анализа 475 детей, получавших респираторную терапию. Наблюдается положительная корреляция между длительностью искусственной вентиляции легких и частотой бронхитов ( $p < 0,005$ ) и пневмоний ( $p < 0,005$ ). Существует тесная связь между ранним введением искусственного вскармливания и развитием аллергии. Выявлена положительная корреляция между наличием аллергической патологии и наследственной предрасположенностью к развитию атопии, сроком беременности и развитием бронхолегочной дисплазии.

**Выводы.** У 27% детей, находившихся на искусственной вентиляции легких в неонатальном периоде, в раннем детстве имел место рецидивирующий бронхообструктивный синдром. Недоношенных детей, перенесших острое заболевание легких и наследственную отягощенность, следует рассматривать как группу высокого риска развития бронхиальной астмы. Повторные эпизоды бронхообструктивного синдрома у детей раннего возраста, находившихся в неонатальном периоде на искусственной вентиляции легких, чаще всего были обусловлены бронхиальной астмой, которая характеризовалась тяжелым течением.

**Ключевые слова:** респираторная терапия, искусственная вентиляция легких, неонатальный период, отдаленные исходы, бронхолегочная патология.